Maintenance for the Avaya™ S8700 Media Server for Multi-Connect Configurations

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Notice

Every effort was made to ensure that the information in this document was complete and accurate at the time of printing. However, information is subject to change.

Preventing Toll Fraud

"Toll fraud" is the unauthorized use of your telecommunications system by an unauthorized party (for example, a person who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf). Be aware that there may be a risk of toll fraud associated with your system and that, if toll fraud occurs, it can result in substantial additional charges for your telecommunications services.

Avaya Fraud Intervention

If you suspect that you are being victimized by toll fraud and you need technical assistance or support, in the United States and Canada, call the Technical Service Center's Toll Fraud Intervention Hotline at 1-800-643-2353.

How to Get Help

For additional support telephone numbers, go to the Avaya Web site:
http://www.avaya.com/
Click Support. If you are:

- Within the United States, click *Escalation Lists*, which includes escalation phone numbers within the USA.
- Outside the United States, click *Escalation Lists* then click *Global Escalation List*, which includes phone numbers for the regional Centers of Excellence.

Providing Telecommunications Security

Telecommunications security (of voice, data, and/or video communications) is the prevention of any type of intrusion to (that is, either unauthorized or malicious access to or use of) your company's telecommunications equipment by some party.

Your company's "telecommunications equipment" includes both this Avaya product and any other voice/data/video equipment that could be accessed via this Avaya product (that is, "networked equipment").

An "outside party" is anyone who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf. Whereas, a "malicious party" is anyone (including someone who may be otherwise authorized) who accesses your telecommunications equipment with either malicious or mischievous intent.

Such intrusions may be either to/through synchronous (time-multiplexed and/or circuit-based) or asynchronous (character-, message-, or packet-based) equipment or interfaces for reasons of:

- Utilization (of capabilities special to the accessed equipment)
- Theft (such as, of intellectual property, financial assets, or toll-facility access)
- Eavesdropping (privacy invasions to humans)
- Mischief (troubling, but apparently innocuous, tampering)
- Harm (such as harmful tampering, data loss or alteration, regardless of motive or intent)

Be aware that there may be a risk of unauthorized intrusions associated with your system and/or its networked equipment. Also realize that, if such an intrusion should occur, it could result in a variety of losses to your company (including but not limited to, human/data privacy, intellectual property, material assets, financial resources, labor costs, and/or legal costs).

Responsibility for Your Company's Telecommunications Security

The final responsibility for securing both this system and its networked equipment rests with you - Avaya's customer system administrator, your telecommunications peers, and your managers. Base the fulfillment of your responsibility on acquired knowledge and resources from a variety of sources including but not limited to:

- Installation documents
- System administration documents
- Security documents
- Hardware-/software-based security tools
- Shared information between you and your peers
- Telecommunications security experts

To prevent intrusions to your telecommunications equipment, you and your peers should carefully program and configure:

- Your Avaya-provided telecommunications systems and their interfaces
- Your Avaya-provided software applications, as well as their underlying hardware/software platforms and interfaces
- Any other equipment networked to your Avaya products.

Voice Over Internet Protocol (VoIP)

If the equipment supports Voice over Internet Protocol (VoIP) facilities, you may experience certain compromises in performance, reliability and security, even when the equipment performs as warranted. These compromises may become more acute if you fail to follow Avaya's recommendations for configuration, operation and use of the equipment. YOU ACKNOWLEDGE THAT YOU ARE AWARE OF THESE RISKS AND THAT YOU HAVE DETERMINED THEY ARE ACCEPTABLE FOR YOUR APPLICATION OF THE EQUIPMENT. YOU ALSO ACKNOWLEDGE THAT, UNLESS EXPRESSLY PROVIDED IN ANOTHER AGREEMENT, YOU ARE SOLELY RESPONSIBLE FOR (1) ENSURING THAT YOUR NETWORKS AND SYSTEMS ARE ADEQUATELY SECURED AGAINST UNAUTHORIZED INTRUSION AND (2) BACKING UP YOUR DATA AND FILES.

Standards Compliance

Avaya Inc. is not responsible for any radio or television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Avaya Inc. The correction of interference caused by such unauthorized modifications, substitution or attachment will be the responsibility of the user. Pursuant to Part 15 of the Federal Communications Commission (FCC) Rules, the user is cautioned that changes or modifications not expressly approved by Avaya Inc. could void the user's authority to operate this equipment.
The equipment described in this manual complies with standards of the following organizations and laws, as applicable:

- Australian Communications Agency (ACA)
- American National Standards Institute (ANSI)
- Canadian Standards Association (CSA)
- Committee for European Electrotechnical Standardization (CENELEC) – European Norms (EN's)
- Digital Private Network Signaling System (DPNSS)
- European Computer Manufacturers Association (ECMA)
- European Telecommunications Standards Institute (ETSI)
- FCC Rules Parts 15 and 68
- International Electrotechnical Commission (IEC)
- International Special Committee on Radio Interference (CISPR)
- International Telecommunications Union - Telephony (ITU-T)
- ISDN PBX Network Specification (IPNS)
- National ISDN-1
- National ISDN-2
- Underwriters Laboratories (UL)

Product Safety Standards

This product complies with and conforms to the following international Product Safety standards as applicable:

Safety of Information Technology Equipment, IEC 60950, 3rd Edition including all relevant national deviations as listed in Compliance with IEC for Electrical Equipment (IECEE) CB-96A.

Safety of Laser products, equipment classification and requirements:

- IEC 60825-1, 1.1 Edition
- Safety of Information Technology Equipment, CAN/CSA-C22.2 No. 60950-00 / UL 60950, 3rd Edition
- Safety Requirements for Customer Equipment, ACA Technical Standard (TS) 001 - 1997
- One or more of the following Mexican national standards, as applicable: NOM 001 SCFI 1993, NOM SCFI 016 1993, NOM 019 SCFI 1998

Electromagnetic Compatibility (EMC) Standards

This product complies with and conforms to the following international EMC standards and all relevant national deviations:

Limits and Methods of Measurement of Radio Interference of Information Technology Equipment, CISPR 22:1997 and EN55022:1998.

Information Technology Equipment – Immunity Characteristics – Limits and Methods of Measurement, CISPR 24:1997 and EN55024:1998, including:

- Electrostatic Discharge (ESD) IEC 61000-4-2
- Radiated Immunity IEC 61000-4-3
- Electrical Fast Transient IEC 61000-4-4
- Lightning Effects IEC 61000-4-5
- Conducted Immunity IEC 61000-4-6
- Mains Frequency Magnetic Field IEC 61000-4-8
- Voltage Dips and Variations IEC 61000-4-11
- Powerline Harmonics IEC 61000-3-2
- Voltage Fluctuations and Flicker IEC 61000-3-3

Federal Communications Commission Statement

Part 15:

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Part 68: Answer-Supervision Signaling. Allowing this equipment to be operated in a manner that does not provide proper answer-supervision signaling is in violation of Part 68 rules. This equipment returns answer-supervision signals to the public switched network when:

- answered by the called station,
- answered by the attendant, or
- routed to a recorded announcement that can be administered by the customer premises equipment (CPE) user.

This equipment returns answer-supervision signals on all direct inward dialed (DID) calls forwarded back to the public switched telephone network. Permissible exceptions are:

- A call is unanswered.
- A busy tone is received.
- A reorder tone is received.

Avaya attests that this registered equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

This equipment complies with Part 68 of the FCC Rules. On the rear of this equipment is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

The REN is used to determine the quantity of devices which may be connected to the telephone line. Excessive RENs on the telephone line may result in devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed 5.0. To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.

REN is not required for some types of analog or digital facilities.

Means of Connection

Connection of this equipment to the telephone network is shown in the following table.

Manufacturer's Port Identifier	FIC Code	SOC/REN/ A.S. Code	Network Jacks
Off/On premises station	OL13C	9.0F	RJ2GX, RJ21X, RJ11C
DID trunk	02RV2-T	0.0B	RJ2GX, RJ21X
CO trunk	02GS2	0.3A	RJ21X
CO trunk	02LS2	0.3A	RJ21X
Tie trunk	TL31M	9.0F	RJ2GX
Basic Rate Interface	02IS5	6.0F, 6.0Y	RJ49C
1.544 digital interface	04DU9-BN, 1KN, 1SN	6.0F	RJ48C, RJ48M
120A2 channel service unit	04DU9-DN	6.0Y	RJ48C

If the terminal equipment (for example, the MultiVantage™ Solution equipment) causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact the Technical Service Center at 1-800-242-2121 or contact your local Avaya representative. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

It is recommended that repairs be performed by Avaya certified technicians.
The equipment cannot be used on public coin phone service provided by the telephone company. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.
This equipment, if it uses a telephone receiver, is hearing aid compatible.

Canadian Department of Communications (DOC) Interference Information

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

This digital apparatus does not exceed Class A limits for radio noise emission set out in the radio interference regulation of the Canadian Department of Communications.

Le Présent Appareil Nomérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils manicures de la class A préscrites dans le reglement sur le brouillage radioélectrique édicté par le ministére des Communications du Canada.

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

DECLARATIONS OF CONFORMITY

United States FCC Part 68 Supplier's Declaration of Conformity (SDoC)

Avaya Inc. in the United States of America hereby certifies that the equipment described in this document and bearing a TIA TSB-168 label identification number complies with the FCC's Rules and Regulations 47 CFR Part 68, and the Administrative Council on Terminal Attachments (ACTA) adopted technical criteria.
Avaya further asserts that Avaya handset-equipped terminal equipment described in this document complies with Paragraph 68.316 of the FCC Rules and Regulations defining Hearing Aid Compatibility and is deemed compatible with hearing aids.
Copies of SDoCs signed by the Responsible Party in the U. S. can be obtained by contacting your local sales representative and are available on the following Web site:
http://support.avaya.com/elmodocs2/DoC/SDoC/index.jhtml/
All MultiVantage™ system products are compliant with FCC Part 68, but many have been registered with the FCC before the SDoC process was available. A list of all Avaya registered products may be found at:
http://www.part68.org/
by conducting a search using "Avaya" as manufacturer.

European Union Declarations of Conformity

CE

Avaya Inc. declares that the equipment specified in this document bearing the "CE" (*Conformité Europeénne*) mark conforms to the European Union Radio and Telecommunications Terminal Equipment Directive (1999/5/EC), including the Electromagnetic Compatibility Directive (89/336/EEC) and Low Voltage Directive (73/23/EEC). This equipment has been certified to meet CTR3 Basic Rate Interface (BRI) and CTR4 Primary Rate Interface (PRI) and subsets thereof in CTR12 and CTR13, as applicable.

Copies of these Declarations of Conformity (DoCs) signed by the Vice President of MultiVantage™ Solutions research and development, Avaya Inc., can be obtained by contacting your local sales representative and are available on the following Web site:
http://support.avaya.com/elmodocs2/DoC/IDoC/index.jhtml/

Japan

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＡ情報技術装置です。この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

Network Connections

Digital Connections - The equipment described in this document can be connected to the network digital interfaces throughout the European Union.
Analogue Connections - The equipment described in this document can be connected to the network analogue interfaces throughout the following member states:

Belgium	Germany	Greece	Italy	Luxemburg
Netherlands	Spain	United Kingdom		

LASER Product

The equipment described in this document may contain Class 1 LASER Device(s) if single-mode fiber-optic cable is connected to a remote expansion port network (EPN). The LASER devices operate within the following parameters:

- Maximum power output –5 dBm to -8 dBm
- Center Wavelength 1310 nm to 1360 nm
- CLASS 1 LASER PRODUCT IEC 60825-1: 1998

Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure. Contact your Avaya representative for more laser product information.

To order copies of this and other documents:

Call: Avaya Publications Center
Voice 1.800.457.1235 or 1.410.568.3680
FAX 1.800.457.1764 or 1.410.891.0207
Write: Globalware Solutions
200 Ward Hill Avenue
Haverhill, MA 01835 USA
Attention: Avaya Account Management
E-mail: totalware@gwsmail.com

Contents

Volume 1

About this Book xxi

- Intended Use xxii
- How to Use this Document xxii
- Organization xxii
- Conventions Used in This Document xxiii
- Trademarks and Service Marks xxiv
- Where to Call for Technical Support xxvi

1 Maintenance Architecture 1-1

- Maintenance Objects 1-3
- Alarm and Error Reporting 1-4
- Basic Server and IPSI Connectivity 1-7
- Power Interruptions 1-8
- Protocols 1-10
- Signaling 1-17
- Service Codes 1-23
- Facility Interface Codes 1-24
- Multimedia Interface (MMI) 1-25

2 Hardware Configurations 2-1

- Multicarrier Cabinets 2-2
- PNC Cabling — Fiber Hardware 2-3
- Circuit Packs 2-8
- Duplication for Reliability 2-9

Contents

3 Initialization and Recovery 3-1

- Initialization 3-1
- Recovery 3-5
- Reset Level 1 (Warm Restart) 3-9
- Reset Level 2 (Cold-2 Restart) 3-10
- Reset Level 4 (MultiVantage Application Reload) 3-11

4 Alarms, Errors, and Troubleshooting 4-1

- Safety Precautions 4-2
- Suppress Alarm Origination [y] 4-6
- Reseating and Replacing Circuit Packs 4-7
- Replacing a BIU or Rectifier 4-9
- Troubleshooting a Duplicated Server 4-10
- Executing a Server Interchange 4-15
- LA85 Port Tester 4-16
- Fault Isolation for Fiber Links 4-19
- ATM Tips 4-28
- Unusual ATM Trouble Conditions 4-58
- Multimedia Call Handling (MMCH) 4-61
- Troubleshooting ISDN-PRI 4-69
- Troubleshooting ISDN-PRI Endpoints (Wideband) 4-71
- Troubleshooting ISDN-BRI / ASAI 4-73
- Troubleshooting ISDN-PRI Test Calls 4-77
- Troubleshooting the Outgoing ISDN-Testcall Command 4-80
- Isolating and Repairing Packet-Bus Faults 4-81

5 Additional Maintenance Procedures 5-1

- DS1 CPE Loopback Jack (T1 Only) 5-2
- Facility Test Calls 5-15
- Preventive Maintenance 5-24
- Analog Tie Trunk Back-to-Back Testing 5-26
- Terminating Trunk Transmission Testing 5-31
- Removing and Restoring Power 5-32
- Automatic Transmission Measurement System 5-34

Contents

6 LED Interpretation 6-1

- Alarm Levels 6-2
- Terminal Alarm Notification 6-3
- Attendant Console LEDs 6-4
- Circuit Pack LEDs 6-5
- Server LEDs 6-16
- IPSI LEDs 6-21
- Duplication Memory Card LEDs 6-24

7 Maintenance Commands 7-1

- New Commands 7-2
- Modified Commands 7-4
- Command-Line Syntax 7-5
- Common Input Parameters 7-6
- Common Output Fields 7-9
- Contention Between Simultaneous Commands 7-12
- Busyout and Release Commands 7-13
- Common Abort and Fail Codes 7-15
- Alarm and Error Categories 7-17
- add atm pnc 7-38
- add ipserver-interface 7-39
- add station 7-41
- busyout cdr-link 7-42
- busyout data-module 7-43
- busyout ds1-facility 7-44
- busyout fiber-link 7-45
- busyout ipserver-interface 7-46
- busyout journal-printer 7-48
- busyout link 7-49
- busyout pms-link 7-50
- busyout sp-link 7-51
- busyout trunk 7-52
- cancel hardware-group 7-53
- change atm pnc 7-55
- change circuit packs 7-56
- change fiber-link 7-61
- change firmware download 7-65

Contents

- change ipserver-interface 7-67
- change ip-network-region 7-69
- change station 7-71
- change synchronization 7-72
- change system-parameters ipserver-interface 7-74
- change system-parameters maintenance 7-76
- clear errors 7-82
- clear firmware-counters 7-83
- clear link n 7-84
- disable filesystem board ppcss 7-85
- disable firmware download 7-86
- display alarms 7-87
- display atm pnc 7-94
- display capacity 7-95
- display communication-interface links 7-107
- display communication-interface processor-channel 7-109
- display errors 7-111
- display events 7-117
- display failed ip-network-region 7-132
- display fiber-link 7-133
- display firmware download 7-134
- display initcauses 7-135
- display ipserver-interface 7-138
- display node-names 7-139
- display system-parameters duplication 7-141
- display system-parameters ipserver-interface 7-143
- display system-parameters maintenance 7-144
- display test-schedule 7-149
- display time 7-151
- enable administered-connection 7-152
- enable filesystem board 7-153
- enable synchronization-switch 7-154
- enable test-number 7-155
- get boot-image 7-156
- get ethernet options 7-158
- go shell 7-159
- list atm pnc 7-160
- list cabinet 7-161
- list configuration 7-162
- list configuration software-version 7-166

Contents

- list directory 7-168
- list disabled-MOs 7-169
- list fiber-link 7-170
- list history 7-171
- list ip-route 7-174
- list ipserver-interface 7-176
- list isdn-testcall 7-178
- list marked-ports 7-179
- list measurements clan ethernet 7-180
- list measurements clan ppp 7-183
- list measurements clan sockets 7-185
- list measurements ds1 7-188
- list measurements ip codec 7-193
- list measurements ip dsp-resource 7-197
- list measurements ip-signaling-group 7-201
- list pms-down 7-204
- list registered-ip-stations 7-205
- list skill-status 7-206
- list station 7-209
- list sys-link 7-210
- list trace 7-212
- mark port 7-214
- monitor bcms 7-215
- monitor health 7-219
- monitor security violations 7-221
- monitor system 7-222
- monitor traffic 7-230
- monitor trunk 7-232
- netstat arp 7-233
- netstat ip-route 7-237
- ping 7-238
- recycle carrier 7-242
- refresh ip-route 7-243
- refresh route-table 7-245
- release commands 7-247
- release ipserver-interface 7-249
- remove file 7-250
- remove ipserver-interface 7-251
- reset board 7-254
- reset fiber-link 7-255

Contents

- reset pnc interchange 7-256
- reset ipserver-interface 7-260
- reset login-ID n 7-261
- reset maintenance 7-262
- reset packet-interface 7-263
- reset port-network 7-264
- reset system 7-266
- reset val 7-267
- resume hardware-group 7-268
- save translation 7-269
- set boot-image 7-270
- set ethernet-options 7-271
- set ipserver-interface 7-273
- set options 7-274
- set pnc 7-282
- set signaling-group 7-283
- set snc 7-284
- set synchronization 7-285
- set tdm 7-286
- set time 7-287
- set tone-clock 7-289
- status access-endpoint 7-290
- status administered-connection 7-291
- status attendant 7-293
- status bri-port 7-294
- status cabinet 7-304
- status cdr-link 7-305
- status clan-port 7-306
- status conference 7-307
- status data-module 7-344
- status firmware download 7-345
- status hardware-group 7-346
- status health 7-348
- status ip-board 7-352
- status ip-network-region 7-354
- status isdn-testcall 7-355
- status journal-link 7-357
- status link n 7-359
- status logins 7-364
- status packet-interface 7-365

Contents

- status periodic-scheduled 7-367
- status processor-channel 1 7-368
- status pms-link 7-369
- status pnc 7-370
- status port-network 7-374
- status processor-channel 7-378
- status psa 7-379
- status signaling-group 7-380
- status sp-link 7-382
- status station 7-383
- status switch-node 7-393
- status synchronization 7-395
- status sys-link 7-396
- status trunk 7-399
- status tsc-administered 7-404
- status tti 7-406
- status val-ip 7-409
- test alarms 7-410
- test analog-testcall 7-419
- test board 7-420
- test cdr-link 7-421
- test customer-alarm 7-422
- test data-module 7-423
- test ds1-facility 7-424
- test ds1-loop 7-425
- test eda-external-device-alrm 7-429
- test environment 7-432
- test failed ip-network-region 7-434
- test fiber-link 7-435
- test firmware download 7-437
- test hardware-group 7-438
- test ipserver-interface 7-442
- test isdn-testcall 7-443
- test journal-printer 7-444
- test led 7-445
- test link 7-446
- test license 7-447
- test maintenance 7-448
- test packet-interface 7-449
- test pkt 7-451

Contents

- test signaling-group 7-453
- test synchronization 7-454
- test sys-link 7-457
- test tdm 7-459
- test tone-clock 7-460
- test trunk 7-461
- test tsc-administered 7-462
- traceroute 7-463

Volume 2

8 Maintenance-Object Repair Procedures 8-1

- Escalation Procedures 8-2
- ABRI-PORT (ASAI ISDN-BRI Port) 8-3
- AC-POWER 8-4
- ADM-CONN (Administered Connection) 8-12
- ADX8D-BD (AUDIX Circuit Pack) 8-15
- ADX8D-PT (AUDIX Digital Port) 8-16
- ADX16D-B (16-Port AUDIX Circuit Pack) 8-24
- ADX16A-BD (AUDIX Circuit Pack) 8-25
- ADX16D-P (16-Port AUDIX Digital Port) 8-26
- ADX16A-PT (AUDIX Analog Line/Control Link) 8-34
- ALARM-PT (ALARM PORT) 8-42
- ANL-16-L (16-Port Analog Line) 8-46
- ANL-24-L (24-Port Analog Line) 8-63
- ANL-BD (Analog Line Circuit Pack) 8-80
- ANL-LINE, ANL-NE-L (8-Port Analog Line) 8-81
- AN-LN-PT (Analog Line Port) 8-101
- ANN-BD (Announcement Circuit Pack) 8-120
- ANN-PT (Announcement Port) 8-136
- ASAI-BD (Multi-Application Platform Board) 8-144
- ASAI-EPT 8-146
- ASAI-PT 8-155
- ASAI-RES/E-DIG-RES (TN800 reserve slot) 8-167
- ATM-BCH (ATM B-Channel Trunk) 8-168
- ATM-DCH (ATM D-Channel Port) 8-183

Contents

- ATM-EI (Expansion Interface Circuit Pack) 8-186
- ATM-INTF (TN2305/6) 8-229
- ATM-NTWK (ATM Network Error) 8-232
- ATM PNC-DUP (ATM PNC Duplication) 8-242
- ATM-SGRP (ATM Signaling Group) 8-253
- ATM-SYNC (ATM Synchronization) 8-264
- ATM-TRK (Circuit Emulation Service Circuit Pack) 8-271
- ATM-WSP (ATM WAN Spare Processor) 8-302
- AUDIX-BD (AUDIX Circuit Pack) 8-307
- AUDIX-PT (AUDIX Port) 8-308
- AUX-BD (Auxiliary Trunk Circuit Pack) 8-309
- AUX-TRK (Auxiliary Trunk) 8-310
- AXA12-BD/ADX8D-BD/AXD12-BD (AUDIX Circuit Packs) 8-319
- AXA12-RS/ADX8D-RS/AXD12-RS (AUDIX Reserve Slots) 8-320
- BRI-BD/LGATE-BD (ISDN-BRI Line Circuit Pack) 8-321
- BRI-DAT (ISDN-BRI Data Module) 8-329
- BRI-PORT (ISDN-BRI Port), ABRI-PORT (ASAI ISDN-BRI Port) 8-330
- BRI-SET, ASAI-ADJ, BRI-DAT 8-354
- CABINET (Cabinet Sensors) 8-383
- CARR-POW (Carrier Power Supply) 8-393
- CDR-LNK (Call Detail Recording Link) 8-410
- CLAN-BD (Control LAN Circuit Pack) 8-411
- CLSFY-BD (Call Classifier Circuit Pack) 8-428
- CLSFY-PT (Call Classifier Port) 8-429
- CO-BD (Central Office Trunk Circuit Pack) 8-434
- CO-DS1 (DS1 CO Trunk) 8-435
- CO-TRK (Analog CO Trunk) 8-452
- CONFIG (System Configuration) 8-476
- CUST-ALM (Customer-Provided Alarming Device) 8-483
- DAJ1 (Server Duplication Memory Board) 8-485
- DAT-LINE (Data Line Port) 8-489
- DC-POWER (Single-Carrier Cabinet Environment) 8-498
- DETR-BD (Tone Detector Circuit) 8-502
- DID-BD (Direct Inward Dial Trunk Circuit Pack) 8-503
- DID-DS1 (Direct Inward Dial Trunk) 8-504

Contents

- DID-TRK (Direct Inward Dial Trunk) 8-515
- DIG-BD (Digital Line Circuit Pack) 8-530
- DIG-IP-STN (Digital IP Station) 8-531
- DIG-LINE (Digital Line) 8-538
- DIOD-BD (DIOD Trunk Circuit Pack) 8-561
- DIOD-DS1 (DS1 DIOD Trunk) 8-562
- DIOD-TRK (DIOD Trunk) 8-573
- DLY-MTCE (MO-DAILY) 8-583
- DS1-BD (DS1 Interface Circuit Pack) 8-586
- DS1-FAC (DS1 Facility) 8-659
- DS1 CONV-BD 8-683
- DT-LN-BD (Data Line Circuit Pack) 8-718
- DTMR-PT (Dual-Tone Multifrequency Receiver Port) 8-719
- E-DIG-BD (Multi Application Platform Board) 8-723
- E-DIG-RES (TN800 reserve slot) 8-725
- E-DIG-STA (Emulated Digital Line) 8-726
- EMG-XFER (Emergency Transfer) 8-736
- PN-SNTY (PN Sanity Audit) 8-741
- ERR-LOG (Error Log) 8-743
- ETH-PT (Control LAN Ethernet) 8-744
- ETR-PT (Enhanced Tone Receiver Port) 8-755
- EXP-INTF (Expansion Interface Circuit Pack) 8-762
- EXP-PN (Expansion Port Network) 8-821
- EXT-DEV ADMIN? Y (External Device Alarm) 8-827
- FIBER-LK (Fiber Link) 8-830
- FW-DWNLD (Firmware Download) 8-869
- GPTD-PT (General-Purpose Tone Detector Port) 8-883
- H323-BCH (H.323 B Channel) 8-888
- H323-SGRP (323 Signaling Group) 8-890
- H323-STN (H.323 IP Station) 8-897
- HYB-BD (Hybrid Line Circuit Pack) 8-903
- HYB-LINE (Hybrid Line) 8-904
- INADS (INADS Link) 8-925
- IPMEDPRO (IP Media Processor Circuit Pack) 8-929
- IPSV-CTL (Ipserver Interface Control) 8-950
- IP-SVR (IP Server Interface) 8-959
- ISDN-PLK (ISDN-PRI Signaling Link Port) 8-965
- ISDN-LNK (ISDN-PRI Signaling Link Port) 8-970
- ISDN-SGR (ISDN-PRI Signaling Group) 8-976
- ISDN-TRK (DS1 ISDN Trunk) 8-989

Contents

- JNL-PRNT (Journal Printer Link) 8-1012
- LGATE-AJ 8-1013
- LGATE-BD 8-1013
- LGATE-PT 8-1013
- LIC-ERR (License-Error Mode) 8-1014
- LOG-SVN (Login Security Violation) 8-1022

Volume 3

- MAINT (PN's Maintenance Circuit Pack) 8-1025
- MAPD-BD (MAPD Interface Circuit Pack TN802) 8-1039
- MEDPRO (Media Processor MAPD Circuit Pack) 8-1069
- MEDPROPT (TN802/TN2302 MED PRO DSP PORT) 8-1081
- MET-BD (MET Line Circuit Pack) 8-1088
- MET-LINE (MET Line) 8-1089
- MIS (Management Information System) 8-1109
- MMI-BD 8-1110
- MMI-LEV (Multimedia Interface Resource Level) 8-1120
- MMI-PT 8-1123
- MMI-SYNC 8-1129
- MODEM-BD (Modem Pool Circuit Pack) 8-1131
- MODEM-PT (Modem Pool Port) 8-1132
- M/T-ANL (Maintenance/Test Analog Port) 8-1147
- M/T-BD (Maintenance/Test Circuit Pack) 8-1157
- M/T-DIG (Maintenance/Test Digital Port) 8-1161
- M/T-PKT (Maintenance/Test Packet Bus Port) 8-1175
- NO-LIC (No License) 8-1180
- OPS-LINE (DS1 Off-Premises Station Line) 8-1183
- PDMODULE (Processor Data Module)
  TDMODULE (Trunk Data Module) 8-1196
- PE-BCHL (PRI Endpoint Port) 8-1213
- PKT-BUS (Packet Bus) 8-1230
- PKT-INT (Packet Interface) 8-1238
- PLAT-ALM (Platform Alarms) 8-1269
- PMS-LINK (Property Management System Link) 8-1270
- PMS-PRNT/JNL-PRNT (PMS Printer Link) 8-1278
- PNC-DUP (PNC Duplication) 8-1283
- POWER 8-1302
- PPP-PT (Control LAN Packet/Port) 8-1314

Contents

- PRI-CDR/SEC-CDR (Call Detail Recording Link) 8-1326
- PROC-SAN (Process Sanity Audits) 8-1331
- RALM-SVC (Remote Alarm Service) 8-1332
- RANL-STA (Remote Analog Line (Station) Port 8-1333
- RDIG-STA (Remote Digital Station) 8-1341
- REM-OFF (Remote Office) 8-1355
- RING-GEN 8-1357
- S-SYN-BD (Speech Synthesis Circuit Pack) 8-1363
- S-SYN-PT (Speech Synthesis Port) 8-1364
- SN-CONF (Switch Node Configuration) 8-1376
- SNC-BD (Switch Node Clock Circuit Pack) 8-1384
- SNC-LINK (Switch Node Clock Link) 8-1422
- SNC-REF (Switch Node Clock Reference) 8-1426
- SNI-BD (SNI Circuit Pack) 8-1429
- SNI-PEER (SNI Peer Link) 8-1491
- SRP-EPN 8-1495
- STRAT-3 (Stratum-3 Clock) 8-1496
- SVC-SLOT (Service Slot) 8-1507
- SYNC (Port-Network Synchronization) 8-1509
- SYS-LINK (System Links) 8-1533
- SYS-PRNT (System Printer) 8-1539
- SYSTEM (System) 8-1544
- TBRI-BD (TN2185 ISDN Trunk-Side BRI) 8-1549
- TBRI-PT (ISDN Trunk-Side BRI Port) 8-1557
- TBRI-TRK (Trunk-Side ISDN BRI) 8-1577
- TDM-BUS (TDM Bus) 8-1588
- TDM-CLK (TDM Bus Clock) 8-1604
- TDMODULE (Trunk Data Module) 8-1619
- TIE-BD (Tie Trunk Circuit Pack) 8-1620
- TIE-DS1 (DS1 Tie Trunk) 8-1621
- TIE-TRK (Analog Tie Trunk) 8-1638
- TIME-DAY (Time of Day) 8-1658
- TONE-BD (Tone-Clock Circuit) 8-1659
- TONE-PT (Tone Generator) 8-1682
- TR-LN-BD (Trunk Line Board) 8-1691
- TSC-ADM (Administered Temporary Signaling Connections) 8-1692
- TTR-LEV (TTR Level) 8-1698
- USB1 (Modem Testing) 8-1703

Contents

- UDS1-BD (UDS1 Interface Circuit Pack) 8-1707
- UPS (Server UPS) 8-1810
- VAL-BD (Voice Announcements over LAN Circuit Pack) 8-1817
- VAL-PT (Voice Announcements over LAN Packet/Port) 8-1839
- VC-BD 8-1845
- VC-DSPPT 8-1849
- VC-LEV (Voice Conditioner DSP Port Level) 8-1857
- VC-SUMPT 8-1860
- WAE-PORT (Wideband Access Endpoint Port) 8-1865
- XXX-BD (Common Port Circuit Pack) 8-1872

IN Index IN-1

Contents

MAINT (PN's Maintenance Circuit Pack)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run	Full Name of MO
MAINT	MINOR	**test maintenance sh**	PN's Maintenance circuit pack
MAINT	MAJOR	**test maintenance l**	PN's Maintenance circuit pack

The PN's TN775D Maintenance circuit pack monitors and supports environmental maintenance for PN multicarrier or single-carrier cabinets. The PN's Maintenance circuit pack provides switch software with a mechanism to activate or deactivate Emergency Transfer in the PN. Control by the system of Emergency Transfer can be overridden by the Emergency Transfer switch on the faceplate of the circuit pack. The PN's Maintenance circuit pack invokes Emergency Transfer when the PN loses contact with the media server or when the PN's Maintenance circuit pack loses contact with every Expansion Interface circuit pack. The PN's Maintenance circuit pack handles loss of AC power in the PN multicarrier cabinet by supplying battery power for 15 seconds to the PN cabinet and then an additional 10 minutes of power to just the control carrier in the PN. When power fails in a single-carrier PN cabinet, no such power holdover is available. In the event that an Expansion Interface circuit pack goes insane and is reset six times within 15 minutes, the PN's Maintenance circuit pack will hold the Expansion Links reset preventing the Expansion Interface circuit pack from running.

The PN's Maintenance circuit pack has alarm LEDs which indicate the presence of Major, Minor, and Warning alarms. A flashing LED indicates the presence of an alarm within the cabinet. A continuously lit LED indicates the presence of an alarm elsewhere in the system.

A management terminal (G3-MT) can be directly connected to the PN's TN775D Maintenance circuit pack. This link operates at 9600 bps, but system software throttles the rate of data flow to the TN775D for display on the G3-MT to about 1200 bps. Every system command can be executed via the PN G3-MT login. However, due to the slow speed at which the PN login operates, it is recommended that it be used only for maintenance sessions and not for system administration.

The media server communicates with an PN's Maintenance circuit pack via the following path. (Up-link messages back from this Maintenance circuit pack to the media server take the reverse path.) Messages flow from the media server's processor to an IPSI-connected PN's TN2312AP IPSI circuit pack's Packet Interface circuit, over this PN's LAN bus to its Expansion Interface circuit pack, across the fiber link to the active PN's Expansion Interface circuit pack, and over a serial link to the PN's Maintenance circuit pack.

The PN's Maintenance circuit pack must be physically inserted into the dedicated slot marked Maintenance in the A carrier of the PN. The serial links from the PN's Maintenance circuit pack to the Expansion Interface circuit packs are physically connected from this dedicated slot to slots 2A01 and 2B02 (2B02 is used only if there is duplicated Port Network Connectivity). The serial link from slot 2A01 to the maintenance slot is hard-wired into the backplane of carrier A, whereas the serial link from slot 2B02 to the maintenance slot is a ribbon cable connecting the two slots. The serial link from the PN's Maintenance circuit pack to the terminal is also a ribbon cable which plugs into a connector labeled TERM on the back of carrier A.

The maintenance strategy for the PN's Maintenance circuit pack consists of checking the integrity of the communications path to/from the PN's Maintenance circuit pack, testing individual hardware components on the PN's Maintenance circuit pack, and keeping the alarm LEDs up-to-date. The individual hardware components include the serial interfaces which handle the serial links connected to the PN's Maintenance circuit pack. There are three serial interfaces, one for each possible Expansion Interface circuit pack and one for the terminal.

Since the PN's Maintenance circuit pack supports environmental maintenance in the PN, trouble with the PN's Maintenance circuit pack can cause environmental maintenance to falsely detect problems. In a multicarrier cabinet PN, these environmental MOs include: POWER (Battery and Battery Charger), CARR-POW (Carrier Port Power Unit), AC-POWER (AC Power), CABINET (Cabinet Sensors), EMG-XFER (Emergency Transfer), EXT-DEV (External Device Alarm), and CUST-ALM (Customer-Provided Alarming Device). In a single carrier cabinet PN, these environmental MOs include DC-POWER (Single Carrier Cabinet Power), EMG-XFER (Emergency Transfer), EXT-DEV (External Device Alarm), and CUST-ALM (Customer-Provided Alarming Device).

TN775D Maintenance Circuit Pack Used with a TN2312AP IPSI Circuit Pack

Connectivity when installed in an Existing System

There is no backplane connectivity from the TN775D Maintenance circuit pack to the TN2312AP IPSI circuit pack in existing pre-R11carrier backplanes. To achieve connectivity for pre-R11 carriers, a faceplate cable must be used. The faceplate cable runs between the TN775D and the TN2312AP IPSI circuit packs faceplates.

NOTE:
The TN775D maintenance circuit pack is located in slot one of Control Carrier A. The associated TN2312AP IPSI circuit pack is located in slot two of Control Carrier A.

Backplane Connectivity when Installed in a New System

New systems PN Control Carriers have backplane connectivity between the TN775D Maintenance circuit pack located in slot one of the new PN Control Carrier and the TN2312AP IPSI circuit pack located in slot two. No face plate cable is needed.

Error Log Entries and Test to Clear Values

Table 8-405. PN's Maintenance Circuit Pack Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	test maintenance sh r 1
1 (a)	0 1	PN Maintenance Circuit Pack Reset test (#306)	MINOR	ON	test maintenance l
513 (a)	0 1	MGR I Channel Loop test (#228)	MINOR	ON	test maintenance sh r 3
769 (b)	Any	Sanity Handshake test (#106)			
1537 (a)	0 1	Sanity Maze test (#303)	MINOR	ON	test maintenance sh r 3
2049 (c)	Any	Battery Holdover Vintage Verification Test (#311)	WARNING	ON	test maintenance sh r 1
2561 (a)	0 1	Sanity Handshake test (#106)	MINOR	ON	test maintenance sh r 3
2817 (a)	0(b) 1	Serial Channel Loop test (#229)	MINOR	ON	test maintenance sh r 3
3329 (d)	Any	Serial Link Test (#337)	MINOR/ WARNING[2]	OFF	test maintenance sh r 3
3585 (e)	Any	Serial Link Test (#337)	MINOR/ WARNING[2]	OFF	test maintenance sh r 3

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. Major and Minor alarms may be downgraded to Warning alarms based on the value used in the **set options** command.

Notes:

a. A value of 0 indicates that PNC-A (and therefore, the Expansion Interface circuit pack located on PNC-A) was active when this error occurred. A value of 1 indicates that PNC-B (and therefore, the Expansion Interface circuit pack located on PNC-B) was active when this error occurred. To clear this problem, make sure the active PNC is the same as that indicated by the Aux Value.

b. Multiple values can appear in the `Aux Data` field. There will be other errors in the log if there is a real problem. Use these other errors to troubleshoot the problem.

c. The PN's Maintenance circuit pack hardware vintage does not support battery holdover for ***all carriers***.

NOTE:
This failure indicates that the cabinet administration is set for battery holdover for ***all carriers***.

d. The serial link between the Expansion Interface circuit pack in the B carrier and the PN's Maintenance circuit pack is defective.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the Sanity Handshake test (#106), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Sanity Handshake test (#106)	X	X	ND
PN Maintenance Circuit Pack Reset test (#306)		X	D
Serial Channel Local Loop-around test (#229)	X	X	ND
MGR I Channel Local Loop-around test (#228)		X	D
PN Maintenance Circuit Pack Sanity Maze test (#303)	X	X	ND
PN Maintenance Circuit Pack Serial Link test (#337)	X	X	ND
Battery Holdover Vintage Verification Test (#311)	X	X	ND

1. D = Destructive, ND = Nondestructive

Sanity Handshake Test (#106)

This test checks the ability of an PN's Maintenance circuit pack's to respond to queries. A message is sent to the PN's Maintenance circuit pack which then sends a message back. If the response message is received, then the Maintenance circuit pack is queried for the PN cabinet type (valid PN cabinet types are single carrier and multicarrier cabinets). The Maintenance circuit pack reads pins on the backplane of carrier A that identify the type of cabinet and report this information. If a valid cabinet type is returned, then the test passes.

Table 8-406. Test #106 Sanity Handshake Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error.
1000	ABORT	System resources required for this test are not available.
2000	ABORT	Response to cabinet query was not received in the allowable time period.
2033	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
2046	ABORT	The PN's Maintenance circuit pack reported an invalid cabinet type. Not knowing the cabinet type of the PN will prevent all PN environment maintenance from running. 1. Retry the command. 2. If the test continues to abort with 2046, then either the PN's Maintenance circuit pack is defective, or the PN cabinet's wiring is defective. First, replace the Maintenance circuit pack. 3. If the test continues to abort with 2046, then the PN cabinet's wiring is defective in the A carrier, and the PN's Maintenance circuit pack cannot read the backplane pins to determine the cabinet type.
10601	ABORT	Test disabled via software patch.

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Table 8-406. Test #106 Sanity Handshake Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	PN's Maintenance circuit pack did not respond to Sanity Handshake and the test timed out. 1. Verify that the carrier A power units are good. If the -5 Volt unit is defective in the A carrier, then communication with the PN's Maintenance circuit pack will not be possible. 2. If the -5 Volt unit is good and this test continuously fails, background maintenance will automatically escalate to an PN's Maintenance circuit pack Reset test (#306). Otherwise, manually reset an PN's Maintenance circuit pack by issuing the **test maintenance long** command and evaluating any generated error codes from Test #306. If Test #306 passes, this test should also PASS. Use the following steps to determine whether the PN's Maintenance circuit pack or its serial link, is defective: Duplicated Port Network Connectivity (PNC): 1. Switch PNC by entering **reset pnc interchange**. 2. Run the short test sequence against the PN's Maintenance circuit pack. If Test #106 still fails, replace the Maintenance circuit pack and retest. Otherwise, follow the error routines for any errors that are logged by this short test. Unduplicated PNC: 1. Replace the PN's Maintenance circuit pack, and invoke the short test sequence against it. 2. If error persists, replace the PN Expansion Interface circuit pack, **at a time when the PN can go down with minimal inconvenience**. 3. If the error still persists, the problem is with the actual serial link in A carrier backplane and not with the PN's Maintenance circuit pack.
	PASS	The communications path to and from the PN's Maintenance circuit pack is sane, and the Maintenance circuit pack can read and report the correct PN cabinet type. The Maintenance circuit pack may still have problems related to Tests #228, #229, #303, or #306.

Management Terminal Channel Local Loop-Around Test (#228)

This test is destructive.

This test checks TN775D on-board circuitry associated with the serial link for the management terminal connection. This test will not cause the local terminal login to drop, but any data displayed on the terminal while the test is running will be lost.

The PN's Maintenance circuit pack has three separate serial interfaces, one to each of the following:

- Management terminal which is tested by Test #228
- Active EI circuit pack which is tested by Test #229
- Standby EI circuit pack which is tested by Test #229

Table 8-407. Test #228 Management Terminal Channel Local Loop-Around Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required for this test are not available.
2000	ABORT	Response to the test was not received within the allowable time period.
2033	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
2034	ABORT	Background maintenance on the PN's Maintenance circuit pack is running the MGR I Channel Local Loop-around test. 1. Wait 30 seconds and retry the test up to 5 times.
22801	ABORT	Test disabled via software patch.
	FAIL	Test failed which means the PN terminal is not usable. 1. Run the test three more times. 2. If the test continues to fail, replace the PN's Maintenance circuit pack.
	PASS	The serial interface circuitry on the PN's Maintenance circuit pack which controls the PN-connected terminal is functioning properly. If there are still troubles with the PN G3-MT terminal, the problem may be one of the following: 1. The PN-connected terminal is not configured properly. The connection between the terminal and the PN's Maintenance circuit pack must be set up at 9600 bps. 2. The serial link from the back of carrier A to the PN terminal may be defective. The serial link consists of the connector on the back of carrier A labeled TERM and the ribbon cable running to the terminal. 3. The terminal may be defective. Try another terminal. 4. Since this test is not 100 percent accurate, there may still be problems with the PN's Maintenance circuit pack.

Serial Channel Local Loop-Around Test (#229)

This test checks TN775D on-board circuitry associated with the serial links to the Expansion Interface circuit packs. A request is sent to the PN's Maintenance circuit pack over the active link via the active Expansion Interface circuit pack serial interface circuitry to test the serial interface circuitry of the standby Expansion Interface circuit pack link. If a response is received, then by definition the serial interface circuitry associated with the active link is good.

The PN's Maintenance circuit pack has 3 separate serial interfaces, one to each of the following:

- Management terminal which is tested by Test #228
- Active EI circuit pack which is tested by Test #229
- Standby EI circuit pack which is tested by Test #229

Table 8-408. Test #229 Serial Channel Local Loop-Around Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available.
2000	ABORT	Response to the test request was not received within the allowable time period.
2033	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
2034	ABORT	Background maintenance on the PN's Maintenance circuit pack is running the Serial Channel Local Loop-around test. 1. Wait 30 seconds, and retry the test up to 5 times.
22901	ABORT	Test disabled via software patch.

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Table 8-408. Test #229 Serial Channel Local Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	The on-board circuitry associated with the standby serial link is defective. Since the PN's Maintenance circuit pack reported this failure, the on-board circuitry associated with the active serial link is functional. 1. This test checks the circuitry on the PN's Maintenance circuit pack associated with the standby Expansion Interface link. a. In a switch without duplicated Port Network Connectivity (PNC), current service will not be affected because the circuitry failing is not being used. Nevertheless, a Minor alarm will remain in the Alarm Log against MAINT. Therefore, the PN's Maintenance circuit pack must be replaced. b. In a switch with duplicated PNC, service is not affected as long as you **do not** interchange the PNCs. Otherwise, the connection to the PN's Maintenance circuit pack will be lost. Losing this connection would mean losing connectivity to the terminal and PN Environment maintenance. The PN's Maintenance circuit pack must be replaced to correct this problem.
	PASS	The on-board circuitry associated with both Expansion Interface circuit pack serial links is good. If there is still a problem communicating with the PN's Maintenance circuit pack, check the following: 1. The cable comprising the serial link (B carrier Expansion Interface circuit pack to PN's Maintenance circuit pack only) may be defective. 2. The PN's Maintenance circuit pack may actually be defective. **NOTE:** This test may not be 100 percent accurate. 3. The Expansion Interface circuit pack on the standby link may be defective.

PN Maintenance Circuit Pack Sanity Maze Test (#303)

The processor on the PN's Maintenance circuit pack has direct access to special registers in the Maintenance circuit pack. These registers are tied to such things as the Expansion Interface circuit pack reset leads and Carrier Port Power Unit reset leads (which enable the PN's Maintenance circuit pack to recycle carriers). To prevent an insane Maintenance circuit pack from inadvertently controlling these external devices, a special interface called the Sanity Maze is provided that must first be navigated by the Maintenance circuit pack processor prior to any register access. There are two parts to the test. Part 1 involves navigating the Sanity Maze to toggle an unused lead. Part 2 attempts to toggle an unused lead without first navigating the Sanity Maze. The Sanity Maze test passes if Part 1 is successful and Part 2 fails.

Table 8-409. Test #303 PN's Maintenance Circuit Pack Sanity Maze Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available.
2000	ABORT	Response to the test was not received within the allowable time period.
2033	ABORT	1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The Sanity Maze of the PN's Maintenance circuit pack is defective. 1. Replace the PN's Maintenance circuit pack.
	PASS	The Sanity Maze is working properly, and the PN's Maintenance circuit pack can access the unused register. If **recycle carrier** commands (for PN carriers) do not work, the following problems may still exist: 1. The Carrier Port Power Unit or wiring to the Carrier Port Power Unit may be defective. See ''CARR-POW (Carrier Power Supply)'' on page 8-393. 2. Since this test only tests the PN, there is a very small probability that the PN's Maintenance circuit pack cannot access those registers that deal with PN devices. The Maintenance circuit pack may need to be replaced.

PN Maintenance Circuit Pack Reset Test (#306)

This test is destructive.

The terminal connection will be dropped and, if the Emergency Transfer switch is in the AUTO position, Emergency Transfer will be disabled for the duration of the test.

The PN's Maintenance circuit pack is reset by the active Expansion Interface circuit pack. After the Expansion Interface circuit pack reports that the PN's Maintenance circuit pack has reset, a handshake message is sent to the Maintenance circuit pack. If the Maintenance circuit pack responds to the handshake, the test passes. If not, it fails. If the test passes, the PN-connected terminal is brought back up, and Emergency Transfer is restored to its previous state.

Table 8-410. Test #306 PN Maintenance Circuit Pack Reset Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1018	ABORT	Test disabled via software patch.
2029	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
1204 1205	FAIL	EI circuit pack could not reset the PN's Maintenance circuit pack. For duplicated Port Network Connectivity: 1. The standby EI circuit pack may be defective and, thereby, preventing the active EI circuit pack from resetting the PN's Maintenance circuit pack. Unplug the standby EI circuit pack, and attempt to reset the Maintenance circuit pack using the **test maint long** command. If Test #306 passes, replace the standby EI circuit pack, and attempt the reset test again. If Test #306 fails, then replace the standby PN EI circuit pack. 2. The active EI circuit pack may be defective and unable to reset the PN's Maintenance circuit pack. Interchange the PNC by entering the **reset pnc interchange** command. Now reset the Maintenance circuit pack again by using the **test maintenance long** command. If the test passes, the problem is with the known standby EI circuit pack. Repeat Step 2 to determine whether the standby EI circuit pack should be replaced.

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Table 8-410. Test #306 PN Maintenance Circuit Pack Reset Test — *Continued*

Error Code	Test Result	Description / Recommendation
1205 *(cont'd)*		3. Replace the PN's Maintenance circuit pack, and run the test again. If the test passes, the problem is with the Maintenance circuit pack. Interchange the PNC by entering the **reset pnc interchange** command, and run the test again. The test should pass with both EI circuit packs being active. 4. If the B carrier EI circuit pack is active, the ribbon cable connecting the Expansion Interface circuit pack and the PN's Maintenance circuit pack may be defective. Check the ribbon cable to make sure it is connected properly and is not damaged. For unduplicated Port Network Connectivity: 1. Replace the PN's Maintenance circuit pack, and run the test again. If it passes, the problem is with the Maintenance circuit pack. 2. If the test fails, replace the EI circuit pack. If the tests passes, the problem is with the EI circuit pack. 3. If the test still fails, the problem is with the serial link wired into the backplane of carrier A.
2005	FAIL	PN Maintenance Circuit Pack reset passed, but the PN's Maintenance circuit pack did not respond to subsequent handshake message. Retry this command three more times. If it continues to fail, the Maintenance circuit pack, the active EI circuit pack, or the serial link is defective. To determine which is defective, follow the appropriate procedures that follow. Duplicated Port Network Connectivity: 1. Interchange PNCs by entering **reset pnc interchange**. 2. Run the short test sequence against the PN's Maintenance circuit pack. If Test #306 still fails, replace the Maintenance circuit pack and retest. Otherwise, follow the error routines for any errors that are logged by this short test sequence. Unduplicated Port Network Connectivity: 1. Replace the PN's Maintenance circuit pack, and invoke the short test sequence against it. 2. If the error persists, replace the EI circuit pack, at a time when the PN can go down with minimal inconvenience. 3. If the error still persists, the problem is with the actual serial link in A carrier backplane and not with the PN's Maintenance circuit pack.
	PASS	The active EI circuit pack can reset the PN's Maintenance circuit pack. This implies the Maintenance circuit pack, the active EI circuit pack, and active serial link are sane. There could still be a problem with the standby EI circuit pack and standby serial link in a Duplication Option system.

Battery Holdover Hardware Verification Test (#311)

The hardware/firmware vintage of the PN's TN775D Maintenance boards does not support battery holdover for ***all carriers***. This test checks to see if PN cabinet battery holdover for ***all carriers*** has been administered in error. If battery holdover is administered for ***all carriers***, the test will fail and a WARNING alarm will be raised against this MO.

Table 8-411. TEST #303 PN Maintenance Circuit Pack Sanity Maze Test

Error Code	Test Result	Description/ Recommendation
1000	ABORT	System resources required to run this test are not available.
2000	ABORT	Response to the test was not received within the allowable time period.
2029	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The hardware vintage of the PN's Maintenance circuit pack does not support battery holdover for ***all carriers***. **NOTE:** This failure indicates that the cabinet administration is set for battery holdover for ***all carriers***. 1. Verify cabinet administration, make sure that the battery holdover feature is administered correctly (That cabinet administration is not set for battery holdover for ***all carriers***.). 2. Retry the command at 1-minute intervals up to 5 times.
	PASS	The cabinet administration shows battery holdover for A carrier only. Also, the hardware vintage of the PN's TN775D Maintenance board is correct.

PN Maintenance Circuit Pack Serial Link Test (#337)

This test is destructive.

This test checks the serial link from the standby EI circuit pack to the PN's Maintenance circuit pack. If there is no standby link, or the standby link is down at the time of the test, this test will abort.

NOTE:
The status of the link is changed to "down" when the standby EI circuit pack begins initialization tests (for example, after being reset). The link status is then updated at the conclusion of these tests.

Table 8-412. Test #337 PN Maintenance Circuit Pack Serial Link Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
2029 2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The serial link between the currently standby EI circuit pack and the PN's Maintenance circuit pack is defective. If the standby EXP-INTF is on the A carrier, then error type 3329 is logged. If the standby EXP-INTF is on the B carrier, then error type 3585 is logged. 1. *If error type 3585 was logged,* check to see if the ICCA/ICCB cables between carriers A and B are present and properly connected (ICCA to ICCA, and ICCB to ICCB). Install or reconnect the cables if necessary, and rerun the test. 2. Replace the PN's Maintenance circuit pack. 3. Rerun the test. If the test continues to fail, replace the standby PN Expansion Interface circuit pack. 4. Rerun the test. If the test continues to fail and the standby link is on the B carrier, then replace the ribbon cable that carries the serial link from Expansion Interface circuit pack B to the PN's Maintenance circuit pack.
	PASS	The serial link from the standby Expansion Links to the PN's Maintenance circuit pack is working.

MAPD-BD (MAPD Interface Circuit Pack TN802)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
MAPD-BD	MAJOR	**test board *UUCSS* sh**	MAPD Interface circuit pack
MAPD-BD	MINOR	**test board *UUCSS* l**	MAPD Interface circuit pack
MAPD-BD	WARNING	**test board *UUCSS* sh**	MAPD Interface circuit pack

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21).

The TN802 Multiple Application Platform (MAP-D) circuit pack allows sending voice and fax from S8700 Multi-Connect through the Internet to another S8700 Multi-Connect also having this feature or to other PBXs that are equipped with the Internet Telephony server (ITS-E).

Throughout this section the term TN802 means the MAP-D IP trunk circuit pack.

Be sure to observe these special considerations for the TN802:

- Port alarms on this circuit pack display as “TIE-DS1” in the Alarm and Error logs.
- The **reset board** command reboots the MAPD PC CPU, but **busyout board** only busies out every emulated port on the board.
- Switch resets that take the switch out of service for more than 20 seconds also cause the MAPD's PC to reboot, which takes several minutes to complete.

Switch-Demanded Tests

Switch-demanded diagnostic tests on the TN802 do not run unless the Internet trunking application is running on Windows NT™, located on the circuit pack.

Feature Limitations

The Internet trunking application relies on the single call scenario, or a direct, point-to-point call that does not terminate at multiple S8700 Multi-Connect nodes through call processing. Table 8-413 describes the feature limitations for S8700 Multi-Connect.

Table 8-413. S8700 Multi-Connect IP trunk feature/performance limitations

Feature/ Performance	Description	Recommendation
Abbreviated Dialing	Abbreviated Dial strings with embedded pauses lose digits after the pause	Most calls work. Do not create Abbreviated dial strings with embedded pauses.
Compression limitations	Every IP trunk call goes through A/D conversion, which uses compression to reduce bandwidth. Each compression degrades the voice signal and creates call processing delay.	No more than 3 compression/decompression cycles for any call. **NOTE:** The compression/ decompression that most voice mail systems use must be counted as 1 cycle.
Call Classifier	IP trunk's compression/ decompression cycle makes ringback, busy and voice detection	Do not administer these features: ■ Call Coverage Redirected Off-Net (CCRON) ■ Certain wireless phone coverage
Call Coverage Call Forwarding Call Transfer	Calls extended across multiple S8700 Multi-Connect nodes require multiple call paths. Significant voice quality degradation is likely.	Multiple call paths not recommended

Continued on next page

Table 8-413. S8700 Multi-Connect IP trunk feature/performance limitations — *Continued*

Feature/ Performance	Description	Recommendation
Conferencing	Voice quality and delay problems if the party controlling the conference is on the IP trunk (voice paths from external callers come in on the IP trunk, are conferenced, then sent out to other external parties across an IP trunk)	Avoid conference calls where at least two other parties are on the other side of the IP trunk. **NOTE:** The following conferences work OK: ■ Conferences of parties on the local S8700 Multi-Connect ■ Conferences controlled by the local S8700 Multi-Connect, involving local parties and only 1 party on the other side of an IP trunk
DCS	Know limitations: ■ Auto Callback	Coordinate specific administration and between the IP trunk and S8700 Multi-Connect for any DCS functionality. Some limitations on routing flexibility may apply.
ISDN	IP trunking has no signalling capability.	ISDN not supported. This includes: ■ 10-digit number display ■ QSIG ■ Path replacement
Voice mail	Calls that have terminated at one location and then cover to a second site for voice mail coverage can have voice quality degradation.	Centralized voice mail through an IP network is not recommended.

Backing Up to the PCMCIA Disk

Table 8-414 details how to back up administration data for the IP trunk application to and restored from the local PCMCIA disk and the Ethernet port. Before backing up, be sure to shut down the application running on the circuit pack, following the procedures in the ''Shutting Down NT on the TN802'' section.

Table 8-414. Backing up TN802 administration data

Step	Description	Comments
1.	Busyout circuit pack	At the S8700 Multi-Connect terminal, type **busyout board UUCSS** (the address of the TN802 circuit pack) and press Enter.
2.	Backup administration TN802 to disk	At the Windows NT desktop, double-click on the **IP Trunk Backup Restore** icon. The IP Trunk Backup/Restore Utility screen appears.
3.	Select utility	In the IP Trunk Backup/Restore Utility dialog screen, click on **Files, Backup**. The IP Trunk Backup screen appears.
4.	Select backup	In the IP Trunk Backup screen, click on the **Backup** button
5.	Wait	Backup can take as much as 20 minutes to complete.
6.	Release circuit pack	At the S8700 Multi-Connect terminal, type **release board UUCss** (the address of the TN802 circuit pack) and press Enter.

NOTE:
Local restore of a complete system from the PCMCIA disk should not require more than 20 minutes assuming that a replacement MAPD pack is available and pre-loaded with the IP trunk application software.

Restoring Data from the PCMCIA Disk

Before You Start

1. Shut down the application running on the circuit pack. See ''Shutting Down NT on the TN802''.
2. Remove the defective IP Trunk circuit pack from the switch (if applicable).
3. Install the replacement IP Trunk circuit pack in the switch (if applicable).
4. Insert the backup diskette into the IP Trunk circuit pack.

Table 8-415. Restore TN802 administration data

Step	Description	Comments
1.	Restore IP Trunk administration	At the Windows NT desktop, double-click on the IP Trunk Back UP Restore icon. The IP Trunk Backup/Restore Utility screen appears.
2.	Select utility	In the IP Trunk Backup/Restore Utility dialog screen, click **Files, Restore**. The IP Trunk Backup screen appears
3.	Select restore	In the IP Trunk Backup screen, click on the **Restore** button.
4.	Wait	Wait until the amber Disk-In-Use LED (Note 5 in Figure 8-55) light is out.

PSTN Fallback Feature

The Public Switched Telephone Network (PSTN) fallback feature is available on the Internet trunk application software, which periodically pings the remote destinations that the software calls. When the far end returns a poor response time to the ping, S8700 Multi-Connect's ARS or AAR network routing patterns bypass those ports and direct the call to another port, typically on a PSTN trunk.

When the remote destinations show acceptable response times to subsequent pings, the corresponding ports are returned to "idle," where they are available for service.

Cabinet Configuration

Because of overheating, the TN802 circuit pack should not be placed directly above or below another MAPD circuit pack.

UPS Protection

An uninterruptible power supply (UPS) protection is strongly recommended for an PN containing a TN802 circuit pack.

Faceplate

Figure 8-55 shows the TN802 faceplate.

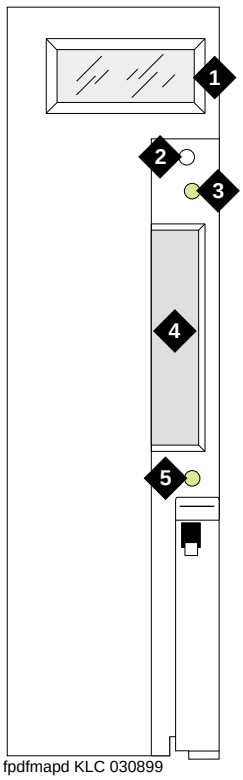

Figure Notes:

1. LCD display (see Table 8-416 on page 8-1045)
2. Reset button (recessed)
3. Red board-status LED
4. PCMCIA card slot
5. Amber PCMCIA disk-in-use LED

Figure 8-55. TN802 faceplate

Table 8-416 lists the TN802 LCD messages that you might see if installing or servicing an IP Trunk.

Table 8-416. TN802 LCD messages for IP trunks

Display	Explanation
PC BOOT	The TN802 MAPD PC is booting up.
IP TRK #	IP Trunk application is running (# character blinks).
IML DWN #	Internal error on the IP Trunk. System shuts down and sends and error message to the board.
MSHUT #, where both MSHUT and # are blinking	The system is in the process of shutting down due to a front panel button press. Do **not** attempt to remove board.
MSHUT #, where # is blinking	The system has shut down gracefully.

Support for Laptop PCs

Field technicians can access the TN802 circuit pack through:

1. ‘‘pcANYWHERE® Client Software’’
2. ‘‘Directly-Connected Keyboard, Monitor, Mouse’’

pcANYWHERE® Client Software

1. Attach a male-to-male serial cable and a NULL modem connector (if not built into the cable you use) to the COM2 connector (Note 8 in Figure 8-56 on page 8-1046) Attach the other end to the serial port of your laptop.
2. Launch the pcANYWHERE® application.
3. Click on Add Remote Control Item.
4. In the Properties window, choose the communication port to which you connected the cable in Step 1.
5. Click on Details and configure the settings (Table 8-417):

Table 8-417. Remote connection settings

Field	Value
Speed	38,400
Parity	None (default)
Flow Control	RTS/CTS
Started by	Carrier detect (DCD)
Ended by	Carrier detect (DCD)

6. Click on the new item icon, and the laptop connects to the host pcANYWHERE® application on the TN802 circuit pack.

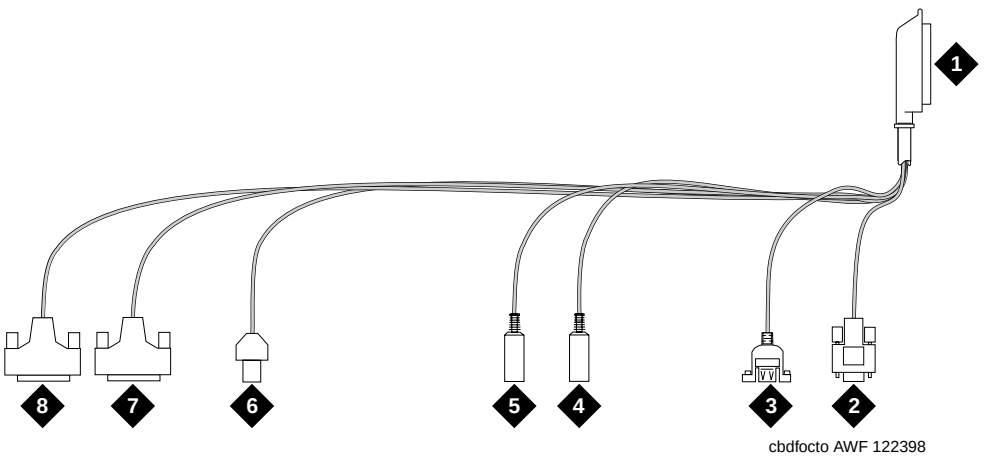

Figure Notes:

1. To TN802 cabinet backplane
2. VGA monitor
3. USB (Universal Serial Bus)
4. Keyboard
5. Mouse
6. Ethernet
7. 25-pin modem connection
8. 25-pin COM2 connection

Figure 8-56. TN802 external cable assembly

Directly-Connected Keyboard, Monitor, Mouse

NOTE:
You need 2 power sources for the monitor and the modem in order to complete this procedure.

NOTE:
The TN802 circuit pack must be booted with a local mouse and keyboard connected to it for these devices to work.

1. Connect the VGA monitor to the VGA connector of the TN802 external cable.
2. Plug the monitor into an AC power receptacle, and turn it on.
3. Attach the keyboard to the keyboard connector of the TN802 external cable assembly.
4. Attach the mouse to the mouse connector of the TN802 external cable assembly.
5. Insert the circuit pack to cause it to boot.

Troubleshooting LAN Connections

This section contains information for troubleshooting

- ‘‘External Connections to the LAN’’
- ‘‘Internal Connections to the LAN’’

External Connections to the LAN

Test the external connections to the LAN by pinging the local host, the external IP trunk server, and another device connected to the network.

1. Click Start in Windows (lower left-hand corner), then select Programs, then Command Prompt.

   This starts a DOS command-line session.

2. At the command prompt, type **ping 127.0.0.1** (the local host’s default address), and press Enter.

   If configured correctly, the system displays:

   `Reply from nnn.nn.nn.nn: bytes=32 time<##ms TTL=###`

   If there is no reply, escalate the problem or replace the circuit pack. The problem is not with the external network but within the circuit pack.

3. At the command prompt, type **ping *nnn.nn.nn.nn*** (the external IP trunk server's address), and press Enter.

   If configured correctly, the system displays:

   ```
   Reply from nnn.nn.nn.nn: bytes=32 time<##ms TTL=###
   ```

   If there is no reply, verify the IP address and check the physical connections to and from the TN802 circuit pack.

4. At the command prompt, type **ping *nnn.nn.nn.nn*** (the IP address of another computer on the network), and press Enter.

   If configured correctly, the system displays:

   ```
   Reply from nnn.nn.nn.nn: bytes=32 time<##ms TTL=###
   ```

   If there is no reply:

   a. Verify the IP address.

   b. Check the physical connections to and from the TN802 circuit pack.

   c. Check the internal cables on the TN802 circuit pack (Notes 4 and 6 in Figure 8-58 on page 8-1051).

   d. Try pinging another device in the same subnet.

   e. Try pinging the gateway to the rest of the network from the subnet.

   f. Try pinging a device outside the local subnet but inside the network or another subnet.

5. When finished, type **exit** at the command prompt, and press Enter.

Internal Connections to the LAN

Test the internal connections to the LAN by pinging the local host, an internal IP trunk server, and another device connected to the network.

1. Click Start in Windows (lower left-hand corner), then select Programs, then Command Prompt.

   This starts a DOS command-line session.

2. At the command prompt, type **ping 127.0.0.1** (the local host's default address), and press Enter.

   If configured correctly, the system displays:

   ```
   Reply from nnn.nn.nn.nn:  bytes=32 time <##ms TTL=###
   ```

   If there is no reply:

   a. Check that the internal cables on the TN802 circuit pack (Notes 4 and 6 in Figure 8-58) have not worked loose.

   b. Otherwise, replace the circuit pack.

3. At the command prompt, type **ping 10.32.64.97** (the internal IP trunk server's address), and press Enter.

   If configured correctly, the system displays:

   ```
   Reply from nnn.nn.nn.nn:  bytes=32 time <##ms TTL=###
   ```

   If there is no reply:

   a. Check that the internal cables on the TN802 circuit pack (Notes 4 and 6 in Figure 8-58) have not worked loose.

   b. Otherwise, replace the circuit pack.

4. At the command prompt, type **ping 10.32.64.96** (the IP address of the internal Motorola MPC860 processor), and press Enter.

   If configured correctly, the system displays:

   ```
   Reply from nnn.nn.nn.nn:  bytes=32 time <##ms TTL=###
   ```

   If there is no reply:

   a. Check that the internal cables on the TN802 circuit pack (Notes 4 and 6 in Figure 8-58) have not worked loose.

   b. Otherwise, replace the circuit pack.

5. Ping the gateway: at the command prompt, type **ping *XX.XXX.XXX.XXX*** (the IP address of the gateway), and press Enter.

6. When finished, type **exit** at the command prompt, and press Enter.

Board Assembly and Cables

Figure 8-57 shows the circuit pack with the two additional boards connected through the side plane.

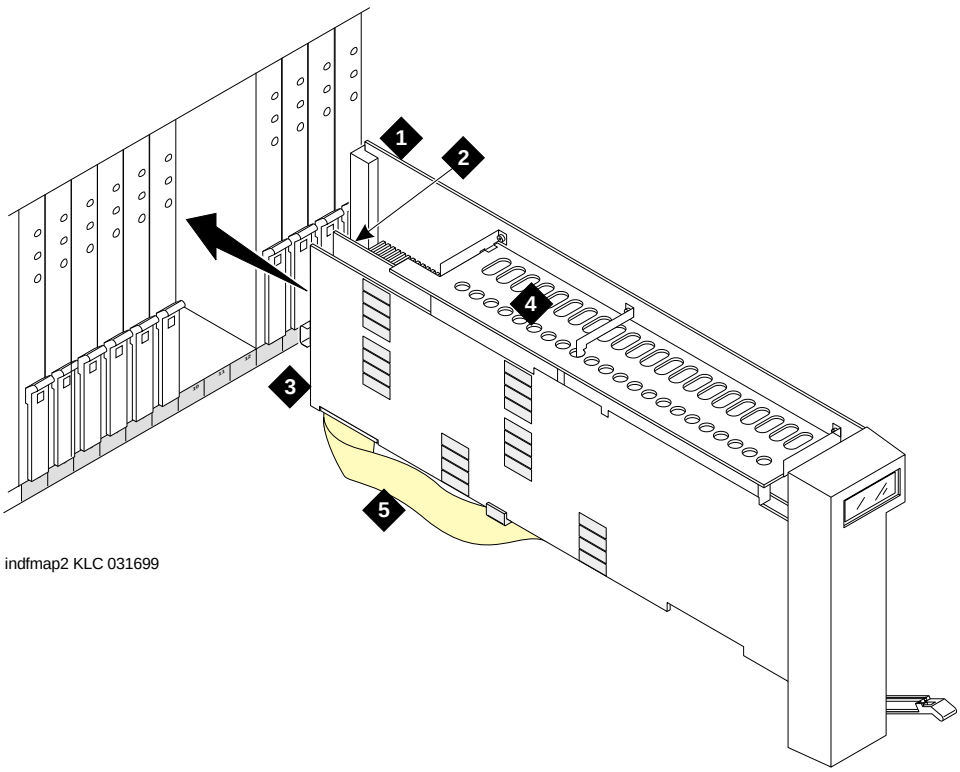

Figure Notes:

1. Main TN802 board
2. Texas Microsystems Inc. (TMI) board
3. Analogic board
4. Side plane
5. SCSA (Signal Computing System Architecture) ribbon cable

Figure 8-57. TN802 board assembly

Figure 8-58 shows a side view of the thee boards and interconnecting cables that make up the TN802.

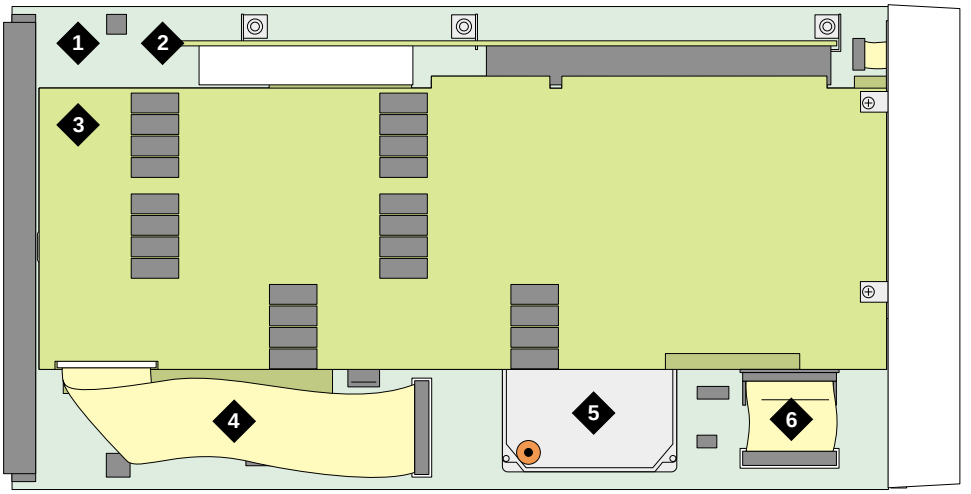

Figure Notes:

1. Main TN802 board
2. Side plane
3. Analogic board
4. SCSA (Signal Computing System Architecture) ribbon cable
5. Hard drive
6. Processor I/O ribbon cable

Figure 8-58. TN802 board assembly and cables (side view)

Figure 8-59 shows the end view of the thee boards and interconnecting cables on the TN802.

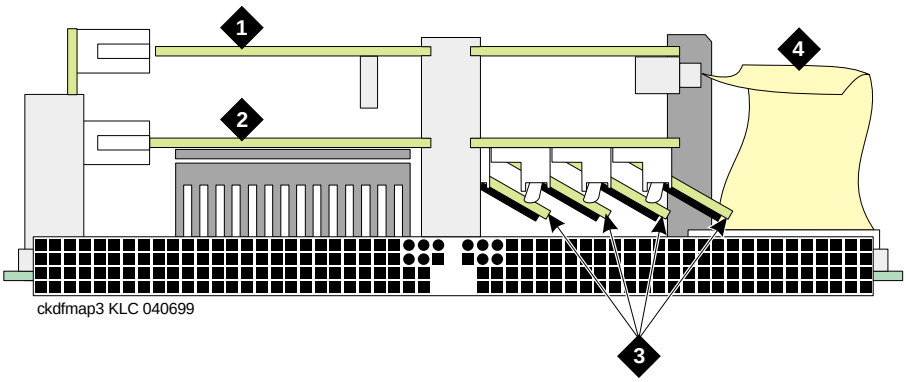

Figure Notes:

1. Analogic board
2. TMI (Texas Microsystems Inc.) board
3. SIMMs (memory)[1]
4. SCSA (Signal Computing System Architecture) ribbon cable

1. If the board is seated and you hear fast beeping, it means that one of the small boards containing the memory chips is dislodged. Secure the memory board firmly in the receptacle and reseat the circuit pack.

Figure 8-59. TN802 board assembly and cables (end view)

Replacing the Hard Disk

The TN802 hard drive (Note 5 in Figure 8-58) is field-replaceable.

Table 8-418. Replacing the TN802 hard drive

Step	Description	Comments
1.	Shut down NT.	Shut down Windows NT by either method described in the "Shutting Down NT on the TN802" section.
2.	Remove the circuit pack.	Unlatch the circuit pack, and remove it from the carrier.
3.	Remove the hard drive.	Remove the 2 screws, and lift the hard drive out of its mounting bracket.
4.	Replace the hard drive.	Position the new hard drive in the mounting bracket, and replace the 2 screws (Step 3).
5.	Replace the circuit pack.	Slide the circuit pack into the slot, and lock the latching lever.
6.	Wait for initialization.	Wait for: ■ the circuit pack to reseat (faceplate LEDs light then go out ■ Windows NT boots (PC BOOT displays on the faceplate LCD) ■ IP Trunk application to run (IP TRK # displays on the faceplate LCD)

Error Log Entries and Test to Clear Values

Table 8-419. MAPD (TN802) Error Log entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	test board UUCSS
1 (a)	0	Circuit pack removed or SAKI test (#53)	MIN/ WRN[2]	ON	
2 (b)					
18 (c)	0	busyout board UUCSS	WRN	OFF	release board UUCSS
257 (f)	Any	None			

Continued on next page

513 (g)	Any		MIN/ WRN[3]	ON	
514 (h)	46086		MIN/ WRN[3]	ON	
769 (i)	46085		MIN/ WRN[3]	ON	
770 (j)	46096		MIN/ WRN[3]	ON	
1025 (d)	4363	NPE Audit test (#50)			
1281	Any	Loss of Signal Alarm Inquiry test (#138)	MIN/ WRN[3]	OFF	test board UUCSS
1537 (k)	46082		MIN/ WRN[3]	ON	
1538 (l)	Any		MIN/ WRN[3]	ON	
1793	Any	Blue Alarm Inquiry test (#139)	MAJ/MIN/ WRN [3]	OFF	test board UUCSS
2049	Any	Red Alarm Inquiry test (#140)	MIN/WRN [3]	OFF	test board UUCSS
2305	Any	Yellow Alarm Inquiry test (#141)	MIN/ WRN[3]	OFF	test board UUCSS
2306	Any	Yellow Alarm Inquiry test (#141)	MIN/ WRN[3]	OFF	test board UUCSS
2561	Any	Major Alarm Inquiry test (#142)	MIN/ WRN[3]	OFF	**test board *UUCSS***
2817		Minor Alarm Inquiry test (#143)	MIN/ WRN[3]	OFF	**test board *UUCSS***

Table 8-419. MAPD (TN802) Error Log entries — *Continued*

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
3073 to 3160 (m)	Any	Slip Alarm Inquiry test (#144)	MIN/ WRN[3]	OFF	**test board *UUCSS* r 6**
3330 (n)	46083		MIN/ WRN[3]	ON	
3585 to 3601 (o)	Any	Misframe Alarm Inquiry test (#145)	MIN/ WRN[3]	OFF	**test board *UUCSS* r 6**
3840 (p)	Any	None			
3841 (q)	4358				
3842 (r)	46097				
3843 (s)	46081				
3999 (t)	Any	None			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. If ports are assigned to the circuit pack, then a minor alarm is raised. If no ports are assigned to the circuit pack, then a warning alarm is raised. The alarm is raised after the circuit pack has been missing for a period of 15 minutes. Warning alarms are also raised against any ports administered on the circuit pack.
3. Major alarms on this MO may be downgraded to minor or warning alarms based on values set in the **set options** command.

Notes:

a. **Error Type 1**—Indicates that the circuit pack has totally stopped functioning or is not fully administered. The alarm is logged about 15 minutes after the circuit pack has been removed or 11 minutes after the SAKI test (#53) fails.

   To be fully administered, a MAPD circuit pack must meet all of these conditions:

   - Have an entry in the circuit plan (**change circuit pack**)
   - Be administered (**add ds1 UUCSS**)
   - Be physically inserted into the correct slot

If the circuit pack has an entry in the circuit plan and either of the other two conditions are *not* met, a MINOR alarm is logged. To resolve the error, either:

1. Make sure the circuit pack is properly administered and that a functioning MAPD circuit pack is inserted in the correct slot

   or

   Completely remove the MAPD-BD from the system:

   a. Shut down NT (see ''Shutting Down NT on the TN802'')

   b. Remove any administered DS1 trunks, access endpoints, or PRI endpoints associated with the circuit pack from their respective trunk groups.

   c. Remove the DS1 (**remove ds1 UUCSS**) and circuit pack (**change circuit pack UUCSS**) administration.

If the circuit pack is properly administered and the red LED is still on, follow the instructions for LED Alarms with Error Type 1 in Chapter 7.

b. **Error Type 2**—NT is down and the system attempts to reset the board. If the reset fails, the board is probably bad.

   1. Replace the circuit pack.

c. **Error Type 18**—The circuit pack has been busied out.

   1. Release the board (**release board UUCSS**).

d. Error Type 23 and 1025: The MAPD-BD circuit pack is not completely administered. In addition to insertion, the MAPD circuit pack must have all of the following administration:

   - Have an entry in the circuit plan (**change circuit pack**)
   - Be administered as DS1 (**add ds1 UUCSS**)

   The MAPD circuit pack differs from others in that inserting it into the switch backplane is not enough to make the board usable.

e. **Error Type 125, no Aux Data**:—A wrong circuit pack is inserted in the slot where this circuit pack is logically administered. To resolve this problem, either:

   1. Remove the wrong circuit pack and insert the logically administered circuit pack

      or

      Re-administer this slot (**change circuit-pack**) to match the circuit pack inserted.

f. **Error Type 257**—This error is associated with the Common Port circuit pack maintenance test. See ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872 for details.

g. Error Type 513: transient hardware problem.

Aux Data:

4352	External RAM failure
4353	Internal RAM failure
4355	Internal ROM failure

1. If the same Error Type/Aux Data value occurs more than once in a 24-hour period, the circuit pack should be replaced. See ''Shutting Down NT on the TN802'' before removing the circuit pack.

If the MAPD board detects only one of these hardware problems, then the error is resolved when none of these faults are detected for 10 minutes.

h. **Error Type 514**—LAN External RAM Error; hardware fault in the PPE external RAM, used for message buffering to and from the packet bus. This error should not occur regularly.

1. If this error occurs 10 times within 30 minutes, replace the circuit pack. See ''Shutting Down NT on the TN802'' before removing the circuit pack.

i. **Error Type 769**—Transmit FIFO Underflow (threshold is 3 errors within 10 minutes); the circuit pack cannot find the “end of frame” bit when transmitting a frame to the packet bus.

1. Clear the alarm using the following command sequence:
   a. **busyout board *UUCSS***
   b. **reset board *UUCSS***
   c. **test board *UUCSS* long clear**
   d. **release board *UUCSS***
2. If the error recurs within 10 minutes, replace the circuit pack. See ''Shutting Down NT on the TN802'' before removing the circuit pack.

j. **Error Type 770**—Unable to Write LAN Translation RAM (threshold is 2 errors within 10 minutes); a call is aborted because there are no available translation RAM locations for the call connection attempt.

1. Clear the alarm using the following command sequence:
   a. **busyout board *UUCSS***
   b. **reset board *UUCSS***
   c. **test board *UUCSS* long clear**
   d. **release board *UUCSS***
2. If the error recurs within 10 minutes, replace the circuit pack. See ''Shutting Down NT on the TN802'' before removing the circuit pack.

k. **Error Type 1537**—LAN Bus Timeout; the circuit pack transmitted too many bytes on the LAN bus for a single frame. This condition may be caused by:

- an on-board fault
- faulty data received on one of the circuit pack's external ports. If any of the ports on this circuit pack are alarmed, refer to the repair procedures for those MOs.

If the error occurs 3 times within 10 minutes, the system raises the board alarm and isolates it from the packet bus.

1. Clear the alarm and restore the board to the packet bus using the following command sequence:

   a. **busyout board *UUCSS***

   b. **reset board *UUCSS***

   c. **test board *UUCSS* long clear**

   d. **release board *UUCSS***

2. If the problem persists, and there are no PKT-BUS alarms or port alarms, then replace the circuit pack. See ''Shutting Down NT on the TN802'' before removing the circuit pack.

l. **Error Type 1538**—Hyperactive circuit pack is out-of-service and may exhibit one or more of the following symptoms:

- The common circuit pack tests (for example, Test #50 and/or Test #52) abort with Error Code 2000.
- Port tests on this circuit pack return NO-BOARD.
- A busyout/release of the circuit pack has no effect on test results.
- A **list configuration** command shows that the circuit pack and ports are properly installed.

The circuit pack is isolated from the system, and every trunk or port on this circuit pack is placed into the out-of-service state. The system attempts to restore the circuit pack within 20 – 30 minutes. When no faults are detected for 20 – 30 minutes, the MAPD Interface circuit pack is restored to normal operation, and every trunk or port on the MAPD Interface circuit pack returns to the in-service state.

1. If the board is not restored to normal operation or the error recurs after the board is restored to normal operation, escalate the problem.

m. **Error Type 3073 – 3160**—Board is reporting slip errors. Aux Data shows the last reported slip count.

n. **Error Type 3330**—LAN Critical error; critical failure in the packet-bus interface to the circuit pack. This failure may be due to an on-board or a packet-bus fault.

   1. If the packet bus is alarmed, see ''PKT-BUS (Packet Bus)'' for recommended repair procedures.

      If not, clear the alarm and restore the board to the packet bus using the following command sequence:

      a. busyout board *UUCSS*

      b. reset board *UUCSS*

      c. test board *UUCSS* clear

      d. release board *UUCSS*

   2. If the problem persists, and there are no PKT-BUS alarms, then replace the circuit pack. See ''Shutting Down NT on the TN802'' before removing the circuit pack.

o. **Error Type 3585 - 3601**—The board received misframe errors; the Aux Data shows the last reported misframe count.

p. **Error Type 3840**—The circuit pack received a bad control channel message from the switch. This error is not service-affecting, and requires no action. The Aux Data describes the following error events:

4096	Bad major heading
4097	Bad port number
4098	Bad data
4099	Bad sub-qualifier
4100	State inconsistency
4101	Bad logical link

q. **Error Type 3841**—The circuit pack detected a transient hardware logic error (for example, program logic inconsistency). This error resolves when no faults are detected for 100 minutes. The value in `Aux Data` field (4358) indicates the type of hardware problem.

r. **Error Type 3842**—Bad Translation RAM Location Found error; the call continues by using another translation location. This error is not service-affecting and requires no action.

s. **Error Type 3843**—LAN Receive Parity error; the circuit pack detected an error in a received frame from the packet bus. These errors are most likely caused by a packet-bus problem, but may be due to a circuit-pack fault.

   1. Determine whether the problem is isolated to this circuit pack or the problem is caused by packet-bus faults (see the PKT-BUS MO).

t. **Error Type 3999**—The circuit pack sent a large number of control-channel messages to the switch within a short period of time.

Error Type 1538 (hyperactivity) also present?	Then the switch:
Y	Takes the circuit pack out-of-service due to hyperactivity
N	Does not take the circuit pack out-of-service, but the circuit pack has generated 50% of the messages necessary to be considered hyperactive. This may be normal during heavy traffic periods.

Shutting Down NT on the TN802

Before removing the TN802 circuit pack from the carrier, shut Windows NT™ down first by *following either procedure* described in Table 8-420:

Table 8-420. Windows NT shutdown procedures

Step	Faceplate button	PC interface
1.	Push the recessed button on the front faceplate and hold it in.	Click on the “Start” button in the lower left-hand corner.
2.	“M shut” flashes on the LCD display	Click on “Shut Down.”
3.	When shutdown is complete, “MSHUT #” displays (“#” is blinking).	Choose the “Shut down the computer?” radio button.
4.	Remove the circuit pack.	Click on “OK.”
5.		Wait for the message indicating that shutdown is complete.
6.		Remove the circuit pack.

System Technician-Demanded Tests: Descriptions and Error Codes

Investigate tests in the order they are presented in Table 8-421. For example, by clearing error codes associated with the NPE Connection Audit test (#50), you may also clear errors generated from other tests in the testing sequence.

Table 8-421. System Technician-Demanded Tests

Order of Investigation	Apply to TN802?[1]	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[2]
NPE Connection Audit test (#50)	Y		X		ND
Control Channel Loop test (#52)	Y		X		ND
Loss of Signal Alarm Inquiry test (#138)	N	X	X		ND
Blue Alarm Inquiry test (#139)	N	X	X		ND
Red Alarm Inquiry test (#140)	N	X	X		ND
Yellow Alarm Inquiry test (#141)	N	X	X		ND
Major Alarm Inquiry test (#142)	N	X	X		ND
Minor Alarm Inquiry test (#143)	N	X	X		ND
Slip Alarm Inquiry test (#144)	N	X	X		ND
Misframe Alarm Inquiry test (#145)	N	X	X		ND
Translation Update test (#146)	N	X	X		ND
SAKI Sanity test (#53)	Y			X	D

1. N = No; this test either passes or ABORTS with Error Code 2000 (problem with NT)
2. D = Destructive; ND = Nondestructive

NPE Connection Audit Test (#50)

The system sends the circuit pack's on-board microprocessor a message to update the network-connectivity translation for its SCOTCH-NPE chip.

Table 8-422. Test #50 NPE Connection Audit Test

Error Code	Test Result	Description / Recommendation
None 2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1019	ABORT	The test aborted because a test was already running on the port. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	The circuit pack's SCOTCH-NPE chip has been updated with its translation.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Ensure that the board translations are correct. Execute the **add ds1 *UUCSS*** command to administer the MAPD interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board re-initializes it. 3. If the board was found to be correctly inserted in Step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Control Channel Loop-Around Test (#52)

This test queries the circuit pack for its circuit pack code and vintage and verifies its records.

Table 8-423. Test #52 Control Channel Loop-Around Test

Error Code	Test Result	Description / Recommendation
None 2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The circuit pack failed to return the circuit pack code or vintage. 1. Retry the command up to 5 times. 2. If the problem continues, and if the circuit pack is one of the Port circuit packs, replace the circuit pack.
	PASS	Communication with this circuit pack is successful.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Ensure that the board translations are correct. Execute the **add ds1 *UUCSS*** command to administer the MAPD interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board re-initializes it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

SAKI Sanity Test (#53)

This test is destructive.

This test resets the circuit pack. The test is highly destructive and can only be initiated by a system technician-demanded **reset board *UUCSS*** command.

Table 8-424. Test #53 SAKI Sanity Test

Error Code	Test Result	Description / Recommendation
None	ABORT	System resources required for this test are not available. 1. Retry the **reset board** command at 1-minute intervals up to 5 times.
1015	ABORT	Port is not out-of-service. 1. Busyout the circuit pack (**busyout board *UUCSS***). 2. Execute the **reset board** command again.
2100	ABORT	System resources required for this test are not available. 1. Retry the **reset board** command at 1-minute intervals up to 5 times.
1 2	FAIL FAIL	The circuit pack failed to reset. The circuit pack failed to restart. 1. Execute the **reset board** command again. 2. If the problem persists, replace the circuit pack.
	PASS	The circuit pack initializes correctly. 1. Run the short test sequence.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Ensure that the board translations are correct. Execute the **add ds1 *UUCSS*** command to administer the MAPD interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board re-initializes it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Loss of Signal Alarm Inquiry Test (#138)

This test is meaningless for the TN802 MAPD circuit pack. Table 8-425 details the test results.

Table 8-425. Loss of Signal Inquiry Test (#138) results

Windows NT up on the TN802?	Then	Cause
Y	Test passes	
Y	Test aborts with ABORT 2000 Error Code.	Windows NT is not communicating with the angel firmware.
N	Test aborts with ABORT 2000 Error Code.	Windows NT down.

Blue Alarm Inquiry Test (#139)

This test is meaningless for the TN802 MAPD circuit pack. Table 8-426 details the test results.

Table 8-426. Blue Alarm Inquiry Test (#139) results

Windows NT up on the TN802?	Then	Cause
Y	Test passes	
Y	Test aborts with ABORT 2000 Error Code.	Windows NT is not communicating with the angel firmware.
N	Test aborts with ABORT 2000 Error Code.	Windows NT down.

Red Alarm Inquiry Test (#140)

This test is meaningless for the TN802 MAPD circuit pack. Table 8-427 details the test results.

Table 8-427. Red Alarm Inquiry Test (#140) results

If Windows NT is up on the TN802	When the switch confirms Red alarm:
Y	Test passes
N	Test aborts with ABORT 2000 Error Code.

Yellow Alarm Inquiry Test (#141)

This test is meaningless for the TN802 MAPD circuit pack. Table 8-428 details the test results.

Table 8-428. Yellow Alarm Inquiry Test (#141) results

If Windows NT is up on the TN802	When the switch confirms Yellow alarm:
Y	Test passes
N	Test aborts with ABORT 2000 Error Code.

Major Alarm Inquiry Test (#142)

This test is meaningless for the TN802 MAPD circuit pack. Table 8-429 details the test results.

Table 8-429. Major Alarm Inquiry Test (#142) results

If Windows NT is up on the TN802	When the switch confirms Major alarm:
Y	Test passes
N	Test aborts with ABORT 2000 Error Code.

Minor Alarm Inquiry Test (#143)

This test is meaningless for the TN802 MAPD circuit pack. Table 8-430 details the test results.

Table 8-430. Minor Alarm Inquiry Test (#142) results

If Windows NT is up on the TN802	When the switch confirms Minor alarm:
Y	Test passes
N	Test aborts with ABORT 2000 Error Code.

Slip Alarm Inquiry Test (#144)

This test is meaningless for the TN802 MAPD circuit pack. Table 8-431 details the test results.

NOTE:
The query for slips always returns a 0 count.

Table 8-431. Slip Alarm Inquiry Test (#144) results

If Windows NT is up on the TN802	When the switch confirms Slip alarm:
Y	Test passes
N	Test aborts with ABORT 2000 Error Code.

Misframe Alarm Inquiry Test (#145)

This test is meaningless for the TN802 MAPD circuit pack. Table 8-432 details the test results.

NOTE:
The query for misframes always returns a 0 count.

Table 8-432. Misframe Alarm Inquiry Test (#145) results

If Windows NT is up on the TN802	When the switch confirms Misframe alarm:
Y	Test passes
N	Test aborts with ABORT 2000 Error Code.

Translation Update Test (#146)

The Translation Update test sends the circuit pack-level information to the MAPD Interface circuit pack. Translation includes the following data administered for a MAPD Interface circuit pack (report from **display ds1 *UUCSS*** command):

- DS1 Link Length between two DS1 endpoints
- Synchronization Source Control
- All Zero Suppression
- Framing Mode
- Signaling Mode
- Time Slot Number of the 697-Hz tone
- Time Slot Number of the 700-Hz tone

Table 8-433. Test #146 Translation Update Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system software error. 1. Verify the MAPD Interface circuit pack translation (**display ds1 *UUCSS***).
	PASS	Translation data has been downloaded to the MAPD Interface circuit pack successfully.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Ensure that the board translations are correct. Execute the **add ds1 *UUCSS*** command to administer the MAPD interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board re-initializes it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

MEDPRO (Media Processor MAPD Circuit Pack)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
MEDPRO	MAJOR	**test board *UUCSS* sh**	Media Processor MAPD circuit pack
MEDPRO	MINOR	**test board *UUCSS* l**	Media Processor MAPD circuit pack
MEDPRO	WARNING	**test board *UUCSS* sh**	Media Processor MAPD circuit pack

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21).

The TN802B MedPro circuit board provides voice over IP connectivity. The TN802B can run either:

- R8.1 IP Trunk application — allows the TN802B to emulate a DS1 circuit pack. In this mode, the circuit pack is maintained as a standard DS1 board with its associated Tie trunk ports. The TN802B operates as an integrated Internet Telephony server (ITS). It communicates with other ITS boxes or IP trunk boards.
- the Media Processor (MedPro) application — allows the TN802B to act as a service circuit to terminate generic RTP streams used to carry packetized audio over an IP network. As part of the overall H.323 implementation, the TN802B or later circuit pack handles the audio streams while the TN799DP C-LAN handles the TCP/IP signaling channels. This maintenance plan applies only to a TN802B MedPro running the Media Processor application.

The MedPro hardware combines an angel complex, a Windows NT PC and a TAP802 DSP card in a 3-slot package. When operating as an IP trunk circuit pack, the MedPro emulates a DS1 Tie Trunk circuit pack and blindly responds to DS1 trunk maintenance requests. Actual maintenance is accomplished via the windows NT interface and the ITS software diagnostics.

The Media Processor application is built upon the existing ITS software, and as such is not administered in S8700 Multi-Connect as a DS1 trunk, and does not emulate a DS1 for maintenance purposes. Use the following Maintenance procedures for this application.

Error Log Entries and Test to Clear Values

Table 8-434. DS1 Interface Circuit Pack Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test board UUCSS**
1(a)	0	Circuit pack removed or SAKI test (#53)	MINOR WARNING[2]	ON	
18(b)	0	**busyout board *UUCSS***	WARNING	OFF	**release board UUCSS**
23(c)	0		WARNING	OFF	**add ds1 UUCSS**
125(d)	None	None	MINOR WARNING[3]	ON	
257(e)	6553 5	Control Channel Loop test (#52)	MINOR	ON	**test board UUCSS l r 2**
1538(f)	Any	Hyper activity	MINOR WARNING[3]	ON	
1793	Any	NIC Loss Of Signal	MINOR WARNING[3]		**test board UUCSS l r 2**
2049(g)	Any	NT PC Failure	MINOR WARNING[3]		**reset board UUCSS**
2305	Any	IP Address Inconsistency			**test board UUCSS l r 2**
2561	Any	Ping Error	MINOR WARNING[3]		**test board UUCSS l r 5**
3841(h)	4358		Log Only		
3999(i)	Any	None			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. If ports are assigned to the circuit pack, then a minor alarm is raised. If no ports are assigned to the circuit pack, then a warning alarm is raised. The alarm is raised after the circuit pack has been missing for a period of 15 minutes. Warning alarms are also raised against any ports administered on the circuit pack.
3. Minor alarms on this MO may be downgraded to warning alarms based on values set in the **set options** command.

Notes:

a. **Error Type 1** - indicates that the circuit pack has totally stopped functioning or is not fully administered. The alarm is logged about 15 minutes after the circuit pack has been removed or 11-minutes after the SAKI test (#53) fails.

   To be fully administered, a MedPro circuit pack must meet *all of these 4 conditions*:

   1. Have an entry in the circuit pack form (**change circuit pack**)
   2. Have the MedPro IP address administered (**change node-names**)
   3. Be enabled (**change ip-interface**)
   4. Be physically inserted into the correct slot

   If the circuit pack has an entry in the circuit pack form and either of the other two conditions are *not* met, a MINOR alarm is logged. To resolve the error either

   1. Make sure every condition for administration is met and that a functioning MedPro circuit pack is inserted in the correct slot.

      or

      Completely remove the MedPro from the system using the following steps:

      a. Remove the administered IP-Interface associated with the circuit pack.
      b. Physically remove the circuit pack from the slot.
      c. Execute the **remove medpro *UUCSS*** and **change circuit pack *UUCSS*** commands.

b. **Error Type 18** -The MedPro Interface circuit pack has been busied out by a **busyout board *UUCSS*** command.

   1. Release the circuit pack (**release board *UUCSS***).

c. **Error Type 23** -The MedPro circuit pack is not completely administered. To be fully administered, a MedPro circuit pack must meet *all of these 4 conditions*:

   1. Have an entry in the circuit plan (**change circuit pack**)
   2. Have the MedPro IP address administered (**change node-names**)
   3. Be enabled (**change ip-interface**)
   4. Be physically inserted into the correct slot.

   A DS1 (MEDPRO, MAPD, UDS1-BD and DS1-BD) differs from most circuit packs in that inserting the circuit pack into the switch is not enough to make the board usable. It must also be administered.

d. **Error Type 125** - no Aux Data: The wrong circuit pack is inserted in the slot where this circuit pack is logically administered.

   1. Remove the wrong circuit pack and insert the logically administered circuit pack

      or

      Re-administer this slot to match the circuit pack inserted (**change circuit-pack**).

e. **Error Type 257** - is associated with the Common Port circuit pack maintenance test. See ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872 for details.

f. **Error Type 1538** - is used to indicate hyperactivity on the circuit pack. Hyperactivity on a circuit pack occurs when the angel is sending too many CCMS messages uplink, 400 per ten seconds for the TN802B, to switch software. The circuit pack will be taken out of service. See error Type 3999.

g. **Error Type 2049** - indicates that the operating system is down. An attempt is made to reset the board automatically. If the reset fails, the board is probably bad and should be replaced.

h. **Error Type 3841** - inconsistent downlink message. This error is not service-affecting. No action is required.

i. **Error Type 3999** - indicates that the circuit pack sent a large number of control channel messages to the switch within a short period of time. If Error Type 1538 is also present, then the circuit pack was taken out-of-service due to hyperactivity. If Error Type 1538 is absent, then the circuit pack was not taken out-of-service, but it has generated 50% of the messages necessary to be considered hyperactive. This may be completely normal during heavy traffic periods. However, if this error type is logged when the circuit pack is being lightly used, it may indicate a problem with the circuit pack or the equipment attached to it.

System Technician-Demanded Tests: Descriptions and Error Codes

Investigate tests in the order they are presented in Table 8-435. For example, by clearing error codes associated with the Control Channel Loop test (#52), you may also clear errors generated from other tests in the testing sequence.

Table 8-435. System Technician-Demanded Tests

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
Control Channel Loop test (#52)		X		ND
SAKI Sanity test (#53)			X	D
IP Address Query (#1371)	X	X		D
NIC Query test (#1383)	X	X		ND
PING test (#1379)	X	X		ND
NT Reset test (#1381)			X	D

1. D = Destructive; ND = Nondestructive

Control Channel Loop-Around Test (#52)

This test queries the circuit pack for its circuit pack code and vintage and verifies its records.

Table 8-436. Test #52 Control Channel Loop-Around Test

Error Code	Test Result	Description / Recommendation
None 2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The circuit pack failed to return the circuit pack code or vintage. 1. Retry the command up to 5 times. 2. If the problem continues, and if the circuit pack is one of the Port circuit packs, replace the circuit pack. 3. Retry the command up to 5 times.
	PASS	Communication with this circuit pack is successful.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Ensure that the board translations are correct. Administer the MedPro interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board re-initializes it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board *UUCSS*** command. 4. Issue the **reset board *UUCSS*** command. 5. Issue the **release board *UUCSS*** command. 6. Issue the **test board *UUCSS* long** command. This should re-establish the linkage between the internal ID and the port.

SAKI Sanity Test (#53)

This is a destructive test.

This test is only run as a part of a reset board procedure. For the Media Processor, it is necessary to use the **change ip-interfaces** form to disable the Media Processor IP interface before performing this reset board procedure. Other common circuit packs can be reset with the **reset board *UUCSS*** command which also executes this test.

A reset of this circuit pack will take about 3½ minutes.

Table 8-437. Test #53 SAKI Sanity Test

Error Code	Test Result	Description / Recommendation
None	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1015	ABORT	Port is not out-of-service. 1. Busyout the circuit pack. 2. Execute command again.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
2803	ABORT	It is necessary to reset the board. 1. Use the **change ip-interfaces** form to disable the Media Processor IP interface. 2. Execute the command again.
1	FAIL	The circuit pack failed to reset.
2	FAIL	The circuit pack failed to restart. 1. Execute command again. 2. If the problem persists, replace the circuit pack.
	PASS	The circuit pack initializes correctly. 1. Run the short test sequence.
Any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up. Otherwise, there is some inconsistency between the physical configuration and the data kept in the system. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Retry the command at 1-minute intervals up to 5 times.

IP Address Query Test #1371

This test is destructive.

The Media Processor has two interfaces for configuring the board: through the NT PC interface, and the SAT via CCMS messages. For R10 DoLAN, the SAT via CCMS is the only approved interface. However, the NT PC interface cannot easily be disabled. It is possible that changes can be made via the NT PC interface that cause the Media Processor board to be inconsistent with S8700 Multi-Connect translations. The area of concern is the IP address, subnet mask, and gateway translation.

This test sends the Media Processor the IP address, subnet mask, and gateway translation (IP parameters). If the parameters do not match S8700 Multi-Connect translations, the new values are written into the Windows registry, and the NT PC asks the maintenance sub-system to reboot the board. The board goes through a physical board removal and insertion.

When this test fails, it is an indication that an illegal change was made and the customer should be notified. Also, writing the IP address parameters to the registry requires NT to reboot. If the IP addresses match, there is no need to update the registry and reboot NT.

Table 8-438. Test #1371 IP Address Query Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Insufficient system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2801	ABORT	Unable to find IP address data for this location. Verify that the board is administered.
2807	ABORT	The board is administered, but not enabled in the **change ip-interfaces** form.
	FAIL	The IP address, subnet mask, and gateway translation parameters do not match S8700 Multi-Connect translations. After the new values are written into the Windows registry, the NT PC must go through a reboot. The board goes through a physical board removal and insertion. 1. If the problem persists, replace the circuit pack.
	PASS	Translation data matches the Windows Registry.

Ping Test (#1379)

This test is nondestructive

This test verifies that the MedPro circuit pack can communicate to other nodes on the LAN.

This test pings the gateway IP address as defined on the **IP Interface** form.

If the PING is successful, this test looks at the PING round trip delay. If a round trip delay of greater than 4 seconds is reported, a separate error is logged. Excessive round trip delays do not take the MedPro out of service.

Services can execute the standard PING command using the C-LAN board address and MedPro IP address to see the actual round-trip delay. (See **ping** commands).

This test is a nondestructive test. It runs because of in-line errors, during periodic and schedule maintenance, and on demand.

Table 8-439. Test #1379 Ping Test

Error Code	Test Result	Description / Recommendation
1, 2	ABORT	Internal Error. 1. Retry the command at 1-minute intervals up to 3 times.
7	ABORT	Destination unreachable. 1. Verify that at least one destination reachable through this port is up. 2. Repeat the test. 3. If the test still aborts, escalate the problem.
2000	ABORT	Response to the test was not received from the Media Processor circuit pack within the allowable time period. 1. If this result occurs repeatedly, attempt to reset the circuit pack. Reset the circuit pack by issuing the **busyout board *UUCSS*** and the **reset board *UUCSS*** commands. 2. If this result occurs again, replace the circuit pack.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times.
2100	ABORT	The necessary system resources to execute the test could not be allocated. 1. Retry the command at 1-minute intervals up to 5 times.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times.

Continued on next page

Table 8-439. Test #1379 Ping Test — *Continued*

Error Code	Test Result	Description / Recommendation
2801	ABORT	No IP address defined. Verify IP Interfaces translations and retest.
2802	ABORT	Different IP address pinged than software had allocated for the test. 1. Retry the command at 1-minute intervals up to 3 times.
2805	FAIL	The number of pings received did not match the number sent (normally one ping sent). This means that no ping responses were received from the gateway defined on the ip-interfaces form for the Media Processor. 1. Retry the command at 1-minute intervals up to 3 times.
2807	ABORT	The board is administered, but not enabled in the **change ip-interfaces** form.
7, 89, 1007	FAIL	Ping to the destination failed through this port due to the destination down. 1. Verify that at least one destination reachable through this port is up. 2. Once verified, execute **test port *UUCSSpp*** command to verify that the H.323 Signaling Group Ping test (#1387) passes.
	PASS	Ping through this port successful.

NT Reset Test (#1381)

This test is destructive.

This test resets the circuit pack. The test is highly destructive and can only be initiated by a system technician-demanded **reset board *UUCSS*** command.

Table 8-440. Test #1381 NT Reset Test

Error Code	Test Result	Description / Recommendation
None	ABORT	System resources required for this test are not available. 1. Retry the **reset board *UUCSS*** command at 1-minute intervals up to 5 times.
1015	ABORT	Port is not out-of-service. 1. Busyout the circuit pack (**busyout board *UUCSS***). 2. Execute the **reset board *UUCSS*** command again.

Continued on next page

Table 8-440. Test #1381 NT Reset Test — *Continued*

Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available. 1. Retry the **reset board *UUCSS*** command at 1-minute intervals up to 5 times.
1	FAIL	The circuit pack failed to reset.
2	FAIL	The circuit pack failed to restart. 1. Execute the **reset board *UUCSS*** command again. 2. If the problem persists, replace the circuit pack.
	PASS	The circuit pack initializes correctly. 1. Run the short test sequence.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Ensure that the board translations are correct. Administer the MEDPRO interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board re-initializes it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board *UUCSS*** command. 4. Issue the **reset board *UUCSS*** command. 5. Issue the **release board *UUCSS*** command. 6. Issue the **test board *UUCSS* long** command. This should re-establish the linkage between the internal ID and the port.

NIC Query Test (#1383)

This test is nondestructive.

This test passes if the Ethernet port is connected, and you can talk on the network. Otherwise, it fails with no fail code or AUX data.

Table 8-441. Test #1383 NIC Query Test

Error Code	Test Result	Description / Recommendation
None	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1015	ABORT	Port is not out-of-service. 1. Busyout the circuit pack (**busyout board *UUCSS***). 2. Execute the command again.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The Ethernet port is not connected, and you cannot talk on the network.
	PASS	The Ethernet port is connected, and you can talk on the network.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Ensure that the board translations are correct. Administer the MedPro interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board re-initializes it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board *UUCSS*** command. 4. Issue the **reset board *UUCSS*** command. 5. Issue the **release board *UUCSS*** command. 6. Issue the **test board *UUCSS* long** command. This should re-establish the linkage between the internal ID and the port.

MEDPROPT (TN802/TN2302 MED PRO DSP PORT)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run	Full Name of MO
MEDPROPT	MINOR WARNING	**test port *UUCSS* | PCSS [short/long] [*repeat#*] | [clear]**	TN802/TN2302 MEDPRO DSP PORT

The MEDPROPT MO monitors the health of the MEDPRO digital signal processors (DSPs).

The TN802B/TN2302 MAP-D (Multi-Application Platform for DEFINITY) Media Processor circuit pack provides the audio bearer channels for H.323 voice over IP calls. One TN802B/TN2302 circuit pack has one MEDPROPT media processing resource. Based on system administration of audio codecs, a MEDPROPT can handle either 31 or 22 simultaneous channels of H.323 audio processing. If the **ip-parameters** form specifies only G.711 mu-law or G.711 a-law as the audio codecs, the MEDPROPT can service 31 channels. If any other codec type (G.723-5.3K, G.723-6.3K, or G.729) is administered, the MEDPROPT can only service 22 channels.

The MEDPROPT is physically made up of 11 individual DSPs, but is treated logically as one port. If individual DSPs on the TN802B/TN2302 MAPD fail, the MEDPROPT remains in-service at lower capacity.

The MEDPROPT is a shared service circuit. It is shared between H.323 trunk channels and H.323 stations. An idle channel is allocated to an H.323 trunk/station on a call-by-call basis.

Error Log Entries and Test to Clear Values

Table 8-442. MEDPROPT Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	test board UUCCSS
1 (a)	ANY	DSP Capacity test (#1382)		ON	test board UUCCSS l r5
18 (b)	0	busyout port UUCSS	WARNING	OFF	release port UUCCSS
258 (c)	ANY	DSP Capacity test (#1382)	WARNING	ON	test board UUCCSS l r5
513 (d)		DSP Capacity test (#1382)	MINOR	ON	test port UUCCSSpp

Continued on next page

Table 8-442. MEDPROPT Error Log Entries — *Continued*

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
515 (e)	ANY	DSP Capacity Query test (##1382)	MINOR	ON	test board UUCCSS l r5
769	Any	TDM NIC Loop-Around test (#1380)	MINOR	ON	test port UUCCSS l r10
1025 (f)	Any				

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. **Error Type 1** - For the TN802B only, this error type indicates that less than three DSPs are OOS (out of service), and no alarm is raised. The `Aux Data` field contains the number of DSPs that are OOS.

b. **Error Type 18** - the MEDPRO has been busied out by a **busyout port *UUCSS*** command.

   1. Release the port (**release port *UUCSS***).

c. **Error Type 258** - For the TN802B only, this error type indicates that more than three, but less than 9 DSPs are OOS (out of service), and a WARNING alarm is raised. The `Aux Data` field contains the number of DSPs that are OOS.

d. **Error Type 513 -** For the TN2302 only, the port is OOS (out of service) because an associated DSP is bad.

e. **Error Type 515** - For the TN802B only, this error type indicates that every DSP is OOS (out of service), and a MINOR alarm is raised. The `Aux Data` field contains the number of DSPs that are OOS.

f. **Error Type 1025** - The port is OOS (out of service) because of a board-level failure. Check for errors/alarms against the board; in particular, ping problems, IP address inconsistency, or board sanity problems.

   1. Verify correct administration.
   2. Check cabling and customer network before replacing circuit pack.

System Technician-Demanded Tests: Descriptions and Error Codes

Investigate tests in the order they are presented in Table 8-443. For example, by clearing error codes associated with the DSP Capacity Query test (#1382), you may also clear errors generated from the other tests in the testing sequence.

Table 8-443. System Technician-Demanded Tests

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
DSP Capacity Query (#1382)		X	ND
TDM NIC Loop-around test (#1380)		X	ND
Port Status test (#1407)	X	X	ND

1. D = Destructive; ND = Nondestructive

DSP Capacity Query Test (#1382)

This test is nondestructive

For the TN802B

When using theTN802B, this test polls the circuit pack for the number of failed DSPs. If every DSP is functional, the test passes and the board is operating at maximum capacity. If any DSPs have failed, the test fails and reports the number of failed DSPs.

A failure of 3 or fewer DSPs does not result in an alarm. A failure of more than 3 and up to 8 DSPs results in a warning alarm. A failure of more than 8 DSPs results in a minor alarm. In all cases, except when every DSP fails, the MEDPROPT continues to provide reduced capacity.

For the TN2302

When using the TN2302 this test polls the circuit pack for the state of health of a specific DSP. If the DSP is bad, an error will be logged and the board will be polled again. If the circuit pack is still failing, the DSP will be taken out of service and a MINOR alarm will be raised.

Table 8-444. DSP Capacity Query Test (#1382)

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
1-11	FAIL	Some DSPs on the circuit pack have failed. The FAIL code is the number of bad DSPs reported (TN802B only).
	FAIL	For the TN2302 only, the DSP failed. If it continues to fail, it will be taken out of service.
	PASS	All 11 DSPs are functioning and in-service.
0	NO BOARD	No board was detected by the test. 1. Check the Error Log for wrong board (Error Type 125) or no board (Error Type 131). Resolve either of these issues, if applicable. 2. Check that the board is properly translated and inserted. If so, check for hyperactivity. If hyperactive, use the **reset board *UUCSS*** command. 3. Run the test again. If it fails, the circuit pack may be bad. Replace the circuit pack and retest.

TDM NIC Loop-Around Test (#1380)

This test is nondestructive

This test sets up a loop-back path from the TDM bus out to the NIC edge of the Media Processor and back to the TDM bus. The loop back is established by setting up the outbound IP connection to send IP packets to the MedPro's own IP address. The tone generator places a test tone (440Hz) onto a timeslot. The timeslot is listened to by the Media Processor board. The tone is routed through the TAP802/2302 DSP farm, where it may undergo transcoding to G.723, etc. The tone is looped back at the Network interface and back through the TAP802/2302 where it is converted back into standard PCM. The tone is placed onto a TDM timeslot and detected by a tone detector port. The test passes if 440Hz is reported by the tone detector

Table 8-445. TDM NIC Loop-Around Test (#1380)

Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate timeslots for the test. The system may be under heavy traffic conditions, or it may have timeslots out of service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, retry the command at 1-minute intervals up to 3 times. 2. If the system has TDM-BUS errors, clear any errors, and retry the command at 1-minute intervals up to 3 times. 3. If the command continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present, or some Tone Detectors may be out of service. 1. Resolve any TTR-LEV errors. Even if there are no TTR-LEV errors, there may not be a Tone Detector available on the network that contains the circuit pack being tested. Verify that there is at least one Tone Detector on this network. This does not harm the system. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the command at 1-minute intervals up to 3 times.
2000	ABORT	Response to the test was not received in the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.

Continued on next page

Table 8-445. TDM NIC Loop-Around Test (#1380) — *Continued*

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times.
2801	ABORT	The TN802B/TN2302 Media Processor board has not been administered on the **ip-interfaces** form.
ANY	FAIL	The test did not detect the test tone through the looparound connection. 1. Test the tone-clock in the port network that contains the media processor under test. 2. If the tone-clock is healthy, test the media processor board again. 3. If the test continues to fail, replace the media processor board.
	PASS	The board is functioning properly.
0	NO BOARD	No board was detected by the test. 1. Resolve either wrong board (Error 125) or no board (Error 131) issues, if applicable. 2. Check that the board is properly translated and inserted. If so, check for hyperactivity (Error 1538). If hyperactive, use the **reset board *UUCSS*** command. 3. Run the test again. If it fails, the NCE chip on board may be bad. Replace the board and retest.

Port Status Query Test (#1407)

This test is nondestructive

This test queries the Port status.

Table 8-446. port Status Query Test (#1407)

Error Code	Test Result	Description / Recommendation
1	ABORT	This port is Out of service (OOS) due to: ■ A board-level problem, for example no IP address has been translated for this location. ■ A DSP hardware problem (See "TDM NIC Loop-Around Test (#1380)" and "DSP Capacity Query Test (#1382)".
2	ABORT	This port has been made maintenance busy
1002	ABORT	The system could not allocate timeslots for the test. The system may be under heavy traffic conditions, or it may have timeslots out of service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, retry the command at 1-minute intervals up to 3 times. 2. If the system has TDM-BUS errors, clear any errors, and retry the command at 1-minute intervals up to 3 times. 3. If the command continues to abort, escalate the problem.
2000	ABORT	Response to the test was not received in the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times.
	FAIL	Unable to get status for this port. Verify that this board has been administered correctly, and that there are no alarms against this board.
	PASS	The board is functioning properly and the port is in-service and available.
0	NO BOARD	No board was detected by the test. 1. Resolve either wrong board (Error 125) or no board (Error 131) issues, if applicable. 2. Check that the board is properly translated and inserted. If so, check for hyperactivity (Error 1538). If hyperactive, use the **reset board *UUCSS*** command. 3. Run the test again. If it fails, replace the board and retest.

MET-BD (MET Line Circuit Pack)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
MET-BD	MINOR	**test board *UUCSS* sh**	MET Line circuit pack
MET-BD	WARNING	**test board *UUCSS* sh**	MET Line circuit pack

1. *UU* is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). *C* is the carrier designation (A, B, C, D, or E). *SS* is the number of the slot where the circuit pack resides (01–21).

See "XXX-BD (Common Port Circuit Pack)" on page 8-1872 for circuit pack-level errors. See also MET-LINE (MET Line) Maintenance documentation for related line information.

MET-LINE (MET Line)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
MET-LINE	MINOR	**test port *UUCSSpp* l**	MET Line
MET-LINE	WARNING	**test port *UUCSSpp* sh**	MET Line

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21). pp is the 2-digit port number (01, 02,...).

The TN735 MET Line circuit pack supports four of these sets as shown below. Each MET set uses three pairs of wires: an analog voice pair, a transmit pair, and a receive pair. Power is sent over the transmit and receive pairs. The MET Line circuit pack supports every 10-, 20-, and 30-button set.

This section describes MET-LINE (MET Line) maintenance. MET-LINE maintenance is closely related to, and interacts with, MET-BD (MET Line circuit pack) maintenance. This interaction should be kept in mind when troubleshooting MET Line problems.

This section occasionally refers to a station's *service states*. The service states are defined as follows:

Out-of-Service	The port, and thus the station, have been removed from service. A busyout of a port will cause it to be out-of-service.
Ready-for-Service	The port on the circuit pack has been put into service, but the voice terminal has not yet established signaling communications with the port.
In-Service	The voice terminal has established signaling communications with the port, and the system is ready to process calls to and from that station. A terminal in the ready-for-service state will progress to the in-service state if it is functioning normally, but it can also be forced into the in-service state if it goes off-hook.

Use the **status station** command to determine terminal service state. Status is reported as either out-of-service, in-service, or "disconnect," which means the station is in the ready-for-service state.

Error Log Entries and Test to Clear Values

Table 8-447. MET Line Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	test port UUCSSpp sh r 1
1 (a)	40987	None			
18 (b)	0	busyout port UUCSSpp	WARNING	OFF	release port UUCSSpp
130 (c)		None	WARNING	ON	test port UUCSSpp sh
257 (d)	40988	None	MINOR WARNING[2]	OFF	
513 (e)	40965	Hybrid Line Station Audits test (#61)	WARNING	OFF	test port UUCSSpp sh r 4
769		Port Diagnostic test (#35)	MINOR WARNING[2]	ON	test port UUCSSpp l r 3
1025		Hybrid and Conf. Circuits test (#57)	MINOR WARNING[2]	ON	test port UUCSSpp l r 3
1537 (f)	40968	None	MINOR WARNING[2]	OFF	
1793		TDM NPE Crosstalk test (#6	MINOR WARNING[2]	ON	test port UUCSSpp l r 3
2049 (g)	32770				
2049 (h)	40967				
3840 (i)	40989				

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. Major or Minor alarms MO may be downgraded to Warning alarms based on the values used in the **set options** command.

Notes:

a. The data link between the port and the terminal is not operational (i.e., the port circuitry has detected an off-board problem). Verify that the MET set is connected and that the EPF (Electronic Power Feed) test passes. If data transmission problems are experienced, check for defective wiring or a defective voice terminal, or move terminal electrically closer to the switch (i.e., reduce the length of the wiring between the terminal and the switch). If the problem persists, replace the circuit pack. Once the problem is resolved, the system retires the alarm after a predetermined time delay.

b. Error type 18 is logged when maintenance personnel busyout the port. The port is released from busyout via the **release port *UUCSSpp*** command.

c. The circuit pack has been removed or has been insane for more than 11 minutes. To clear the error, reinsert or replace the circuit pack.

d. The EPF has been turned off due to an overcurrent condition at the voice terminal. Check for defective wiring or a damaged jack, and verify that the voice terminal is an MET set. Once the problem is resolved, the system retires the alarm after a predetermined time delay.

e. The EPF inquiry audit has returned “epf-no-load” messages. This usually indicates that the voice terminal has been disconnected or that there is a defect in the wiring to the terminal. Check out both possibilities.

   When the EPF inquiry audit subsequently receives an “epf-on-ok” or an “epf-off-ok” message, the system will take action to retire the alarm.

f. The port has reported a problem with the data link to the voice terminal. Ignore this error if there are no complaints about the voice terminal. Otherwise, make sure the voice terminal is connected, check for defective wiring, check for a defective voice terminal, and decrease the length of the wiring between the voice terminal and the switch. If the problem persists, replace the circuit pack.

g. The voice terminal went off-hook while it was in the ready-for-service state. Use the **status system** command to determine the state of the voice terminal. The off-hook should have moved the station to in-service. No repair action is necessary.

h. This code is generated when the link between the circuit pack and the voice terminal is successfully reset. No repair action is necessary.

i. The hardware sent an uplink message indicating that the Electric Power Feed (EPF) is not loaded, that is, it is not currently supplying power to a voice terminal. No repair action is necessary.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the Port Diagnostic test (#35), you may also clear errors generated from other tests in the testing sequence.

Table 8-448. System Technician-Demanded Tests: MET-LINE

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
NPE Crosstalk test (#6)		X	ND
Port Diagnostic test (#35)		X	ND
MFAT Electronic Power Feed test (#56)		X	ND
Hybrid Circuit and Conference Circuit test (#57)		X	ND
Station Lamp Update test (#60)	X	X	ND
Station Audits test (#61)	X	X	ND
Ringer Update test (#62)	X	X	ND

1. D = Destructive, ND = Nondestructive

NPE Crosstalk Test (#6)

The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Table 8-449. Test #6 NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use **status station** to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1001	ABORT	System resources required to run this test are not available. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present or some Tone Detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use the **status station** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. Retry the command at 1-minute intervals up to 5 times.

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Table 8-449. Test #6 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
1018	ABORT	Test disabled via administration. This only applies to analog stations. The default for this field is **y**, so you may want to determine why it has been turned off on this station. 1. To enable the test for the particular analog station being tested, enter the **change station *extension*** command and change the `Test` field on the 'Station' form from 'n' to 'y.'
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.
2020	ABORT	The test did not run due to an already existing error on the specific port or a more general circuit pack error. 1. Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
2100	ABORT	System resources required to run this test are not available. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	This test can fail due to on-board or off-board problems. Off-board problems of concern include EXP-PN and EXP-INTF faults, TDM-BUS faults, and faults associated with the tone detectors/tone generators. Clear every off-board problem before replacing the board. Keep in mind that a TDM-BUS problem is usually the result of a faulty board connected to the backplane or bent pins on the backplane. 1. Resolve any EXP-PN and/or EXP-INTF errors. 2. Resolve any TDM-BUS errors. 3. Resolve any TONE-BD and/or TONE-PT errors. 4. Test the board when the faults from steps 1, 2, and 3 are cleared. Replace the board only if the test fails.

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Table 8-449. Test #6 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The port uses its allocated time slots correctly. Investigate user-reported troubles on this port using other port tests and by examining station, trunk, or external wiring.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to ensure that there is a valid board inserted.

Port Diagnostic Test (#35)

This test checks a port's battery feed circuitry. The battery feed circuitry is tested for proper battery voltage by testing the switchhook state. In response to the test message, the on-board firmware terminates the line and checks for switch-hook presence. The termination is then removed, and a check is made for no switch-hook presence. The MET set must be on-hook for the test to execute.

Table 8-450. Test #35 Port Diagnostic Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use the **status station** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use the **status station** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. **NOTE:** The battery feed circuitry is tested for proper battery voltage by testing the switchhook state. In response to the test message, the on-board firmware terminates the line and checks for switch-hook presence. The termination is then removed, and a check is made for no switch-hook presence. The MET set must be on-hook for the test to execute. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1018	ABORT	Test disabled via software patch.
2000	ABORT	This port may have been busied out. 1. Look in the Error Log for Error Type 18 (port busied out) for this port. If this error type is present, then release the port via the **release station *extension*** command and run the test again. 2. Make sure that the terminal is connected. 3. Retry the command at 1-minute intervals up to 5 times.

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Table 8-450. Test #35 Port Diagnostic Test — *Continued*

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Battery Feed test failed. This port is out-of-service. 1. Other ports on this circuit pack are not affected. Place user on a different port, if available, until a replacement circuit pack can be obtained. 2. Replace circuit pack when available.
	PASS	Battery Feed test passed. Current flow is properly detected for this port. 1. If users are reporting problems, examine connections to the port.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to ensure that there is a valid board inserted.

MFAT Electronic Power Feed (#56)

The software requests that the EPF be turned on for a given port. The hardware then attempts to turn on that port's station power unit. If no current is drawn, the station is probably not connected. If an overcurrent condition is sensed (too much current is drawn), a short may exist in the loop, or the voice terminal may be defective. The test results in a message indicating that either the EPF was turned on successfully with no problems, or an overcurrent condition exists. This test is repeated after a 5 second delay. If either test is not successful, the test aborts. Although this test will never actually return a fail result (except for the internal system error), an error type 257 entry will be made in the error log when the test has completed if the overcurrent case is detected by the hardware.

Table 8-451. Test #56 MFAT Electronic Power Feed Test

Error Code	Test Result	Description / Recommendation
	ABORT	The test was aborted due to an internal system error on a software request to the board. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use the **status station** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
	FAIL	The test failed with an internal error while it was attempting to turn on the EPF. 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	Electronic Power Feed test passed. The message to turn on the power to the station was successfully sent to the port. 1. Although this test will never actually return a FAIL result except for the **Internal system error** described above, it will log an error if the overcurrent case is detected by the hardware. Check the Error Log for any entries with Error Type 257 when the test has completed. 2. If Error Type 257 does not appear in the Error Log within 10 seconds after completion of this test, it is safe to assume that the test sensed no problems with the power to the station. You can verify that the station is powered up correctly by executing a self-test on the station, and checking that every feature button is operating. 3. The appearance of Error Type 257 in the Error Log indicates a station power problem. Check for a wiring short, a damaged jack, a defective voice terminal, or an incorrect type of terminal.

Continued on next page

Table 8-451. Test #56 MFAT Electronic Power Feed Test — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to ensure that there is a valid board inserted.

MET Circuit and Conference Circuit Test (#57)

This test checks two different port circuit functions. The Hybrid Circuit test performs an analog reflective loop-around measurement on the port's hybrid circuitry. The Conference Circuit test performs a conference test on the port's NPE.

For Hybrid Circuit test results to be valid, a voice terminal must be connected to the port being tested. The test instructs the on-board microprocessor to put the port in analog reflective loop-around mode. The Tone-Clock circuit pack supplies a 1004-Hz tone to the port's listen time slot and a GPTD (General-Purpose Tone Detector) measures the level of the reflected signal appearing on port's talk time slot.

The Conference test is performed only if the Hybrid Circuit test passes. The Conference Circuit test verifies that the Network Processing Element (NPE) can correctly conference several test tones together. The test is executed in two parts. The first half of the test verifies operation of the NPE's first three conference channels, and the second half verifies the NPE's remaining four conference channels. The test puts the NPE in loop-around mode and instructs it to talk on a specified time slot while listening to a 1004-Hz tone using the Conference Channels. A GPTD then measures the signal and noise levels of the conferenced output and reports whether or not these fall within a specified acceptable range.

Table 8-452. Test #57 Hybrid Circuit and Conference Circuit Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use the **status station** command to determine the service state of the port. If the port is in use, wait until the port is idle before retesting. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1001	ABORT	System resources required to run this test were not available. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-452. Test #57 Hybrid Circuit and Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present or some Tone Detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use the **status station** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.
2012	ABORT	Internal system error.
2103	ABORT	The system could not make the conference connection for the test. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-452. Test #57 Hybrid Circuit and Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
7	FAIL	The conference circuit test failed. The conference circuit test is performed only if the hybrid test passes. The conference circuit test verifies that the network processing element (NPE) can correctly conference several test tones together. The test is executed in two parts. The first half of the test verifies the operation of the NPE's first three conference channels, while the second half verifies the NPE's remaining four conference channels. The test puts the NPE in loop around mode and instructs it to talk on a specified time slot while listening to a 1004-Hz tone, using the conference channels. A GPTD then measures the signal and noise levels of the conferenced output and reports whether or not these are within an acceptable range. The failure may be due to off-board circumstances, the most common of which is an off-hook occurring during the test. It is possible that the port may still be functional from a user's point of view. Also, check the error logs against the GPTD-BD, the TONE-BD, and the TONE-PT. 1. This error can be caused by a disconnected terminal. First, ensure that the terminal is connected and the wiring is OK. 2. Then, issue the **display port** and **station status** commands to determine whether the station is idle. If so, issue the **test port** command for this port. 3. If test continues to fail, issue the **busyout port** and **release port** commands, and then retest the port.
57	FAIL	Hybrid Circuit test failed. This can result in noisy or bad connections. 1. Run circuit pack tests to check the Tone Generator circuit pack and the Tone Detector circuit pack, using **test board *UUCSS* short** command. 2. Resolve any problems that are detected on the Tone Generator circuit pack or Tone Detector circuit pack. 3. If the Tone Generator and Tone Detector circuit packs are functioning properly, and the test still fails, replace the MET Line circuit pack. **NOTE:** If the Hybrid Circuit and Conference Circuit test fails for every port on a circuit pack, a -5 Volt power problem is indicated. To investigate problems with a power unit, see "CARR-POW (Carrier Power Supply)" on page 8-393.

Continued on next page

Table 8-452. Test #57 Hybrid Circuit and Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	Hybrid Circuit and Conference Circuit test passed. The hybrid circuitry is transmitting properly. 1. If complaints persist, investigate by using other port tests, and by examining the station, wiring, and connections.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to ensure that there is a valid board inserted.

MET Line Station Lamp Updates Test (#60)

For this test, the software lights the lamps on the terminal based on the status record contained in the processor. The lamp updates run only if the station is in-service.

Table 8-453. Test #60 MET Line Station Lamp Updates Test

Error Code	Test Result	Description / Recommendation
1	ABORT	This port may have been busied out. 1. Look in the Error Log for Error Type 18 (port busied out) for this port. If this error type is present, then release the port via the **release station *extension*** command and run the test again. 2. Make sure that the terminal is connected. 3. Retry the command at 1-minute intervals up to 5 times.
2	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
3	ABORT	Station is in ready-for-service or out-of-service state. This may be due to wiring or an unplugged or defective set. 1. Make sure terminal is connected and the wiring is correct. 2. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use the **status station** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	MET Line Station Lamp Updates completed successfully. 1. If complaints persist, investigate by using other circuit pack tests, and by examining the station, wiring, and connections.

Continued on next page

Table 8-453. Test #60 MET Line Station Lamp Updates Test — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to ensure that there is a valid board inserted.

MET Line Station Audits Test (#61)

This is a series of three tests that are classified as audits. These audits will abort if attempted on an out-of-service station. Although this test never actually returns a fail result (except for the internal system error), it is possible that it will enter error types 257 (over current) or 513 (open circuit) into the error log. To determine whether there are any problems that do not show up in the test result, look for these error types in the error log. If these errors appear in the error log or if user complaints still exist, investigate by using other circuit pack tests and by examining the station, the wiring, and the connections. The tests are as follows:

Switchhook Audit	This is an update of the Avaya MultiVantage™ software records according to the circuit packs' records.
Bad Scan Inquiry	A message is sent uplink that contains a count that is generated due to certain events relating to the link conditions. This is an indication of data transmission problems between the MET Line circuit pack and the voice terminal.
EPF Inquiry	The status of the Electronic Power Feed is sent uplink. Possible conditions are: EPF-on-ok, EPF-off, EPF-no-load, and EPF-on-overcurrent.

Table 8-454. Test #61 MET Line Station Audits Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error
1	ABORT	The test was aborted due to an internal system error during the switchhook audit.
2		The test was aborted due to an internal system error during the bad scan inquiry.
3		The test was aborted due to an internal system error during the EPF audit inquiry. 1. Make sure that the station is not in an out-of-service state. 2. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use the **status station** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use the **status station** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The test failed due to an internal system error. 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-454. Test #61 MET Line Station Audits Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	Hybrid Line Station audits passed. 1. Although this test will never actually return a FAIL result except for the **Internal system error** described above, it is possible that it will enter Error Type 257 or 513 into the Error Log. To determine whether there are any problems that don't show up in the test result, look for these error types in the Error Log. 2. If these errors appear in the Error Log, or if user complaints persist, investigate by using other circuit pack tests, and by examining the station, wiring, and connections.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to ensure that there is a valid board inserted.

MET Line Ringer Update Test (#62)

In this update, a “ringer on” or a “ringer off” message is sent to the firmware to start and stop the ringer on the set.

Table 8-455. Test #62 MET Line Ringer Update Test

Error Code	Test Result	Description / Recommendation
3	ABORT	This port may have been busied out. 1. Look in the Error Log for Error Type 18 (port busied out) for this port. If present, release the port via **release station *extension*** and run the test again. 2. Make sure that the terminal is connected. 3. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use **display port *UUCSSpp*** to determine the station extension of the port. Use **status station** to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. If the port status is idle, retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	Hybrid Station Ringer Update passed. 1. If complaints persist, investigate using other circuit pack tests, and by examining the terminal, wiring, and connections.
0	NO BOARD	The test could not relate the internal ID to the port. This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. Issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to ensure that there is a valid board inserted.

MIS (Management Information System)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run	Full Name of MO
MIS	WARNING	**release mis**	Management Information System

The Management Information System (MIS)/Call Management System (CMS) MO is used only to monitor MIS busyouts during administration of MIS translations. There are no hardware failures associated with this MO.

The MIS/CMS is an adjunct processor that collects Automatic Call Distribution (ACD) data sent from the switch. In order to change MIS translations, a switch administrator must first enter a **busyout mis** command at the G3-MT. When the MIS is busied out, the switch will stop sending ACD data to the MIS, and a Warning alarm will be raised.

When the switch administrator is finished, a **release mis** command should be entered at the terminal. This will clear the Warning alarm and allow the switch to send ACD data to the MIS.

Error Log Entries and Test to Clear Values

Table 8-456. Management Information System Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	release mis
18[2]	0	busyout mis	WARNING	ON	release mis

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. When the **busyout MIS** command is issued, no data is sent to the MIS/CMS regardless of the link state. To allow data to be sent to MIS/CMS, a **release mis** command must be issued from the terminal.

MMI-BD

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
MMI-BD	MAJOR	**test board *UUCSS* l *r#***	Multimedia Interface circuit pack
MMI-BD	MINOR	**test board *UUCSS* l r#**	Multimedia Interface circuit pack
MMI-BD[2]	WARNING	**test board *UUCSS* s *r#***	Multimedia Interface circuit pack

1. Where UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC); C is the carrier designation (A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack resides (01–21); and pp is the 2-digit port number (01, 02, 03, ...).
2. Refer to XXX-BD (Common Port Board).

Two circuit packs can be used for multimedia connections:

- ''TN787D (or later)''
- ''TN2207/Expansion Services Module''

TN787D (or later)

The Multimedia Interface circuit pack (TN787D or later and also called the MMCH circuit pack) provides a number of H.221 protocol terminations for bit streams received from the TDM bus. The Multimedia Interface demultiplexes the H.221 bit stream (audio, video, data, control, and indication signals) and transmits the bit streams onto the TDM bus so that the appropriate circuit packs can process them.

The Multimedia Interface circuit pack is commonly referred to as the MMI pack for H.221 protocol termination. There are 32 ports (also called resources) on the circuit pack. See ''MMI-PT'' for maintenance of these resources.

The MMI circuit pack contains 4 digital signal processors that manage the 32 resources.

NOTE:
Refer to ''Multimedia Call Handling (MMCH)'' in Chapter 4, ''Alarms, Errors, and Troubleshooting'' for MMCH troubleshooting information.

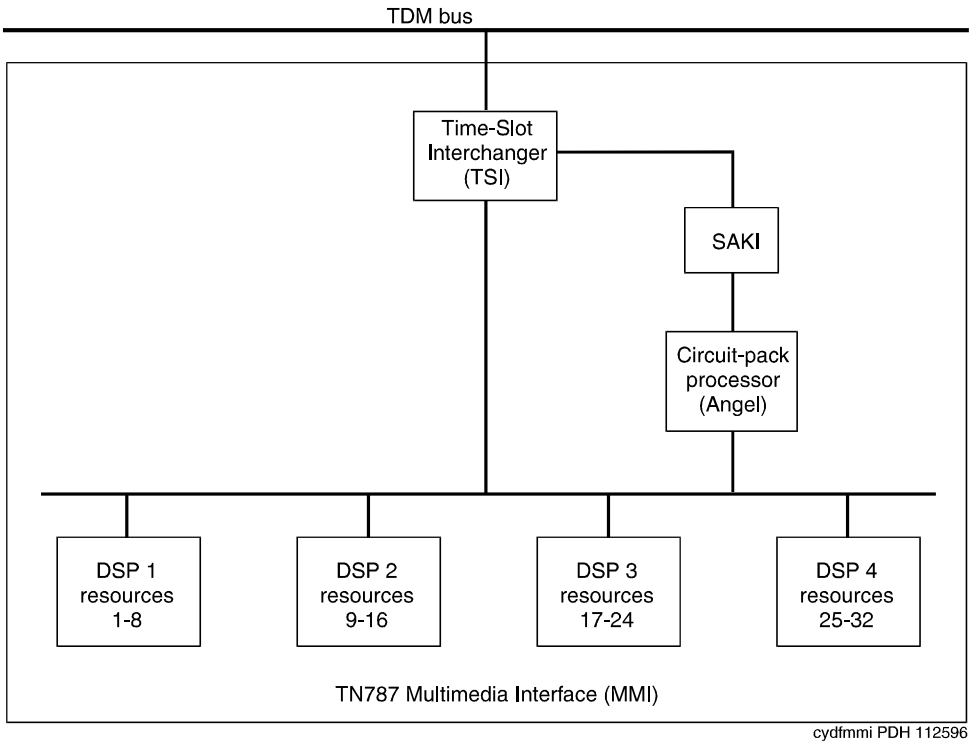

Figure 8-60. TN787 Multimedia Interface (MMI) Circuit Pack

TN2207/Expansion Services Module

The TN2207 circuit pack permits connecting an ESM (Expansion Services Module). See Figure 8-61 for connectivity.

- Provides T.120 data-sharing capability on a MMCH multipoint H.320 video conference
- Each conference participant must have endpoints administered and a personal computer with the H.320 video application installed.
- The S8700 Multi-Connect must have the expansion service module installed.

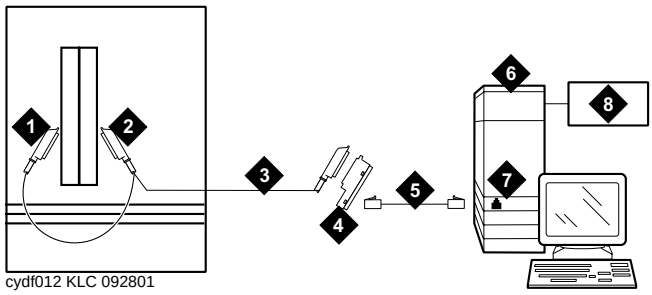

Figure Notes

1. Port B Y-cable connector to a TN787 MMI (Multimedia Interface) circuit pack
2. Port A Y-cable connector to a TN2207 PRI circuit pack
3. 25-pair Y-cable
4. 356A adapter
5. D8W cord connected to 356A adapter port 1
6. Expansion Service Module (ESM)
7. Port B on compatible PRI (primary rate interface) card

Figure 8-61. Typical ESM connections

CAUTION:
The TN2207 circuit pack is the only pack allowing connection of an ESM to the S8700 Multi-Connect configuration.

Error Log Entries and Test to Clear Values

Table 8-457. MMI-BD Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	test board UUCSS sh r 1
1 (a)	Any	None	MINOR	ON	
18 (b)	0	Busyout board UUCSS	WARNING	OFF	release board UUCSS
217 (c)	0	None	WARNING	ON	
257 (d)	65535	Control Channel Loop test (#52)	MINOR	ON	test board UUCSS r 3
513 (e)	4352 to 4357	Uplink error from pack			
769 (f)	Any	MMI Synchronization Status test (#1123)			
1281 (g)	Any	Circuit Pack Restart test (#594)	MAJOR	ON	
1538 (h)	Any	Software detected error	MINOR	ON	
1793 (i)	ANY	TSI XTalk (#6)	MINOR	ON	test board UUCSS l r 3
2049 (j)	Any	TSI Loop (#1108)	MAJOR	ON	test board UUCSS l r 3

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. The circuit pack stopped functioning or it was physically removed from the system. The alarm logs approximately 11 minutes after the circuit pack has been removed and/or the SAKI Sanity test (#53) fails.

   If the circuit pack is in the system and the red LED is on, follow the instructions for a red alarm in ''Circuit Pack LEDs'' in Chapter 6, ''LED Interpretation''. Also, see "Handling Common Port Circuit Packs."

b. This circuit pack has been busied out using the **busyout board *UUCSS*** command.

c. There are more than four MMI circuit packs in the system. Remove the circuit pack that generated the error in the error log by locating the slot indicated by the error.

d. Indicates transient communication problems between the switch and this circuit pack. Execute the **test board *UUCSS*** command and see the repair procedures for the Control Channel Loop-around test (#52) in ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872.

e. The circuit pack detected an Angel on-board hardware failure. The reported aux data values correspond to the following detected errors:

4352 — External RAM error
4253 — Internal RAM error
4355 — ROM Checksum error
4357 — Instruction set error

Reset the circuit pack by using the **busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS*** commands. When reset, the circuit pack executes a set of tests to detect the presence of any of the above faults. The detection of one these errors during initialization causes the circuit pack to lock up and appear insane to the system. See the repair procedures in note b for Error Type 1.

f. This MMI circuit pack reported a loss of MMI synchronization. Refer to Test #1123 for repair procedures.

g. A failure of the time slot interchanger has been detected. Reset the circuit pack using the **busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS*** commands. If the reset passes, then the on-board circuitry is healthy. Retire the alarm using the **test board *UUCSS* long clear** command followed by **release board *UUCSS***.

h. The circuit pack is hyperactive; that is, it is flooding the switch with messages sent over the control channel. The circuit pack is taken out of service when a threshold number of these errors is reported to the switch. Clear the alarm using the following commands: **busyout board *UUCSS***, **reset board *UUCSS***, **test board *UUCSS* long clear**, **release board *UUCSS***. If the error recurs within 10 minutes, replace the circuit pack.

i. The TSI Cross Talk test (#6) failed. See the description of this test, and follow its repair procedures.

j. The TSI Loop-around test (#1108) failed. See the description of this test, and follow its repair procedures.

System Technician-Demanded Tests: Descriptions and Error Code

Always investigate tests in the order presented in Table 8-458 below when inspecting errors in the system. For example, by clearing error codes associated with the TSI Crosstalk test (#6), you may also clear errors generated from other tests in the testing sequence.

Table 8-458. System Technician-Demanded Tests: MMI-BD

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
TSI Crosstalk test (#6)		X		ND
TSI Loop-around test (#1108)		X		ND
MMI SYNC Status test (#1123)	X			ND
MMI SYNC Status test (#1122)		X		ND
Control Channel Loop-around test (#52)[2]	X	X		ND
SAKI Sanity test (#53)[2]			X	D

1. D = Destructive, ND = Nondestructive
2. Refer to the repair procedure described in "XXX-BD (Common Port Circuit Pack)" on page 8-1872for a description of this test.

TSI Crosstalk Test (#6)

This test is nondestructive.

The Time Slot Interchanger (TSI) chip controls connectivity to the TDM bus. The TSI Cross Talk test verifies that this TSI talks on the selected TDM bus time slot and never crosses over to time slots reserved for other connections. If the TSI is not working correctly, one-way and noisy connections may occur. If the test passes, then the TSI can communicate over the TDM bus. This test is part of the circuit pack's demand and scheduled long test sequence, and takes approximately 20 to 30 seconds to complete.

Table 8-459. Test #6 TSI Crosstalk Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error. This is an abnormal abort. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test, the traffic load on the system is very high, or the time slots are out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat the test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone detector for the test. The system is oversized for the number of tone detectors present, or some tone detectors are out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received from the MMI-BD circuit pack within the allowable time period. 1. If this result occurs repeatedly, attempt to reset the circuit pack if the other ports are idle. Reset the circuit pack by issuing the **busyout board *PCSS***, **reset board *UUCSS***, followed by the **release board *UUCSS*** commands. 2. If this result occurs again, replace the circuit pack.
2012	ABORT	Internal system error. This is an abnormal abort.
2100	ABORT	Could not allocate the necessary resources to run this test. This is an abnormal abort. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The TSI was found to be transmitting in error. This causes noisy and unreliable connections. 1. Replace the circuit pack.
	PASS	The TSI is correctly using its allocated time slots.

TSI Loop-Around Test (#1108)

This test is nondestructive.

During this test, the MMI's Time Slot Interchanger (TSI) is listens to a TDM timeslot. A digital count tone loops back in the TSI and onto another TDM timeslot without passing through any resource hardware. A tone detector port verifies the looped data. If the digital count is correct, then the test passes. The test is done for both TDM buses. Failures indicate that the TSI is unreliable.

Table 8-460. Test #1108 TSI Loop-Around Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error. This is an abnormal abort. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. Either the traffic load on the system is very high or time slots are out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat the test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone detector for the test. The system may be oversized for the number of Tone Detectors present, or some Tone Detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received from the Tone Detector circuit pack within the allowable time period. 1. If this result occurs repeatedly, attempt to reset the circuit pack (if the other ports are idle). Reset the circuit pack by issuing the **busyout board *UUCSSpp*** and the **reset board *UUCSSpp*** commands followed by the **release board *UUCSSpp*** command. 2. If this result occurs again, replace the circuit pack.
2012	ABORT	Internal system error. This is an abnormal abort.
2100	ABORT	Could not allocate the necessary resources to run this test. This is an abnormal abort. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The TSI was found to be transmitting in error, causing noisy and unreliable connections. 1. Replace the circuit pack.
	PASS	The TSI is correctly using its allocated time slots.

MMI Synchronization Status Test (#1122 and 1123)

This test is nondestructive.

To support applications involving multiple MMI circuit packs, the appropriate MMI circuit packs must be synchronized with one another. One such circuit pack is designated as the master sync source, which provides the synchronization signal onto the TDM bus. The other MMI circuit packs in the system listen to this signal.

This test monitors this synchronization state. The test fails if the MMI circuit pack is not in sync. The test passes with auxiliary code 1100 if the MMI circuit pack is in sync and is providing the synchronization signal for the system. The test also passes with an auxiliary code of 1101 if the MMI circuit pack is in sync and listening to the sync signal. MMI circuit packs do not lose the synchronization signal unless an MMI circuit pack is either pulled out of the system or reset by using a technician command.

Test #1122 runs when the **long** option of the **test board** command is entered, initiating the recovery of synchronization. Test #1123 runs when the **short** option of the **test board** command is entered, giving the status of the synchronization. You need not necessarily run the **long** option since synchronization signal recovery should be taking place within software running in the background. Use the **long** option only if synchronization is not established within 5 minutes of investigating the problem.

Table 8-461. Test #1122/1123 MMI Synchronization Status Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error. This is an abnormal abort. 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	A response to the test was not received from the MMI circuit pack within the allowable time period. 1. If this result occurs repeatedly and the MMI circuit pack is idle, reset the circuit pack using **busyout board *UUCSS***, then **reset board *UUCSS***, followed by **release board *UUCSS***. 2. Rerun the test; if the same result occurs again, replace the MMI circuit pack.
2012	ABORT	Internal system error
2100	ABORT	Could not allocate the necessary resources to run this test. This is an abnormal abort. 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-461. Test #1122/1123 MMI Synchronization Status Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	The MMI circuit pack is out of MMI synchronization. Run the **long** option of the **test board** command. 1. Wait up to 5 minutes, and then reset the circuit pack with these commands: **busyout board *UUCSS***, then **reset board *UUCSS***, followed by **release board *UUCSS***. 2. Rerun the test; if the same result occurs again, replace the circuit pack.
1100	PASS	The MMI circuit pack is providing the synchronization correctly. This MMI circuit pack is designated as the Master Sync source.
1101	PASS	The MMI circuit pack is listening to the synchronization signal correctly.

Control Channel Loop-Around Test (#52)

Refer to the repair procedure described in XXX-BD (Common Port Circuit Pack) maintenance documentation as ''Control Channel Loop-Around Test (#52)'' on page 8-1555.

SAKI Sanity Test (#53)

Refer to the repair procedure described in the XXX-BD (Common Port Circuit Pack) maintenance documentation as ''SAKI Sanity Test (#53)'' on page 8-1555.

MMI-LEV (Multimedia Interface Resource Level)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run	Full Name of MO
MMI-LEV	MAJOR	See "Resolving MMI-LEV Errors/Alarms"	MMI-LEV

The Multimedia Interface Resource Level MO monitors MMI efficiency by tracking the number of MMI ports that are in-service, and then comparing that number with the value entered in the `MMIs` field on the System-Parameters Maintenance form. This `MMIs` field is located under the Minimum Maintenance Threshold section. The `MMIs` field contains the minimum number of MMI ports needed for the Multimedia Call Handling (MMCH) feature to run efficiently and is an administrable field. This field must contain a minimum threshold number for MMI port capacity of between 0-128. The MMCH feature must be enabled on the System-Parameters Customer-Options form before the `MMIs` field can be changed to a number greater than zero. The algorithm for determining that a low level of MMI resources exists uses the value entered in the `MMIs` field, and the number of MMI ports that are in-service in the system.

Each MMI circuit pack contains up to 32 ports. If the number of in-service MMI ports falls below the minimum port capacity (value entered on the System Parameters Maintenance form under the Minimum Maintenance Threshold section and in the `MMI` field), a MMI-LEV error is logged. If this outage continues for 15 minutes, a MAJOR alarm is raised.

Resolving MMI-LEV Errors/Alarms

MMI ports are a key part of the MMCH feature, and any loss in the number of ports available for use degrades the MMCH customer-defined service level.

If a MMI circuit pack or port is busied out using the **busyout board** or **busyout port** commands, these out-of-service ports are not included in the MMI level calculation, thus allowing a technician to busyout a MMI circuit pack for maintenance reasons without causing a MAJOR alarm to be raised. However, if every port on the MMI circuit pack is not made busy and the circuit pack is removed, an alarm is raised.

NOTE:
When diagnosing a MMI-LEV problem, begin by resolving any alarms raised against MMI-BD or MMI-PT MOs. Clearing MMI-BD or MMI-PT alarms may clear the MMI-LEV alarm.

The MMI circuit pack is maintained by the software like the Tone Detector circuit pack, which can be removed and reinserted in any port board slot without administration. Similarly, if a MMI circuit pack is removed from service logically by failing the Archangel sanity scan test or is removed from service physically by removing the circuit pack from the carrier, no error/alarm is raised against either the MMI-BD or the MMI-PT MOs. Therefore, if a MMI-LEV error/alarm exists, yet no alarms have been raised against MMI-BD or MMI-PT MOs, a MMI circuit pack may have been removed from service causing the MMI-LEV error/alarm. To resolve a MMI-LEV MAJOR alarm, restore the number of MMI ports available for service to be equal to or greater than the calculated port capacity.

To determine how many MMI circuit packs are needed for the MMCH feature:

1. Using the **display system-parameters maintenance** command, locate the number listed in the Minimum Maintenance Thresholds (`MMIs`) field and record this number.
2. Use the **list configuration** command to verify the number of MMI ports.
3. Compare this number with the value listed in the `MMIs` field on the System-Parameters Maintenance form (number listed in step 1 a minimum thresholds number for MMI ports of between 0-128). Each MMI circuit pack contains up to 32 ports. If this number in the `MMIs` field is less than or equal to 32, one MMI circuit pack is needed. If this number is 64, then two MMI circuit pack are needed.
4. Use the **list configuration** command to verify that the number of MMI circuit packs listed agrees with the required minimum port capacity (from step 1). If the number of MMI circuit packs listed in the step 2 differs from the calculated number, restore the number of MMI circuit packs to the correct value, in order to resolve the MMI-LEV alarm.

Error Log Entries and Test to Clear Values

Table 8-462. MMI-LEV Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1[1]	Any	None	MAJOR	OFF	

1. The number of MMI resources in the system that are in service has fallen below the calculated minimum value. If the number of in-service MMI ports falls below the MMCH port capacity (value entered in the Minimum Maintenance Thresholds for MMIs field) on the System-Parameters Maintenance form, a MMI-LEV error is logged. If this outage continues for 15 minutes, a MAJOR alarm is raised.

To resolve this alarm, correct the out-of-service problem by following these procedures:

1. See “MMI-PT” and “MMI-BD” and resolve any associated alarms.
2. If a MMI-LEV error/alarm exist and none has been raised against MMI-BD or MMI-PT MOs, an MMI circuit pack may have been removed from service causing the MMI-LEV error/alarm. To resolve a MMI-LEV MAJOR alarm, restore the number of MMI ports available for service to be equal to or more than the calculated port capacity. See the ‘‘Resolving MMI-LEV Errors/Alarms’’ section above for details.
3. If the error continues to alarm, escalate the problem.

System Technician-Demanded Tests: Descriptions and Error Code

There are no System Technician-Demanded tests for MMI-LEV.

MMI-PT

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
MMI-PT	MAJOR	**test port *UUCSSpp* l *r#***	Multimedia Interface Port
MMI-PT	MINOR	**test port *UUCSSpp* l *r#***	Multimedia Interface Port
MMI-PT	WARNING	**test port *UUCSSpp* l *r#***	Multimedia Interface Port

1. Where UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC); C is the carrier designation (A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack resides (01–21); and pp is the 2-digit port number (01, 02, 03, ...).

NOTE:
Refer to Chapter 4, ''Alarms, Errors, and Troubleshooting'' for MMCH troubleshooting information.

The Multimedia Interface circuit pack provides a number of H.221 protocol terminations for bit streams received from the TDM bus. The Multimedia Interface demultiplexes the H.221 bit stream (audio, video, data, control, and indication signals) and transmits the bit streams onto the TDM bus to be processed by the appropriate circuit packs.

Each Multimedia Interface circuit pack contains 32 separately maintained "ports," more commonly referred to as "resources." MMI-PT represents one of these 32 resources. At system boot or when the circuit pack is inserted, 32 resources are inserted into the system.

The MMI circuit pack contains 4 Digital Signal Processors (DSPs) which manage the 32 resources. These resources are directly mapped to DSPs:

Resource	Direct Map
1-8	DSP1
9-16	DSP2
17-24	DSP3
25-32	DSP4

All 8 resources that the circuit pack controls may be placed out of service by the failure of one of these DSPs.

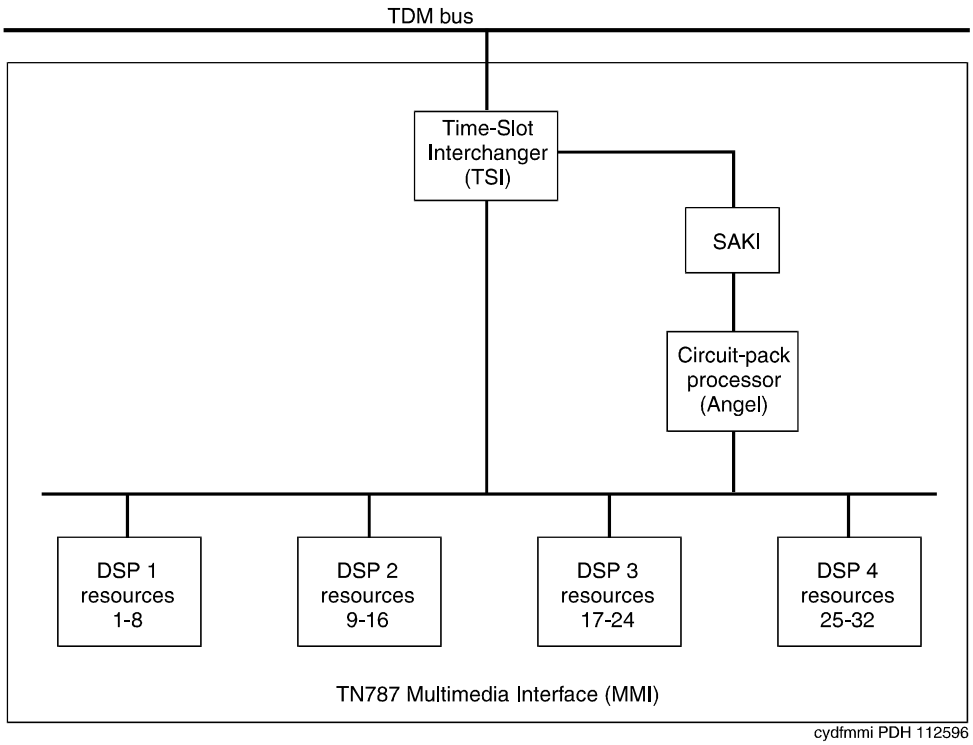

Figure 8-62. TN787 MMI (MULTIMEDIA INTERFACE) CIRCUIT PACK

Error Log Entries and Test to Clear Values

Table 8-463. MMI-PT Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	test port UUCSSpp sh r 1
1 (a)	Any	Uplink error from pack			
18 (b)	0	Busyout port PCSSpp	WARNING	OFF	release port UUCSSpp
130 (c)	Any	Software generated	WARNING	ON	
257 (d)	Any	None	MAJOR MINOR	ON	
513 (e)	Any	Resource Loop-Back test (#1111)	MINOR	ON	test port UUCSSpp sh r 3
1025 (f)	Any	Uplink error from pack			
3841 – 3844 (g)	Any	Uplink error from pack			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. The customer endpoint connected on a conference sent too many messages to the VSP-MCU in a specified amount of time. Check the "status conference" forms to correlate which customer had the problem. This is a customer endpoint problem and not a VSP-MCU problem.

b. This port has been busied out by the **busyout port *UUCSSpp*** command.

c. Indicates that the circuit pack has been removed or has been insane for more than 11 minutes. To clear the error, replace or reseat the circuit pack.

d. This error occurs if the MMI circuit pack detects a DSP Error. Maintenance software will reset the DSP when this error is received. This error is logged for all 8 resources connected to this particular DSP. If this DSP continues to fail sanity, a Minor alarm is raised. Replace the circuit pack.

e. This error occurs when the Resource Loop-around test (#1111) fails. Run the long test sequence, and note the results of Test #1111.

f. This error occurs if either the MMI or Voice Conditioner (VC) circuit packs reports a loss of framing on the service channel between these two circuit packs. When a customer endpoint establishes a call to the VSP-MCU, a channel is established between the MMI resource and the VC port. If this channel is detected to go down by either circuit pack, an uplink message is sent. This error is then forwarded to maintenance for both circuit packs. Run the long test sequence for this MMI resource, and if any of the tests fail, follow the repair procedures for that test. If every test passes, the cause of the problem might be with the VC pack. See the "VC-DSPPT" repair procedures.

g. These errors are not related to VSP-MCU. They could be caused by network problems or from the customer endpoints. They are presented here for logging purposes only.

Code	Description
3841	CRC4 Error (FrLame checksum error)
3842	Correctable BAS (Control msg bit error – 1- or 2-bit error, correctable)
3843	Uncorrectable BAS (Control msg bit error – 3-bit or more, not correctable)
3844	Protocol Error (H.221 Protocol error from endpoint detected)

System Technician-Demanded Tests: Descriptions and Error Codes

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Resource Looparound test (#1111)	X	X	D

1. D = Destructive; ND = Nondestructive

Resource Loop-Around Test (#1111)

This test is destructive.

This test checks the connectivity of the resource within MMI circuit pack and out to the TDM bus. The object is to test the circuitry that an H.221 bit stream comes in contact with when that stream is demultiplexed, pre-processed, written to the TDM bus and then reread (looped in the TSI), post-processed, multiplexed, and then written back to the TDM bus for verification. The video, audio, and data components of the bit stream are tested separately. If any one of these tests fails, then the resource is taken out of service.

Table 8-464. Test #1111 Resource Loop-Around Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Retry the command at 1-minute intervals up to 5 times. 2. Use the **status conference** command to determine whether there is an active conference. If a call is active, the test cannot be run until the conference call finishes.
1002	ABORT	The system could not allocate time slots for the test. The traffic load on the system may be very high, or time slots may be out-of-service due to TDM-Bus errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat the test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone detector for the test. The system is oversized for the number of tone detectors present or some tone detectors are out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The resource has been seized by a user for a valid call. Use the **status conference** command to verify that there is a conference call active. 1. If there are no conference calls, retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received from the Tone Detector circuit pack within the allowable time period. 1. If this result occurs repeatedly, reset the circuit pack, if the other ports are idle. Reset the circuit pack by issuing the **busyout board *UUCSSpp*** and the **reset board *UUCSSpp*** commands, followed by the **release board *UUCSS*** command. 2. If this result occurs again, replace the circuit pack.
2012	ABORT	Internal system error
2100	ABORT	Could not allocate the necessary resources to run this test. Abnormal abort. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-464. Test #1111 Resource Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
0, 1, 2	FAIL	This resource cannot guarantee data integrity and is out-of-service. The following error codes indicate failure of a particular media loop: 0 = video 1 = audio 2 = low-speed data 1. Replace the circuit pack.
	PASS	The resource is functioning normally.

MMI-SYNC

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
MMI-SYNC	MINOR	**test board *UUCSS* l *r#***	Multimedia Interface circuit pack

1. Where UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC); C is the carrier designation (A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack resides (01–21); and pp is the 2-digit port number (01, 02, 03, ...).

NOTE:
Refer to Chapter 4, ''Alarms, Errors, and Troubleshooting'' for MMCH troubleshooting information.

Each Port Network (PN) must have a TN787D or later MMI circuit pack assigned as the Multimedia Interface (MMI) master synchronization source for that PN. If one or more MMI circuit pack is administered in a PN, one MMI circuit pack is designated as the master synchronization source for every MMI circuit pack within that PN.

The MMI circuit pack generates a synchronization signal and puts that signal on the TDM bus. Other MMI packs or any other circuit pack within a PN can listen to this signal and "synchronize up" to it. The first MMI circuit pack inserted in a PN is normally designated as the master. As subsequent MMI packs are inserted, they are instructed to listen and synchronize to the time-slot of the master MMI. In the unlikely case of an MMI losing this reference, an uplink message is sent from the MMI circuit pack that lost the signal to maintenance, which also clears the "event" counter on this MMI with a downlink message. This forces the MMI circuit pack to return the current state of the synchronization signal. If the signal is still lost, then the recovery algorithm is entered. Note that during this time, the MMI circuit pack synchronizes to its internal clock, and there should be no service disruption. A loss of synchronization is usually the result of a circuit pack failure. The maintenance strategy is to switch the master source away from the bad pack to another healthy MMI circuit pack within the PN.

A synchronization switch takes place if half or more of the MMI circuit packs in a PN report a loss of synchronization. For example, a PN with two MMIs reporting a loss of sync source switches immediately, three and four MMIs switch if two report the loss, and so forth. A healthy MMI circuit pack becomes the master synchronization source providing the signal on a new timeslot. The other MMI circuit packs within the PN are instructed to listen to this new signal, and the old master stops providing the signal and now listens to the new master MMI. If an MMI is physically removed from the system, then the remaining MMIs report the loss of synchronization. The first MMI with no alarms present becomes the new master of that PN. Once a synchronization switch has occurred, another switch is not allowed for 15 minutes to avoid hyperactive switching. If every MMI has an alarm, then no switch is made.

If the MMI circuit pack that provides synchronization is craft busied out, it will not affect the PN synchronization. The signal is still provided by the busied-out pack. There is no effect on synchronization if the technician issues a release of the busied-out MMI. Synchronization is not affected by a warm start of the system (reset system 1). For every other restart (reboot through cold 2), MMI synchronization recovers during board insertion.

Error Log Entries and Test to Clear Values

Table 8-465. MMI-SYNC Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1	Any	None			See note [1]
257	Any	None	MINOR	OFF	See note [2]

1. An MMI synchronization switch was successful. Refer to MMI-BD errors for the reason for the switch.
2. The requested MMI synchronization switch failed. Resolve every MMI-BD alarm.

System Technician-Demanded Tests: Descriptions and Error Codes

There are no system technician-demanded tests for MMI-SYNC.

MODEM-BD (Modem Pool Circuit Pack)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
MODEM-BD	MIN	**test board *UUCSS* sh**	Modem Pool circuit pack
MODEM-BD	WRN	**test board *UUCSS* sh**	Modem Pool circuit pack

1. *UU* is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). *C* is the carrier designation (A, B, C, D, or E). *SS* is the number of the slot where the circuit pack resides (01–21).

Refer to XXX-BD (Common Port circuit pack) for circuit pack-level errors. See also MODEM-PT (Modem Pool Port) for related port information.

MODEM-PT (Modem Pool Port)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
MODEM-PT	MINOR	**test port *UUCSSpp* s**	Modem Pool Port

1. *UU* is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). *C* is the carrier designation (A, B, C, D, or E). *SS* is the number of the slot where the circuit pack resides (01–21). *pp* is the 2-digit port number (01, 02,...).

The Modem Pool Port provides an interface for digital and analog data communication devices or ports connected to the PBX. It may be thought of as a PBX data communications "conversion resource" because it converts analog modem signals typically used in the telephone network into digital signals that are compatible with the internal PBX network and vice versa.

There may be a number of these conversion resources available in the PBX, each assigned to an available Modem Pool Group. Only one conversion resource is used per data connection. The PBX software usually adds the conversion resource into a data connection if it determines that it is necessary for the call. Typical connections that include Modem Pool conversion resources include data calls from Analog Line or Central Office Trunk ports to any digital port or Digital Line or Trunk ports to any analog port. An example of a Data Module to Central Office Trunk connection using a Modem Pool conversion resource is shown in Figure 8-63 on page 8-1133. In the case where a local data call originates from an analog port normally used for voice service only and terminates on a digital port, a Data Origination access code must be dialed before the extension number for the Modem Pool conversion resource to be included in the connection.

Each Modem Pool conversion resource contains two ports. One of these, an analog port, is connected (via the PBX network) to the analog line or trunk port that is the source of the modem signal. The second port is referred to as the digital port and is connected (again through the PBX network) to the digital line or trunk port associated with the Data Module in the connection. The analog modem signals enter the analog port of the conversion resource in standard Pulse Code Modulation (PCM) format, but are converted into Data Communications Protocol (DCP) format before going to the digital line or trunk in the connection.

Integrated Modem Pools

There are two primary types of Modem Pool conversion resources available: an Integrated Pooled Modem and a Combined Modem Pool. The integrated TN758 Pooled Modem circuit pack contains two independent 300- or 1200-bps conversion resources. Each conversion resource contains two interfaces to the PBX digital network: an analog port and a digital port. The analog port is connected through the PBX network to the analog line or trunk port containing the analog modem signals. The digital port connects through the PBX network to the digital line or trunk port in the call. The figure below shows a typical end-to-end connection using a conversion resource on the integrated Pooled Modem circuit pack.

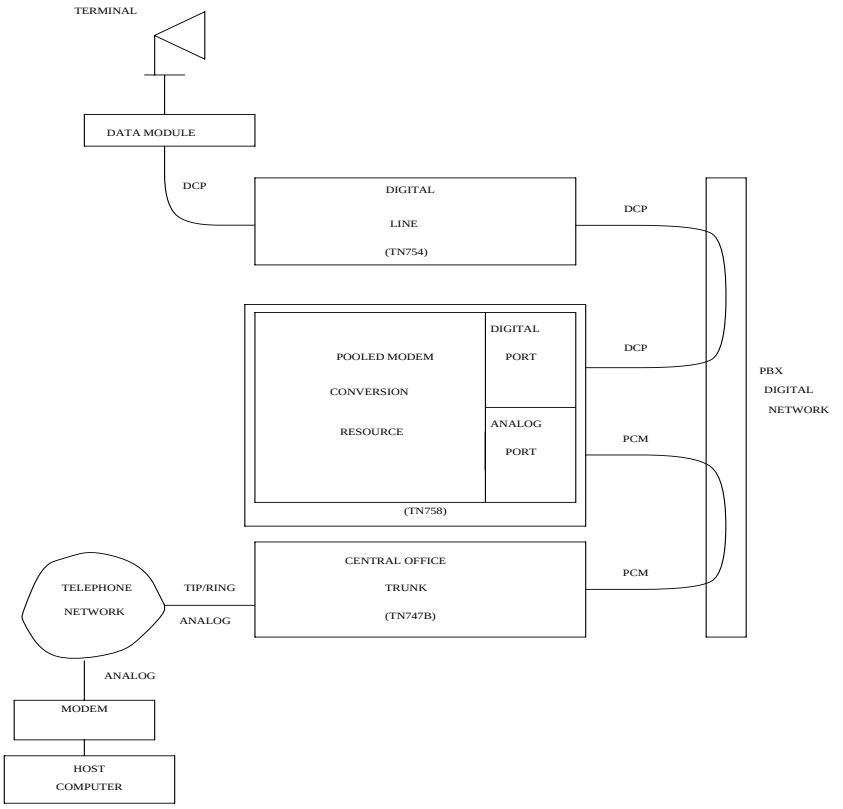

Figure 8-63. Typical Modem Pool Switched Connection with Integrated Pooled Modem

Combined Modem Pools

The Combined Modem Pool conversion resource is the second type available. The function served by the Combined Modem Pool is similar to that of the integrated Pooled Modem circuit pack, but the physical implementation is much different. It has the advantage of supporting any speed the external modem can support. The integrated Pooled Modem circuit pack can only support 300- or 1200-bps transmission rates. The Combined Modem Pool conversion resource consists of a port on an Analog Line circuit pack, an external modem, a Data Module, and a port on a TN754 Digital Line circuit pack. The tip and ring interface of the Analog Line is connected to the modem, the RS-232C interface of the modem connects to the Data Module, and the DCP interface on the Data Module is connected to the Digital Line port.

The analog modem signals pass through the Analog Line port to the modem. The modem converts these to RS-232C signals which are passed on to the Data Module. The Data Module further converts the signals to the DCP protocol for the Digital Line port which passes the signals on to the PBX network.

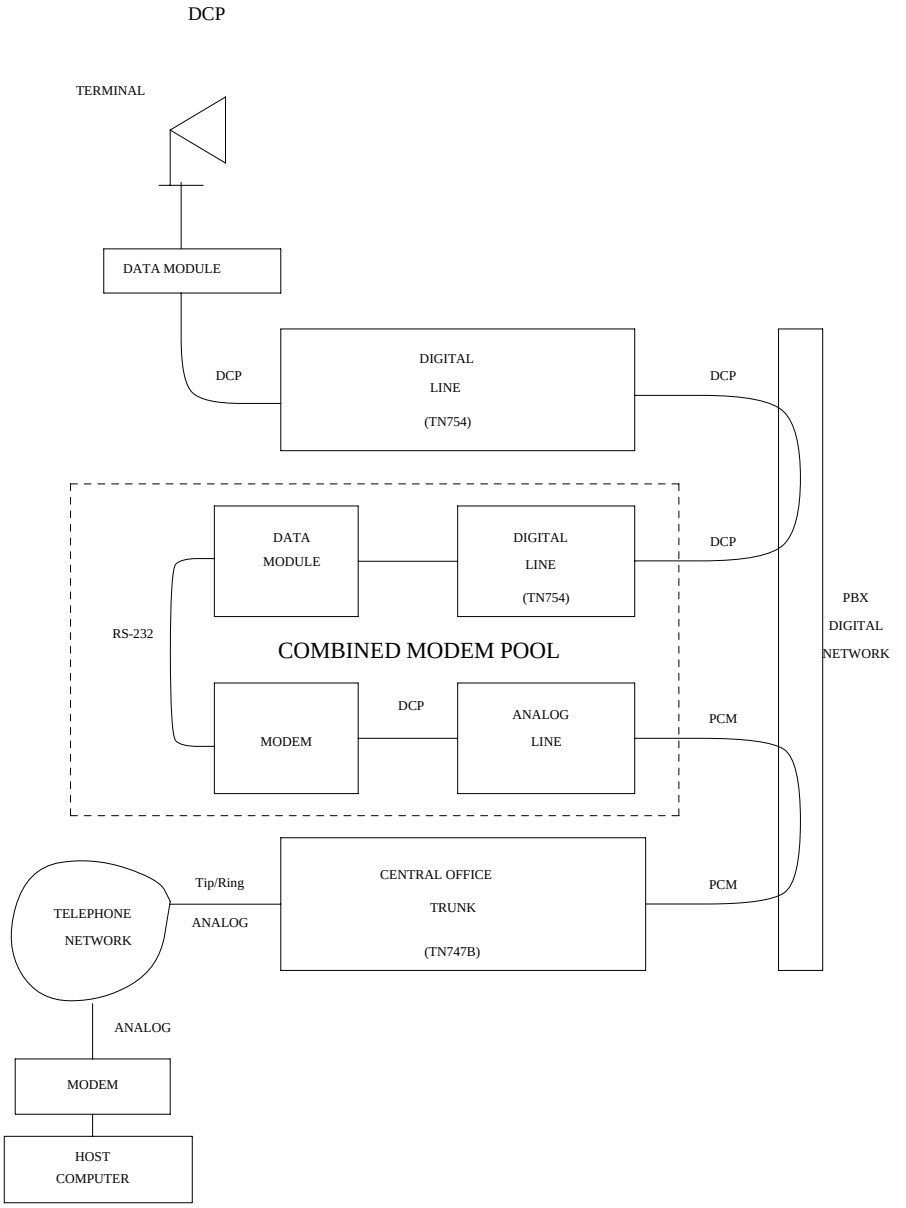

Figure 8-64. Typical Modem Pool Switched Connection with Combined Modem Pool

Troubleshooting Modem-Pool Symptoms

Certain customer-reported troubles may provide important information for troubleshooting Modem Pool problems. For example, if the customer tries to make a data call requiring a Modem Pool conversion resource, and the Modem Pool and Data Module speeds or other options do not match, they may receive a "CHECK OPTIONS" error message on the terminal. In this case, check the Modem Pool administration and Data Module option settings. If the Modem Pool is a Combined type, check also the option settings on the external Modem and Data Module, and cabling and connections between the Digital Line port, Data Module, Analog Line port, and Modem.

Testing Modem Pools

There are three types of commands that can be used to test Modem Pool circuits: **test port, test modem-pool #,** and **test board.** The **test port** command is generally the first test to run after the Error Log is evaluated and an entry is found for a Modem Pool port. The **test modem-pool #** command runs the same tests as the **test port short** command performed on a Modem Pool port. However, the **test modem-pool #** command can automatically test every port in the Modem Pool group number specified in #. The **test board** command performs the same tests as **test port** and **test modem-pool #** plus additional tests for circuits common to the entire circuit pack. See "XXX-BD (Common Port Circuit Pack)" on page 8-1872 for information about additional tests performed with **test board** (#50, #52, and #53).

If the Modem Pool port or group being tested with **test modem-pool #** contains Combined Modem Pools, the ports on the associated Analog Line circuit pack and the TN754 Digital Line circuit pack are tested as a group. Note, however, that Combined Modem Pools are not tested with the tests described in this section and the repair information related to Tests #96, 97, 98, and 99 is not applicable. The Analog port of the Combined Modem port is tested with Analog port tests, and the Digital port of the Combined Modem port is tested with TDMODULE/PDMODULE tests. Therefore, use the repair procedures outlined in the ANL-LINE, ANL-16-L, ANL-NE-L, and TDMODULE/PDMODULE Maintenance documentation when interpreting the results of the execution of the **test modem-pool #** command on Combined Modem Pools.

Error Log Entries and Test to Clear Values

Table 8-466. Modem Pool Port Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp* sh r 1**
18	0	**busyout *UUCSS***	WARNING	OFF	**release port *UUCSS***
130[2]		None	WARNING	ON	**test port *UUCSSpp* sh**
257		Conversion Resource Loop (#98)	MINOR	ON	**test port *UUCSS* s r 3**
513		Modem Conference (#97)	MINOR	ON	**test port *UUCSS* l r 3**
769		Modem NPE Crosstalk (#96)	MINOR	ON	**test port UUCSS l r 3**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. This error type indicates that the circuit pack has been removed or has been insane for more than 21 minutes. To clear the error, reinsert or replace the circuit pack.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the Modem Pool Conference test (#97), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Modem Pool NPE Crosstalk test (#96)		X	D
Modem Pool Conference test (#97)		X	D
Modem Pool Conversion Resource Loop-around test (#98)	X	X	ND
Modem Pool Audits test (#99)	X	X	ND

1. D = Destructive, ND = Nondestructive

NOTE:
The tests in this section do not apply to Combined Modem Pool conversion resources. The standard Digital Line and/or Analog Line port tests are run on the ports associated with the Combined Modem Pool. Consult the test descriptions for those MOs when repairing Combined Modem Pool arrangements.

Modem Pool NPE Crosstalk Test (#96)

This test is destructive.

The Modem Pool Crosstalk test verifies that the NPE is connected only to the desired time slot and is not crosstalking on other time slots. This test operates exactly like Test #6 for other types of port circuits but is performed twice in order to test both NPEs in the Modem Pool Port.

Table 8-467. Test #96 Modem Pool NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required for this test are not available. The port may be in use on a valid call. Determine whether the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1001	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions, or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat the test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present or some Tone Detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The port has been seized by a user for a valid call. Determine whether the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1020	ABORT	The test did not run due to a previously existing error on the specific port or because of a more general circuit pack error. 1. Examine the Error Log for existing errors against this port or the circuit pack, and attempt to diagnose the previously existing errors.
2000	ABORT	A response to the test was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-467. Test #96 Modem Pool NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
6000	ABORT	System resources needed to complete the test could not be allocated for the digital section of the Modem Pool conversion resource. Ordinarily, this means the conversion resource or other hardware used during the test was in use. 1. Wait 1 minute and attempt the test again. 2. If the same error occurs, use the **status port** command to determine whether the Modem Pool conversion resource is in use. 3. If the conversion resource is in use, and it is absolutely necessary to test it, the call must be dropped by issuing a **busyout port *UUCSS*** command against the conversion resource. Run the test again. 4. If the same error occurs while the conversion resource is idle, busyout both Modem Pool conversion resources on the TN758 Pooled Modem circuit pack containing the conversion resource under test. 5. If the test continues to fail or abort, replace the Pooled Modem circuit pack and retest.
6001	ABORT	System resources needed to complete the test could not be allocated for the analog section of the Modem Pool conversion resource. Follow the test procedures for the previous error code.
None	FAIL	The test failed. This error is internal to the Pooled Modem circuit pack and does not involve external equipment or interfaces. 1. Busyout both of the TN758 Pooled Modem conversion resources on the circuit pack containing the failing conversion resource. 2. If the test continues to fail, replace the Pooled Modem circuit pack and retest.
ANY	FAIL	The NPE of the tested port was found to be transmitting in error. This condition will cause noisy and unreliable connections. 1. If the remaining ports are currently idle (amber LED is off), reset the circuit pack and repeat the test. 2. If the test fails again, replace the circuit pack.
	PASS	The port is correctly using its allocated time slots. Investigate user-reported troubles on this port using other port tests and by examining station, trunk, or external wiring.

Modem Pool Conference Test (#97)

This test is destructive.

The Modem Pool Conference test checks most of the switching and gain control functions provided by the NPE circuit in the analog section of the conversion resource. This test conferences a 1004-Hz tone through the NPE, looping it back so that it can be verified with a Tone Detector circuit

Table 8-468. Test #97 Modem Pool Conference Test

Error Code	Test Result	Description / Recommendation
	ABORT	System resources required for this test are not available.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Determine whether the port is available for testing.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions, or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present, or some Tone Detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The port has been seized by a user for a valid call. Determine whether the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1020	ABORT	The test did not run due to a previously existing error on the specific port or because of a more general circuit pack error. 1. Examine the Error Log for existing errors against this port or the circuit pack, and attempt to diagnose previously existing errors.
2000	ABORT	The response to the test was not received in the allowable time period.
2012	ABORT	Internal system error.
2100	ABORT	System resources required for this test are not available.
2103	ABORT	The system could not make the conference connection for the test. 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-468. Test #97 Modem Pool Conference Test — *Continued*

Error Code	Test Result	Description / Recommendation
4000	ABORT	System resources needed to complete the test could not be allocated. Ordinarily, this means the conversion resource or other hardware used during the test was in use. 1. Wait 1 minute and attempt the test again. 2. If the same error occurs, use the **status port** command to determine whether the Modem Pool conversion resource is in use. 3. If the conversion resource is in use, and it is absolutely necessary to test it, the call must be dropped by issuing a **busyout port *UUCSS*** command against the conversion resource. Run the test again. 4. If the same error occurs while the conversion resource is idle, busyout both Modem Pool conversion resources on the TN758 Pooled Modem circuit pack containing the conversion resource under test. Run the test again. 5. If the test continues to abort, replace the Pooled Modem circuit pack and retest.
65515	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times. 2. Issue the **test port long** command on the port on which the test aborted. If any test aborted or failed, follow recommended maintenance strategy for the appropriate port type (for example, ANL-LINE, DIG-LINE).
None	FAIL	The test failed. This error is internal to the Pooled Modem circuit pack and does not involve external equipment or interfaces. 1. Busyout both of the TN758 Pooled Modem conversion resources on the circuit pack containing the failing conversion resource. 2. If the test continues to fail, replace the Pooled Modem circuit pack and retest.
Any	FAIL	The Network Processing Element (NPE) of the tested port did not conference the tones correctly. This will cause noisy and unreliable connections. 1. If the remaining ports are currently idle (amber LED is off), reset the circuit pack and repeat the test. 2. If the test fails again, replace the circuit pack.
	PASS	The port can correctly conference multiple connections. User-reported troubles on this port should be investigated using other port tests and by examining station, trunk, or external wiring.

Modem Pool Conversion Resource Loop-Around Test (#98)

The Modem Pool Conversion Resource Loop-around test is set up as follows:

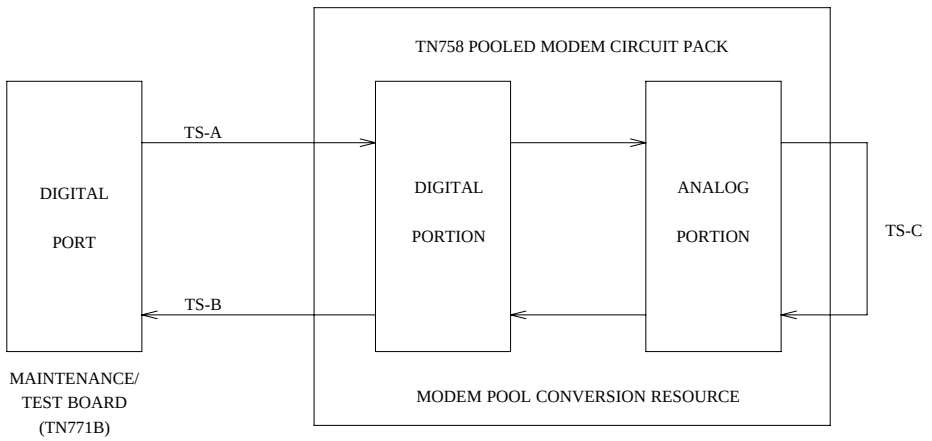

Figure 8-65. Modem Pool Conversion Resource Loop-Around

Test data patterns are transmitted from a Maintenance/Test board's digital port over network time slot A through the digital port on the conversion resource, looped around through the analog port via time slot C back to the Maintenance/Test board's digital port circuit via time slot B where the patterns are checked for accuracy. Finally, the test forces a disconnect by breaking the connection between the Maintenance/Test board's digital port and the Modem Pool port (time slot A) and verifying that the Maintenance/Test board's digital port and Modem Pool port go on-hook within the proper time. This test attempts to allocate a Maintenance/Test board's digital port, Modem Pool port, and other internal resources. If any of these allocation attempts fail, the test cannot be completed, and a specific abort error is reported.

Table 8-469. Test #98 Modem Pool Conversion Resource Loop-Around Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources needed to complete the test could not be allocated for the digital section of the Modem Pool conversion resource. Ordinarily, this means the conversion resource or other hardware used during the test was in use. 1. Wait 1 minute and attempt the test again. 2. If the conversion resource is in use, and it is absolutely necessary to test it, the call will have to be dropped by issuing a **busyout port *UUCSSpp*** command against the conversion resource. Run the test again. If the test passes, release the port. 3. If the same error occurs while the conversion resource is idle, busyout both Modem Pool conversion resources on the TN758 Pooled Modem circuit pack containing the conversion resource under test. Rerun the test. 4. If the test continues to abort, replace the Pooled Modem circuit pack and retest.
1180	ABORT	A Maintenance/Test board's digital port could not be allocated for this test. Since this error more closely relates to the digital ports on the specific Maintenance/Test board used than to the TN758 Pooled Modem circuit pack itself, any hardware testing or replacement activities will focus on the Maintenance/Test board. 1. Use the **list config** command to verify the presence of both digital ports (ports 02 and 03) on the Maintenance/Test board. The display should show entries for both. 2. If the ports are absent, see''M/T-BD (Maintenance/Test Circuit Pack)'' on page 8-1157. 3. If the ports are present, retry the command at 1-minute intervals up to 5 times.
1181	ABORT	No time-slots available to connect digital ports for the test. 1. Retry the command at 1-minute intervals up to 5 times.
1182	ABORT	Internal system error. Failed to connect the digital ports with time-slots. 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-469. Test #98 Modem Pool Conversion Resource Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
1340	ABORT	No Maintenance/Test digital port is currently available to perform this test. 1. Use **list config** to determine whether any Maintenance/Test digital ports (ports 02 and 03 on the Maintenance/Test circuit pack) are present in the system. Because at least one Maintenance/Test circuit pack must always be present in the a PN of any Mulit-Connect configuration, there should be at least two such ports present. If the ports are present, proceed to step 2. Otherwise, determine why no ports appear in the **list config** display. 2. If the ports are present and no errors are logged against them, retry the command at 1-minute intervals up to 5 times. 3. If the test continues to abort, replace the Maintenance/Test circuit pack.
2004	ABORT	Off-Hook was not received from the Pooled Modem. 1. Busyout the digital port being tested on the Pooled Modem circuit pack. Retry the command at 1-minute intervals up to 5 times. 2. If the test still aborts, replace the circuit pack.
2005	ABORT	The Maintenance/Test and the Pooled Modem boards' digital ports failed to handshake. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test still aborts, replace the Pooled Modem circuit pack.
2312	ABORT	The Loop-around test did not complete, failed to receive loop-back data. 1. Retry the test, if still aborts, replace the Pooled Modem board.
2313	ABORT	The Maintenance/Test board's digital port allocated for this test did not respond to down-linked message. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, replace the MTB.
2314	ABORT	The Modem Pool digital port did not respond to downlinked message. This error is internal to the Modem Pool circuit pack and does not involve external equipment or interfaces. 1. Busyout the TN758 Pooled Modem conversion resources on the circuit pack. 2. If the test continues to abort, replace the Pooled Modem circuit pack and retest.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-469. Test #98 Modem Pool Conversion Resource Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
2323	ABORT	The Maintenance Test circuit pack digital port allocated for this test did not disconnect properly. This error is more closely related to the Maintenance Test circuit pack digital port used for this test than the TN758 Pooled Modem circuit pack itself. Therefore, any hardware testing or replacement activities will focus on the Maintenance Test circuit pack. 1. Wait 1 minute and attempt the test again up to 5 times.
2324	ABORT	The digital portion of the tested Modem Pool port did not disconnect properly. 1. Wait 1 minute and attempt the test again. 2. If the test continues to abort, replace the Pooled Modem circuit pack and retest.
2325	FAIL	The Modem Pool port did not respond with an on-hook message when the connection to the TN711 Maintenance/Test digital port was broken, indicating a likely problem with the TN758 Pooled Modem circuit pack. 1. Busyout both of the TN758 Pooled Modem conversion resources on the circuit pack containing the failing conversion resource. 2. If the test continues to fail, replace the Pooled Modem circuit pack and retest.
	FAIL	The Loop-around test failed, the loop-back data did not match the original data. 1. Repeat Test #98. 2. If the test fails again, replace the Pooled Modem circuit pack.
	PASS	The port can correctly transmit/receive data.

Modem Pool Audit Test (#99)

This audit updates the Modem Pool conversion resource status contained in the TN758 Pooled Modem circuit pack's microprocessor. It does not actually test the Pooled Modem circuit pack; therefore, there are no FAIL codes. The audit can only be performed on idle conversion resources. If the conversion resource is in use, the audit will abort.

Table 8-470. Test #99 Modem Pool Audit Test

Error Code	Test Result	Description / Recommendation
None	ABORT	The system was not able to allocate every necessary resource to execute this test. An ABORT simply indicates that the conversion resource was in use when the audit was performed. No repair action is necessary unless the conversion resource was known to be idle during the test (amber in-use LED was off) or was busied out before the test was run. In that case, a TN758 failure condition may exist and the following procedure should be used: 1. Busyout both of the TN758 Pooled Modem conversion resources on the circuit pack containing the failing conversion resource. 2. If the test continues to abort, replace the Pooled Modem circuit pack and retest.

M/T-ANL (Maintenance/Test Analog Port)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
M/T-ANL	Minor	**test port *UUCSSpp* l**	Maintenance/Test analog port
M/T-ANL	Warning	**release port *UUCSSpp***	Maintenance/Test analog port

1. *UU* is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). *C* is the carrier designation (A, B, C, D, or E). *SS* is the number of the slot where the circuit pack resides (01–21). *pp* is the 2-digit port number (01, 02,...).

The Maintenance/Test analog port is port number 1 on the TN771D Maintenance/Test circuit pack. This port is used by the Automatic Transmission Measurement System (ATMS) as an Originating Test Line (OTL) or Terminating Test Line (TTL) for test calls over analog trunks. For more details, see "Automatic Trunk Transmission System" in Chapter 5, ''Additional Maintenance Procedures''. Figure 8-66 shows a typical ATMS configuration.

M/T-ANL maintenance ensures that the analog trunk's testing function is operating correctly. Although an M/T-ANL alarm can reduce service, it will not block service. To accurately measure the performance and health of analog trunks, replace an alarmed TN771D when a new circuit pack is available.

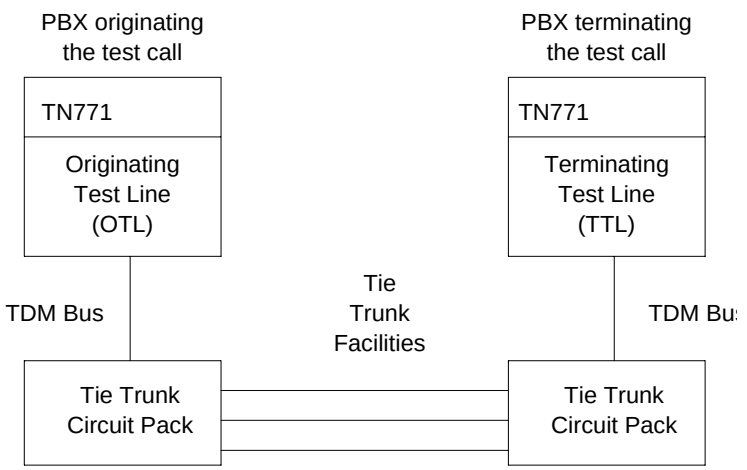

Figure 8-66. ATMS Tie Trunk Test Call

Error Log Entries and Test to Clear Values

Table 8-471. M/T-ANL Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1] (a)	0	Any	Any	Any	**test port *UUCSSpp***
1 (b)	41018	none	MINOR	ON	**test port *UUCSSpp* l r 3**
18	0	**busyout port *UUCSSpp***	WARNING	OFF	**release port *UUCSSpp***
257	Any	NPE Crosstalk test (#9)	MINOR	ON	**test port *UUCSSpp* l r 3**
513	Any	Analog Port Sanity test (#963)	MINOR	ON	**test port *UUCSS01* r 2**
769	Any	Analog Port Digital Loop-around test (#13)	MINOR	ON	**test port *UUCSSpp* r 3**
3840(c)	Any	Hook State Inquiry test (#566)			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. This error code appears in the Error Log only if the MTB circuit pack has been removed since the Error Log was last cleared. Verify that the circuit pack has been reinserted.

b. This error indicates a hardware failure on the Analog Port circuitry. Replace the Maintenance/Test circuit pack if the above command does not resolve the alarm.

c. This error indicates that call processing records did not agree with on-board records for the hook state (on-/off-hook) of the Maintenance/Test analog port. This error is not service-affecting and no action is required.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the following table when inspecting errors in the system. For example, by clearing error codes associated with the Analog Port Sanity test (#963), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Analog Port Sanity test (#963)	X	X	ND
Digital Loop-around test (#13)	X	X	ND
NPE Crosstalk test (#9)		X	ND
Hook State Inquiry (#566)	X	X	ND
Clear Error Counters (#270)		X	ND

1. D = Destructive, ND = Nondestructive

NPE Crosstalk Test (#9)

The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections.

One or more Network Processing Elements (NPE) reside on each circuit pack with a TDM-bus interface. The NPE controls port connectivity, gain, and provides conferencing functions on a per-port basis. If the NPE is not working correctly, one-way and/or noisy connections may be observed. This test is part of a port's long test sequence and takes approximately 10 to 20 seconds to complete.

Table 8-472. Test #9 NPE Cross Talk Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid ATMS trunk test call. 1. Retry the command at 1-minute intervals up to 3 times.
1001	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 3 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out of service due to TDM-BUS errors. A system is considered under heavy traffic when the Call Processing Occupancy is greater than 50% or when the System Management and the Call Processing Occupancies together exceed 65%. To view the system occupancy measurements enter the command **status system health** on the system technician terminal. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 3 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 3 times.
1004	ABORT	The port has been seized by a valid ATMS test call. 1. Retry the command at 1-minute intervals up to 3 times. 2. If the test continues to abort and the port is idle on a valid ATMS test call, escalate the problem. To determine whether the port is in use by an ATMS test call, enter **status station *ext*** where ***ext*** is the assigned ATMS station's number.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.
2100	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 3 times.

Continued on next page

Table 8-472. Test #9 NPE Cross Talk Test — *Continued*

Error Code	Test Result	Description / Recommendation
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1. If the remaining ports are currently idle (amber LED is off), try to reset the circuit pack via the **busyout board *UUCSS***, **reset board *UUCSS***, **release board *UUCSS*** command sequence. Then repeat the test. 2. If the test fails again, replace circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated by examining station, trunk, or external wiring.

Analog Port Digital Loop-Around Test (#13)

This test is a modification of the Voice and Control Channel Local Loop test used by Digital Station (DIG-LINE) maintenance. This test does not perform the control channel and secondary information channel loop around tests as described for DIG-LINE, as these data paths do not exist for the Maintenance/Test analog port. The primary information channel is tested by:

1. Looping back the data channel onto the TDM bus
2. Sending a digital count from the Tone-Clock circuit pack and receiving the same digital count with a general-purpose tone detector
3. Doing a conference test for the primary information channel. This is the same test as Conference test (#6).

Only one value (Pass, Fail, or Abort) is generated as a result of the two tests. If either fails or aborts, the sequence is stopped.

Table 8-473. Test #13 Analog Port Digital Loop-Around Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
1000	ABORT	The port is in use on a valid ATMS test call. 1. Retry the command at 1-minute intervals up to 3 times. 2. If the test continues to abort and the port is idle on a valid ATMS test call, escalate the problem. To determine whether the port is in use by an ATMS test call, enter **status station *ext*** where ***ext*** is the assigned ATMS station's number.
1001	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 3 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions, or it may have time slots out-of-service due to TDM-BUS errors. A system is considered under heavy traffic when the Call Processing Occupancy is greater than 50% or when the System Management and the Call Processing Occupancies together exceed 65%. To view the system occupancy measurements enter the command **status system health** on the system technician terminal. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat the test at 1-minute intervals up to 3 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present, or some tone detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the command at 1-minute intervals up to 3 times.
1004	ABORT	The port was seized by a valid ATMS test call. 1. Retry the command at 1-minute intervals up to 3 times. 2. If the test continues to abort and the port is idle on a valid ATMS test call, escalate the problem. To determine whether the port is in use by an ATMS test call enter **status station *ext***, where ***ext*** is the assigned ATMS station's number.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.

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Table 8-473. Test #13 Analog Port Digital Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
7	FAIL	Conference test failed on the primary information channel. 1. Run the circuit pack tests to check the Tone-Clock (TONE-BD) circuit pack and the Tone Detector circuit pack via the **test board *UUCSS*** command. 2. Resolve any problems that are detected on the Tone-Clock (TONE-BD) circuit pack or Tone Detector circuit pack. See the section on Tone Generator circuit pack. 3. If the Tone-Clock and Tone Detector circuit packs are functioning properly, and the test still fails, replace the Maintenance/Test circuit pack.
14	FAIL	The primary information channel is not transmitting properly. User may not notice any interruption in service or may not be able to use this port. 1. Run the circuit pack tests to check the Tone Generator circuit pack and the Tone Detector circuit pack using **test board *UUCSS***. 2. Resolve any problems that are detected on the Tone Generator circuit pack or Tone Detector circuit pack. See the section on Tone Generator circuit pack. 3. If the Tone Generator and Tone Detector circuit packs are functioning properly, and the test still fails, replace the Maintenance/Test circuit pack.
	PASS	The Maintenance/Test analog port analog trunk testing capability is operating correctly.

Clear Error Counters (#270)

The ports on the Maintenance/Test circuit pack continually run self-tests, whenever the port is idle. The Angel uses a counter so that the Background Maintenance Failure message is only sent uplink once. Many circuit packs have counters in the Angel firmware. These counters are used so that Control Channel Message Set (CCMS) messages are not continuously sent uplink. Using this method, the message will be sent once, when the counter reaches some preset threshold, and then not sent again until the counter is cleared. This test is used to clear the counter, so that if the port continues to fail during or after Avaya MultiVantage™ software demanded testing, the Angel will send a message to indicate that fact.

This test is only used to send a message to the Angel on the Maintenance/Test circuit pack. Therefore, this test should never abort or fail.

Table 8-474. Test #270 Clear Error Counters

Error Code	Test Result	Description / Recommendation
	PASS	The message to clear the Maintenance/Test circuit pack's counter for Background Maintenance Failures has been sent.

Hook State Inquiry (#566)

This test ensures that the Maintenance/Test analog port maintenance software and call processing agree on the on-/off-hook status of the Maintenance/Test analog port.

Table 8-475. Test #566 Hook State Inquiry

Error Code	Test Result	Description / Recommendation
1	ABORT	Switch hook audit timed out. No response was received from the circuit pack for information about the switch hook state. 1. Retry the command at 1-minute intervals up to 3 times. 2. If the test continues to abort, replace the circuit pack and repeat the test.
2100	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 3 times.
Any	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 3 times. 2. If the test continues to fail reset the circuit pack via the **busyout board *UUCSS***, **reset board *UUCSS***, **release board *UUCSS*** command sequence. 3. Retry the command at 1-minute intervals up to 3 times.
	PASS	Call processing and Maintenance/Test analog port maintenance software agree on the Maintenance/Test analog port hook state.

Analog Port Sanity Test (#963)

This test verifies that the port circuitry involved in the analog trunk testing on the Maintenance/Test analog port is functioning properly.

This test will abort if an ATMS test call is in progress on the Maintenance/Test analog port when the test is requested.

Table 8-476. Test #963 Analog Port Sanity Test

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required to run this test are not available.
2500	ABORT	An internal operation failed; the test could not be completed. 1. Retry the command at 1-minute intervals up to 3 times.
50	FAIL	The switch was unable to communicate with the port circuitry used for analog trunk testing. 1. Reset the circuit pack via the **busyout board *UUCSS***, **reset board *UUCSS***, **release board *UUCSS*** command sequence. 2. Test the port again via the **test port *UUCSS*01 l** command. 3. If the test fails again, replace the circuit pack.
	PASS	The Maintenance/Test analog port analog trunk testing capability is operating correctly.

M/T-BD (Maintenance/Test Circuit Pack)

MO's Name As It Appears in Alarm Log	Alarm Level	Initial System Technician SAT Command to Run[1]	Full Name of MO
M/T-BD	MINOR	**test board *UUCSS* l**	Maintenance/Test circuit pack
M/T-BD	WARNING	**release board *UUCSS***	Maintenance/Test circuit pack

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21).

The Maintenance/Test circuit pack supports packet-bus fault detection and bus reconfiguration for the port network where it is installed. The circuit pack also provides Analog Trunk testing, and data loop-back testing of DCP Mode 2 endpoints and Digital (ISDN) Trunk facilities via the TDM bus.

Port 1 of the Maintenance/Test board is the Analog Test port which provides the Analog Trunk testing function for Automatic Transmission Measurement System (ATMS). ATMS is a feature in which calls are made from a device called an Originating Test Line (OTL) over a specific trunk to a device called a Terminating Test Line (TTL). The OTL and TTL can then send tones over the trunk under test and determine the quality of the connection. Ports 2 and 3 are the digital ports which provide the digital (ISDN) trunk-testing functions. Port 4 is the packet port which provides the packet-bus maintenance function.

See "XXX-BD (Common Port Circuit Pack)" on page 8-1872 for circuit pack-level errors. See also, related maintenance/test information for analog, digital, and packet-bus ports:

- M/T-ANA (Maintenance/Test analog port)
- M/T-DIG (Maintenance/Test digital port)
- M/T-PKT (Maintenance/Test packet-bus port)

Every port except the analog port (Port 1) of the Maintenance/Test board is automatically administered when the circuit pack is inserted into the system and automatically removed when the circuit pack is unplugged from the system. The Analog port however, is administered via the station screen with the type "105TL" for an OTL or a TTL. This port remains administered even after the circuit pack is physically removed from the system. Care should be taken to remove the OTL or the TTL before unplugging the circuit pack.

Hardware Error Log Entries and Test to Clear Values

Maintenance/Test Board Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level[1]	On/Off Board	Test to Clear Value
0[2]	0	Any	Any	Any	**test port *UUCSSpp* sh r 1**
1(a)	0	SAKI Sanity test (#53)	MINOR	ON	See footnote a
18(b)	0	**busyout board**	WARNING	OFF	**release board *UUCSS***
36(c)	0				
217(e)			WARNING	ON	
257(d)	0	CC Loop test (#52)	MINOR	ON	**test board *UUCSS* r3**
267(e)			WARNING	ON	
513(f)	4352 to 4357				
769(g)	4358				
1025(h)	4363	NPE Audit test (#50)			**test board *UUCSS* l**
1538(i)	0		MINOR	ON	
3840(j)	4096 to 4101				
3999 (k)	Any	None			

1. Major or Minor alarms on this MO may have been downgraded to Warning alarms based on the values used in the **set options** command.
2. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. This error indicates that the circuit pack has stopped functioning. Reset the circuit pack via **busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS*** commands. If the SAKI Sanity test (#53) passes, then the on-board circuitry is healthy. If the SAKI Sanity test (#53) fails, replace the circuit pack.

b. The circuit pack has been busied out via the **busyout board *UUCSS*** command. Execute **release board *UUCSS*** command.

c. A port processor on the circuit pack failed to initialize. Reset the circuit pack via **busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***. if the problem does not go away, replace the circuit pack.

d. A Control Channel Protocol error has occurred. This may be due to the circuit pack detecting an on-board hardware failure. Execute **busyout board *UUCSS*** and **reset board *UUCSS*** commands to reset the circuit pack. Any such problem will be detected during initialization, as the circuit pack locks up and appears insane to the system.

e. An extra TN771D circuit pack has been inserted into the port network.

f. An on-board hardware failure has been detected by the circuit pack. Enter the **busyout board UUCSS**, **reset board UUCSS**, and **release board UUCSS** commands to reset the circuit pack. If the SAKI Sanity test (#53) passes, the circuitry is healthy. If not, replace the circuit pack.

g. This error is reported by the circuit pack when it detects a program logic error. While no action is required, this error may lead to errors of other types being reported against this circuit pack.

h. This error is reported by the circuit pack when it cannot update NPE memory and read it back. This error type can be ignored, but may lead to errors of other types being reported against this circuit pack.

i. Excessive number of messages have been received from the Maintenance/Test circuit pack. This may be due to a hardware problem on the circuit pack. The switch will take the board out of service and periodically put it back into service to see if the problem has disappeared. If the problem persists, replace the circuit pack.

j. This error is not service affecting. No action is required. This error is reported by the circuit pack when it receives a bad control channel message from the switch.

k. Error type 3999 indicates that the circuit pack sent a large number of control channel messages to the switch within a short period of time. If error type 1538 is also present, then the circuit pack was taken out-of-service due to hyperactivity. If error type 1538 is absent, then the circuit pack was not taken out-of-service, but it has generated 50% of the messages necessary to be considered hyperactive. This may be completely normal during heavy traffic periods. However, if this error type is logged when the circuit pack is being lightly used, it may indicate a problem with the circuit pack or the equipment attached to it.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the Control Channel Loop-Around test (#52), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Control Channel Loop-Around test (#52)	X	X	ND
NPE Audit test (#50)		X	ND

1. D = Destructive, ND = Nondestructive

Repair procedures for the above tests are described in "XXX-BD (Common Port Circuit Pack)" on page 8-1872.

M/T-DIG (Maintenance/Test Digital Port)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
M/T-DIG	MINOR	**test port *UUCSSpp* l**	Maintenance/Test digital port
M/T-DIG	WARNING	**release port *UUCSSpp***	Maintenance/Test digital port

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21). pp is the 2-digit port number (01, 02,...).

The Maintenance/Test digital port is a port on the TN771D circuit pack. Ports 2 and 3 are digital ports. The Maintenance/Test digital port provides the ability to perform digital (i.e., ISDN-PRI) trunk testing via the TDM bus. For an ISDN-PRI test call, connections are set up in the system as shown in Figure 8-67 on page 8-1162.

When the Maintenance/Test digital port is participating in an ISDN-PRI test call, the port sends a stream of pseudo-random data along the connected B channel. The far end loops back this data, and the Maintenance/Test digital port compares the data to that which was sent. Errors are recorded on a bit and block basis. Refer to ISDN-TRK (DS1 ISDN Trunk) Maintenance documentation for more information about ISDN-PRI test calls.

The Maintenance/Test digital port maintenance ensures that the digital trunk testing function is operating correctly. The Maintenance/Test digital port is alarmed if maintenance determines that the digital port is operating incorrectly.

NOTE:
An alarm on the Maintenance/Test digital port reduces service, but does not block it since the ISDN-TRK has other means to determine the health of the ISDN-PRI trunk facility. However, to accurately measure the error performance and to ensure accuracy of the health of the ISDN-PRI trunk, the Maintenance/Test circuit pack should be replaced when a new circuit pack is available.

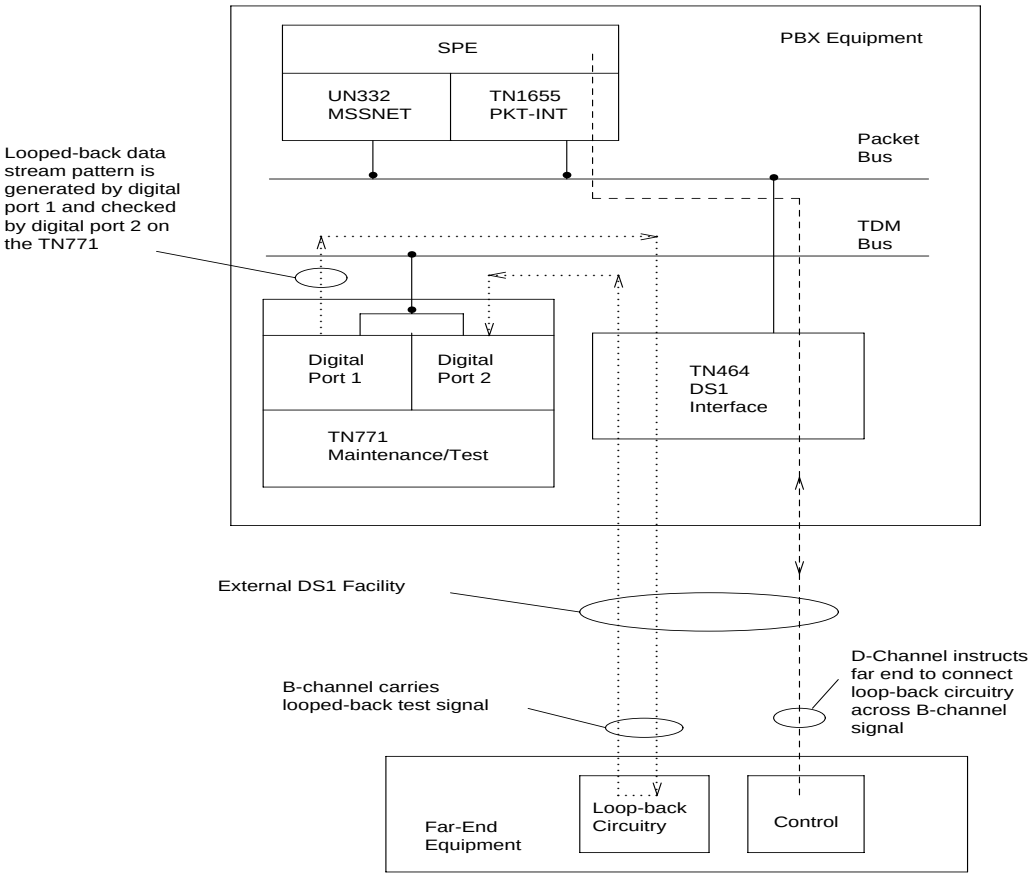

Figure 8-67. ISDN-PRI Outgoing Test Call

Hardware Error Log Entries and Test to Clear Values

M/T-DIG Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp***
1 (a)	41018	none	MINOR	ON	**test port *UUCSSpp* l r 3**
18 (b)	0	busyout port UUCSSpp	WARNING	OFF	**release port *UUCSSpp***
257 (c)	Any	NPE Crosstalk test (#9)	MINOR	ON	**test port *UUCSSpp* l r 3**
513 (d)	Any	Digital Port Sanity test (#565)	MINOR	ON	**test port *UUCSS*02 r 2**
769 (e)	Any	Digital Port Loop Around test (#13)	MINOR	ON	**test port *UUCSSpp* r 3**
3840 (f)	Any	Hook State Inquiry test (#566)			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. This error indicates a hardware failure on a digital port's circuitry. Replace the Maintenance/Test circuit pack if the alarm is not resolved by the command above.

b. The port has been busied out via the **busyout port *UUCSSpp*** command.

c. This error indicates that Maintenance/Test digital port is talking on more than just its assigned time slot. Replace the Maintenance/Test circuit pack.

d. This error indicates that the Maintenance/Test digital port has failed its self-test. Since the Digital Port Sanity test runs only on port 2, but tests both ports 2 and 3, both ports will be alarmed when the test fails. Note that the command above indicates to test port 2, even if the error is logged against port 3.

e. This error indicates that the Maintenance/Test digital port has been unable to successfully loop data from a tone generator to a tone detector.

f. This error indicated that call processing records did not agree with on-board records for the hook state (on-/off-hook) of the Maintenance/Test digital port. This error is not service-affecting and no action is required.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the following table when inspecting errors in the system. For example, by clearing error codes associated with the Digital Port Sanity test (#565), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Digital Port Sanity test (#565)	X	X	ND
Digital Port Loop Around test (#13)	X	X	ND
NPE Crosstalk test (#9)		X	ND
Hook State Inquiry (#566)	X	X	ND
Clear Error Counters (#270)		X	ND

1. D = Destructive, ND = Nondestructive

NPE Crosstalk Test (#9)

This test is a modified version of the Digital Line NPE Crosstalk test used by DIG-LINE maintenance.

One or more Network Processing Elements (NPE) reside on each circuit pack with a TDM-bus interface. The NPE controls port connectivity, gain, and provides conferencing functions on a per-port basis. The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and/or noisy connections may be observed. This test is part of a port's long test sequence and takes approximately 10 to 20 seconds to complete. This test is a modified version of the Digital Line NPE Crosstalk test used by DIG-LINE maintenance.

Table 8-477. Test #9 NPE Cross Talk Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid ISDN-PRI test call. Use the **list isdn-testcall** command to determine whether the port is in use (listed in the M/T Port column). If so, either wait for the test call to finish (as indicated in the `Start Time` and `Duration` fields in the above display), or abort the test call with the **clear isdn-testcall *grp/mem*** command, where ***grp/mem*** is determined from the `B-channel` field of the above display. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort and the port is idle, escalate the problem.
1001	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out of service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times. 4. If the test continues to abort, escalate the problem.
1004	ABORT	The port has been seized by a valid ISDN-PRI test call. Use the **list isdn-testcall** command to determine which call is using the port (from the M/T Port column). Either wait for the test call to complete (as indicated in the `Start Time` and `Duration` fields of the above display), or abort the test call with the **clear isdn-testcall *grp/mem*** command, where grp/mem is determined form the `B-channel` field of the above display. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort and the port is idle, escalate the problem.

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Table 8-477. Test #9 NPE Cross Talk Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1. If the remaining ports are currently idle (amber LED is off), try to reset the circuit pack. Then repeat the test. 2. If the test fails again, replace circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and by examining station, trunk, or external wiring.

Digital Port Loop-Around Test (#13)

This test is a modification of the Voice and Control Channel Local Loop test used by Digital Station (DIG-LINE) maintenance. This test does not perform the control channel and secondary information channel loop around tests as described for DIG-LINE, as these data paths do not exist for the Maintenance/Test digital port. The primary information channel is tested by first looping back the data channel onto the TDM bus, and then sending a digital count from the Tone-Clock circuit pack and receiving the same digital count with a general-purpose tone detector. A conference test is done next for the primary information channel. This is the same test as Conference test (#6).

Only one value (Pass, Fail, or Abort) is generated as a result of the two tests. If either fails or aborts, the sequence is stopped.

Table 8-478. Test #13 Digital Port Loop-Around Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
1000	ABORT	The port is use on a valid ISDN-PRI test call. Use the **list isdn-testcall** command to determine which call is using the port (from the M/T Port column). Either wait for the test call to complete (as indicated in the `Start Time` and `Duration` fields in the above display), or abort the test call with the **clear isdn-testcall *grp/mem*** command, where grp/mem is determined from the `B-channel` field of the above display. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort and the port is idle, escalate the problem.
1001	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions, or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat the test at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.

Continued on next page

Table 8-478. Test #13 Digital Port Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present, or some tone detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the command at 1-minute intervals up to 5 times. 4. If the test continues to abort, escalate the problem.
1004	ABORT	The port was seized by a valid ISDN-PRI test call. Use the **list isdn-testcall** command to determine which call is using the port (from the M/T Port column). Either wait for the test call to complete (as indicated in the `Start Time` and `Duration` fields of the above display), or abort the test call with the **clear isdn-testcall *grp/mem*** command, where grp/mem is determined from the `B-channel` field of the above display. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort and the port is idle, escalate the problem.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required to run this test are not available. 1. Retry the test at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
7	FAIL	Conference test failed on the primary information channel. In most cases, the user may not notice a disruption in service. 1. Run the circuit pack tests to check the Tone Generator circuit pack and the Tone Detector circuit pack via the **test board *UUCSS*** command. 2. Resolve any problems that are detected on the Tone Generator circuit pack or Tone Detector circuit pack. 3. If the Tone Generator and Tone Detector circuit packs are functioning properly, and the test still fails, replace the Maintenance/Test circuit pack.

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Table 8-478. Test #13 Digital Port Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
14	FAIL	The primary information channel is not transmitting properly. User impact may range from nothing to not being able to use this port. 1. Run the circuit pack tests to check the Tone Generator circuit pack and the Tone Detector circuit pack using **test board *UUCSS***. 2. Resolve any problems that are detected on the Tone Generator circuit pack or Tone Detector circuit pack. 3. If the Tone Generator and Tone Detector circuit packs are functioning properly, and the test still fails, replace the Maintenance/Test circuit pack.
	PASS	The Maintenance/Test digital port digital trunk testing capability is operating correctly.

Clear Error Counters (#270)

This test is not an actual test in the strict sense of the word. Many circuit packs have counters in the Angel firmware. These counters are used so that Control Channel Message Set (CCMS) messages are not continuously sent uplink. Using this method, the message will be sent once, when the counter reaches some preset threshold, and then not sent again until the counter is cleared.

The ports on the Maintenance/Test circuit pack continually run self-tests, whenever the port is idle. The Angel uses a counter so that the Background Maintenance Failure message is only sent uplink once. This test is used to clear the counter, so that if the port continues to fail during or after Avaya MultiVantage™ software demanded testing, the Angel will send a message to indicate that fact.

This test is only used to send a message to the Angel on the Maintenance/Test circuit pack. Therefore, this test should never abort or fail.

Table 8-479. Test #270 Clear Error Counters

Error Code	Test Result	Description / Recommendation
Any	ABORT	This test should never abort.
Any	FAIL	This test should never fail. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail, escalate the problem.
	PASS	The message to clear the Maintenance/Test circuit pack's counter for Background Maintenance Failures has been sent.

Digital Port Sanity Test (#565)

This test verifies that the port circuitry involved in the digital trunk testing on the Maintenance/Test digital port is functioning properly. This circuitry is common to both Maintenance/Test digital ports on the Maintenance/Test circuit pack. Therefore, this test is only run for port 2. The test will abort when run on port 3, as described in Table 8-480.

This test operates by connecting the two Maintenance/Test digital ports on the TDM bus so that they talk and listen to each other. Then four self-tests are attempted: (a) sending data from port 2 to port 3 in asynchronous mode; (b) sending data from port 3 to port 2 in asynchronous mode; (c) sending data from port 2 to port 3 in synchronous mode; and (d) sending data from port 3 to port 2 in synchronous mode. The test passes if all four of these self-tests are successful. The test will stop as soon as any one of these self-tests fails.

This test will abort if an ISDN test call is in progress on either Maintenance/Test digital port when the test is requested or if an ISDN test call is initiated while the Digital Port Sanity test is in progress.

Table 8-480. Test #565 Digital Port Sanity Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	One of the Maintenance/Test digital ports is busy with background maintenance. 1. Either wait for the port to become idle, or busyout both Maintenance/Test digital ports on the Maintenance/Test circuit pack via the **busyout port *UUCSS*02** and **busyout port *UUCSS*03** commands, respectively. 2. Release the ports (if they were busied out) via the **release port *UUCSS*02** and **release port *UUCSS*03** commands, respectively. 3. Retry the command at 1-minute intervals up to 5 times. 4. If the test continues to abort, escalate the problem.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions, or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors, and if not handling heavy traffic, repeat the test at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.

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Table 8-480. Test #565 Digital Port Sanity Test — *Continued*

Error Code	Test Result	Description / Recommendation
1004	ABORT	The port was seized by a valid ISDN-PRI test call. Use the **list isdn-testcall** command to determine which call is using the port (from the M/T Port column). Either wait for the test call to complete (as indicated in the `Start Time` and `Duration` fields of the above display), or abort the test call with the **clear isdn-testcall *grp/mem*** command, where ***grp/mem*** is determined from the `B-channel` field of the above display.
1019	ABORT	An ISDN test call is in progress using this Maintenance/Test circuit pack. The Maintenance/Test circuit pack cannot perform a self-test on one of its digital ports while an ISDN test call is using either of the digital ports. Use the **list isdn-testcall** command to determine which call is using the port (form the M/T Port column). Either wait for the test call to complete (as indicated in the `Start Time` and `Duration` fields of the above display), or abort the test call with the **clear isdn-testcall *grp/mem*** command, where ***grp/mem*** is determined from the `B-channel` field of the above display. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort and the port is idle, escalate the problem.
1138	ABORT	This test does not run on port 3 of the Maintenance/Test circuit pack. This test will only run on port 2. Look at the results of the Digital Port Sanity test for port 2. 1. Run the command again for port 2 via the **test port *UUCSS*02** or **test port *UUCSS*02 l** command.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required to run this test are not available.
2500	ABORT	An internal operation failed; the test could not be completed. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail, escalate the problem.

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Table 8-480. Test #565 Digital Port Sanity Test — *Continued*

Error Code	Test Result	Description / Recommendation
50	FAIL	The switch was unable to communicate with the port circuitry used for digital trunk testing.
100	FAIL	Data was not sent from port 2 to port 3 successfully in asynchronous mode.
101	FAIL	Data was not sent from port 3 to port 2 successfully in asynchronous mode.
102	FAIL	Data was not sent from port 2 to port 3 successfully in synchronous mode.
103	FAIL	Data was not sent from port 3 to port 2 successfully in synchronous mode. 1. Reset the circuit pack via the **busyout board *UUCSS***, **reset board *UUCSS***, **release board *UUCSS*** command sequence. 2. Test the port again via the **test port *UUCSS*02 l** command. 3. If the test fails again, replace the circuit pack.
	PASS	The Maintenance/Test digital port digital trunk testing capability is operating correctly.

Hook State Inquiry (#566)

This test ensures that the Maintenance/Test digital port maintenance software and call processing agree on the on-/off-hook status of the Maintenance/Test digital port.

Table 8-481. Test #566 Hook State Inquiry

Error Code	Test Result	Description / Recommendation
1	ABORT	Switch hook audit timed out. No response was received from the circuit pack for information about the switch hook state. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, replace the circuit pack and repeat the test. 3. If the test continues to abort, escalate the problem.
2100	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
Any	FAIL	Internal system error. This test should never return a failure. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail reset the circuit pack via the **busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS*** command sequence. 3. Retry the command at 1-minute intervals up to 5 times. 4. If the test continues to fail, escalate the problem.
	PASS	Call processing and Maintenance/Test digital port maintenance software agree on the Maintenance/Test digital port hook state.

M/T-PKT (Maintenance/Test Packet Bus Port)

MO's Name As It Appears in Alarm Log	Alarm Level	Initial System Technician SAT Command to Run[1]	Full Name of MO
M/T-PKT	Minor	**test port *UUCSSpp* l**	Maintenance/Test Packet Bus port
M/T-PKT	Warning	**release port *UUCSSpp***	Maintenance/Test Packet Bus port

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21). pp is the 2-digit port number (01, 02,...).

The Maintenance/Test packet-bus port (M/T-PKT) is Port #4 on the TN771D Maintenance/Test circuit pack. The packet-bus port provides the following packet-bus maintenance functions:

- Packet-bus fault detection

  The ability to detect faults (e.g., shorts, open leads) on the packet bus autonomously (i.e., without Avaya MultiVantage™ software involvement).

- Packet-bus reconfiguration

  The ability to swap faulty leads with spare leads autonomously so that the packet bus remains operational. This is accomplished by sending a message to every circuit pack using the packet bus (e.g., TN556 ISDN-BRI), telling it which spare leads to use on the bus.

M/T-PKT maintenance ensures that these maintenance functions are operating correctly. The Maintenance/Test packet-bus port is alarmed if maintenance determines that the port's maintenance functions are operating incorrectly.

When M/T-PKT maintenance determines that the packet-bus port is defective, the packet-bus fault-detection and -reconfiguration functions provided by the port will be turned off.

M/T-PKT maintenance interacts with packet-bus maintenance. Therefore, there may be alarms on the packet bus when there is a fault on the M/T-PKT. For further information, refer to the PKT-BUS MO's section.

Hardware Error Log Entries and Test to Clear Values

M/T-PKT Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp***
1 (a)	41018	none	MINOR	ON	**test port *UUCSSpp* l r 3**
18 (b)	0	**busyout port *UUCSSpp***	WARNING	OFF	**release port *UUCSSpp***
257 (c)	Any	none	MINOR	ON	
513 (d)	Any	Packet Bus Port Health Inquiry test (#567)	MINOR	ON	**test port *UUCSSpp* r 3**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. This error indicates a hardware failure with the port circuitry which provides the packet-bus maintenance functions. Replace the Maintenance/Test circuit pack if the alarm is not resolved by the test command above.

b. The port has been busied out via the **busyout port *UUCSSpp*** command.

c. This error indicates that the Maintenance/Test packet-bus port has reconfigured the packet bus by swapping a bad lead to a spare. Note that this error is sent up whenever the Maintenance/Test packet-bus port is initialized (since the packet-bus port reconfigures the packet bus to whatever state it determines the packet bus is in). This will occur if the circuit pack is inserted, if the system is restarted, or if the port is released from a busyout state. Therefore, it is normal for this error to be present in the error log.

   If the M/T-PKT reconfigures the packet bus 6 times within 15 minutes, a Minor alarm is raised indicating that either:

   - Packet-bus maintenance functions are not operating correctly
   - Many changes are taking place on the packet bus (insertions or removals of circuit packs)

If the system has been in a stable state for more than 15 minutes, try the following procedure:

1. Reset the Maintenance/Test circuit pack from the G3-MT as follows:
   - Enter the **busyout board *UUCSS*** command.
   - Enter the **reset board *UUCSS*** command.
   - Enter the **release board *UUCSS*** command.
2. Wait 15 minutes.
3. If the error recurs, replace the Maintenance/Test circuit pack.

When this alarm is active, the amber LED will be in one of three states:

- An unlit amber LED indicates no activity on the Maintenance/Test circuit pack. You can replace the Maintenance/Test circuit pack.
- If there is an indication of an uncorrectable fault on the packet bus, the amber LED will be blinking at a rate of 1 Hz. It is OK to replace the Maintenance/Test circuit pack. Ignore the packet-bus error indication, since the Maintenance/Test circuit pack has been determined to be defective.
- If there is other activity on the Maintenance/Test circuit pack (i.e., ISDN test call), or if there is an indication of a correctable fault on the packet bus, the amber LED will be on steady. If there is an ISDN test call in progress, it must be halted via the **clear isdn-testcall *grp/member*** command prior to replacing the circuit pack. Ignore the packet-bus error indication, since the Maintenance/Test circuit pack has been determined to be defective.

d. This error indicates a failure of the Packet Bus Port Health Inquiry test. Either the packet-bus port has reported a self-test failure, or the Avaya MultiVantage™ software can communicate with the Maintenance/Test circuit pack but not with the Maintenance/Test circuit pack packet-bus port. Refer to the description of the Packet Bus Port Health Inquiry test, and follow the instructions indicated for the failure code that matches the `Aux Data` field.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the following table when inspecting errors in the system.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Packet Bus Port Health Inquiry test (#567)	X	X	ND
Clear Error Counters (#270)		X	ND

1. D = Destructive, ND = Nondestructive

Clear Error Counters (#270)

This test is not an actual test in the strict sense of the word. Many circuit packs have counters in the Angel firmware. The circuit pack's Angel continuously runs port self-tests on idle ports and keeps track of any errors it detects by incrementing a firmware counter. When the counter value reaches some preset threshold, the Angel sends a single CCMS (Control Channel Message Set) error message uplink to the Avaya MultiVantage™ software. No more error messages of that type are sent uplink until the Avaya MultiVantage™ software sends a downlink message to clear the counter. This strategy keeps a failed port/circuit pack from flooding the Avaya MultiVantage™ software with a continuous string of identical error messages. This test is used to clear the counter, so that if the port continues to fail during or after Avaya MultiVantage™ software demanded testing, the Angel will send a message to indicate that fact.

This test is only used to send a downlink message to the Angel on the Maintenance/Test circuit pack. Since the Angel normally provides no uplink response to this message, this test should never abort or fail.

Table 8-482. Test #270 Clear Error Counters

Error Code	Test Result	Description / Recommendation
Any	ABORT	This test should never abort.
Any	FAIL	This test should never fail. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail, escalate the problem.
	PASS	The message to clear the Maintenance/Test circuit pack's counter for Background Maintenance Failures has been sent.

Packet Bus Port Health Inquiry Test (#567)

This test verifies that the packet-bus fault-detection and maintenance function of the M/T-PKT is functioning properly. This is done by having the M/T-PKT perform a self-test. If the self-test passes, then the Packet Bus Port Health Inquiry test passes. If the self-test fails or the Avaya MultiVantage™ software cannot communicate with the M/T-PKT, then the test fails

Table 8-483. Test #567 Consistency Test

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources necessary to run this test are not available.
2500	ABORT	An internal operation failed, and the test could not be completed. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2059	FAIL	The M/T-PKT has reported a failure of the on-board self-test.
2060	FAIL	The M/T-PKT has reported an invalid state for the packet bus.
2061	FAIL	The Avaya MultiVantage™ software cannot communicate with the M/T-PKT, but can communicate with the Maintenance/Test circuit pack. 1. Retry the command. 2. If the test continues to fail, replace the Maintenance/Test circuit pack, and retry the command. 3. If the test continues to fail, see''PKT-BUS (Packet Bus)'' on page 8-1230 to determine whether the M/T-PKT failure is being caused by a packet-bus fault.
	PASS	The M/T-PKT packet-bus fault-detection capability is operating correctly.

NO-LIC (No License)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run	Full Name of MO
NO-LIC	MAJOR	None	NO License

NOTE:
The NO-LIC MO (No License) is a non-traditional MO. As a result, there are no associated tests or commands that are executed in the traditional manner.

The NO-LIC MO works in concert with the LIC-ERR MO to look for any errors/violations associated with the License File. Once a License File error occurs, MO LIC-ERR logs the error, raises an alarm, and starts a timer that is associated with the error. When the timers threshold has been exceeded, MO NO-LIC will cause call processing to be restricted. Every call origination will be restricted to outgoing ***emergency numbers***. Incoming calls will be restricted to a ***Administration*** (Attendant Console) number.

The license file feature is loaded onto a switch during initialization of the switch software, restore of translations, and periodically. After initialization, a query is made to a software module called the license server. This module reads the license file, compares a serial number in the license file to a serial number in hardware, compares the software version in the license with the running software version, and if a match occurs, delivers permission to run to the S8700 Multi-Connect software along with a new feature mask. The feature mask controls revenue associated options.

For more information, see ''Troubleshooting License File errors'' on page 8-1016.

Error Log Entries and Test to Clear Values

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1 (a)			MAJOR	OFF	See Footnote[1]
513 (b)		None	MAJOR	OFF	See Footnote[1]
769 (c)		None	MAJOR	OFF	See Footnote[1]
1281 (d)		None	MAJOR	OFF	See Footnote[1]
1537 (e)		None	MAJOR	OFF	See Footnote[1]
1793 (f)		None	MAJOR	OFF	See Footnote[1]
2305 (g)		None	MAJOR	OFF	See Footnote[1]
2561 (h)		None	MAJOR	OFF	See Footnote[1]

1. These error types can be cleared by providing the correct License File per local instructions.

Notes:

a. Error Type 1 — This error indicates a serial-number mismatch of the reference IPSI and a subsequent License Error failure. This error is caused by the:

- Reference IPSI not responding
- Expiration of its 6-day timer

Call-processing software stops every new call, except outgoing calls to an emergency number and incoming calls to an administration number.

b. Error Type 513 — This error indicates that the license has expired and also that:

- A License Error failure has occurred
- The 6-day timer has expired

Call-processing software stops every new call, except outgoing calls to an emergency number and incoming calls to an administration number.

c. Error Type 769 — This error indicates that the system is in the Feature Usage Exceeds Limits mode, and also that a License Error failure has occurred. The feature usage has exceeded limits, and the 6-day timer has expired. Call-processing software stops every new call, except outgoing calls to an emergency number and incoming calls to an administration number.

d. Error Type 1281 — This error indicates that a new license was not installed after an upgrade. The 6-day timer has expired, and a License Error failure has occurred. Call-processing software stops every new call, except outgoing calls to an emergency number or incoming calls to an administration number.

e. Error Type 1537 — This error indicates the License File is missing or corrupted. Maintenance software notifies call-processing software to stop every new call origination, except outgoing calls to an emergency number and incoming calls to an administration number.

f. Error Type 1793 — This error indicates a Software Version Mismatch has occurred. Maintenance software notifies call-processing software to stop every new call origination, except outgoing calls to an emergency number and incoming calls to an administration number.

g. Error Type 2305 — This error indicates that the Offer Category of the License does not match the Offer Category in translations. Maintenance software notifies call-processing software to stop every new call origination, except calls to an emergency number and incoming calls to an administration number.

h. Error Type 2561 — This error indicates that during the last attempted license-file audit, the license server did not respond in time.

On-Demand Tests for System Technicians

This MO provides no on-demand tests for system technicians.

OPS-LINE (DS1 Off-Premises Station Line)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run	Full Name of MO
OPS-LINE	MINOR	**test station *extension* l**	DS1 OPS Line
OPS-LINE	WARNING	**test station *extension***	DS1 OPS Line

An analog Off-Premises Station (OPS) can be connected to the system through a DS1 link. A TN767 DS1 Interface circuit pack or a TN464 UDS1 Interface circuit pack can support up to 24 DS1 OPSs. Since the DS1 OPS is an analog telephone set, a channel multiplexer is necessary as the remote DS1 endpoint that converts the digital signal of a DS1 port to the OPS Line and vice versa.

The DS1 OPS Line Maintenance provides a strategy to maintain an OPS Line via a trunk port of the TN767 DS1 Interface circuit pack or the TN464 UDS1 Interface circuit pack. (Throughout this section, the term DS1 Interface can apply to either of these circuit packs.) The strategy covers initialization tests, periodic tests, scheduled tests, system technician-demanded tests, and alarm resolution and escalation. Two service states are specified in a DS1 OPS Line maintenance. They are: *out-of-service*, in which the line is in a deactivated state and cannot be used for either incoming or outgoing calls; or *in-service*, in which the line is in an activated state and can be used for both incoming and outgoing calls. If the DS1 Interface circuit pack is out-of-service, then every line on the DS1 Interface circuit pack is put into the out-of-service state, and a Warning alarm is raised.

For maintenance of the remote DS1 endpoint (for example, a Channel Division Multiplexer or D4 Channel Bank), refer to the vendor's maintenance documentation for details.

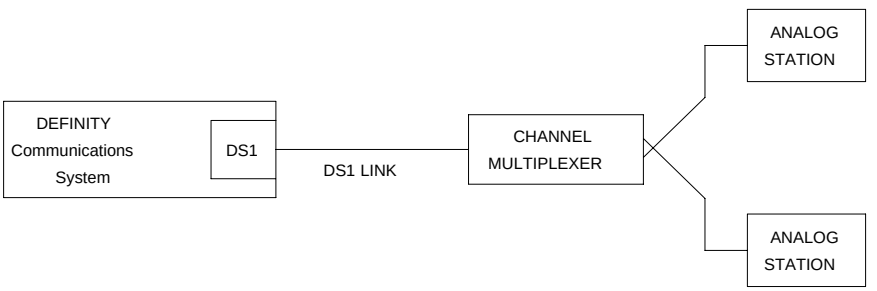

Figure 8-68. DS1 OPS Line Interactions

Error Log Entries and Test to Clear Values

Table 8-484. DS1 OPS Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test station *ext***
15(a)	Any	Audit and Update test (#36)			
18(b)	0	**busyout station *ext***	WARNING	OFF	**release station *ext***
130(c)		None	WARNING	ON	**test station *ext***
1281		Conference Circuit test (#7)	MINOR	ON	**test station *ext* l r 4**
1537		NPE Crosstalk test (#6)	MINOR	ON	**test station *ext* l r 3**
1793(d)					**test board *UUCSS* l**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. This is a software audit error that does not indicate any hardware malfunction. Run the short test sequence, and investigate associated errors (if any).

b. The DS1 OPS Line has been busied out by a **busyout station *ext*** command. No calls can be made on this line.

c. This error type indicates that the circuit pack has been removed or has been insane for more than 11 minutes. To clear the error, reinsert or replace the circuit pack.

d. Error Type 1793 indicates a problem with the DS1 Interface circuit pack. Since there is no error against the OPS-LINE port, no alarm is raised against the OPS-LINE port. However, there should be errors logged against the DS1 Interface circuit pack. Look for DS1-BD/UDS1-BD errors in the Hardware Error Log, and follow the appropriate procedures provided in the ''DS1-BD (DS1 Interface Circuit Pack)'' on page 8-586.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the NPE Crosstalk test (#6), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
NPE Crosstalk test (#6)		X	ND
Conference Circuit test (#7)		X	ND
DS1 OPS Switchhook Inquiry test (#312)	X	X	ND
Audit and Update test (#36)	X	X	ND

1. D = Destructive; ND = Nondestructive

NPE Crosstalk Test (#6)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM-bus interface. (The TN464 UDS1 circuit pack has one SCOTCH-NPE chip instead of several NPE chips.) The NPE controls port connectivity and gain, and provides conferencing functions on a per-port basis. The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is usually only part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Table 8-485. Test #6 NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate system resources to run this test or an internal system error (software) occurred. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use **status station** or **status trunk** command to determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-485. Test #6 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. The **status health** command can be used to determine whether the system is experiencing heavy traffic. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present or some Tone Detectors may be out-of-service. The **list measurements tone-receiver** command will display information about the system's tone receivers. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The test was aborted because the port was seized by a user for a valid call. Use **status station** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 1. Retry the command at 1-minute intervals up to 5 times.
1020	ABORT	The test did not run due to an already existing error on the specific port or due to a more general error on the circuit pack. 1. Examine the error log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error. (Error code 1793 indicates a problem with the DS1 interface board, and any problems on the associated DS1-BD or UDS1-BD should be resolved first.)
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test aborts with error code 2000 again, run short test sequence on the associated DS1-BD or UDS1-BD. If tests 138 through 145 on the associated DS1-BD or UDS1-BD are also aborting with error code 2000, hyperactivity on the board or facility is indicated. In this case, the hyperactivity problem should be dealt with first.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-485. Test #6 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
Any	FAIL	The test failed. This can be due to on-board or off-board problems. Off-board problems of concern include EXP-PN and EXP-INTF faults, TDM-BUS faults, and faults associated with the tone detectors/tone generators. Clear every off-board problem before replacing the board. Keep in mind that a TDM-BUS problem is usually the result of a faulty board connected to the backplane or bent pins on the backplane. 1. Resolve any TONE-BD and/or TONE-PT errors. 2. Retest when the faults from step 1 are cleared.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and by examining station, trunk, or external wiring.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, dispatch to check to ensure that there is a valid board inserted.

Conference Circuit Test (#7)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM-bus interface. (The TN464 UDS1 circuit pack has one SCOTCH-NPE chip instead of several NPE chips). The NPE controls port connectivity and gain, and provides conferencing functions on a per-port basis. The Conference Circuit test verifies that the NPE channel for the port being tested can correctly perform the conferencing function. The NPE is instructed to listen to several different tones and conference the tones together. The resulting signal is then measured by a Tone Detector port. If the level of the tone is within a certain range, the test passes.

Table 8-486. Test #7 Conference Circuit Test

Error Code	Test Result	Description / Recommendation
	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use the **status station** or **status trunk** command to determine when the port is available for testing.
1002	ABORT	The test was aborted because the system could not allocate time slots for the test. The system might be under heavy traffic conditions, or it might have time slots out of service due to TDM-BUS errors. (The **status health** command may be used to determine whether the system is experiencing heavy traffic.) 1. If the system has no TDM-BUS errors, is not handling heavy traffic, and the port status is idle, retry the command at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some of the tone detectors may be out of service. Issue the **list measurements tone-receiver** command to display basic information about the system's tone receivers. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The port has been seized by a user for a valid call. Use **status station** or **status trunk** command to determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1018	ABORT	The test was disabled via translation. 1. You may want to determine why the test has been disabled before you enable it. 2. To enable the test for the particular analog station being tested, enter the **change station *extension*** command, and then change the `Test` field on the Station form from **n** to **y**.

Continued on next page

Table 8-486. Test #7 Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
1020	ABORT	The test did not run due to an already existing error on the specific port or due to a more general error on the circuit pack. 1. Examine the error log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error. (Error code 1793 indicates a problem with the DS1 interface board, and any problems on the associated DS1-BD or UDS1-BD should be resolved first.)
2000	ABORT	The test was aborted because response to the test was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test aborts with error code 2000 again, run short test sequence on the associated DS1-BD or UDS1-BD. If tests 138 through 145 on the associated DS1-BD or UDS1-BD are also aborting with error code 2000, hyperactivity on the board or facility is indicated. In this case, the hyperactivity problem should be dealt with first.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-486. Test #7 Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
Any	FAIL	The NPE of the tested port did not conference the tones correctly. This can cause noisy and unreliable connections. 1. Enter the **list configuration board *UUCSS*** command. If the circuit pack is a TN767B vintage 8 or 9, replace the circuit pack with a TN767C V3 or later. The error log may have error type 1281 entries. 2. Test every administered trunk on the board. If one fails, this could be an off-board problem (such as an incoming seizure or an off-hook port seizure during the test). Retest the board. 3. If every port fails, check the CARR-POW (see note below). 4. If several ports fail, check the error log for TONE-BD or TONE-PT errors. If there are such errors, take the appropriate action. When the TONE errors have cleared, rerun the test. 5. If the retry passes and troubles have been reported, coordinate isolation with the far-end PBX. Make sure that the near- and far-end switches and any NTCE equipment (the CSUs) have the correct administration. 6. Replace the circuit pack. **NOTE:** If the conference circuit test fails for every port on a circuit pack, a -5 Volt power problem is indicated. If a TN736 or TN752 power unit circuit pack is present, either the 631DB AC power unit or the 676B DC power unit may be defective. (The 631DB power unit is used in a medium cabinet powered by an AC source. The 645B power unit is used in a medium cabinet powered by a DC power source.) The system may contain a TN736 or TN752 power unit or a 631DB AC power unit, but not both types of power units. See ''CARR-POW (Carrier Power Supply)'' on page 8-393 to investigate problems with either a 631DB AC or a 645B DC power unit. If a red LED is lit on TN736 or TN752 power unit circuit pack, replace the pack.

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Table 8-486. Test #7 Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The port can correctly conference multiple connections. User-reported troubles on this port should be investigated using other port tests and by examining station, trunk, or external wiring.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, dispatch to check to ensure that there is a valid board inserted.

Audit and Update Test (#36)

This test sends port level translation data from switch processor to the DS1 Interface circuit pack to assure that the trunk's translation is correct. Translation updates include the following data: line type, dial type, timing parameters, and signaling bits enabled. The port audit operation verifies the consistency of the current state of the trunk as kept in the DS1 Interface circuit pack and in the switch software.

Table 8-487. Test #36 Audit and Update Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	The test was aborted because system resources required to run this test were not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the station extension of the port. Use the **status station** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 2. If the port is idle, retry the command at 1-minute intervals up to 5 times.
1006	ABORT	The test was aborted because the station is out of service. This condition may be accompanied by an error type 18 entry in the error log. You may want to determine why the station was taken out of service. (When stations are taken out of service by maintenance software, the problems that preceded that point must be cleared.) 1. Use the **status station** command to check the service state of the port. If the port is indeed out of service, enter the **release station** command to bring the station back into service. 2. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
7 or 8	FAIL	Test failed due to internal system error. Do not replace port board. ■ Error code 7: the failure occurred during station translation download (to DS1 Interface circuit pack). ■ Error code 8: the failure occurred during station ringer update. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-487. Test #36 Audit and Update Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	Trunk translation has been updated successfully. The current trunk states kept in the DS1 Interface circuit pack and switch software are consistent. If the trunk is busied out, the test will not run but will return PASS. To verify that the station is in-service: 1. Enter the **status station** command to verify that the station is in-service. If the station is in-service, no further action is necessary. If the station is out-of-service, continue to step 2. 2. Enter the **release station** command to put the station back into in-service. 3. Retry the test command.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, dispatch to check to ensure that there is a valid board inserted.

DS1 OPS Switchhook Inquiry Test (#312)

This test initiates the Switchhook Audit test. The test queries the switchhook state of the Off-Premises-Station in switch software. If the state in switch software disagrees with the state on the DS1 Interface circuit pack, then the state in the switch software is updated to match the state on the DS1 Interface circuit pack.

Table 8-488. Test #312 DS1 OPS Switchhook Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port has been seized by a user for a valid call. Use the **status station** command to determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1005	ABORT	Test failed due to incompatible configuration administered in station administration. 1. Using the **display station** command, verify that the station is not the 24th port of the DS1 Interface circuit pack while common channel signaling is specified. Use the **display ds1** command to check the signaling type of the DS1 circuit pack.
1006	ABORT	The test was aborted because the station is out of service. This condition may be accompanied by an error type 18 entry in the error log. You may want to determine why the station was taken out of service. (When stations are taken out of service by maintenance software, the problems that led up to that must be cleared.) 1. Use the **status station** command to check the state of the port. If the port is indeed out of service, enter the **release station** command to bring the station back into service. 2. Retry the command at 1-minute intervals up to 5 times.
1020	ABORT	The DS1 Interface circuit pack is out-of-service. 1. Look for DS1-BD/UDS1-BD errors in Hardware Error Log. If present, see the appropriate error ''DS1-BD (DS1 Interface Circuit Pack)'' on page 8-586. 2. Retry the command.

Continued on next page

Table 8-488. Test #312 DS1 OPS Switchhook Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	The test was aborted because response to the test was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test aborts with error code 2000 again, run short test sequence on the associated DS1-BD or UDS1-BD. If tests 138 through 145 on the associated DS1-BD or UDS1-BD are also aborting with error code 2000, hyperactivity on the board or facility is indicated. In this case, the hyperactivity problem should be dealt with first.
2012	ABORT	The test was aborted due to a system error.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1	FAIL	Internal system error. 1. Look for DS1-BD/UDS1-BD errors in the Hardware Error Log. If present, see "DS1-BD (DS1 Interface Circuit Pack)" on page 8-586. 2. If a channel multiplexer is used as the remote DS1 endpoint to which the station connects, refer to the multiplexer vendor's maintenance document for diagnosis. 3. Retry the command at 1-minute intervals up to 5 times.
	PASS	The station hook states in both switch software and DS1 Interface circuit pack are consistent.
0 2012	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, dispatch to check to ensure that there is a valid board inserted.

PDMODULE (Processor Data Module)
TDMODULE (Trunk Data Module)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
PDMODULE[2]	MINOR	**test port *UUCSSpp* l**	Processor Data Module
PDMODULE	WARNING	**test port *UUCSSpp* s**	Processor Data Module
TDMODULE [2]	MINOR	**test port *UUCSSpp* l**	Trunk Data Module
TDMODULE	WARNING	**test port *UUCSSpp* s**	Trunk Data Module

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21). pp is the 2-digit port number (01, 02,...).
2. Digital Terminal Data Modules (DTDM), and Data Adaptors (DA) in linked mode are considered part of the Digital Line MO. See the DIG-LINE section for maintenance of these devices. DAs in stand-alone mode are included in PDMODULE.

   Some of the alarms that are logged due to PDMODULE and TDMODULE test failures may be related to circuit-pack problems reported during DIG-BD testing. See ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872.

The PDMODULE and TDMODULE MOs monitor and test Digital Line circuit pack ports that are connected to Data Communications Equipment (DCE) or Data Terminal Equipment (DTE). DCE include processor data modules (MPDM) and Data Adaptors (DA). DTE include trunk data modules (DTE). These stand-alone data modules provide interfaces between DCP ports on the Digital Line circuit packs and data equipment such as terminals, host computers, and data modems. (See the following list and figure.) Data modules are used for dial-up and permanent circuit-switched data calls.

Digital Line circuit packs also connect to digital terminal data modules (DTDMs), which work in conjunction with a voice terminal. Those configurations are covered by the DIG-LINE MO. Circuit pack-level maintenance is covered by DIG-BD whose strategy is described in the ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872.

Digital line circuit packs include the TN754, TN754B, TN413, TN2136. See DIG-LINE for more information about the characteristics of these circuit packs.

Stand-Alone DCP Data Modules

There are two types of stand-alone DCP data modules:

Table 8-489. Stand-Alone DCP Data Modules

Type	Name[1]	Interfaces to:
MPDM	Modular Processor Data Module	DTE (data terminals, host computers, printers, etc.)
MTDM	Modular Trunk Data Module	DCE (modems, data modules, etc.)

1. Early versions of these data modules were referred to as PDMs and TDMs, respectively. Later models are designed to provide a variety of interfaces by using interchangeable modules and are thus called modular data modules. Both types are supported by the tests described in this section

Data Adapters

TN2136 circuit packs use IDCP signaling and a DAA2 Data Adaptor (DA) to interface to DTE. DAs can operate in either of two modes which are covered by different MOs:

Table 8-490. Data Adaptor Modes

DA Mode	Administered as:	Endpoint	Maintenance Object
Stand-Alone	PDM	data endpoint only	PDMODULE
Linked	DTDM	IDT1/2[1] and optional data terminal	DIG-LINE

1. IDT1/2: Italtel Digital Telephone, Model 1 or 2 (also known as Digital Telephones TD7210 and TD7206).

Configurations and Maintenance

In the following discussion, the general term data module refers to MPDMs, MTDMs, and DAs. The PBX loop or digital link between a data module and the Digital Line port supports two logical information channels and one signaling channel. Data modules generally use the primary information channel for data communications and the signaling channel for dialing and call supervision. With 4-wire DCP, the secondary information channel can be used to support a second data module on a shared port.

Besides being used for data calls between terminals, computers, and data communications equipment, data modules also serve as interfaces to equipment associated with system features such as System Administration, Station Message Detailed Recording, Message Center Service, Automatic Call Distribution, Distributed Communications System, and Audio Information Exchange. Maintenance for data modules associated with these latter services are covered by other MOs such as PMS-PRNT, JNL-PRNT, and PMS-LINK.

Maintenance of data modules is closely related to and interacts with Digital Line circuit pack maintenance, and test results for data modules can be affected by the health of the Digital Line circuit pack. Keep this interaction in mind when investigating customer-reported problems with data modules.

Data modules provide a variety of option switches to allow the customer to select data rates, parity, keyboard dialing, local, and remote loop back, etc. (The DAA2 Data Adaptor has an AT (Hayes) type interface that allows selection of the above parameters as well as mode — linked or stand-alone.) An incorrect selection will not necessarily cause errors, alarms or test failures, but it can result in service disruption. See the installation manual provided with the data module for more information about those options.

This discussion occasionally refers to a station's service state, which is defined as follows:

Out-of-Service	The port, and thus the data module, have been removed from service. Causes for this include busyout of the port, removal of the Digital Line circuit pack and failure of the NPE Crosstalk test (#9).
Disconnected	The port is administered but the associated digital link does not respond. An administered port is put in a disconnected state after a system reboot or circuit pack insertion. This state persists until a link-reset-pass message is received from firmware on the circuit pack.
In-Service	When switch software receives a link-reset-pass message from the port, the port is placed in service. If the link-reset-pass message is missed, and an off-hook message is received while the port is in the disconnected state, maintenance software will run an ID request test and put the port into service upon receiving a correct response.

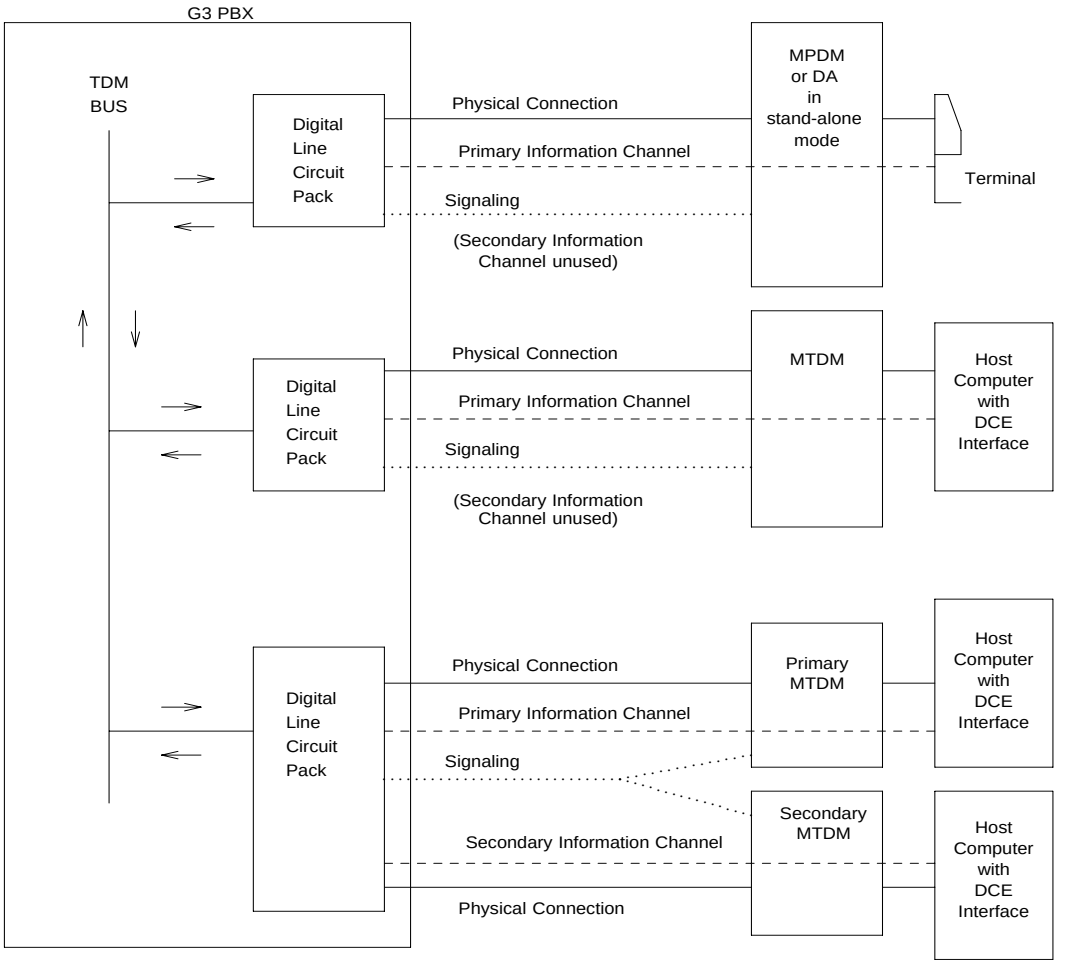

Figure 8-69. Typical Data Module Configurations

Error Log Entries and Test to Clear Values

Table 8-491. PDMODULE, TDMODULE Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0 (a)	0	None			
1 (b,n)	40987	None	WARNING	OFF	
1 (c,n)	1 – 20	None	WARNING	OFF	
15 (d)	Any	None			
18 (e)	0	**busyout port *UUCSSpp***	WARNING	OFF	**release port *UUCSSpp***
257 (f)	40971	None			
513	0	Data Module audits (#17)	WARNING	OFF	**test port *UUCSSpp* sh r 6**
769 (g,n)	40988	None	WARNING	OFF	
1281	Any	Data Module audits (#17)	WARNING	OFF	**test port *UUCSSpp* sh r 4**
1537 (h,n)	40968	None	WARNING	OFF	
1793		Information Channel and Control Channel Looparound (#13)	MINOR	ON	**test port *UUCSSpp* l r 3**
2049		NPE Crosstalk (#9)	MINOR	ON	**test port *UUCSSpp* l r 3**
2304 (i)		None			
2305 (j)	32770	None			
2305 (k)	40967	None			
2561 (l)	Any	Data Module Internal Looparound (#175)	WARNING	OFF	**test port *UUCSSpp* l r 5**
2817 (m)		Link GPP Loop (#183) Against Links	MAJOR	ON	
3841 (n)		NONE			
3841 (o)		None			

Notes:

a. Error type 0 appears in the Error Log only if a Digital Line circuit pack that has ports administered has been removed since the Error Log was last cleared. Make sure that the circuit pack has been re-inserted.

b. Error type 1 with aux data 40987 indicates an off-board problem detected by the port circuit, and may result in a noisy port or link. See note *n* for recommendations.

c. Error type 1 with aux data of 1 to 20 is logged when at least 15 off-board problems have been detected with the link to the data module. Each error detected increments an on-board counter. The aux data gives the value of this counter divided by 15. The user could experience a noisy port or link. See note “n” for recommendations.

d. Error type 15 is an internal that occurs when an audit request fails.

e. Error type 18 is logged when the port in question is demand busied out Make sure that the port is released from busyout.

f. Error type 257 indicates problems with transmitting to the data module. This is usually an on-board problem and can be ignored if no user complaints are received. Otherwise, check for faulty wiring.

g. Error type 769 indicates that EPF has been turned off due to the overcurrent condition at the data module. See the recommendations in note *n*. This may also be caused by the PTC being in the “tripped” position due to a short on the power line. You can correct this by removing the short, unplugging the data module from the wall for about 30 seconds, and plugging it back in.

h. Error type 1537 indicates that an in-line maintenance error has generated an off-board warning due to some problem with the link to the data module. This can be ignored if no user complaints are received. Otherwise, see note *n* for recommendations.

i. Error type 2304 indicates an internal error. No action is necessary.

j. Error type 2305 with aux data 32770 indicates that the data equipment went off-hook while the associated link was being initialized (in a disconnected state). Use the **status data-module** command to determine the state of the data module. The off-hook should have changed the service state to in-service. No action is necessary.

k. Error type 2305 with aux data 40967 indicates that the link between the circuit pack and the data module has been reset successfully. The link is normally reset when the circuit pack associated with an administered port is first plugged in (assuming that the data module is already in place and connected to the associated port), when a port is first administered (assuming the associated circuit pack is plugged in and that the data module is connected to the associated port), or when a data module is first connected to an administered port. No system technician action is necessary.

l. Error type 3841 indicates that the downlink buffer on the circuit pack has overflowed. No action is necessary.

m. A DCP endpoint may have been disconnected.

n. Make sure the data module is connected and operating properly. Check for faulty wiring. If necessary, reduce the length of the cable between the data module and the switch to 5000 ft. for 24-gauge wire or 4000 ft. for 24-gauge wire.

If the problem still exists, replace the circuit pack. Once the problem has been resolved, the alarm will be retired in 60 minutes (90 min. for error 1537). (These error counters use the leaky bucket mechanism.)

The DA module is not phantom-powered from the port. Thus when it is in linked mode, its range is limited by the Italtel digital phone's limit: 0.7 Km (2300) ft. on 26-gauge wire or 1.8 Km (5900) ft. on 22-gauge (0.6 mm) wire. If in stand-alone mode, it is limited by the maximum length of loop allowed from the Digital Line Interface (DLI) component: up to 3.5 Km (2 miles) on 22-gauge (0.6 mm) wire.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below. For example, by clearing error codes associated with the Data Module Internal Loop-around test (#175), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Data Module Internal Loop-around test (#175)		X	ND
Digital Port Board Network Processing Element Crosstalk test (#9)		X	ND
Port Circuit Information Channel and Control Channel Loop-around test (#13)		X	ND
Data Module Audits test (#17)	X	X	ND

1. D = Destructive; ND = Nondestructive

NPE Crosstalk Test (#9)

The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. If a secondary data module is assigned, it is tested after the primary data module. If either test fails, both data modules are taken out of service. This test usually run only during the long test sequence and takes about 20 to 30 seconds to complete.

Table 8-492. Test #9 NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the extension of the data module port. Use the **status data-module** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1001	ABORT	System resources to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the extension of the data module port. Use the **status data-module** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-492. Test #9 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
1020	ABORT	Test disabled via background testing. Use **status data-module** command to determine when the data module is available for testing.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.
2020	ABORT	The test did not run due to a previously existing error on the specific port or a more general circuit pack error. 1. Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the previously existing error.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1, 2	FAIL	The NPE of the tested port was found to be transmitting in Error Log. This will cause noisy and unreliable connections. Failure code 1 indicates that the Crosstalk test failed on the primary channel. Failure code 2 indicates that the Crosstalk test failed on the secondary channel. 1. Replace the circuit pack.
	PASS	The port is correctly using its allocated time slots. 1. To be sure that this is not an intermittent problem, repeat this test up to up to 10 times and verify that it continues to pass. 2. If complaints still exist, examine the data module, connections, and wiring.

Information and Control Channel Local Loop Test (#13)

This is a set of four tests that check the operation of the information and control channels used between the Avaya MultiVantage™ software and the Digital Line port circuit. This is an Internal Loop around test only and does not check building wiring. See Test #175 for external loop around tests to the data module.

The Avaya MultiVantage™ software first sends a message to the on-board microprocessor to loop around both the information and control channels for the port. Then, the primary information channel loop back test is run. The test is performed by sending a digital count from the Tone-Clock circuit pack on the primary channel time slot and receiving the same digital count with a General-Purpose Tone Detector. The digital count looks like transparent data to the on-board microprocessor.

With the port still in loop-around mode, the S Channel Loop-around test is performed next. This test consists of sending four different transparent patterns to the on-board microprocessor, receiving them back, and comparing them.

The third test is a loop around test for the secondary information channel. It is performed only if a secondary data module is assigned to the port.

The fourth test is a Conference test of the primary channel. This is the same test as Analog Line Conference test (#6).

Only one result is reported for the three tests run. If any test fails or aborts, the sequence is stopped.

Table 8-493. Test #13 Information and Control Channel Local Loop Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the data module extension. Then use **status data module** command with the extension number to determine the service state of the data module. If the service state indicates that the data module is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1001	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat the test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the command at 1-minute intervals up to 5 times.

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Table 8-493. Test #13 Information and Control Channel Local Loop Test — *Continued*

Error Code	Test Result	Description / Recommendation
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. 1. Use the **display port *UUCSSpp*** command to determine the data module extension. Then use **status data module** command with the extension number to determine the service state of the data module. If the data module is in use, wait until the port is idle before retesting.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
7	FAIL	Conference test failed on the primary information channel. In some cases, user may not notice disruption in service. In extreme cases, conferencing feature may not work at all.
14	FAIL	The primary information channel is not transmitting properly. User impact may range from noticing nothing to not being able to use this port.
15	FAIL	The control channel between the processor and Digital Line circuit pack is not transmitting properly. This can cause a wide range of effects. The user may notice nothing or the port may be totally unusable. This could also disrupt other users. 1. Run circuit pack tests to check the Tone Generator and the Tone Detector circuit packs using the **test board *UUCSS* short** command. 2. Resolve any problems that are detected on the Tone Generator circuit pack or Tone Detector circuit pack. 3. If the Tone Generator and Tone Detector circuit packs are functioning properly, and the test still fails, replace the Digital Line circuit pack.
16	FAIL	The secondary information is not transmitting properly. This can cause a wide range of effects. The user may notice nothing or the port may be totally unusable. 1. To be sure that this is not an intermittent problem, repeat this test up to up to 10 times to make sure it continues to pass. 2. If complaints still exist (poor data transmission), examine the data module, connections, and wiring.
	PASS	Information and Control Channel Local Loop test passed. Every channel is transmitting properly.

Data Module Audits Test (#17)

This is a series of six tests that are classified as hardware audits. The processor sends messages to the on-board microprocessor to perform the following tests:

- Switchhook Inquiry — This is an update of the processor's software records based on the on-hook/off-hook status of the data module.
- Bad Scan Inquiry — A message is sent uplink that contains a count generated by certain events relating to the digital loop's (link) conditions. This could be an indication of communication problems between the processor and digital port board.
- EPF inquiry — The status of the Electronic Power Feed is sent uplink. EPF is not used for data modules.
- ID Request — A request is made to the data module for its status. The data module sends its configuration information and health information back. This information is checked and a pass/fail result is provided.
- Ringer Update — This updates the data module's ringer state according to processor records.
- Translation Update — This is a message normally used with digital stations to refresh the default value that causes the station to send touch tones only in the primary information channel. This test is not used with data modules.

Table 8-494. Test #17 Data Module Audits Test

Error Code	Test Result	Description / Recommendation
1	ABORT	Switchhook audit timed out. 1. Verify the data module is connected to the PBX and repeat the test. 2. If the test aborts, replace the data module and repeat the test. 3. If the test continues to abort, replace the circuit pack and repeat the test.
2	ABORT	ID request fails, health bit is defective, or no response from on-board microprocessor. 1. Verify that the correct data module type (PDM versus TDM) is administered. 2. If the test aborts, replace the data module and repeat the test. 3. If the test aborts, replace the circuit pack and repeat the test.
3	ABORT	No response from EPF audit.
4	ABORT	Internal system error 1. Resolve any outstanding circuit pack maintenance problems. 2. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-494. Test #17 Data Module Audits Test — *Continued*

Error Code	Test Result	Description / Recommendation
5	ABORT	Ringer update aborted (data module not in the in-service state) 1. Verify that the data module is powered (power LED on). 2. Make sure data module is connected to the building wiring, check for faulty wiring, check for faulty data module. 3. Retry the command at 1-minute intervals up to 5 times. 4. Replace the Data Module and repeat the test. 5. If the test continues to abort, replace the Digital Line circuit pack and repeat the test.
6	ABORT	Data module translation update aborted. 1. Verify the data module is connected to the PBX. 2. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1392	ABORT	This port is currently a TTI port and the test will not execute on it. 1. Verify that the port is a TTI port using either the **display port** command (the display shows that the port is a TTI port) or the **list config** command (the display shows a `t` for the port). 2. If either **list config** or **display port** indicate that the port is *not* a TTI port, escalate the problem. If both commands indicate that the port is a TTI port, the abort is correct, and no action is necessary.
2000	ABORT FAIL	Response to the test was not received within the allowable time period. Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	Data Module audits passed. This digital port circuit pack is functioning properly. 1. If complaints still exist, investigate by using other port tests and by examining the data module options, wiring, and connections.

Data Module Internal Loop-Around Test (#175)

This test verifies that a data message can be sent from the PBX, through the building wiring, through an internal loop-around path in the data module, and back to the PBX. This path is illustrated below.

For this test to run, the `Remote Loop-Around Test` field on the Data Module administration form must be set to **y**, indicating that the data module endpoint supports the test.

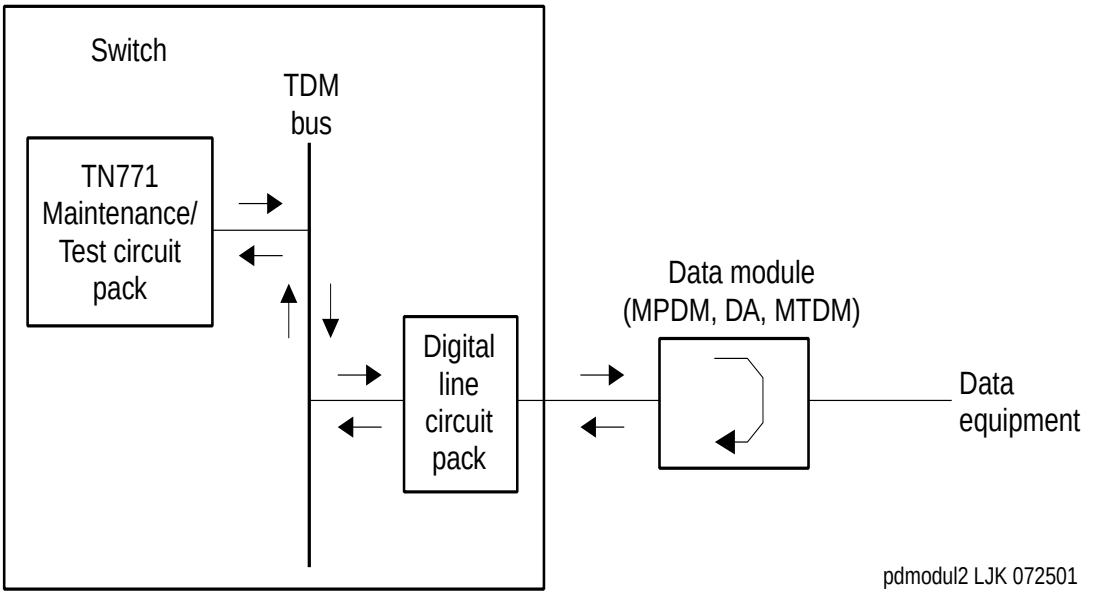

Figure 8-70. Internal Loop-Around Test

A signaling message is sent through the digital port circuit pack to the data module, requesting it to enter loop-around mode. A test pattern is then sent from the TN771D Maintenance/Test circuit pack, over the path illustrated above, and back to the TN771D where it is checked for consistency.

The test aborts if any of the following local PBX resources are not available: a digital port on the TN771D (there are two such digital ports, but only one may be used at a time), two TDM time slots and an idle digital port connected to the data module.

Table 8-495. Test #175 Data Module Internal Loop-Around Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use **status data-module** to determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1005	ABORT	Loop around testing is not enabled on the data module administration form. 1. Set `Loop-Around Test` field to **y** on the data module administration form.
1042	ABORT	The port under test is a TTI port and thus has only default translations and no assigned extension. The test requires an extension assigned to the port being tested. 1. If there is a need to execute the test on this particular port, then you must fully administer the port so that is has an assigned extension.
1180	ABORT	A Maintenance/Test circuit pack digital port is not available to carry out the test. 1. Check to see if the Maintenance/Test digital ports are present (use the **list config board** command and look for ports 02 and 03). 2. If the digital ports (02 and 03) on the M/T-BD are absent, see ''M/T-DIG (Maintenance/Test Digital Port)''. 3. If the digital ports are present, try the command again at 1-minute intervals up to 5 times.
1181	ABORT	No time-slots available to connect digital ports for the test. 1. Try the command again at 1-minute intervals up to 5 times.
1182	ABORT	Internal system error. Failed to connect the digital ports with time-slots. 1. Retry the command at 1-minute intervals up to 5 times.
1340	ABORT	No Maintenance/Test digital port is currently available to perform this test. 1. Use **list config** to determine whether any Maintenance/Test digital ports (ports 02 and 03 on the Maintenance/Test circuit pack) are present in the system. Because at least one Maintenance/Test circuit pack must always be present in the PN of S8700 Multi-Connect configurations, there should be at least two such ports present. If the ports are present, proceed to step 2. Otherwise, determine why no ports appear in the **list config** display. See ''M/T-DIG (Maintenance/Test Digital Port)'' and ''M/T-BD (Maintenance/Test Circuit Pack)''. 2. Look for M/T-DIG errors in the Error Log. If present, see ''M/T-DIG (Maintenance/Test Digital Port)''. 3. If the ports are present and no errors are logged against them, retry the command at 1-minute intervals up to 5 times. 4. If the test continues to abort, replace the Maintenance/Test circuit pack.

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Table 8-495. Test #175 Data Module Internal Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
1392	ABORT	This port is currently a TTI port and the test will not execute on it. 1. Verify that the port is a TTI port using either the **display port** command (the display shows that the port is a TTI port) or the **list config** command (the display shows a "t" for the port). 2. If either **list config** or **display port** indicate that the port is **not** a TTI port, escalate the problem. If both commands indicate that the port is a TTI port, the abort is correct for the test, and no action is necessary.
2005	ABORT	The handshake between the Maintenance/Test digital port and the Data Module failed. 1. Look for M/T-DIG errors in the Error Log. If present, see ''M/T-DIG (Maintenance/Test Digital Port)''. 2. If test still aborts on retry, check physical connection of data module under test. Make sure the switches are on NORM, OFF (between REM_LP and LOC_LP), 9600, and ASYN. 3. If the test still aborts, replace the Data Module.
2312	ABORT	The loop-around test did not complete, failed to receive loop-back data. 1. Check for M/T-DIG error in the Error Log. If present, see ''M/T-DIG (Maintenance/Test Digital Port)''. 2. Retry the test, if still aborts, replace the Data Module. 3. If the test aborts again, replace the Digital Line circuit pack.
2313	ABORT	The Maintenance/Test digital port allocated for this test did not respond to downlinked message. 1. Look for M/T-DIG errors in the Error Log. If present, see ''M/T-DIG (Maintenance/Test Digital Port)''. 2. Retry the command at 1-minute intervals up to 5 times. 3. If the test continues to abort, replace the MTB.
2314	ABORT	Data Module did not respond to downlinked message. 1. Check the wiring of the Data Module under test. 2. Verify that the Data Module is powered (power LED on). 3. Make sure the switches are on NORM, OFF (between REM_LP and LOC_LP), 9600, and ASYN. 4. If the test still aborts, replace the Date Module. 5. If the same abort code appears, replace the Digital Line circuit pack that is connected to the Data Module.

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Table 8-495. Test #175 Data Module Internal Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Data received from remote loop back does not match data sent. 1. Check for faulty wiring. 2. Replace the data module and repeat the test. 3. If the test fails, replace the Digital Line circuit pack associated with the data module and repeat the test.
	PASS	Data Module Loop-around test passed.

PE-BCHL (PRI Endpoint Port)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
PE-BCHL[1]	MINOR	**test port *UUCSSpp* l**	PRI Endpoint Port
PE-BCHL	WARNING	**test port *UUCSSpp* sh**	PRI Endpoint Port

1. For additional repair information, see also UDS1-BD and *Troubleshooting Wideband Problems* in Chapter 4, ''Alarms, Errors, and Troubleshooting''.

A PRI endpoint provides ISDN-PRI (Primary Rate Interface) connections application equipment or terminal adapters that terminate ISDN PRI. The equipment or terminal adapters are connected to the switch via the TN464C/D UDS1 interface circuit pack. This MO monitors the PRI endpoint's port hardware on the UDS1 circuit pack by:

- Logging hardware errors
- Running tests for port initialization
- Running periodic and scheduled maintenance
- Executing demand tests

Wideband Switching

Wideband switching supports end-to-end connectivity between customer endpoints at data rates from 128 to 1536 kbps over T1 facilities and to 1984 kbps over E1 facilities. S8700 Multi-Connect switching capabilities support wideband calls comprised of multiple DS0s that are switched end-to-end as a single entity.

Wideband switching is designed for ISDN application equipment such as ISDN video codecs, but can also interface to non-ISDN application equipment by using PRI terminal adapters. In the same sense that a S8700 Multi-Connect data module acts as a DCP or BRI terminal adapter between endpoint data such as V.35 and dialing interfaces such as RS-366 and a DCP interface, a PRI terminal adapter acts as a wideband terminal adapter between endpoint data and dialing interfaces and S8700 Multi-Connect's line-side ISDN-PRI interface. Wideband switching introduces PRI endpoints on S8700 Multi-Connect line-side interfaces.

A PRI endpoint has a unique extension number and consists of one or more contiguous B channels on a line-side T1 or E1 ISDN-PRI facility. Endpoints initiate and receive calls via ISDN SETUP messages indicating the data rate and specific B channels to be used, and communicate all other call status information via standard ISDN messages. Any S8700 Multi-Connect ISDN signaling set such as Avaya, CCITT, or ECMA may be used for a line-side ISDN-PRI facility.

Multiple PRI endpoints on one line-side facility are separate and distinct within the facility. Non-overlapping contiguous sets of B channels are associated with each PRI endpoint, and the endpoint equipment is expected to initiate calls within these boundaries. The endpoint application equipment must:

- Use standard ISDN-PRI signaling
- Adhere to the administered PRI endpoint boundaries when initiating calls
- Handle incoming calls appropriately, based on the originating PRI endpoint

Signaling and B-Channel States

PRI ports use a separate channel called the D channel for call-control and signaling messages. This is called out-of-band signaling. The D channel associated with the set of B channels is an ISDN-PRI signaling link's port (ISDN-LNK). The signaling protocol used on the ISDN-PRI signaling-link port's D channel is defined by one of the four selectable ISDN-PRI Specifications: Avaya, CCITT, ECMA, and ANSI.

The ISDN-PRI Specification defines the possible service states for a B channel. The service state is negotiated with the far-end terminal adapter, changes over time, and can have far- and near-end components. The service state is initialized to Out-Of-Service/Far-End, and an attempt is made to negotiate it to In-Service. The service state of a particular PRI endpoint port's B channel can be displayed with the **status pri-endpoint *extension*** command.

If a call is present, the Specification defines the permissible call states as well. There are tests in the short and long test sequences for the PRI endpoint port designed to audit these states and ensure agreement between both ends of the PRI wideband connection.

Alarming Based on Service States

A PRI endpoint port's B channel logs a warning alarm when it is placed in a Maintenance/Far-End or Out-Of-Service/Far-End state. While in such a state, the port is unusable for calls to the terminal adapter. However, the user can still use the other remaining ports in the PRI endpoint to make calls to and from the terminal adapter. When a warning alarm is raised, use the **status pri-endpoint *extension*** command to determine the exact state of the port. Other alarms can be diagnosed by using the short and long test sequences. Note that a PRI endpoint port's B channel can be placed in a far-end service state by direct action by the far-end terminal adapter or by inaction of the far-end terminal adapter. For example, if it does not respond to a Remote Layer 3 Query (see Test #260 for ISDN-LNK) the associated PRI endpoint port's B channels will be placed in the Maintenance/Far-End service state.

A PRI endpoint port is a port on a UDS1 interface circuit pack and thus depends on the health of the circuit pack for proper operation (see the following figure). A problem on the associated ISDN-LNK's (ISDN-PRI signaling-link port's) D channel can also affect the PRI endpoint. In turn, the ISDN-LNK depends on the SYS-LINK (system link) to the packet interface. Keep this hierarchy of dependencies in mind when diagnosing problems.

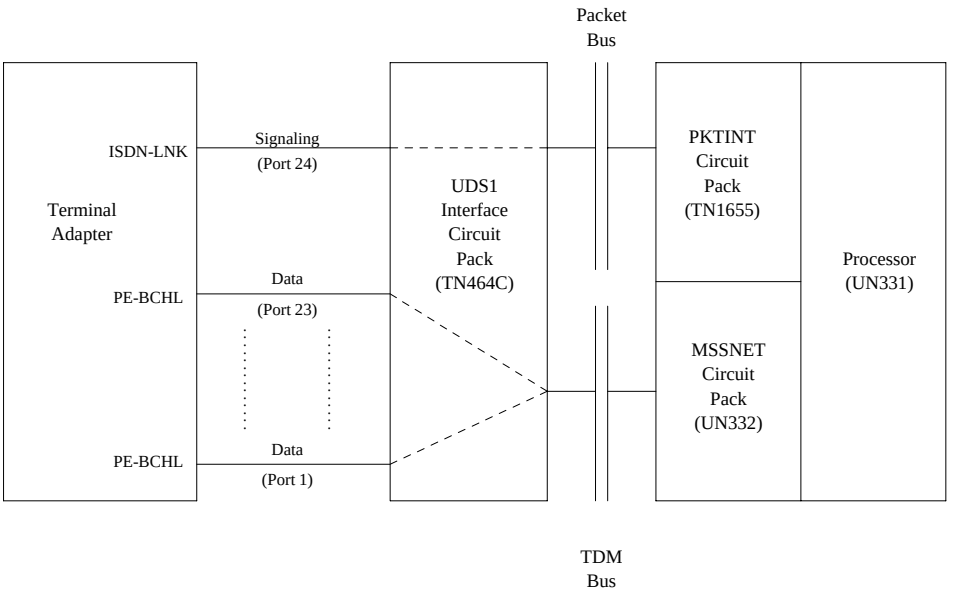

Figure 8-71. PRI Endpoint Port Interactions

PRI Endpoint Port Service States

The **status pri-endpoint *extension*** command displays the following possible service states for PRI endpoint ports. The table that follows gives recommended procedures for each state. The figure following that shows typical progressions from one service state to another. Refer also to *Troubleshooting Wideband Problems* in Chapter 4, ''Alarms, Errors, and Troubleshooting'' for a layered approach to addressing PRI endpoint problems.

- In-Service (INS)

  The B channel is in its normal operating state.

- Out-of-Service/Far-End (OOS/FE)

  A B channel is initialized to this state when first administered. The switch then sends messages to the far-end terminal adapter to negotiate the B channel into service. If the far-end terminal adapter does not respond to the messages within a certain time period, the port remains out of service, and maintenance will periodically resend the messages. The port is unusable for incoming and outgoing calls, although other ports in the PRI endpoint can still be used.

- Out-of-Service/Near-End (OOS/NE)

  This is the state of the port when a hardware failure exists on the signaling link, the NPE Crosstalk test fails, or when the port is busied out by command. In this state, the port is unusable for calls coming into the switch or going out to the terminal adapter, although other ports in the PRI endpoint can still be used for incoming and outgoing calls. No messages are sent to the far-end terminal adapter until the signaling link comes back into service or the port is released by command.

- Maintenance/Far-End (MTC/FE)

  This state is reached when the far-end terminal adapter does not respond to messages sent over the signaling link for a particular port within a certain amount of time. This state is different from OOS/FE since the signaling link must have initially been up and the B channels in service. The switch will periodically send messages to the far-end terminal adapter to try to negotiate the port (B channel) into service. The port is unusable for outgoing calls to the terminal adapter but will service incoming call requests from the far end. Other ports of the PRI endpoint can still to place outgoing calls to the terminal adapter. Transitions into MTC/FE do not drop stable calls. If the service state changes from in-service to MTC/FE, stable calls are unaffected.

- Maintenance/Near-End (MTC/NE)

  The signaling link (SYS-LINK) is busied out by the **busyout**, **test port l** or **test pri-endpoint l** commands. Transitions into MTC/NE do not drop stable calls. The **busyout link *lnk-no*** command does not drop stable wideband calls. In this state, the B channel is not usable for new incoming calls to the switch or new outgoing calls to the terminal adapter.

- Pending States (PEND)

  If the near end is expecting a timed response from the far end for a request to change the service state of a port, a *pending* state is in effect. For example, if the port is out-of-service/far-end and an in-service message was sent to the far end, then the service state of the port is OOS/FE-PEND/INS meaning out-of-service/far-end, pending/in-service. The service state will reflect this pending state until the far end responds or the timer expires.

Table 8-496. PRI Endpoint Port Service States

Service State[1]	Alarm	Possible Cause	Possible Solution
OOS/NE	Warning	Port has been busied out by command.	Enter **release pri-endpoint *extension***.
	Minor	NPE Crosstalk test (#6) failed.	Replace UDS1 circuit pack.
		UDS1 circuit pack lost its signal.	Is the UDS1 circuit pack removed? Is the UDS1 cable disconnected? Is the far-end terminal restarting or experiencing problems? Check circuit pack using procedures UDS1-BD.
OOS/FE	Warning	Far-end problems or incompatibility	Check administration and status of the corresponding port on the terminal adapter.
	Warning	The far-end port is busied out.	Check the status of the far-end terminal adapter.
OOS/FE PINS		Service message was sent and the switch is waiting up to 2 minutes for a reply from the far-end terminal adapter.	Wait 2 minutes, and check service state after the PINS state has cleared.
MTC/NE		System link demand busied out	Check link status. Release with **release link *link#***.
MTC/FE	Warning	Signaling channel has been down for over 90 sec.	Consult ISDN-SGRP, ISDN-LNK and/or SYS-LINK. Far-end terminal adapter may currently be restarting.
	Warning	Repeated failure of far end to respond to messages.	Maintenance software will periodically try to resend messages. You can speed the process with **test port *UUCSSpp*** (Test #256).
	Warning	The far-end port is being tested.	Check status of the far-end terminal adapter.
MTC/FE PINS		Service message was sent, and the switch is waiting up to 2 minutes for a reply from the far-end terminal adapter.	Wait 2 minutes, and check service state after the PINS state has cleared.

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Table 8-496. PRI Endpoint Port Service States — *Continued*

Service State[1]	Alarm	Possible Cause	Possible Solution
INS		Normal operating state. ISDN wideband calls being completed.	

1. OOS Out-of-Service
   MTC Maintenance
   FE Far-end
   NE Near-end
   PINS Pending in-service

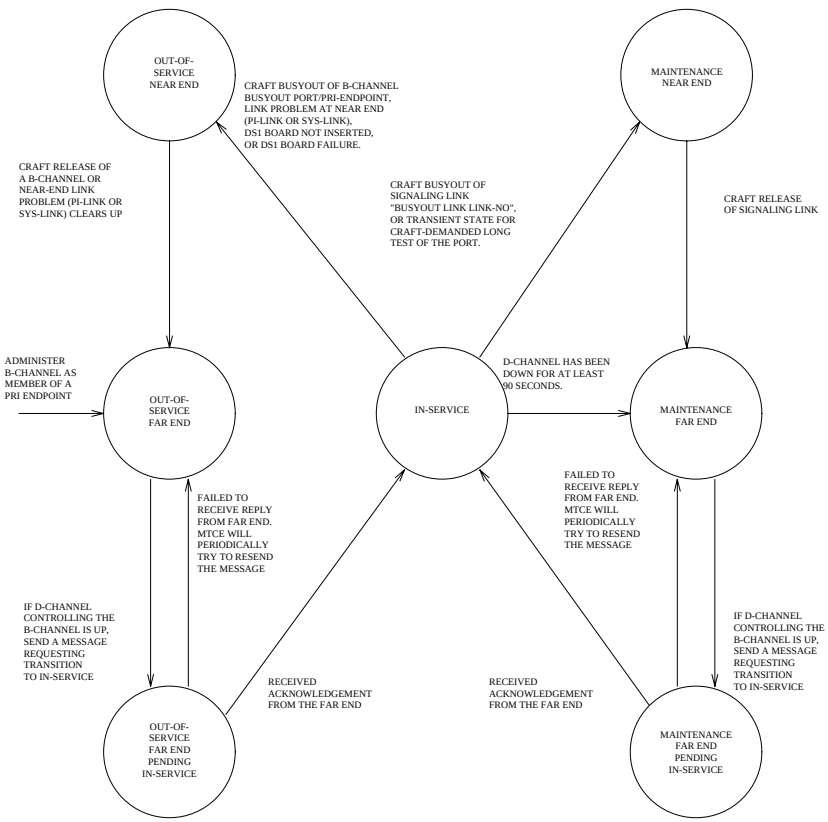

Figure 8-72. Common Progressions in PRI Endpoint Service States

Error Log Entries and Test to Clear Values

Table 8-497. PRI endpoint port Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp* sh r 1**
1 (a)	Any	None			**test port *UUCSSpp* sh r 1**
15 (b)	Any	Audit and Update test (#36)			
18 (c)	0	**busyout pri-endpoint *extension* busyout port *UUCSSpp***			**release pri-endpoint *extension* release port *UUCSSpp***
129 (d)		None	WARNING	OFF	**test port *UUCSSpp* sh r 1**
130 (e)		None	WARNING	ON	**test port *UUCSSpp* sh**
257 (f)	Any	None			**test port *UUCSSpp* sh r 1**
513 (g)	Any	None	WARNING	OFF	**test port *UUCSSpp* sh r 1**
769 (f)	Any	None			**test port *UUCSSpp* sh r 1**
1281 (h)	Any	Conference Circuit test (#7)	MINOR	ON	**test port *UUCSSpp* l r 4**
1537 (i)	Any	NPE Crosstalk test (#6)	MINOR	ON	**test port *UUCSSpp* l r 3**
1793 (j)	Any	None			**test port *UUCSSpp* sh r 1**
3073 (k)	Any	Service State audit (#256)			**test port *UUCSSpp* sh r 2**
3585 (l)	Any	None			None

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. These error types indicate a disagreement between this switch and the terminal adapter at the other end of the connection with regard to the ISDN *call* state of the PRI endpoint port. This switch will automatically try to recover by clearing the call (the call will be torn down). Use the **status pri-endpoint *extension*** command to determine the state of the port.

   When running the short test sequence, pay close attention to the results of the Call State Audit test (#257).

b. This is a software audit error that does not indicate any hardware malfunction. Run the short test sequence, and investigate associated errors.

c. The PRI endpoint port has been busied out by **busyout pri-endpoint *extension*** or **busyout port *UUCSSpp***. No wideband calls can be made to this port, although wideband calls can still be made to other ports within this PRI endpoint if they are in service.

d. The far-end terminal adapter changed its ISDN *service* state to either out-of-service or maintenance. This may be a temporary condition due to testing of this port by the far-end terminal adapter *or* a hardware problem with the port. Outgoing calls to the terminal adapter will not be allowed over the port, although calls can still be made to other ports that are in service within the same PRI endpoint. To investigate the status of the port, enter **status pri-endpoint *extension***.

e. This error type indicates that the circuit pack has been removed or has been insane for more than 11 minutes. To clear the error, reinsert or replace the circuit pack.

f. These error types indicate a disagreement between this switch and the terminal adapter at the other end of the connection with regard to the ISDN service state of the PRI endpoint port. The switch will automatically try to recover by performing a service state audit. Use **status pri-endpoint *extension*** to determine the state of the port.

   When running the short test sequence, pay close attention to the results of the Service State Audit test (#256).

g. This port is not recognized by the far-end terminal adapter. Investigate the PRI endpoint administration for both the switch and the terminal adapter, and make sure they agree.

h. The Conference Circuit test (#7) failed on this port. See Test #7 for repair procedures.

i. The NPE Crosstalk test (#6) failed on this port. See Test #6 for repair procedures.

j. This error indicates a failure of the UDS1 Interface circuit pack. The results of the Signaling Link State Check test (#255 in the short sequence) are important.

k. Two Service State audit attempts have failed (see Test #256). The port will not be usable for any outgoing calls to the terminal adapter until the test passes and the port state is changed to in-service. Incoming calls from the terminal adapter *will* be accepted over this port, and other ports in the PRI endpoint can still be used for both incoming and outgoing calls to and from the terminal adapter.

l. Error Type 3585 appears when the switch receives an ISDN RESTART message for an ISDN port that is not idle. Since calls are not typically cleared with the RESTART message, this error type may be associated with a dropped call report from a user.

   The following Aux Data values for Error Type 3585 represent the port's ISDN call state at the time the unexpected RESTART request was received from the terminal adapter. This information can be useful if dropped calls are being reported by users of the PRI endpoint. Aux values that do not appear below can be ignored.

PE-BCHL Error 3585 Aux Data

Aux Data	Meaning
10	A call in a stable, talking state (the *active* state) was cleared unexpectedly by the far-end terminal adapter with an ISDN RESTART message.
4 7 8 260 263	A call that has not reached the active state, but has at least reached a ringing state, was cleared unexpectedly by the far-end terminal adapter with an ISDN RESTART message.
1 3 6 265	A call that has not yet reached a ringing state was cleared unexpectedly by the far-end terminal adapter with an ISDN RESTART message.
11 12 19 531 267 268	A call that was already in the process of clearing has been cleared by the far-end terminal adapter with an ISDN RESTART message. If this condition occurs frequently, it may mean that the far-end terminal adapter is attempting to clear ports that it thinks are in a "hung" state. The RESTART message puts the port in an idle condition.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the NPE Crosstalk test (#6), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
NPE Crosstalk test (#6)		X	ND
Conference Circuit test (#7)		X	ND
Audit and Update test (#36)	X	X	ND
Signaling Link State Check test (#255)	X	X	ND
Service State Audit test (#256)	X	X	ND
Call State Audit test (#257)	X	X	ND

1. D = Destructive; ND = Nondestructive

NPE Crosstalk Test (#6)

The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed. This test is usually part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Table 8-498. Test #6 NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use **status pri-endpoint *extension*** commands to determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-Bus errors. Use the **status health** command to determine whether the system is experiencing heavy traffic. Investigate and resolve any errors against TDM-BUS. 1. If the system has no TDM-Bus errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some tone detectors may be out-of-service. The **list measurements tone-receiver** command will display information about the system's tone receiver. 1. Resolve any errors against TTR-LEV. 2. Resolve any errors against TONE-PT. 3. If neither of the above exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The port has been seized by a user for a valid call. Use **status pri-endpoint *extension*** to determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1117	ABORT	A service state audit message is outstanding. 1. Wait 2 minutes and then try again.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-498. Test #6 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
2020	ABORT	The test did not run due to an existing error on the specific port or a more general circuit pack error. 1. Examine the Error Log for existing errors against this port or the circuit pack, and follow recommended procedures.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. The PE-BCHL is moved to out-of-service/near-end state. 1. Replace the circuit pack.
	PASS	The port can communicate over the TDM bus.

Conference Circuit Test (#7)

The Conference Circuit test verifies that the NPE channel for the port being tested can correctly perform the conferencing function. The NPE is instructed to listen to several different tones and conference the tones together. The resulting signal is measured by a tone detector port. If the level of the tone is within a certain range, the test passes.

Table 8-499. Test #7 Conference Circuit Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use **status pri-endpoint *extension*** commands to determine when the port is available for testing.
1004	ABORT	The port has been seized by a user for a valid call. Use **status pri-endpoint *extension*** to determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1020	ABORT	The test did not run due to an already existing error on the specific port or a more general circuit pack error. 1. Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The NPE of the tested port did not conference the tones correctly. This will cause noisy and unreliable connections. 1. Replace the circuit pack. Even though wideband calls do not use the conferencing feature on the NPE, this failure indicates problems with the circuit pack hardware.
	PASS	The port can correctly conference multiple connections. User-reported troubles on this port should be investigated using other port tests and examining terminal adapter or external wiring.

Audit and Update Test (#36)

This test sends port level translation data from switch processor to the UDS1 interface circuit pack to assure that the port's translation is correct. The port audit operation verifies the consistency of the current state of port kept in the UDS1 interface circuit pack and in the switch software.

Table 8-500. Test #36 Audit and Update Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error
2000	ABORT	Response to the test was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	FAIL	Test failed due to internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	Port translation has been updated successfully. The current port states kept in the UDS1 interface circuit pack and switch software are consistent. If the port is busied out, the test will not run, but will return PASS. To verify that the port is in-service: 1. Enter **status pri-endpoint *extension*** to verify that the port is in-service. If the port is in-service, no further action is necessary. If the port is out-of-service, continue to Step 2. 2. Enter **release pri-endpoint *extension*** or **release port *UUCSSpp*** command to put port back into in-service. 3. Retry the test command.

Signaling Link State Check Test (#255)

As noted in the preceding general description, operation of the PRI endpoint port depends on the health of the UDS1 interface circuit pack and System Link for proper operation. This test checks the status of those critical elements.

Table 8-501. Test #255 Signaling Link State Check Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1700	ABORT	Rollabout video abort. The PRI terminal adapter associated with this PRI endpoint extension is detached from the circuit pack. This is a normal abort when the rollabout video feature is enabled. 1. Either reconnect the disconnected PRI terminal adapter or disable the rollabout video feature on this circuit pack. To do the latter, enter **change ds1 *UUCSS*** and set the `Alarm when PRI Endpoint Detached?` field to **y**.
4	FAIL	There is a problem with the Signaling Channel and/or with the System Link. 1. Consult procedures for the ISDN-GRP and SYS-LINK. See also ISDN-LNK for useful information.
8	FAIL	There is a problem with the UDS1 interface circuit pack. 1. Consult procedures for UDS1-BD.
	PASS	The signaling link hardware is OK.

Service State Audit (#256)

As noted in the general description for PRI endpoint port, these ports may be in one of several service states as defined by the ISDN-PRI Specification. This test performs a service state audit with the far-end terminal adapter to ensure both sides agree on the service state.

A PASS for this test simply means that an audit message was successfully composed and sent out to the far-end terminal adapter. The ISDN Specification allows up to 2 minutes for a reply. If no reply is received within that 2-minute window, this switch will automatically try once again. If that attempt fails, an error will be logged (Error Type 3073) and the switch will then attempt recovery by automatically retrying approximately every 15 minutes. If the port was initially in the INS (in-service) state, it will now be placed in the MTC/FE (maintenance state, far-end problem) state. Until a Service State audit attempt is successful, no outgoing calls will be placed over this port, but incoming calls will be accepted. The service state of this port does not affect the service state of other ports in the PRI endpoint. If an incoming call that uses this port is presented while in such a state, a Service State audit attempt will immediately be attempted (that is, the switch will not wait for the 15-minute cycle, but will instead try to recover immediately). To investigate the status of this PRI endpoint port, issue the **status pri-endpoint *extension*** command.

Table 8-502. Test #256 Service State Audit Test

Error Code	Test Result	Description / Recommendation
1113	ABORT	The signaling link has failed, so the system cannot send any messages on behalf of this port. 1. Check the results of Test #255 (Signaling Link State Check).
1117	ABORT	A service state audit message is outstanding. 1. Wait 2 minutes and then try again.
1700	ABORT	Rollabout video abort. The PRI terminal adapter associated with this PRI endpoint extension is detached from the circuit pack. This is a normal abort when the rollabout video feature is enabled. 1. Either reconnect the disconnected PRI terminal adapter or disable the rollabout video feature on this circuit pack. To do the latter, enter **change ds1 *UUCSS*** and set the `Alarm when PRI Endpoint Detached?` field to y.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-502. Test #256 Service State Audit Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	Wait 4 minutes and then check the Error Log for any new errors of type 3073. If there are none, then both sides of the ISDN connection agree on the service state; the negotiation succeeded. If there is a new 3073 error, then the negotiation failed (the far-end terminal adapter twice failed to respond within the mandatory 2-minute window). This switch will automatically retry approximately every 15 minutes. If the port was initially in the INS (in-service) state, it will now be placed in the MTC/FE (maintenance, far-end problem) state (see the "Service States" section which precedes the PE-BCHL "Hardware Error Log Entries and Test to Clear Values" table); incoming calls will be accepted, but no outgoing calls will be originated this port. If an incoming call is presented, another Service State audit will be immediately performed in an attempt to bring the PRI endpoint port the proper state.

Call State Audit Test (#257)

If a call is active on the port, the switches on both sides of the connection should agree on the ISDN state of the call as defined in the ISDN Protocol Specification. This test audits internal call state data by querying the far-end terminal adapter as to the ISDN state of the call. It can be helpful when trying to clear a hung call. If the internal call state data on the near-end switch is different than that of the far-end terminal adapter, the call will be **torn down**.

As with Test #256 (Service State audit), a PASS simply means that an appropriate message was composed and sent to the far-end terminal adapter. The ISDN Specification allows up to 2 minutes for a reply. If a reply is not received within the 2-minute window, a protocol time-out violation is recorded in the error log against the associated signaling channel (ISDN-PRI signaling link's port, which is listed in the Error Log as ISDN-LNK; the Error Type is 1).

Table 8-503. Test #257 Call State Audit Test

Error Code	Test Result	Description / Recommendation
1019	ABORT	An audit is already in progress. 1. Wait 2 minutes and try again.
1113	ABORT	The signaling link has failed, so the system cannot send any messages on behalf of this port. 1. Check the results of Signaling Link State Check test (#255).

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Table 8-503. Test #257 Call State Audit Test — *Continued*

Error Code	Test Result	Description / Recommendation
1116	ABORT	The port is in an out-of-service ISDN service state. 1. A call cannot be present if the port is in an ISDN out-of-service state, so a call state audit would be inappropriate. No action necessary. (Use the **status pri-endpoint *extension*** command to investigate the ISDN state of the port).
1700	ABORT	Rollabout video abort. The PRI terminal adapter associated with this PRI endpoint extension is detached from the circuit pack. This is a normal abort when the rollabout video feature is enabled. 1. Reconnect the disconnected PRI terminal adapter or disable the rollabout video feature on this circuit pack. To do the latter, enter **change ds1 *UUCSS*** and set the `Alarm when PRI Endpoint Detached?` field to **y**.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	This switch sent a call-state auditing message to the far-end terminal adapter to verify the state of the call active on this port. If a call-state mismatch is found, then the call is torn down within two minutes. If no call was active, then no message was sent.

PKT-BUS (Packet Bus)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run[1]	Full Name of MO
PKT-BUS	MAJOR	**test pkt *P* l r 2**[1]	Packet Bus
PKT-BUS	MINOR	**test pkt *P* l**	Packet Bus
PKT-BUS	WARNING	**test pkt *P* l**	Packet Bus

1. where P is the port-network number indicated in the PORT field from the Alarm or Error Log.

The packet bus consists of a single bus, and one such bus appears in each port network. The packet bus in each port network is physically independent from those in other port networks, so each port network has a separate PKT-BUS MO. This bus supports the following types of connections:

- Logical control links between the media server and every PN
- ISDN-BRI D-channel transport (signaling)
- ASAI D-channel transport (signaling)
- ISDN-PRI D-channel (signaling)
- X.25 system adjunct signaling and traffic
- System Access Ports

The TN2312AP IPSI circuit pack's Packet Interface circuit provides the media server an interface to the packet bus. Packet-bus testing depends on the TN771D Maintenance/Test circuit pack, the TN2312AP IPSI circuit pack's Packet Interface circuit, TN570 Expansion Interface circuit pack, and various port circuit packs (including TN556 ISDN-BRI Line, TN553 Packet Data Line, and TN464 Universal DS1). Packet Bus tests may abort if some of these are absent from the system. The tests may yield inconsistent results if any of this hardware is defective. The individual test descriptions provide more information.

The interactions between the packet bus and the circuit packs that use the bus are complex. Circuit pack failures can alarm the packet bus, while packet-bus faults can alarm or interrupt service to one or more circuit packs and their ports and endpoints. The ''Isolating and Repairing Packet-Bus Faults'' section in Chapter 4, ''Alarms, Errors, and Troubleshooting'' describes packet-bus maintenance and interactions with circuit packs. That section should be referenced for all troubleshooting and repairs. The flowchart is the normal starting point for experienced technicians. Technicians unfamiliar with the packet bus and its implementation in R*X*r should study the introductory material (for example, ''What is the Packet Bus?'') before using the flowchart to diagnose and repair packet bus faults.

This section on the PKT-BUS MO is limited to a description of the Error and Alarm Log entries and the test sequence for the packet bus. The following list summarizes some of the important points to consider when working with the packet bus.

- The Maintenance/Test circuit pack (TN771D) is a critical tool for isolating packet bus faults. This circuit pack resides in each port network of a critical-reliability system (duplicated Avaya MultiVantage™ software *and* PNC). In a duplex-, or high-reliability system, the circuit pack may be included as a customer option. If a TN771D is absent, *one must be taken to the customer site* to allow for proper fault isolation. The *''Isolating and Repairing Packet-Bus Faults''* section in Chapter 4, ''Alarms, Errors, and Troubleshooting'' describes the Packet Bus testing facilities of the TN771D and when one must be taken to the customer site.
- Certain catastrophic packet-bus faults have an effect on maintenance software activities relating to packet circuit packs, ports, and endpoints:
  - — Packet circuit pack (BRI-BD, UDS1-BD) in-line errors indicating possible Packet Bus test failures are logged in the error log, but are not acted upon.
  - — Port-level (BRI-PORT, ABRI-PORT) in-line errors on Packet circuit packs which indicate possible Packet Bus failures are not logged or acted upon.
  - — Circuit pack and port in-line errors that are not relevant to the Packet Bus, or that indicate a circuit pack failure, are acted upon in the normal fashion.
  - — Periodic and scheduled background maintenance are not affected.
  - — Foreground maintenance (for example, a **test board** command executed at a terminal) is not affected.

  The actions in the previous list serve to reduce the system load, which could become excessive if many MOs are affected by a packet bus failure. However, such an excessive load should in no way impede the isolation and the correction of the faults.

  When the above actions are implemented, Error Type 3329 is logged against PKT-BUS, and a Warning alarm is raised. Other Packet Bus errors may raise more severe alarms, thereby overriding the Warning alarm.
- Since all packet traffic requires communication with the IPSI's PKT-INT circuit in an IPSI-connected PN, a PKT-BUS failure in the IPSI-connected PN causes packet traffic in this PN, and every PN controlled by the IPSI-connected PN, to fail. In the S8700 Multi-Connect configuration where some PNs are non-IPSI-connected, an IPSI-connected PN PKT-BUS fault should be investigated first whenever PKT-BUS problems occur in multiple PNs.

Hardware Error Log Entries and Test to Clear Value

Table 8-504. PKT-BUS Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board[1]	Test to Clear Value
0[2]	0	Any	Any	Any	**test pkt port-network**
1 (a)	1–2	Packet circuit pack Audit test (#570)	MAJOR	ON	**test pkt port-network *P* l r 2**
513 (b)	1–24	Maintenance/Test Circuit Pack Query test (#572)	MAJOR	ON	**test pkt port-network *P* l r 2**
1793 (c)	Any	None			
2049 (d)	1–3	Maintenance/Test Circuit Pack Query test (#572)	MINOR	ON	**test pkt port-network *P* l r 2**
2305 (e)	1–24	Maintenance/Test Circuit Pack Query test (#572)			**test pkt port-network *P* l**
3329 (f)	1–7	none	WARNING	ON	**test pkt port-network *P* l**
3585 (g)	Any	none	MINOR	ON	**test pkt port-network *P* l**
3841 (h)	Any	none	MINOR	OFF	

1. ON-BOARD indicates a problem with the packet bus itself.
2. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. Within the last minute, packet circuit packs have reported errors that indicate a possible packet bus failure. The Aux Data value is 1 or 2, indicating that only one or more than one Packet circuit pack (respectively) have reported a possible packet bus failure.

b. The Maintenance/Test packet bus port (M/T-PKT) for this port network has determined that there are more packet bus faults than the port can correct. The Aux Data value indicates the number of faulty leads.

c. Packet circuit packs have detected possible packet bus failures via in-line error or via background test failure. Examine the Error and Alarm logs for more specific PKT-BUS errors.

d. The Maintenance/Test packet bus port (M/T-PKT) has detected a Packet Bus fault and has taken corrective action by swapping to spare leads. This error appears only in high/critical-reliability systems (duplicated PNC). The Aux Data value indicates the number of faulty leads. If this is the only active error against the packet bus, *the packet bus is still in service*. Due to the disruptive nature of the packet bus Fault Isolation and Correction procedures, repairs should be deferred until a time when the least interruption in service would result. This should be determined by consultation with the customer. However, do not delay repairs for too long, since the switch cannot recover from another packet bus failure until the current one is resolved. *''Isolating and Repairing Packet-Bus Faults'' on page 4-81* in Chapter 4, ''Alarms, Errors, and Troubleshooting'' contains a sub-section, *A Special Precaution Concerning the TN771D* that describes how to ensure that the TN771D is providing correct information. A new TN771D may need to be taken to the customer site.

e. The Maintenance/Test packet bus port (M/T-PKT) has detected open leads on the packet bus. The Aux Data value indicates the number of open leads.

f. Packet circuit pack, port, and endpoint maintenance has been disabled due to a packet bus failure. The Aux Data value indicates the cause:

Aux Data	Cause
1	In-line errors from packet circuit packs
2	Uncorrectable packet bus fault reported by the
	Maintenance/Test packet bus port (M/T-PKT)
3	Both of the above
100*x*	Packet-related circuit pack, port, and endpoint maintenance in the PN has been disabled due to a packet bus failure in the PN. The last digit has the same meaning as the single digits listed above.

Keep in mind that although only packet circuit packs can detect and report packet bus problems, such problems can be caused by any circuit pack.

g. Packet circuit pack, port, and endpoint maintenance has been disabled due to more than one circuit pack reporting in-line errors. If this occurs more than three times in 15 minutes a Minor alarm is raised against the packet bus. This happens when maintenance is disabled due to errors and is then re-enabled because no more errors are reported.

This error may still be present in the error log even though the Packet Circuit Pack Audit test (#573) indicates that only one circuit pack is reporting a problem. This happens when more than one circuit pack has reported errors in any 1-minute interval since the packet bus fault occurred.

h. The Maintenance/Test packet bus port (M/T-PKT) for this port network is not in service. This alarm does not appear for PNs in high-reliability systems since a TN771D is not required there. The error indicates one or more of the following:

- The packet bus port has been busied out (indicated by Error Type 18), and a Warning alarm is active against M/T-PKT in the same port network. Release the port by entering **release port *UUCSS*04**.
- The packet bus port has failed. Look for alarms against M/T-PKT, and attempt to resolve these alarms.
- The Maintenance/Test circuit pack was not recognized by the system at the last system restart. Replace the Maintenance/Test circuit pack.
- There is no Maintenance/Test circuit pack in this port network. One must be installed.

The TN711 must be installed before other packet bus alarms can be resolved. (Alarms against a given MO are not resolved until every alarm-generating condition has been cleared).

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the following tables. For example, by clearing error codes associated with the Packet Circuit Pack Audit test (#573), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Packet Circuit Pack Audit test (#573)	X	X	ND
Maintenance/Test Circuit Pack Query test (#572)	X	X	ND

1. D = Destructive; ND = Nondestructive

Maintenance/Test Circuit Pack Query Test (#572)

This test queries the Maintenance/Test packet bus port about the state of health of the packet bus. If the Maintenance/Test circuit pack indicates that the packet bus has faults, the test fails. The corresponding failure code describes the severity, type, and number of faults. The test passes if the packet bus is fault-free.

NOTE:
A Maintenance/Test circuit pack is usually absent from a duplex-, or high-reliability system's PNs. However, customers may optionally install a Maintenance/Test circuit pack both to utilize its enhanced analog-trunk and digital-line testing capabilities and to enhance the system's ability to quickly recognize a packet bus failure.

Table 8-505. Test #572 Maintenance/Test Circuit Pack Query Test

Error Code	Test Result	Description / Recommendation
1006	ABORT	The packet bus port of the Maintenance/Test circuit pack is out of service. 1. Determine whether the port is busied out. If so, release it with the **release port *UUCSS*04** command. Then retry the test command. 2. If there are alarms active against the packet bus port (MT-PKT), see "M/T-PKT (Maintenance/Test Packet Bus Port)" to resolve them. Then retry the test command.
1142	ABORT	No Maintenance/Test circuit pack packet bus port is in service in this PN. 1. If this PN is required by configuration guidelines to have a Maintenance/Test circuit pack: a. the Maintenance/Test circuit pack for this PN has failed, and should be replaced, b. the Maintenance/Test circuit pack has been busied out, and should be released, or c. there is no Maintenance/Test circuit pack in thisPN, and one must be installed. 2. In an PN of a system without PNC duplication, the Maintenance/Test packet bus Port is not required and may not be present. If it is present, and is busied out, or has failed, release or replace the circuit pack. If there is no Maintenance/Test circuit pack, ignore the results of this test for this PN.
2000	ABORT	The test timed-out while waiting for an uplink CCMS response from the Maintenance/Test packet bus port. 1. Re-enter the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, check for problems with the Maintenance/Test packet bus port (look for M/T-PKT in the Error and Alarm Logs).
2059	ABORT	The Maintenance/Test packet bus port has reported a hardware failure. 1. See "M/T-PKT (Maintenance/Test Packet Bus Port)" to correct the problem. 2. Re-enter the test command.

Continued on next page

Table 8-505. Test #572 Maintenance/Test Circuit Pack Query Test — *Continued*

Error Code	Test Result	Description / Recommendation
2077	ABORT	The Maintenance/Test Circuit Pack Query located more than one Maintenance/Test packet bus port in the PN. **NOTE:** The software should not allow this to occur. This is an internal system error. Escalate the problem, but also attempt the following work-around steps. 1. Remove every Maintenance/Test circuit pack from the PN. 2. Insert one Maintenance/Test circuit pack (there should not be more than one in an PN). 3. Re-enter the test command.
2100	ABORT	Maintenance could not allocate every necessary system resource to perform this test.
2500	ABORT	An internal operation failed; the test could not be completed. 1. Re-enter the command at 1-minute intervals up to 5 times.
	FAIL	The Maintenance/Test packet bus port has detected faults on the Packet Bus. The error codes are interpreted as follows:
1*xxx*		The Maintenance/Test packet bus port has reconfigured the packet bus around the faulty leads. This action only occurs in high/critical-reliability systems (duplicated PNC).
2*xxx*		The Maintenance/Test packet bus port is unable to correct every Packet Bus fault it has detected.
x**0***xx*		None of the packet bus faults are open faults.
x**1***xx*		At least some of the packet bus faults are open faults. Look for error type 2305 in the Error Log. The Aux Data value indicates the number of open leads.
xxyy		The last two digits of the error code indicate the total number of faulty packet bus leads detected. Examples: Error Code 2003 FAIL: The Maintenance/Test packet bus port has detected 3 faulty leads. None of them are opens. At least one was unable to be corrected. Error Code 1103 FAIL: The Maintenance/Test Packet Port has detected 3 faulty leads. At least one is an open. The Maintenance/Test circuit pack was able to correct all of them by reconfiguring. 1. See the ''Isolating and Repairing Packet-Bus Faults'' section in Chapter 4, ''Alarms, Errors, and Troubleshooting''

Continued on next page

Table 8-505. Test #572 Maintenance/Test Circuit Pack Query Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	No faults have been detected on the packet bus by the Maintenance/Test circuit pack. This is an indication that the packet bus is operating correctly.

Packet Circuit Pack Audit Test (#573)

This test determines whether Packet circuit packs have reported Packet Bus-related in-line errors within the last minute. If so, the failure code indicates whether one or more than one circuit pack has reported such failures.

If the test has failed within the last 5 minutes, there is a 15 second delay before the result is returned. This prevents a repeated sequence of this test from always reporting the same result. If the test passes and a FAIL has not occurred within the last five minutes, a PASS is returned immediately.

Table 8-506. Test #573 Packet Circuit Pack Audit Test

Error Code	Test Result	Description / Recommendation
2500	ABORT	An internal operation failed; the test could not be repeated. 1. Re-enter the command at 1-minute intervals up to 5 times.
1	FAIL	One Packet circuit pack has reported packet bus-related in-line errors within the last minute.
2	FAIL	More than one Packet circuit pack has reported packet bus-related in-line errors within the last minute.
	PASS	No Packet circuit packs have reported packet bus-related in-line errors within the last minute. This indicates that the packet bus is healthy, or that a packet bus fault is transient or is being caused by a faulty Packet circuit pack. If this test passes, but there are other signs of a packet bus failure (for example, logged errors or alarms, or other test failures), see the ''Isolating and Repairing Packet-Bus Faults'' section in Chapter 4, ''Alarms, Errors, and Troubleshooting''.

PKT-INT (Packet Interface)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
PKT-INT	MAJOR	**reset packet-interface *UC***	Packet Interface
PKT-INT	MINOR	**test packet-interface *UC***	Packet Interface
PKT-INT	WARNING	**test packet-interface *UC***	Packet Interface

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21).

The Packet Interface (PKT-INT) MO resides on the TN2312AP IP Server Interface (IPSI) circuit pack and serves as an interface between the media server and the packet bus.

The TN1665 PKT-INT and TN2182 Tone-Clock circuit packs' functions have been moved to the TN2312AP IPSI circuit pack. In addition, the IPSI circuit pack provides the following functions:

- PKT-INT packet-bus interface
- Archangel TDM-bus interface
- Tone-Clock functionality
- Ethernet interface for connectivity to media servers
- Ethernet interface for connectivity to services laptop PCs
- Maintenance board interface for communication with the PN's Maintenance board (in Carrier A or B only)

The TN2312AP IPSI circuit pack is inserted into an PN's Tone-Clock slot and provides an Ethernet interface back to the media servers. The PKT-INT interface on the IPSI is like previous DEFINITY TN1655 PKT-INT boards. However, the IPSI's PKT-INT does not support DMI Mode-2/-3 data or BX.25 links.

The PKT-INT supports links used for call setup of every port located in an PN. In a duplex-reliability system (unduplicated IPSIs), a Packet Interface failure:

- Obstructs the origination of new calls
- Causes the termination of stable calls

connected to/through an PN's stations and trunks. (Duplicated IPSIs help prevent this in a high- or critical-reliability system.)

In addition to affecting telephone service, a failure of one or both of the PN's Packet Interfaces affects service provided by circuit packs that connect to the packet bus. For example:

- TN464C, TN2207, TN2464 Universal DS1 circuit pack — ISDN-PRI service
- TN556, TN2198, TN2185 ISDN-BRI Line circuit pack — ISDN-BRI service
- TN2305, TN2306 ATM
- TN570 Expansion Interface (EI)
- TN573 Switch Node Interface (SNI)
- TN799DP Control LAN (C-LAN) packet port circuit pack
- TN2501 Voice Announcements over the LAN (VAL)

If the active IPSI's Packet Interface causes a MAJOR alarm in a high- or critical-reliability system (with duplicated IPSIs), an IPSI interchange occurs if the standby IPSI's state of health (SOH) is high enough to permit the interchange. A MAJOR alarm due to a failure of the standby IPSI's Packet Interface lowers the standby's SOH, preventing a subsequent interchange.

The links that pass through the Packet Interface circuit are identified as either "application" or "system" links as follows:

1. Application links

    a. Endpoints requiring connectivity to the media server via the C-LAN board's Socket interface.

    These links pass over the packet bus, and through C-LAN ports.

    The following system features use application links of this type.

    - Call Detail Recording (CDR)
    - Dial-up administration
    - Property Management System (PMS)
    - Journal printer
    - Wake-up log printer
    - Announcement circuit pack upload/download of recorded messages
    - IP phones

2. System links

    - Expansion Archangel links (signaling links for call setup of an PN's endpoints)
    - Center Stage Control Network (CSCN) links
    - ISDN-PRI D-channel signaling links
    - ISDN-BRI D-channel broadcast and point-to-point signaling links
    - Adjunct Switch Application Interface (ASAI) links
    - Remote Socket Control Link (RSCL) (C-LAN, VAL)
    - BRI (TRK and STA)

Distributed PKT-INTs

In earlier G3r systems, every PKT-INT resided in the PPN and terminated all of the LAP-D links. In S8700 Multi-Connect, LAP-D links are terminated by the PKT-INTs within IPSIs that are distributed out to the PNs. Whereas, G3r allowed up to three active and three standby PKT-INTs in the PPN, S8700 Multi-Connect allows one active and one standby PKT-INT in each PN (that is, up to 64 (for ATM PNC) or 44 (for CSS PNC) active PKT-INTs in the system). As shown in Figure 8-73, EPNs 1 and 2 have IPSIs that terminate LAP-D links. EPNs 3 and 4 do not have local IPSIs, so their LAP-D links are terminated by IPSIs in EPNs 1 and 2, respectively.

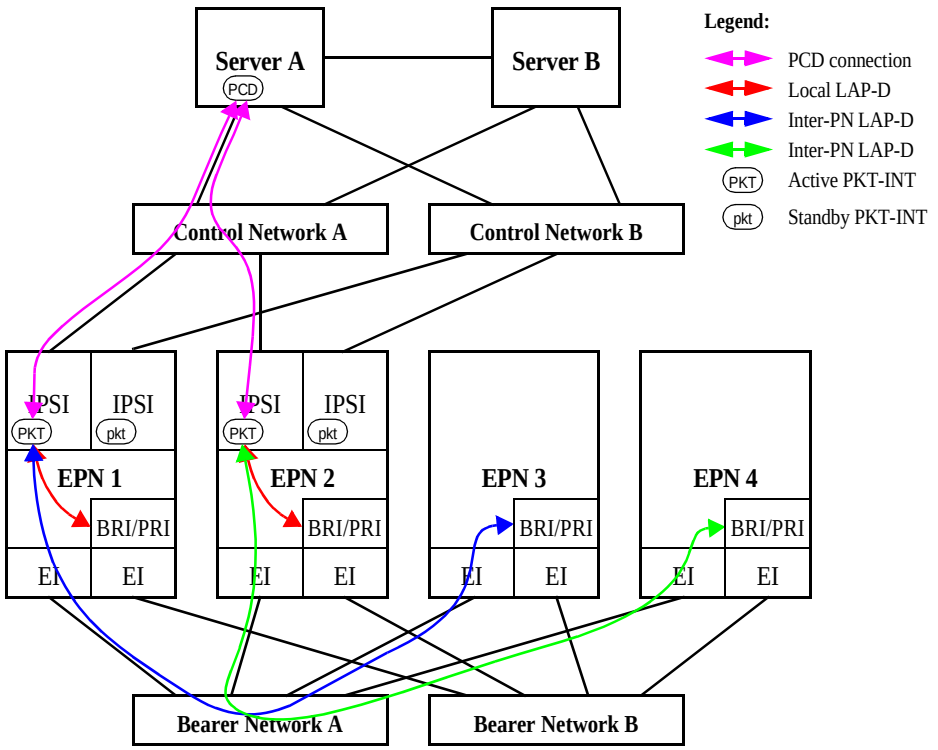

Figure 8-73. Distributed PKT-INTs

PKT-INT Interchange

In earlier G3r systems, PKT-INT interchange was an integral part of an SPE interchange. In S8700 Multi-Connect, PKT-INT interchange is independent of media server interchange (that is, a PKT-INT interchange can occur without a media server interchange and vice versa). In S8700 Multi-Connect, the active media server's packet control driver (PCD) has sockets to both active and standby IPSIs and exchanges heartbeats with both. The active PCD is not only responsible for bringing up the active PKT-INT but also responsible for bringing up the standby PKT-INT into the standby mode. This is different than the current G3r where the standby PCD brings up the standby PKT-INT into the standby mode. The standby PCD also has sockets to both active and standby IPSIs and exchanges heartbeats with both. The standby PCD only talks to the IPSI SIM and does not communicate with the PKT-INTs. In the G3r systems, the active media server communicated with the standby media server via the SMM to perform maintenance activities on the standby PKT-INT. In S8700 Multi-Connect, the active media server communicates directly with both active and standby PKT-INTs and performs maintenance activities on both PKT-INTs without the standby media server getting involved.

Earlier G3r PKT-INT duplication relied on the duplication hardware to automatically duplicate and write each command from the processor into both the active and standby PKT-INT's dual-port RAMs. The standby PKT-INT was always up-to-date with the state of every link terminated by the active PKT-INT. On S8700 Multi-Connect, there is no dedicated hardware to keep the standby PKT-INT up-to-date. Instead, the PCD refreshes the standby PKT-INT prior to an interchange.

Executing a PKT-INT Interchange

There are two ways to interchange PKT-INTs, spontaneous and planned.

1. A spontaneous interchange is usually caused by a fault, and:
   - Stable calls are retained.
   - LAP-D links are restarted.
   - Some data may be lost.
2. A planned interchange can be requested by Services' personnel or by software for maintenance or periodic testing.
   - LAP-D links are migrated from the active to the standby PKT-INT.
   - No data is lost during the interchange.

The active media server's PCD has socket connections to both active and standby IPSIs. Media server interchange and IPSI interchange are independent of each other. IPSIs in an PN can be interchanged independently of IPSIs in other PNs.

Spontaneous PKT-INT Interchange

For S8700 Multi-Connect, the standby PKT-INT is not kept up-to-date with the links terminated by the active PKT-INT. During a spontaneous interchange of PKT-INTs, the standby PKT-INT is refreshed with the link information by the active PCD and the standby PKT-INT is activated with a warm reset. As with G3r, a spontaneous interchange of PKT-INTs may result in loss of some up-stream and down-stream data.

- PCD maintains socket connections to the active and the standby PKT-INTs (via the SIM).
- Media server sends control and data packets only to the active PKT-INT.
- Standby PKT-INT has no information about the LAP-D links.
- On a spontaneous interchange, the standby PKT-INT is “refreshed” by the PCD. That means the LAT and the LCT are sent to the PKT-INT, and the standby PKT-INT is made active by a warm interrupt.

Planned PKT-INT Interchange (Link Migration)

A planned interchange of PKT-INTs uses link migration to assure that no data is lost during the interchange of PKT-INTs. On a planned interchange of PKT-INTs, software initiates the link migration by sending commands to the active and standby PKT-INTs to make a peer link between the PKT-INTs and to start the link migration process. Down-stream and up-stream messages can be processed by the PKT-INTs during the link migration process. As long as the PKT-INT interchange has not been completed, PCD should continue to send down-stream messages to the active PKT-INT. If a down-stream data packet is for a link that has not yet been migrated over to the standby PKT-INT, the active PKT-INT processes it and sends it out.

If a down-stream data packet is for a link that has already migrated over to the standby PKT-INT, the peer link forwards the down-stream data packet to the standby PKT-INT, and the standby PKT-INT processes it and sends it out. Up-stream messages during migration are handled by both PKT-INTs as with the down-stream messages. The PKT-INT that controls the link (the active PKT-INT if the link has not yet been migrated, and the standby PKT-INT if the link has been migrated) processes the up-stream data packet and sends it up to the PCD. During the migration process, both the active and the standby PKT-INTs can send up-stream messages to the PCD.

On G3r, during the migration process, the standby PKT-INT terminating a link processes the up-stream packet and forwards it to the active PKT-INT which sends it up to the PCD.

On S8700 Multi-Connect, all down-stream packets go to the active PKT-INT, but the up-stream packets can come from the active and the standby PKT-INTs during the migration process.

- Link migration is performed to prepare the standby PKT-INT for a hot reset.
- RNRs are not sent to the endpoints at the start of the link migration.
- PCD tells the active and standby PKT-INTs that a link migration is starting.
- LAP-D links are migrated from the active-mig PKT-INT to the standby-mig PKT-INT in the order they appear in the internal list. (Links without data do not migrate first. The entire migration happens so quickly that delaying a few hundredths of a second would seldom clear a link's preexisting data.)
- Active-mig PKT-INT continues to accept up-stream messages for the links that are not yet migrated. The standby-mig PKT-INT starts accepting up-stream messages for the links that are migrated. Both the active-mig and the standby-mig PKT-INTs send up-stream messages to the PCD.
- PCD accepts up-stream messages from both the active-mig and standby-mig PKT-INTs.
- PCD sends every down-stream message to the active-mig PKT-INT and has the active-mig PKT-INT forward it to the:
  - — active-mig PKT-INT of links that have not yet migrated
  - — standby-mig PKT-INT of links that have migrated
- At the end of the migration, the active-mig PKT-INT tells the PCD that the migration is finished, and PCD tells the standby-mig PKT-INT to go active (hot interrupt). Some coordination verifies that every up- and down-stream message has been flushed from the active-mig PKT-INT before completing the interchange.

PKT-INT and System Reliability

A PKT-INT circuit resides on each IPSI board. LAPD links are terminated by the PKT-INT circuits in the IPSIs that are distributed out to the port networks. The non-IPSI-terminated port networks do not have their own PKT-INT capability so their LAPD links are terminated by IPSIs in the IPSI-terminated port networks.

S8700 Multi-Connect architecture has three items that can be duplicated for increased reliability: media server, IPSI, and PNC. They can be duplicated independently. Note that duplicated control networks and duplicated IPSIs go together. That is, when the IPSIs are duplicated, the control networks must be duplicated. The set of items in your configuration that are duplicated depend on the reliability option chosen for your system: duplex, high or critical. See Table 8-507.

Table 8-507. Reliability Options

Configurations	Servers	Control Networks and IPSIs	Bearer Networks
Duplex Reliability	Duplicated	Unduplicated	Unduplicated
High Reliability	Duplicated	Duplicated	Unduplicated
Critical Reliability	Duplicated	Duplicated	Duplicated

Duplex-Reliability Configuration

The duplex-reliability configuration shown in Figure 8-74 has duplicated media servers, an unduplicated control network, unduplicated IPSIs in the IPSI-connected PNs, and an unduplicated bearer network. Since the IPSIs are not duplicated, the PKT-INT circuits contained within them are also not duplicated.

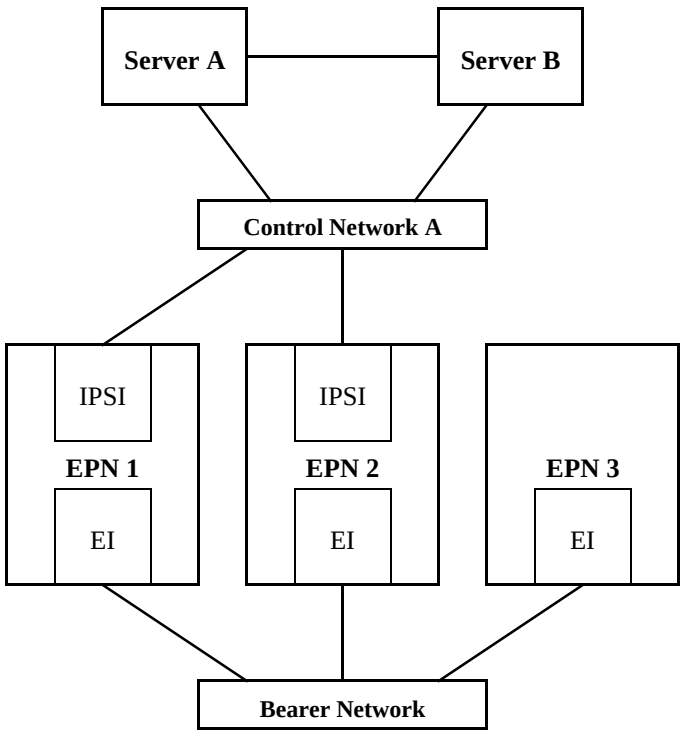

Figure 8-74. Duplex-Reliability Configuration

High-Reliability Configuration

The high-reliability configuration shown in Figure 8-75 has duplicated media servers, duplicated control networks, and duplicated IPSIs in the IPSI-connected EPNs. With this configuration, every IPSI-connected EPN must have duplicated IPSIs. The duplicated control network prevents a single fault in the control network, such as a bad Ethernet switch, from bringing the whole system down. Since the IPSI's are duplicated in this configuration, the PKT-INT circuits are also duplicated.

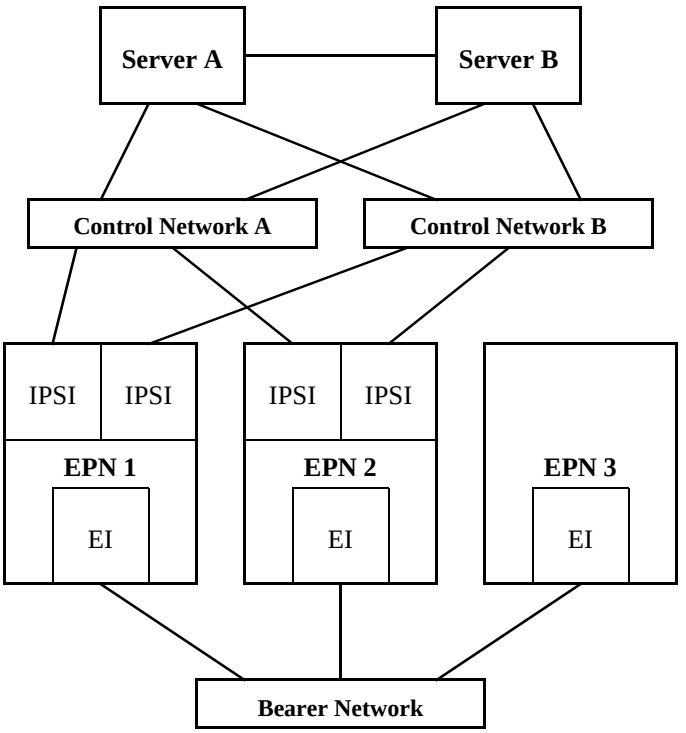

Figure 8-75. High-Reliability Configuration

Critical-Reliability Configuration

The critical-reliability configuration shown in Figure 8-76 has full duplication of the following options: media servers, control networks, IPSIs and PNCs (bearer networks). As with the high-reliability configuration, this configuration also requires that IPSI-connected EPNs have duplicated IPSIs. Since the IPSI's are duplicated in this configuration, the PKT-INT circuits are also duplicated.

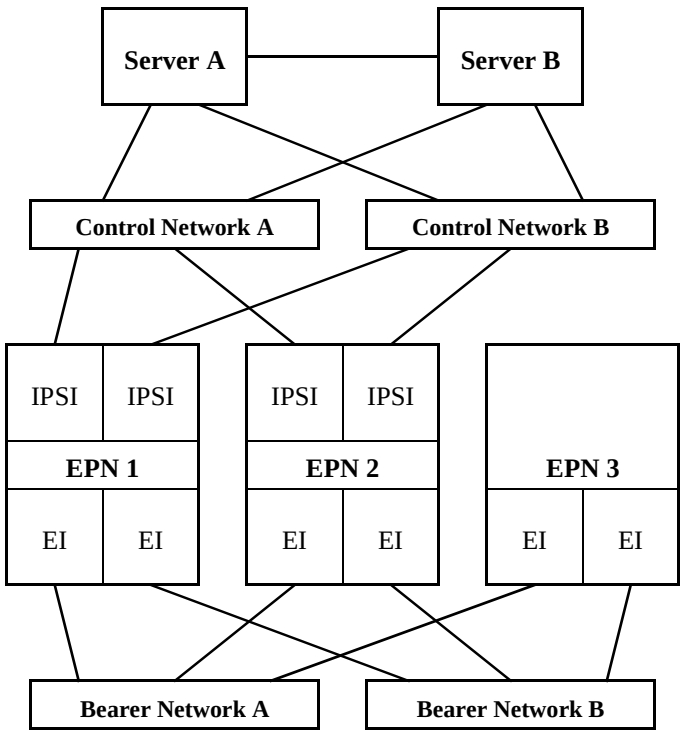

Figure 8-76. Critical-Reliability Configuration

Packet Interface Service Operations

The following sections provide more background information about service operations for the Packet Interface circuit.

Administration

PKT-INTs are automatically administered as a component of an IPSI circuit pack. See **add ipserver-interface**, **remove ipserver-interface**, **test packet-interface**, **status packet-interface**, and **reset packet-interface**.

Packet Interface Circuit Replacement

When replacing a Packet Interface circuit as part of a TN2312AP IPSI circuit pack, follow the procedure used for replacing an IPSI circuit pack.

Demand Reset of a Packet Interface Board

A demand reset of an active IPSI's Packet Interface via the entry of a **reset packet-interface** command is denied by system software if the Packet Interface is in service (has not been placed in an out-of-service state by background maintenance software). Otherwise, a reset of an in-service Packet Interface circuit would cause severe service disruption including the loss of all existing calls and dropped links to adjuncts such as AUDIX. As part of the automatic recovery action initiated when a fatal hardware-fault condition is detected, the software that controls Packet Interface maintenance puts a Packet Interface circuit in the out-of-service state if that circuit pack has been reset three times within the last 15 minutes.

A demand reset of a standby Packet Interface circuit is not disruptive and is allowed regardless of the service state of the associated maintenance software.

Service States

Packet Interface maintenance software maintains a state variable to monitor the in-service/out-of-service state of each Packet Interface circuit. In a duplex-reliability system (unduplicated IPSIs), if maintenance software detects that a Packet Interface has a "fatal fault", it automatically attempts to reset the circuit pack as quickly as possible. An extensive set of diagnostic tests is run when the circuit pack is reset.

If the circuit pack's diagnostic tests do not pass in a duplex-reliability system (unduplicated IPSIs), the failing Packet Interface is placed in an out-of-service state. In turn, every link handled by that IPSI goes out of service. This is a disruptive action since established calls associated with telephones connected to PNs are dropped as a result of the PNs being taken out of service.

If the standby IPSI (in a high- or critical-reliability system – with duplicated IPSIs) has an acceptable state of health, maintenance software interchanges the IPSIs – instead of resetting the active IPSI's Packet Interface circuit. This is less disruptive than a reset.

An IPSI's Packet Interface also goes out-of-service if the IPSI has either:

- Reported a fatal fault at system initialization time
- Been reset by background maintenance 3 times in the last 15 minutes, whether or not reset succeeded.

The state of a Packet Interface circuit can be determined by using the **status packet-interface** command.

Duplication Impact

The Packet Interface circuit is a single point of failure in a duplex-reliability system (with unduplicated IPSIs). If not acceptable, a S8700 Multi-Connect customer can upgrade to a high- or critical-reliability system (with duplicated IPSIs). Figure 8-76 shows a S8700 Multi-Connect configuration with duplicated IPSIs. The following concepts apply only to duplicated IPSIs.

- Packet-bus connection

  In a high- or critical-reliability system (duplicated IPSIs), the standby IPSI's Packet Interface circuit cannot access the packet bus to write data except during a planned IPSI interchange or when the Peer Link test (#888) is run. Consequently, the Maintenance Loop-Around test (#886) — requiring access to the packet bus — is not run on the standby IPSI's Packet Interface circuit.

- IPSI interchange

  Severe Packet Interface circuit faults causing system and application links to go down are detected within 1 second. A fatal fault error message is generated, and the Packet Interface maintenance software attempts to run the Packet Interface Reset test. In a high- or critical-reliability system, this results in a requested IPSI interchange (instead of a Packet Interface reset) since stable calls are preserved across the interchange.

Maintenance-Object Interactions

- Packet Bus maintenance

  A Packet Interface circuit physically interacts with the PKT-BUS. So, for certain types of Packet Interface errors, it may be difficult to isolate faults to one or the other component. In each of these cases, Packet Interface maintenance forwards an error report to packet-bus maintenance, where it records a packet-bus fault in the hardware error log and runs appropriate Packet Bus tests.

- Packet Interface maintenance

  The operation of the IPSI circuit pack's Packet Interface circuit affects the operation and maintenance of other circuit packs connected to the packet bus. This includes:

  1. BRI applications (BRI-PT)
  2. Universal DS1 applications (UDS1) for ISDN/PRI applications
  3. Expansion Interface circuit pack maintenance (EXP-INTF)

  Some packet errors may require examination of the Packet Interface circuit's operating status. To obtain this information:

  - Examine the Error and Alarm Logs for PKT-INT entries. You must determine which PKT-INT the link is accessing.

- Use **status sys-link** to identify the PKT-INT location in this PN, or use **status sys-link** to find the PKT-INT hardware used by the faulted link.
- Then use **test sys-link** command to troubleshoot that component.
- Issue the **status packet-interface** command to determine the:
  - — Service state of the Packet Interface circuit (for example, in service/out of service)
  - — Total number of Packet Interface links assigned to a Packet Interface circuit.

  For a standby IPSI's Packet Interface circuit in a high- or critical-reliability system (duplicated IPSIs), the circuit (if not out of service due to a failure condition) is shown in "standby" mode. The number of links for a standby Packet Interface circuit is always zero.

In general, if every link for an active IPSI's Packet Interface circuit is shown as a "Failed Link," there may be a fault on either the Packet Interface circuit or the packet bus that caused every link to go down. If only a small percentage of the links are shown as "Failed Links," then the Packet Interface circuit is probably not the source of the problem. Some typical sources of individual link failures include a:

- Failed BRI telephone set
- Disconnected cord to a BRI set (causes three link failures)
- Failed or removed EI circuit pack in an PN (causes one link failure)

For a case where not every link appears in the "Failed Links" category, examine the alarm and error logs for failures of the following circuit packs, and follow the repair procedures for those circuit packs before considering replacing the associated IPSI circuit pack:

- TN570 Expansion Interface circuit pack (EXP-INTF)
- TN573 Switch Node Interface circuit pack (SNI-BD)
- Switch Node Clock circuit pack (SNC-BD)
- ISDN-BRI Line circuit packs, ports, and stations (BRI-BD, BRI-PORT, BRI-SET)
- Universal DS1 circuit packs and ports (UDS1-BD, TIE-DS1)
- TN464C, TN2207, TN2464 Universal DS1 circuit pack — ISDN-PRI service
- TN556, TN2198, TN2185 ISDN-BRI Line circuit pack — ISDN-BRI service
- TN2305, TN2306 ATM
- TN799DP Control LAN (C-LAN) packet port circuit pack
- TN2501 Voice Announcements over the LAN (VAL)

Use the **test sys-link** command with the faulted path option to test all components in the faulted link.

Error Log Entries and Test to Clear Values

Table 8-508. Packet Interface Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	ON	**test packet-interface *Uc* l r 2**
1 (a)	Any	None	MAJOR	ON	**reset packet-interface *Uc*[2]**
10 (b)	0	None			
50 (c)	0	None			
257 (d)	Any	None	MAJOR	ON	**reset packet-interface *Uc***
513 (e)	Any	None	MAJOR	ON	**reset packet-interface *Uc***
769 (f)	Any	Maintenance Loop-around test (#886)	MAJOR	ON	**test packet-interface *Uc* s r 2**
1025 (g)	Any	Private Loop-around test (#885)	MAJOR	ON	**reset packet-interface *Uc*[2]**
1281 (h)	Any	None	MAJOR	ON	**reset packet-interface *Uc*[2]**
1537 (i)	Any	Memory Checksum test (884)	MINOR	ON	**test packet-interface *Uc* l r 2**
1793 (j)	Any	Memory Checksum test (#884)	MINOR	ON	**test packet-interface *Uc* l r 2**
2049 (k)	Any	None	WARNING	ON	**test packet-interface *Uc* r 25**
2305 (l)	Any	None			**test packet-interface *Uc* r 2**
2561 (m)	Any	Active-Standby Peer Link test (#888)	MINOR	OFF	**test packet-interface *Uc* s r 2**
2817 (n)	Any	Read and Clear test (#887)	MINOR/ MAJOR	ON	**test packet-interface *Uc* s**
3074, 3073, 3072 (o)	Any	Maintenance Loop-around test (#886)	WARNING	OFF	**test packet-interface *Uc* s r 2**
3585 (p)	Any	None	WARNING	OFF	**reset packet-interface *Uc*[2]**
3841 (q)	Any	None	MAJOR	OFF	**reset packet-interface *Uc*[2]**

1. Indicates that an alarm was raised but an associated error was not entered into the hardware error log due to a momentary overload condition caused by a burst of hardware or software error reports. Run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

2. **A Packet Interface circuit on an active IPSI can only be reset if it has been taken out of service by background maintenance software. A Packet Interface circuit on a standby IPSI can be reset independent of its service state.**

Notes:

a. Error 1 occurs when background maintenance software has reset the Packet Interface circuit as a fault recovery action. It is used to keep track of the number of times that the Packet Interface circuit is reset, independent of whether or not the Reset test passed. Once 3 of these errors have occurred in the last 15 minutes, maintenance places the Packet Interface circuit into an out-of-service state, and a MAJOR on-board alarm is raised on the Packet Interface circuit.

   1. Check to see if error codes 257, 513, 769, 1025, 1281, or 3841 are present in the hardware error log. If one or more of those error codes are present, refer to the information associated with those errors for the appropriate repair procedures.

   2. If no other Packet Interface errors appear in the error log, and if the Packet Interface is not in a held reset state as indicated by the absence of a MAJOR alarm with a Service State of OUT, no action should be taken. If a Packet Interface MAJOR alarm is present and no other Packet Interface error codes are in the hardware error log, execute a demand reset by entering **reset packet-interface *Uc*** and refer to the repair procedures for Test #889.

b. Error 10 indicates that the Packet Interface maintenance software caused an escalating system WARM restart as part of a recovery action for certain Packet Interface circuit failures. A SYSTEM error type 10 should also be present, indicating that a software initiated WARM restart occurred.

   1. Check to see if error types 513, 1025, or 3074 are present in the hardware error log. If they are present, refer to the repair procedures for those errors for further action.

c. Error 50 indicates that the media server is sending more downlink messages than the Packet Interface circuit can keep up with. This is an in-line error not produced by any test. When this error is reported, application software is slowed down to allow the circuit to process existing downlink messages. If there is a hardware problem, the Packet Interface test normally causes other errors to be logged. In rare cases where no other PKT-INT errors are logged but error 50 occurs more than 10 times in the last hour, follow normal escalation procedures.

d. Error 257 indicates that the circuit pack detected a fatal failure. This error is a very serious and when it occurs, maintenance software immediately escalates testing to the Destructive Reset test (#889).

   1. If the Packet Interface circuit has a MAJOR alarm:

      a. Enter **reset packet-interface *Uc*** to reset the Packet Interface circuit.

      b. Refer to the repair procedures for the Packet Interface Reset test (#889).

   2. If the Packet Interface circuit is not alarmed, no action is required.

e. Error 513 is called Message Handshake failure. It indicates that a failure with the message protocol between the media server's software and the Packet Interface circuit was detected.

   1. If the Packet Interface has a MAJOR alarm:
      a. Reset the Packet Interface circuit using the **reset packet-interface *Uc*** command.
      b. Refer to the repair procedures for the Packet Interface Reset test (#889).
   2. If the Packet Interface circuit is not alarmed, no action is required.

f. Error 769 indicates that there was a failure in the Packet Loop-Around test. A maintenance loop-around link cannot be established or the Packet Interface circuit cannot send and receive data correctly as part of the Loop-Around test (#886). If the number of errors exceeds a defined threshold, a Major alarm is raised.

   In a high- or critical-reliability system (duplicated IPSIs), a failure of the Maintenance Loop-Around test may have caused an IPSI interchange which would result in an alarm associated with error code 769 being reported against the standby IPSI's Packet Interface circuit. If so, it may be necessary to force another IPSI interchange using the **set ip server-interface** command.

   For more information, refer to the repair procedures of Test #886.

g. Error 1025 indicates a failure of the Private Loop-around test (#885).

   1. If the Packet Interface circuit has a MAJOR alarm:
      a. Enter **reset packet-interface *Uc*** to reset the Packet Interface circuit.
      b. Refer to the repair procedures for the Packet Interface Reset test (#889).
   2. If the Packet Interface circuit is not alarmed, no action is required.

h. Error 1281 indicates that the Packet Interface circuit has Translation RAM failures. PKT-INT Translation RAM is used to convert the addresses of a packet to the destination endpoint address.

   1. If the Packet Interface circuit has a MAJOR alarm:
      a. Enter **reset packet-interface *Uc*** to reset the Packet Interface circuit.
      b. Refer to the repair procedures for the Packet Interface Reset test (#889).
   2. If the Packet Interface circuit is not alarmed, no action is required.

i. Error 1537 indicates a Boot PROM memory failure. The Packet Interface circuit may still be operational if no other errors are reported. However the circuit may report a fatal fault during board initialization. This may occur during a system recovery level more severe than a WARM restart. For more information, refer to Test #884.

j. Error 1793 indicates a FLASH Memory test failure. The Packet Interface circuit may still be operational if no other errors are reported. However the circuit may report a fatal fault during board initialization. This may occur during a system recovery level more severe than a WARM restart. For more information, refer to the repair procedures of Test #884.

k. Error 2049 indicates a LAP-D Received Buffer Overflow error. The Packet Interface circuit's packet-bus receive buffer overflowed. For more information, refer to the repair procedures of Test #887.

l. Error 2305 indicates a parity failure detected by the packet-bus interface. The Packet Interface circuit received packets with parity errors from the packet bus.

    1. Check for errors logged against the packet bus and Maintenance/ Test circuit pack. Refer to the appropriate repair procedures to clear those errors first.

    2. Check every other circuit pack connected to the packet bus in the same cabinet. Packet-bus failures are likely to be caused by a faulty circuit pack connected to the backplane or bent pins on the back plane.

    3. If steps 1 and 2 above do not clear the problem, execute the **test packet-interface** command, and follow repair procedures described for Test #887.

m. Error 2561 indicates a Active-Standby Peer Link test failure indicating a possible failure of either the:

    - Active IPSI's Packet Interface circuit
    - Standby IPSI's Packet Interface circuit

    If the number of errors exceeds a defined threshold, a Minor alarm is raised. For more information, refer to the repair procedures of Test #888.

n. Error 2817 indicates a Standby Packet Interface circuit Translation RAM failure. A MINOR alarm is raised when there are 1 to 5 bad locations and a MAJOR alarm is raised when there are 5 or more bad locations. Execute the **test packet-interface** command, and follow repair procedures described for Test #887.

o. Errors 3074, 3073, and 3072 indicate PKT-INT Transmit Buffer Overflow, which means that the number of transmit buffers required by software exceeded the number available. A 3074 error is generated when the PKINT sends an in-line hardware error to maintenance software indicating transmit buffer overflow. As part of the background recovery action for this error, maintenance software automatically runs the Maintenance Loop-Around test (#886). If that test fails, maintenance software generates error codes 3073 and 3072, and it requests a system WARM restart. If, after the WARM restart, transmit buffer overflow errors continue to be reported, maintenance software generates error code 100 and it resets the PKT-INT. These errors may be the result of system overload due to a problem with communication between the PKT-INT and the PNs.

   1. Check for errors logged against the Expansion Interface circuit pack, the Switch Node Interface circuit pack, Packet Gateway circuit pack, the Packet Data Line circuit packs associated with the System Ports, BRI Line circuit packs and BRI endpoints, and the Universal DS1 circuit packs supporting PRI service. Errors against those components should be cleared first.

   2. Enter the **test packet-interface short** command against the Packet Interface circuit associated with the error. If the Maintenance Loop-Around test (#886) passes, the alarm will clear. If the test fails, repeat the test 5 times. If it continues to fail, follow normal escalation procedures.

p. Error 3585 indicates that a packet-bus failure has been detected and that the packet bus is alarmed. Refer to the packet bus maintenance documentation for further action.

q. Error 3841 indicates that the Packet Interface circuit has reported a fatal fault failure condition that may be caused by a packet-bus fault on the PN containing the failed PKT-INT.

   1. If error 3585 has also been reported, see ''PKT-BUS (Packet Bus)'' on page 8-1230. After the packet-bus fault has been corrected, execute the **reset packet-interface** command to bring the Packet Interface circuit back into service.

   2. If error 3585 has not been reported, enter **reset packet-interface**, and follow the repair steps associated with Test #889.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below. By clearing error codes associated with the Packet Interface Private Loop-Around test for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
Packet Interface Reset test (#889)			X	D
Packet Interface Private Loop-around tests (#885)		X		ND
Packet Interface Maintenance Loop-around test (#886) (a)	X	X		ND
Packet Interface Memory Checksum test (#884)		X		ND
Packet Interface Error Counter Read and Clear test (#887)	X	X		ND
Packet Interface Active-Standby Peer Link test (#888) (b)	X	X		ND

1. D = Destructive; ND = Nondestructive

Notes:

a. This test only runs on an active IPSI circuit pack's Packet Interface.

b. This test only runs on a standby IPSI circuit pack's Packet Interface.

Memory Checksum Test (#884)

This test involves sending a message to the Packet Interface circuit to run private non-destructive memory checksum tests on the firmware text residing in Boot PROM and FLASH memory. If the test fails during background testing, the IPSI circuit pack remains operational until an executed reset. Then, the initialization firmware fails and puts the IPSI circuit pack in an out-of-service state.

Table 8-509. Test #884 Memory Checksum Test

Error Code	Test Result	Description / Recommendation
1006, 1137	ABORT	Since the IPSI's Packet Interface circuit is out of service, normal maintenance tests do not run on the IPSI circuit pack. 1. Enter the **reset packet-interface *Uc*** command to reset the Packet Interface circuit. For further action, see the repair procedures in Table 8-509 on page 8-1256 for the Packet Interface Reset test (#889).
1334	ABORT	The Packet Interface command queue is full. This should be a temporary condition caused by a high rate of commands being sent to a Packet Interface. Continued operation with a full command queue would cause a system WARM restart that may escalate to more severe restart levels. 1. Retry the command at 10-second intervals up to 5 times.
1335	ABORT	Internal IPSI error. The Packet Interface is on the standby IPSI, so this test is not allowed to execute. 1. To run this test on the standby Packet Interface, enter **set ipserver-interface *Uc*** to activate it.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.
2500	ABORT	Internal system error 1. Retry the command.
	NO BOARD	The IPSI circuit pack's Packet Interface circuit is assigned, but is not detected as being physically present. 1. If the IPSI circuit pack is present, replace it. 2. If not, insert a TN2312AP IPSI circuit pack in the assigned slot, and run the test again.

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Table 8-509. Test #884 Memory Checksum Test — *Continued*

Error Code	Test Result	Description / Recommendation
1	FAIL	The Boot PROM memory checksum test failed. The circuit pack may still be operational. 1. Retry the command. 2. The same error code occurs: a. If this is a duplex-reliability system, replace the circuit pack at a time that would cause the least disruption of service. The circuit pack is still functional but should be replaced since it may not operate after a system reboot and it will enter a fatal fault state if it is reset for other reasons. b. If this is a high- or critical-reliability system and if the Packet Interface is on the standby IPSI, replace that circuit pack. c. If this is a high- or critical-reliability system and if the Packet Interface circuit is on the active IPSI, enter **set ipserver-interface** to perform a planned IPSI interchange.
2	FAIL	The Flash memory checksum test failed. The circuit pack may still be operational, but will fail if a reset is executed. 1. Retry the command. 2. If the same error code occurs: a. If this is a duplex-reliability system, replace the circuit pack at a time that would cause the least disruption of service. The circuit pack is still functional but should be replaced since it may not operate after a system reboot and it will enter a fatal fault state if it is reset for other reasons. b. If this is a high- or critical-reliability system and if the Packet Interface circuit is on the standby IPSI, replace that circuit pack. c. If this is a high- or critical-reliability system and if the Packet Interface circuit is on the active IPSI, enter **set ipserver-interface** to perform a planned IPSI interchange.
3	FAIL	The Boot PROM memory Checksum test and the FLash memory checksum test have both failed. Follow the steps listed for FAIL Error Codes 1 and 2.
	PASS	The circuit pack's firmware is in a proper state. If problems are still reported on the circuit pack, check for errors on the Private Loop-around test (#885) and Maintenance Loop-Around test (#886).

Private Loop-around Tests (#885)

This test requests the Packet Interface circuit to execute its two private loop-around tests: Level-2 Loop Around, and Broadcast Path Loop Around. These tests verify the health of the circuit pack's packet-bus interface, as well as the translation RAM, inward and outward bound data paths, parity indications and CRC calculations.

- Level-2 (LAP-D) Link Loop Around

  LAP-D is a link level protocol that is used for all system links. This test verifies the health of the processing of these links.

- Broadcast Link Loop Around

  Each ISDN-BRI port has two associated broadcast signaling links, one for call control and one for maintenance and management. Since these links have separate routing circuitry from the Level-2 Loop Around, this test forces a CRC error to verify the CRC hardware associated with the broadcast data path.

These tests are also run as part of the reset tests. If the Level-2 Loop-Around test fails as background tests, a "fatal error" message is sent to the Packet Interface circuit's maintenance software, and the Packet Interface circuit is put in the out-of-service state. Therefore, repair procedures associated with Abort Code 1137 (out of service) would normally follow failures of the level-2 test.

Table 8-510. Test #885 Private Loop-Around Tests

Error Code	Test Result	Description / Recommendation
1006, 1137	ABORT	Packet Interface circuit is out of service, so normal maintenance tests do not run on that circuit. 1. Enter **reset packet-interface *Uc*** to reset the Packet Interface circuit. For further action, see the procedures in Table 8-509 on page 8-1256 for the Packet Interface Reset test (#889).
1334	ABORT	The Packet Interface circuit's command queue is full. This should be a temporary condition caused by a high rate of commands being sent to a Packet Interface circuit. Continued operation with a full command queue will cause a system WARM restart that may escalate to more severe restart levels. 1. Retry the command at 10-second intervals up to 5 times.
1335	ABORT	Internal IPSI error. The Packet Interface circuit is on the standby IPSI, so this test is not allowed to execute. 1. To run this test on the standby Packet Interface, enter **set ipserver-interface *Uc*** to activate it.

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Table 8-510. Test #885 Private Loop-Around Tests — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.
2500	ABORT	Internal system error 1. Retry the command.
	NO BOARD	The IPSI circuit pack's Packet Interface is assigned, but is not detected as being physically present. 1. If the IPSI circuit pack is present, replace it. 2. If not, insert a TN2312AP IPSI circuit pack in the assigned slot, and rerun the test.
1	FAIL	The Private Link Broadcast Loop-Around test failed. The circuit pack will enter a fatal fault state when this occurs and the Packet Interface maintenance software should put the circuit in a out-of-service state. Therefore by the time further action is taken, it is expected that the test will abort with ABORT code 1137 and a demand reset should be used to test the circuit pack. 1. Reset the circuit pack using the **reset packet-interface *Uc*** command. For further action, see the repair procedures in Table 8-509 on page 8-1256 for the Packet Interface Reset test (#889). 2. If the test continues to fail, replace the IPSI circuit pack.
2	FAIL	The Private Level-2 Loop-Around test failed. When this occurs, the circuit pack enters a fatal fault state, and the Packet Interface maintenance software should put the circuit out of service. Therefore, by the time further action is taken, the test should abort with ABORT code 1137, and a demand reset should be used to test the circuit pack. 1. Enter **reset packet-interface *Uc*** to reset the Packet Interface circuit. For further action, see the repair procedures in Table 8-509 on page 8-1256 for the Packet Interface Reset test (#889). 2. If the test continues to fail, replace the IPSI circuit pack.
	PASS	Every private loop-around test passed. The circuit pack is functioning properly. If the system is still unable to place then: 1. Display the error log using the command **display errors**, and check for errors on the packet bus and Maintenance/Test circuit pack. Clear those errors first. 2. Check all other circuit packs connected to the packet bus in the same cabinet. Packet-bus failures are likely to be caused by a faulty circuit pack connected to the backplane or bent pins on the back plane. See "PKT-BUS (Packet Bus)" on page 8-1230 the PKT-BUS for repair procedures.

Maintenance Loop-Around Test (#886)

This test checks whether an IPSI circuit pack's Packet Interface circuit can send and receive data correctly. It establishes a LAP-D link from the IPSI's Packet Interface circuit back to the same Packet Interface circuit, and transmits and receives test data over that testing link. While timing signals from the packet bus are used for the data transfer, the data itself is looped around on the circuit pack at the interface to the packet bus and does not get sent over the packet bus.

NOTE:
In a high- or critical-reliability system (duplicated IPSIs), this test does not run on a standby IPSI's Packet Interface circuit. However, a failure of the Maintenance Loop-Around test may have caused an IPSI interchange that reported an alarm (associated with the loop-around failure, error code 769) against standby IPSI's Packet Interface circuit. If so, and if every other Packet Interface test in **test packet-interface *Uc* long** sequence passes, enter **set ipserver-interface** to force the standby IPSI to go active. Then, enter the **test packet-interface *Uc*** command to run the Maintenance Loop-Around test, and verify that the problem has been cleared.

Table 8-511. Test #886 Maintenance Loop-Around Test

Error Code	Test Result	Description / Recommendation
1006, 1137	ABORT	Since the IPSI circuit pack's Packet Interface circuit is out of service, normal maintenance tests do not run on that circuit pack. 1. Enter **reset packet-interface *Uc*** to reset the Packet Interface circuit. For further action, see the repair procedures in Table 8-509 on page 8-1256 for the Packet Interface Reset test (#889).
1139	ABORT	The packet bus is alarmed. 1. Try to retire the alarm associated with the packet bus. Refer to the Alarm Log via the **display alarms** command. Refer to the maintenance documentation for Packet Bus maintenance for further action. 2. Retry the command when the alarm associated with the packet bus is retired.
1335	ABORT	Internal IPSI error. Since the Packet Interface circuit is on the standby IPSI, this test is not allowed to execute. 1. To run this test on the standby Packet Interface circuit, enter **set ipserver-interface *Uc*** to activate it.
1373	ABORT	Could not establish the link loop around link to run this test. 1. Retry the command at 1-minute intervals up to 3 times.

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Table 8-511. Test #886 Maintenance Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
2060	ABORT	Packet link's bus went down during maintenance loop-around test. 1. Retry the command at 1-minute intervals up to 5 times. 2. If there are errors associated with the packet bus, see "PKT-BUS (Packet Bus)".
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.
2500	ABORT	Internal system error 1. Retry the command.
	NO BOARD	The IPSI circuit pack's Packet Interface circuit is assigned but is not detected as being physically present. 1. If the IPSI circuit pack is present, replace it. 2. If not, insert a TN2312AP IPSI circuit pack in the assigned slot, and rerun the test.

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Table 8-511. Test #886 Maintenance Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
1–3	FAIL	The test failed. Either maintenance could not establish a loop-around link from the IPSI's Packet Interface circuit back to itself or could not receive data that was sent on one side of the loop-around link. 1. Issue the **test packet-interface *Uc*** command to retry the test. If the same error code is observed, background maintenance software will automatically attempt to reset the circuit pack and clear the problem. 2. Retry the command and if the test fails, replace the IPSI circuit pack. 3. If the test continues to fail after replacing the IPSI circuit pack, run the **test packet *P* long** command. If any of the tests fail, the fault may be on the packet bus. See"PKT-BUS (Packet Bus)" on page 8-1230 for recommended repair procedures. 4. If the test continues to fail after the circuit pack is replaced and with no other alarms associated with the packet bus or circuit packs connected to the packet bus, follow normal escalation procedures.
	PASS	This test passed. The IPSI circuit pack and its interface with the are functioning properly. If the system is unable to place calls on PNs served by this IPSI, then: 1. Check for packet-bus errors, and solve those errors first. 2. Check for errors in the PN where calls cannot be completed, and solve those errors. 3. Check every other circuit pack connected to the packet bus in the same cabinet. Packet-bus failures are likely to be caused by a faulty circuit pack connected to the backplane or bent pins on the back plane. 4. Check the IPSI circuit pack's Packet Interface circuit that serves this PN for errors, and resolve these errors. 5. If errors continue, escalate.

Read and Clear Board Counters (#887)

This test involves sending commands to read circuit pack error counters located on the IPSI circuit pack's Packet Interface circuit. It also verifies the message interface between the media server and the Packet Interface circuit.

This test checks different circuit pack counters depending on whether the circuit pack is on the active or standby IPSI.

Running this test on the active IPSI circuit pack's Packet Interface circuit reads and clears the Parity Error counter and FIFO Overflow counter. Those counters are not used when an IPSI's Packet Interface circuit is in standby mode.

Running this test on the standby IPSI circuit pack's Packet Interface circuit, reads but does not clear a Translation RAM counter. The Translation RAM counter is not cleared since the number of bad translations RAM locations indicates bad locations that cannot be used. For an active Packet Interface circuit, information about the number of bad Translation location is sent to maintenance software as an in-line error from the circuit pack so it is not necessary to read a counter location.

Table 8-512. Test #887 Read and Clear Board Counters

Error Code	Test Result	Description / Recommendation
1006, 1137	ABORT	The IPSI circuit pack's Packet Interface circuit is out of service, so normal maintenance tests do not run on the circuit pack. 1. Enter the **reset packet-interface *Uc*** command to reset the Packet Interface circuit. For repair procedures, see Table 8-509 on page 8-1256, the Packet Interface Reset test.
1335	ABORT	Internal IPSI error. The test is on standby IPSI's Packet Interface circuit, so this test is not allowed to execute. 1. To run this test on the standby Packet Interface circuit, enter **set ipserver-interface *Uc*** to activate it.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.
2500	ABORT	Internal system error 1. Retry the command.
	NO BOARD	The IPSI circuit pack's Packet Interface circuit is administered, but is not detected as being physically present. 1. If the IPSI circuit pack is present, replace it. 2. If not, insert a TN2312AP IPSI circuit pack in the administered slot, and rerun the test.

Continued on next page

Table 8-512. Test #887 Read and Clear Board Counters — *Continued*

Error Code	Test Result	Description / Recommendation
256, 512, 768	FAIL	The active IPSI circuit pack's Packet Interface circuit has an error counter set. The following error codes are possible: 256 (parity error), 512 (FIFO overflow), 768 (parity error and FIFO overflow error). 1. If error code 256 or 768 is reported, the IPSI's Packet Interface circuit received a parity error off the packet bus. a. Check for alarms logged against the packet bus. See ''PKT-BUS (Packet Bus)'' on page 8-1230 to clear those errors first. b. Check for alarms and errors logged against other circuit packs connected to the PN's packet bus. A list of packet circuit packs is presented in the first section of this repair procedure. Refer to the repair procedures for those circuit packs, in this manual, to clear those errors first. c. If this is a standard- or duplex-reliability system, replace the circuit pack at a time that would cause the least disruption of service. The circuit pack is still functional but should be replaced. d. If this is a high- or critical-reliability system and if the Packet Interface circuit is on the standby IPSI, replace the circuit pack. e. If this is a high- or critical-reliability system and if the Packet Interface circuit is on the active IPSI, enter **set ipserver interface** to perform a planned IPSI interchange. Replace the standby IPSI circuit pack.

Continued on next page

Table 8-512. Test #887 Read and Clear Board Counters — *Continued*

Error Code	Test Result	Description / Recommendation
256, 512, 768 (cont'd)	FAIL (cont'd)	2. If error code 512 or 768 is reported for an **active** IPSI's Packet Interface circuit, the receive FIFO in the PKT-INT has overflowed. This may indicate that additional IPSI circuit packs are required. For the current hardware configuration, only one IPSI circuit pack is allowed per PN. Escalate the problem if not corrected by the following repair steps. Retry the command after one minute if the test continues to fail. a. If this is a high- or critical-reliability system and if the Packet Interface circuit is on the active IPSI, enter **set ipserver-interface** to perform a planned IPSI interchange. Replace the standby IPSI circuit pack. b. Otherwise, replace the circuit pack at a time that would cause the least service disruption. 3. If error code 512 or 768 is reported for a **standby** IPSI's Packet Interface circuit, replace the IPSI circuit pack.
1024–1096	FAIL	The standby IPSI's Packet Interface circuit has bad Translation RAM locations. A MINOR alarm is generated when the number of bad locations is from 1 and 4. A MAJOR alarm is generated if the number of bad locations is 5 or more. The MAJOR alarm prevents a planned IPSI interchange. (A planned interchange may be administered to occur automatically every 24 hours, or it may be requested by using the **set ipserver-interface *Uc*** command.) 1. If a MAJOR alarm is associated with this error, replace the alarmed IPSI circuit pack. 2. If a MINOR alarm is associated with this error, replace the alarmed IPSI circuit pack at a time that would cause the least disruption to service.
	PASS	The media server can communicate with the IPSI circuit pack's Packet Interface circuit. 1. If problems are still reported on the circuit pack, check for failures using the Private Loop-around test (#885) and Maintenance Loop-around test (#886).

Active-Standby Peer Link Test (#888)

The Active-Standby Peer Link test is only run in a system equipped with the high- or critical-reliability configuration. It verifies that a peer link can be set up between the active and standby PKT-INTs. A peer link is a logical connection established between the packet bus and an IPSI circuit pack's Packet Interface circuit for both active and standby IPSIs. This link forwards data and control messages between the active and standby PKT-INT to prepare for a planned IPSI interchange. This test not only checks the operation of setting up a Peer Link, but it also verifies that the active and standby IPSI's Packet Interface circuits can communicate over the packet bus.

Although this test checks the functionality of both the active and standby Packet Interface circuits, the test is run against the standby Packet Interface circuit.

Table 8-513. Test #888 Active-Standby Peer Link Test

Error Code	Test Result	Description / Recommendation
1006, 1137	ABORT	An IPSI's circuit pack's Packet Interface circuit is out of service, so normal maintenance tests do not run on this circuit pack. 1. Request a Packet Interface circuit reset using the **reset packet-interface *Uc*** command. For further action, see repair procedures in Table 8-509 on page 8-1256, Packet Interface Reset test.
1139	ABORT	The packet bus is alarmed. 1. Try to retire the alarm associated with the packet bus. Enter the **display alarms** command to refer to the Alarm log. For further action, see "PKT-BUS (Packet Bus)" on page 8-1230. 2. Retry the command when the alarm associated with the packet bus is retired.
1335	ABORT	Internal IPSI error. The Packet Interface is on the standby IPSI, so this test is not allowed to execute. 1. To run this test on the standby Packet Interface, enter **set ipserver-interface *Uc*** to activate it.
1336	ABORT	Internal system error. 1. To run this test on the standby Packet Interface, enter **set ipserver-interface *Uc*** to activate it.
1337	ABORT	The test is not allowed to run since a PNC interchange is in progress. A PNC interchange may have been initiated using the **reset pnc interchange** command or as part of a recovery action. 1. Wait 3 minutes and retry the command.

Continued on next page

Table 8-513. Test #888 Active-Standby Peer Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.
2500	ABORT	Internal system error 1. Retry the command.
	NO BOARD	The IPSI circuit pack's Packet Interface circuit is assigned, but is not detected as being physically present. 1. If the IPSI circuit pack is present, replace it. 2. If not, insert a TN2312AP IPSI circuit pack in the assigned slot, and rerun the test.
1	FAIL	Setting up peer links between the active and standby IPSI circuit pack's Packet Interface circuits failed. 1. Use the **display alarms** command to display active alarms. 2. If errors related to the packet bus exist, see ''PKT-BUS (Packet Bus)'' on page 8-1230 to clear those problems first. 3. Retry the test command after a 1-minute delay. 4. If the test continues to fail, replace the standby IPSI circuit pack.

Reset Test (#889)

The reset action initializes the Packet Interface firmware on the IPSI circuit pack and runs a comprehensive set of diagnostic tests.

The demand reset action will abort if the specified IPSI circuit pack's Packet Interface is in the active in-service state.

An IPSI circuit pack's Packet Interface is put in the out-of-service state automatically if it has been reset 3 times by background maintenance within the last 15 minutes, independent of the results of the reset action.

If this is a high- or critical-reliability system and if the Packet Interface is on the standby IPSI, the demand reset action will run, independent of the service state.

Table 8-514. Test #889 Reset Test

Error Code	Test Result	Description / Recommendation
1334	ABORT	The Packet Interface circuit's command queue is full. This should be a temporary condition caused by a high rate of commands being sent to a Packet Interface circuit. Continued operation with a full command queue would cause a system WARM restart that could escalate to more severe restart levels. 1. Retry the command at 10 second intervals up to 5 times.
1335	ABORT	Internal IPSI error. The Packet Interface circuit is on the standby IPSI, and this test is not allowed to execute. 1. If you wish to run this test on the standby Packet Interface, enter **set ipserver-interface *Uc*** to activate it.
1362	ABORT	The Reset test is not allowed to run because the Packet Interface is in service. Resetting an active IPSI circuit pack's Packet Interface while in service is not allowed since this is a destructive test. 1. Use the **status packet-interface** command to determine the service state of the Packet Interface circuit. If the circuit is out of service, try the Reset command again.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.
2500	ABORT	Internal system error 1. Retry the command.
	NO BOARD	The IPSI circuit pack's Packet Interface is assigned but is not detected as being physically present. 1. If the IPSI circuit pack is present, replace it. 2. If not, insert a TN2312AP IPSI circuit pack in the assigned slot, and rerun the test.
5001	ABORT	The TDM clock in the Processor port network has failed. 1. See ''TDM-CLK (TDM Bus Clock)'' on page 8-1604 to clear this failure.
5002	ABORT	The packet bus in the Processor port network has failed. 1. See ''PKT-BUS (Packet Bus)'' on page 8-1230 to clear this failure.
Any	FAIL	The diagnostic tests failed for the IPSI's Packet Interface failed. If the system is equipped with the high-reliability or critical-reliability configuration, the reset will run only on demand if the Packet Interface is on the standby IPSI circuit pack or if Packet Interface is in an out-of-service state on the active IPSI. 1. Retry the command **reset packet-interface**. 2. If the reset fails, replace the circuit pack.
	PASS	The IPSI's Packet Interface diagnostic software passed. The Packet Interface is put back into service automatically.

PLAT-ALM (Platform Alarms)

The PLAT-ALM is a virtual MO used by the S8700 Multi-Connect's MultiVantage software to keep track of its media server alarms. A MAJOR, MINOR, or WARNING alarm can be logged against this MO to indicate the presence of one or multiple S8700 media server alarms.

A technician who is using the SAT and finds an alarm against the PLAT-ALM MO must:

1. Log into the media server's Linux shell.
2. To see the media server's current list of alarms, execute the **almdisplay** command.
3. To clear the problems, follow the troubleshooting procedures listed there for "media server alarms".

NOTE:
After repairing the media server, use the Linux **almclear** command to manually clear every media server alarm. This action will also clear any alarms associated with the PLAT-ALM MO.

System Technician-Demanded Tests: Descriptions and Error Codes

This MO provides no on-demand tests for system technicians.

PMS-LINK (Property Management System Link)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run	Full Name of MO
PMS-LINK	MINOR	**test pms l**	PMS Link
PMS-LINK	WARNING	**test pms**	PMS Link

Property Management System (PMS) is a stand-alone computer system that environments such as hotels or hospitals use for services such as reservations, registration, messaging, housekeeping, night audit, billing, and inventory. The PMS Link provides a communications channel between the switch and the customer-owned PMS so that the PMS can interrogate the system for information related to the following features:

- Message Waiting Notification
- Controlled Restriction
- Housekeeping Status
- Check-in/Check-out
- Room Change/Room Swap

The PMS device connects to the system via a data module (PDM, MPDM, DTDM) connected to a port on a TN754 Digital Line circuit pack which is administered as a data extension. The PMS link to the processor is via a TN799 C-LAN port. For information about C-LAN connectivity, refer to ''CLAN-BD (Control LAN Circuit Pack)'' on page 8-411.

PMS Link maintenance provides a strategy for maintaining the link between the switch and a PMS device. The strategy includes a set of tests for periodic diagnosis, detection of errors during normal operation, actions for troubleshooting, and raising alarms for serious problems. PMS Link Maintenance uses a "try-and-wait" mechanism for maintaining the PMS Link. If a PMS Link is torn down due to an error, PMS Link Maintenance attempts to bring up the link immediately. If the Link Setup fails, PMS Link Maintenance will wait for five minutes before the next retry. If the number of retries reaches a threshold (12), a Minor alarm is raised for service attention.

PMS Link Maintenance does not cover the maintenance of the elements composing the PMS physical link (the external PMS device, Data Module (PDM/MPDM/DTDM), Digital Line Port of a TN754 Digital Line circuit pack, ADU, or Data Line Port of TN726B Data Line circuit pack). If PMS Link Maintenance cannot restore the PMS Link, then the maintenance tests of these individual components of the PMS Link must be executed to diagnose faults. If the **test pms-link** command fails, no alarm will be generated.

The **list pms-down** command lists every meaningful event to the PMS that occurred while the link between the switch and the PMS was down. For example, any room status codes entered by hotel housekeeping staff during a time of PMS outage would be shown in this report.

Procedures for Restoring the PMS Link

1. Determine the status of the PMS Link.

   Enter **status pms** command, and make sure that the PMS Link is not busied out for maintenance. If the link is "down," then continue with the next step.

2. Where does the PMS Link connect?

   Enter **display system hospitality**, and find out the destinations of the PMS Link.

3. Determine the status of the data extension.

   Enter **status data *extension*** command, and verify whether the data extension is in the in-service/idle state. If the data extension is **not** available, then look for the extension number in `Alt Name` field of Hardware Error Log. See "XXX-BD (Common Port Circuit Pack)" on page 8-1872 for resolutions.

4. Is the external PMS device available?

   Make sure that the PMS device is ON-LINE and ready for service. Check the physical connectivity between Data Module and the PMS device.

5. If the problem is not found in the above steps, check the C-LAN board for any problems. For a description about the C-LAN board and its connectivity, refer to "CLAN-BD (Control LAN Circuit Pack)" on page 8-411.

When restoring the PMS link, it is necessary to execute maintenance test on different objects that comprise the PMS link. It is recommended that you busyout the PMS link before trying to restore the link. When the PMS Link is busied out, every PMS Link maintenance action is deactivated, and interference with tests of other MOs is prevented.

Hardware Error Log Entries and Test to Clear Values

Table 8-515. PMS Link Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test pms sh r 1**
18 (a)	0	**busyout pms-link**	WARNING	OFF	**release pms-link**
257 (b)	Any	Link Retry test (#215)	MINOR WARNING[2]	OFF	**test pms-link l**
513 (c)	Any	None			**test pms-link**
769 (d)	Any	None			
1025 (e)	40–49	None			
1281 (f)	10–19	None			
1537 (g)	N0–N9	None			
1793 (h)	Any	None			**test pms-link**
2049 (i)	Any	None			
2305 (j)	50–59	None			**release pms-link**, or **test pms-link**
2561 (k)	Any	None			**test pms-link**
2817 (l)	100–109 200–209 300–309	None			
3073 (m)	70–79	None			
3841 (n)	20–29	None			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. Minor alarms on this MO may be down graded to Warning alarms based o the value in the **set options** command.

Notes:

a. The PMS Link has been busied out with the **busyout pms-link** command. The link is torn down. Enter the **release pms-link** command to restore the link.

b. The Link Retry test (#215) fails. An error was detected when setting up the link. Refer to the *Procedures for Restoring the PMS Link* above.

c. The PMS physical link is down for one of the following reasons:

   - Cable to the PMS device is disconnected.
   - The PMS device is powered off.
   - The data extension to which the PMS device connects has been busied out.

   Check the connectivity of wire and cable among wall jacket, data module, and the PMS device. Enter **status data *extension*** and verify that the data extension of the PMS device is in the in-service/idle state. If the data extension is not available, then see ''Procedures for Restoring the PMS Link'' on page 8-1271.

d. There has been no communication between the switch and the PMS for a period of time specified in "system hospitality" administration. The PMS Link is torn down. To clear this error, see ''Procedures for Restoring the PMS Link'' on page 8-1271.

e. The link was taken down because the switch could not receive an incoming message from the PMS. The message from the PMS repeatedly had corrupted data or the switch received requests for acknowledgment but never received a message to be processed. If this error type occurs frequently (more than once a month), advise the customer to call the vendor of the PMS to check out the PMS device. Once the PMS Link is successfully established, this error disappears from the Hardware Error Log.

f. The link was taken down because the switch could not send an outgoing message. The message, which was sent but not acknowledged, was flushed. If this error type occurs frequently (more than once a month), advise the customer to call the vendor of the PMS to check out the PMS device. Once the PMS Link is successfully established, this error disappears from the Hardware Error Log.

g. The PMS has been busied out for maintenance at the request of the PMS. The PMS Link is torn down. The reason code (N), if present, is that supplied by the PMS in the request message. If this error type recurs frequently (that is, more than once a month), advise the customer to call the vendor of the PMS to check out the PMS device. Once the PMS Link is successfully established, this error disappears from the Hardware Error Log. No alarm is raised against this error.

h. Due to either heavy call traffic, or the PMS protocol message rate being faster than the PMS/PBX protocol specifications allow, the PMS Link is torn down. PMS Link maintenance software will wait for five minutes before attempting to set up the link again. If this error type occurs frequently (more than once a month), advise the customer to call the vendor of the PMS to check out the PMS device. Once the PMS Link is successfully established, this error disappears from the Hardware Error Log. The PMS should be checked for adherence to message rate defined in the PMS/PBX protocol specifications. No alarm is raised against this error.

i. The attempt to swap the database between PBX and PMS failed three times consecutively due to excessive PMS/PBX protocol violations, buffer overflows, or PMS Link outages. The PMS Link is NOT torn down. If this error type occurs frequently (more than once a month), advise the customer to call the vendor of the PMS to check out the PMS device. Once the PMS Link is successfully established, this error disappears from the Hardware Error Log. No alarm is raised against this error.

j. The PMS Link has been busied out with the **busyout pms-link** command or has been brought down with the **test pms-link long** command. The PMS Link is torn down, and PMS Link maintenance will stop attempting to reestablish the link in the case where the **busyout pms-link** command has been used. When the **test pms-link long** command has been used, PMS Link maintenance will continue to try to reset the link. To restore the PMS Link after use of the **busyout pms-link** command, issue the **release pms-link** command. To restore the PMS Link after use of the **test pms-link long** command, issue the **test pms-link** command.

k. The PMS Link is physically established, but the protocol has not been started by the PMS before the protocol timer expires. The PMS Link is NOT torn down. If this error type occurs frequently (more than once a month), advise the customer to call the vendor of the PMS to check out the PMS device. Once the PMS Link is successfully established, this error disappears from the Hardware Error Log. The PMS should be checked to make sure that it will attempt to start the protocol according to the PMS/PBX protocol specifications. No alarm is raised against this error.

l. For Error Type 2817 look for the following AUX data:

10x	The PMS violated the application protocol. The first message after a request to initiate a database exchange was not the start of a database exchange. The message is processed. If this error type with this aux data value occurs frequently (more than once a month), advise the customer to call the vendor of the PMS to check out the PMS device. Once the PMS Link is successfully established, this error disappears from the Hardware Error Log.
20x	The PMS violated the application protocol. The start of a database exchange was received in a state in which it was not expected. The message is ignored. If this error type with this Aux data value occurs frequently (more than once a month), advise the customer to call the vendor of the PMS to check out the PMS device. Once the PMS Link is successfully established, this error disappears from the Hardware Error Log.
30x	The PMS violated the application protocol. The end of a database exchange was received when no exchange was in progress. The message is ignored. If this error type with this Aux Data value occurs frequently (more than once a month), advise the customer to call the vendor of the PMS to check out the PMS device. Once the PMS Link is successfully established, this error disappears from the Hardware Error Log. No alarm is raised against this error.

The PMS should be assessed for adherence to the PMS/PBX protocol specifications.

m. The link was taken down by the switch because the threshold for application protocol violations has been exceeded by the PMS. The protocol never started and messages were received and/or messages were received in a state in which they were not expected. (Refer to Error Type 2817 for recommended strategy.)

n. Link was taken down by the switch because the threshold for link protocol violations has been exceeded by the PMS. PMS is sending “garbage” to the switch.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below. For example, by clearing error codes associated with the Link Tear Down test (#213), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Link Tear Down test (#213)		X	D
Link Retry test (#215)	X	X	ND

1. D = Destructive; ND = Nondestructive

Link Tear Down Test (#213)

This test is destructive.

This test disconnects the existing link between the system and the external PMS device. If the link has been disconnected already, then this test just returns "PASS." Every resource allocated for a PMS Link is released after this test.

Table 8-516. Test #213 Link Tear Down Test

Error Code	Test Result	Description / Recommendation
40 50	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
1010	ABORT	The PMS Link has been busied out and placed in the out-of-service state. 1. Enter **release pms-link** command to release the PMS Link from busyout state. 2. Retry **test pms long** command to execute the test.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	The PMS Link is torn down.

Link Retry Test (#215)

This test sends a message to the PMS software process to make a data call to the extension where the PMS device connects. If the PMS Link is already up, then this test passes without making any data call.

Table 8-517. Test #215 Link Retry Test

Error Code	Test Result	Description / Recommendation
10, 20	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
30	ABORT	Internal system error. 1. Refer back to ''Procedures for Restoring the PMS Link'' on page 8-1271 for resolution.
1010	ABORT	The PMS Link has been busied out and placed in the out-of-service state. 1. Enter **release pms-link** command to release the PMS Link from busyout state. 2. Retry **test pms** command to execute the test.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The PMS Link CANNOT be established. 1. Refer back to ''Procedures for Restoring the PMS Link'' on page 8-1271 for restoring the PMS Link.
	PASS	The PMS Link is up.

PMS-PRNT/JNL-PRNT (PMS Printer Link)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run	Full Name of MO
PMS-PRNT/JNL-PRNT	MINOR	**test journal [pms-log | wakeup-log] long**	PMS Printer/ Journal Printer
PMS-PRNT/JNL-PRNT	WARNING	**test journal [pms-log | wakeup-log]**	PMS Printer/ Journal Printer

A journal printer is a printer to which Emergency Access to Attendant, Wakeup and Property Management System (PMS) events are printed as they occur. The PMS-log printer is used as a backup of the PMS output device to print an audit trail of every PMS transaction and Housekeeping Status Change event when the PMS Printer Link is not available. There may be one or two journal printers. If there is one, every event is printed there. If there are 2, then emergency access, wakeup events, and scheduled reports are printed at one printer (JNL-PRNT), and PMS events are printed at the other (PMS-PRNT).

The scheduled report printer is where summaries of daily wakeup activity and emergency access activity are printed. If the customer requests a summary report, the report will be printed exactly once per day.

The distinction between Journal and Scheduled report printers is logical rather than physical. Whether or not there are two printers, the scheduled reports are always sent to the printer that journals the wakeup and emergency access events. A scheduled report will temporarily suspend the journal activity. Upon completion of the scheduled report, journaling will be resumed after the printing of every withheld event.

The journal printer device connects to the system via a data module (PDM, MPDM, DTDM) connected to a port on a TN754 Digital Line circuit pack that is administered as a data extension. A journal printer device can also be connected through an ADU to a port on TN726B Data Line circuit pack. The journal printer's link to the processor is via a C-LAN port. For information about C-LAN connectivity, see ''CLAN-BD (Control LAN Circuit Pack)'' on page 8-411 Maintenance Service Description .

PMS/JOURNAL Printer Link Maintenance provides a strategy for maintaining the link between the system and a PMS device (an external Journal Printer device). The strategy includes a set of tests for periodic diagnosis, detection of errors during normal operation, actions for troubleshooting, and raising alarms for serious problems. PMS Printer Link Maintenance uses a try-and-wait mechanism. If a PMS Printer Link is torn down due to an error, PMS Printer Link Maintenance will try to bring the link up immediately. If the link setup fails, PMS Link Maintenance will wait for five minutes before the next trial. If the number of retries reaches a threshold (15), a Minor alarm is raised for service attention.

PMS Printer Link Maintenance does not cover the maintenance of the elements composing the journal printer physical link (for instance, the external printer device, Data Module (PDM/MPDM/DTDM), Digital Line Port or ADU and Data Line Port). If PMS Printer Link maintenance cannot restore the PMS Printer Link, then the maintenance tests of individual components of the PMS Link must be executed to diagnose faults.

The **list pms-down** command lists every meaningful event to the PMS that occurred while the link between the switch and the PMS was down. For example, any room status codes entered by hotel housekeeping staff during a time of PMS outage would be reflected in this report.

Procedures for Restoring the PMS Printer Link

1. Determine the status of the PMS Printer Link.

   Enter **status journal-printer wakeup-log | pms-log** and make sure that the journal printer link is not busied out for maintenance. If the link is down, then continue to the next step.

2. Where does the journal printer link connect?

   Enter **display system hospitality** and find out the destinations of the PMS Printer Link.

3. Determine the status of the data extension.

   Enter **status data *extension*** command and verify that the data extension is in the in-service/idle state. If the data extension is *not* available, look for the extension number in the `Alt Name` field of the Hardware Error Log. See ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872 for resolutions.

4. Is the external printer device available?

   Make sure that the printer device is ON-LINE and ready for service. Check the physical connectivity between Data Module and the printer device.

5. If the problem is not found in the above steps, check the C-LAN board for any problems. For a description of C-LAN connectivity, see ''CLAN-BD (Control LAN Circuit Pack)'' on page 8-411.

It should be noted that when restoring the PMS printer link, it is necessary to execute tests on different MOs that comprise the link; it is recommended that you busyout the PMS printer link before trying to restore the link. If the PMS printer Link is busied out, then every PMS printer Link maintenance action is deactivated, and interference with tests of other MOs is prevented.

Error Log Entries and Test to Clear Values

Table 8-518. PMS-PRNT/JNL-PRNT Link Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test journal wakeup-log | pms-log sh**
18 (a)	0	**busyout journal wakeup-log | pms-log**	WARNING	OFF	**release journal wakeup-log | pms-log**
257 (b)	Any	Link Retry test(#215)	MINOR[2] WARNING	OFF	**test journal wakeup-log | pms-log long**
513 (c)	Any				**test journal wakeup-log | pms-log**
769 (d)					

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures. Both PMS Printer and Journal Printer are administered to the same extension, and the printer is not connected. Refer to the *Procedures for Restoring the PMS Printer Link* above for resolution.
2. Minor alarms may be downgraded to Warning alarms based on the value used in the **set options** command.

Notes:

a. Craft busied out the Journal Printer Link. The link is torn down. Enter **release journal wakeup-log | pms-log** command to restore the link.

b. Link Retry test (#215) fails. Physical link cannot be set up, usually because of hardware problems such as power off or cable disconnect. See ''Procedures for Restoring the PMS Printer Link'' on page 8-1279.

c. Physical link cannot be set up, usually because of hardware problems such as power off or cable disconnect. The PMS Printer Link physical link is down due to the following causes: cable to the printer device is disconnected, the printer device is powered off, or the data extension where the printer device connects to has been busied out. Check the connectivity of wire and cable among wall jacket, data module, and the printer device. Enter **status data *extension*** and verify that the data extension of the printer device is in the in-service/idle state. If the data extension is not available, then see ''Procedures for Restoring the PMS Printer Link'' on page 8-1279.

d. Link idle timer; link comes down. This indicates that the printer device is in an off-line state, for example, paper jam or paper out. Check the printer device and act promptly to put it back to on-line state. Enter **test journal wakeup-log | pms-log** command to set up the printer link.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below. For example, by clearing error codes associated with the Link Tear Down test (#213), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Link Tear Down test (#213)		X	D
Link Retry test (#215)	X	X	ND

1. D = Destructive; ND = Nondestructive

Link Tear Down Test (#213)

This test is destructive.

This test disconnects the existing link between the system and the external printer device. If the link has been disconnected already, this test just returns PASS. Every resource allocated for a PMS Printer Link is released after this test.

Table 8-519. Test #213 Link Tear Down Test

Error Code	Test Result	Description / Recommendation
40	ABORT	Internal system error.
50	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
1010	ABORT	The link has been busied out to out-of-service. 1. Enter **release journal wakeup-log|pms-log** command to release the link from busyout state. 2. Retry **test journal wakeup-log|pms-log l** command to execute the test.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal System error. 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	The link is torn down.

Link Retry Test (#215)

This test sends a message to the journal printer management software process to make a data call to the extension where the printer device connects to. If the journal printer link is already up, this test passes without making any data call.

Table 8-520. Test #215 Link Retry Test

Error Code	Test Result	Description / Recommendation
10	ABORT	Internal system error.
20	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
30	ABORT	Internal system error. 1. See ''Procedures for Restoring the PMS Link'' on page 8-1271 for instructions.
1010	ABORT	The PMS Printer Link has been busied out to out-of-service. 1. Enter **release journal wakeup-log|pms-log** command to release the link from busyout state. 2. Retry **test journal wakeup-log|pms-log l** command to execute the test.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The link CANNOT be established. 1. See ''Procedures for Restoring the PMS Printer Link'' on page 8-1279 for instructions.
	PASS	The link is up.

PNC-DUP (PNC Duplication)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run	Full Name of MO
PNC-DUP	NA	status pnc	PNC duplication

In systems with the Critical Reliability option, the following components, which together comprise the Port Network Connectivity (PNC), are duplicated:

- Expansion Interface (EI) TN570 circuit packs in the port networks (PNs)
- Switch Node Interface (SNI) TN573 circuit packs in switch nodes
- DS1 Converter (DS1C) TN574 circuit packs for remote PN connections
- Fiber-optic cables (metallic in certain cases) connecting the above circuit packs
- DS1 facilities between the DS1Cs
- Switch Node Clock (SNC) TN572 circuit packs
- IP Server Interface (IPSI) TN2312AP circuit packs

Although not part of the PNC, Tone-Clock circuit packs are also duplicated in each PN. The PNC is available in two different configurations: direct connect, in which each port network is connected directly by fiber optic links to each other PN; and Center Stage Switch (CSS) which utilizes one or two switch nodes to interconnect the PNs. Direct connect systems can have up to two PNs. CSS systems with one switch node can have up to 15 PNs. CSS systems with three switch node can have up to 44 PNs. See the following figures.

PNC duplication architecture utilizes an active/standby duplication scheme, in which one complete set of PNC components supports call processing, while the duplicate PNC is held in reserve. All calls on the active PNC are simultaneously set up, or shadowed, on the standby PNC in order for it to be capable of instantly assuming active status when necessary, allowing for interchanges without service disruption (in the case of single faults).

The PNC-DUP MO tracks the health of the active and standby PNCs, controls planned and spontaneous interchanges, and manages related functions such as double call refresh and unrefresh, antithrashing, and so on. The main responsibility of PNC-DUP is to recover the system to full service in the event of a fault. In the event of multiple faults PNC-DUP will do its best to maximize service continuity.

PNC duplication does not introduce any additional types of hardware or hardware faults, and there are no tests associated with the PNC-DUP MO. Instead, error log entries are used to log useful information about the occurrence and causes of interchanges. This is done in order to facilitate diagnosis of problems, which can then be addressed by using the documentation for the individual MO involved.

PNC-DUP Related Commands

The following commands and their output forms are fully described in Chapter 7, ''Maintenance Commands''.

status pnc	This command displays information about the operational status of both PNCs including state of health, alarms, busyouts and locks, and so on.
reset pnc interchange	This command is used to initiate a demand PNC interchange. If the standby is healthy (state of health indexes all zero), there is no effect on service. Otherwise, calls may be dropped.
set pnc	This command is used to lock or unlock the active PNC, preventing interchanges. It does not interfere with double call setup.
busyout pnc	This removes the standby PNC from service. See also the following section on busyout of PNC components.

Busyouts and PNC-DUP

Busyout pnc puts the standby PNC in the busyout state. In this condition:

1. Double call set up is turned off.
2. The standby PNC is unrefreshed; existing duplicate call connections are removed.
3. PNC interchanges are prevented.

Upon release, interchanges are re-enabled and a global refresh of double call setup on the standby is performed.

When PNC duplication is in effect:

- An active PNC component cannot be busied-out.
- A standby PNC component can only be busied-out when the standby PNC is first busied-out.
- The standby PNC cannot be released unless all standby PNC components are released.

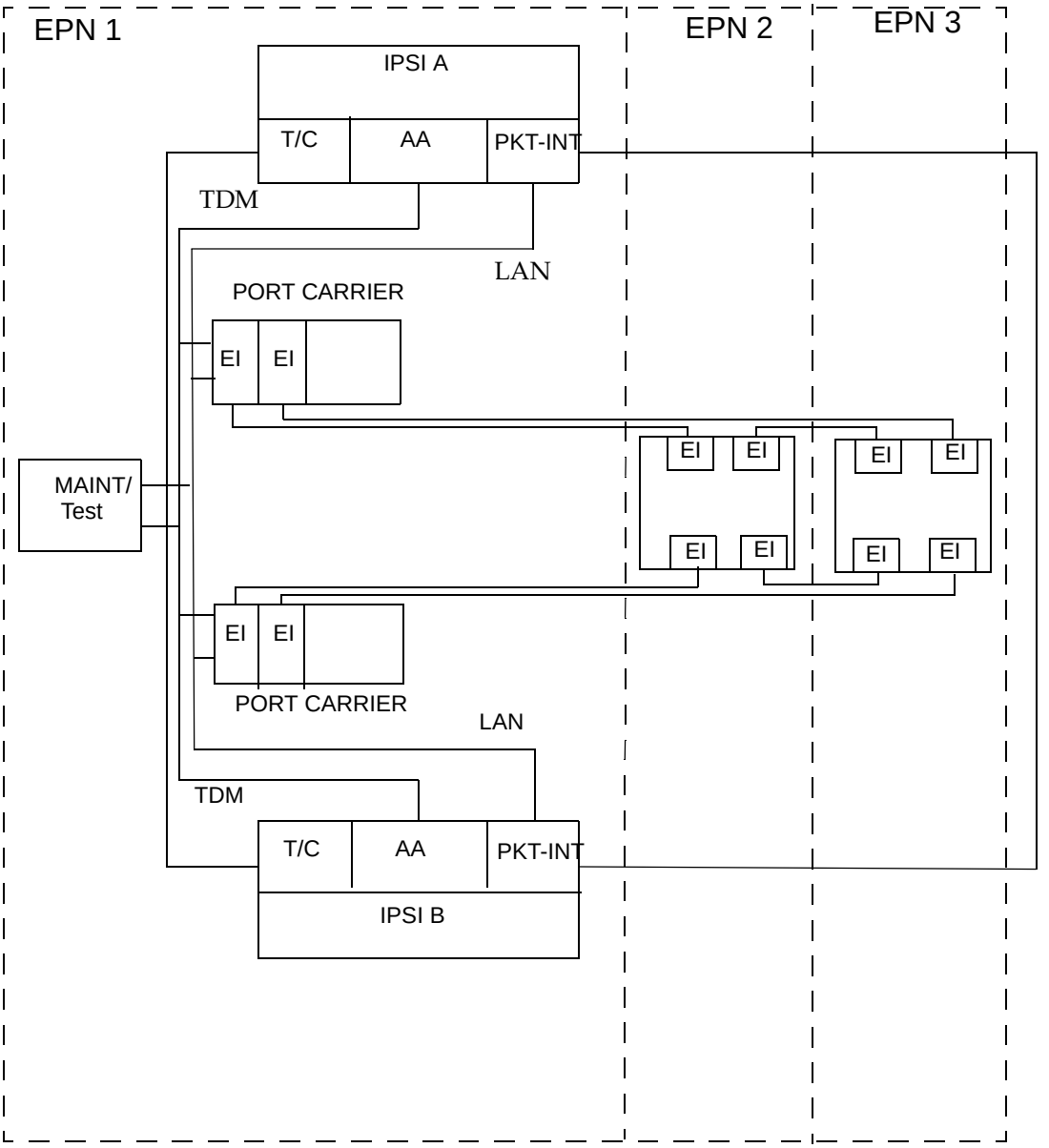

Figure 8-77. Duplicated Direct Connect PNC Connectivity

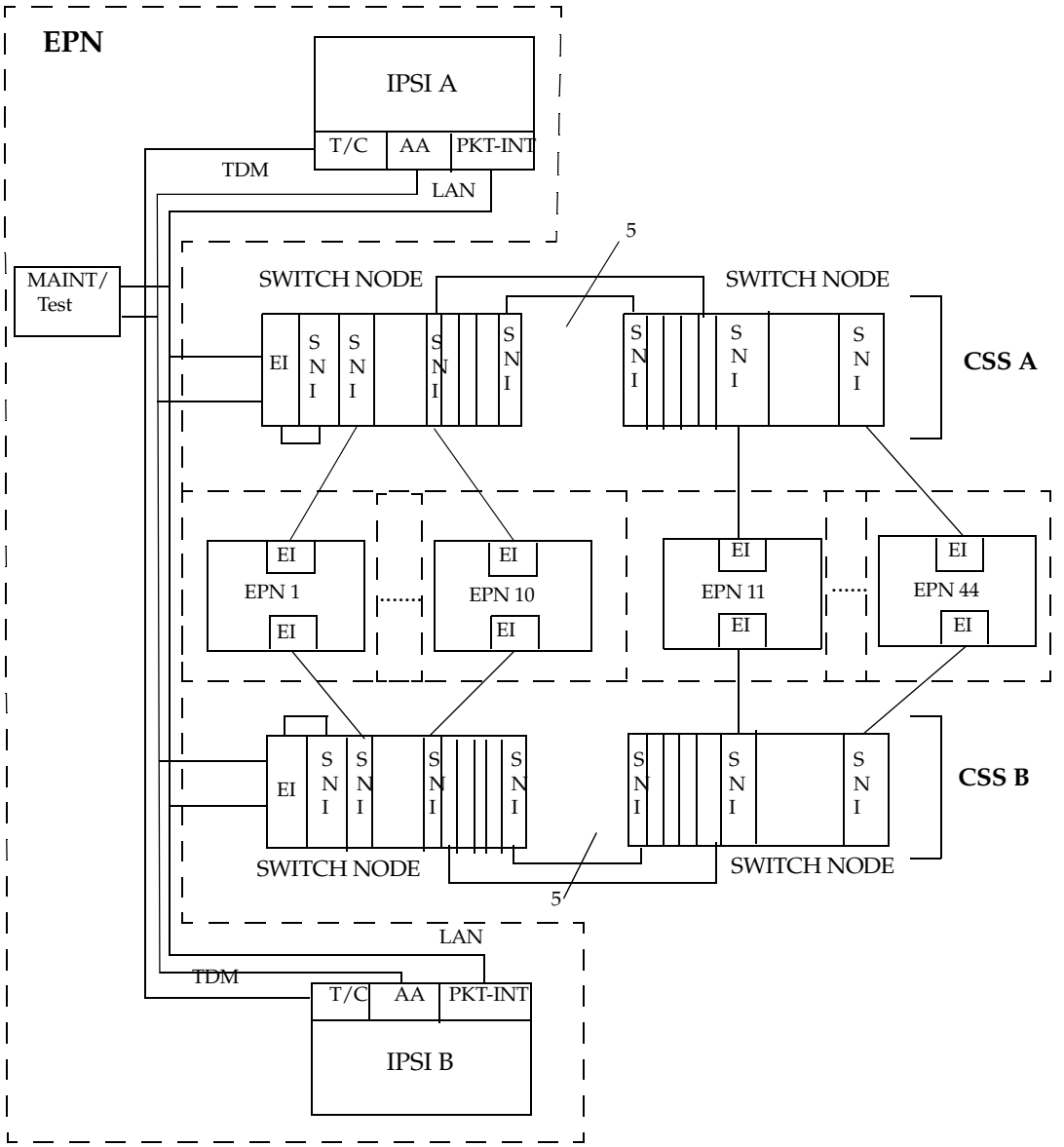

Figure 8-78. Duplicated PNC with Center Stage Switch Connectivity

Enabling and Removing PNC Duplication

NOTE:
PNC duplication requires IPSI duplication.

To Enable PNC Duplication

To enable PNC duplication perform the following sequence of steps:

1. Enable PNC-DUP on the **change system-parameters customer-options** form.
2. Fully administer duplicate fiber link connectivity. Verify by **list fibers**. For IP Duplication go to step three.
3. Fully administer IPSI duplication (**ipserver-interface duplication**). Verify by using **list ipserver-interface**.
4. Turn on PNC-DUP via the **change system-parameters duplication** form. This is note allowed if any component of either PNC (A or B) is busied out.
5. The system must insert all connectivity-related components for both standby and active PNC. For CSS configurations this takes up to 5 minutes depending upon CSS circuit pack insertion. For Direct Connect configurations this is declared complete at 5 minutes after the first appearance of the terminal login prompt.
6. The PNC-DUP initialization anti-thrashing timer must expire (this occurs 5 minutes after completion of board insertion, PNC interchange, or system reset of level 2 or higher).

To Disable PNC Duplication

To disable PNC duplication perform the following sequence of steps:

1. Verify that the A-PNC is active. A forced interchange may be required. See **reset pnc** in Chapter 8.
2. Busyout the standby PNC (B-PNC).
3. Turn off the system parameter for PNC-DUP via **change system-parameters duplication**.

   After PNC duplication has been removed, configuration audits will generate the alarm shown below and possibly others. To clear this alarm, the B-PNC fibers, circuit packs in switch node carriers (EIs, SNIs, SNCs, and DS1Cs), and switch node carriers must be removed as outlined in the following steps.

   ```
   01D    SN_CONF      5000  255
   ```

   In this case, 01D is the B-PNC switch node from which duplication was removed.

4. Remove the B-PNC fibers by removing the Endpoint Board Locations on the **change fiber** form for all fibers. For fibers using DS1Cs, remove the B-PNC DS1C Board Locations on page 3 of the **change fiber** form.
5. Remove the B-PNC circuit packs starting with the switch node carrier most distant from the media server complex. Use **change circuit pack *UUC***, page to the B-PNC carrier and remove all of the circuit packs there. Remove all circuit packs in the other B-PNC switch node carriers.

   If the Expansion Interface circuit pack associated with the PN is located in the switch node carrier closest to the media server, it cannot be removed from translation until it has been busied-out and disconnected from the carrier slot.

   When SNI, SNC, or DS1C circuit packs are removed from a B-PNC carrier, any alarms against them should be resolved.
6. Remove the B-PNC switch node carriers. Use **change cabinet *UUC*** and enter **not-used** for B-PNC carriers.

   Any alarm against the carrier such as 01D SN-CONF should be resolved. The B-PNC carriers and associated circuit packs should not be alarmed.
7. Disable PNC duplication on the **change system-parameters customer-options** form by changing "PNC Duplication" to **no**.

   If an alarm exists against any Expansion Interface circuit pack connected to a B-PNC carrier, attempt to use **test board *UUCSS* long clear** to clear the alarm.

Alterations to PNC which involve only the *addition* of fiber connectivity can be done with PNC-DUP operational. Alterations requiring the *removal* of fiber connectivity must be done with PNC-DUP removed. PNC-DUP must be removed and translations should be saved before any hardware changes are made.

Steady State LEDs

The LEDs of PNC components in a stable duplicated system should appear as follows:

- The *active* IPSIs are functioning as archangels in IPSI port networks.
- The *active* EIs in the PNs are functioning as archangels. Their LEDs flash in a pattern of 2 seconds on 200 milliseconds off (PN ***without*** an IPSI).
- The PN standby EIs amber LEDs are off (PN ***without*** an IPSI).
- The PN active EI amber LED is on solid (PN ***with*** an IPSI).
- The PN standby EI amber LED is off (PN ***with*** an IPSI).
- The SNIs on the active switch node(s) have amber LEDs on solid.
- The SNIs on the standby switch node(s) have amber LEDs off.
- Active DS1Cs amber LEDs are on solid.

- Standby DS1Cs amber LEDs are off.
- DS1C facility green LEDs are on if the corresponding facility is equipped.

PNC State of Health

PNC-DUP software monitors the health of the two PNCs as determined by their state of health (SOH) vectors, and initiates an interchange when the health of the active falls below that of the standby (unless prevented from doing so by a PNC lock, busyout, or antithrashing mechanism). Potentially service-disrupting faults which occur in PNC components are reported to PNC-DUP and incorporated in the state of health for the affected PNC. The SOHs of both PNCs are displayed on the **status pnc** form.

```
status pnc                                                  page 1 of 1

                          PORT NETWORK CONNECTIVITY


                               Duplicated? yes
                          Software Locked? no
                           Standby Busied? no
                           Direct Connect? no
                        Standby Refreshed? yes
                     Interchange Disabled? no


             A-PNC                                B-PNC

           Mode:  active                        Mode:  standby
State of Health:  functional          State of Health:  functional
 Inter PN Index:  00.00.00.00.00       Inter PN Index:  00.00.00.00.00
 Inter SN Index:  00.00                Inter SN Index:  00.00
   Major Alarms:  0                      Major Alarms:  0
   Minor Alarms:  0                      Minor Alarms:  0
 Warning Alarms:  0                    Warning Alarms:  0
   SN Locations:  01E                    SN Locations:  01D
```

Screen 8-7. Status PNC Screen with Standby PNC Fully In-Service

PNC State-of-Health Indexes

The Inter-PN and Inter-SN Indexes form the state of health vector, which is used to track and compare the states of health of both PNCs. The fields making up the indexes are two digit numbers separated by periods (.), with each field representing a different class of faults. The fault class fields are arranged in order of decreasing importance from left to right. In other words, each field in the index supersedes the following fields in determining which PNC is healthiest. A fault class drives an interchange only when all of the higher priority fault classes are equal. A zero entry indicates no faults in that class. Increasing numbers indicate increasingly higher numbers of faults present in that class.

The Inter-PN Index contains six fields (XX.XX.XX.XX.XX.XX), and the Inter-SN Index has two (XX.XX). The Inter-PN Index reports faults in connectivity between port networks and supersedes the Inter-SN Index, which reports faults in connectivity between switch nodes. (The Inter-SN Index is only meaningful for systems with a center stage switch having two switch nodes, each of which is duplicated).

The meaning of each fault class field is given in the following table. A zero entry indicates that there are no such faults reported. Higher numbers indicate increasing number of faults. All zeros indicates perfect state of health. Unless the PNCs are locked, the active PNC's state of health should always be equal to or better than the standby's. (Otherwise, the system would perform a spontaneous interchange.)

After a PNC-related alarm is cleared, the system performs a partial refresh of the standby PNC. The corresponding fault class field is not updated to reflect the improved state of health until the refresh is done. The state of health indexes will not agree with the current alarm status during this period.

Inter SN Index: FC_SNIL s11.s10 FC_SNIHW

Table 8-521. PNC State-of-Health Fault Classes

Fault Class	Priority	Description	MOs
FC_EAL	1	Number of PNs with EALs down	EXP-PN
FC_INL	2	Number of PNs with LINL, RINL, or EI-SNI neighbor link faults	EXP-PN, SN-CONF
FC_BFD[1]	3	Number of PNs with BFDL (Bearer Fault Detection Link faults	SYS-LINK
FC_HW	4	Number of PNs affected by hardware faults in a link having an EI as an endpoint (Endpoints can be determined with **list fiber-link**.)	EXP-INTF, SN-CONF, FIBER-LK, SNI-BD, DS1C-BD
FC_PER	5	Number of PNs affected by SNI peer link faults for SNIs connected to EIs	SNI-PEER
FC_DS1	6	Number of PNs affected by DS1C facility faults	DS1FAC
FC_SNIL	7	Number of inter-switch-node fibers affected by peer or neighbor link faults	SNI-PEER
FC_SNIHW	8	Number of interswitch-node fibers affected by hardware faults	SN-CONF, SNI-BD, FIBER-LK

1. BFDLs only exist in Port networks that have an IPSI. Port networks that do not have an IPSI will have the EI as Archangel and no BFDL faults.

In multinode CSS configurations FC_DS1 is considered less critical that FC_ SNINL since DS1C constraints affect only one PN and indicate restricted bandwidth. However FC_SNINL can indicate problems for all PNs on the far end switch node (the one downlink from the PN) If the DS1C problem is critical (for example, loss of all bandwidth to the affected PN) a constraint with a higher order fault class will be reported to PNC DUP.

Resolving Poor State of Health

When the SOHs for both PNCs are not all zeros (perfect health), use the following steps to identify and repair the problem.

1. Look for PNC component alarms (major or minor) for the PNC side whose SOH is not all zero. The standby PNC should be repaired first.
2. Busy-out the standby PNC.
3. Follow the appropriate diagnostic and repair procedures for the alarmed PNC components just as with a unduplicated PNC. Both the alarm and error logs should be examined to isolate the fault.
4. Verify that the related PNC SOH is restored to all zeros.
5. Release the standby PNC for busy-out.

Refresh and Unrefresh of the Standby PNC

In a fully functional PNC with healthy standby and active sides, the standby PNC has a complete set of call connections corresponding to those in the active PNC. If, however, the state of health of the standby PNC degrades, a selective unrefresh of those connections which utilize the faulted component(s) is performed. If the health of the standby PNC improves, a selective refresh of connections on the affected route is performed, so that call setup is consistent between the active PNC and the healthy parts of the standby PNC.

The `Standby Refreshed`? field on the **status pnc** form does *not* refer to the selective type of refresh. It refers only to a global refresh which is performed when:

- The system is initialized and PNC duplication is enabled.
- There has been a spontaneous PNC interchange.
- The standby PNC has been released from busy-out.
- A system reset of level 2 or higher has taken place.

The `Refreshed` field may display `yes` when in fact the standby is partially unrefreshed. An interchange into an incompletely refreshed standby will result in dropped calls. This can happen when a more severe fault occurs on the active PNC, or when **set pnc interchange** is used with the override option.

PNC Interchanges

PNC spontaneous interchanges occur when PNC duplication software determines that the SOH of the standby PNC is better than that of the active PNC. PNC-DUP executes a spontaneous interchange only when a message from a PNC component MO sends a message indicating that either a fault has occurred on the active PNC, or a fault has been resolved on the standby PNC such that the state of health of the active PNC is now lower than that of the standby.

This message will usually indicate the type and location of the failed connectivity component. A corresponding major or minor alarm is logged by the reporting MO, stimulating an alarm report.

In the less common situation when the resolution of a fault on the standby renders it more healthy than a simultaneously faulted active PNC, the message will indicate the type and location of the *improved* component.

Once the interchange completes, the failed component will be on the standby PNC. A demand interchange can be requested in the presence or absence of standby PNC faults. The following sequence of actions can be observed during a fault-free interchange:

1. The Expansion Interfaces currently acting as archangels in the PNs are deactivated as indicated by the amber LEDs going from flashing to on solid.
2. The EIs in IPSI port networks are interchanged as indicated by the new standby EI amber LED off and the new active EI amber LED on solid.
3. One by one the EIs in non-IPSI port networks are interchanged as indicated by new standby EI amber LED turning off and the new active EI amber LED flashing (2 seconds on, 200 milliseconds off). At this point the interchange is functionally complete.
4. The SNIs amber LEDs are updated. so that the SNIs on the active SN have amber LEDs on, while the standby SN's SNIs amber LEDs turn off.

Certain conditions may interfere with the normal execution of the interchange:

1. In a faulted spontaneous interchange it is possible the PN directly affected by the fault will be the last to interchange.
2. A user directly affected by the single fault instigating a PNC interchange can experience a momentary outage of voice path connectivity during the switch.
3. If faults exist on both the standby and active PNC, it is possible to have some PNs go out of service while others are returned to service.
4. The new standby SNIs amber LED my not be off due to a fault in the line of communication path to the standby SNIs. In a multi-fault interchange, LEDs on the new active SNIs may not be on for the same reason.

In any multifault situation, rely on **status pnc** to determine which is the active PNC.

PNC duplication informs Timing Synchronization maintenance when a PNC interchange has been completed and indicates which PNC is active. This will cause Synchronization to audit and insure that the primary source for synchronization of Tone-Clocks in each PN is supplied by a path associated with the active PNC.

Antithrashing and PNC Interchanges

Following a spontaneous PNC interchange, subsequent PNC interchanges are prevented for 5 minutes. This condition is indicated by a **yes** in the `Interchange Disabled?` field of the Status PNC form. After 5 minutes, the antithrashing, timer expires, interchange decisions are re-enabled, and the field displays **no**.

NOTE:
Should a catastrophic failure occur on the active PNC during the period when "Interchange Disabled?" is set to "yes" there will be no spontaneous PNC interchange.

Demand PNC interchanges also invoke anti-thrashing, but only for a period of 30 seconds. During antithrashing mode, demand interchanges are also prevented unless the override option is specified. Use of this option will cause a service disruption.

Repairs on the Standby PNC Components

CAUTION:
If there is a TDM-CLK alarm, system timing may be routed through part of the standby PNC, and circuit switched data may be affected by the following repair procedures. This can happen, for example, when a slave tone/clock circuit pack experiences a loss of signal and switches to receive timing from the standby EI. In this case TDM-CLK 2305 error will be logged, and the clock problem should be addressed first, if possible.

To repair PNC components in a duplicated PNC proceed as follows:

1. Most repairs will involve fixing a single fault on the standby PNC. Use **set pnc lock** or **busy-out pnc** to prevent an interchange into the PNC being repaired.
2. If a faulty component exists on the currently active PNC, the standby PNC is more severely faulted. Normally the standby PNC will be fully repaired first since it is the most severely impaired. To repair the active PNC, request an interchange via the **reset pnc interchange override-and-lock** command. The *override-and-lock* option ensures that no subsequent

interchange will occur during the repair of the standby PNC. The demand interchange may not be necessary if the following conditions drive a spontaneous interchange:

- The anti-thrashing period from the last interchange has expired.
- The global refresh from releasing the standby PNC has completed.

The standby PNC SOH is better than the active.

3. At this point, the faulty component will be on the standby PNC, and the PNCs are locked in their current active/standby state. Busy-out the PNC. Then fault isolation and component testing procedures for the individual PNC components can be used just as for an unduplicated PNC. Replacement of components will not disrupt operation of the active PNC.
4. Once the failed component is replaced, test the standby PNC component from the terminal to ensure the replacement is functioning properly.
5. When confident that the problem has been resolved, as indicated by a state of health with all zeros, (**status pnc**), unlock and release the pnc. Note that no further PNC interchange is required since you can test the standby PNC as thoroughly as the active.

Interactions: Media Server Resets and PNC Interchanges

- A system reset of level 1 (warm), 2 (cold2) or 4 (reboot) does not change which PNC is active. If a PNC interchange was in progress when the reset took place, the PNC interchange still goes to completion.
- If a system reset level 1 (warm) takes place during a PNC interchange, the reset is escalated to level 2 (cold2).

Fault Isolation Using Duplicated PNC

PNC duplication, can, in some cases aid in the isolation of faults. PNC interchanges can be used to help indict the faulty hardware. Following are two examples demonstrating this technique.

- There is a fault which can occur in either an IPSI port network's EI or the PKT-INT which cannot be readily attributed to one board or the other. If the packet bus transceivers on either the PKT-INT or EI fail, it will be apparent that the two boards cannot communicate, but it will not be clear which board is at fault. In this case, a planned interchange of the PNC can be used to indict one of the two boards. If the interchange cures the problem, the EI was at fault. If the interchange does not cure the problem, the PKT-INT is suspect, provided there are no PKT-BUS faults.
- A similar relationship exists for the PN Archangel (active EI) and certain TDM bus problems. If the EAA is unable to communicate with a port board over the TDM bus, either the EAA has a fault, the port board has a fault, or there is a problem with the TDM bus itself. If TDM bus maintenance tests

find no problems with the bus, then it is either the port board or the EAA. It may be simpler to replace the port board than to request a PNC interchange. However, if it is not clear which port board may be at fault, or maintenance is being performed remotely, verify that the EAA is not at fault by executing a PNC interchange. If the interchange solves the problem, then the EAA is faulty. If the problem persists after the interchange, but TDM bus maintenance finds no problem, then the port board is faulty.

Error Log Entries

Whenever a PNC interchange takes place, an error is logged against PNC-DUP with a code that conveys information about the cause of the interchange and which PNC became active. There are no alarms associated with PNC-DUP errors, but there should be an alarm against the PNC component that drove the interchange. There are no PNC-DUP test sequences, but **status pnc** will provide information regarding the status of the PNCs. The information given in the following tables will help to identify areas of the Alarm Log to be investigated to find the source the problem.

Error Code	Aux Data
00000 (a)	None
10000 – 10063 (b)	1
10100 – 10163 (c)	1
10200 – 10263 (d)	1
10300 – 10363 (e)	1
10400 – 10463 (f)	1
10500 – 10563 (g)	1
10601 – 10664 (h)	1
10701 – 10764 (i)	1
11000 – 11063 (j)	1
11100 – 11163 (k)	1
11200 – 11263 (l)	1
11300 – 11363 (m)	1
11400 – 11463 (n)	1
11601 – 11664 (o)	1
11701 – 11764 (p)	1
20000 – 20063 (q)	1
20100 – 20163 (r)	1

Error Code	Aux Data
20200 – 20263 (s)	1
20300 – 20363 (t)	1
20400 – 20463 (u)	1
20500 – 20563 (v)	1
20601 – 20664 (w)	1
20701 – 20764 (x)	1
21000 – 21063 (y)	1
21100 – 21163 (z)	1
21200 – 21263 (aa)	1
21300 – 21363 (ab)	1
21400 – 21463 (ac)	1
21601 – 21664 (ad)	1
21701 – 21764 (ae)	1
51000 (af)	1
52000 (ag)	1
53000 (ah)	1
60801 (ai)	1
60800 (aj)	1

1. The Aux Data indicates which PNC became active after the PNC interchange: “0” denotes PNC-A; “1” denotes PNC-B.

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
18	None	**busy PNC-DUP**	WARNING	ON	**release pnc-dup**

Notes:

a. An error took place in generating the error code.

b. A spontaneous PNC interchange took place in response to the retiring of an alarm on the A-PNC associated with fault class FC_EAL. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (10003 points to port network 4) **List config port-network** gives the cabinet number associated with a port network.

c. A spontaneous PNC interchange took place in response to the retiring of an alarm on the A-PNC associated with fault class FC_INL. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (10003 points to port network 4) **List config port-network** gives the cabinet number associated with a port network.

d. A spontaneous PNC interchange took place in response to the retiring of an alarm on the A-PNC associated with fault class FC_HW. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (10203 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

e. A spontaneous PNC interchange took place in response to the retiring of an alarm on the A-PNC associated with fault class FC_PER. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (10303 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

f. A spontaneous PNC interchange took place in response to the retiring of an alarm on the A-PNC associated with fault class FC_DS1. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (10403 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

g. A spontaneous PNC interchange took place in response to the retiring of an alarm on the A-PNC associated with fault class FC_BFD. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (10203 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

h. A spontaneous PNC interchange took place in response to the retiring of an alarm on the A-PNC associated with fault class FC_SNIL. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. The last two digits of the error code indicate the fiber-link number (01-64) of the fiber that reported the retired alarm. **List fiber-link** gives the location of the fiber.

i. A spontaneous PNC interchange took place in response to the retiring of an alarm on the A-PNC associated with fault class FC_SNIHW. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. The last two digits of the error code indicate the fiber-link number (01-64) of the fiber that reported the retired alarm. **List fiber-link** gives the location of the fiber.

j. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the A-PNC associated with fault class FC_EAL. This indicates that one or more Expansion Archangel Links are down. Investigate any EXP-PN alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the alarm. (11003 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

k. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the A-PNC associated with fault class FC_INL. This indicates that one or more neighbor or indirect neighbor links with an EI as an endpoint have experienced faults. Investigate any alarms against EXP-PN and SN-CONF. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the alarm. (11103 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

l. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the A-PNC associated with fault class FC_HW. This indicates that one or more neighbor or indirect neighbor links with an EI as an endpoint have experienced faults. Investigate any alarms against EXP-PN and SN-CONF. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the alarm. (11203 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

m. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the A-PNC associated with fault class FC_ PER. This indicates one or more faults on peer links that connect SNIs to EIs. Investigate any alarms against SNI-PEER. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the alarm. (11303 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

n. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the A-PNC associated with fault class FC_ DS1. This indicates faults on one or more DS1C facilities. Investigate any alarms against DS1-FAC. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the alarm. (11403 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

o. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the A-PNC associated with fault class FC_ SNIL. This indicates one or more faults on peer or neighbor links between SNIs on different switch nodes. Investigate any alarms against SNI-PEER. The last two digits of the error code indicate the fiber-link number (01-64) of the fiber that reported the retired alarm. **List fiber-link** gives the location of the fiber.

p. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the A-PNC associated with fault class FC_ SNIHW. This indicates one or more faults on hardware connecting SNIs on different switch nodes. Investigate any alarms against SN-CONF, SNI-BD, FIBER-LK. The last two digits of the error code indicate the fiber-link number (01-64) of the fiber that reported the retired alarm. **List fiber-link** gives the location of the fiber.

q. A spontaneous PNC interchange took place in response to the retiring of an alarm on the B-PNC associated with fault class FC_EAL. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (20003 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

r. A spontaneous PNC interchange took place in response to the retiring of an alarm on the B-PNC associated with fault class FC_INL. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (20103 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

s. A spontaneous PNC interchange took place in response to the retiring of an alarm on the B-PNC associated with fault class FC_HW. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (20203 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

t. A spontaneous PNC interchange took place in response to the retiring of an alarm on the B-PNC associated with fault class FC_PER. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (20303 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

u. A spontaneous PNC interchange took place in response to the retiring of an alarm on the B-PNC associated with fault class FC_DS1. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (20403 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

v. A spontaneous PNC interchange took place in response to the retiring of an alarm on the B-PNC associated with fault class FC_BFD. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the retired alarm. (20203 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

w. A spontaneous PNC interchange took place in response to the retiring of an alarm on the B-PNC associated with fault class FC_SNIL. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. The last two digits of the error code indicate the fiber-link number (01-27) of the fiber that reported the retired alarm. **List fiber-link** gives the location of the fiber.

x. A spontaneous PNC interchange took place in response to the retiring of an alarm on the B-PNC associated with fault class FC_SNIHW. Use **status pnc** to look at the state of health indexes for the PNCs, and investigate any associated alarms. The last two digits of the error code indicate the fiber-link number (01-27) of the fiber that reported the retired alarm. **List fiber-link** gives the location of the fiber.

y. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the B-PNC associated with fault class FC_EAL. This indicates that one or more Expansion Archangel Links are down. Investigate any EXP-PN alarms. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the alarm. (21003 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

z. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the B-PNC associated with fault class FC_ INL. This indicates that one or more neighbor or indirect neighbor links with an EI as an endpoint have experienced faults. Investigate any alarms against EXP-PN and SN-CONF. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the alarm. (21103 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

aa. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the B-PNC associated with fault class FC_ HW. This indicates that one or more neighbor or indirect neighbor links with an EI as an endpoint have experienced faults. Investigate any alarms against EXP-PN and SN-CONF. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the alarm. (21203 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

ab. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the B-PNC associated with fault class FC_ PER. This indicates faults on peer links that connect SNIs to EIs. Investigate any alarms against SNI-PEER. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the alarm. (21303 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

ac. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the B-PNC associated with fault class FC_ DS1. This indicates faults on one or more DS1C facilities. Investigate any alarms against DS1-FAC. Adding 1 to the last two digits of the error code gives the PN number of the port network that reported the alarm. (21403 points to port network 4.) **List config port-network** gives the cabinet number associated with a port network.

ad. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the B-PNC associated with fault class FC_ SNIL. This indicates faults on peer or neighbor links between SNIs on different switch nodes. Investigate any alarms against SNI-PEER. The last two digits of the error code indicate the fiber-link number (01-27) of the fiber that reported the alarm. **List fiber-link** gives the location of the fiber.

ae. A spontaneous PNC interchange took place in response to the occurrence of a major or minor alarm on the B-PNC associated with fault class FC_ SNIHW. This indicates faults on hardware connecting SNIs on different switch nodes. Investigate any alarms against SN-CONF, SNI-BD, FIBER-LK. The last two digits of the error code indicate the fiber-link number (01-27) of the fiber that reported the alarm. **List fiber-link** gives the location of the fiber.

af. A spontaneous PNC interchange took place upon the expiration of the anti-thrashing timer.

ag. A spontaneous PNC interchange took place upon the unlocking of the PNCs with the **set pnc unlock** command.

ah. A spontaneous PNC interchange took place upon the completion of a global refresh of the standby.

ai. A demand interchange was executed with the **reset pnc interchange** command.

aj. A demand interchange was executed with the **reset pnc interchange** command using the **override-and-lock** option.

POWER

Battery and Charger for AC-Powered Systems

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run[1]	Full Name of MO
POWER	MINOR	**test environment *UU***	Battery and Battery Charger

1. *UU* is the cabinet number indicated in the PORT field from the Alarm or Error Log.

S8700 Multi-Connect systems support two different cabinet types: multicarrier and single carrier. Single carrier cabinets are used only for PNs. Both cabinet types may be powered by either AC or DC external power source. Environmental maintenance differs according to cabinet type and external power supply.

AC-powered multicarrier cabinets can be equipped with rechargeable batteries that provide backup power during short power outages. Battery backup is optional on cabinets powered by an uninterruptible power supply (UPS), and is required on those that are not. DC-powered cabinets and single-carrier cabinets do not have battery backup, and this MO is not valid for those cabinets.

The battery backup for the J58890CH unit consists of one battery assembly and charger. The battery backup for the J58890CE unit consists of three 48V batteries and a battery charger. Each cabinet so equipped has its own independent battery backup unit. When power to the cabinet is interrupted, a warning alarm is logged against AC-POWER and the system draws power from the backup batteries. This is known as Nominal Power Holdover (NPH). If power is restored before the NPH time expires, the alarm is resolved. If power does not return, error logs are saved to the Mass Storage System (MSS). The nominal power holdover provided is as follows:

PN cabinet	Holdover
All carriers	15 seconds
Expansion control carrier	10 minutes

When AC power is restored after an outage, the battery charger fully recharges the batteries within 30 hours.

In a multicarrier-cabinet system, the Battery and Battery Charger MO represents the battery charger and the battery which are located in the lower left corner of the cabinet. Should anything go wrong with the battery or charger, they must be replaced using the procedure described in ''Replacing the Battery and Battery Charger (J58890CE)'' below. The system will detect one of the following three problems with the batteries or charger:

- Reserve Fault: the charger has detected a problem within itself or the batteries and has notified the system.
- High Charge Rate: the batteries have been charging at a high charge rate for an excessively long period of time. This indicates that there is a short in the batteries or the charger.
- Prepare to Disconnect (Low Battery): the batteries are in danger of being drained to a point where the batteries would be damaged. This warning often occurs after multiple power failures.

  The batteries take 30 hours to fully charge after being drained. A fully charged battery pack should bridge two power failures without causing a low battery warning to occur.

Replacing the Battery and Battery Charger (J58890CE)

1. Move the power switch on the battery charger to OFF.

   WARNING:
   Always turn off the battery charger before replacing the batteries. Failure to do so will result in damage to the 397C battery charger.

2. Disconnect the cord from the outlet on the front of the battery charger.
3. Remove the screw at the top left of the cover and open the cover to access the charger.
4. Check the battery voltages at the test points. Check all 3 batteries wired in series (the voltage should be 144 Volts, 3 X 48 Volts = 144 Volts).

   NOTE:
   An ordinary voltmeter can be used to check battery voltages at the test points, but it may not produce valid results. If the battery voltage readings are below 48 Volts (the voltages at test points should read 144 Volts, 3 x 48 Volts = 144 Volts), the battery is probably defective. However, a normal voltage reading does not necessarily mean the battery is good; under load, a defective battery with a normal reading on the voltmeter may discharge rapidly.

5. Check the battery dates and the preventive maintenance log. Replace the batteries if they are more than 2.5 years old.

   NOTE:
   If any defective batteries are found, replace all of them. Batteries are ordered in sets of three and should be replaced as such.

6. If no defective batteries are found, replace the entire charger.
7. Close the cover and secure it with the screw.
8. Reconnect the cord and move the power switch to ON.

Replacing the Battery Assembly (J58890CH)

The batteries are replaced as an entire assembly.

1. Check the battery voltages at the test points on the BIU (Battery Interface Unit).
2. Remove the BIU from the power distribution unit.
3. Disconnect the battery plug from the power distribution unit (J20).
4. Remove the battery assembly from the rear of the cabinet.
5. Install the new battery assembly in the reverse order.
6. Plug the BIU back into the power distribution unit.

Error Log Entries and Test to Clear Values

Table 8-522. Battery and Battery Charger Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test environment *UU* sh r 1**
1	Any	Battery and Battery Charger Query test (#5) (error code 8)	MINOR	ON	**test environment *UU* s r 1**
257	Any	Battery and Battery Charger Query test (#5) (error code 4)	MINOR	ON	**test environment *UU* s r 1**
769	Any	Battery and Battery Charger Query test (#5) (error code 2)	MINOR	ON	**test environment *UU* s r 1**
3840 (a)	1005 or 1028	Associated Battery and Battery Charger Query test (#5)			**test environment *UU* s r 1**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Note:

a. Check to see if the battery charger is connected. If the cabinet is powered by a UPS, there is no battery backup, and this error can be ignored.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the Battery and Battery Charger Query test (#5), you may also clear errors generated from other tests in the testing sequence.

Table 8-523. System Technician-Demanded Tests: POWER

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Battery and Battery Charger Query test (#5)	X	X	ND
AC Power Query test (#78) (a)	X	X	ND
Power Unit Query test (carrier E) (#127) (b)	X	X	ND
Power Unit Query test (carrier D) (#127) (b)	X	X	ND
Power Unit Query test (carrier A) (#127) (b)	X	X	ND
Power Unit Query test (carrier B) (#127) (b)	X	X	ND
Power Unit Query test (carrier C) (#127) (b)	X	X	ND
Emergency Transfer Query test (#124) (c)	X	X	ND
Cabinet Sensors Query test (#122) (d)	X	X	ND
External Alarm Lead Query test (#120) (e)	X	X	ND
Analog Ring Generator Initialization test (#117) (f)	X	X	ND
Analog Ring Generator Query test (#118) (f)	X	X	ND

1. D = Destructive, ND = Nondestructive

Notes:

a. See ''AC-POWER'' on page 8-4 for a description of this test.

b. See ''CARR-POW (Carrier Power Supply)'' on page 8-393 for a description of this test.

c. See EMG-XFER (Emergency Transfer) for a description of this test.

d. See ''CABINET (Cabinet Sensors)'' on page 8-383 for a description of this test.

e. See EXT-DEV (External Alarm) for a description of this test.

f. See ''RING-GEN'' on page 8-1357 for a description of this test.

Battery and Battery Charger Query Test (#5)

This test queries the PN's Maintenance circuit pack for the status of the battery pack and battery charger, and reports the result. During this test, the status LED on the battery charger is lit and extinguished if the status of the battery charger is reported as normal. This event is a result of checking that the battery charger is connected.

Table 8-524. Test #5 Battery and Battery Charger Query Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1005	ABORT	The battery charger is not connected. If the system has a UPS and no battery charger and batteries, ignore this error since the batteries and charger are not required with certain UPSs. 1. Verify that the battery charger is switched on. 2. Unplug one battery. 3. Switch off the charger and remove its white power cord. 4. Verify that the power cord has at least 106 VAC. 5. Verify that the connector on the rear of the charger is properly inserted. 6. Re-insert the charger power cord and switch on the charger. 7. Plug the battery back in. 8. Run the test environment. The batteries will probably need charging and may be drained if there were power outages. Reconnect the battery charger to allow the batteries to recharge. If Test #5 is run before the batteries are completely charged, the test will fail with Error Code 2. If Abort 1005 occurs again, escalate the problem. 9. Wait 30 hours and rerun the test.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 time. 2. If the test continues to ABORT with error code 2000, check for system powering problems with the A carrier. Look for and resolve every AC-POWER and CARR-POW alarm in a multicarrier cabinet system. Then, repeat the test. 3. If the test continues to ABORT with a 2000 error code, check for and resolve every MAINT (Maintenance circuit pack) error in an PN. Then, repeat the test.

Continued on next page

Table 8-524. Test #5 Battery and Battery Charger Query Test — *Continued*

Error Code	Test Result	Description / Recommendation
2029, 2319, 2320, 2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2	FAIL	The system is in nominal power holdover, and the battery is currently so low that the system will disconnect power very shortly. 1. If power returns, then the port carriers in the PN should power-up again. Every circuit pack should be reinserted, and the system should continue to operate normally. There will probably be a minor alarm against battery and battery charger due to the fact that the batteries are recharging. 2. If power does not return, the system will shut down to prevent damage to the batteries. Restore power, and the system will reboot. *No manual intervention is required.* 3) Rerun the test. If the test still fails, then the PN's MAINT (Maintenance) circuit pack could be reporting this condition incorrectly. Resolve every alarm on this MO, and rerun the test. There are failures that can occur on the PN's Maintenance circuit pack that *will not* be detected by their respective maintenance, but which will cause many, if not every, environment tests to fail. If many environment tests are failing, the suspect circuit pack, depending on the system configuration, should be replaced and the test rerun.
4	FAIL	The battery is currently being charged. 1. After 30 hours, the battery should be fully charged, and this error should clear.

Continued on next page

Table 8-524. Test #5 Battery and Battery Charger Query Test — *Continued*

Error Code	Test Result	Description / Recommendation
		2. If after 30 hours the battery is still in the high charge rate, an alarm will be raised. Display the Error Log with the **display errors** command and select the category "environs" to display only environment-related errors. Look for POWER errors of type 257. The *first occurrence* of this error indicates the time when the battery started charging. Use this time as the starting point to determine whether the battery has been charging for 30 hours. If so, then replace the battery and battery charger. **CAUTION:** *Read the section, "Replacing the Battery and Battery Charger (J58890CE)" before proceeding. 3) Rerun the test. If the test still fails, then the PN's MAINT (Maintenance) circuit pack could be reporting this condition incorrectly. There are failures that can occur on the PN's Maintenance circuit pack that will not be detected by their respective maintenance, but which will cause many, if not every, environment test to fail. If many environment tests are failing, the suspect circuit pack, depending on the system configuration, should be replaced and the test rerun. Resolve every alarm on these MOs, and rerun the test.*
6	FAIL	This indicates that error codes 2 and 4 have occurred. Refer to these descriptions. Also, refer to this test's description for error code 14.

Continued on next page

Table 8-524. Test #5 Battery and Battery Charger Query Test — *Continued*

Error Code	Test Result	Description / Recommendation
8	FAIL	**NOTE:** For a Global AC MCC (J58890CH) use the procedures outlined in step 3. There is a reserve power fault. A problem exists with the battery charger or, less likely, the batteries. Also, this fault could be generated if the charger is switched off or a battery is unplugged. 1. Replace the battery charger and the battery. The fault should disappear. **WARNING:** *Always turn off the battery charger before replacing the batteries.* 2. Rerun the test. If the test still fails, then the PN's MAINT (Maintenance) circuit pack could be reporting this condition incorrectly. Resolve every alarm on this MO, and rerun the test. There are failures that can occur on the PN's Maintenance circuit pack that *will not* be detected by their respective maintenance, but which will cause many, if not every, environment test to fail. If many environment tests are failing, the suspect circuit pack, depending on the system configuration, should be replaced and the test rerun. 3. Procedures for a Global MCC (J58890CH): a. Look to see if any "red" LEDs are "on" on any of the rectifier modules or the BIU (Battery Interface Unit) located in the Power Distribution Unit (J58890CH). b. If the BTW (Battery Temp Warning) LED on the BIU is "on" check the batteries for a over temp condition[(a)] if temp is normal[(a)] replace the BIU, If the test still fails replace the battery in a small battery system. For a large battery system escalate the problem. c. If the BNA (Battery Not Available) LED is "on" check the battery connections including connector J20. *More information continues.*

Continued on next page

Table 8-524. Test #5 Battery and Battery Charger Query Test — *Continued*

Error Code	Test Result	Description / Recommendation
8 *(cont'd)*	FAIL *(cont'd)*	d. If you have an alarm and every LED is OK (PWR OK and BOK) on the rectifier modules, and the BIU (Battery Interface Unit), make sure the BIU and the RM0850 rectifiers are seated properly (plugged in). If the BOK LED on the BIU is OK use the following information to check the number of rectifiers serving this cabinet: Number of carriers per cabinet | Number of rectifiers per cabinet 1 | 2 2 | 3 3 | 3 4 | 4 5 | 4 If the number of rectifiers is correct replace the maintenance circuit pack in the PN.
10	FAIL	Error codes 2 and 8 have occurred. Refer to these descriptions. Also, refer to this test's description for error code 14.
12	FAIL	Error codes 4 and 8 have occurred. Refer to these descriptions. Also, refer to this test's description for error code 14.
14	FAIL	Error codes 2, 4, and 8 have occurred. Refer to these descriptions. **NOTE:** This could also indicate that the detection logic on the PN's MAINT (Maintenance) circuit pack is defective. Such an error will not be detected by the respective maintenance. If many environment tests are failing, replace the suspect circuit pack (depending on system configuration).
	PASS	The PN's Maintenance circuit pack has reported that the status of Battery and Battery Charger is good.

a The equipment must be installed in a well-ventilated area. Maximum equipment performance is obtained at an ambient room temperature between 40 and 120 degrees Fahrenheit (4 and 49 degrees Celsius) for short term operation (not more than 72 consecutive hours or 15 days in a year) and up to 110 degrees Fahrenheit (43 degrees Celsius) for continuous operation.

Battery and Charger for DC-Powered Systems

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
POWER	MINOR	**test environment *UU***	Battery and Battery Charger

1. *UU* is the cabinet number indicated in the PORT field from the Alarm or Error Log.

NOTE:
This MO applies to the J58890CE and the J58890CH-1 with large battery holdover.

This MO represents the battery backup unit found in AC-powered multicarrier cabinets. Because the system does not recognize the type of external power, this MO exists in DC-powered multicarrier cabinets but serves no functional purpose. In such cabinets, every POWER test should always either pass or abort, and no POWER alarms should be raised.

S8700 Multi-Connect systems support two different types of PN cabinets: multicarrier and single-carrier. Both cabinet types may be powered by either AC or DC external power source. Environmental maintenance differs according to cabinet type and external power supply.

Error Log Entries and Test to Clear Values

Table 8-525. Battery and Battery Charger Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test environment *UU* sh r 1**
1	Any	Battery and Battery Charger Query test (#5) (error code 8)	MINOR	ON	**test environment *UU* s r 1**
257	Any	Battery and Battery Charge Query test (#5) (error code 4)	MINOR	ON	**test environment *UU* s r 1**
769	Any	Battery and Battery Charger Query test (#5) (error code 2)	MINOR	ON	**test environment *UU* s r 1**
3840 (a)	1005, 1028	Associated Battery and Battery Charger Query test (#5)			**test environment *UU* s r 1**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Note:

a. This error occurs is valid only for AC-powered multicarrier cabinets with battery backup. For DC-powered cabinets, you cannot clear the error and it should be ignored.

Battery Holdover (Large Batteries)

The large batteries are mounted inside a separate battery cabinet and can supply holdover times of 2 to 8 hours depending on the size of the battery. The batteries are circuit breaker protected and are charged by the J58890CH-1. The batteries also contain a thermal sensor that change the charging voltage depending on the battery temperature.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the Battery and Battery Charger Query test (#5), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND*
Battery and Battery Charger Query test (#5)	X	X	ND
AC Power Query test (#78) (a)	X	X	ND
Power Unit Query test (carrier E) (#127) (b)	X	X	ND
Power Unit Query test (carrier D) (#127) (b)	X	X	ND
Power Unit Query test (carrier A) (#127) (b)	X	X	ND
Power Unit Query test (carrier B) (#127) (b)	X	X	ND
Power Unit Query test (carrier C) (#127) (b)	X	X	ND
Emergency Transfer Query test (#124) (c)	X	X	ND
Cabinet Sensors Query test (#122) (d)	X	X	ND
External Alarm Lead Query test (#120) (e)	X	X	ND
Analog Ring Generator Initialization test (#117) (f)	X	X	ND
Analog Ring Generator Query test (#118) (f)	X	X	ND

Notes:

a. See ''AC-POWER'' on page 8-4 for a description of this test.

b. See ''CARR-POW (Carrier Power Supply)'' on page 8-393 for a description of this test.

c. See EMG-XFER for a description of this test.

d. See ''CABINET (Cabinet Sensors)'' on page 8-383 for a description of this test.

e. See EXT-DEV for a description of this test.

f. See ''RING-GEN'' on page 8-1357 for a description of this test.

Battery and Battery Charger Query Test (#5)

This test queries the PN's Maintenance circuit pack for the status of the battery pack and battery charger, and reports the result. In a DC-powered system, this test should never fail. During this test, the status LED on the battery charger is lit and extinguished if the status of the battery charger is reported as normal. This event is a result of checking that the battery charger is connected.

Table 8-526. Test #5 Battery and Battery Charger Query Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available.
1005	ABORT	Battery charger is not connected. DC-powered cabinets do not have battery backup; ignore this error.
2000	ABORT	Response to the test request was not received within the allowable time period.
2028	ABORT	Internal system error prevented the extinguishing of the Battery Charger status LED. 1. Since this test is not relevant for DC-powered systems, an occurrence of this error indicates possible existence of internal system problems.
2029, 2319, 2320, 2500	ABORT	Internal system error 1. Try the command again at 1-minute intervals up to 5 times.
any	FAIL	The PN's Maintenance circuit pack is incorrectly reporting a problem with power. If this test fails for a DC-powered cabinet, the circuit pack has a problem. Replace the suspect circuit pack, and run the test again.
	PASS	All that can be inferred is that an MCC PN's Maintenance circuit pack is working properly for this test.

PPP-PT (Control LAN Packet/Port)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
PPP-PT	MAJOR	**test port *UUCSSpp* long**	PPP Port Maintenance
PPP-PT	MINOR	**test port *UUCSSpp* long**	PPP Port Maintenance
PPP-PT	WARNING	**test port *UUCSSpp***	PPP Port Maintenance

1. *UU* is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). *C* is the carrier designation (A, B, C, D, or E). *SS* is the number of the slot where the circuit pack resides (01–21). *pp* is the 2-digit port number (01, 02,...).

The TN799DP Control LAN (C-LAN) packet port circuit pack provides TCP/IP connection to adjuncts applications such as CMS, Intuity, and DCS Networking. The C-LAN circuit pack has 1 10baseT Ethernet connection and up to 16 DS0 physical interfaces for PPP connections. Multiple C-LAN circuit packs in a system gives additional TCP/IP capacity.

An RSCL (remote socket control link) connects the C-LAN and the media server to pass call-control and other management information. Since one link serves every port on the circuit pack, maintenance of the RSCL is part of the C-LAN circuit pack maintenance.

NOTE:
The TN799DP C-LAN circuit pack combines the functions of the PGATE and PI circuit packs into one circuit pack. The PGATE or PI can be used with the C-LAN to create an X.25 to TCP/IP bridge for adjunct and DCS connectivity.

Control LAN Congestion Controls

The switch activates congestion controls on C-LAN when it detects buffers exceeding the threshold. The switch releases the congestion controls when the C-LAN reports that its buffer level has returned to normal levels.

If congestion:	Then the switch:
Persists for a 14-minute interval	Raises MINOR alarm
Exhausts buffers	Raises MINOR alarm
Ceases for 12 minutes	Retires MINOR alarm

Error Log Entries and Test to Clear Value

Table 8-527. PPP-PT Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp* s**
1 (a)	0	SCOTCH Sync Looparound test (#1275)	MINOR	ON	**test port *UUCSSpp* l r 3**
257 (b)	0		WARNING	OFF	
513 (c)	0		MINOR	OFF	
769 (d)	0		WARNING	OFF	
1281 (e)	0				
1537, 1538 (f)	See note	Session Status test (#1286)	MINOR	OFF	
1793–1920 (g)	See note				
2305–2560 (h)	See note				
2561–2816 (h)	See note				
3329 (i)	35768	TCP/IP Ping test (#1281)	WARNING	OFF	
3585 (j)	0, 1	TDM Loop-around test (#1285)	MAJOR	ON	**test port *UUCSSpp* l r 3**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. **Error Type 001**: SCOTCH Synchronous Loop-around test (#1275) failed.

1. Test the port (**test port *UUCSSpp* long**).
2. See ''SCOTCH Synchronous Loop-Around Test (#1275)'' on page 8-1319 for repair procedures.

b. **Error Type 257**: C-LAN port detected overrun or underrun condition that may indicate a hardware problem.

1. Test for hardware problem (**test port *UUCSSpp* long**).
2. See ''SCOTCH Synchronous Loop-Around Test (#1275)'' on page 8-1319 for repair procedures to verify repair.
3. Clear the alarm (**test port *UUCSSpp* long clear**).

c. **Error Type 513**: PPP link lost end-to-end connectivity.

   1. Test for hardware problem (**test port *UUCSSpp* long**).
   2. Run TDM Loop-around test (#1285), and refer to repair procedures if there is a hardware problem.

      If there is no hardware problem, the switch tries to re-establish PPP link.

d. **Error Type 769**: Port received an invalid frame, which

   - is greater than the maximum length
   - contains CRC errors
   - violates the link level protocol.

   1. Test the port (**test port *UUCSSpp* long**).
   2. Refer to TDM Port Loop-around test (#1285) to verify repair.
   3. Clear the alarm (**test port *UUCSSpp* long clear**).

e. **Error Type 1281**: System software received an indication that the far end has requested a disconnect of a session on this link. This is a log-only error.

f. **Error Type 1537, 1538**: Some or all port sessions (sockets) are down

If the switch indicates that:	Then it:
Some of the sessions are down	Raises off-board WARNING
Every session is down	Raises off-board MINOR alarm

   1. Test the port (**test port *UUCSSpp* short**).
   2. See ''Session Status Test (#1286)'' on page 8-1322 for repair procedure to verify repair.

g. **Error Type 1793-1920**: system software received an indication that a socket was closed due to an error. Error Type indicates the application associated with this socket.

Error Type	Application
1793	Unused
1794	DCS
1795	AUDIX
1796	CMS
1797	ISDN Gateway
1798–1920	Reserved for future

Aux Data indicates the internal application number.

h. **Error Type 2305-2816**: System software detected a session is down. Aux Data indicates the session number. These are log only errors. Error types 2305–2560 are for session numbers 1–256. Error types 2561–2816 are for session numbers 257–512.

i. **Error Type 3329**: TCP/IP Ping test failed.

   1. Test the port (**test port *UUCSSpp* short**).
   2. See "TCP/IP Ping Test (#1281)" on page 8-1321 for repair procedures.

j. **Error Type 3585**: TDM Port Loop-around test (#1285) failed.

   1. Test the port (**test port *UUCsspp* long**).
   2. See "TDM Loop-Around Test (#1285)" on page 8-1318 for repair procedure.

System Technician-Demanded Tests: Descriptions and Error Codes

Investigate errors in the order they appear in the table below.

Table 8-528. System Technician-Demanded Tests: PPP-PT

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
TDM Loop-around test (#1285)		X	D
SCOTCH Synchronous Loop-around test (#1275)		X	D
TCP/IP Ping test (#1281)	X	X	ND
Session Status test (#1286)	X	X	ND
PPP Link Status test (#1279)	X	X	ND

1. D = Destructive, ND = Nondestructive

TDM Loop-Around Test (#1285)

NOTE:
This test is destructive.

This test verifies whether the C-LAN PPP port can send and receive data on the TDM bus. This test has a tone generator send tones on a timeslot, and it has a tone receiver receive tones on another timeslot. The tones are looped through the ppp port.

If the received tones:	Then:
Match the tones sent	The test passes
Do not match the tones sent	The test fails

Test failure indicates failure of the

- C-LAN (TN799DP) circuit pack
- TDM bus
- Tone generator / tone receiver circuit pack

Table 8-529. Test #1285 TDM Loop-Around Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	The port is in use. 1. Determine port status (**status clan-port *UUCSSpp***). 2. Retry the command when the port is idle. The port may be forced to the idle state by executing a **busyout port *UUCSS*** command. 3. Escalate if the problem persists. **NOTE:** The **busyout port** command is destructive, causing every call and link associated with the port to be torn down.
1002	ABORT	No TDM bus timeslots available for the test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
1003	ABORT	No more tone receivers idle for use in this test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.

Continued on next page

Table 8-529. Test #1285 TDM Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Did not receive circuit pack test response within the allowable time period. 1. If this problem persists, reset the circuit pack (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). 2. If the problem persists, replace the circuit pack.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times. 2. Escalate if the problem persists.
2100	ABORT	Could not allocate the necessary system resources to run test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
	FAIL	Received tones do not match transmitted tones. 1. Retry command at 1-minute intervals up to 3 times. 2. If the problem persists, see ''TDM-BUS (TDM Bus)'', ''TONE-PT (Tone Generator)'' and Tone Receiver repair procedures. 3. If the problem persists, reset the board (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). Repeat the test. 4. If the problem persists, replace the circuit pack.
	PASS	Port connections across the TDM bus function properly.

SCOTCH Synchronous Loop-Around Test (#1275)

NOTE:
This test is destructive.

This test verifies the circuit in the datapath of a ppp call. This test fails if the data transmitted on the port does not match the data received in the loop-around mode. Failure of this test indicates a port hardware fault on the circuit pack.

This test aborts if calls are using the port, or if the PPP link associated with the port is connected. To avoid this, first enter **busyout data-module *extension***, or **busyout port *UUCSSpp***, or **busyout link *link#***, which will cause every call and link using the port to be torn down.

Table 8-530. Test #1275 SCOTCH Synchronous Loop-Around Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	The port is in use or PPP link is connected. 1. Determine when the port is available for testing (**status clan-port *UUCSSpp***). 2. The port may be forced to the idle state by executing a **busyout port *UUCSSpp*** command. **NOTE:** This command is destructive, causing every call and link using the port to be torn down.
1002	ABORT	No TDM bus timeslots available for the test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
1963	ABORT	Firmware indicates that the port is in use or ppp link is connected. 1. Determine when the port is available for testing (**status clan-port *UUCSSpp***). 2. The port may be forced to the idle state by executing a **busyout port *UUCSSpp*** command. **NOTE:** This command is destructive, causing every call and link using the port to be torn down.
2000	ABORT	Did not receive circuit pack test response within the allowable time period. 1. If this problem persists, reset the circuit pack (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). 2. If the problem persists, replace the circuit pack.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times. 2. Escalate if the problem persists.
2100	ABORT	Could not allocate the necessary system resources to run test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
	FAIL	C-LAN circuit pack detected test failure. 1. If the problem persists, reset the circuit pack (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). 2. If the problem persists, replace the circuit pack.
	PASS	Port circuitry functioning properly.

TCP/IP Ping Test (#1281)

This nondestructive test fails if the endpoint fails to respond. Use this test to check the circuitry in the data path for a peer-to-peer IP layer connection.

Table 8-531. Test #1281 TCP/IP Ping Test

Error Code	Test Result	Description / Recommendation
1, 2, 7, 11	ABORT	Internal error 1. Retry the command at 1-minute intervals up to 3 times 2. Escalate if the problem persists.
1005	ABORT	Test configuration is incorrect. 1. Verity PPP link is in-service (**status clan-port UUCSSpp** or **status link *n***). 2. Repeat the test. 3. Escalate if the problem persists.
1124	ABORT	ppp link is not enabled. 1. Verify that the ppp link is enabled (**status port *UUCSSpp***, **status link *n***, or **display data-module**). 2. If the link is not enabled, enable the link (**change data-module**). 3. Repeat the test. 4. Escalate if the problem persists.
1125	ABORT	PPP link not in service. 1. Verify whether ppp link is in service (**status port *UUCSSpp*** or **status link *n***). 2. If the ppp link is not in service, release the link (**release link *n*** or **release port *UUCSSpp***). 3. Repeat the test. 4. Escalate if the problem persists.
2000	ABORT	Response to the test was not received from the C-LAN circuit pack within the allowable time period. 1. If this result occurs repeatedly, attempt to reset the circuit pack if the other ports on the board are idle (amber LED is off). Reset the circuit pack (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). 2. If this result occurs again, replace the circuit pack.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times. 2. Escalate if the problem persists.

Continued on next page

Table 8-531. Test #1281 TCP/IP Ping Test — *Continued*

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times. 2. Escalate if the problem persists.
1003	FAIL	Ping to the destination failed due to on-board problem. 1. Retry the command at 1-minute intervals up to 3 times. 2. If the problem persists, reset the circuit pack (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). 3. If the problem persists, re-administer the PPP connection through a different PPP port, if available. 4. If the problem still persists, or if there are no other available PPP ports, replace the circuit pack.
1007	FAIL	Ping to the destination failed due to the destination down. 1. A PPP destination or a component in the path (e.g., DS1 trunk) may be down. Check the status of the destination or other components in the path. 2. If the destination and every component in the path is in-service, ping the PPP destinations (**ping ip-address *xxx.xxx.xxx.xxx***). 3. Escalate if the problem persists.
	PASS	TCP/IP Ping test (#1281) is successful.

Session Status Test (#1286)

This nondestructive test determines the status of every PPP port session. This test queries the system software on port session status.

If the system software indicates that:	Then the switch:
Every port session is up (ALL UP)	Raises no alarm, or retires alarm
Some port sessions are up (SOME UP)	Raises MINOR alarm
Every port sessions is down (ALL DOWN)	Raises MINOR alarm

Table 8-532. Test #1286 Session Status Test

Error Code	Test Result	Description / Recommendation
1124	ABORT	PPP link is not enabled. 1. Verify that the ppp link is enabled (**status port *UUCSSpp***, **status link *n***, or **display data-module**). 2. If the link is not enabled, enable the link (**change data-module**). 3. Repeat the test. 4. Escalate if the problem persists.
1125	ABORT	PPP link not in service. 1. Verify whether PPP link is in service (**status port *UUCSSpp*** or **status link *n***). 2. If the PPP link is not in service, release the link (**release link *n*** or **release port *UUCSSpp***). 3. Repeat the test. 4. Escalate if the problem persists.
2000	ABORT	Did not receive circuit pack test response within the allowable time period. 1. If the problem persists, reset the circuit pack (**busyout port *UUCSSpp*, reset board *UUCSS***, and **release board *UUCSS***). 2. If the problem persists, replace the circuit pack.
2100	ABORT	Could not locate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times. 2. Escalate if the problem persists.
1	FAIL	System software indicates at least one PPP link session is down (SOME UP). 1. Isolate downed sessions (**status port *UUCSSpp*** or **status link *n***). Follow actions based on session information.
2	FAIL	System software indicates every PPP session is down (ALL DOWN). 1. Test the port (**test port UUCSSpp**) to verify the SCOTCH Synchronous Loop-around test (#1275) result. 2. If test passes, wait for system software to indicate ALL UP. 3. If the test fails, check the destination and other components in the path. 4. If the destination and other components in the path are in-service, take action based on session information.
	PASS	Every session up.

PPP Link Status Inquiry Test (#1279)

This nondestructive test determines the state of the PPP link. The test passes only if the link is up.

Table 8-533. Test #1279 PPP Link Status Inquiry Test

Error Code	Test Result	Description / Recommendation
1124	ABORT	ppp link is not enabled. 1. Verify that the ppp link is enabled (**status port *UUCSSpp***, **status link *n***, or **display data-module**). 2. If the link is not enabled, enable the link (**change data-module**). 3. Repeat the test. 4. Escalate if the problem persists.
1125	ABORT	PPP Link is not in service. 1. Verify whether PPP link is in-service (**status port *UUCSSpp*** or **status link *n***). 2. If the PPP link is not in service, release the link (**release link n** or **release port *UUCSSpp***). 3. Repeat the test. 4. Escalate if the problem persists.
2100	ABORT	Could not locate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times. 2. Escalate if the problem persists.

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Table 8-533. Test #1279 PPP Link Status Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	PPP link is down. 1. Test the port (**test port *UUCSSpp* long**) to verify the SCOTCH Synchronous Local Loop Around test (#1275) result. 2. If the test passes, wait for sessions to come up. 3. If the test fails, check the destination and other components in the path (e.g., DS1 trunks). 4. If the destination and other components in the path are in-service and the test still fails, execute **busyout port *UUCSSpp*** and **release port *UCCSSpp***, and repeat the test. 5. If the test still fails, reset the circuit pack (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). Repeat the test. 6. If the problem persists, replace the circuit pack.
	PASS	PPP link is up.

PRI-CDR/SEC-CDR (Call Detail Recording Link)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run	Full Name of MO
PRI-CDR/SEC-CDR	MINOR	**test cdr primary | secondary l**	CDR Link
PRI-CDR/SEC-CDR	WARNING	**test cdr primary | secondary**	CDR Link

The CDR feature records detailed call information about every incoming and outgoing call on specified trunk groups and sends this information to a CDR output device. The two physical links can be administered for connecting external CDR output devices to the system. They are identified as the primary CDR (PRI-CDR) link and the secondary CDR (SEC-CDR) link. The CDR device connects to the system via a data module (PDM, MPDM, DTDM) connected to a port on a TN754 Digital Line circuit pack that is administered as a data extension. A CDR device can also be connected through an ADU to a port on TN726B. The CDR link to the processor is via a C-LAN board. For information about C-LAN port connectivity, see ''CLAN-BD (Control LAN Circuit Pack)'' on page 8-411 . External CDR output devices include:

- 94A Local Storage Unit (LSU)
- TELESEER CDR Unit
- Call Accounting System (CAS)
- Call Detail Recording Unit (CDRU)
- Printer
- Host computer
- Personal computer (PC)
- Customer-provided equipment

CDR Link Maintenance provides a strategy for maintaining the link between the system and an external CDR output device. The strategy includes a set of tests for periodic diagnosis, detection of errors during normal operation, actions for troubleshooting, and raising alarms for serious problems. CDR Link Maintenance uses a try-and-wait mechanism for maintaining the CDR link. If the CDR link is torn down due to an error, CDR Link Maintenance tries to bring the CDR link up. If the Link Setup fails, CDR Link Maintenance will wait for 30 seconds before the next retry. If the number of retries reaches a threshold (two), a Minor alarm is raised for service attention.

CDR Link Maintenance does not cover the maintenance of the elements composing the CDR physical link:

- External CDR output device
- Data Module (PDM/MPDM/DTDM) and Digital Line Port of TN754 Digital Line circuit pack
- ADU and Data Line Port of TN726B Data Line circuit pack

If CDR Link Maintenance cannot restore the CDR link, the maintenance tests of these individual components of the CDR link must be executed to diagnose faults.

Procedures for Restoring the CDR Link

1. Determine the status of CDR links.

   Enter **status cdr** command and make sure that the CDR links are not busied out for maintenance. If the link is down, then continue to the next step.

2. Where does the CDR link connect to?

   Enter **display system feature** and find out the destinations of CDR links. Continue to the next step.

3. Enter the **status data *extension*** command and verify whether the data extension is in the in-service/idle state. If the data extension is *not* available, then look for the extension number in the `Alt Name` field of the Hardware Error Log and see ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872 for resolutions.

4. Is the external CDR output device available?

   Make sure that the CDR output device is on-line and ready for service. Check the physical connectivity between Data Module and the CDR output device.

5. If the problem is not found in the above steps, check the C-LAN board for any problems. For description about system port and its connectivity, see ''CLAN-BD (Control LAN Circuit Pack)'' on page 8-411.

When restoring the CDR link it is necessary to execute maintenance test on different objects that comprise the CDR link. It is recommended that you busyout the CDR link before trying to restore the link. When the CDR Link is busied out, then every CDR Link maintenance action is deactivated, and interference to tests of other MOs is prevented.

Error Log Entries and Test to Clear Values

Table 8-534. CDR Link Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test cdr primary | secondary sh**
18 (a)	0	**busyout cdr primary|secondary**	WARNING	OFF	**release cdr primary | secondary**
257 (b)	Any	Link Retry test (#215)	MINOR[2] WARNING	OFF	**test cdr primary | secondary l**
513 (c)					**test cdr primary | secondary**
1025 (d)					
1281 (e)	Any				

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. Minor alarms may be downgraded to Warning alarms based on the value used in the **set options** command.

Notes:

a. The CDR link is busied out. The CDR link is torn down.

b. Link Retry test (#215) fails. An error was detected when setting up the link. See the preceding section ''Procedures for Restoring the CDR Link'' for resolution.

c. The CDR physical link is down for one of the following reasons:

- Cable to the CDR output device is disconnected.
- CDR output device is powered off.
- The data extension where the CDR output device connects to has been busied out or there is a scheduled daily interchange.

Check the connectivity of wire and cable among wall jacket, data module, and the CDR output device. Enter **status data *extension*** and verify that the data extension of the CDR output device is in the in-service/idle state. If the data extension is not available, see ''Procedures for Restoring the CDR Link'' on page 8-1327 for resolution. Issue the **display system-parameters-maintenance** command to see the start time of daily maintenance. If the error occurs and is resolved during of daily maintenance, it can be ignored.

d. This error indicates that the CDR output device is in an off-line state, (for example, due to paper jam or paper out for a printer device). The CDR link is torn down. Check the CDR output device and act promptly to put it back to on-line state. Enter **test cdr primary | secondary** command to set up the CDR link.

e. Software detects an overflow of CDR records generated in the switch due to the heavy trunk traffic and low speed CDR output device. If both primary and secondary links are ON, the secondary link is torn down temporarily for two minutes to speed up the output process to the primary link. No action is necessary for this error type.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the Link Tear Down test (#213), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Link Tear Down test (#213)		X	D
Link Retry test (#215)	X	X	ND

1. D = Destructive; ND = Nondestructive

Link Tear Down Test (#213)

This test is destructive.

This test disconnects the existing link between the system and the external CDR output device. If the link has been disconnected already, this test just returns PASS. Every resource allocated for a CDR link is released after this test.

Table 8-535. Test #213 Link Tear Down Test

Error Code	Test Result	Description / Recommendation
40	ABORT	Internal system error.
50	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
1010	ABORT	The CDR link has been busied out to out-of-service. 1. Enter the **release cdr primary | secondary** command to release the CDR link from busyout state. 2. Retry the **test cdr primary | secondary long** command to execute the test.

Continued on next page

Table 8-535. Test #213 Link Tear Down Test

Error Code	Test Result	Description / Recommendation
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	The CDR link is torn down.

Link Retry Test (#215)

This test sends a message to the CDR software process to make a data call to the extension where the CDR output device connects to. If the CDR link is already up, then this test will be passed without making any data call.

Table 8-536. Test #215 Link Retry Test

Error Code	Test Result	Description / Recommendation
10	ABORT	Internal system error.
20	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
30	ABORT	Internal system error. 1. See ‘‘Procedures for Restoring the CDR Link’’ for instructions.
1010	ABORT	The CDR link has been busied out to out-of-service. 1. Enter **release cdr primary | secondary** command to release the CDR link from busyout state. 2. Retry **test cdr primary | secondary long** command to execute the test.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The CDR link CANNOT be established. 1. See ‘‘Procedures for Restoring the CDR Link’’ for instructions.
	PASS	The CDR link is up.

PROC-SAN (Process Sanity Audits)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run	Full Name of MO
PROC-SAN	none	none	Process Sanity Audits

The Process Sanity Audits MO is responsible for monitoring the sanity of software processes in the system. If the Process Sanity Audits MO detects that a process has gone insane (does not respond to a sanity message within an allotted time period), the process will be restarted. If the Process Sanity Audits MO detects that multiple processes (or a single key process) do not respond to sanity messages within an allotted time period, a system recovery action will be initiated.

The Process Sanity Audits MO has no alarms and no tests. Certain errors are logged to the Hardware Error Log for information purposes only.

Error Log Entries and Test to Clear Values

Table 8-537. Process Sanity Audits Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0	0	Any	Any	Any	none
10 (a)	0	none	none	none	none
204 (a)	any	none	none	none	none

Note:

a. These errors indicate that a system recovery action has been taken because one or more software processes failed to respond to a sanity audit in a timely fashion. As a result of the recovery action, the system may have temporarily suspended service for a period of time surrounding the error.

RALM-SVC (Remote Alarm Service)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run	Full Name of MO
RALM-SVC	SUPER	None	Remote Alarm Service
RALM-SVC	MAJOR	None	Remote Alarm Service

For the RALM-SVC MO, maintenance software does special periodic testing every 60 seconds. These tests verify that the standby media server's components are operating correctly.

Alarm Log Entries

Table 8-538. RALM SVC Alarm Log Entries

EVENT ID#	Aux Data	Associated Test	Alarm Level	On/Off Board	Linux Test to Clear Value
1 (a)		SME_ARB test	SUPER	ON	`testdupboard`
2 (b)		Standby_PN Check test	MAJOR	ON	`testdupboard`

Notes:

a. **Event ID #1** SME_ARB test failed — This periodic test verifies the Arbiter's Remote Alarm Service functionality. The test queries the standby media server to find out whether it can generate alarms. (Both media servers must have their own alarm-generation utilities.) If the test fails three consecutive times, the following Super alarm is logged:

#1,ACT,SME,A,1,MIN,Far-end alarm service is down

b. **Event ID #2** Standby_PN_Check test failed — This periodic test:

1. Queries the standby media server about the state of health of its PNs
2. Compares the acquired information to an administered value

A failure indicates that a mismatch occurred and that the standby media server is out of sync. If this test fails 2 consecutive times, the following Major alarm is logged:

#1,ACT,SME,A,2,MAJ,Standby Port-Network check failed

System Technician-Demanded Tests: Descriptions and Error Codes

This MO provides no on-demand tests for system technicians.

RANL-STA (Remote Analog Line (Station) Port

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
RANL-STA	MINOR	**test port *UUCSSpp* l**	Remote Analog Line Port
RANL-STA	WARNING	**test port *UUCSSpp* sh**	Remote Analog Line Port

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21). pp is the 2-digit port number (01, 02,...).

A per-port instance of this MO (RANL-STA) is used to maintain the circuitry associated with a port which has been translated as analog station. The combo blade circuit board has the capability of having two instances of this type of MO.

Failures of the neon message waiting lamp power and the common ringing application circuitry are reported as part of common port circuit pack errors; see errors 1281 and 1793 in ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872.

Ringing Caused by Maintenance Testing

Test #48 may cause some terminal equipment to ring briefly during daily maintenance. If this ringing disturbs the customer or the terminal equipment, disable it in the `Tests` field of the **change station *extension*** form. Be aware that this action will also disable Test 35 on that station.

Error Log Entries and Test to Clear Values

Table 8-539. Analog Line Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp* sh r 1**
1 (a)	40960, 40975, 40977	none			
15 (b)	Any	Audits and Updates test (#36)			
18	0	**busyout station *extension***	WARNING	ON	**release station *extension***
257 (c)	40973	none			
513 (d)		Station Present test (#48)	WARNING	OFF	**test port *UUCSSpp* sh r 2**
769		Battery Feed test (#35)	MINOR WARNING[2]	ON	**test port *UUCSSpp* sh r 2**
2817 (e)		Hyperactive	MINOR	OFF	

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. Minor alarms on this MO may be downgraded to Warning alarms based on the values used in the **set options** command.

Notes:

a. **Error type 1**—These are in-line errors and can only be resolved over time.

- 40960 indicates that too many simultaneous incoming ringing attempts were made on this board. Only 4 ports on a board may ring simultaneously. A 5th incoming call will cause an inline error from the board.
- 40975 indicates that the terminal equipment was on-hook when ring-tip was detected during ringing. This usually indicates a failure in the terminal equipment or the type of terminal has a low ringer impedance. Call the terminal equipment and verify that the terminal rings. If the terminal does not ring, then replace it. Otherwise, issue the **test port *UUCSSpp*** command, and follow the procedure for Test #48.
- 40977 indicates that terminal equipment was not connected when ringing was attempted. Run the short test via the **test port *UUCSSpp*** command, and follow the procedure for the results of Test #48.

b. **Error type 15**—A software audit error that does not indicate hardware malfunction. Run the short test sequence, and investigate associated errors.

c. **Error type 257**—An in-line error and can only be resolved over time. This error indicates that ringing voltage is absent. If only one analog circuit pack in the system has this problem, then replace the circuit pack. If only analog circuit packs on a particular carrier have this error, then the ringing generator may not be connected to this carrier. If analog circuit packs on many carriers have this error, then it is probably a problem with the ringing generator.

d. **Error type 513**—Test #48 may cause some terminal equipment to ring briefly during daily maintenance. If this disturbs the customer or the terminal equipment, disable it by setting the `Tests` field on the **change station** extension form to `n`. On some software releases, this will also disable Tests #7 and 35.

e. **Error type 2817**—Indicates that the endpoint caused a large number of control channel messages to be sent to the switch within a short period of time (50 or more CCMS uplinks within 10 seconds). The station will be taken out-of-service for 30 seconds due to the hyperactivity. This may be completely normal during heavy traffic periods.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the Battery Feed test (#35), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Battery Feed test (#35)	X	X	ND
Station Present test (#48)	X	X	ND
Station Status and Translation Audits and Updates test (#36)	X	X	ND

1. D = Destructive; ND = Nondestructive

Battery Feed Test (or Port Diagnostic test) (#35)

The battery feed chip provides power to the telephone equipment, signaling, rotary dial pulsing, transmission, and balance. This test checks the signaling and switchhook capabilities of the battery feed chip by terminating the port, applying battery and detecting the resulting current.

Table 8-540. Test #35 Battery Feed Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. This result is also reported for the system's Music-On-Hold port when it is off-hook, which it usually is. 1. Enter **display port *UUCSSpp*** to determine the station's extension. Enter **status station *extension*** to determine the service state of the port. If the port is in use, wait until the port is idle. 2. Retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the **display port *UUCSSpp*** command to determine the station extension. Use the **status station** command to determine the service state of the port. If the port is in use, wait until the port is idle. 1. Retry the command at 1-minute intervals up to 5 times.
1005	ABORT	The test was aborted due to a configuration problem. This test may not be applicable, or it may be disruptive to terminal equipment other than a voice terminal (for example, the modem pool member or Music On Hold).
1018	ABORT	The test has been disabled via administration. The default for the `Test` field on the **change station** form is `y`. 1. Determine why this field has been set to `n` on this station (this may be due to the ringing application test 48, which can be customer or terminal disturbing). 2. To enable the test for the particular analog station being tested, enter **change station *extension*** and set the `Test?` field on the **change station** form to `y`.
1392	ABORT	This port is currently a TTI port and the test will not execute on it. 1. Verify that the port is a TTI port using either the **display port** command (the display shows that the port is a TTI port) or the **list config** command (the display shows a `t` for the port). 2. If the port is *not* a TTI port, escalate the problem. If both commands indicate that the port is a TTI port, the abort is correct for the test, and no action is necessary.

Continued on next page

Table 8-540. Test #35 Battery Feed Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The port's battery feed chip is unable to supply sufficient power to the terminal equipment. This could be a marginal test, and the terminal equipment may be operating satisfactorily. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail, determine whether the customer is experiencing problems on this line. Replace the circuit pack only if the customer is experiencing problems.
	PASS	The port's battery feed chip can provide power to the station equipment to detect on-/off-hook, but may not be able to supply power for touch tones. If touch tones are inoperative on this station, then replace the circuit pack because this port is inoperative. User-reported troubles on this port should be investigated by using other port tests, by examining station wiring, or by examining the station.

Station Status and Translation Audits and Updates Test (#36)

This test updates the analog port's message lamp state (if it has one) and translations with information in the software.

Table 8-541. Test #36 Station Status and Translation Audits and Updates

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test, and the test was aborted. Use the **display port *UUCSSpp*** command to determine the station extension. Use the **status station** command to determine the service state of the port. If the port is in use, wait until port is idle. 1. Retry the command at 1-minute intervals up to 5 times.
1005	ABORT	The test was aborted due to a configuration problem. This test may not be applicable, or it may be disruptive to terminal equipment other than a voice terminal (for example, the modem pool member or Music On Hold).
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1	FAIL	This does not indicate a hardware problem. The switchhook audit failed. The other updates were not performed because of this failure. This may occur when the audit is performed at the same time the terminal equipment goes off-hook. Use the **status station** command to determine when the port is available. 1. Retry the command at 1-minute intervals up to 5 times.
5	FAIL	This may be an internal software error. The message waiting lamp update failed. The translation and ringer updates were not performed because of this failure. 1. Retry the command at 1-minute intervals up to 5 times.
7	FAIL	The translation update failed. There may be an internal software error. The ringer update was not performed because of this failure. 1. Retry the command at 1-minute intervals up to 5 times.
8	FAIL	This does not indicate a hardware problem. There may be an internal software error. The ringer update failed. 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	The software and the port processor have the same status. User-reported troubles on this port should be investigated by using other port tests, by examining station wiring, or by examining the station.

Station Present Test (or Ringing Application Test) (#48)

This test applies momentary ringing voltage to the terminal equipment and monitors resulting current flow to determine whether the terminal equipment is connected to the port. The test may cause some terminal equipment to ring briefly during daily maintenance. If this ringing disturbs the customer or the terminal equipment, disable it via the `Tests` field on the **change station** form. However, on some software releases, Test #35 is disabled.

Table 8-542. Test #48 Station Present Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use the **display port *UUCSSpp*** command to determine the station extension. Use the **status station** command to determine the service state of the port. If the service state indicates that the port is in use. Wait until the port is idle. 1. Retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test, and the test was aborted. Use the **display port *UUCSSpp*** command to determine the station extension. Use the **status station** command to determine the service state of the port. If the service state indicates that the port is in use. Wait until the port is idle. 1. Retry the command at 1-minute intervals up to 5 times.
1005	ABORT	The test was aborted due to a configuration problem. This test may not be applicable, or it may be disruptive to terminal equipment other than a voice terminal (for example, the modem pool member or Music On Hold).
1008	ABORT	Could not allocate a ringing circuit. Either every ringing circuit is in use, or the ringing generator is either defective or incorrectly wired. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, look for RING-GEN errors in the Error Log. If an ABORT 1008 occurs for this test on other circuit packs as well, then the ringing generator may be defective or incorrectly wired (see errors for RING-GEN). If it does not occur on other ports, then all four ring phases are in use.
1018	ABORT	The test has been disabled by administration. The default for the `Test` field on the **change station** form is `y`. Determine why this field has been set to `n` on this station (this may be due to the brief ringing disturbance that this test may cause). 1. To enable the test for the particular analog station being tested, enter **change station *extension*** and set the `Test?` field on the **change station** form to `y`.

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Table 8-542. Test #48 Station Present Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The terminal equipment is not connected to the circuit pack. Some terminal equipment, such as modems, may fail even when connected properly. 1. Remotely test the equipment. 2. If the test fails again, look for RING-GEN errors in the error log. If present, see ''RING-GEN'' on page 8-1357. 3. Check all of the wiring between the station equipment and the switch. Then, run the test again. 4. If the test still fails, the set may be defective. Check the set and replace it, if necessary. 5. Some terminal equipment could fail even when it is connected properly. If so, disable the test using the **change station *extension*** command (enter `n` into the `Test` field). Note that this action also disables Test #35 on this port.
	PASS	The station is connected properly. This test may also pass if no terminal equipment is connected and the terminal is located very far from the switch. Investigate user-reported troubles on this port by using other port tests, examining station wiring, or examining the station.

RDIG-STA (Remote Digital Station)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
RDIG-STA	MINOR	**test station *UUCSSpp* l**	Remote Digital Station
RDIG-STA	WARNING	**test station *UUCSSpp* sh**	Remote Digital Station

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21). pp is the 2-digit port number (01, 02,...).

A per-port instance of this MO (RDIG-STA) is used to maintain the circuitry associated with a port which has been translated as a digital station (or DCP Console). The combo blade circuit board has the capability of having 24 instances of this type of MO.

Remote Digital Station maintenance software provides maintenance for a port administered as a digital station on the circuit pack. This strategy covers the in-line errors log, initialization tests, periodic tests, craft-demanded tests, and alarm resolution and escalation. Each port, translated as a digital station on a digital line board, is running as a separate MO (RDIG-STA) of this type. Fault conditions discovered on one MO may or may not indicate faults on other MOs of the same type.

Maintenance testing for the port circuitry on the combo blade circuit packs is handled by on-board firmware and media server-controlled tests. Maintenance software queries the firmware for error and alarm information, status, and test results. Firmware automatically reports in-line error conditions, which results in media server-controlled testing.

There are instances where the service state of a station is mentioned. The different service states that apply to a remote digital line station are as follows:

Table 8-543. Remote Digital Line Station Service States

Out-of-Service	The port, and thus the station, have been removed from service. Busyout puts the port in the out-of-service state.
Ready-for-Service	The port on the circuit pack has been put into service, but the voice terminal has not yet established signaling communications with the port.
In-Service	The voice terminal has established signaling communications with the port, and the system is ready to process calls to and from that station. A terminal in the ready-for-service state will progress to the in-service state if it is functioning normally. It can also be forced into the in-service state by going off-hook.

Downloading of Terminal Parameters

Programmable Terminals

The following information describes how maintenance software interacts with terminal parameter downloading.

Terminal Types

a. 84xx multibutton digital voice terminals (8403D01A, 8410B, 8410D02A, 8434D01A) with optional expansion module.

b. 603A1 and 603D1 Callmaster terminals for telemarketing applications.

c. 302B1 and 302C1 attendant console.

Downloadable Terminal Parameters

The following parameters are downloaded to programmable terminals:

Table 8-544. Parameters Downloadable to Programmable Terminals

Parameter	Scope	Terminal
International Flags (A-law/mu-law, Display Mode, DLI Voltage level)	System level	84xx, 603x, 302B1
Primary Levels (Transmission and Sidetone)	System level	84xx, 603x, 302B1
Adjunct Levels (Transmission and Sidetone)	System level	84xx
Handset Expander Option	System level	84xx
Administrable Options (Speakerphone and Mute Button)	Per-terminal	84xx
Administrable Softkeys	Per-terminal, System level	8410D, 8434D

Nonvolatile Memory

Nonvolatile memory stores downloadable parameters in programmable terminals. Once the terminal is downloaded, it is not be necessary to download it again, even if power is removed from the terminal. If nonvolatile memory fails with power still present, the terminal reverts to its default factory settings except for its A-law/mu-law companding settings which are stored in RAM. If power is removed after the nonvolatile memory fails, the terminal reverts to its factory default settings.

NOTE:
The mu-law companding mode is assigned as a default setting at the factory. For the United States, a programmable terminal can place calls even though it has not been downloaded from the system.

Download Actions

There are several different scenarios which causes a terminal to be downloaded. These can occur as part of background maintenance activity or on demand from the SAT (System Access Terminal) or from a station.

For the background actions described below, the terminal downloads automatically if a download retry flag for the terminal is set in software. This flag is set at the time translation is loaded at boot time, when the translation that affects the parameters of a terminal is changed as part of system administration actions, or when a port is inserted in software as a result of board insertion or translation change.

Automatic Download Actions

1. System Reboot/Restart

   A global download action is initiated when periodic maintenance tests begin after a system reboot/restart, regardless of whether the parameters have been downloaded previously.

2. Periodic tests

   If the download flag is still set when periodic tests are run on a terminal, a download action will occur. This action is required in case a terminal could not be downloaded previously, either because the terminal was off-hook when the:

   - System first booted
   - Translations associated with downloadable parameters were changed.

   NOTE:
   It may take more than an hour for periodic tests to reach the terminal that needs to be downloaded.

3. Terminal Administration

   A downloadable terminal is *automatically* downloaded when translation changes associated with downloadable parameters are made as part of system administration. As shown in the previous table, these changes can be for a specified terminal or may be system-wide. If the change is for a system-level parameter, a background global update request must be submitted to download every programmable terminal.

   NOTE:
   This global update may take more than an hour for a system with several thousand programmable terminals.

4. Port Insertion

   Whenever maintenance software initiates a request to place a port into service, a terminal download action is begun on that terminal, if that terminal is programmable. This port insertion action occurs under the following circumstances:

   - A digital line circuit pack that is physically inserted into the system and has ports currently administered for programmable terminals.
   - A station port is added to the system by an **add station** or **change station** command.
   - A TTI port is activated.

5. Audits

   As part of periodic maintenance, the Hardware Status Audit test queries programmable terminals to determine which levels and/or options are being used. If the reported values are not equal to the administered values, the system will initiate a terminal download action; however, this audit does NOT check the parameters used for softkeys.

6. Activation of TTI

   A terminal is downloaded automatically when it is activated using the TTI (Terminal Translation Initialization) feature. Therefore, no special user actions are required for TTI.

   NOTE:
   Plugging the station cord into a terminal does not automatically cause the terminal to be downloaded. If this terminal has factory defaults or if the terminal has been previously downloaded with parameters different than those desired, use one of the demand download actions described below to download the terminal.

Demand Download Actions

1. Busyout/Release Command

   A maintenance demand busyout/release request for a station will cause the terminal to be downloaded regardless of its previous download status.

2. Feature Access Code

   A Refresh Terminal Parameters Feature Access Code can be used to request a terminal download action. When this code is followed by a "#", the programmable parameters for the current terminal are downloaded when the terminal goes on-hook. When this code is followed by an extension, the programmable parameters for the specified station are downloaded.

   This Refresh Terminal Parameters Feature Access Code is assigned on the second page of the **feature-access-codes** screen.

A confirmation is returned if the download request is accepted. A busy tone is returned if the request is made from a different station when the target station is off-hook.

As a result of an entry of a Refresh Terminal Parameters Facility Access Code, the first three green call appearance LEDs on the 84xx 603x terminal are turned on for three seconds, if the station was successfully downloaded. This is not true for the 302B1 terminal.

There is no visible display on a station for the other background or demand download actions. As described below, the **status station** and **status attendant** screens can be used to check the download status of a specified terminal.

Status of Parameter Downloads

The **status station** and **status attendant** screens display the current download status of individual 84xx, 603, and 301B1 terminals in the `Download Status` field. The possible download states are:

Status	Terminal Download State
Complete	The terminal successfully downloaded sometime in the past.
Pending	The system is waiting to download the terminal. This may require the execution of a background periodic test, which could take more than an hour. A demand download as described above may also be used to initiate an immediate download.
Not Applicable	Not a programmable terminal.

Possible reasons for no terminal download include:

- Terminal is off-hook.
- Terminal detected a bad checksum.
- Terminal detected a bad or missing EEPROM (refer to hardware error log).
- Terminal is busy programming data from a previous PROGRAM message.
- Terminal is in the Programming Disabled state.
- Terminal is in the Local Program Options mode.
- Terminal is disconnected or out of service (use **status station** command).

Table 8-545. Digital Line Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp* sh r 1**
1 (a)	1 – 20, 40987	None	WARNING	OFF	
18 (b)	0	**busyout port *UUCSSpp***	WARNING	OFF	**re port *UUCSSpp***
257 (c)	40971	None			
513 (d)	0	Station (Digital) Audits test (#17)	WARNING	OFF	**test port *UUCSSpp* sh r 6**
767 (e)	40964	None	WARNING	OFF	
769 (f)	40963, 40988	None	WARNING	OFF	
1025 (g)		None	WARNING	OFF	
1281	Any	Station (Digital) Audits test (#17)	WARNING	OFF	**test port *UUCSSpp* sh r 4**
1537 (h)	40968	None	WARNING	OFF	
2304 (i)		None			
2305 (j)	32770, 40967	None			
2817 (k)		Hyperactive	MINOR	OFF	
3840 (l)	40965, 40989	None			
3841 (m)	41029	None			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. **Error type - 1**; **with Aux Data of 40987**—Could be caused by a noisy port or link. This is an off-board problem detected by the port circuit. Check for defective wiring, a defective voice terminal, or move the voice terminal closer to the switch (in terms of feet of wire from the jack to the switch). If the problem persists, replace the circuit pack. Once the problem has been resolved, the alarm disappears after a predetermined amount of time.

   Error Type - 1; with Aux Data of 1 to 20—Occurs when at least 15 off-board problems have been detected with the link to the terminal. When an error with the link is detected, an on-board counter is incremented.

   The user could experience a noisy port or link. This is an off-board problem detected by the port circuit. Check for defective wiring, a defective voice terminal, or move the voice terminal closer to the switch (in terms of feet of wire from the jack to the switch). If the problem persists, replace the circuit pack. Once the problem has been resolved, the alarm disappears after a predetermined amount of time.

b. **Error Type - 18**—Logged when the port in question is busied out by maintenance personnel. Make sure the port is released from busyout by the **release port *UUCSSpp* | *PCSSpp*** command.

c. **Error Type - 257—**Indicates problems transmitting to the voice terminal, which can be caused by defective wiring. Defective wiring can cause varying degrees of problems on different types of sets.

d. **Error Type - 513**—The result of an ID Request failure to respond to the digital endpoint audit.

e. **Error Type - 767**—An in-line event produces this error type when a favorable response is received from running the Digital Line Electronic Power Feed test (#11). No craft action is necessary. This alarm will be resolved with the passing of time.

f. **Error Type - 769; with Aux Data 40963**—The result of an unfavorable response to the Electronic Power Feed/ Positive Temperature Coefficient test (#11).

   Error Type - 769; with Aux Data 40988—Indicates that the EPF/PTC circuit has been turned off due to an overcurrent condition.

   Once the problem has been resolved, it may take up to one hour for the alarm to clear due to the “leaky bucket” strategy. If the problem cannot be resolved by one of the steps above, then replace the circuit pack.

g. **Error Type - 1025**—A problem with the voice terminal EEPROM. When the voice terminal is repaired the alarm will be resolved with the passing of time.

h. **Error Type - 1537**—An in-line maintenance error has generated an off-board warning due to a problem with the link to the voice terminal. This can be ignored if no user complaints are received. Otherwise, make sure the voice terminal is connected, check for defective wiring, check for a defective voice terminal, and move the voice terminal to a jack that is closer to the switch (in terms of feet of wiring between the jack and the switch). If the problem persists, replace the circuit pack. Once the problem has been resolved, the alarm disappears after a predetermined amount of time.

i. **Error Type - 2304**—Internal system error. No action is necessary.

j. **Error Type - 2305; with aux data 32770**—Indicates that the station went off-hook while it was in the ready-for-service state. Use the **status station** command to determine the state of the station. The off-hook should have moved the station to ready-for-service. No craft action is necessary.

   Error Type - 2305; with aux data 40967—Indicates that an in-line maintenance error has generated an off-board warning due to a problem with the link to the voice terminal. This can be ignored if no user complaints are received. Otherwise, make sure the voice terminal is connected, check for defective wiring, check for a defective voice terminal, and move the voice terminal to a jack that is closer to the switch (in terms of feet of wiring between the jack and the switch). If the problem persists, replace the circuit pack. Once the problem has been resolved, the alarm disappears after a predetermined amount of time.

k. **Error Type - 2817**—Indicates that the endpoint caused a large number of control channel messages to be sent to the switch within a short period of time (50 or more CCMS uplinks within 10 seconds). The station will be taken out-of-service for 30 seconds due to the hyperactivity. This may be completely normal during heavy traffic periods.

l. **Error Type - 3840; with aux data 40965**—Indicates that no terminal is connected to the COMBO board. No maintenance action is required. This is also the code that is generated when the link between the circuit pack and the voice terminal is successfully reset. No craft action is necessary.

   Error Type - 3840; with aux data 40989—Indicates an uplink message has been logged indicating that the Electric Power Feed (EPF) is on with no load on it. No action is necessary. No craft action is necessary.

m. **Error Type - 3841**—The circuit pack's message buffer is full. This may be caused by having many display phones with heavy traffic connected to the circuit pack. No action is necessary.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below. For example, by clearing error codes associated with the Digital Line Electronic Power Feed test (#11), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Digital Line Electronic Power Feed test (#11)		X	ND
DIG-LINE Station Lamp Updates test (#16)	X	X	ND
Station (Digital) Audits test (#17)	X	X	ND

1. D = Destructive; ND = Nondestructive

Digital Line Electronic Power Feed/Positive Temperature Coefficient/PPF Test (#11)

This is an Electronic Power Feed (EPF) restoration test. In this test, the processor requests that the EPF be turned on for a given port, and an attempt is made to turn on the power supply to the station. If no current is drawn, the station is probably not connected. If an overcurrent condition is sensed, there may be a short in the loop. A message is returned reporting that either the EPF was successfully turned on, or that an overcurrent condition was sensed. This test is repeated again 5 seconds later.

Table 8-546. Test #11 Digital Line Electronic Power Feed Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Enter **display port *UUCSSpp*** to determine the station extension or attendant number of the port. Use **status station** or **status attendant** to determine the service state of the port. If the port is in use, wait until the port is idle before testing. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	Electronic Power Feed test passed. The message to turn on the power to the station was successfully sent to the port. 1. Although this test will never actually return a FAIL result except for the Internal system error described above, it will log an error indicating the real results of the test. Check the Error Log for any entries with Error Types 767 or 769 after the test completes. 2. If Error Type 767 appears in the Error Log, the test sensed no problems with the power to the station. To verify that the station is powered up correctly, run a self-test on the station and verify that every feature button is operating. 3. If Error Type 769 appears in the Error Log, this indicates some problem with the power to the station. Check for a short in the wiring, a damaged jack, a defective voice terminal, or an incorrect type of terminal.

DIG-LINE Station Lamp Updates Test (#16)

This test lights every lamp on the terminal as specified. The lamp updates will run only if the station is in-service. The status of the station is checked and the lamp updates are blocked from taking place, if the station is not in the in-service state. This test does not affect the status of the Message Waiting lamp.

Table 8-547. Test #16 DIG-LINE Station Lamp Updates Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1	ABORT	This port may have been busied out by system technician. 1. Look in the Error Log for Error Type 18 (port busied out) for this port. If this error type is present, then release the port using the **release station** *extension* command and run the test again. 2. Make sure that the terminal is connected. 3. Retry the command at 1-minute intervals up to 5 times.
3	ABORT	Station may be in ready-for-service or out-of-service state. 1. Use the **status station** command to verify the state of the station. 2. Make sure the terminal is connected. 3. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. Use **display port *UUCSSpp*** to determine the station extension or attendant number of the port. Use **status station** or **status attendant** to determine the service state of the port. If the port is in use, wait until the port is idle before testing. Attendants are always in use (off-hook) if the handset is plugged in and the port is not busied out. 1. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1392	ABORT	The port is currently a TTI port and the test will not execute on it. 1. Verify that the port is a TTI port using either the **display port** command (the display shows that the port is a TTI port) or the **list config** command (the display shows a `t` for the port). 2. If either **list config** or **display port** indicates that the port is *not* a TTI port, escalate the problem. If both commands indicate that the port is a TTI port, the abort is correct, and no action is necessary.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-547. Test #16 DIG-LINE Station Lamp Updates Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The message to light every station lamp was sent successfully to the port. 1. Observe the station lamps being lit when running the test. If every lamps does not light, the other Digital Line test results may indicate related problems that do not allow the lamps to light. 2. Investigate by using other Digital Line port tests, and by examining the station, wiring, and connections.

Digital Station Audits Test (#17)

This is a series of six tests that are classified as audits. The media server sends messages to the on-board microprocessor to perform the tests. These audits run only if the station is in-service.

- Switchhook Inquiry test — This updates the media server's records according to the circuit pack's records. This inquiry is sent all the way to the voice terminal.
- Bad Scan Inquiry test — This sends an up-link message containing a generated count based on certain events relating to the link's conditions. This indicates communications problems between the media server and Digital Port circuit pack.
- EPF/PTC Inquiry test — This sends an up-link status message of the Electronic Power Feed (EPF). Possible conditions are: EPF-on-ok, EPF-off.
- ID Request test — This sends a status request to the station. The station returns its configuration information and health information. The information is checked, and a pass/fail result is provided.
- Ringer update — This updates the digital telephone's ringer state according to the media server's records.
- DTMF Administration update — This sends the digital station a message to refresh its default value (sending touch tones only) in the primary information channel. This value is initially set when the station is put in-service and each time the station's state changes from another state to in-service.

Table 8-548. Test #17 Station (Digital) Audits Test

Error Code	Test Result	Description / Recommendation
1	ABORT	Switchhook audit timed out. 1. Make sure voice terminal is connected and repeat test. 2. If test fails, replace voice terminal and repeat test.
2	ABORT	ID request fails, health bit returned from voice terminal is bad. 1. Make sure voice terminal is connected and repeat test. 2. If test fails, replace voice terminal and repeat test.
3	ABORT	The EPF has detected an overcurrent condition. 1. Use **test *UUCSSpp* long**. If Test #11 passes, then the EPF condition was cleared. Rerun the short test sequence. If Test #11 does not pass, follow the repair procedures described for Test #11. 2. Look for Error Type 769 logged against RDIG-STA, and follow the procedures in the associated footnote. If any additional problems are found, rerun the test.
4	ABORT	Internal system error 1. Resolve any outstanding circuit pack maintenance problems. 2. Retry the command at 1-minute intervals up to 5 times.
5	ABORT	Ringer update aborted due to station being in ready-for-service or out-of-service state.
6	ABORT	This port may have been busied out by a system technician. 1. Look in the Error Log for Error Type 18 (port busied out) for this port. If this error is present, release the port using the **release station** command. 2. Make sure that the terminal is connected. 3. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1392	ABORT	This port is currently a TTI port and the test will not execute on it. 1. Verify that the port is a TTI port using either the **display port** command (the display shows that the port is a TTI port) or the **list config** command (the display shows a `t` for the port). 2. If either **list config** or **display port** indicate that the port is *not* a TTI port, escalate the problem. If both commands indicate that the port is a TTI port, the abort is correct, and no action is necessary.

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Table 8-548. Test #17 Station (Digital) Audits Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received in the allowable time period.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	Station audits passed. This Digital Port circuit pack is functioning properly. 1. If complaints persist, investigate by using other port tests, and by examining the station, wiring, and connections.

REM-OFF (Remote Office)

`C-LAN Board Location`	The physical location of the circuit pack in CCcss format (cabinet, carrier, slot)
`Number of Routes Removed`	The number of routes that were deleted from the TN799DP (C-LAN) route tables
`Number of Routes Added`	The number of routes that were added from the TN799DP (C-LAN) route tables

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
REM-OFF	MINOR	**ping *node-name* | ip-address *addr***	Remote Office
REM-OFF	WARNING	**ping *node-name* | ip-address *addr***	Remote Office

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21).

An instance of this MO (REM-OFF) is associated with every Remote Office box that is administered on the switch. This MO monitors keep alive and periodic PING test failures, and if these errors occur, they are logged against this MO.

Error Log Entries and Test to Clear Values

Table 8-549. Analog Line Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1(a)		A ping test to an endpoint has failed	MINOR	OFF	**ping *node-name* | ip-address *addr***
257(b)	See note (b)	A keep alive update request has exceeded the time limit for an endpoint	Log only	OFF	**ping *node-name* | ip-address *addr***

Notes:

a. **Error Type - 1 —** indicates that a PING test to the Remote Office has failed, and a MINOR alarm has been raised.

   The PING test verifies that a path to a registered Remote Office is good. When this error is logged, as many as 26 endpoints (associated with that Remote Office) and several H.323 signaling groups could be out of service.

b. **Error Type - 257 —** A Keep-Alive Timer is set for every registered endpoint on the Remote Office. The switch expects keep-alive update information within a certain time period, and if that time limit is exceeded, an error is logged. The error is a log-only error, because there is no way to determine which entity has failed.

   However, the aux data associated with this error indicates whether the endpoint that failed to respond was a DCP, Analog, or Signaling Group type. Aux data with a value of:

   - 1096 = Analog Line
   - 1095 = DCP Line
   - 6179 = H.323 Signaling Group

System Technician-Demanded Tests: Descriptions and Error Codes

There are no demand tests for this MO, although the Remote Office can be pinged using the **ping ip | *node*** command.

RING-GEN

Analog Ring Generator

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
RING-GEN	MAJOR	**test environment *P***	Analog Ring Generator

1. P is the port network's number indicated in the PORT field from the Alarm or Error Log.

Analog phones must be provided with a voltage that allows them to ring. The Analog Ring Generator MO represents the device that provides the ringing voltage for every analog phone associated with a given cabinet. In a multicarrier cabinet, the ring generator resides in the power distribution unit. It is protected by a fuse located next to the main circuit breaker on the front of the unit. In single-carrier cabinets, the ring generator is part of the WP-91153 power supply. Failure of the ring generator results in loss of ringing on analog phones. Ringing on digital and hybrid phones is not affected.

The ringing voltage is monitored by the Tone-Clock circuit pack. In a port network with duplicated Tone-Clocks, the active Tone-Clock performs this function. In an PN made up of single-carrier cabinets, the Tone-Clock monitors the ringing voltage of only the carrier where it resides.

The TN2036 Voltage Range circuit pack provides easy access for testing the various voltages on the backplane pins. For more information, see Chapter 4, ''Alarms, Errors, and Troubleshooting''.

Error Log Entries and Test to Clear Values

Table 8-550. Analog Ring Generator Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test environment *UU***
1		Analog Ring Generator Query (#118)	MAJOR	ON	**test environment *UU* r 3**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the Analog Ring Generator Initialization test (#117), you may also clear errors generated from other tests in the testing sequence.

Table 8-551. Multicarrier Cabinet

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Analog Ring Generator Initialization test (#117)	X	X	ND
Analog Ring Generator Query test (#118)	X	X	ND
Battery and Battery Charger Query test (#5) (a)	X	X	ND
AC Power Query test (#78) (b)	X	X	ND
OLS Query test (Carrier E) (#127) (c)	X	X	ND
OLS Query test (Carrier D) (#127) (c)	X	X	ND
OLS Query test (Carrier A) (#127) (c)	X	X	ND
OLS Query test (Carrier B) (#127) (c)	X	X	ND
OLS Query test (Carrier C) (#127) (c)	X	X	ND
Emergency Transfer Query test (#124) (d)	X	X	ND
Cabinet Sensors Query test (#122) (e)	X	X	ND
External Alarm Lead Query test (#120) (f)	X	X	ND

1. D = Destructive, ND = Nondestructive

Notes:

a. See ''POWER'' on page 8-1302 for a description of this test.

b. See ''CARR-POW (Carrier Power Supply)'' on page 8-393 for a description of this test.

c. See EMG-XFER for a description of this test.

d. See ''CABINET (Cabinet Sensors)'' on page 8-383 for a description of this test.

e. See EXT-DEV for a description of this test.

Table 8-552. Single-Carrier Cabinet

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Analog Ring Generator Initialization test (#117)	X	X	ND
Analog Ring Generator Query test (#118)	X	X	ND
Single-Carrier Cabinet Power Query test (#79) (a)	X	X	ND
Emergency Transfer Query test (#124) (b)	X	X	ND
External Alarm Lead Query test (#120) (c)	X	X	ND

1. D = Destructive, ND = Nondestructive

Notes:

a. See DC-POWER for a description of this test.

b. See EMG-XFER for a description of this test.

c. See EXT-DEV for a description of this test.

Analog Ring Generator Initialization Test (#117)

The Analog Ring Generator Initialization test sends a request to the active TN768, TN780, TN2182 Tone-Clock or TN2312AP IPSI circuit pack's Tone-Clock circuit to monitor the voltage. The Tone-Clock responds with an error if the ringing voltage falls too low.

Table 8-553. Test #117 Analog Ring Generator Initialization Test

Error Code	Test Result	Description / Recommendation
1, 1000, 1001, 1003, 1115, 2012, 2100	ABORT	The system software is unable to determine the active Tone-Clock circuit pack, unable to allocated the resources necessary to run the test, or unable to send a down link message. 1. Wait for the green LED on the active Tone-Clock to go out; use the **status port-network** command to determine the active Tone-Clock circuit pack. 2. Rerun the test. If the test aborts again, see ''TDM-CLK (TDM Bus Clock)''.
2000	ABORT	Response to the request was not received within the allowable time period. 1. Look for TDM-CLK errors and alarms. Resolve every other Tone-Clock problem first. 2. Rerun the test.
	PASS	The active Tone-Clock has successfully been enabled to monitor the ringing voltage level.

Analog Ring Generator Query Test (#118)

The Analog Ring Generator Query test requests the active Tone-Clock circuit pack to check the ringing voltage. The Tone-Clock circuit pack replies with PASS if the ringing voltage is adequate to ring the analog phones. If not, the active Tone-Clock circuit pack replies with a FAIL.

Table 8-554. Test #118 Analog Ring Generator Query Test

Error Code	Test Result	Description / Recommendation
1, 1000, 1001, 1003, 1115, 2012, 2100	ABORT	Could not seize the resources to run the test. Other maintenance is running on the active Tone-Clock circuit pack. 1. Wait for the green LED on the active Tone-Clock circuit pack to go out; use the **status port-network** command to determine the active Tone-Clock circuit pack. 2. Rerun the test. If the test aborts again, see "TDM-CLK (TDM Bus Clock)" on page 8-1604.
2000	ABORT	Response to the request was not received within the allowable time period. 1. Look for TDM-CLK errors and alarms. Resolve every other Tone-Clock problem first. 2. Rerun the test.
	FAIL	The ringing voltage is below acceptable levels. Procedure for a **multicarrier** cabinet system: 1. If this is a duplicated system, then determine the active Tone-Clock circuit pack by issuing a **status port-network** command. Make the standby Tone-Clock circuit pack active via the **set tone-clock *PC*** command, and rerun the test. a. If the test passes, then the trouble is with the now standby Tone-Clock circuit pack. See "TONE-BD (Tone-Clock Circuit)" on page 8-1659 for details on replacing the standby Tone-Clock circuit pack. After the circuit pack is replaced, make this Tone-Clock active again by issuing the **set tone-clock *PC*** command, and rerun the test. b. If the test fails, then proceed with step 2. 2. Resolve CARR-POW alarms first, and then rerun the test. 3. Check fuse on the power distribution unit. Replace if it is open, and rerun the test. If the test still fails, then an analog line circuit pack could be defective and causing the ring generator and/or fuse to fail. 4. Unseat every analog circuit pack in the affected cabinet, and rerun the test. 5. If the test passes, then the ring generator is healthy, and one of the analog circuit packs is defective. Replace the analog circuit packs one at a time, and rerun the test to determine which circuit pack is causing the problem. When the defective analog circuit pack is found, replace it and rerun the test. If the test still fails, proceed with Step 6.

Continued on next page

Table 8-554. Test #118 Analog Ring Generator Query Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL *(cont'd)*	6. Since the test still fails, the ring generator is defective. a. If the reset button on the ring generator is out, press it in. b. Originate calls to several analog stations on different port circuit packs in different carriers in the affected port network. c. If called stations ring, the fault is cleared. Proceed to Step d. If no stations ring, replace the ring generator. d. Rerun the test. If the test still fails, proceed to Step 7. 7. The active Tone-Clock may be faulty and incorrectly reporting the level of the ringing voltage. Replace the active Tone-Clock, and rerun the test. See ''TONE-BD (Tone-Clock Circuit)'' on page 8-1659 for details on replacing the Tone-Clock. Rerun the test.
	FAIL *(cont'd.)*	Procedure for a **single-carrier** cabinet system: This failure indicates that there is no ringing voltage in the carrier where the active Tone-Clock circuit pack resides. Other carriers may or may not have ringing voltage. 1. If this is a duplicated system, determine the active Tone-Clock circuit pack by issuing a **status system** command. Make the standby Tone-Clock circuit pack active via the **set tone-clock *PC*** command, and rerun the test. a. If the test passes, then the trouble is with the "new" stand by Tone-Clock circuit pack. See ''TONE-BD (Tone-Clock Circuit)'' on page 8-1659 for details on replacing the standby Tone-Clock circuit pack. After the circuit pack is replaced, make this Tone-Clock active again by issuing the **set tone-clock *PC*** command and rerun the test. b. If the test fails, then proceed with Step 2. 2. Unseat every analog circuit pack in the cabinet that contains the active Tone-Clock circuit pack, and rerun the test. 3. If the test passes, then the ring generator is healthy and one of the analog circuit packs is defective. Replace the analog circuit packs one at a time, and rerun the test to determine which circuit pack is causing the problem. Replace the defective analog circuit pack. Rerun the test. If the test still fails, go to Step 4. 4. Replace the WP-91153 power unit for the affected carrier, and rerun the test. If the test still fails, go to Step 5. 5. The active Tone-Clock may be faulty and incorrectly reporting the level of the ringing voltage. Replace the active Tone-Clock, and rerun the test. See ''TONE-BD (Tone-Clock Circuit)'' on page 8-1659 for details on replacing the active Tone-Clock circuit pack. Rerun the test.
	PASS	The analog ringing voltage level is acceptable. For a single-carrier cabinet stack, ringing voltage is acceptable in the cabinet containing the active Tone-Clock circuit pack.

S-SYN-BD (Speech Synthesis Circuit Pack)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
S-SYN-BD	MINOR	**test board *UUCSS* sh**	Speech Synthesis circuit pack
S-SYN-BD	WARNING	**test board *UUCSS* sh**	Speech Synthesis circuit pack

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21).

See "XXX-BD (Common Port Circuit Pack)" on page 8-1872 for circuit pack-level errors. See also "S-SYN-PT (Speech Synthesis Port)" on page 8-1364 for related port information.

S-SYN-PT (Speech Synthesis Port)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
S-SYN-PT	MAJOR	**test port *UUCSSpp* sh**	Speech Synthesis port
S-SYN-PT	MINOR	**test port *UUCSSpp* l**	Speech Synthesis port
S-SYN-PT	WARNING	**test port *UUCSSpp* sh**	Speech Synthesis port

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21). pp is the 2-digit port number (01, 02,...).

The TN725B Speech Synthesis circuit pack provides four independent Speech Synthesis ports which may be connected to any of the voice time slots on the Time Division Multiplex (TDM) Bus. Each Speech Synthesis port consists of a speech synthesizer device (SSD) and is managed by a custom-coded programmable speech synthesizer (PSS) controller. The PSS controller is, in turn, controlled by the on-board microprocessor via a command interface specifically designed for this application. The PSS controller's main function is the orderly transfer of encoded speech from the speech vocabulary read-only memory (ROM) to the SSDs. The SSDs decode it and produce 64-kbps 5-255 PCM (Pulse Code Modulation) speech. The encoded speech is stored in up to 512 Kbytes of on-board ROM. In addition, each Speech Synthesis port has an associated dual-tone multifrequency receiver (DTMR) to receive touch-tone digits from a station set connected to the port via a voice time slot. The station set may be connected to the Speech Synthesis port through either a line or trunk circuit.

When there is an incoming call to a port, the "listen" network time slot is connected to the DTMF receiver input and the "talk" network time slot is connected to the SSD output. This enables the Speech Synthesis port to support speech synthesis features or touch-tone input with voice response features. Some of the features that use the Speech Synthesis port's capabilities include Leave Word Calling, Automatic Circuit Assurance, Automatic Wakeup (hotel-motel), and Do Not Disturb (hotel-motel).

The Speech Synthesis circuit pack should not be confused with the Announcement circuit pack. Different voice features are supported by each circuit pack.

Error Log Entries and Test to Clear Values

Table 8-555. Speech Synthesis Port Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp* sh r 1**
1 (a)	17672	None			
18	0	**busyout port *UUCSSpp***	WARNING	OFF	**release port *UUCSSpp***
130 (b)		None	WARNING	ON	**test port *UUCSSpp* sh**
257		Speech Synthesis PSS Handshake test (#168)	MAJOR	ON	**test port *UUCSSpp* sh r 2**
513	17922	Speech Synthesis Memory test (#166)	MINOR	ON	**test port *UUCSSpp* sh r 2**
769	17664	Speech Synthesis DTMF Receiver Inquiry test (#164)	MINOR	ON	**test port *UUCSSpp* sh r 2**
1025	17670	Speech Synthesis SSD Inquiry test (#167)	MINOR	ON	**test port *UUCSSpp* sh r 2**
1281		Speech Synthesis DSP Tone test (#165)	MINOR	ON	**test port *UUCSSpp* sh r 2**
1537		Speech Synthesis Memory test (#166)	MINOR	ON	**test port *UUCSSpp* sh r 2**
1793		Speech Synthesis DTMF Receiver test (#163)	MINOR	ON	**test port *UUCSSpp* l r 2**
2049 (c)		Conference Circuit test (#7)	MINOR	ON	**test port *UUCSSpp* l r 2**
2305		NPE Crosstalk test (#6)	MINOR	ON	**test port *UUCSSpp* l r 2**
3840 (d)	Any	None			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. An in-line failure of the on-board microprocessor/PSS handshake has occurred. Refer to Test #168 for repair procedures.

b. This error type indicates that the circuit pack been removed or has been insane for more than 11 minutes. To clear the error, reinsert or replace the circuit pack.

c. A transient error that does not cause an alarm can occasionally occur during a server, TDM bus, or Tone-Clock interchange. Test the port, and follow the instructions for the Conference test (#7).

d. This error is not service-affecting, and no action is required.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *NPE Crosstalk* test (#6), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Speech Synthesis PSS Handshake test (#168)	X	X	ND
NPE Crosstalk test (#6)		X	ND
Conference Circuit test (#7)		X	ND
Speech Synthesis DTMF Receiver test (#163)		X	ND
Speech Synthesis Memory test (#166)	X	X	ND
Speech Synthesis DSP Tone test (#165)	X	X	ND
Speech Synthesis SSD Inquiry test (#167)	X	X	ND
Speech Synthesis DTMF Receiver Inquiry test (#164)	X	X	ND
Speech Synthesis Parameter Update test (#169)	X	X	ND

1. D = Destructive, ND = Nondestructive

NPE Crosstalk Test (#6)

The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may occur. This test is usually only part of a port's long test sequence and takes about 20 to 30 seconds to complete.

Table 8-556. TEST #6 NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (amber LED is off) before retesting. 1. If the port is idle, retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-556. TEST #6 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
1001	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present or some Tone Detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test and the test has been aborted. Wait until the port is idle (amber LED is off) before retesting. 1. Retry the command at 1-minute intervals up to 5 times.
1020	ABORT	The test did not run due to an already existing error on the specific port or a more general circuit pack error. 1. Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The NPE of the tested port was found to be transmitting in error. This will cause noisy and unreliable connections. 1. Replace the circuit pack.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and by examining the Error Log.

Conference Circuit Test (#7)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM-bus interface. The NPE controls port connectivity and gain, and provides conferencing functions on a per-port basis. The Conference Circuit test verifies that the NPE channel for the port being tested can correctly perform the conferencing function. The NPE is instructed to listen to several different tones and conference the tones together. The resulting signal is then measured by a Tone Detector port. If the level of the tone is within a certain range, the test passes.

Table 8-557. TEST #7 Conference Circuit Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (amber LED is off) before retesting. 1. If the port is idle, retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test and the test has been aborted. Wait until the port is idle (amber LED is off) before retesting. 1. Retry the command at 1-minute intervals up to 5 times.
1020	ABORT	The test did not run due to an already existing error on the specific port or a more general circuit pack error. 1. Examine Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The NPE of the tested port did not conference the tones correctly. This causes noisy and unreliable connections. 1. Retry the test. 2. If the test continues to fail, then replace the circuit pack.
	PASS	The port can correctly conference multiple connections. User-reported troubles on this port should be investigated using other port tests and by examining the Error Log.

Speech Synthesis DTMF Receiver Test (#163)

A series of dual-tone multifrequency (DTMF) tones are conferenced from the TDM bus into the port's DTMF receiver and checked to see if the correct tones have been detected during the correct intervals. If every DTMF tone was detected correctly, the test passes. If any of the tones were not detected correctly, the test fails.

Table 8-558. TEST #163 Speech Synthesis DTMF Receiver

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (amber LED is off) before retesting. 1. If the port is idle, retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	DTMF tones were not detected. This type of failure may cause features using touch-tone input to the Speech Synthesis port to malfunction. 1. Verify that the Tone-Clock circuit is functioning correctly by checking the Error Log and using the **test tone-clock long** command. 2. If the test fails again, replace the Speech Synthesis circuit pack.
	PASS	The port has detected every DTMF tone correctly. User-reported troubles should be investigated using other tests and by verifying other ports on this circuit pack are working correctly.

Speech Synthesis DTMF Receiver Inquiry Test (#164)

This test determines the sanity of the port's dual-tone multifrequency (DTMF) receiver. The on-board microprocessor tests the port's DTMF receiver and determines if it is in a sane (test passes) or insane (test fails) condition.

Table 8-559. TEST #164 Speech Synthesis DTMF Receiver Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (amber LED is off) before retesting. 1. If the port is idle, retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The DTMF receiver for this port is insane. 1. If the test fails again, replace the circuit pack.
	PASS	The DTMF receiver for this port is sane. User-reported troubles should be investigated using other tests and by verifying other ports on this circuit pack are working correctly.

Speech Synthesis DSP Tone Test (#165)

The digital signal processor (DSP) associated with each port can generate a 440-Hz tone whose presence can be detected by TN748 General-Purpose Tone Detector circuits. A 440-Hz tone is generated for 500 ms on a specified time slot which is being listened to by the detector circuit. If the detector determines the tone is present on the time slot, the test passes; otherwise, it fails.

Table 8-560. TEST #165 Speech Synthesis DSP Tone Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (amber LED is off) before retesting. 1. If the port is idle retry the command at 1-minute intervals up to 5 times.
1001 1002 1003	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1021	ABORT	The 440-Hz tone was not detected by the Tone Detector circuit and inter-digit time-out has occurred on the Tone Detector circuit. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, verify that every Tone Detector circuit in the system is functioning correctly by checking the Error Log and using the **test board *UUCSS* long** command. Replace any faulty circuit packs containingTone Detector circuits, and repeat the test. 3. If the test continues to abort, replace the Speech Synthesis circuit pack.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The 440-Hz tone was not detected by the Tone Detector circuits. 1. If the test fails again, verify that every Tone Detector circuit in the system is functioning correctly by checking the Error Log and using the **test board *UUCSS* long** command. Replace any circuit packs containing faulty Tone Detector circuits, and repeat the test. 2. If the test fails again, replace the Speech Synthesis circuit pack.
	PASS	The 440-Hz tone has been detected correctly. User-reported troubles should be investigated using other tests and by verifying other ports on this circuit pack are working correctly.

Speech Synthesis Memory Test (#166)

The encoded speech for the Speech Synthesis circuit pack is stored in on-board read-only memory (ROM). A checksum is computed for each 32K speech memory block and compared against a known checksum value. If every computed checksum value is successfully compared against the stored checksum values, the test passes. If, while testing the speech complex memory, the on-board microprocessor finds a memory error, the test is terminated and a failure is reported. This type of failure may affect other ports on the Speech Synthesis circuit pack, resulting in errors or alarms on each port.

Table 8-561. TEST #166 Speech Synthesis Memory Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (amber LED is off) before retesting. 1. If the port is idle, retry the command at 1-minute intervals up to 5 times.
1019	ABORT	Test is already running on a different port, possibly due to background maintenance activity. Only one of these tests may be active on a circuit pack at a time. 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The computed checksum from the speech vocabulary ROM did not compare correctly with the stored checksum. This type of failure may cause features using the Speech Synthesis port's speech services to malfunction and result in degradation of synthesized speech quality ranging from insignificant to major. 1. Replace the circuit pack.
	PASS	The computed checksum values were successfully compared against the stored checksum values. User-reported troubles should be investigated using other tests and by verifying other ports on this circuit pack are working correctly.

Speech Synthesis SSD Inquiry Test (#167)

This test determines the sanity of the specified port's speech synthesis device (SSD). The on-board microprocessor tests the port's SSD and determines if it is in a sane (test passes) or insane (test fails) condition. Other ports on the Speech Synthesis circuit pack will continue to function correctly during this type of failure.

Table 8-562. TEST #167 Speech Synthesis SSD Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (amber LED is off) before retesting. 1. If the port is idle, retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The SSD is insane. 1. Replace the circuit pack.
	PASS	The SSD is sane. User-reported troubles should be investigated using other tests and by verifying other ports on this circuit pack are working correctly.

Speech Synthesis PSS Handshake Test (#168)

This test verifies control functionality between the on-board microprocessor and programmable speech synthesizer (PSS) controller. A failure occurs if either of the following events occur:

- The on-board microprocessor times out while waiting for the PSS controller to respond.
- An invalid command is received by the on-board microprocessor from the PSS controller.

This type of failure will affect all four ports on the Speech Synthesis circuit pack, resulting in errors or alarms on each port.

Table 8-563. TEST #168 Speech Synthesis PSS Handshake Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (amber LED is off) before retesting. 1. If the port is idle, retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The on-board microprocessor has timed out while waiting for the PSS controller to respond or an invalid command has been received by the on-board microprocessor from the PSS controller. This type of failure may cause features using the Speech Synthesis port's speech services to malfunction. 1. Replace the circuit pack.
	PASS	The on-board microprocessor/PSS handshake is working correctly. User-reported troubles should be investigated using other tests and by verifying other ports on this circuit pack are working correctly.

Speech Synthesis Parameter Update Test (#169)

This test updates the dual-tone multifrequency (DTMF) interdigit time-out parameter used by the Speech Synthesis circuit pack so that it is consistent with that specified by the server.

Table 8-564. TEST #169 Speech Synthesis Parameter Update Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call and therefore unavailable for certain tests. Wait until the port is idle (amber LED is off) before retesting. 1. If the port is idle, retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	An internal system error has occurred.
	PASS	The DTMF interdigit time-out parameter has been updated. 1. User-reported troubles should be investigated using other tests and by verifying that other ports on this circuit pack are working correctly.

SN-CONF (Switch Node Configuration)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
SN-CONF	MAJOR	**test board *UUCSS* s**	Switch Node Configuration
SN-CONF	MINOR	**test board *UUCSS*[2]**	Switch Node Configuration

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01 – 21). pp is the 2-digit port number (01, 02, ...).

2. If the error and alarm logs display the switch node carrier location UUC, (cabinet and carrier only), run the *long* test sequence on the active SNC in the carrier, (slot 10 or 12). If the error and alarm logs display a circuit pack location, UUCSS, run the *short* test sequence on the alarmed SNI.

A switch node carrier contains:

- Up to 16 Switch Node Interface (SNI) TN573 circuit packs in slots 2 through 9 and slots 13 through 20
- One or two Switch Node Clock (SNC) TN572 circuit packs in slots 10 and 12
- An Expansion Interface (EI) TN570 circuit pack, a DS1 Converter (DS1C) TN574 circuit pack, or no circuit pack in slot 1
- An optional DS1 CONV circuit pack in slot 21

SN-CONF errors and alarms are generated for two types of failures:

1. Failure of a board in the switch node carrier to insert (be detected by software).
2. A problem found by running the Configuration Audit test (#759). Test 759 is executed for either an SNI or SNC circuit pack during scheduled maintenance or as part of the **test board *UUCSS* s** command.

   For SNI circuit packs, test 759 queries the SNI for SNCs in the same switch node carrier, SNI peers, DS1 CONVs, and EI or SNI neighbors that the SNI can communicate with and compares this data to the administered data.

   For SNC circuit packs, test 759 queries the SNC for SNCs and SNIs in the same switch node carrier that the SNC can communicate with and compares this data to the administered data.

Switch node carriers are part of port-network connectivity (PNC). For background information about PNC, refer to the Maintenance Architecture and Hardware Configurations chapters and related MOs.

Error Log Entries and Test to Clear Values

SN-CONF Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test board *UUCSS* sh r 1**
5000 (a)	Any	processor route audit (#760)	MINOR	OFF	**test board *UUCSS* l rep 1**
6000 (b)	1	configuration audit (#759)	MAJOR	OFF	**test board *UUCSS* rep 1**
6000 (b)	2	configuration audit (#759)	MAJOR	OFF	**test board *UUCSS* rep 1**
6001 (c)	Any	configuration audit (#759)	MAJOR	OFF	**test board *UUCSS* rep 1**
6002 (d)	1	configuration audit (#759)	MAJOR	OFF	**test board *UUCSS* rep 1**
6002 (d)	2	configuration audit (#759)	MAJOR	OFF	**test board *UUCSS* rep 1**
6003 (e)	Any	configuration audit (#759)	MAJOR	OFF	**test board *UUCSS* rep 1**
6004 (f)	Any	configuration audit (#759)	MAJOR	OFF	**test board *UUCSS* rep 1**
6005 (g)	Any	configuration audit (#759)	MAJOR	OFF	**test board *UUCSS* rep 1**
6005 (g)	1	configuration audit (#759)	MAJOR	OFF	**test board *UUCSS* rep 1**
6005 (g)	2	configuration audit (#759)	MAJOR	OFF	**test board *UUCSS* rep 1**
6006 (h)	Any	configuration audit (#759)	MINOR	OFF	**test board *UUCSS* rep 1**
6007 (i)	Any	configuration audit (#759)	MINOR	OFF	**test board *UUCSS* rep 1**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. At least one administered circuit pack in this switch node carrier was not inserted, or one or more administered circuit packs in this switch node carrier did not respond to Test 760 with a "board insertion" uplink message.

   To resolve this error, run test 760 via **test board *UUCSS* l** for an SNC in the same switch node carrier that has this error.

b. No neighbor link is administered but the SNI has one. If the aux data is 1, the type of neighbor connected is an EI. If the aux data is 2, the type of neighbor connected is an SNI.

   To resolve error type 6000 with aux data 1, refer to FAIL code 133 for test 759. To resolve error type 6000 with aux data 2, refer to FAIL code 134 for test 759.

c. No neighbor link exists between the SNI and its neighbor, but a neighbor link (i.e., fiber link) is administered.

   To resolve this error, refer to FAIL code 135 for test 759.

d. The physical neighbor type does not match administration. If the aux data is 1, the type of neighbor administered is an SNI and the type of neighbor connected is an EI. If the aux data is 2, the type of neighbor administered is an EI and the type of neighbor connected is an SNI.

   To resolve error type 6002 with aux data 1, refer to FAIL code 136 for test 759. To resolve error type 6002 with aux data 2, refer to FAIL code 137 for test 759.

e. The neighbor location does not match administration.

   To resolve this error, refer to FAIL code 138 for test 759.

f. A peer link does not exist to another equipped SNI. The aux data equals the slot number of the SNI to which this SNI or SNC does not have a peer link. To resolve this error, refer to the FAIL code for test 759 corresponding to the aux data on the following table:

Aux Data (slot no.)	Test 759 FAIL Code
2	102
3	103
4	104
5	105
6	106
7	107
8	108
9	109
13	113
14	114
15	115
16	116
17	117
18	118
19	119
20	120

g. A link does not exist to one of the SNCs. If the aux data is not 1 or 2, the link from this SNI to the active SNC does not exist. If the aux data is 1, the link from this SNC to the active SNC does not exist. If the aux data is 2, the link from this SNC to the standby SNC does not exist.

   To resolve this error, refer to FAIL code 112 for test 759.

h. The SNI is administered to be connected to a DS1C but is not.

   To resolve this error, refer to FAIL code 139 for test 759.

i. The SNI is connected to a DS1C, but no DS1C is administered.

   To resolve this error, refer to FAIL code 140 for test 759.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *Configuration* audit (#759), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
Configuration audit (#759)	X	X		ND
Processor Route audit (#760)		X		ND

1. D = Destructive, ND = Nondestructive

Configuration Audit (#759)

This test is nondestructive.

NOTE:
For descriptions of result codes for this test see:

- ''SNC-BD (Switch Node Clock Circuit Pack)'' when the circuit pack tested is a Switch Node Clock (circuit pack slots 10 or 12).
- ''SNI-BD (SNI Circuit Pack)'' when the circuit pack tested is a Switch Node Interface (circuit pack slots 2–9 or 13–20).

This test is run via the **test board short** or **test board long** command for SNI circuit packs or SNC circuit packs.

For SNI circuit packs, this test queries the SNI for SNCs in the same switch node carrier, SNI peers, DS1Cs, and EI or SNI neighbors that the SNI can communicate with and compares this data to the administered data.

For SNC circuit packs, this test queries the SNC for SNCs and SNIs in the same switch node carrier that the SNC can communicate with and compares this data to the administered data.

Failures of this test cause entries in the error and alarm logs against Switch Node Configuration (SN-CONF) with the board location of the SNI or SNC.

Incorrectly Connected Administered Fibers

Some physically connected fibers that do not match fiber administration can cause port network problems that are not detected and alarmed by PNC test. The symptoms will usually be phone calls not working correctly, and port network component alarms because of translation mismatches.

This test is unable to detect the case where an SNI is connected to the same type of board (EI or SNI) as administered but located in a different cabinet but the same carrier and same slot as the administered fiber endpoint. The administered fiber endpoint can be viewed with the **list fiber-link** command. This test can only detect if the fiber endpoint connected to the SNI is in a different carrier, slot location than the administered fiber endpoint.

Incorrectly Connected Administered SNI-to-EI Fibers

If the SNI is connected to the same type of fiber endpoint as the administered fiber endpoint, but the location is the same as administered except for the cabinet, every phone call will work incorrectly; some phone calls will not go through and others will ring the wrong phone.

The **test led** command can be used in this case to check connectivity.

1. Run the **test led port-network** command on each administered port network and verify that the LEDs on the correct port network are lit.
2. If they are not lit, check that the fiber connections to the port network are consistent with the administered fibers (**list fiber-link**) that does not light the LEDs as expected.
3. Run **test led switch-node** on each administered switch node carrier and verify that the LEDs on the correct carrier are lit.
4. If they are not, check the connectivity to the switch node carrier that does not light the LEDs as expected.

Incorrectly Connected SNI-to-SNI Fibers between Three Switch Nodes

If the system has more than 2 switch nodes, SNI-to-SNI fibers administered between 2 switch nodes could be incorrectly connected to a third switch node. This is a problem that could occur during installation or when inter-switch node fibers are changed. For multiple fibers to a distant switch node, an incorrect connection would not appear as a problem unless this fiber is used for a system-link to a port network connected to the distant switch node. The **status sys-link** command can be used to determine the boards in the path from an IPSI-connected EPN to another specific EPN. A specific SNI-to-SNI fiber connection must be in the system-link path to be checked with the port network LED test.

Forcing SNI-to-SNI Fiber Connection

To force an SNI-to-SNI fiber connection to be used as a system-link, remove every SNI-to-SNI connection except the fiber link being tested at the distant switch node by removing SNI boards in the distant switch node.

1. Use the **status sys-link** command to verify that the fiber selected for test is in the path to the EPN connected to the distant switch node that will be used for the LED test.
2. Run the **test led** sequence to a port network as described above to verify this fiber connection.
3. Repeat the above procedure for each of the SNI-to-SNI fibers terminating on the distant switch node.

Testing Multiple Fiber Connections

To test multiple fiber connections to a distant switch node:

1. Use the **list fiber-link** command to determine the number of SNI-to-SNI fibers that are administered to and terminate on the distant switch node.
2. Run the **test led port-network** command on an EPN connected to the distant switch node, and verify the LEDs on the correct EPN are lit.
3. Use the **status sys-link** command, and select the active EI in the IPSI-connected EPN connected to the distant EPN under test. (The display will show the path from the IPSI-connected EPN and the SNI-to-SNI fiber being used.)
4. If the EPN's LEDs are lit and there are multiple fibers to the distant switch node, remove the SNC that is listed by the **list fiber-link** command for this path.

   If not, enter the **list fiber-link** command to verify that the fiber connections to the EPN are consistent with the administration assignments.
5. Use the **status sys-link** command to determine the new path from the IPSI-connected EPN to the distant switch.
6. Run the **test led port-network** command on the port network connected to the distant switch node, and verify that the LEDs on the correct EPN are lit.
7. Repeat steps 4 – 6 until every SNI-to-SNI fiber connection to the distant switch has been tested.

Processor Route Audit Test (#760)

This test is nondestructive.

This test sends a processor route to every SNI in the carrier for which the **test board *UCSS*** command was run. A processor route enables an SNI board to send up-link messages to the server by providing the board with a specific sequence of boards for routing messages up to the server. Without a processor route, an SNI cannot send any in-line errors to the server.

As each SNI receives its processor route, the SNI returns a "board insertion" up-link message, and (if not already inserted) the server's software inserts that board. Depending on the configuration, each SNI board is sent either one or two processor routes.

Use **test led** or **list config carrier** to see whether the boards are inserted.

The processor route test is run as part of the long test sequence for SNC boards.

Table 8-565. TEST #760 Processor Route Audit Test

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2306	ABORT	None of the circuit packs in this switch node carrier are responding to the processor route messages sent by software. 1. Run **test led switch-node** for the switch node where this switch node carrier resides to verify whether the LEDs on any of the boards light. 2. If none of the LEDs light for the boards in this carrier, fix any problems associated with the connectivity of this carrier to the server. a. Use **list fiber-link** to determine the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with an IPSI-connected EPN. d. Also, follow the associated repair procedures for any SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries.

Continued on next page

Table 8-565. TEST #760 Processor Route Audit Test — *Continued*

Error Code	Test Result	Description / Recommendation
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
	FAIL	If this test fails, one or more administered circuit packs in this switch node carrier did not respond with a "board insertion" uplink message. Verify that administered SNI and SNC boards match the physically installed SNI and SNC boards by entering **list config carrier *UUC***. The command output will show "NO BOARD" for every board that is administered, but not inserted. ■ If every administered board is inserted, run this test again. ■ If administration does not match the physical configuration, and is *correct*, insert the missing circuit packs in this switch node carrier. ■ If administration does not match the physical configuration, and is *incorrect*, change the administration, and run this test again. ■ If *none* of the administered boards in this switch node carrier were inserted, fix any other SN-CONF errors by following the associated repair procedures for SN- CONF. Use **display errors** with category **pnc** to view SN-CONF errors. Next check if any INLs, LNLs, or RNLs are down with **list sys-link**. If any INLs, LNLs, or RNLs are down, see "SYS-LINK (System Links)" for fixing link problems.
	PASS	If this test passes, every administered circuit pack in this switch node carrier was inserted.

SNC-BD (Switch Node Clock Circuit Pack)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
SNC-BD	MAJOR	**test board *UUCSS* s**	SNC Circuit Pack
SNC-BD	MINOR	**test board *UUCSS* s**	SNC Circuit Pack

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (10 or 12).

The Switch Node Clock (SNC) TN572 circuit pack is part of the Center Stage Switch (CSS) configuration. It resides in a switch node carrier that alone or with other switch nodes make up a CSS. In a high-reliability system (duplicated server and control network, unduplicated PNC), each SNC is duplicated such that there are two SNCs in each switch node carrier. In a critical-reliability system (duplicated server, control network, and PNC), each switch node is fully duplicated, and there is one SNC in each switch node carrier. SNCs are placed in slots 10 and 12 of the switch node carrier.

The active SNC communicates with each circuit pack in the switch node carrier over the serial channel bus on the backplane. In addition, the active SNC provides timing to the circuit packs in the switch node carrier via the clock buses. The active SNC uses Timing Priority Number (TPN) links with each Switch Node Interface (SNI) and the other SNC to receive and distribute TPNs. TPNs are used for setting up the correct timing distribution for the switch node carrier. The active SNC receives timing for the switch node carrier from each SNI circuit pack in the carrier and chooses the SNI with the best timing reference for the switch node carrier timing signal the SNC puts out on the clock buses. The timing reference for each SNI is derived from the fiber signal to each SNI. The active SNC chooses the SNI to receive timing from by choosing the SNI with the lowest numbered TPN which means that the SNI is closest to the system timing source. The active SNC also verifies that the SNI reference signal is good before using that SNI as the timing reference for the switch node carrier. The active SNC then supplies this timing over the clock buses on the backplane to every SNI and SNC circuit pack in the carrier. For more information about timing synchronization (including how the SNC fits into the overall synchronization configuration), see ''SYNC (Port-Network Synchronization)'' on page 8-1509.

The SNC circuit packs are associated with three MOs:

- The "SNC-BD (Switch Node Clock Circuit Pack)" MO covers general SNC board errors and errors with the serial communication channel between the active and standby SNCs.
- The "SNC-LINK (Switch Node Clock Link)" MO covers errors between the active SNC and SNIs over the serial channel (aux data is 1). Also, the SNC-LINK MO covers TPN Link errors between the active SNC and SNIs (aux data is 2).
- The "SNC-REF (Switch Node Clock Reference)" MO covers errors the active SNC detects with SNI reference signals.

SNC circuit packs are part of port-network connectivity (PNC). For background information about PNC, refer to the Maintenance Architecture and Hardware Configurations chapters.

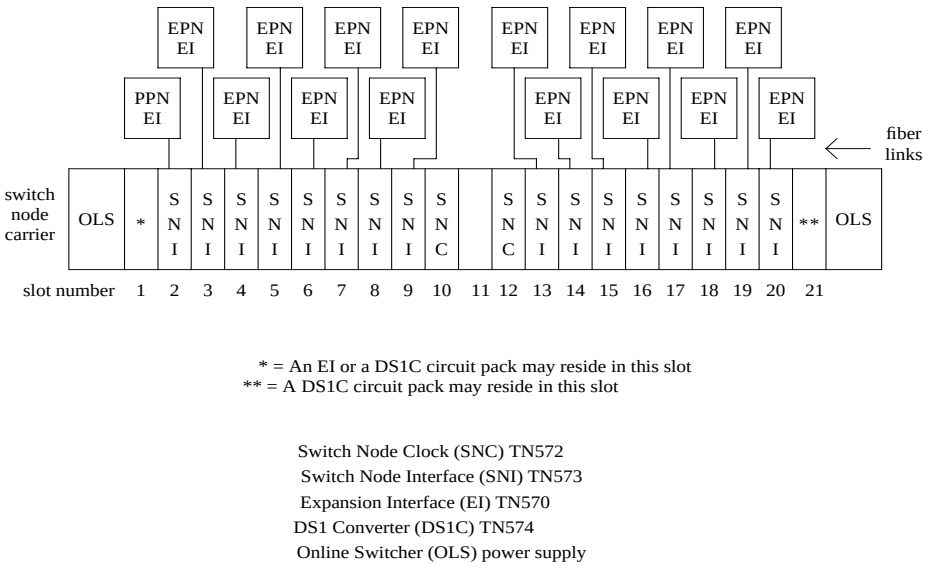

Figure 8-79. A Center Stage Switch Configuration

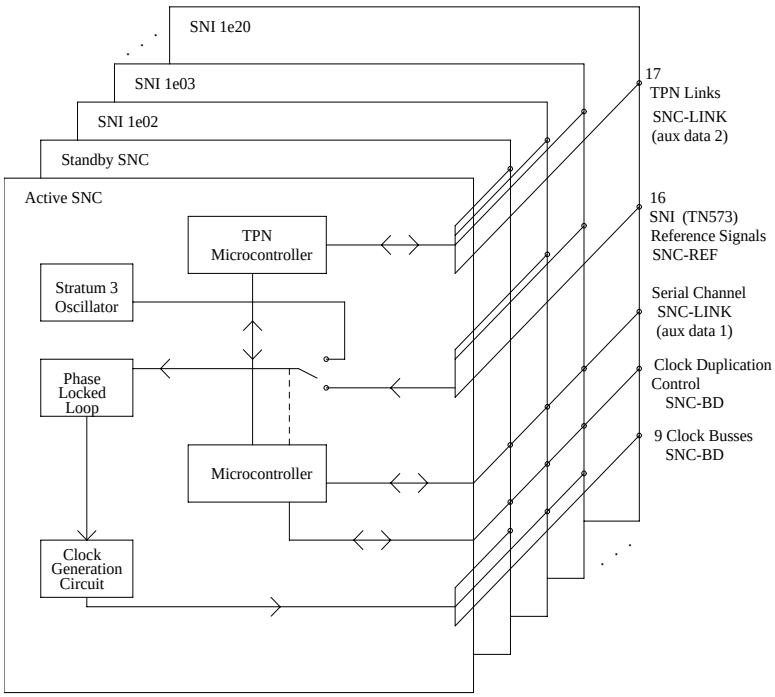

Figure 8-80. SNC Functions

SNC LEDs

SNC circuit packs have the standard red, green, and yellow LEDs. The red and green LEDs operate as usual: red means an alarm condition and green indicates maintenance testing in progress. If the yellow LED is lit, this indicates that the SNC is the active circuit pack, supplying timing to the carrier. In a duplex- or high-reliability system (unduplicated PNC), the standby SNC in a carrier is unlit. In a critical-reliability system (duplicated PNC), an SNC in a standby switch node carrier is lit since it is providing timing for the standby carrier.

Clear Firmware-Counters Command

SNC firmware generates error reports independently of technician-demanded tests. Therefore, the **test board *UUCSS*** clear command will not affect the error status reported by firmware. The **clear firmware-counters** command will clear every firmware-generated error unconditionally.

The **clear firmware-counters *UUCSS*** command sends a downlink message to the SNC circuit pack, causing it to clear out its firmware error counters and failure database. Once the firmware failure database is cleared, the failure audit test (#777) will pass. If problems still exist, the firmware will increment its error counters and the failure audit test will begin failing again.

This command should not be used as a replacement for the repair procedures associated with the hardware error log entries. This command may be useful if a problem has been fixed and off-board alarms associated with the problem are still active.

Replacing SNC Circuit Packs

WARNING:
Do not power down a Switch Node carrier to replace a circuit pack. Replacing an SNC on a system with unduplicated SNCs disrupts service.

High-Reliability System (Duplicated Server and SNCs, Unduplicated PNC)

This procedure is nondestructive.

1. If the SNC circuit pack to be replaced is the active SNC in the switch node carrier (yellow LED is on solid), first set the standby SNC to active via the **set switch-node-clock** command.
2. When the SNC circuit pack is in standby mode (yellow LED is off), pull out the SNC circuit pack to be replaced.
3. Insert a new SNC circuit pack.
4. Wait for the SNC to reset. (The red and green LEDs light and then go out.) The yellow LED should be off since the SNC circuit pack is in standby mode.

Critical-Reliability System (Duplicated Server and PNC)

WARNING:
On a system with duplicated PNC, synchronization may be provided over a combination of active and standby components. This condition is indicated by an OFF-BOARD WARNING alarm against TDM-CLK with error type 2305. Repairs to standby PNC in this state may disrupt service. Otherwise, if the active PNC is functional, replacement of a standby component will not disrupt service.

STEPS:

Enter **status pnc**	Verify that the component to be replaced is on the standby PNC.
Enter **busyout pnc**	
Enter **busyout board *UUCSS***	UUCSS represents the cabinet-carrier-slot address of the circuit pack to be replaced.
Replace the circuit pack	
Enter **release board *UUCSS***	**CAUTION:** *Do not busyout any Expansion Interface circuit pack after this point.*
Enter **test alarms long clear** for category **exp-intf**	
Wait 5 minutes for SNI-BD, SNI-PEER, FIBER-LK, and DS1C alarms to clear, or enter **clear firmware counters a-pnc | b-pnc**	Use the letter designation of the pnc which holds the replaced component (the standby pnc).
Enter **status pnc**	If either PNC's state of health is not "functional", consult "PNC-DUP (PNC Duplication)" on page 8-1283.
Enter **release pnc**	

Error Log Entries and Test to Clear Values

Table 8-566. SNC Board Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test board *UUCSS* r 1**
1 (a)	Any	Failure audit (#777)	MAJOR	ON	**test board *UUCSS* r 1**
18 (b)	0	**busyout board *UCSS***	WARNING	OFF	**release board *UCSS***
257 (c)	Any	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
513 (d)	Any	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
769 (e)	Any	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
1025 (f)	Any	Failure audit (#777)	MAJOR	ON	**test board *UUCSS* r 1**
1281 (g)	Any	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
1537 (h)	Any	Failure audit (#777)	MINOR	ON	**test board *UUCSS* r 1**
1793 (i)	Any	Failure audit (#777)	MAJOR	ON	**test board *UUCSS* r 1**
2049 (j)	Any	Failure audit (#777)	MAJOR	ON	**test board *UUCSS* r 1**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. Error type 1 indicates SNC on-board microcontroller error. (This occurs whenever the microcontroller sanity test fails, the ROM has problems, the processor internal or external RAM is faulty, or the firmware instruction test fails. In addition, this error indicates problems with the interrupt capabilities, the dual-port RAM and the RTM (real-time monitor) interface on the faceplate of the SNC.)

   Replace the SNC circuit pack.

b. This error indicates that the SNC circuit pack has been busied out via the **busyout board *UCSS*** command. To resolve this error, release the SNC circuit pack via the **release board *UCSS*** command.

c. These errors occur whenever firmware detects failure of the phase-locked loop, inability to lock, or failure of the clock drivers and the problem is off-board.

   1. Enter **display errors** and if SNC-BD error type 1793 exists in the hardware error log, follow the associated repair procedures for SNC-BD error 1793.

   2. Enter **display errors** and if no SNI-BD 1025 errors exist in the error log, replace the active SNC.

3. Enter **display errors** and if any SNI-BD 1025 errors exist in the error log, follow the associated repair procedure in the SNI-BD section for these errors.

d. This error occurs whenever the active SNC determines that there is a problem communicating with the standby SNC via the connecting serial channel.

   If the switch node carrier is administered with duplicate SNCs:

   1. If the standby SNC (the one with its yellow LED off) has this error, escalate the problem. (**Status switch-node** will also display the active and standby SNCs.)
   2. If the system originally had duplicate SNCs and the standby SNC was removed and never replaced and the active SNC has not been reset after the standby SNC was removed, this error will occur.

      If you do not intend to replace the SNC:

      a. Remove the standby SNC from circuit pack administration via **change circuit-pack**.

      b. If the problem persists, replace the active SNC circuit pack.

      Otherwise:

      a. Insert an SNC circuit pack.

   3. Check the error log via **display errors**. If SNIs in the switch node carrier also have problems communicating with the active SNC (i.e., error code 257 is logged against SNI-BD), then replace the active SNC.
   4. Replace the standby SNC circuit pack.
   5. Retry the **test board** command. Check the error log via **display errors**. If this error is still in the error log, replace the active SNC.

   If the switch node carrier is administered with only one SNC:

   1. If step 2 above does not apply, replace the SNC.

e. This error occurs whenever the standby SNC determines that there is a problem communicating with the active SNC via the connecting serial channel.

   1. If the active SNC (the one with its yellow LED on) has this error, escalate the problem. (**Status switch-node** will also display the active and standby SNCs.)
   2. Check the error log via **display errors**. If more than one SNI in the switch node carrier has problems communicating with the active SNC (i.e., error code 257 is logged against SNI-BD), then replace the active SNC.
   3. If a single SNI has SNI-BD error 257, replace the SNI circuit pack.

4. Replace the standby SNC circuit pack.
5. Retry the **test board** command. Check the error log via **display errors**. If this error is still in the error log, replace the active SNC.

f. This error occurs when the firmware detects problems with the various hardware circuit monitors (e.g., loss of reference monitor) that verify correct operation of the reference links.

   Replace the SNC circuit pack.

g. This error occurs when the firmware detects problems with the interface used to track the status of both SNCs when there are duplicated SNCs in a switch node carrier. When this error occurs, software may have incorrect information from SNC firmware for which SNC is active. Therefore, the yellow LEDs on the SNCs must be checked in the following repair procedure and the **status switch-node** command should not be used when this error type occurs.

   If the switch node carrier has duplicate SNCs:

   1. Replace the SNC that does not have its yellow LED lit.
   2. Retry the **test board** command. Check the error log via **display errors**. If this error is still in the error log, replace the SNC that has its yellow LED lit.

   If the switch node carrier has only one SNC, replace the SNC.

h. This error occurs whenever a loss of signal from the SNC on-board Stratum-3 oscillator is detected by the firmware.

   Replace the SNC circuit pack.

i. These errors occur whenever firmware detects failure of the phase-locked loop, inability to lock, or failure of the clock drivers and the problem is on-board.

   Replace the SNC circuit pack.

   If the error persists, follow normal escalation procedures.

j. This error occurs when the firmware detects problems with the microcontroller used for Timing Priority Number processing.

   Replace the SNC circuit pack.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *Configuration* audit (#759), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
Configuration audit (#759)	X	X		ND
Failure audit (#777)	X	X		ND
Processor Route audit (#760)		X		ND
SNC On-Board test (#778)	X	X		ND
TPN test (#779)	X	X		ND
Switch Node Clock Reset test (#780)			X	D

1. D = Destructive, ND = Nondestructive

NOTE:
Test #983 is not an actual demand maintenance test. This test number is used to report results of executing of the **clear firmware-counters** command. Refer to error codes for Test #777.

Configuration Audit (#759)

This test is nondestructive.

This test is run via the **test board short** or **test board long** command for SNC circuit packs.

For SNC circuit packs, this test queries the SNC for SNCs and SNIs in the same switch node carrier that the SNC can communicate with and compares this data to the administered data.

Failures of this test cause entries in the error and alarm logs against Switch Node Configuration (SN-CONF) with the board location of the SNC.

Table 8-567. TEST #759 Configuration Audit

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2306	ABORT	The SNC circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where this board resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNC may be service interrupting. See ''SNC-BD (Switch Node Clock Circuit Pack)'' on page 8-1384 for the procedure for replacing an SNC. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Check **list fibers** to determine the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors,** and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.

Continued on next page

Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
102	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 2. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 2. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: ■ If an SNI is not supposed to be installed in slot 2: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. ■ If an SNI is supposed to be installed in slot 2, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 2, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 1, replace the SNI in slot 2. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 1, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
103	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 3. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 3. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: ■ If an SNI is not supposed to be installed in slot 3: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. ■ If an SNI is supposed to be installed in slot 3, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 3, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 257, replace the SNI in slot 3. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 257, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
104	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 4. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 4. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: ■ If an SNI is not supposed to be installed in slot 4: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board** UUCSS. If the error still persists, replace the active SNC circuit pack. ■ If an SNI is supposed to be installed in slot 4, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 4, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 513, replace the SNI in slot 4. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 513, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
105	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 5. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 5. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: ■ If an SNI is not supposed to be installed in slot 5: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. ■ If an SNI is supposed to be installed in slot 5, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 5, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 769, replace the SNI in slot 5. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 769, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
106	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 6. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 6. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: ■ If an SNI is not supposed to be installed in slot 6: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. ■ If an SNI is supposed to be installed in slot 6, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 6, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 1025, replace the SNI in slot 6. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 1025, replace the SNC circuit pack.

Continued on next page

Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
107	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 7. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 7. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: ■ If an SNI is not supposed to be installed in slot 7: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. ■ If an SNI is supposed to be installed in slot 7, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 7, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 1281, replace the SNI in slot 7. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 1281, replace the SNC circuit pack.

Continued on next page

Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
108	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 8. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 8. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: ■ If an SNI is not supposed to be installed in slot 8: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. ■ If an SNI is supposed to be installed in slot 8, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 8, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 1537, replace the SNI in slot 8. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 1537, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
109	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 9. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 9. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: ■ If an SNI is not supposed to be installed in slot 9: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. ■ If an SNI is supposed to be installed in slot 9, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 9, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 1793, replace the SNI in slot 9. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 1793, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
112	FAIL	The SNC circuit pack cannot communicate with the other SNC. If this test was run on the active SNC and if the switch node carrier is administered with duplicate SNCs: 1. If the system originally had duplicate SNCs and the standby SNC was removed and never replaced, this error will occur. *If you do not intend to replace the SNC:* a. Remove the standby SNC from circuit pack administration via **change circuit-pack**. b. If the problem persists, reset the active SNC circuit pack via **reset board *UUCSS***. If the problem persists after the reset, replace the active SNC circuit pack. 2. Check the error log via **display errors**. If SNIs in the switch node carrier also have problems communicating with the active SNC (i.e., error code 257 is logged against SNI-BD), then replace the active SNC. 3. Replace the standby SNC circuit pack. 4. Retry the **test board** command. If this test continues to fail, replace the active SNC. If this test was run on the active SNC and if the switch node carrier is administered with only one SNC: 1. Replace the SNC.
112	FAIL *(cont'd)*	If this test was run on the standby SNC**:** 1. Check the error log via **display errors**. If more than one SNI in the switch node carrier has problems communicating with the active SNC (i.e., error code 257 is logged against SNI-BD), then replace the active SNC. 2. Replace the standby SNC circuit pack. 3. Retry the **test board** command. Check the error log via **display errors**. If this error is still in the error log, replace the active SNC.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
113	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 13. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 13. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: If an SNI is not supposed to be installed in slot 13: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. If an SNI is supposed to be installed in slot 13, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 13, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 2049, replace the SNI in slot 13. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 2049, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
114	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 14. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 14. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: If an SNI is not supposed to be installed in slot 14: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. If an SNI is supposed to be installed in slot 14, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 14, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 2305, replace the SNI in slot 14. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 2305, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
115	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 15. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 15. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: If an SNI is not supposed to be installed in slot 15: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. If an SNI is supposed to be installed in slot 15, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 15, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 2561, replace the SNI in slot 15. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 2561, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
116	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 16. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 16. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: If an SNI is not supposed to be installed in slot 16: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. If an SNI is supposed to be installed in slot 16, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 16, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 2817, replace the SNI in slot 16. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 2817, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
117	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 17. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 17. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: If an SNI is not supposed to be installed in slot 17: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. If an SNI is supposed to be installed in slot 17, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 17, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 3073, replace the SNI in slot 17. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 3073, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
118	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 18. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 18. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: If an SNI is not supposed to be installed in slot 18: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. If an SNI is supposed to be installed in slot 18, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 18, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 3329, replace the SNI in slot 18. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 3329, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
119	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 19. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 19. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: If an SNI is not supposed to be installed in slot 19: a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. If an SNI is supposed to be installed in slot 19, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 19, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 3585, replace the SNI in slot 19. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 3585, replace the SNC circuit pack.

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Table 8-567. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
120	FAIL	The SNC circuit pack cannot communicate with the SNI in slot 20. 1. If a standby SNC (one with its yellow LED off) was tested and resulted in this error code, follow normal escalation procedures. (**status switch-node** will also display the active and standby SNCs.) 2. Use **list configuration carrier** to determine whether an SNI is physically present in slot 20. If the `Vintage` field indicates that a circuit pack is present, proceed to step 3. If the `Vintage` field reports `no board`, do one of the following: If an SNI is not supposed to be installed in slot 20 a. This failure will not affect service. The missing SNI can be removed from administration with **change circuit-pack**. b. If the error persists, reset the active SNC circuit pack with **reset board *UUCSS***. If the error still persists, replace the active SNC circuit pack. If an SNI is supposed to be installed in slot 20, insert one. 3. **Display errors** for category **pnc**. If the SNC has SNC-BD error 513, or SNC-LINK errors with aux data 1 pointing to other SNIs besides the one in slot 20, replace the active SNC circuit pack. 4. If SNIs in the same carrier have SNI-BD error 257 logged, (indicating they are having trouble communicating with the SNC), replace the active SNC circuit pack. 5. If the SNC being tested has SNC-LINK error type 3841, replace the SNI in slot 20. Replacing an SNI may interrupt service. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 6. If the SNC being tested still has SNC-LINK error type 3841, replace the SNC circuit pack.
	PASS	The administered data and the circuit packs the SNC can communicate with match.
0	NO BOARD	No board was detected by the test. 1. Check that SNC board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNC should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNC. It may be necessary to use the **reset board** command if the SNC circuit pack gets into a mode where it cannot communicate with software. If an SNC with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

Processor Route Audit Test (#760)

This test is nondestructive.

This test sends a processor route to every SNI in the carrier for which the **test board *UCSS*** command was run. A processor route enables an SNI board to send uplink messages to the server by providing the board with a specific sequence of boards for routing messages up to the server. Without a processor route, an SNI cannot send any in-line errors to the server.

As each SNI receives its processor route, the SNI returns a "board insertion" uplink message, and (if not already inserted) the server's software inserts that board. Depending on the configuration, each SNI board is sent either one or two processor routes.

Use **test led** or **list config carrier** to see whether the boards are inserted.

Table 8-568. TEST #760 Processor Route Audit Test

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2306	ABORT	None of the circuit packs in this switch node carrier are responding to the processor route messages sent by software. 1. Run the **test led switch-node** for the switch node where this switch node carrier resides to verify whether the LEDs on any of the boards light. 2. If none of the LEDs light for the boards in this carrier, fix any problems associated with the connectivity of this carrier to the server. a. Use the **list fiber link** command to obtain a list of the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries.

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Table 8-568. TEST #760 Processor Route Audit Test — *Continued*

Error Code	Test Result	Description / Recommendation
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
	FAIL	If this test fails, one or more administered circuit packs in this switch node carrier did not respond with a “board insertion” uplink message. Verify that administered SNI and SNC boards match the physically installed SNI and SNC boards by entering **list config carrier *UUC***. The command output will show "NO BOARD" for every board that is administered, but not inserted. ■ If every administered board is inserted, run this test again. ■ If administration does not match the physical configuration, and is correct, insert the missing circuit packs in this switch node carrier. ■ If *none* of the administered boards in this switch node carrier were inserted, fix any other SN-CONF errors by following the associated repair procedures for SN-CONF. Use **display errors** with category **pnc** to view SN-CONF errors. Next check if any INLs, LNLs, or RNLs are down, see “SYS-LINK (System Links)” for fixing link problems.
	PASS	If this test passes, every administered circuit pack in this switch node carrier was inserted.
0	NO BOARD	No board was detected by the test. 1. Check that SNC board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNC should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNC. It may be necessary to use the **reset board** command if the SNC circuit pack gets into a mode where it cannot communicate with software. If an SNC with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

Failure Audit (#777)

This test is nondestructive.

This test queries an SNC for any existing failures and any unacknowledged "cleared failure" messages. Each failure generates an error and alarm entry against SNC-BD, SNC-LINK, or SNC-REF. A "cleared failure" message is a message an SNI circuit pack sends to software indicating the resolution of a previous failure. This message is "unacknowledged" if the SNI circuit pack never receives a response from software indicating it's own receipt of the original "cleared failure" message.

If no failures are detected by the SNC circuit pack, this test will pass.

If this test reports failures, the results screen for the **test board** command will show **FAIL** with no FAIL code. The error log must then be displayed via **display errors** with category PNC to view every SNC-related errors: SNC-BD, SNC-LINK, and SNC-REF.

Table 8-569. TEST #777 Failure Audit

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.

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Table 8-569. TEST #777 Failure Audit — *Continued*

Error Code	Test Result	Description / Recommendation
2306	ABORT	The SNC circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where this board resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNC may be service interrupting. See ''SNC-BD (Switch Node Clock Circuit Pack)'' on page 8-1384 for the procedure for replacing an SNC. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Use the **list fiber link** command to obtain a list of the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries.
	FAIL	The SNC circuit pack reported failures or retransmitted a “cleared failure” message. 1. Check the error and alarm logs for SNC-BD, SNC-LINK, or SNC-REF entries. Use the **display errors** and **display alarms** commands with category PNC. Fix any problems found by referring to the SNC Board, SNC Link, or SNC Reference Error Log Entries tables in this section and follow the associated repair procedures. 2. If no SNC-BD, SNC-LINK, or SNC-REF errors exist in the error and alarm logs, retry the command.
	PASS	No problems are detected on the board.

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Table 8-569. TEST #777 Failure Audit — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	No board was detected by the test. 1. Check that SNC board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNC should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNC. It may be necessary to use the **reset board** command if the SNC circuit pack gets into a mode where it cannot communicate with software. If an SNC with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

SNC On-Board Test (#778)

This test is nondestructive.

This test queries the SNC circuit pack for status of the background tests run on-board. These background tests include an SNC on-board microcontroller test, clock test, an SNC on-board Stratum-3 oscillator test, and TPN microcontroller test.

Table 8-570. TEST #778 SNC On-Board Test

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2303	ABORT	The SNC circuit pack responded that the software test requested is not valid. 1. Retry the command at 1-minute intervals up to 3 times.

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Table 8-570. TEST #778 SNC On-Board Test — *Continued*

Error Code	Test Result	Description / Recommendation
2304	ABORT	SNC firmware is not able to run the test. 1. Retry the command at 1-minute intervals up to 3 times.
2306	ABORT	The SNC circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where this board resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNC may be service interrupting. See ''SNC-BD (Switch Node Clock Circuit Pack)'' on page 8-1384 for the procedure for replacing an SNC. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Use the **list fiber link** command to obtain a list of the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries.
101	FAIL	The SNC circuit pack has on-board microcontroller failure.
128	FAIL	The SNC circuit pack has a problem with its clock; firmware has detected a phase-locked loop failure, an inability to lock, or a failure of the clock drivers.
129	FAIL	The SNC circuit pack has a problem with the SNC on-board Stratum-3 oscillator.
130	FAIL	The SNC circuit pack has a problem with the TPN microcontroller. 1. Replace the SNC circuit pack.
	PASS	No problems exist with the on-board functions verified by this test.

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Table 8-570. TEST #778 SNC On-Board Test — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	No board was detected by the test. 1. Check that SNC board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNC should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNC. It may be necessary to use the **reset board** command if the SNC circuit pack gets into a mode where it cannot communicate with software. If an SNC with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

TPN Test (#779)

This test is nondestructive.

This test queries the SNC circuit pack for status of the ROM and internal RAM background tests for the TPN microcontroller.

Table 8-571. TEST #779 TPN Test

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2302	ABORT	Software received unexpected message data from the SNC circuit pack. 1. Retry the command at 1-minute intervals up to 3 times.
2303	ABORT	The SNC circuit pack responded that the software test requested is not valid. 1. Retry the command at 1-minute intervals up to 3 times.

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Table 8-571. TEST #779 TPN Test — *Continued*

Error Code	Test Result	Description / Recommendation
2304	ABORT	SNC circuit pack responded that it is not able to run the test requested by software. 1. Retry the command at 1-minute intervals up to 3 times.
2306	ABORT	The SNC circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where this board resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNC may be service interrupting. See ''SNC-BD (Switch Node Clock Circuit Pack)'' on page 8-1384 for the procedure for replacing an SNC. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Use the **list fiber link** command to obtain a list of the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries.
	FAIL	The test failed. Replace the SNC circuit pack.
	PASS	No problems exist with the TPN microcontroller.
0	NO BOARD	No board was detected by the test. 1. Check that SNC board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNC should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNC. It may be necessary to use the **reset board** command if the SNC circuit pack gets into a mode where it cannot communicate with software. If an SNC with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

Switch Node Clock Reset Test (#780)

This test is destructive.

This test resets the SNC circuit pack via the **reset board *UUCSS*** command when an SNC circuit pack location is entered. If the system has PNC duplication, the active SNC on the active PNC cannot be reset.

If the SNC is active and the **reset board** command is executed, an SNI in the same carrier as the SNC will be told by software to reset the SNC via the TPN link. If no inserted SNIs in the same carrier as the SNC can successfully reset the SNC, software will send a “reset” message directly to the SNC. Software first tries to reset the SNC via an SNI in case the SNC is insane because the latter method (sending the “reset” message directly to the SNC) will not work if the SNC is insane.

If an active SNC is reset and a standby SNC exists in the same switch node carrier, the standby SNC will become active. The **reset board** command should not be used to make a standby SNC active. Instead, the **set switch-node-clock *UUCSS*** command should be used.

If the SNC is standby and the **reset board** command is executed, the active SNC is told by software to reset the standby SNC via the TPN link.

An SNC should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNC. It may be necessary to use the **reset board** command if the SNC circuit pack gets into a mode where it cannot communicate with software.

Table 8-572. TEST #780 Switch Node Clock Reset Test

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2302	ABORT	Software received unexpected message data from the SNC circuit pack. 1. Retry the command at 1-minute intervals up to 3 times.
2303	ABORT	The SNC circuit pack responded that the software test requested is not valid. 1. Retry the command at 1-minute intervals up to 3 times.

Continued on next page

Table 8-572. TEST #780 Switch Node Clock Reset Test — *Continued*

Error Code	Test Result	Description / Recommendation
2304	ABORT	SNC circuit pack responded that it is not able to run the test requested by software. 1. Retry the command at 1-minute intervals up to 3 times.
2306	ABORT	The SNC circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where the SNC resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNC may be service interrupting. See ''SNC-BD (Switch Node Clock Circuit Pack)'' on page 8-1384 for the procedure for replacing an SNC.. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Use the **list fiber link** command to obtain a list of the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
	PASS	The “reset” message was sent out successfully to the active SNC or to an SNI. A PASS does not necessarily mean the SNC circuit pack was successfully reset. The reset can be verified by checking that the red and green LEDs turn on and then turn off. If an SNC circuit pack fails one of the firmware tests run during its reset sequence, the red LED will stay on and the circuit pack should be replaced.

Continued on next page

Table 8-572. TEST #780 Switch Node Clock Reset Test — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	No board was detected by the test. 1. Check that SNC board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNC should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNC. It may be necessary to use the **reset board** command if the SNC circuit pack gets into a mode where it cannot communicate with software. If an SNC with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

Clear Firmware Counters (#983)

This test number is used to report unsuccessful results of the **clear firmware-counters** command. This is not an actual demand maintenance test. If the command aborts, refer to the error codes listed for Test #777.

SNC-LINK (Switch Node Clock Link)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
SNC-LINK	MINOR	**test board *UUCSS* s**	SNC Link

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (10 or 12).

The SNC-LINK MO reports errors in communications between the active Switch Node Clock and Switch Node Interfaces over the serial channel (aux data 1) and the TPN link (aux data 2). SNC-LINK errors are described on the following pages. For a complete description of SNCs and SNIs, including circuit pack replacement instructions, see MOs ''SNI-BD (SNI Circuit Pack)'' and ''SNC-BD (Switch Node Clock Circuit Pack)''.

Error Log Entries and Test to Clear Values

Table 8-573. SNC-LINK Hardware Error Log Entries

Error Type	Aux Data	SNI Slot[1]	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[2]	0		Any	Any	Any	**test board *UUCSS* r 1**
1	1 (a)	2	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
1	2 (b)	2	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
257	1 (a)	3	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
257	2 (b)	3	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
513	1 (a)	4	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
513	2 (b)	4	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
769	1 (a)	5	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
769	2 (b)	5	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
1025	1 (a)	6	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
1025	2 (b)	6	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
1281	1 (a)	7	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
1281	2 (b)	7	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
1537	1 (a)	8	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
1537	2 (b)	8	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**

Continued on next page

Table 8-573. SNC-LINK Hardware Error Log Entries — *Continued*

Error Type	Aux Data	SNI Slot[1]	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1793	1 (a)	9	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
1793	2 (b)	9	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
2049	1 (a)	13	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
2049	2 (b)	13	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
2305	1 (a)	14	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
2305	2 (b)	14	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
2561	1 (a)	15	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
2561	2 (b)	15	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
2817	1 (a)	16	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
2817	2 (b)	16	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
3073	1 (a)	17	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
3073	2 (b)	17	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
3329	1 (a)	18	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
3329	2 (b)	18	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
3585	1 (a)	19	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
3585	2 (b)	19	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
3841	1 (a)	20	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**
3841	2 (b)	20	Failure audit (#777)	MINOR	OFF	**test board *UUCSS* r 1**

1. The location of the SNI with which the SNC cannot communicate.
2. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. This error occurs whenever the active SNC determines that there is a problem communicating with an SNI circuit pack in the same carrier via the connecting multiprocessor serial channel used for transmitting CSCN messages. The slot location of the SNI with which the SNC cannot communicate is given in Table 8-573.

   1. Check the error log via **display errors**.
   2. If any SNI-PEER errors exist in the hardware error log, follow the associated repair procedures for SNI-PEER errors.

3. If the SNC has SNC-LINK errors with aux data of 1 against other SNIs and/or has SNC-BD error 513, replace the SNC circuit pack.
4. If SNIs in the same carrier have SNI-BD error 257 logged indicating they are having trouble communicating with the SNC, replace the SNC circuit pack.
5. Use **list configuration carrier** to determine whether an SNI is physically present in the slot pointed to by the SNC-LINK error. If the `Vintage` field indicates that a circuit pack is present, proceed to step 6. If the `Vintage` field reports `no board`, do one of the following:
   - If an SNI is not supposed to be installed in this slot:
   - Remove the SNI from circuit pack administration with **change circuit-pack**.
   - If the error remains, readminister the SNI circuit pack and then remove it from administration again.
   - If the error still remains, replace the active SNC circuit pack.
   - If an SNI should be installed in this slot, but is missing, insert an SNI circuit pack.
6. Replace the SNI that the SNC is complaining about.
7. Retry the command. If this error is still in the error log, continue with the following steps.
8. Replace the SNC circuit pack.
9. If a standby SNC (the one with its yellow LED off) has this error, escalate the problem. (**Status switch-node** will also display the active and standby SNCs.)

b. This error occurs whenever the active SNC determines that there is a problem communicating with an SNI circuit pack in the same carrier via the TPN communication channel. The slot location of the SNI with which the SNC cannot communicate is given in Table 8-573 on page 8-1422.

1. Check the error log via **display errors**. If more than one SNI in the same carrier have SNI-BD errors with error type 769, replace the SNC.
2. Check the error log via **display errors**. If the SNC has more than one SNC-LINK error with aux data of 2, replace the SNC.

3. Verify that the SNI the SNC is complaining about exists in the slot indicated by the error code. If the SNI does not exist:

   If you do not intend to replace the SNI:

   a. Remove the SNI from circuit pack administration via **change circuit-pack**.

   b. If the error remains, readminister the SNI circuit pack and then remove it from administration again.

   c. If the problem persists, replace the active SNC circuit pack.

   Otherwise:

   a. Insert an SNI circuit pack.

   If this step does not apply, continue with the following steps.

4. Replace the SNI circuit pack that the SNC is complaining about.
5. Retry the command. If this error is still in the error log, continue with the following steps.
6. Replace the SNC circuit pack.
7. If a standby SNC (the one with its yellow LED off) has this error, escalate the problem. (**Status switch-node** will also display the active and standby SNCs.)
8. Retry the command. If this error is still in the error log, escalate the problem.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *Configuration* audit (#759), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
Configuration audit (#759)	X	X		ND
Failure audit (#777)	X	X		ND
Processor Route audit (#760)		X		ND
SNC On-Board test (#778)	X	X		ND
TPN test (#779)	X	X		ND
Switch Node Clock Reset test (#780)			X	D

1. D = Destructive, ND = Nondestructive

See "SNC-BD (Switch Node Clock Circuit Pack)" on page 8-1384 for descriptions of tests and results.

SNC-REF (Switch Node Clock Reference)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
SNC-REF	MAJOR	**test board *UUCSS* s**	SNC Reference

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (10 or 12).

The SNC-REF MO reports errors in SNI reference signals detected by the active Switch Node Clock. Descriptions of SNC-REF errors are described on the following pages. For a complete description of SNCs and SNIs, including circuit pack replacement instructions, see MOs ''SNI-BD (SNI Circuit Pack)'' and ''SNC-BD (Switch Node Clock Circuit Pack)''.

Error Log Entries and Test to Clear Value

Table 8-574. SNC Reference Error Log Entries

Error Type	Aux Data	SNI Slot[1]	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[2]	0		Any	Any	Any	**test board *UUCSS* r 1**
1(a)	Any	2	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
257 (a)	Any	3	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS r 1***
513 (a)	Any	4	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
769 (a)	Any	5	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
1025 (a)	Any	6	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
1281 (a)	Any	7	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
1537 (a)	Any	8	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
1793 (a)	Any	9	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
2049 (a)	Any	13	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
2305 (a)	Any	14	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
2561 (a)	Any	15	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
2817 (a)	Any	16	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
3073 (a)	Any	17	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
3329 (a)	Any	18	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
3585 (a)	Any	19	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**
3841 (a)	Any	20	Failure audit (#777)	MAJOR	OFF	**test board *UUCSS* r 1**

1. The slot location of the SNI with which the SNC cannot communicate.
2. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. This error occurs whenever the active or standby SNC detects problems in its timing reference with an SNI circuit pack in the same carrier. The slot location of the SNI with which the SNC cannot communicate is given in the previous error table.

   If duplicated SNCs exist in the carrier:

   1. If the SNCs are duplicated in the carrier, check the error log via **display errors**. If both SNCs have this error, replace the SNI that the SNCs are complaining about.
   2. If the error occurred only on the standby SNC and the active SNC in the carrier does not have this error, reset the standby SNC via the **reset board** command. (The active and standby SNCs are displayed via **status switch-node**.) If this error comes back after the standby has been reset, replace the standby SNC.
   3. Retry the command. If this error is still in the error log, continue with the following steps.
   4. If the active SNC has this error, use the **set switch-node-clock** command to set the standby SNC to active. If the new active SNC had this error, replace the SNI that the SNC is complaining about. Otherwise, replace the SNC that originally had this error.

   If only one SNC exists in the carrier:

   1. Replace the SNI that the SNC is complaining about.
   2. Retry the command. If this error is still in the error log, continue with the following step.
   3. Replace the SNC.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *Configuration* audit (#759), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
Configuration audit (#759)	X	X		ND
Failure audit (#777)	X	X		ND
Processor Route audit (#760)		X		ND
SNC On-Board test (#778)	X	X		ND
TPN test (#779)	X	X		ND
Switch Node Clock Reset test (#780)			X	D

1. D = Destructive, ND = Nondestructive

See ‘‘SNC-BD (Switch Node Clock Circuit Pack)’’ on page 8-1384 for descriptions of tests and results.

SNI-BD (SNI Circuit Pack)

MO's Name As It Appears in Alarm Log	Alarm Level	Initial System Technician SAT Command to Run[1]	Full Name of MO
SNI-BD	MAJOR	**test board *UUCSS* s**	SNI Circuit Pack
SNI-BD	MINOR	**test board *UUCSS* s**	SNI Circuit Pack
SNI-BD	WARNING	**test board *UUCSS* s**	SNI Circuit Pack

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01 – 21).

The TN573 Switch Node Interface (SNI) circuit pack is part of the Center Stage Switch (CSS) configuration. It resides in a switch note carrier that alone or with other switch nodes make up a CSS. SNIs connect to other SNIs or Expansion Interface (EI) circuit packs via fiber links. SNI-to-EI fiber links are used to connect port networks to a switch node carrier and SNI-to-SNI fiber links are used as inter-switch node fibers. In critical-reliability systems, the fiber link connections are duplicated as part of port-network connectivity (PNC) duplication. In standard- and high-reliability systems, the PNC is not duplicated.

There may be up to 16 SNIs in a switch node carrier. They are located in slots 2 through 9 and slots 13 through 20. Slot 11 in a switch node carrier is not used. One or two TN572 boards (SNCs) must reside in switch node carrier positions 10 and 12. The SNIs connect to other SNIs in the same carrier via the backplane; these connections within the same carrier are referred to as peer-links. Each SNI also connects via an optical fiber or metallic connection to another SNI in another carrier or to an EI in an Expansion Port Network (EPN). These connections are referred to as fiber links.

The Switch Node Clock (SNC) provides timing for the SNIs in the entire carrier. When two SNCs reside in the same switch node carrier, one is in active mode and one is in standby mode. The yellow LED on the active SNC will be on solid. The yellow LED on the standby SNC will be off. See ''SYNC (Port-Network Synchronization)'' for an explanation of how SNIs are involved in timing synchronization.

Figure 8-81 on page 8-1430 shows an unduplicated CSS with one switch node. A single switch node can accommodate up to 16 port networks. A system with two switch nodes can accommodate up to 22 port networks. Figure 8-82 on page 8-1431 shows a two-switch node CSS with duplicated PNC (four switch node carriers). In this configuration, each PNC (A and B) contains two switch nodes. The cabinet numbers for the switch node carriers are typical cabinet numbers. The EPNs on the top half of the figure (PNC A) are the same as the EPNs on the bottom half of the figure (PNC B).

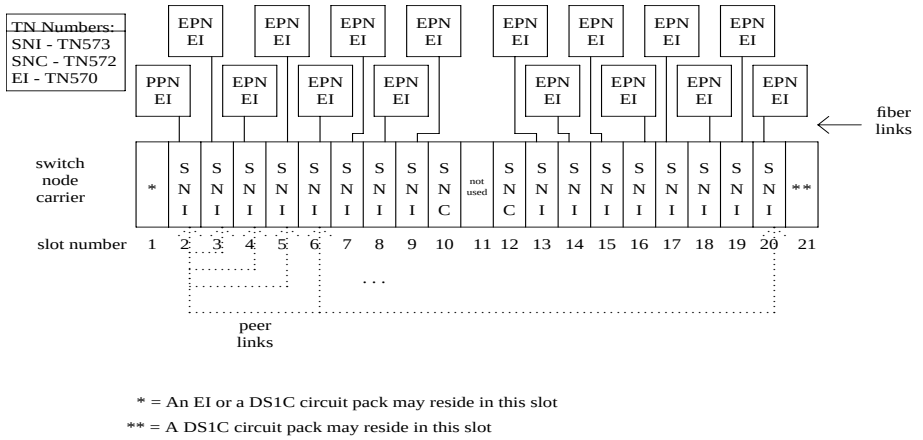

Figure 8-81. CSS Configuration with Unduplicated PNC and 1 Switch Node Carrier

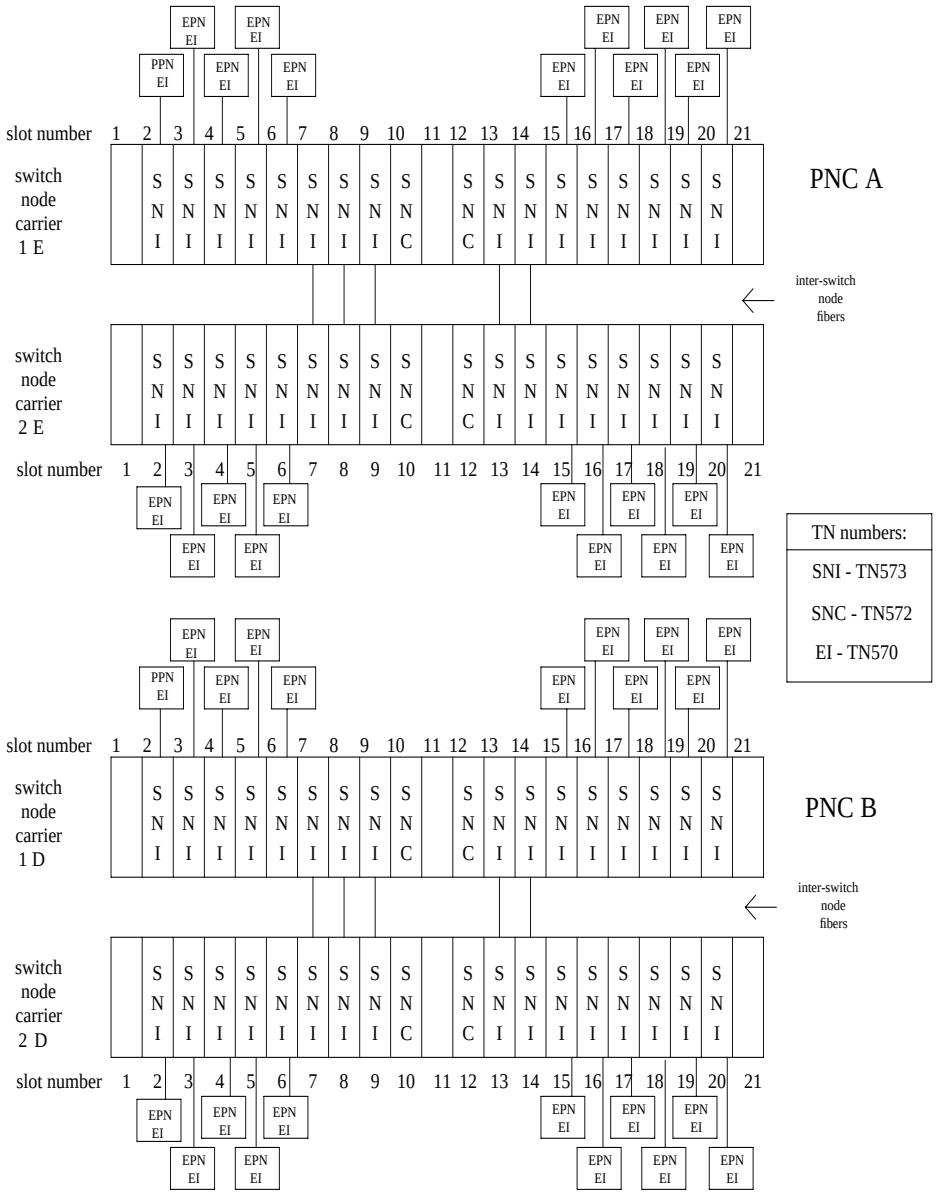

Figure 8-82. CSS Configuration with Duplicated PNC and 4 Switch Node Carriers

Remote EPNs

A DS1 converter complex can used to provide connectivity to a remotely located port network. The DS1 converter complex consists of two TN574 DS1 converter (DS1C) circuit packs connected by 1 to 4 DS1 facilities. The DS1C complex is administered as a fiber link.

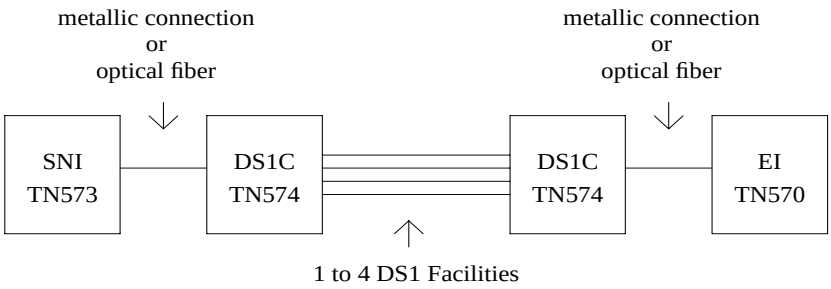

Figure 8-83. Fiber Link over a DS1 Converter Complex

SNI LEDs

The SNI circuit pack has red, green, and yellow LEDs. The red and green LEDs have the usual meaning, with red signifying an on-board alarm, and green signifying maintenance testing in progress. The red and green LEDs will come on and then turn off when the circuit pack is reset.

NOTE:
If the red LED is on without any alarms active against the circuit pack, replace the SNI circuit pack. This indicates that SNI firmware has detected a fault and is unable to notify software.

The yellow LED indicates status information as follows:

SNI Yellow LED states

Condition	LED on	LED off
Fiber out of Frame	0.1 second	0.1 second
In frame, No Neighbor [1]	0.5 second	0.5 second
SNI active	solid on	never off
SNI standby	never on	solid off

1. The fiber is in frame but a communication problem exists to the neighbor.

SNI Administration and SNI Board Insertion

The circuit packs in the switch node carrier will not function properly unless administration is performed first. For example, without fiber link administration, phone calls cannot be made through the CSS, CSS circuit packs will not be inserted, and maintenance software cannot test the CSS circuit packs.

For an unduplicated PNC configuration, administration must be done in the following order before SNIs will be inserted:

1. Cabinet Administration: The switch node carriers must be administered into the proper cabinets. When this form is submitted by pressing ENTER, these carriers will be assigned switch node numbers. The **list cabinet** command can then be used to determine the numbers for the carriers of interest.
2. Circuit Pack Administration: Every board in the switch node carriers must be administered.
3. Fiber-Link Administration: The fibers between the TN570s and the TN573 (or TN573 to TN573) must be administered via the **add fiber-link** command. A DS1C converter complex is added to a fiber link via the **add fiber-link** command also.

For a duplicated PNC configuration, administration must be done in the following order before SNIs will be inserted:

1. Obtain a license file to activate PNC duplication.
2. Cabinet Administration: The switch node carriers and duplicate switch node carriers must be administered into the proper cabinets. When this form is submitted by depressing the "enter" key, these carriers will be assigned switch node numbers. The **list cabinet** command can then be used to determine the numbers for the carriers of interest.
3. Circuit Pack Administration: Every board in the switch node carriers must be administered.
4. Fiber-Link Administration: The fibers between the TN570s and the TN573 (or TN573 to TN573) must be administered via the **add fiber-link** command. If the system is being changed from an unduplicated to a duplicated PNC configuration, the **change fiber-link command** can be used to administer the b-pnc fiber-link endpoints on the existing fiber links. A DS1C converter complex is added to a fiber link via the **add fiber-link** command also.
5. PNC duplication is enabled via the **change system-parameters duplication** command.

Clear Firmware-Counters Command

SNI firmware generates error reports autonomously. This takes place independently of technician-demanded tests. Therefore, the **test board *UUCSS*** clear command will not affect the error status reported by firmware. The clear firmware-counters command will clear every firmware-generated error unconditionally.

The **clear firmware-counters *UUCSS*** command sends a downlink message to the SNI circuit packs, causing them to clear out their firmware error counters and failure databases. Once the firmware failure database is cleared, the failure audit test (#777) will pass. If problems still exist, the firmware will increment its error counters and the failure audit test will begin failing again.

This command should not be used as a replacement for the repair procedures associated with the hardware error log entries. This command may be useful if a problem has been fixed and off-board alarms associated with the problem are still active.

Replacing SNI Circuit Pack—Unduplicated PNC

WARNING:
Do not power down a Switch Node carrier to replace a circuit pack.

WARNING:
*Replacing a Switch Node Interface circuit pack on a **simplex** system (eh???) disrupts service. This service effect can cause an outage of a single EPN.*

1.	Enter **busyout board *UUCSS***.	***UUCSS*** represents the cabinet-carrier-slot address of the circuit pack to be replaced.
2.	Replace the circuit pack.	
3.	Wait for the circuit pack to reset.	Red and green LEDs will light and then go out.
4.	Enter **release board *UUCSS***.	**CAUTION:** *Do not busyout any Expansion Interface circuit pack after this point.*
5.	Enter **test alarms long clear** for category **exp-intf**.	
6.	Wait 5 minutes for SNI-BD, FIBER-LK, *and* DS1C-BD alarms to clear, or enter **clear firmware counters a-pnc**.	

Replacing an SNI Circuit Pack— Duplicated PNC

WARNING:
On a system with duplicated PNC, synchronization may be provided over a combination of active and standby components. This condition is indicated by an OFF-BOARD WARNING alarm against TDM-CLK with error type 2305. Repairs to standby PNC in this state may disrupt service. Otherwise, if the active PNC is functional, replacement of a standby component will not disrupt service.

1.	Enter **status pnc**	Verify that the component to be replaced is on the standby PNC.
2.	Enter **busyout pnc**	
3.	Enter **busyout board *UUCSS***	UUCSS represents the cabinet-carrier-slot address of the circuit pack to be replaced.
4.	Replace the circuit pack	
5.	Enter **release board *UUCSS***	**CAUTION:** *Do not busyout any Expansion Interface circuit pack after this point.*
6.	Enter **test alarms long clear** for category **exp-intf**.	
7.	Wait 5 minutes for SNI-BD, SNI-PEER, FIBER-LK, and DS1C alarms to clear, or enter **clear firmware counterssp 0 a-pnc | b-pnc**.	Use the letter designation of the pnc which holds the replaced component (the standby pnc).
8.	Enter **status pnc**.	If either PNC's state of health is not "functional", consult ''PNC-DUP (PNC Duplication)'' on page 8-1283.
9.	Enter **release pnc**.	

Switch Node Interface Manual Loop Back Procedure

This procedure is destructive.

This procedure is to be used when an SNI circuit pack cannot be tested by software. This can occur when communication between the switch node carrier and the server is down. Before using this procedure, the configuration audit test (#759) should be run on SNI circuit packs where possible via **test board *UUCSS* s**. Also, the processor route audit test (#760) should be run via the **test board *UUCSS* long** command for the active SNC in the switch node carrier. If the active SNC is not inserted, test 760 can be run via **test hardware-group pnc *P***, where ***P*** is **a-pnc** or **b-pnc**.

Before using this procedure, first determine whether more than one SNI is unable to communicate with software. Verify SNI and SNC circuit pack insertion via the **list configuration carrier *UUC*** command, where UUC is the cabinet and carrier location of a switch node carrier. Check for inserted SNIs and SNCs in every administered switch node carrier.

If every SNI and SNC is not inserted, then "NO BOARD" is displayed for each board in the entire PNC (either the a-pnc or the b-pnc). As a result, the link between the IPSI-connected EPN's EI (on the PNC where SNI and SNC circuit packs were not inserted) and the connected SNI does not function properly. If this case applies, perform the following steps:

1. Run the **test board *UUCSS*** command on the IPSI-connected EPN's EI, and fix any problems found.
2. Perform the manual loopback procedure for the IPSI-connected EPN's EI.
3. Perform the manual loopback procedure for the SNI connected to the IPSI-connected EPN's EI.
4. Replace the active SNC.

If the system has a 2-level switch node carrier configuration (i.e., SNI-to-SNI fiber links exist) and the SNIs and SNCs in the second switch node carrier only (the switch node carrier that has no SNI connected to the IPSI-connected EPN's EI) are not inserted and at least two SNI-to-SNI fiber links exist, perform the following steps:

1. Run the **test board *UUCSS* long** command on the SNIs in the first switch node carrier that are connected to SNIs in the second switch node carrier and fix any problems found.
2. Replace the active SNC.
3. Perform the manual loopback procedure for the SNIs in the second switch node carrier that are connected to SNIs in the first switch node carrier.

If software is unable to communicate with an EPN EI but can communicate with the connected SNI:

1. Run the **test board *UUCSS* long** command on the connected SNI and fix any problems found.
2. Perform the manual loopback procedure for the EPN EI.

   When the connection to the SNI circuit pack is via fiber, a short length of optical fiber is required for this procedure. If a metallic cable is used in the connection, the metallic connector must be removed from the back of the carrier, and a lightwave transceiver connected in its place. The short length of optical fiber can then be used.

   If this procedure is run on both endpoints on a fiber link (Expansion Interface circuit packs or Switch Node Interface circuit packs), and both check out fine, then the failure is most likely in the connection (fiber or metallic) itself if neither endpoint circuit pack is busied out, but the link remains inactive.

   1. Busyout the circuit pack (Expansion Interface or SNI) using the **busyout board *UUCSS*** command.
   2. Disconnect the transmit and receive fiber pair from the lightwave transceiver behind the circuit pack (Expansion Interface or Switch Node Interface) slot.

      NOTE:
      Note which is the transmit fiber and which is the receive fiber for proper re-connection at the end of this procedure. The fiber connected to the transmit side of the lightwave transceiver on one circuit pack should be connected to the receive side of the lightwave transceiver on the circuit pack on the opposite end of the fiber.

   3. Using a spare fiber jumper cable, interconnect the transmit and receive jacks of the lightwave transceiver as shown in Figure 8-84 on page 8-1438.

      NOTE:
      Make sure that the total length of the fiber jumper cable does not exceed the maximum length recommended for the fiber link connections between cabinets. This is necessary so that the testing of the Expansion Interface or SNI circuit pack is done within connectivity guidelines so that test results are not influenced due to the cable length not meeting requirements.

   4. Go to the front of the cabinet and inspect the yellow LED.
      - If the yellow LED flashes on at a rate of once per second, the (Expansion Interface or Switch Node Interface) circuit pack or transceiver should be replaced.

- If the yellow LED flashes on at a rate of five times per second, the circuit pack (Expansion Interface or Switch Node Interface) or the lightwave transceiver may need replacement. This condition may also be due to a faulty system clock on the network containing the Expansion Interface circuit pack or in the switch node carrier containing the SNI.
- If the yellow LED was blinking before starting this procedure and the yellow LED is not blinking now, this circuit pack (Expansion Interface or Switch Node Interface) and the lightwave transceiver are functioning properly.

5. Replace faulty component(s) and reconnect the original fiber. Be sure to reconnect the fibers properly as noted in Step 2.
6. Release Expansion Interface circuit pack or Switch Node Interface circuit pack with the **release board *UUCSS*** command.

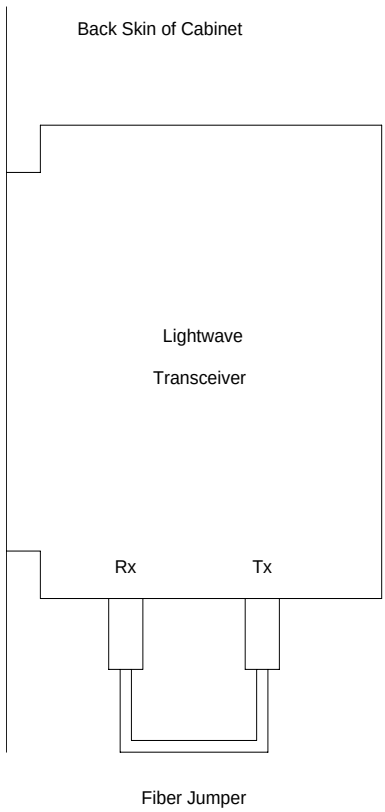

Figure 8-84. Interconnection of Lightwave Transceiver Transmit/Receive Jacks

Error Log Entries and Test to Clear Values

Table 8-575. SNI Board Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test board *UUCSS* r 1**
1 (b)	any	failure audit (#777) (a)	MAJOR MINOR WARNING	ON	**test board *UUCSS* r 1**
18 (c)	0	busyout board UUCSS	WARNING	OFF	**release board *UUCSS***
125(d)		None	MINOR	ON	
257 (e)	any	failure audit (#777) (a)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
513 (f)	any	failure audit (#777) (a)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
769 (g)	any	failure audit (#777) (a)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
1025 (h)	any	failure audit (#777) (a)	MAJOR MINOR WARNING	ON/ OFF	**test board *UUCSS* r 1**
1281 (i)	any	failure audit (#777) (a)	MAJOR MINOR WARNING	ON	**test board *UUCSS* r 1**
1537 (j)	any	failure audit (#777) (a)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
2561 (k)	any	failure audit (#777) (a)	MAJOR MINOR WARNING	ON	**test board *UUCSS* r 1**
2817 l)	any	failure audit (#777) (a)	MAJOR MINOR WARNING	ON	**test board *UUCSS* r 1**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. The first time you see an SNI-BD error in the error log, run the **test board *UUCSS*** command. If the failure audit test (#777) fails, enter **display errors** for this SNI circuit pack and continue with the associated repair procedures for SNI-BD errors.

b. This error indicates that the SNI may have trouble communicating with every other SNI and SNC circuit pack in the switch node carrier.

   1. Replace the SNI circuit pack.

c. This error indicates that the SNI circuit pack has been busied out via the **busyout board *UUCSS*** command. To resolve this error, release the SNI circuit pack via the **release board *UUCSS*** command.

d. The SNI circuit pack is incompatible with the TN1654 DS1 Converter board. A TN573B or later suffix SNI board must be used when connecting to a TN1654 DS1 Converter board. Replace with a newer suffix.

e. This error indicates that the SNI cannot communicate with the active SNC.

   1. Check the error log via **display errors** for other SNI circuit packs with the 257 SNI-BD error. If other SNI circuit packs in the same switch node carrier have error 257, then replace the active SNC.
   2. Replace this SNI.
   3. Replace the active SNC in the same switch node carrier.
   4. Enter **display errors** and if this error is still in the error log, follow normal escalation procedures.

f. This error indicates that the SNI cannot communicate with the DS1C.

   1. Perform the Fiber Fault Isolation Procedure described in Chapter 5.

g. This error indicates a failure communicating synchronization control data with the active SNC.

   Look at every SNI-BD error in the log via **display errors** and **display alarms** to determine whether to follow procedure 1 or procedure 2. See the table below which lists pairs of SNIs that are considered to be adjacent. Use Procedure 2 if either of the following two conditions is present:

   — At least one pair of adjacent SNIs in this carrier has Error 769 with an off-board alarm logged against both SNIs in the pair.

   — The active SNC in this carrier has error 257.

   If neither of the above is true, follow Procedure 1.

Adjacent SNI Slot Numbers	Adjacent SNI Slot Numbers
2 & 3	13 & 14
4 & 5	15 & 16
6 & 7	17 & 18
8 & 9	19 & 20

Procedure 1 (suspect TPN link or clock generation out of lock problem):

1. Enter **display alarms** and **display errors** and follow the procedures for any on-board SNI-BD error and alarm entries.
2. If more than one SNI circuit pack in the same switch node carrier has SNI-BD error 769 with an off board alarm, replace the active SNC in the same carrier.
3. Replace this SNI.
4. Replace the active SNC in the same carrier.

Procedure 2 (suspect clock generation out of lock problem):

1. If only one SNC exists in this switch node carrier, replace the SNC. If two SNCs exist in this switch node carrier, perform the following steps:
    a. Set the standby SNC to active by running the **set switch-node-clock *UUCSS*** command with the standby SNC's location.
    b. If the problem goes away, replace the SNC that was previously active. Then set the SNC that was just replaced to active via the **set switch-node-clock *UUCSS*** command. If the problem returns, assume that the SNC that was just replaced was not at fault and go to step 2 below.
    c. If the problem persists, switch back to the previously active SNC via the **set switch-node-clock** command and go to step 2 below.
2. Replace the leftmost SNI from the pair of adjacent SNIs.
3. Replace the rightmost SNI from the pair of adjacent SNIs.
4. If none of the above steps cleared this error, this could be a switch node carrier backplane problem.

h. This error indicates a failure communicating synchronization control data over the fiber link.

    If the error is logged as an on-board error:

    1. Replace the SNI circuit pack.

    If the error is logged as an off-board error:

    1. Enter **display errors** and follow the associated repair procedures for FIBER-LK errors.
    2. Replace the SNI with this error.

3. Replace the fiber link's other endpoint if no DS1C complex is administered on the fiber link. (Use **list fiber-link** to determine whether a DS1C complex is administered). If so, replace the circuit packs in this order:

   i. Replace the DS1C circuit pack connected to this SNI.

   ii. Replace the other DS1C circuit pack.

   iii. Replace the fiber link's other endpoint.

i. This error indicates a processor complex failure.

   1. Replace the SNI circuit pack.

j. This error indicates that excessive slips have occurred.

   Follow the steps for diagnosing synchronization problems when slips have occurred in the SYNC section.

k. This error indicates that the SNI cannot communicate with its neighbor. The SNI is at fault.

   1. Replace the SNI circuit pack.

l. This error indicates that the SNI cannot communicate with one of its peers. The SNI is at fault.

   1. Replace the SNI circuit pack.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *Configuration* audit (#759), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
Configuration audit (#759)	X	X		ND
Failure audit (#777)	X	X		ND
Fiber Out of Frame query (#989)	X	X		ND
Packet Neighbor test (#767)	X	X		ND
Circuit Path test (#755)	X	X		ND
Destructive Facility test (#757)		X		D
Off-board Destructive Facility test (#756)		X		D
Switch Node Interface Reset test (#761)			X	D

1. D = Destructive, ND = Nondestructive

NOTE:
Test #982 is not an actual demand maintenance test. This test number is used to report results of executing of the **clear firmware-counters** command. Refer to error codes for Test #777.

SNI Circuit Path Test (#755)

This test is nondestructive. This test performs a nondestructive test of the circuit path.

Table 8-576. TEST #755 SNI Circuit Path Test

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2302	ABORT	Software received incorrect message data from the SNI circuit pack. 1. Retry the command at 1-minute intervals up to 3 times.
2303	ABORT	The SNI circuit pack responded that software test requested is not valid. 1. Retry the command at 1-minute intervals up to 3 times.
2304	ABORT	SNI circuit pack responded that it is not able to run the test requested by software. 1. Retry the command at 1-minute intervals up to 3 times.

Continued on next page

Table 8-576. TEST #755 SNI Circuit Path Test — *Continued*

Error Code	Test Result	Description / Recommendation
2306	ABORT	The SNI circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where the SNI resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Check **list fiber-link** to determine the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries. 4. Follow the procedure described above, SNI Manual Loopback to determine whether the circuit pack or the fiber connection is faulty.
102	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 2 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 2. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 1. If other SNI circuit packs have SNI-PEER error type 1, then replace the SNI in slot 2. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. 3. If other SNI circuit packs do not have SNI-PEER error type 1 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 4. Replace this SNI. 5. Replace the SNI in slot 2.

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Table 8-576. TEST #755 SNI Circuit Path Test — *Continued*

Error Code	Test Result	Description / Recommendation
103	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 3 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 3. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 257. If other SNI circuit packs have SNI-PEER error type 257, then replace the SNI in slot 3. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 257 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 3.
104	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 4 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 4. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 513. If other SNI circuit packs have SNI-PEER error type 513, then replace the SNI in slot 4. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 513 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 4.

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Table 8-576. TEST #755 SNI Circuit Path Test — *Continued*

Error Code	Test Result	Description / Recommendation
105	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 5 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 5. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 769. If other SNI circuit packs have SNI-PEER error type 769, then replace the SNI in slot 5. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 769 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 5.
106	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 6 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 6. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 1025. If other SNI circuit packs have SNI-PEER error type 1025, then replace the SNI in slot 6. Replacing an SNI may be service interrupting. See the SNI-BD section for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 1025 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 6.

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Table 8-576. TEST #755 SNI Circuit Path Test — *Continued*

Error Code	Test Result	Description / Recommendation
107	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 7 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 7. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 1281. If other SNI circuit packs have SNI-PEER error type 1281, then replace the SNI in slot 7. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 1281 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 7.
108	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 8 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 8. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 1537. If other SNI circuit packs have SNI-PEER error type 1537, then replace the SNI in slot 8. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 1537 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 8.

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Table 8-576. TEST #755 SNI Circuit Path Test — *Continued*

Error Code	Test Result	Description / Recommendation
109	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 9 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 9. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 1793. If other SNI circuit packs have SNI-PEER error type 1793, then replace the SNI in slot 9. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 1793 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 9.
113	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 13 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 13. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 2049. If other SNI circuit packs have SNI-PEER error type 2049, then replace the SNI in slot 13. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 2049 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 13.

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Table 8-576. TEST #755 SNI Circuit Path Test — *Continued*

Error Code	Test Result	Description / Recommendation
114	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 14 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 14. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 2305. If other SNI circuit packs have SNI-PEER error type 2305, then replace the SNI in slot 14. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 2305 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 14.
115	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 15 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 15. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 2561. If other SNI circuit packs have SNI-PEER error type 2561, then replace the SNI in slot 15. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 2561 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 15.

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Table 8-576. TEST #755 SNI Circuit Path Test — *Continued*

Error Code	Test Result	Description / Recommendation
116	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 16 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 16. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 2817. If other SNI circuit packs have SNI-PEER error type 2817, then replace the SNI in slot 16. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 2817 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 16.
117	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 17 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 17. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 3073. If other SNI circuit packs have SNI-PEER error type 3073, then replace the SNI in slot 17. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 3073 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 17.

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Table 8-576. TEST #755 SNI Circuit Path Test — *Continued*

Error Code	Test Result	Description / Recommendation
118	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 18 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 18. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 3329. If other SNI circuit packs have SNI-PEER error type 3329, then replace the SNI in slot 18. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 3329 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 18.
119	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 19 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 19. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 3585. If other SNI circuit packs have SNI-PEER error type 3585, then replace the SNI in slot 19. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 3385 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 19.

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Table 8-576. TEST #755 SNI Circuit Path Test — *Continued*

Error Code	Test Result	Description / Recommendation
120	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 20 over the circuit path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 20. Use **display errors** to find any SNI-BD errors and check **display alarms** to see whether the errors have on-board alarms. Then follow the associated repair procedures for SNI-BD. 2. Check the error log via **display errors** for other SNI circuit packs with SNI-PEER error type 3841. If other SNI circuit packs have SNI-PEER error type 3841, then replace the SNI in slot 20. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 3841 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. Proceed as follows: 3. Replace this SNI. 4. Replace the SNI in slot 20.
122	FAIL	The SNI circuit pack cannot communicate with its neighbor via the circuit path. 1. Fix any on-board errors (SNI-BD, EXP-INTF, and/or DS1C-BD) against the components of this fiber link by using **display errors** and **display alarms** and following the associated repair procedures. (Use the **list fiber-link** command to find the fiber link associated with this SNI. The **display fiber-link** command can then be used to find the endpoints of the fiber link and the DS1C circuit pack locations if this fiber link has a DS1 Converter complex administered.) 2. Enter **display errors** and follow the associated repair procedures for any FIBER-LK entries for the fiber this SNI is administered on. Check **list fiber-link** to determine the administered fiber. 3. If this fiber link has a DS1 converter complex administered, enter **display errors** and **display alarms** and follow the associated repair procedures for any off-board DS1C-BD or DS1-FAC entries for either of the DS1C boards administered or for the DS1 facilities associated with either of the DS1C boards administered. 4. Replace this SNI.

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Table 8-576. TEST #755 SNI Circuit Path Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The SNI passed the sni circuit path test.
0	NO BOARD	No board was detected by the test. 1. Check that board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNI should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNI. It may be necessary to use the **reset board** command if the SNI circuit pack gets into a mode where it cannot communicate with software. If an SNI with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

SNI Off-Board Destructive Facility Test (#756)

This test is destructive.

The SNI runs a destructive loop around of the on-board and off-board Looparound. This test returns the result of the off-board loop around, while Test #757 returns the result of the on-board loop around.

Table 8-577. TEST #756 SNI Off-Board Destructive Facility Test

Error Code	Test Result	Description / Recommendation
1015	ABORT	The system will not allow this test to be run because the SNI circuit pack has not been busied out. Busyout the SNI circuit pack with **busyout board**. Repeat the **test board *UUCSS* long** command.
1415	ABORT	The lightwave transceiver is absent. 1. If a lightwave transceiver should not be present, do nothing. For example, an SNI connected to a DS1C circuit pack or an SNI with a metallic connection does not have a lightwave transceiver. This test can only be run when a lightwave transceiver exists. 2. Otherwise, check the lightwave transceiver connections. 3. If OK, replace the lightwave transceiver. If a fiber out of frame condition exists and lightwave transceivers are used, check that the lightwave transceivers are of the same type, that is, both are 9823a or both are 9823b. If they are not the same type, replace one of the lightwave transceivers: ■ 9823a is used for distances up to 4900 feet. ■ 9823b is used for distances up to 25,000 feet. 4. If the test continues to abort, replace the SNI circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2304	ABORT	SNI circuit pack responded that it is not able to run the test requested by software. 1. Retry the command at 1-minute intervals up to 3 times.

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Table 8-577. TEST #756 SNI Off-Board Destructive Facility Test — *Continued*

Error Code	Test Result	Description / Recommendation
2306	ABORT	The SNI circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where the SNI resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Check **list fiber-link** to determine the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries. 4. Follow the procedure described above, SNI Manual Loopback to determine whether the circuit pack or the fiber connection is faulty.
127	FAIL	The data is not correctly looped around. 1. Check the lightwave transceiver or metallic physical connections. 2. If connections OK, replace the lightwave transceiver or the metallic interconnect. 3. If the test still fails, replace the SNI circuit pack.
	PASS	No problems associated with this test are detected on the SNI.
0	NO BOARD	No board was detected by the test. 1. Check that board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNI should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNI. It may be necessary to use the **reset board** command if the SNI circuit pack gets into a mode where it cannot communicate with software. If an SNI with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

SNI Destructive Facility Test (#757)

This test is destructive.

The SNI runs a destructive loop around of the off-board and on-board loop around. This test returns the result of the on-board loop around, while test 756 returns the result of the off-board loop around.

Table 8-578. TEST #757 SNI Destructive Facility Test

Error Code	Test Result	Description / Recommendation
1015	ABORT	The system will not allow this test to be run because the SNI circuit pack has not been busied out. Busyout the SNI circuit pack with **busyout board**. Repeat the **test board *UUCSS* long** command.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2304	ABORT	SNI circuit pack responded that it is not able to run the test requested by software. 1. Retry the command at 1-minute intervals up to 3 times.

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Table 8-578. TEST #757 SNI Destructive Facility Test — *Continued*

Error Code	Test Result	Description / Recommendation
2306	ABORT	The SNI circuit pack is not responding to software test requests. 1. Run the **test led switch-node** for the switch node where the SNI resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Check **list fiber-link** to determine the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries. 4. Follow the procedure described above, SNI Manual Loopback to determine whether the circuit pack or the fiber connection is faulty.
127	FAIL	The data is not correctly looped around. 1. Replace the SNI circuit pack.
	PASS	No problems associated with this test are detected on the SNI.
0	NO BOARD	No board was detected by the test. 1. Check that board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNI should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNI. It may be necessary to use the **reset board** command if the SNI circuit pack gets into a mode where it cannot communicate with software. If an SNI with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

Configuration Audit (#759)

This test is nondestructive.

NOTE:
For descriptions of result codes for this test see:

- ''SNC-BD (Switch Node Clock Circuit Pack)'' when the circuit pack tested is a Switch Node Clock (circuit pack slots 10 or 12).
- ''SNI-BD (SNI Circuit Pack)'' when the circuit pack tested is a Switch Node Interface (circuit pack slots 2–9 or 13–20).

This test is run via the **test board short** or **test board long** command for SNI circuit packs or SNC circuit packs.

For SNI circuit packs, this test queries the SNI for SNCs in the same switch node carrier, SNI peers, DS1Cs, and EI or SNI neighbors that the SNI can communicate with and compares this data to the administered data.

For SNC circuit packs, this test queries the SNC for SNCs and SNIs in the same switch node carrier that the SNC can communicate with and compares this data to the administered data.

Failures of this test cause entries in the error and alarm logs against Switch Node Configuration (SN-CONF) with the board location of the SNI or SNC.

Incorrectly Connected Administered Fibers

Some physically connected fibers that do not match fiber administration can cause port network problems that are not detected and alarmed by PNC tests. The symptoms will usually be many phone calls not working correctly, and port network component alarms because of translation mismatches.

This test is unable to detect the case where an SNI is connected to the same type of board (EI or SNI) as administered but located in a different cabinet but the same carrier and same slot as the administered fiber endpoint. The administered fiber endpoint can be viewed with the **list fiber-link** command. This test can only detect if the fiber endpoint connected to the SNI is in a different carrier, slot location than the administered fiber endpoint.

Incorrectly Connected Administered SNI-to-EI Fibers

If the SNI is connected to the same type of fiber endpoint as the administered fiber endpoint, but the location is the same as administered except for the cabinet, many phone calls will not work correctly; some phone calls will not go through and some phone calls will ring the wrong phone.

The **test led** command can be used in this case to check connectivity.

1. Run the **test led port-network** command on each administered port network and verify that the LEDs on the correct port network are lit.
2. If they are not lit, check that the fiber connections to the port network are consistent with the administered fibers (**list fiber-link**) that does not light the LEDs as expected.
3. Run **test led switch-node** on each administered switch node carrier and verify that the LEDs on the correct carrier are lit.
4. If they are not, check the connectivity to the switch node carrier that does not light the LEDs as expected.

Incorrectly Connected Administered SNI-to-SNI Fibers between Three Switch Nodes

If the system has more than 2 switch nodes, SNI-to-SNI fibers administered between 2 switch nodes could be incorrectly connected to a third switch node. This is a problem that could occur during installation or when inter-switch node fibers are changed. For multiple fibers to a distant switch node, an incorrect connection would not appear as a problem unless this fiber is used for a system-link to a port network connected to the distant switch node. The **status sys-link** command can be used to determine the boards and fiber links in the path from an IPSI-connected EPN to a specific port network. A specific SNI-to-SNI fiber connection must be in the system-link path to be checked with the port network LED test.

One method to force an SNI-to-SNI fiber connection to be used as a system-link is to physically remove every SNI-to-SNI connection except the fiber link being tested at the distant switch node by physically removing SNI boards in the distant switch node.

1. Use the **status sys-link** command to verify that this fiber selected for test is in the path to the EPN connected to the distant switch node that will be used for the LED test.
2. Run the **test led** sequence to a port network as described above to verify this fiber connection.
3. Repeat this procedure for each of the other SNI-to-SNI fibers terminating on this distant switch node.

Another method for testing multiple fiber connections to a distant switch node is described below.

1. Use the **list fiber-link** command to determine the number of SNI-to-SNI fibers that are administered to and terminating on this switch node.
2. Run the **test led port-network** command on an EPN connected to this distant switch node, and verify that the LEDs on the correct EPN are lit.

3. Use the **status sys-link** command and select the active EI in the IPSI-connected EPN connected to the distant switch node being tested. (This display will show the path from the IPSI-connected EPN and the SNI-to-SNI fiber being used in this path.)
4. If the port network LEDs are lit and multiple SNI-to-SNI fibers connect to this distant switch node, physically remove the SNI that is listed in this path.

   If not lit, check that the fiber connections to the EPN are consistent with the administered fibers (**list fiber-link**) that do not light the LEDs as expected.
5. Use the **status sys-link** command to determine the new path from the IPSI-connected EPN to the this distant switch.
6. Run the **test led port-network** command on an EPN connected to the distant switch node and verify that the LEDs on the correct EPN are lit.
7. Repeat steps 4 – 6 until the last SNI-to-SNI fiber to this distant switch node has been tested.

Table 8-579. TEST #759 Configuration Audit

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.

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Table 8-579. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
2306	ABORT	The SNI circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where this board resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS*** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Check **list fiber-link** to determine the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries. 4. Follow the procedure described above, SNI Manual Loopback to determine whether the circuit pack or the fiber connection is faulty.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
102	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 2. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 1, replace the SNI being tested. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 1, replace the SNI in slot 2. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. Retry the command.

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Table 8-579. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
103	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 3. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 257, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 257, replace the SNI in slot 3. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.
104	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 4. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 513, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 513, replace the SNI in slot 4. Replacing an SNI may be service interrupting. See"SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.
105	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 5. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 769, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 769, replace the SNI in slot 5. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.

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Table 8-579. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
106	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 6. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 1025, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 1025, replace the SNI in slot 6. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.
107	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 7. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 1281, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 1281, replace the SNI in slot 7. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.
108	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 8. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 1537, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 1537, replace the SNI in slot 8. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.

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Table 8-579. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
109	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 9. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 1793, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 1793, replace the SNI in slot 9. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.
112	FAIL	The SNI circuit pack cannot communicate with the active SNC. 1. Check the error log for other SNI circuit packs in the same carrier with a 257 SNI-BD error. Use **display errors** with category PNC to view SNI-BD errors. If other SNI circuit packs in the same switch node carrier have error 257, then replace the active SNC in this switch node carrier. Replacing an SNC may be service interrupting. See "SNC-BD (Switch Node Clock Circuit Pack)" on page 8-1384 for the procedure for replacing an SNC. If other SNI circuit packs in the same carrier do not have SNI-BD error type 257 logged, proceed to step 2. 2. Replace this SNI. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. 3. Replace the active SNC in the same switch node carrier. Replacing an SNC may be service interrupting. See "SNC-BD (Switch Node Clock Circuit Pack)" on page 8-1384 for the procedure for replacing an SNC.
113	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 13. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 2049, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 2049, replace the SNI in slot 13. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.

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Table 8-579. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
114	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 14. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 2305, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNC-BD (Switch Node Clock Circuit Pack)" on page 8-1384 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 2305, replace the SNI in slot 14. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.
115	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 15. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 2561, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 2561, replace the SNI in slot 15. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.
116	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 16. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 2817, replace the SNI being tested. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 2817, replace the SNI in slot 16. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. Retry the command.

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Table 8-579. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
117	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 17. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 3073, replace the SNI being tested. Replacing an SNI may be service interrupting. See''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 3073, replace the SNI in slot 17. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. Retry the command.
118	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 18. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 3329, replace the SNI being tested. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 3329, replace the SNI in slot 18. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. Retry the command.
119	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 19. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 3585, replace the SNI being tested. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 3585, replace the SNI in slot 19. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. Retry the command.

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Table 8-579. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
120	FAIL	The SNI circuit pack cannot communicate with the equipped SNI in slot 20. 1. Perform the Fiber Fault Isolation Procedure described in Chapter 5. This will resolve multiple SNI-PEER errors. 2. If the SNI being tested has SNI-PEER error type 3841, replace the SNI being tested. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. To view SNI-PEER errors, use the **display errors** command with category PNC-PEER. Retry the command. 3. If the SNI being tested has SNI-PEER error type 3841, replace the SNI in slot 20. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. Retry the command.
133	FAIL	No neighbor link is administered, but the SNI has an EI neighbor. 1. Administer the SNI on a fiber link to the EI neighbor it is connected to via the **add fiber-link next** command. Or remove both fiber endpoints (i.e., this SNI and its EI neighbor) and remove the fiber endpoints from circuit pack administration via **change circuit-pack**.
134	FAIL	No neighbor link is administered, but the SNI has an SNI neighbor. 1. Administer the SNI on a fiber link to the SNI neighbor it is connected to via the **add fiber-link next** command. Or remove both fiber endpoints (i.e., this SNI and its SNI neighbor) and remove the fiber endpoints from circuit pack administration via **change circuit-pack**.
135	FAIL	The SNI circuit pack cannot communicate with its neighbor. The SNI has an administered neighbor, but cannot communicate with its neighbor. 1. Check if the administered neighbor is inserted. If not, insert the neighbor circuit pack. 2. Perform the Fiber Fault Isolation Procedure described in Chapter 5.
136	FAIL	The SNI's administered neighbor does not match the physical neighbor connected. The type of neighbor administered is an SNI and the type of neighbor physically connected is an EI. Enter **list fiber-link**, and verify that the fiber-optic and metallic cable connections are installed as administered.
137	FAIL	The SNI's administered neighbor does not match the physical neighbor connected. The type of neighbor administered is an EI and the type of neighbor physically connected is an SNI. Enter **list fiber-link**, and verify that the fiber-optic cable and metallic cable connections are installed as administered.

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Table 8-579. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
138	FAIL	The physical neighbor location does not match administered neighbor location. The carrier and slot of the administered neighbor do not match the carrier and slot of the physical neighbor. Enter **list fiber-link**, and verify that the fiber-optic cable and metallic cable connections are installed as administered. If the problem does not seem to be caused by a physical connection problem or an administration problem, replace the neighbor circuit pack. It is possible for the neighbor circuit pack to have a hardware problem that causes it to report a wrong angel address (physical carrier/slot address) to software.
139	FAIL	The SNI is administered to be connected to a DS1C but is not physically connected to a DS1C. *If a DS1C is not supposed to be connected to this SNI*, change administration to remove the DS1 converter complex from the fiber link associated with this SNI by: 1. Determine which fiber that this SNI is an endpoint of by checking **list fiber-link**. 2. Remove this fiber with the **remove fiber-link** command. 3. Add the fiber back via **add fiber-link**, and do not administer the DS1 converter complex at this time.
140	FAIL	The SNI is physically connected to a DS1C but is not administered to be connected to a DS1C. **Either** add the DS1 converter complex to the fiber that this SNI is associated with by: 1. Determine which fiber that this SNI is an endpoint of by checking **list fiber-link**. 2. Remove this fiber with the **remove fiber-link** command. 3. Add the fiber back via **add fiber-link**, and at this time also administer the DS1 converter complex. **Or**: 1. Remove the DS1C connection, and connect the SNI directly to its administered fiber endpoint. 2. Verify that the fiber-optic and metallic cable connections are installed as administered by entering **list fiber-link**.
	PASS	The administered data and the circuit packs the SNI can communicate with match.

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Table 8-579. TEST #759 Configuration Audit — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	No board was detected by the test. 1. Check that board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNI should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNI. It may be necessary to use the **reset board** command if the SNI circuit pack gets into a mode where it cannot communicate with software. If an SNI with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

Switch Node Interface Reset Test (#761)

This test is destructive.

This test resets the SNI circuit pack via the **reset board *UUCSS*** command when an SNI circuit pack's location is entered. The SNI is reset via the active SNC circuit pack in the carrier. If the SNI is connected to an IPSI-connected EPN's EI, the SNI is reset via its IPSI-connected EPN's EI neighbor. If an SNI with a non-IPSI-connected EPN's EI or another SNI as its neighbor cannot be reset via the active SNC (i.e., if no software communication exists between the active SNC and the server), an attempt will be made to reset the SNI via its neighbor.

An SNI should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNI. It may be necessary to use the **reset board** command if the SNI circuit pack gets into a mode where it cannot communicate with software.

If an SNI with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems.

Table 8-580. TEST #761 Switch Node Interface Reset Test

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2302	ABORT	Software received incorrect message data from the SNI circuit pack. 1. Retry the command at 1-minute intervals up to 3 times.
2303	ABORT	The SNI circuit pack responded that the software test requested is invalid. 1. Retry the command at 1-minute intervals up to 3 times.
2304	ABORT	SNI circuit pack responded that it is not able to run the test requested by software. 1. Retry the command at 1-minute intervals up to 3 times.
2306	ABORT	The SNI circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where the SNI resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Check **list fiber-link** to determine the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries. 4. Follow the procedure described above, SNI Manual Loopback to determine whether the circuit pack or the fiber connection is faulty.

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Table 8-580. TEST #761 Switch Node Interface Reset Test — *Continued*

Error Code	Test Result	Description / Recommendation
2316	ABORT	The reset of the SNI circuit pack was attempted via the connected DS1C circuit pack. This ABORT code indicates that the fiber is not administered, but in this particular case it also indicates a software problem. 1. Retry the command at 1-minute intervals up to 1 time.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
	PASS	The “reset” message was sent out successfully to the active SNC or to the SNI’s neighbor. A PASS does not necessarily mean the SNI circuit pack was successfully reset. The reset can be verified by checking that the red and green LEDs turn on and then turn off. If an SNI circuit pack fails one of the firmware tests run during its reset sequence, the red LED will stay on and the circuit pack should be replaced.
0	NO BOARD	No board was detected by the test. 1. Check that board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNI should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNI. It may be necessary to use the **reset board** command if the SNI circuit pack gets into a mode where it cannot communicate with software. If an SNI with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

Packet Neighbor Link Test (#767)

This test is nondestructive.

This test checks the packet path of the neighbor circuit pack and the peer circuit packs. A packet is sent from the SNI being tested to the peer SNIs and to the neighbor EI or SNI. If the other EI or SNI sends the same data back in the packet, this test passes. Otherwise, this test fails.

Table 8-581. TEST #767 Packet Neighbor Link Test

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2302	ABORT	Software received incorrect message data from the SNI circuit pack. 1. Retry the command at 1-minute intervals up to 3 times.
2303	ABORT	The SNI circuit pack responded that the software test requested is invalid. 1. Retry the command at 1-minute intervals up to 3 times.
2304	ABORT	SNI firmware is not able to run the test. For this particular test, the SNI circuit pack must be able to communicate with its neighbor. 1. Verify that the SNI can communicate with its neighbor by checking the yellow LED of the SNI to make sure the SNI is in frame or by running the **test board** command for the SNI and checking test 989 for fiber out-of-frame. If the results of Test 989 indicate that the fiber is out-of-frame, follow the recommendation associated with the test failure. If a DS1 converter complex exists on the fiber link, enter **display errors** and follow the associated repair procedures for any DS1C-BD and DS1-FAC entries. 2. Retry the command at 1-minute intervals up to 3 times.

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Table 8-581. TEST #767 Packet Neighbor Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
2306	ABORT	The SNI circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node carrier where the SNI resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Check **list fiber-link** to determine the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries. 4. Follow the procedure described above, SNI Manual Loopback to determine whether the circuit pack or the fiber connection is faulty.
102	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 2 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 2. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 1. If other SNI circuit packs have SNI-PEER error type 1 errors, replace the SNI in slot 2. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 1 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 2.

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Table 8-581. TEST #767 Packet Neighbor Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
103	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 3 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 3. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 257. If other SNI circuit packs have SNI-PEER error type 257 errors, replace the SNI in slot 3. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 257 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 3.
104	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 4 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 4. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 513. If other SNI circuit packs have SNI-PEER error type 513 errors, replace the SNI in slot 4. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 513 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 4.

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Table 8-581. TEST #767 Packet Neighbor Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
105	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 5 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 5. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 769. If other SNI circuit packs have SNI-PEER error type 769 errors, replace the SNI in slot 5. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 769 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 5.
106	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 6 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 6. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 1025. If other SNI circuit packs have SNI-PEER error type 1025 errors, replace the SNI in slot 6. Replacing an SNI may be service interrupting. See"SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 1025 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 6.

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Table 8-581. TEST #767 Packet Neighbor Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
107	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 7 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 7. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 1281. If other SNI circuit packs have SNI-PEER error type 1281 errors, replace the SNI in slot 7. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 1281 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 7.
108	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 8 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 8. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 1537. If other SNI circuit packs have SNI-PEER error type 1537 errors, replace the SNI in slot 8. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 1537 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 8.

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Table 8-581. TEST #767 Packet Neighbor Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
109	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 9 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 9. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 1793. If other SNI circuit packs have SNI-PEER error type 1793 errors, replace the SNI in slot 9. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 1793 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 9.
113	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 13 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 13. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 2049. If other SNI circuit packs have SNI-PEER error type 2049 errors, replace the SNI in slot 13. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 2049 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 13.

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Table 8-581. TEST #767 Packet Neighbor Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
114	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 14 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 14. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 2305. If other SNI circuit packs have SNI-PEER error type 2305 errors, replace the SNI in slot 14. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 2305 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 14.
115	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 15 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 15. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 2561. If other SNI circuit packs have SNI-PEER error type 2561 errors, replace the SNI in slot 15. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 2561 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 15.

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Table 8-581. TEST #767 Packet Neighbor Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
116	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 16 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 16. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 2817. If other SNI circuit packs have SNI-PEER error type 2817 errors, replace the SNI in slot 16. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 2817 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 16.
117	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 17 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 17. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 3073. If other SNI circuit packs have SNI-PEER error type 3073 errors, replace the SNI in slot 17. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 3073 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 17.

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Table 8-581. TEST #767 Packet Neighbor Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
118	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 18 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 18. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 3329. If other SNI circuit packs have SNI-PEER error type 3329 errors, replace the SNI in slot 18. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 3329 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 18.
119	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 19 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 19. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 3585. If other SNI circuit packs have SNI-PEER error type 3585 errors, replace the SNI in slot 19. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 3585 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 19.

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Table 8-581. TEST #767 Packet Neighbor Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
120	FAIL	The SNI circuit pack cannot communicate with the SNI in slot 20 over the packet path. 1. Fix any on-board SNI-BD errors against this SNI and the SNI in slot 20. Use the **display errors** command to find any SNI-BD errors and use the display alarms command to determine whether the errors have on-board alarms. Then, follow the associated repair procedures for the SNI-BD as described in the Maintenance manual. 2. Using the **display errors** command, check the error log for other SNI circuit packs with SNI-PEER error type 3841. If other SNI circuit packs have SNI-PEER error type 3841 errors, replace the SNI in slot 20. Replacing an SNI may be service interrupting. See "SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. **NOTE:** If other SNI circuit packs do not have SNI-PEER error type 3841 errors, the problem could be at either of the peer SNI boards. It is arbitrary as to which SNI is replaced first. 3. Replace the SNI being tested. 4. Replace the SNI in slot 20.

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Table 8-581. TEST #767 Packet Neighbor Link Test — *Continued*

Error Code	Test Result	Description / Recommendation
123	FAIL	The SNI circuit pack cannot communicate with its neighbor via the packet path. 1. Fix any on-board errors (SNI-BD, EXP-INTF, and/or DS1C-BD) against the components of this fiber link by using **display errors** and **display alarms** and following the associated repair procedures. (Use the **list fiber-link** command to find the fiber link associated with this SNI. The **display fiber-link** command can then be used to find the endpoints of the fiber link and the DS1C circuit pack locations if this fiber link has a DS1 Converter complex administered.) 2. Enter **display errors** and **display alarms** and follow the associated repair procedures for any SNC-BD error entries with corresponding on-board alarm entries. 3. Enter **display errors** and follow the associated repair procedures for any SYNC entries. 4. If this FIBER-LK has circuit, packet, and control path errors, check the lightwave transceiver connections or metallic connections. Use the LED states to verify whether the connections are correct. Also, a test fiber-link s command can be run to determine whether a fiber out of frame condition exists on the fiber link; the SNI Fiber Out-of-Frame Query (#989) reports whether a fiber out of frame condition exists for an SNI endpoint and the Expansion Interface Fiber Out-of-Frame Query test (#238) reports whether a fiber out of frame condition exists for an Expansion Interface endpoint. 5. Replace the lightwave transceivers if present. 6. Replace one of the endpoint boards. 7. Replace the other endpoint board. 8. Replace the DS1 CONV circuit packs if a DS1 CONV converter complex is administered on this fiber.
	PASS	The SNI can communicate with the peer SNIs and the neighbor over the packet path.
0	NO BOARD	No board was detected by the test. 1. Check that board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNI should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNI. It may be necessary to use the **reset board** command if the SNI circuit pack gets into a mode where it cannot communicate with software. If an SNI with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

Failure Audit (#777)

This test is nondestructive.

This test queries an SNC for any existing failures and any unacknowledged "cleared failure" messages. Each failure generates an error and alarm entry against SNC-BD, SNC-LINK, or SNC-REF. A "cleared failure" message is a message an SNI circuit pack sends to software indicating the resolution of a previous failure. This message is "unacknowledged" if the SNI circuit pack never receives a response from software indicating it's own receipt of the original "cleared failure" message.

If no failures are detected by the SNI circuit pack, this test will pass.

If this test reports failures, the results screen for the **test board** command will show **FAIL** with no FAIL code. The error log must then be displayed via **display errors** with category PNC to view every SNI-BD and FIBER-LK error and category PNC-PEER to view every SNI-PEER error.

Table 8-582. TEST #777 Failure Audit

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.

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Table 8-582. TEST #777 Failure Audit — *Continued*

Error Code	Test Result	Description / Recommendation
2306	ABORT	The SNI circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where the SNI resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNI may be service interrupting. See"SNI-BD (SNI Circuit Pack)" on page 8-1429 for the procedure for replacing an SNI. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Check **list fiber-link** to determine the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries. 4. Follow the procedure described above, SNI Manual Loopback to determine whether the circuit pack or the fiber connection is faulty.
	FAIL	The SNI circuit pack reported failures or retransmitted a "cleared failure" message. 1. If this is the first time this test was run, run the test again. If there were any previous failure messages that software did not acknowledge, this test will FAIL even if the failure messages indicate a FAIL to PASS transition (i.e., a problem has gone away). If this test is run twice and FAILs both times, then at least one problem still exists. 2. Fix any SNI-BD, SNI-PEER, and FIBER-LK errors by following the associated repair procedures. Use the **display errors** and **display alarms** commands with category PNC for SNI-BD and FIBER-LK and category PNC-PEER for SNI-PEER. Fix any problems found by referring to the SNI Board or SNI Peer Error Log Entries tables in this section or Fiber Link Error Log Entries tables in the "FIBER-LK (Fiber Link)" section. 3. If no SNI-BD, SNI-PEER, or FIBER-LK entries exist in the error and alarm logs, retry the command.
	PASS	No problems are detected on the board.

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Table 8-582. TEST #777 Failure Audit — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	No board was detected by the test. 1. Check that board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNI should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNI. It may be necessary to use the **reset board** command if the SNI circuit pack gets into a mode where it cannot communicate with software. If an SNI with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

Clear Firmware Counters (#982)

This test number is used to report unsuccessful results of the **clear firmware-counters** command. This is not an actual demand maintenance test. If the command aborts, refer to the error codes listed for Test #777.

SNI Fiber Out of Frame Query (#989)

This test is nondestructive.

The SNI circuit pack reports whether a fiber out of frame condition exists, whether a loss of signal condition exists, and whether the lightwave transceiver is present.

Table 8-583. TEST #989 SNI Fiber Out of Frame Query

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
1415	ABORT	The lightwave transceiver is absent. 1. If a lightwave transceiver should not be present, do nothing. For example, an SNI connected to a DS1C circuit pack or an SNI with a metallic connection does not have a lightwave transceiver. 2. Otherwise, check the lightwave transceiver connections. 3. If OK, replace the lightwave transceiver. If a fiber out of frame condition exists and lightwave transceivers are used, check that the lightwave transceivers are of the same type, that is, both are 9823a or both are 9823b. If they are not the same type, replace one of the lightwave transceivers: ■ 9823a is used for distances up to 4900 feet. ■ 9823b is used for distances up to 25,000 feet. 4. If the test continues to abort, replace the SNI circuit pack.
2300	ABORT	The downlink message necessary to run this test could not be sent. 1. Retry the command at 1-minute intervals up to 3 times.
2301	ABORT	The software timer could not be set before sending the downlink message necessary to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2304	ABORT	SNI circuit pack responded that it is not able to run the test requested by software. 1. Retry the command at 1-minute intervals up to 3 times.

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Table 8-583. TEST #989 SNI Fiber Out of Frame Query — *Continued*

Error Code	Test Result	Description / Recommendation
2306	ABORT	The SNI circuit pack is not responding to test requests sent by software. 1. Run the **test led switch-node** for the switch node where the SNI resides to verify whether the LEDs on the board light. 2. If the LEDs on the other boards in the carrier light, but the LEDs on this board do not light, run test 760 via **test board *UUCSS* l** for the active SNC in this carrier. Wait 5 minutes and then try step 1 one more time. If the LEDs on this board still do not light, replace this board. Replacing an SNI may be service interrupting. See ''SNI-BD (SNI Circuit Pack)'' on page 8-1429 for the procedure for replacing an SNI. 3. If none of the LEDs light for the boards in the same carrier as this board, fix any problems associated with the connectivity of this carrier to the server. a. Check **list fiber-link** to determine the fiber connections to this carrier. b. Check the LEDs on every SNI and EI, and fix any fiber problems. c. Enter **display errors**, and follow the associated repair procedures for any EXP-INTF error entries associated with the controlling IPSI-connected EPN. d. Follow the associated repair procedures for any SYNC, SNI-BD, SNC-BD, FIBER-LK, or SNI-PEER error entries. 4. Follow the procedure described above, SNI Manual Loopback to determine whether the circuit pack or the fiber connection is faulty.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
141	FAIL	The SNI circuit pack has a fiber out of frame condition, but no loss of signal condition. Also, a lightwave transceiver is connected to the SNI circuit pack. 1. Check that the connected circuit pack is physically installed. The connected circuit pack is the other endpoint of the fiber-link if no DS1C complex is administered (check via **list fiber-link**). Otherwise, if a DS1C complex is administered, the connected circuit pack is the DS1C circuit pack connected to the SNI circuit pack. 2. Perform the Fiber Fault Isolation Procedure described in Chapter 5. 3. Replace this SNI circuit pack. 4. Replace the connected circuit pack.

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Table 8-583. TEST #989 SNI Fiber Out of Frame Query — *Continued*

Error Code	Test Result	Description / Recommendation
142	FAIL	The SNI circuit pack has a fiber out-of-frame condition, but no loss of signal condition. Also, no lightwave transceiver is connected to the SNI circuit pack. 1. Check that the connected circuit pack is physically installed. The connected circuit pack is the other endpoint of the fiber-link if no DS1C complex is administered (check via **list fiber-link**). Otherwise, if a DS1C complex is administered, the connected circuit pack is the DS1C circuit pack connected to the SNI circuit pack. 2. If a lightwave transceiver is not supposed to be present, go to step 2. For example, an SNI connected to a DS1C circuit pack or an SNI with a metallic connection does not have a lightwave transceiver. Otherwise, check the lightwave transceiver connections. If OK, replace the lightwave transceiver. If a fiber out-of-frame condition exists and lightwave transceivers are used, check that the lightwave transceivers are of the same type, that is, both are 9823a or both are 9823b. If they are not the same type, replace one of the lightwave transceivers: ■ 9823a is used for distances up to 4900 feet. ■ 9823b is used for distances up to 25,000 feet. 3. Perform the Fiber Fault Isolation Procedure described in Chapter 5. 4. Replace this SNI circuit pack. 5. Replace the connected circuit pack.
143	FAIL	The SNI circuit pack has a loss of signal condition, but no fiber out of frame condition. Also, a lightwave transceiver is connected to the SNI circuit pack. 1. Check that the connected circuit pack is physically installed. The connected circuit pack is the other endpoint of the fiber-link if no DS1C complex is administered (check via **list fiber-link**). Otherwise, if a DS1C complex is administered, the connected circuit pack is the DS1C circuit pack connected to the SNI circuit pack. 2. Perform the Fiber Fault Isolation Procedure described in Chapter 5. 3. Replace this SNI circuit pack. 4. Replace the connected circuit pack.

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Table 8-583. TEST #989 SNI Fiber Out of Frame Query — *Continued*

Error Code	Test Result	Description / Recommendation
144	FAIL	The SNI circuit pack has a loss of signal condition, but no fiber out of frame condition. Also, no lightwave transceiver is connected to the SNI circuit pack. 1. Check that the connected circuit pack is physically installed. The connected circuit pack is the other endpoint of the fiber-link if no DS1C complex is administered (check via **list fiber-link**). Otherwise, if a DS1C complex is administered, the connected circuit pack is the DS1C circuit pack connected to the SNI circuit pack. 2. If a lightwave transceiver is not supposed to be present, go to step 2. For example, an SNI connected to a DS1C circuit pack or an SNI with a metallic connection does not have a lightwave transceiver. Otherwise, check the lightwave transceiver connections. If OK, replace the lightwave transceiver. If a fiber out-of-frame condition exists and lightwave transceivers are used, check that the lightwave transceivers are of the same type, that is, both are 9823a or both are 9823b. If they are not the same type, replace one of the lightwave transceivers: ■ 9823a is used for distances up to 4900 feet. ■ 9823b is used for distances up to 25,000 feet. 3. Perform the Fiber Fault Isolation Procedure described in Chapter 5. 4. Replace this SNI circuit pack. 5. Replace the connected circuit pack.
145	FAIL	The SNI circuit pack has a fiber out of frame condition and a loss of signal condition. Also, a lightwave transceiver is connected to the SNI circuit pack. 1. Check that the connected circuit pack is physically installed. The connected circuit pack is the other endpoint of the fiber-link if no DS1C complex is administered (check via **list fiber-link**). Otherwise, if a DS1C complex is administered, the connected circuit pack is the DS1C circuit pack connected to the SNI circuit pack. 2. Perform the Fiber Fault Isolation Procedure described in Chapter 5. 3. Replace this SNI circuit pack. 4. Replace the connected circuit pack.

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Table 8-583. TEST #989 SNI Fiber Out of Frame Query — *Continued*

Error Code	Test Result	Description / Recommendation
146	FAIL	The SNI circuit pack has a fiber out of frame condition, and a loss of signal condition. Also, no lightwave transceiver is connected to the SNI circuit pack. 1. Check that the connected circuit pack is physically installed. The connected circuit pack is the other endpoint of the fiber-link if no DS1C complex is administered (check via **list fiber-link**). Otherwise, if a DS1C complex is administered, the connected circuit pack is the DS1C circuit pack connected to the SNI circuit pack. 2. If a lightwave transceiver is not supposed to be present, go to step 2. For example, an SNI connected to a DS1C circuit pack or an SNI with a metallic connection does not have a lightwave transceiver. Otherwise, check the lightwave transceiver connections. If OK, replace the lightwave transceiver. If a fiber out-of-frame condition exists and lightwave transceivers are used, check that the lightwave transceivers are of the same type, that is, both are 9823a or both are 9823b. If they are not the same type, replace one of the lightwave transceivers: ■ 9823a is used for distances up to 4900 feet. ■ 9823b is used for distances up to 25,000 feet. 3. Perform the Fiber Fault Isolation Procedure described in Chapter 5. 4. Replace this SNI circuit pack. 5. Replace the connected circuit pack.
	PASS	No problems associated with this test are detected on the SNI.
0	NO BOARD	No board was detected by the test. 1. Check that board is properly translated and inserted. 2. Run the test again. If it fails, reset the board. An SNI should be reset instead of reseating the circuit pack. The **reset board** command should almost never be used on an SNI. It may be necessary to use the **reset board** command if the SNI circuit pack gets into a mode where it cannot communicate with software. If an SNI with active errors and alarms is reset, the errors and alarms may take a while to come back, therefore the **reset board** command can mask real problems. 3. Run the test again. If it fails, the ID chip on board may be bad. Replace the board and retest.

SNI-PEER (SNI Peer Link)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
SNI-PEER	MAJOR	**test board *UUCSS* s**	SNI Peer Link
SNI-PEER	MINOR	**test board *UUCSS* s**	SNI Peer Link
SNI-PEER	WARNING	**test board *UUCSS* s**	SNI Peer Link

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21).

SNI Peers are Switch Node Interfaces residing on the same Switch Node Carrier. SNI-PEER maintenance involves testing of the links between SNI Peers. SNI-PEER errors are described on the following pages. For a full description of SNIs, including circuit pack replacement, see ''SNI-BD (SNI Circuit Pack)'' on page 8-1429.

Error Log Entries and Test to Clear Values

Table 8-584. SNI-PEER Hardware Error Log Entries

Error Type	Aux Data	SNI Slot[1]	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[2]	0		Any	Any	Any	**test board *UUCSS* r 1**
1	any	2	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
257	any	3	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
513	any	4	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
769	any	5	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
1025	any	6	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
1281	any	7	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board UUCSS r 1**

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Table 8-584. SNI-PEER Hardware Error Log Entries — *Continued*

Error Type	Aux Data	SNI Slot[1]	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1537	any	8	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS r 1***
1793	any	9	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
2049	any	13	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
2305	any	14	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
2561	any	15	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
2817	any	16	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
3073	any	17	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
3329	any	18	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
3585	any	19	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**
3841	any	20	Failure audit (#777)	MAJOR MINOR WARNING	OFF	**test board *UUCSS* r 1**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. The slot location of the SNI at the other end of the peer link indicted by the SNI reporting the error.

Notes:

For **every** error in Table 8-584, the SNI circuit pack reporting the error is indicating that it has a problem with the control path, circuit path, or packet path to the SNI peer in the slot indicated on the error table.

First, the Failure Audit test (#777) should be run to confirm whether the error still exists.

If the SNI is reporting an SNI-PEER error against a slot that does not contain an SNI, either change circuit pack administration via **change circuit-pack** to unadminister the SNI, or insert an SNI into the indicated slot. **List configuration carrier** can be used to determine whether an SNI circuit pack is inserted. Otherwise, **display errors** and look at *every* SNI-PEER error in the log. If either of the following two conditions are present, follow Procedure 2 below.

- Do many SNIs have SNI-PEER errors pointing to the same 2 adjacent SNIs?
- Do 2 adjacent SNIs have SNI-PEER errors pointing to many other SNIs?

If neither condition is present, follow Procedure 1 below. When using either procedure, see ''SNI-BD (SNI Circuit Pack)'' or ''SNC-BD (Switch Node Clock Circuit Pack)'' for circuit pack replacement instructions.

Slot Numbers of Adjacent SNIs	Point to This SNI Pair
2, 3	1, 257
4, 5	513, 769
6, 7	1025, 1281
8, 9	1537, 1793
13, 14	2049, 2305
15, 16	2561, 2817
17, 18	3073, 3329
19, 20	3585, 3841

Procedure 1: Proceed through the following steps until the problem is resolved:

1. Perform the Fiber Fault Isolation Procedure described in Chapter 5.
2. Replace the SNI pointed to by the SNI-PEER error type (see the SNI Slot column in *Table 8-584 on page 8-1491*, ''SNI-PEER Hardware Error Log Entries'').
3. Replace the SNI reporting the SNI-PEER error.
4. Replace the active SNC.

Procedure 2: If either of the two patterns described before are present, then the clock signal between active SNC and 2 Adjacent SNIs is suspect. Proceed through the following steps *until* the problem is resolved:

1. If only one SNC exists in this switch node carrier, replace the SNC. If two SNCs exist in this switch node carrier, perform the following steps:
   a. Set the standby SNC to active by executing **set switch-node-clock** UUCSS with the standby SNC's location.
   b. If the problem persists, switch back to the previously active SNC via the **set switch-node-clock** command and go to step 2 below.
   c. If the problem went away, replace the SNC that was previously active. Then set the newly replaced SNC to active. If the problem returns, assume that the SNC that was just replaced was not at fault and go to step 2 below.
2. Replace the leftmost SNI from the pair of adjacent SNIs.
3. Replace the rightmost SNI from the pair of adjacent SNIs.
4. This could indicate a problem with the switch-node-carrier backplane.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *Configuration* audit (#759), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
Configuration audit (#759)	X	X		ND
Failure audit (#777)	X	X		ND
Fiber Out of Frame query (#989)	X	X		ND
Packet Neighbor test (#767)	X	X		ND
Circuit Path test (#755)	X	X		ND
Destructive Facility test (#757)		X		D
Off-board Destructive Facility test (#756)		X		D
Switch Node Interface Reset test (#761)			X	D

1. D = Destructive, ND = Nondestructive

For descriptions of these tests, see ''SNI-BD (SNI Circuit Pack)''.

SRP-EPN

MO's Name in Alarm Log	Alarm Level	Full Name of MO
SRP-EPN	MAJOR	SRP-EPN

The Survivable Remote Expansion Port Network (SREPN) provides EPN service to the customer when the link to the main processor fails or is broken, or when the processor or center stage fails. SREPN is a disaster recovery operation rather than an additional reliability option.

Due to the hardware solution for SRP (Survivable Remote Processor), maintenance tests to make sure the SRP can go into "survive" mode are not possible.

When the `Survivable Remote Processor` field on the **system-parameters customer-options** form is set to y, then the following alarming strategy is used:

1. When the SRP is not in control of the SREPN (which is the normal state), then every alarm associated with the SREPN is downgraded to a WARNING alarm. These include the EXP-INTF in the SRP, the EXP-LINK between the SRP and the SREPN, and every maintenance component in the SREPN.
2. When the SRP is in control of the SREPN (the EXP-LINK is up between the SRP and SREPN), the disaster recovery state is in effect. A MAJOR alarm is raised against the SRP-EPN MO. Every other MO uses its normal alarm strategy.

If the S8700 Multi-Connect's server loses control (connectivity) to a SREPN, and the SRP associated with the SREPN does not raise a MAJOR alarm against the SRP-EPN MO, then the disaster recovery mechanism is **not** working.

There are no tests associated with the SRP-EPN MO. The only way to resolve the SRP-EPN alarm is to fix the connectivity problem(s) between the server and the SREPN.

STRAT-3 (Stratum-3 Clock)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run	Full Name of MO
STRAT-3	MAJOR	**test synchronization**	Stratum-3 clock
STRAT-3	MINOR	**test synchronization**	Stratum-3 Clock

The *Digital Synchronization Network Plan (PUB 60110)* specifies a hierarchy of synchronization nodes consisting of Strata 1 to 4, where the public network's sole Stratum-1 clock is the most accurate. The Release 5r system supports both Stratum-3 and -4 operations. See "Stratum-4 Synchronization" on page 8-1511 for details on Stratum-4 operation.

A Stratum-3 clock derives its timing from two DS1 references connected to a Stratum-3 or better source. The Stratum-3 clock provides a holdover of at least 24 hours should both DS1 references fail. (After 24 hours, the Stratum-3 clock still provides service but its accuracy may be degraded). The *Digital Synchronization Network Plan (PUB 60110)* requires that the Stratum-3 clock have duplicated components.

The Stratum-3 clock can be configured with only one DS1 input if one of the Clock Input cards is removed. Also, the Stratum-3 clock can free run (use its internal clock without using DS1 inputs, if both Clock Input cards are removed).

Only a TN780 Tone-Clock circuit pack recognizes and supports a Stratum-3 clock and its alarm signals. (The TN780 Tone-Clock circuit pack is also backward-compatible with a TN768 Tone-Clock circuit pack.) The Stratum-3 clock may be connected to a non-IPSI EPN where a TN780 Tone-Clock circuit pack resides. The Stratum-3 clock should never be connected to an IPSI-connected EPN.

The only operation that software can perform is a query of the alarm leads. The only recovery action that can be performed on a catastrophic failure of the Stratum-3 clock is using the local oscillator on the active TN780 Tone-Clock circuit pack. Neither software nor the TN780 Tone-Clock circuit pack can request additional information about the health of the Stratum-3 clock other than the information provided by the alarm leads. Furthermore, neither the software nor the TN780 Tone-Clock circuit pack can request that the external clock switch references, change configuration, disable/enable, initialize, and so forth.

In the system, the Stratum-3 clock has been implemented as an external which follows the specification in PUB 60110 for Stratum 3. The only external Stratum-3 clock that is supported is the Telecom Solutions Digital Clock Distributor™ for Customer Premise Timing (DCD-CPT) Stratum-3 clock. Figure 8-85 on page 8-1497 shows how the Stratum-3 hardware configuration provides clock and alarm signals to the TN780 Tone-Clock circuit pack(s). The reference DS1 facilities connect directly to the Stratum-3 clock for timing purposes, but the DS1 data may be routed into the switch by using a Y connector (H-600-274 G1 for the 50-pin DS1 end or H-600-274 G2 for the 15-pin DS1 end).

For more information about installing a Stratum-3 clock, refer to *Installing the Avaya S8700 Media Server for Multi-Connect Configurations*.

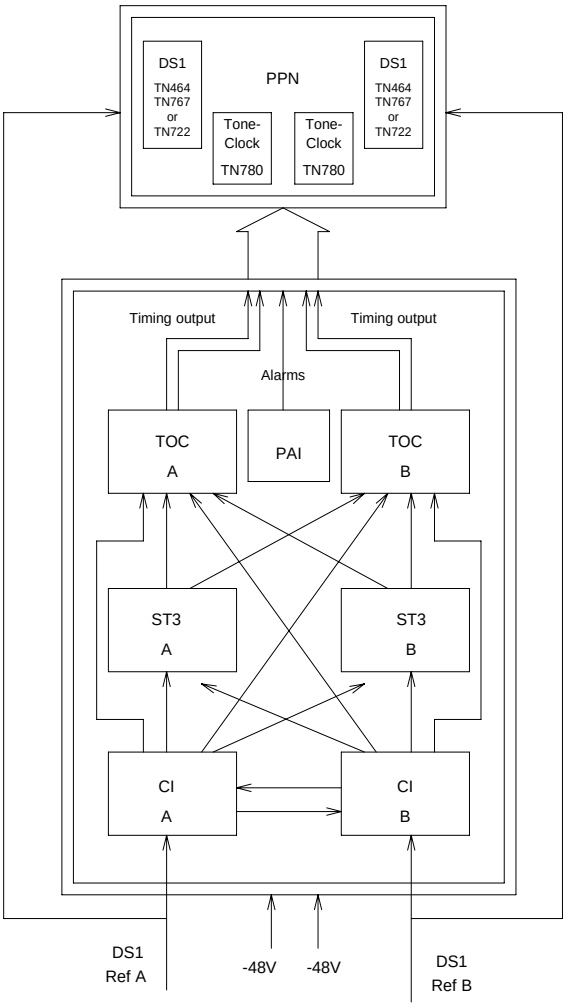

Figure 8-85. Stratum-3 Clock Hardware Configuration

Stratum-3 Clock LED Strategy

NOTE:
When looking in the Stratum-3 cabinet, ''A'' card is on the left and ''B'' card is on the right.

NOTE:
The normal LED scheme is not followed for this device. Green LEDs do not indicate maintenance activity. There are no yellow LEDs, and there are more than three LEDs per circuit pack.

NOTE:
Removal of a card in the Stratum-3 clock may cause alarm(s) to be resolved and the query test to pass. However, the removed cards should still be replaced to restore the Stratum-3 clock to full service.

The Stratum-3 clock has the following components:

- 2 Clock Input cards (CI)

  Provides the logic to select the better DS1 reference or Clock Input card. The red FAIL LED on this card indicates a failure with the card or the DS1 reference connected to it.

- 2 Stratum-3 Cards (ST3)

  Provides 24-hour holdover. The red FAIL LED on this card indicates a failure with the card. Replace the card.

- 2 Timing Output Cards (TOC)

  Provides cable length compensation, multiple output ports, selection of the ST3, and CI outputs. This type of card has two red failure LEDs: one indicates a failure of the card; the other indicates a failure in one or more output ports. In either case, replace the card.

- 1 PBX (Private Branch Exchange) Alarm Interface (PAI)

  Filters power supplied to the clock, provides fuse protection, and provides alarm indications based on inputs supplied by other cards. The six LEDs on this card provide indications for the six alarm or status conditions as follows:

  — Loss of DS1 reference A

  — Loss of DS1 reference B

  — Loss of one clock unit

  — Loss of both clock units

  — Loss of one power supply

  — Loss of both power supplies

The output of the CI and PAI cards go directly to the TN780 Tone-Clock circuit pack via two 25-pair amphenol-terminated cables. Every card has red and/or green LEDs for providing status or alarm indications. The abbreviations used in the table are defined above except for SRC (source) and PLL (Phase Locked Loop).

Table 8-585. Stratum-3 Clock LED Indications

Card	Name	Color	Indication
PAI	REF A	Red	Loss of input reference A or CI A failed
	REF B	Red	Loss of input reference B or CI A failed
	ST A	Red	Failed Stratum-3 clock A
	ST B	Red	Failed Stratum-3 clock B
	PWR A	Green	-48VDC A present
	PWR B	Green	-48VDC B present
CI	FAIL	Red	Card failure
	DS1	Green	DS1 source present
	CC	Green	Composite clock source[1] present
	SRC ACTIVE	Green	Card is currently on-line
ST3	FAIL	Red	Card failure
	LOCK	Red	PLL lost sync with reference or holdover mode
	REF A	Red	Timing Reference from CI A
	REF B	Red	Timing Reference from CI B
TOC	FAIL	Red	Card failure
	PORT ALM	Red	Output port alarm (one or more)
	ST	Green	Reference present from ST clock
	INPUT	Green	Reference present from CI
	500’	Green	500-foot phase advance
	1000’	Green	1000-foot phase advance

1. Composite Clock (CC) source refers to the protocol used to electrically transfer timing from the Stratum-3 clock to the switch. The Composite Clock source is not relevant to the system.

Error Log Entries and Test to Clear Values

Table 8-586. Stratum-3 Clock Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test synchronization r 4**
1(a)	Any	Stratum-3 Clock Alarm Query (#649	MINOR	OFF	**test synchronization r 4**
18(b)	0	disable sync	WARNING	OFF	**enable sync**
257(c)	Any	Stratum-3 Clock Alarm Query (#649)	MINOR	OFF	**test synchronization r 4**
513(d)	Any	Stratum-3 Clock Alarm Query (#649	MINOR	ON	**test synchronization r 4**
769(e)	Any	Stratum-3 Clock Alarm Query (#649)	MINOR	ON	**test synchronization r 4**
1025(f)	Any	Stratum-3 Clock Alarm Query (#649)	MINOR MAJOR(h)	ON	**test synchronization r 4**
1281(g)	Any	Stratum-3 Clock Alarm Query (#649)	MINOR /MAJOR(h)	ON	**test synchronization r 4**
1537(i)		none	MINOR MAJOR(h)	ON	
1793(j)		none	MINOR MAJOR(h)	ON	

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. This error type corresponds to FAIL code 1 of the Stratum-3 Clock Alarm Query test (#649): either reference A failed or the CI card A failed.

b. This error indicates that Synchronization Maintenance has been disabled via the **disable synchronization-switch** command. Execute the **enable synchronization-switch** command to enable Synchronization Maintenance reference switching and to resolve this alarm.

c. This error type corresponds to FAIL code 2 of the Stratum-3 Clock Alarm Query test (#649): one power supply failed.

d. This error type corresponds to FAIL code 4 of the Stratum-3 Clock Alarm Query test (#649): one clock unit failed.

e. This error type corresponds to FAIL code 8 of the Stratum-3 Clock Alarm Query test (#649): either reference B failed or the CI card B failed.

f. This error type corresponds to FAIL code 16 of the Stratum-3 Clock Alarm Query test (#649): every power supplied failed.

g. This error type corresponds to FAIL code 32 of the Stratum-3 Clock Alarm Query test (#649): every clock unit failed.

h. An OFF-BOARD alarm on the Stratum-3 clock, indicates a DS1 facility problem; an ON-BOARD alarm indicates a fault in either the Stratum-3 clock or the connection between the Stratum-3 clock and the switch. If the Stratum-3 clock cannot be referenced and the local oscillator on the TN780 Tone-Clock circuit pack must serve as the reference, a Major alarm is raised. Otherwise, a Minor alarm is raised.

i. This error can be caused by one of the following conditions:

   - One or both TOCs (Timing Output Cards) has failed.
   - The connection between the Stratum-3 clock and the TN780 Tone-Clock circuit pack is faulty.
   - The TN780 Tone-Clock circuit pack is defective.

   A Minor alarm results if the Stratum-3 clock can still provide timing to the switch; otherwise, a Major alarm will be raised because the Stratum-3 clock is not providing timing and the switch is referencing the local oscillator on the TN780 Tone-Clock circuit pack. If only the active TN780 Tone-Clock circuit pack is faulty, the standby TN780 Tone-Clock circuit pack becomes active and remains synchronized to the Stratum-3 clock. When the system switches to the standby Tone-Clock circuit pack, the alarm is resolved, and a TDM-CLK alarm is raised to indicate a possible problem on the TN780 Tone-Clock circuit pack.

   If the alarm is minor:

   Look for a red LED on either or both TOC cards. If there is a red LED, then replace the card. If there is no red LED, then, using the *Stratum-3 Wiring Guide*, check that the wiring installation is correct. After replacing the card or correctly rewiring the installation, clear the alarm by first issuing the **disable synchronization-switch** command followed by the **enable synchronization-switch** command. The latter procedure will cause synchronization software to switch back to using the Stratum-3 clock again. Wait 2 minutes and then execute the command. If Maintenance Name on the status screen shows ‘‘STRAT-3,’’ then the problem is resolved.

CAUTION:
*The **disable synchronization-switch** command followed by the **enable synchronization-switch** command may cause slip alarms. The circuit packs that can experience slips and the associated error log entry for slips are as follows.*

Table 8-587. Timing Slip Error Types

Circuit Pack Name	Error Log Name	Error Log Entry for Slips
DS1 Interface	DS1-BD	3073 to 3160
Expansion Interface	EXP-INTF	2305
Switch Node Interface	SNI-BD	1537
Tone-Clock	TDM-CLK	1025
UDS1 Interface	UDS1-BD	3073 to 3160

If the alarm is major:

Check connections between the Stratum-3 clock and the switch. If there are no loose connections, then, using the *Stratum-3 Wiring Guide*, check that the wiring installation is correct. After reconnecting the loose connection or correctly rewiring it, clear the alarm by first issuing the **disable synchronization-switch** command followed by the **enable synchronization-switch** command. Wait 1-minute, and then execute the **status synchronization** command. If Maintenance Name on the status screen shows ''STRAT-3,'' then the problem is resolved.

If the Standby Tone-Clock circuit pack became active:

Check the connection between the Stratum-3 clock and the TN780 Tone-Clock circuit pack from which the system has just switched. If there are no loose connections, then, replace the circuit pack containing the TN780 Tone-Clock circuit pack. See ''Replacing the IPSI or Tone-Clock Circuit Pack''. Before switching back to the new TN780 Tone-Clock circuit pack, use the **test tone-clock *UC* long** command to check that the Tone-Clock is receiving a signal from the Stratum-3 clock. If every test passes, switch to the new Tone-Clock circuit pack via the **set tone-clock *UC* override** command. If Test #651 fails, then the original TN780 Tone-Clock circuit pack should be reinserted, and the cable between the Stratum-3 clock and the TN780 Tone-Clock circuit pack should be replaced. If Test #651 continues to fail, then escalate the problem.

If slip alarms exist after following the repair procedures for **any** of the previous cases, clear the slip alarms by running the **test board** command with the **clear** option. See Table 8-587, ''Timing Slip Error Types'' for a list of circuit packs and associated slip error log entries.

This error indicates that the Tone-Clock circuit pack in the master port network is not a TN780. If duplicate Tone-Clock circuit packs exist in the master port network, this error may mean that one or both Tone-Clock circuit packs are not TN780s. Verify that the Tone-Clock(s) in the master port network are TN780s.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the following table when inspecting errors in the system. For example, by clearing error codes associated with the *Stratum-3 Clock Alarm Query* test (#649), you may also clear errors generated from other tests in the testing sequence.

The **test synchronization** command also runs the Test Synchronization test (#417). Test 417 is described in "SYNC (Port-Network Synchronization)" on page 8-1509.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Stratum-3 Clock Alarm Query (#649)	X	X	ND

1. D = Destructive, ND = Nondestructive

Stratum-3 Clock Alarm Query (#649)

This test queries the Stratum-3 clock for its alarm status and reports the results of the query. The Stratum-3 clock provides the system with the following six alarm indications via the TN780 Tone-Clock circuit pack:

- Reference A failed or CI card A failed.
- Reference B failed or CI card B failed.
- One power supply failed.
- Every power supply failed.
- One clock unit failed.
- Every clock unit failed.

CAUTION:
The removal of a card in the Stratum-3 clock may cause alarm(s) to be resolved and the query test to pass. However, the removed cards should still be replaced to restore the Stratum-3 clock to full service.

Table 8-588. TEST #161 Loop-Around Test

Error Code	Test Result	Description / Recommendation
1001	ABORT	The system could not allocate the necessary resources to run this test. 1. Retry the command at 1-minute intervals up to up to 3 times.

Continued on next page

Table 8-588. TEST #161 Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
1005	ABORT	This test aborts when it is run on a Stratum-4 system. Do not change synchronization to Stratum 3 without consulting the synchronization plan administrator for this switch.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
1	FAIL	Either Reference A failed or CI card A failed. This condition usually indicates a failure of the DS1 reference; however, there may also be a failure of the CI card to which the reference is connected. The system technician dispatched to investigate this problem should take a spare CI card in case the CI card caused the failure. If you are NOT ON-SITE, use the following procedure: 1. Look for DS1-BD (DS1 Interface Circuit Pack) errors using the **display error** command. See the DS1-BD Maintenance documentation for recommended strategy to resolve any DS1-BD errors found. 2. If there are no DS1-BD errors **or** after resolving every DS1-BD error, issue the **test synchronization r 4** command to determine whether the alarm still exists. If every test repetition passes, then the alarm no longer exists. Otherwise, the system technician should be dispatched with a spare CI card to use the following instructions on-site. (*continued*)
1	FAIL	(*continued*) If you are ON-SITE, use the following procedure: 1. Look for a red LED on CI card A (i.e., the left CI card). If there is a red LED, then replace the CI card, if a spare is available. If no spare CI is available on-site, proceed to Step 3. If after replacing the CI card, the red LED on the new CI card lights also, then proceed to Step 3. 2. If a spare CI card is available, replace the suspect CI card. Otherwise, issue the **test synchronization r 4** command to clear the alarm. If any test repetitions fail, then follow the procedure for those failures. 3. Look for DS1-BD (DS1 Interface Circuit Pack) errors using the **display error** command. See the DS1-BD Maintenance documentation for recommended strategy to resolve any DS1-BD errors found. If there are no DS1-BD errors, then proceed to Step 5. 4. After every DS1-BD error has been resolved, then determine whether the alarm still exists by issuing the **test synchronization r 4** command to clear the alarm. If any test repetitions fail, then follow the procedures for those failures. 5. Check the DS1 reference A connections to the Stratum-3 clock. 6. To determine whether the alarm still exists, issue the **test synchronization r 4** command to clear the alarm. If any test repetitions fail, then follow the procedures for those failures.

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Table 8-588. TEST #161 Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
2	FAIL	One power supply failed. This error only occurs when the Stratum-3 clock has two power supplies, and one of them has failed. However, the clock can function with one power supply. 1. Locate the failed power supply (the one with a red LED), and replace it. The power supplies reside under the Stratum-3 clock's carrier. 2. To determine whether the alarm still exists, issue the **test synchronization r 4** command to clear the alarm. If any test repetitions fail, then follow the procedures for those failures.
4	FAIL	One clock unit failed. 1. Look at the Stratum-3 cabinet for a red LED on a circuit card marked "ST3.'' Replace the card. 2. To determine whether the alarm still exists, issue the **test synchronization r 4** command to clear the alarm. If any test repetitions fail, then follow the procedures for those failures.
8	FAIL	Reference B failed or CI card B failed. This condition usually indicates a failure of the DS1 reference; however, there may also be a failure of the CI card to which the reference is connected. The system technician dispatched to investigate this problem should take a spare CI card in case the CI card caused the failure. If you are NOT ON-SITE, use the following procedure: 1. If there were no DS1-BD errors **or** if every DS1-BD error has been resolved, enter **test synchronization r 4** to determine whether the alarm is still present. If every repetition of the test passes, the alarm no longer exists. Otherwise, the system technician should be dispatched with a spare CI card to perform the following instructions on-site.

Continued on next page

Table 8-588. TEST #161 Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
8	FAIL *(cont'd)*	If you are ON-SITE, use the following procedure: 1. Look for a red LED on a CI card B (the CI card on the right). If there is a red LED, then replace the CI card, if a spare is available. If no spare CI is available on-site, proceed to Step 3. If, after replacing the CI card, the red LED on the new CI card lights, proceed to step 3. 2. Otherwise, enter **test synchronization r 4** to clear the alarm. If any test repetitions fail, follow the procedure for those failures. 3. Enter **display errors** and look for DS1-BD errors. If there are any, see "DS1-BD (DS1 Interface Circuit Pack)". If there are no DS1-BD errors, proceed to step 5. 4. After every DS1-BD error has been resolved, determine whether the alarm still exists with **test synchronization r 4**. If any test repetitions fail, follow procedures for those failures. 5. Check the DS1 reference A connections to the Stratum-3 clock. 6. Determine whether the alarm still exists with **test synchronization r 4** to clear the alarm. If any test repetitions fail, then follow procedures for those failures.
16	FAIL	Every power supply failed. 1. Replace the failed power supplies. 2. If battery backup for the Stratum-3 clock is not supplied or if the battery backup holdover time has been exceeded, then the system will be referencing the local oscillator on the active TN780 Tone-Clock circuit pack until software detects that one or both power supplies have been restored (approximately 40 minutes). To speed up this restoration, issue the **test synchronization r 4** command. Every test should pass. If any repetitions should fail, then follow the procedures for those failures. The battery backup resides under the Stratum-3 clock's carrier.
32	FAIL	Every clock unit failed. 1. Look at the Stratum-3 cabinet for red LEDs on circuit cards marked "ST3." Replace the card(s). 2. To determine whether the alarm still exists, issue the **test synchronization r 4** command to clear the alarm. If any test repetitions fail, then follow the procedures for those failures.
2101	FAIL	The TN780 Tone-Clock circuit pack detects loss of signal. See note h of the STRAT-3 Hardware Error Log Entries table in the STRAT-3 (Stratum-3 Clock) Maintenance documentation for replacement procedures.
	PASS	The Stratum-3 clock has reported that it has no alarm conditions. If synchronization problems have been reported, look for SYNC errors and see "SYNC (Port-Network Synchronization)" for recommended strategy for those errors.

SVC-SLOT (Service Slot)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run	Full Name of MO
SVC-SLOT	MINOR	none	Service Slot

The Service Slot MO detects the insertion of an invalid circuit pack into a dedicated SERVICE slot. The SERVICE slot is the leftmost slot in the J58890BB port carrier, and is identified as slot location "00" in every command, field entry, and display on the management terminal.

Since this slot does not provide tip and ring connectivity to the wall field, only the following circuit packs are allowed:

- TN744 Call Classifier
- TN750 Integrated Announcement
- TN771 Maintenance/Test
- TN725 Speech Synthesizer
- TN433 Speech Synthesizer
- TN457 Speech Synthesizer
- TN748 Tone Detector
- TN420 Tone Detector

When another circuit pack is inserted in a SERVICE slot (for example, TN755 Neon Power Unit), a MINOR alarm is generated against the Service Slot MO.

Instead of the illegal circuit pack's MO name, the "Service Slot" MO name is used to prevent any attempt to assign a port to the illegal pack physically residing in the SERVICE slot.

Error Log Entries and Test to Clear Values

Table 8-589. Service Slot Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
600 (a)		None	MINOR	ON	

Note:

a. Error type 600 indicates that an invalid circuit pack was inserted in slot 00, the SERVICE slot, of a J58890BB port carrier. See the previous list of valid circuit packs.

The invalid circuit pack's TN code can be displayed by using the **list configuration board *UUCSS*** command — where UU is the cabinet number, C is the carrier letter, and SS is the slot number (always 00) of the alarmed circuit pack.

To retire the alarm, remove the invalid circuit pack.

SYNC (Port-Network Synchronization)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run	Full Name of MO
SYNC	MINOR	**display errors**	Port Network Synchronization
SYNC	WARNING	**test synchronization**	Port Network Synchronization

This section discusses synchronization problems local to the switch. For further information about synchronization including network synchronization, refer to *AT&T Network and Data Connectivity*.

Synchronization maintenance is composed of both hardware and software components, and its purpose is to provide a common reference frequency for reliable digital communications between an S8700 Media Server system and other PBXs, central offices (COs), or customer-premises equipment (CPE). Synchronization is implemented using several system components including:

- TN2312 IPSI
- TN722, TN767, and TN464 DS1 Interfaces (all suffixes)
- TN768, TN780, or TN2182 Tone-Clock
- TN572 Switch Node Clock
- TN573 Switch Node Interface
- TN570 Expansion Interface

NOTE:
If both a primary and secondary references are administered for Stratum-4 synchronization, both references must reside in the same port network (PN).

Traditional Sync Operation

For a previous DEFINITY system, or optionally for an S8700 Media Server Mulit-Connect system, synchronization is obtained from the public circuit-switched network via either:

- A DS1 or BRI interface
- The ATM network

For DS1- or BRI-based synchronization, a particular DS1 or PRI interface is configured as the synchronization reference. The IPSI/Tone-Clock board in the same PN locks on to this reference and regenerates clock signals that are placed on the EPN's backplane. In turn, the Center Stage Switch (CSS) components transfer this timing to every other PN. These IPSI/Tone-Clocks then regenerate clock signals for their own PNs at the same rate as the:

- Master PN
- Public network

This creates a hierarchy where the master EPN receives timing from the public network, and every other EPN derives its timing from the master through the CSS. See Figure 8-86.

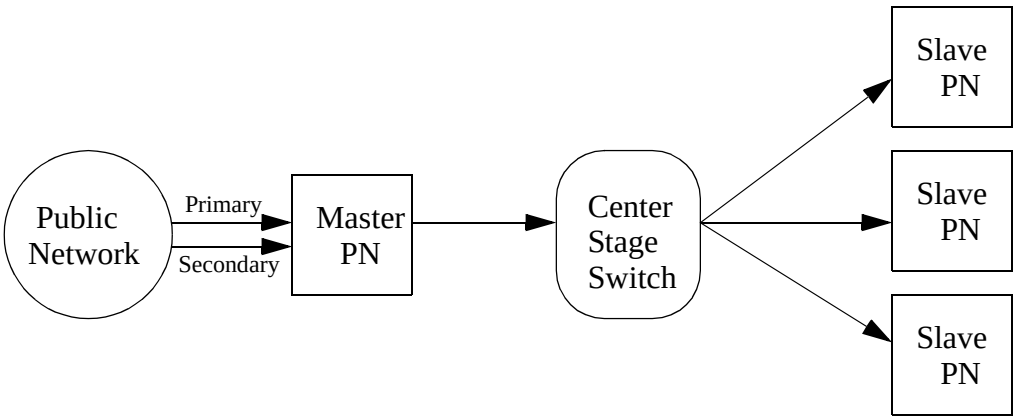

Figure 8-86. Traditional Sync Operation

Typically, a pair of interfaces from the public network are configured — one as a primary and one as a secondary. The IPSI/Tone-Clock in the Master PN can:

- Lock onto either interface
- Switch between them in the event of a failure

In the event of a dual failure, the Tone-Clock in the master PN can generate its own timing and keep every PN synchronized. However, these PNs would not be synchronized with any other public-network interfaces that exist in any of the PNs.

When a center stage is implemented via an ATM network, it is possible to obtain timing from the ATM network. For more information, See ''ATM-SYNC (ATM Synchronization)'' on page 8-264.

Clock Synchronization

NOTE:
Stratum-3 clocking is not available for an EPN where the Tone-Clock function is supplied by either a:

- TN2312 IPSI circuit pack's Tone-Clock circuit
- TN2182 Tone-Clock circuit pack

This section discusses synchronization with Stratum-3 and -4 clocking devices.

Stratum-3 Synchronization

Since the clock module on the TN2312 does not support synchronization with an external Stratum-3 clocking device, you may provide Stratum-3 clocking for a S8700 Media Server system by using the TN780 Tone-Clock circuit pack in a non-IPSI-connected port network. To bring in the external Stratum-3 clocking signals into the TN780, a processor carrier is needed. This new EPN control carrier will replace the processor carrier in the old PPN converted to EPN 1. The Stratum-3 clocking must come into Port Network #1 because the S8700 Multi-Connect software has the Stratum-3 clocking hard-coded to this port network.

Stratum-4 Synchronization

An EPN can be configured with primary and secondary synchronization references (DS1 or UDS1 Interface circuit packs) when using Stratum-4 synchronization. If this is the master synchronization source for the network, then its local oscillator is used and no DS1s are used as references. If this system is a slave in the network, a primary reference must be used as the synchronization reference and a secondary reference is optional:

- If the primary synchronization reference is not providing a valid timing signal, the system automatically switches to the secondary synchronization reference.
- If the primary synchronization reference is invalid and secondary reference does not provide a valid timing signal or is not administered as a synchronization reference, an IPSI's Tone-Clock circuit or a Tone-Clock circuit pack provides the EPN's timing source.
- If the system (PN for S8700 Media Server systems) is using the local oscillator as the timing source (both the primary and secondary references are providing invalid timing signals), should either the primary or secondary reference becomes valid again, the system (PN for S8700 Media Server systems) switches back to the primary or secondary source.
- When both the primary and secondary source become valid, the system (PN for S8700 Media Server systems) switches to the primary source, since the primary source is always preferred over the secondary source when both sources are equally healthy.

Synchronization Troubleshooting

For Stratum-4 operation, major and minor alarms indicate that there is a problem with the system synchronization references. These alarms will be resolved when the alarmed synchronization reference is restored.

The **change synchronization** command allows primary and secondary references to be administered per cabinet.

The **status synchronization** command shows the current synchronization reference per cabinet. The **display synchronization** command shows the synchronization references (e.g. primary, secondary) that are administered.

The **list timing-source** command displays all DS1 and UDS1 locations that are allowed to be administered as primary or secondary references with the **change synchronization** command.

Other commands associated with Synchronization Maintenance are **disable synchronization-switch** and **enable synchronization-switch.** These commands are used to disable the ability of Synchronization Maintenance to switch between synchronization references and to enable this switching ability, respectively. The **set synchronization** command is executed only after synchronization has been disabled and is used to manually switch to a specific synchronization reference. This command is useful to diagnose synchronization problems by forcing a specific reference (DS1, UDS1, or Tone-Clock) to be the system synchronization reference to determine if a specific reference is providing a valid timing signal.

Troubleshooting Approach

Slip errors are the primary symptom associated with being unsynchronized.

A correct Synchronization plan for the network keeps the systems within the network transmitting data at approximately the same rate to avoid situations where:

- One system transmits data at a rate faster than another system can receive the data (in which case data is lost).
- One system transmits data at a rate slower than another system expects to receive data (in which case data is repeated).

Either of these situations, data being lost or repeated, is a slip.

When troubleshooting synchronization problems when slips are the primary error log entry indications of a synchronization problem, requires that the problem be isolated to:

- A problem outside of the switch (That is, the switch is not properly synchronized to the rest of the network.)
- A problem internal to the switch

DS1 and UDS1 circuit packs can be administered with slip detection enabled via the **Slip Detection?** field set to a **y** (see the **add ds1**, **change ds1**, and **display ds1** commands). All DS1 and UDS1 circuit packs administered as slip enabled will be counted in the following algorithm:

When over half of the DS1 and UDS1 circuit packs administered as slip enabled are experiencing slips, and the primary or secondary synchronization reference is the current synchronization reference, synchronization will try the other administered synchronization reference.

In situations where one or many circuit packs in the system are experiencing slips, the problem could be with the synchronization reference, with individual circuit packs, or with phase modulation of the transmitted digital bit streams due to environmental variations of the transmission facilities (such as temperature variations that affect the electrical length of a transmission line). The circuit packs that can experience slips and the associated error log entry for slips are as follows in Table 8-590:

Table 8-590. Error Log Entries for Slip Errors

Circuit Pack	Error Log Name	Error Log Entry for Slips
DS1 Interface	DS1-BD	3073 – 3160
Expansion Interface	EXP-INTF	2305
Switch Node Interface	SNI-BD	1537
IPSI's Tone-Clock circuit or Tone-Clock	TDM-CLK	1025
UDS1 Interface	UDS1-BD	3073 – 3160

When slips occur on any of these circuit packs, first consult the individual circuit pack's section in this manual. If slips occur in small amounts, they may be due to environmental conditions as previously described. If no service degradation is occurring, no action is necessary. Whenever the system switches synchronization sources, slips can be expected from DS1-BD, UDS1-BD, and EXP-INTF circuit packs. If service degradation occurs, after following the repair steps in the individual section, use the following trouble shooting techniques.

Table 8-591 lists circuit packs that can report slips and related circuit packs whose hardware problems that cause those slips.

Table 8-591. Slips and Related Circuit Packs

Circuit Pack Reporting Slips	Associated Circuit Packs that Can Cause Slips
DS1 Interface	Active Tone-Clock in same PN
Expansion Interface	Active Tone-Clock in same PN or circuit pack at opposite end of fiber or metallic connection
Switch Node Interface	Circuit pack at opposite end of fiber or metallic connection, or active Switch Node Clock circuit pack in same switch node carrier
IPSI's Tone-Clock or Tone-Clock	Current DS1 reference
UDS1 Interface	Active Tone-Clock in same PN

Troubleshooting Synchronization Problems

The following flow chart presents a logical approach to troubleshooting synchronization problems in conjunction with the previous background information. Explanatory notes follow the charts.

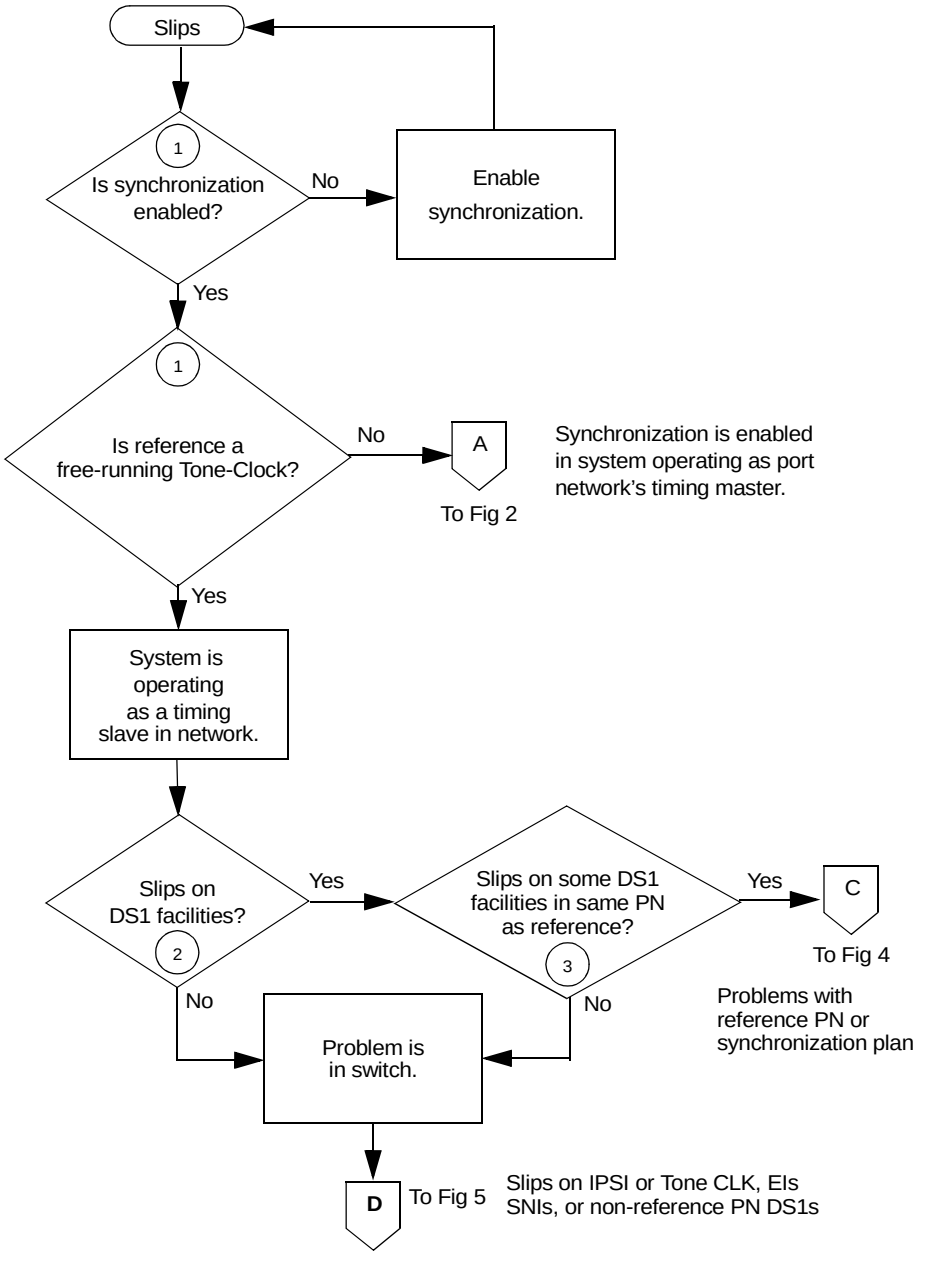

Figure 8-87. Synchronization Troubleshooting, Fig. 1 of 6

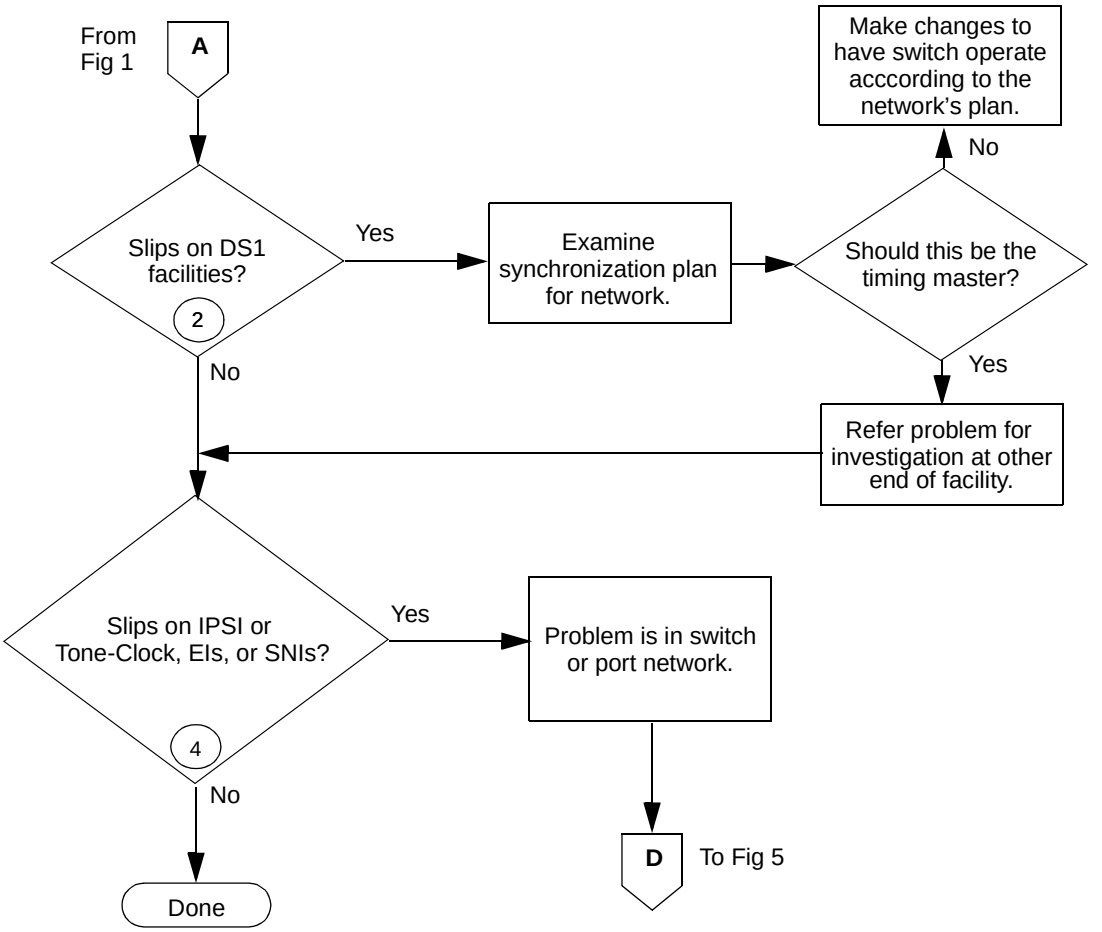

Figure 8-88. Synchronization Troubleshooting, Fig. 2 of 6

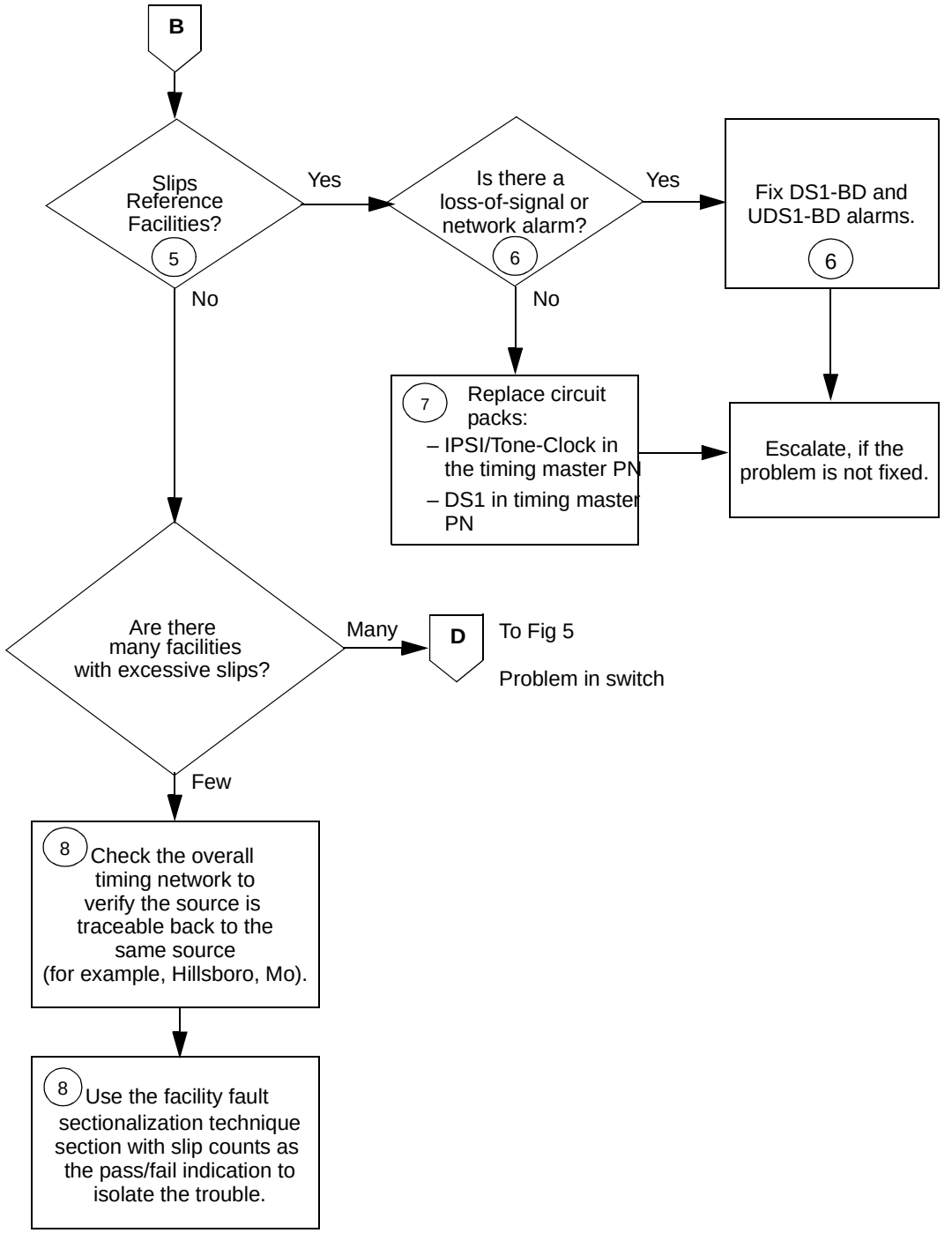

Figure 8-89. Synchronization Troubleshooting, Fig. 3 of 6

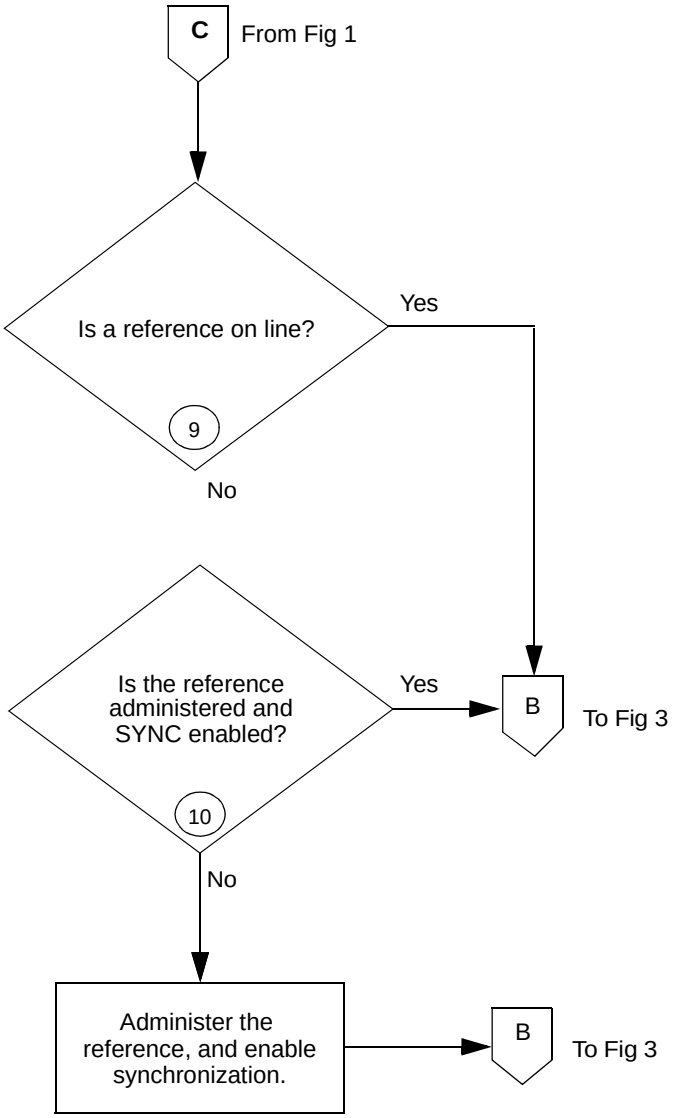

Figure 8-90. Synchronization Troubleshooting, Fig. 4 of 6

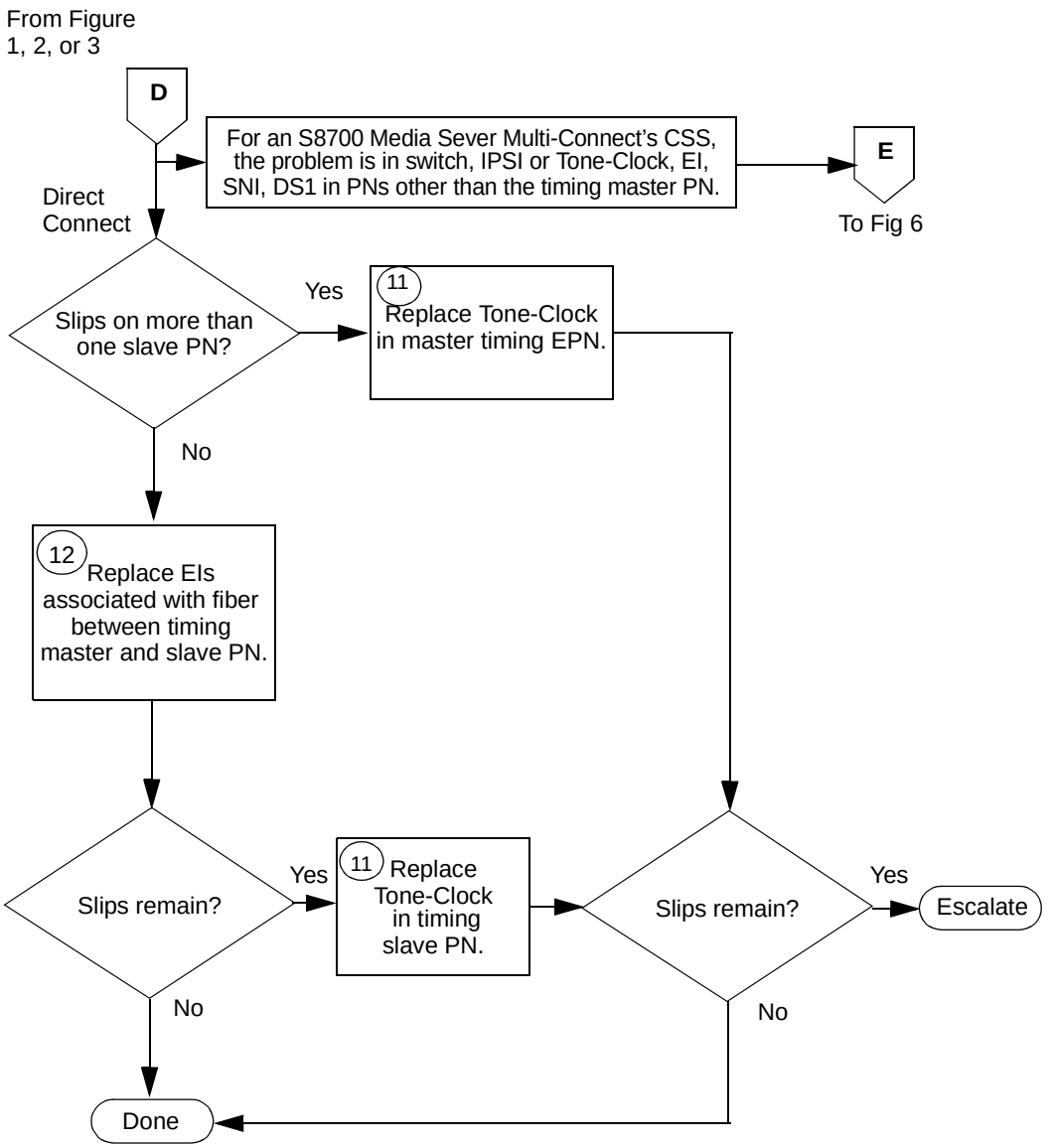

Figure 8-91. Synchronization Troubleshooting, Fig. 5 of 6

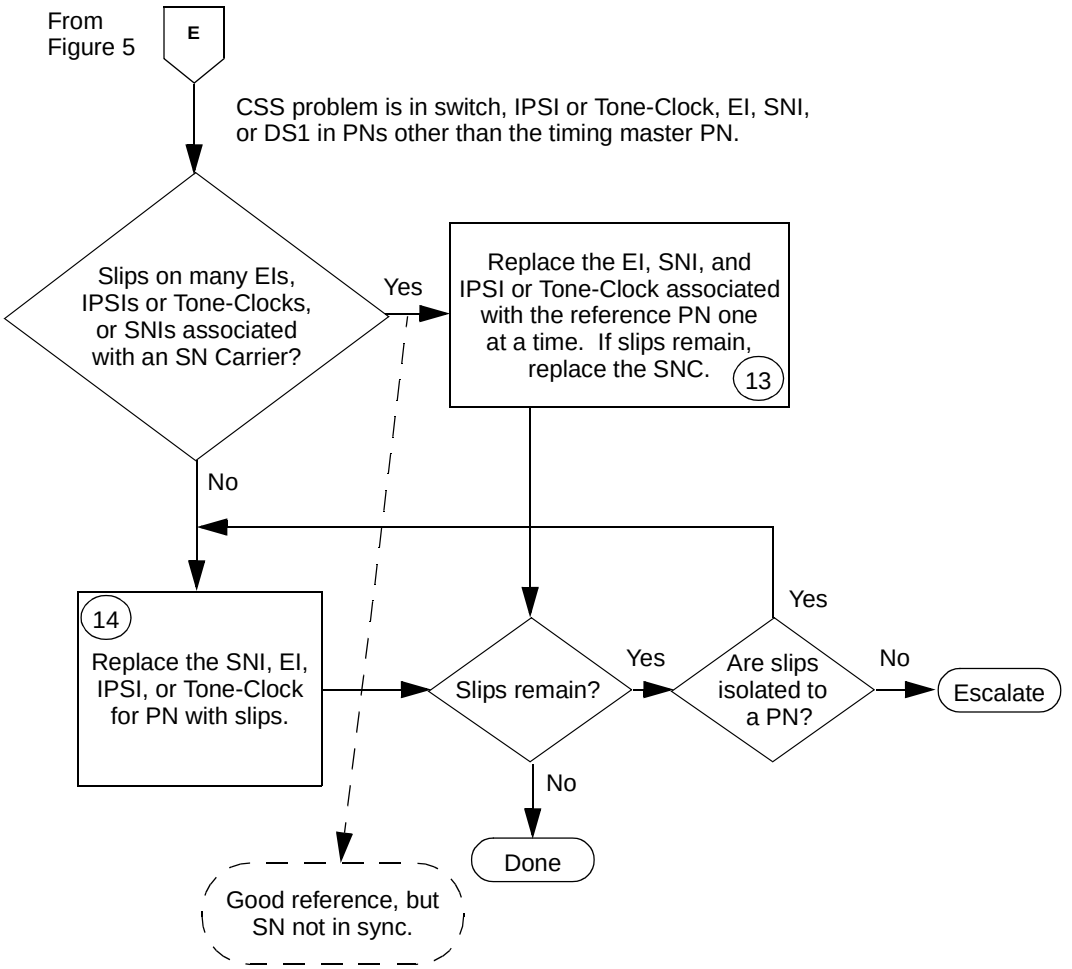

Figure 8-92. Synchronization Troubleshooting, Fig 6 of 6

Notes for Sheet 1 through Sheet 6 flowcharts. (When checking for slip errors, use the previous Table 8-590 on page 8-1513 and .):

1. Use the **status synchronization** command to determine whether synchronization is enabled and to determine the on-line reference. If the on-line reference is a Tone-Clock board, the switch is operating in free run mode. If Stratum 3 is displayed, and no DS1s are connected to the Stratum-3 clock or no DS1 connection existed to the Stratum-3 clock for over 24 hours, then the Stratum-3 clock is in free run mode.
2. Check for slip errors against DS1-BD and UDS1-BD.

3. If Stratum 3 is administered (**display synchronization**) and on-line (**status synchronization**), check for DS1-BD or UDS1-BD slip errors for the DS1(s) or UDS1(s) used as input to the Stratum-3 clock. Check the LED indications on the Stratum-3 clock to determine which DS1 is providing input to Stratum 3, and examine the cross-connect information for that DS1.
4. Check for slips errors against EXP-INTF, SNI-BD, and TDM-CLK.
5. Check **status synchronization** for the current DS1 reference. If a DS1 or UDS1 is on-line, check for slips on that DS1 or UDS1.
6. Check for LOS, Blue, Yellow, and Red alarms on the on-line reference facility, and fix those problems first. See the DS1-BD and/or UDS1-BD for the error log entries associated with the previously mentioned alarms. Replace the circuit packs one at a time and wait at least one hour to determine if the problem has gone away. This procedure is disruptive and should be done after hours if possible.

   An alternative to replacing the Tone-Clock circuit pack in systems where the Tone-Clocks are duplicated, is to run the **set tone-clock** command to interchange Tone-Clocks. If the problem goes away, the previously active Tone-Clock should be replaced.
7. If a few facilities are experiencing slips or are unusable references, the clock source for facilities with slips or that are unusable is not traceable to the same ultimate source as the clock source for the on-line reference facility.

   Examine the overall timing network for the interconnected DS1 to determine if the:

   - Clock can be traced back to a single source
   - Reference designations for each location in the distribution of timing is supplied in accordance with the customer's *synchronization plan*

   Examine the capability of the external transmission equipment to pass or provide timing.

   Verify the integrity of the on-site hardware by using the technique, ''Facility Fault Sectionalization'' on page 8-1522, which:

   - Loops the transmit signal to the receive signal
   - Verifies that the excessive slips or the unusable reference are no longer observed

   This is a time consuming process that disrupts service. You should perform it after hours if the service being provided by the system is acceptable as determined by checking with the customer.
8. Use **status synchronization** to determine the on-line reference. If a DS1 reference is not on-line and the local oscillator of a Tone-Clock board is on-line, then the answer to this question is **no**.

9. Use **display synchronization** to find out what references, if any, are administered. Use **status synchronization** to find out whether synchronization is enabled.
10. For a high- or critical-reliability system, the **set tone-clock** command can be used to interchange IPSI circuit packs' Tone-Clock circuits or Tone Clock circuit packs. If slips go away, then replace the previously active Tone-Clock.
11. Use **list fiber-links** to determine the EIs on the active PN and the EIs associated with the slave PN. If the switch does not have duplication, the EIs are all on the active PN.
12. Replace the circuit packs one at a time, and wait at least one hour to determine if the problem has gone away. This procedure is disruptive and should be done after hours if possible.

    An alternative to replacing the EI and SNI in systems where the PNC is duplicated, is to perform a PNC interchange via **reset pnc interchange**. If the problem goes away, either the EI or the SNI on the previously active PNC should be replaced. Replace one at a time and make that PNC active again to determine whether the problem is fixed.

    An alternative to replacing the Tone-Clock circuit pack in systems where the Tone-Clocks are duplicated, is to run the **set tone-clock** command to interchange Tone-Clocks. If the problem goes away, the previously active Tone-Clock should be replaced.

    Also, before replacing an SNC circuit pack, the **set switch-node-clock** command can be used if SNCs are duplicated in the carrier. If the problem goes away, the previously active SNC should be replaced.
13. Replace the circuit packs one at a time and wait at least one hour to determine if the problem has gone away. This procedure is disruptive and should be done after hours if possible.

    An alternative to replacing the EI and SNI in systems where the PNC is duplicated, is to perform a PNC interchange via **reset pnc interchange**. If the problem goes away, either the EI or the SNI on the previously active PNC should be replaced. Replace one at a time and make that PNC active again to determine whether the problem is fixed.

    An alternative to replacing the Tone-Clock circuit pack in systems where the Tone-Clocks are duplicated, is to run the **set tone-clock** command to interchange Tone-Clocks. If the problem goes away, the previously active Tone-Clock should be replaced.

    Also, before replacing an SNC circuit pack, the **set switch-node-clock** command can be used if SNCs are duplicated in the carrier. If the problem goes away, the previously active SNC should be replaced.

Facility Fault Sectionalization

DS1 facility fault sectionalization involves looping around the DS1 signal at on-site access points to localize the source of the problem to equipment and wiring on either the near side or far side of the loop-around point.

WARNING:
The facility fault sectionalization technique disrupts service. When you perform the loop around on a facility, make sure it is not the on-line synchronization reference or a system outage will occur.

When you use this technique to investigate problems on facilities with multiplex or DACS equipment, the technique becomes cumbersome because every 64-kbps (B channel) or subrate channel corresponding to the DS1 facility needs to be looped around.

Figure 8-93 shows a sequence of units (1 though n) that may be connected as the on-site equipment. A typical example is the case where the only on-site equipment is channel-terminating equipment designated Unit #1. A more complex, less typical example might have a DACS as Unit #1, a protection switch as Unit #2, and a DS1-level microwave radio system as Unit #3.

The flowchart in Figure 8-94 on page 8-1523 gives an overview of the facility fault sectionalization technique. It is important that you know the configuration and wiring of the equipment for the problem facility in order to support this technique.

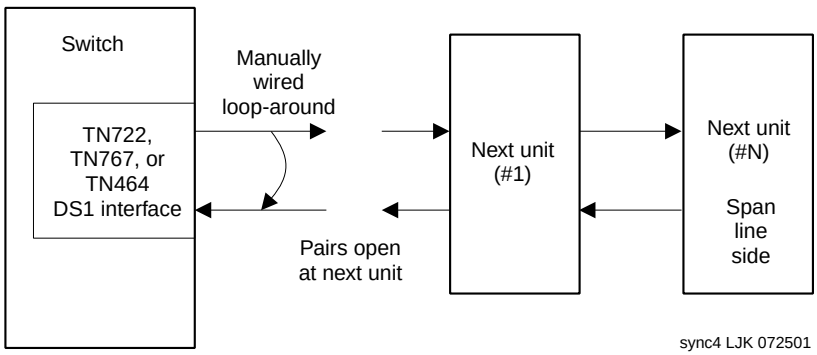

Figure 8-93. Manual Loop-Around for Facility Fault Sectionalization

Since the technique is time consuming, fix any DS1-BD, UDS1-BD, STRAT-3, or SYNC errors first that are not slip errors.

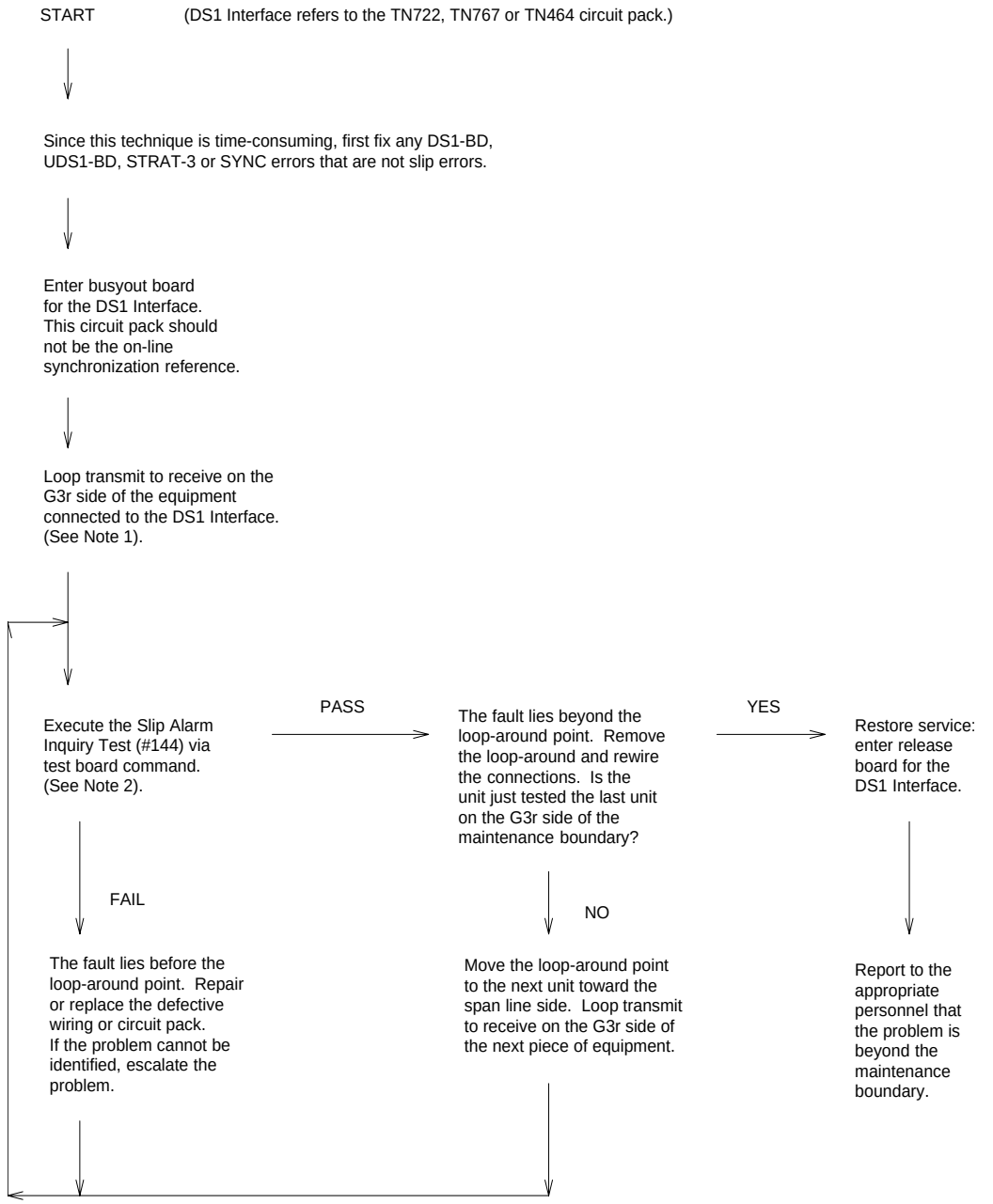

Figure 8-94. Facility Fault Sectionalization

Notes to Facility Fault Sectionalization Flowchart

1. Loop transmit to receive on the system side.

   Remove the transmit signal from the TN722, TN767, or TN464 circuit pack inputs and outputs and loop it around to the receive signal going toward the TN722, TN767, or TN464 circuit pack at the first unit wired to the TN722, TN767, or TN464 circuit pack.

   The loop-around signal may take different forms depending on the installation.

   - In some cases, the unit connected to the system may provide a switch or a terminal interface to control the desired loop around. Make sure that the signal is looped toward the system and that the timing signal is looped.
   - In most cases, it may be necessary to temporarily rewire connections at the cross-connect fields to loop the signal back toward the switch.

   The point at which the signal is looped should be one at which physical access is easy and where the signal level is within the line compensation (i.e. equalization) range of the hardware connected. A few cases exist where access to the loop around cannot be easily provided at locations where the signal level is within the line compensation range of the hardware. The line compensation can be changed via the **change ds1 *UUCSS*** command.

2. Execute the **test board *UUCSS*** command for the TN722, TN767 or TN464. Look at results of Test #144, the Slip Alarm Inquiry test. When this test fails, the error code gives the number of slips detected since the last Slip Inquiry test was run. If the test fails, run it at least one more time to ensure that slips have occurred since the loop around was installed.

Timing Loops

A timing loop exists whenever a system receives timing from another system whose timing reference is directly or indirectly derived from itself. The system synchronization planner *must avoid creating a timing loop* when administering the synchronization references in a system. Timing loops can lead to loss of digital data between systems that are exchanging data with any system within the loop. An invalid timing signal will also be generated by any system within the loop, thus propagating the invalid timing signal to any system(s) using a system within the loop as a synchronization reference.

A correctly designed network has no loops, and each piece of equipment in the network is supplied by a clock with an equal or lower stratum number. (For example, the inputs to a Stratum-3 clock should **never** be from a Stratum-4 device.)

CAUTION:
Synchronization administration changes should never be done without consulting the network's overall synchronization plan. If you suspect that synchronization administration changes are needed, follow normal escalation procedures.

Synchronization Switches away from Current Timing Reference

Synchronization will switch away from a DS1 reference (primary or secondary) if the current DS1 reference is not providing a valid timing signal. The other DS1 reference will be used if one is administered and providing a valid timing signal. Otherwise, the local oscillator of the Tone-Clock circuit pack in the same port network as the DS1 reference will be used. The following conditions will cause a synchronization switch:

- The current DS1 reference is not inserted (that is, **list configuration board *UUCSS*** shows "no board").
- The current DS1 reference has a loss of signal error (DS1-BD and UDS1-BD error type 1281), a blue alarm error (DS1-BD and UDS1-BD error type 1793), a red alarm error (DS1-BD and UDS1-BD error type 2049), or a hyperactive angel error (DS1-BD and UDS1-BD error type 1538). A corresponding alarm log entry is not required.
- DS1 and UDS1 circuit packs can be administered with slips detection enabled via the **Slip Detection?** field set to a **y** (see the **add ds1**, **change ds1**, and **display ds1** commands). When over half of the DS1 and UDS1 circuit packs administered as slip enabled are experiencing slips, and the primary or secondary synchronization reference is the current synchronization reference, synchronization will try the other administered synchronization reference if the other administered reference does not have the previous two conditions. The **list measurements ds1-log** command can be used to get an historical perspective of DS1 facility operation.

The following conditions will cause a switch to the other DS1 reference if one exists and the other DS1 reference is more healthy:

- The current DS1 reference has a misframe error (DS1-BD error type 3329 to 3345 or UDS1-BD error type 3585-3601). A corresponding alarm log entry is not required.
- The current DS1 reference has a slip alarm (DS1-BD and UDS1-BD error type 3073 to 3160). A corresponding alarm log entry is required.

If the previous conditions are repaired and no longer apply, synchronization will switch back to the primary reference.

LEDs on Tone-Clock Circuit Packs

The specific flashing pattern of a TN768, TN780, or TN2182 Tone-Clock circuit pack's amber and green LEDs indicates the circuit pack's status. For example, these flashing LED patterns are used to indicate whether the Tone-Clock circuit pack is:

- Deriving timing from an external source
- Providing the timing signal for its PN

The amber and green LED patterns for TN768, TN780, and TN2182 Tone-Clock circuit packs are as follows:

Table 8-592. Tone-Clock Amber/Green LED Flashing Codes

Circuit Pack Condition	Tone-Clock State	Explanation
[1]flashing amber 2.7 seconds on 0.3 seconds off	active	An external timing source is being used as a synchronization reference.
flashing amber 0.3 seconds on 2.7 seconds off	active	The circuit pack is being used as a synchronization reference.
steady amber on	active	The circuit pack has been reset, but has not been told which synchronization reference source to use.
steady amber off	standby	The circuit pack is in standby mode (neither generating tones nor supplying clocks).
"jingle bells" green and amber 0.1 seconds on, 0.2 seconds off, 0.1 seconds on, 0.4 seconds off, 0.4 seconds on, 0.4 seconds off	standby	The system is running maintenance tests on the standby Tone-Clock circuit pack. (The standby circuit pack is providing tones.)
other green and amber	active	The system is running maintenance tests on the active Tone-Clock circuit pack.

1. The external synchronization reference being used is a primary reference, a secondary reference, or an external Stratum-3 clock when the Tone-Clock is in the master PN. The external synchronization reference used in a slave PN is an Expansion Interface circuit pack.

Error Log Entries and Test to Clear Values

Table 8-593. Synchronization Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test synchronization**
1 (a)*		None	WARNING/MINOR (h)	OFF	None
18 (b)	0	**disable sync**	WARNING	OFF	**enable sync**
257 (c)*		None	WARNING/MINOR (h)	OFF	None
513 (d)*		None	WARNING/MAJOR (h)	OFF	None
769 (e)		None	MAJOR	OFF	None
1793 (f)[2]	0–50	None	MAJOR	OFF	None
2049 (g)[2]	0	None	WARNING	OFF	None

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. It may take up to 1 hour for these alarms to clear via the "leaky bucket" strategy.

Notes:

a. This error indicates a problem with the primary DS1 reference. It will be cleared when the primary reference is restored. The following procedure should indicate the problem's source:

1. Enter **list configuration board *UUCSS*** to check if the primary DS1 Interface circuit pack is inserted in the carrier.
2. Verify that the administered primary reference matches the DS1 reference from the network synchronization plan.
3. Enter **test board *UUCSS* long** to test the primary DS1 Interface circuit pack.

   Check the Error Log for DS1-BD or UDS1-BD errors and see "DS1-BD (DS1 Interface Circuit Pack)" or "UDS1-BD (UDS1 Interface Circuit Pack)" on page 8-1707 to resolve any errors associated with the primary DS1 (DS1 or UDS1) interface circuit pack.

   If the only errors against DS1-BD or UDS1-BD are slip errors, then follow the procedures described in the previous troubleshooting section. If no errors are listed in the Error Log for the primary DS1 Interface circuit pack, continue with the following steps.
4. Enter **test Tone-Clock *UUC* long** to test the active Tone-Clock circuit pack in the master port network.

   Check the Error Log for TDM-CLK errors, and verify that TDM Bus Clock Circuit Status Inquiry test (#148), passes.

If Test #148 fails with Error Code 2–32, see ''TDM-CLK (TDM Bus Clock)'' to resolve the problem. If not, continue with the following steps.

5. Execute the **disable synchronization-switch** and then the **enable synchronization-switch** commands. These two commands (when executed together) will switch the system synchronization reference to the primary DS1 Interface circuit pack.
6. Check the Error Log and execute the **status synchronization** command to verify that the primary DS1 Interface circuit pack is still the system synchronization reference.

   If the primary DS1 Interface circuit pack is not the system synchronization reference **and** the master port network does not have duplicate Tone-Clock circuit packs, escalate the problem.

   Otherwise, continue with the following step.
7. For ***duplicated*** Tone-Clock circuit packs in the master port network:

   Enter **set tone-clock *UUC*** to interchange Tone-Clocks in the master port network, and repeat the disable/enable commands described in the previous step.

b. This error indicates that Synchronization Maintenance has been disabled via the **disable synchronization-switch** command. Execute the **enable synchronization-switch** command to enable Synchronization Maintenance reference switching and to resolve this alarm.

c. This error indicates a problem with the secondary DS1 reference. It will be cleared when the secondary reference is restored. Refer to note (a) to resolve this error substituting **secondary** for **primary** in the preceding resolution steps.

d. This error indicates that the Tone-Clock circuit pack is providing the timing source for the system. The primary and secondary (if administered) are not providing a valid timing signal. Investigate errors 1 and 257 to resolve this error.

e. This error indicates that the external Stratum-3 clock failed to provide the system's timing reference. Refer to Stratum-3 clock's Maintenance document to resolve the defective synchronization reference.

f. This error indicates excessive switching of system synchronization references has occurred. When this error occurs, synchronization is disabled and the Tone-Clock circuit pack (in the master port network) becomes the synchronization reference for the system. Execute the following steps to resolve this error:

   1. Check for timing loops, and resolve any loops that exist.
   2. Test the active Tone-Clock circuit pack in the master port network via the **test Tone-Clock *UUC* long** command.

      Check the Error Log for TDM-CLK errors, and verify that TDM bus Clock Circuit Status Inquiry test (#148) passes.

If Test #148 fails with Error Code 2–32, see ‘‘TDM-CLK (TDM Bus Clock)’’ to resolve the problem. If not, continue with the following steps.

3. For ***duplicated*** Tone-Clock circuit packs in the master port network, enter **set tone-clock *UUC*** command to switch the Tone-Clocks.

   For ***unduplicated*** Tone-Clock circuit packs in the master port network of a Stratum-4 (not Stratum-3) system, replace the primary and secondary (if assigned) DS1 Interface circuit packs.

4. Investigate any other SYNC or STRAT-3 errors.

g. This error indicates that the Expansion Interface circuit packs are experiencing timing slips. This error will increase the bit error rates for data transmission between port networks. The Expansion Interface circuit packs with timing slips have EXP-INTF error 2305.

   1. Check the LEDs on the active Tone-Clock circuit packs in the system and verify that the system is properly synchronized.
   2. Verify that all the TDM/LAN Bus cables on the backplane are marked WP-91716. Also for a Multi-Carrier Cabinet (MCC), check that the bus terminator type is a ZAHF4 TDM/LAN.

      For a Single Carrier Cabinet verify that the bus terminator type is a AHF110 TDM/LAN.

   3. Check for timing loops, and resolve any loops that exist.
   4. Check the Error Log for any active as well as resolved Expansion Interface circuit pack errors and see ‘‘EXP-INTF (Expansion Interface Circuit Pack)’’ to resolve any errors found.
   5. Duplicated Tone-Clock circuit packs in the slave port networks:

      - Interchange Tone-Clock circuit packs in the slave port networks where EXP-INTF error 2305 also occurs via the **set tone-clock *UUC*** system technician command. The error count for this particular error should start decrementing once the problem is solved—if the count does not decrease in 15 minutes the problem still persists.
      - If the problem still persists, switch the Tone-Clock in the slave port network back to the previous configuration. Then, perform a PNC interchange via the **reset pnc interchange** command.
      - If the problem still persists, switch the PNC back to the previous configuration via the **reset pnc interchange** command. Then, switch the Tone-Clock circuit packs in the master port network via **set tone-clock *UUC***.
      - If the problem still persists, switch the Tone-Clock circuit packs in the master port network back to the previous configuration via **set tone-clock *UUC***.

- Replace the active Expansion Interface circuit pack in the master port network.
- In a CSS configuration, replace the Switch Node Interface circuit pack connected to the active Expansion Interface circuit pack in the master port network. The **list fiber-link** command can be used to determine the Switch Node Interface circuit pack that is connected to the active Expansion Interface circuit pack in the master port network.
- If the system's synchronization reference is a Tone-Clock circuit pack or a Stratum-3 clock, follow normal escalation procedures.

  If the system's primary synchronization reference is a DS1 Interface circuit pack, assign a different DS1 Interface as the primary reference. If the problem persists and any slip errors remain, follow the procedures described in the troubleshooting section above.

6. For *unduplicated* Tone-Clock circuit packs in a slave port network:
   - Enter **set tone-clock *UUC*** command to switch the Tone-Clock in the master port network.
   - If the problem still persists, enter **set tone-clock *UUC*** to switch the Tone-Clocks in the master port network back to their previous configuration.

     Enter the **test Tone-Clock *UUC* long** command to test the Tone-Clock in the master and slave port networks.

     Check the Error Log for TDM-CLK errors and verify that TDM Bus Clock Circuit Status Inquiry test (#148) passes.

     If Test #148 fails with an Error Code 2–32, see ''TDM-CLK (TDM Bus Clock)'' to resolve the problem. If not, continue with the following steps.
   - If the master and slave Tone-Clock circuit packs *do not* fail TDM Bus Clock Test #150 (TDM Bus Clock PPM Inquiry test), replace the Expansion Interface circuit packs that have EXP-INTF error 2305.
   - If the system synchronization reference is a Tone-Clock circuit pack and the master Tone-Clock circuit pack fails TDM Bus Clock Test #150, follow the steps listed in "TDM-CLK" to replace the master Tone-Clock circuit pack.
   - If the system's synchronization reference is a DS1 Interface circuit pack and the master Tone-Clock circuit pack fails TDM Bus Clock test (#150), the primary or secondary (if administered) synchronization references are not providing valid timing signals for the system.

If the **primary** synchronization reference is providing the system's timing, check the synchronization references administered, and follow the steps outlined in note (a). If the **secondary** reference is providing timing, follow note (c).

- If the slave Tone-Clock circuit pack fails TDM Bus Clock Test #150 but the master Tone-Clock *does not* fail this test, the master Tone-Clock circuit pack must be replaced. Follow the Tone-Clock replacement steps listed in "TDM-CLK".
- Replace the active Expansion Interface circuit pack in the master port network.
- In a CSS configuration, replace the Switch Node Interface circuit pack connected to the active Expansion Interface circuit pack in the master port network. The **list fiber-link** command can be used to determine the Switch Node Interface circuit pack that is connected to the active Expansion Interface circuit pack in the master port network.
- If the problem persists and any slip errors remain, follow the procedures described in the troubleshooting section above.

This error is cleared by a leaky bucket strategy and takes one hour to clear (leak away) the error counter once it is alarmed. Therefore, it may take up to one hour to clear the alarm after the problem is cleared.

h. Noise on the DS1 line can cause transient alarms on synchronization. Therefore, when a sync problem occurs on error types 1, 257, or 513, a WARNING alarm is first raised for 15 to 20 minutes before the alarm is upgraded to a MINOR or MAJOR alarm.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system.

If Stratum 3 is administered via **change synchronization**, the Stratum-3 Clock Alarm Query test (#649) will also execute when the **test synchronization** command is run. Test #649 is described in ''Stratum-3 Synchronization''.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Test Synchronization test (#417)	X	X	ND

1. D = Destructive, ND = Non-destructive

Test Synchronization Test (#417)

This test updates every Synchronization Maintenance component with the correct information about its role in providing a system's synchronization. Specifically, this test updates every:

- IPSI circuit pack's Tone-Clock circuit
- Tone-Clock, Expansion Interface, DS1 Interface, and UDS1 Interface circuit pack

in the system. The test either passes or aborts.

Table 8-594. Test #n (Name of) Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 3 times.
1115	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 3 times.
	PASS	The Synchronization Maintenance component circuit-pack parameters have been successfully updated. The system should be synchronized after successful execution of this test. If synchronization problems still exist, refer to the Error Log to obtain information about the source of the problem.

SYS-LINK (System Links)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run	Full Name of MO
SYS-LINK	MINOR	**test sys-link *UUCSSpp***	SYSTEM LINKS
SYS-LINK	WARNING	**test sys-link *UUCSSpp***	SYSTEM LINKS

System links are packet links that originate at the Packet Interface board and traverse various hardware components to specific endpoints. The hardware components involved on the forward and reverse routes can be different, depending upon the configuration and switch administration. Various types of links are defined by their endpoints:

EAL	Expansion Archangel Link terminating at an Expansion Interface board. This link carries CCMS messages.
INL	Indirect Neighbor Link terminating at a Switch Node Interface board
PACL	PNC ATM Control Link terminating at a PNC ATM-EI board. This link carries ATM signaling commands from CaPro to the remote TN2238 (ATM-EI) boards.
PRI	ISDN-PRI D-Channel Link terminating at a Universal DS1 board
RSCL	Remote Socket Control Link terminating at a C-LAN board
RSL	Remote Socket Link terminating at a C-LAN board

Recording System Link Events

The system links MO records every error encountered on the links. Most of these events are not extraordinary unless they occur with an alarming frequency. The events are logged as they occur, leaving a "trail" to help analyze abnormal behavior exhibited by the endpoints attached to the links or the links themselves.

When a link goes down, an alarm is raised immediately. For EAL, INL, and PACL link types a MINOR alarm is raised; for every other link type a WARNING alarm is raised. Other alarming conditions that do not cause the link to go down get a WARNING alarm, regardless of the link type.

Identifying a System Link

In order to trace problems associated with a system link, it is necessary to find its location. The following methods can be used to find the location of the system link:

Display Errors/Alarms

The output of the **display errors** or **display alarm** commands shows the location of the system link for entries with a Maintenance Name of SYS-LINK. You can restrict the scope of the output of these commands by specifying **sys-link** in the `Category` **field** on the input form. The link type and channel number, if any, are listed under the `Alt Name` field of the report.

List sys-link

The **list sys-link** command lists every system link (location, link type, and channel number) present in the system.

NOTE:
In case of the X.25 link type, a single endpoint carries multiple links. A combination of the endpoint and channel number is used to uniquely identify the link. Every other link can be uniquely identified by its endpoint.

Common Procedure for Repairing Link Problems

The state of a system link is dependent on the state of the various hardware components that it travels over. To resolve any problems associated with a system link, use the following procedure.

The switch maintains a list of hardware components over which the link travels, called the hardware path. There are two hardware paths: the current hardware path and the faulted hardware path for each of the system links. The current hardware path is present only for those links that are currently up. When a link is down, the current hardware path is empty. The faulted hardware path is always present once the link has gone down and is *not cleared when the link subsequently recovers.* The faulted path preserves the path that the link traversed when it last went down. The time at which the faulted path was last recorded is preserved and is accessible through the **status sys-link *location*** and **list sys-link** commands. Therefore, the focus of attention for problems which do not involve a link that is down is the current hardware path. If the link is down, faulted hardware path is the focus of attention.

The **status sys-link *location*** command shows the state of both the hardware paths (current and faulted) along with the state of each of the components in the hardware path. When analyzing any system link problem:

1. Look for alarms on the components listed under desired hardware path.
2. If any alarms are present, then follow the maintenance procedures for the alarmed components to clear those alarms first.

   NOTE:
   For systems using ATM-EI (TN2305/6 circuit packs) and where link alarms are present, see ''ATM-BCH (ATM B-Channel Trunk)'' and the ''ATM Tips'' section in Chapter 4.

3. When every component is alarm free, wait for 3 minutes to allow the links to recover.
4. Test the system link (**test sys-link *PCSSpp* long clear**), and notice any tests that fail.
5. If there are any failures, fix the problems indicated by the tests and repeat the procedure.

Error Log Entries and Test to Clear Values

Table 8-595. Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
13 (a)		System Link Status (#985)	MINOR WARNING	OFF	
257 (b)			WARNING	OFF	**test sys-link *UUCSSpp* l cl**
513 (c)			WARNING	OFF	**test sys-link *UUCSSpp* l cl**
772 (d)			WARNING	OFF	**test sys-link *UUCSSpp* l cl**
1025 (e)			WARNING	OFF	**test sys-link *UUCSSpp* l cl**
1281 (f)			WARNING	OFF	**test sys-link *UUCSSpp* l cl**
1537 (g)			WARNING	OFF	**test sys-link *UUCSSpp* l cl**
1793 (h)			WARNING	OFF	**test sys-link *UUCSSpp* l cl**

Notes:

a. This error indicates that the link went down. The link may have gone down or never come up. Enter command **status sys-link *location*** and check the value of the `Faulted Path` field. If the value is `default`, then the link never came up. If the value is `present`, then the link came up and then went down.

   1. Follow the information in the previous section, ''Common Procedure for Repairing Link Problems'' on page 8-1534.
   2. Wait for 3–5 minutes before checking the link state.
   3. Repeat the procedure until there are no problems with the components.

b. This error indicates that the link has experienced uplink flow control. Manifest effect of this error is that the endpoint may be hyperactive. The system link is alarmed if 4 or more errors of this type are detected within 10 minutes.

   1. Follow the information in the previous section, ''Common Procedure for Repairing Link Problems'' on page 8-1534.
   2. Clear errors and wait for 10 minutes.

c. This error indicates that the link has experienced downlink flow control, meaning that some information packets from the packet interface board have been lost. The link is reset on first occurrence, hence, Error 1025 is also logged. The system link is alarmed if 2 or more errors of this type are detected within 10 minutes.

   1. Follow the information in the previous section, ''Common Procedure for Repairing Link Problems'' on page 8-1534.
   2. Clear errors and wait for 10 minutes.

d. This error indicates that the link experienced a temporary disconnect due to excessive resets or state transitions, meaning that the link is taken down and then brought up again. The system link is alarmed if 2 or more errors of this type are detected within 10 minutes.

   1. Follow the information in the previous section, ''Common Procedure for Repairing Link Problems'' on page 8-1534.
   2. Clear errors and wait for 10 minutes.

e. This error indicates that the link has been reset, meaning that information packets queued at the time of reset are lost. The system link is alarmed if 20 or more errors of this type are detected within 10 minutes.

   1. Follow the information in the previous section, ''Common Procedure for Repairing Link Problems'' on page 8-1534.
   2. Clear errors and wait for 10 minutes.

f. This error indicates that the link has experienced slow transmit rate because the remote endpoint is busy. The effect of this error is that the endpoint location may experience slower throughput rate and/or noisy transmission. The system link is alarmed if 4 or more errors of this type are detected within 10 minutes.

   1. Ensure that the remote endpoint is functioning properly.
   2. Follow the information in the previous section, ''Common Procedure for Repairing Link Problems'' on page 8-1534.
   3. Clear errors and wait for 10 minutes.

g. This error indicates that the link has experienced slow transmit rate due to excessive retransmission. Possible causes for this error may be that the switch is overrunning the endpoint or that the endpoint is sick. The effect of this error is that the endpoint location may experience slower throughput rate. The system link is alarmed if 4 or more errors of this type are detected within 10 minutes.

   1. Follow the information in the previous section, ''Common Procedure for Repairing Link Problems'' on page 8-1534.
   2. Clear errors and wait for 10 minutes.

h. This error indicates that the link has experienced slow transmit rate due to unknown causes, meaning that the endpoint location may experience slower throughput rate and the Packet Interface may experience backup or congestion. The system link is alarmed if 4 or more errors of this type are detected within 10 minutes.

   1. Follow the information in the previous section, ''Common Procedure for Repairing Link Problems'' on page 8-1534.
   2. Clear errors and wait for 10 minutes.

System Technician-Demanded Tests: Descriptions and Error Codes

Testing for system links is different from the standard test procedures for MOs. In addition to testing the system link MO, the user is allowed to test every component in the path of the system link. There are two paths preserved for the link. The current path, if present, represents the path traversed by the link currently. This path is absent when the link is down. The other path, the faulted path, is present if the link has ever gone down or never come up. If the link came up and went down, then the faulted path is marked `present`. If the link never came up, the faulted path is marked `Default`. In either case, it represents the path on which the link was attempted or established unsuccessfully.

Test command for the system links, **test sys-link *UUCSSpp*** can be specified with current or faulted as an optional argument if the user wishes to test every component in the specified path. The tests executed will be the same if the user were to test each component manually. In the event that the user does not specify any path, then only the tests specified for the system links are executed.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
System Link Status (#985)	X	X	ND

1. D = Destructive, ND = Nondestructive

System Link Status (#985)

This test is nondestructive. This test queries the switch for the status of the system link and verifies that every switch component has the same view of the link state.

Table 8-596. TEST #985 System Link Status

Error Code	Test Result	Description / Recommendation
1007	ABORT	Could not locate the system link associated with this location 1. Retry the command at 1-minute intervals up to 5 times.
2500	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
6	FAIL	The system link is down. 1. Follow the procedure for Error Type 13.
	PASS	The system link is up.

SYS-PRNT (System Printer)

MO's Name As It Appears in Alarm Log	Alarm Level	Initial System Technician SAT Command to Run	Full Name of MO
SYS-PRNT	MINOR	**test sp-link l**	System Printer
SYS-PRNT	WARNING	**release sp-link**	System Printer

The Report Scheduler feature provides the capability to schedule printing of output form selected administration commands on an asynchronous System Printer (SYS-PRNT) or a Personal Computer (PC). The System Printer device connects to the system via a data module (PDM, MPDM, DTDM) connected to a port on a TN754 Digital Line circuit pack which is administered as a data extension. A System Printer device can also be connected through an ADU to a port on TN726B Data Line circuit pack. The System Printer link to the processor is via a C-LAN board. For information about C-LAN connectivity, see ''CLAN-BD (Control LAN Circuit Pack)'' on page 8-411.

System Printer Link Maintenance provides a strategy for maintaining the link between the system and an external SYS-PRNT output device. The strategy includes a set of tests for detection of errors during normal operation, troubleshooting actions, and alarms for serious problems. System Printer Link Maintenance uses a try-and-wait mechanism for maintaining the SYS-PRNT link. A minor alarm is raised when the link set-up fails. A warning alarm is raised when the server has been busied out. up to two link retry attempts is made. After the second attempt, set-up attempts are only made by the application software. (The 15-minute timer fires and jobs are printed unless an immediate job was entered.) After two unsuccessful attempts to establish the link, a MINOR alarm is raised. If the System Printer Link is torn down due to an error, System Printer Link Maintenance will raise a MINOR alarm but will not attempt to bring up the System Printer Link.

System Printer Link Maintenance does not cover the elements comprising the SYS-PRNT physical link: the external SYS-PRNT output device, the Data Module (PDM/MPDM/DTDM) and TN754 Digital Line, or the ADU and TN726B Data Line. If System Printer Link Maintenance cannot restore the System Printer Link, the maintenance tests of these individual components of the System Printer Link must be executed to diagnose faults.

Procedures for Restoring the System Printer Link

1. Determine the status of the System Printer Link via the **status sp-link** command. Verify that the System Printer Link is not busied out for maintenance. This is indicated by a `no` in the `Maintenance Busy?` field. If the System Printer Link has been busied out, issue the **release sp-link** command. If the link is `down`, proceed to Step 2.
2. Issue the **display system feature** command to determine the location of the System Printer Link.

   Enter the **status data-module *extension*** command and verify that the data extension is in-service/idle. If the data extension is *not* available, refer to the `Port` field. Look for errors and/or alarms on the circuit pack with which this extension is associated. Follow repair instructions for the appropriate MO. Continue with Step 3.
3. Verify the availability of the external SYS-PRNT output device. Make sure that the output device is *on-line* and ready-for-service. Check the physical connectivity between the Data Module and the SYS-PRNT output device.
4. Verify that there is at least one C-LAN port available. The System Printer Link cannot be established without an available C-LAN port. For more information about C-LAN ports, see ''CLAN-BD (Control LAN Circuit Pack)'' on page 8-411.
5. If the problem is not found in the previous steps, check the C-LAN port for any problems. For a description about C-LAN board and its connectivity, see ''CLAN-BD (Control LAN Circuit Pack)'' on page 8-411 .

It should be noted that when restoring the System Printer link it is necessary to execute tests on different MOs that comprise the System Printer link. It is recommended that you busyout the System Printer link before trying to restore the link. When the System Printer Link is busied out, every System Printer Link maintenance action is deactivated, and interference with tests of other MOs is prevented.

Error Log Entries and Test to Clear Values

Table 8-597. SYS-PRNT Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0	0	Any	Any	Any	**test sp-link**
18 (a)	0	**busyout sp-link**	WARNING	OFF	**release sp-link**
257(b)	1, 3 4, 5, 6	Link Retry test (#215)	MINOR[1] WARNING	OFF	**test sp-link l**
513 (c)	0	None	MINOR	OFF	**test sp-link**

1. Minor alarms may be downgraded to Warning alarms based on the value used in the **set options** command.

Notes:

a. The System Printer Link has been busied out.

b. A failure was encountered while attempting to set up the System Printer Link. This attempt could have been initiated by either Report Scheduler software or by link maintenance during automatic link retry or as a result of a Link Retry test (#215) request. The Aux Data field indicates the following:

1	No C-LAN port available. See ''CLAN-BD (Control LAN Circuit Pack)'' on page 8-411 for explanation.
3, 4	Time-out during setup attempt. Most likely due to problem with physical link or printer status.
5	Internal system error. Most likely temporary/sporadic failure.
2, 6	The data module the printer is trying to use is busy with another call. Use the **Status data module** command to determine when the port is available for testing.

See the preceding section ''Procedures for Restoring the System Printer Link'' on page 8-1540 for recommended maintenance strategy.

c. The SYS-PRNT was interrupted for one of the following reasons:

- The cable to the SYS-PRNT output device is disconnected
- The SYS-PRNT output device is powered off
- The data extension to which the SYS-PRNT output device connects has been busied out
- Internal software error

Check the connectivity of the wires and cables among the wall jacket, data module, and SYS-PRNT output device. Follow the instructions provided in ''Procedures for Restoring the System Printer Link'' on page 8-1540.

System-Technician-Demanded Tests: Descriptions And Error Codes

When inspecting errors in the system and deciding which ones to address, always investigate errors in the order they are presented in the table below. For example, by clearing error codes associated with the *Link Tear Down* test (#213), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Link Tear Down test (#213)		X	D
Link Retry test (#215)	X	X	ND

1. D = Destructive, ND = Nondestructive

Link Tear Down Test (#213)

This test is destructive.

The Link Tear Down test disconnects the existing link between S8700 Multi-Connect and the external SYS-PRNT output device. If the link has been disconnected already, this test just returns PASS. Every resource allocated for a System Printer Link is released after this test.

Table 8-598. TEST #213 Link Tear Down Test

Error Code	Test Result	Description / Recommendation
40, 50	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to two times.
1010	ABORT	The System Printer Link has been busied out. 1. Enter the **release sp-link** command to release the System Printer Link from the busyout state. 2. Reissue the **test sp-link long** command to execute the test.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to five times.
	FAIL	Internal system error. 1. Retry the command at 1-minute intervals up to two times.
	PASS	The System Printer Link is torn down, or a short test sequence was executed and the link was not torn down.

Link Retry Test (#215)

This test sends a message to the System Printer management software process instructing it to make a data call to the extension connected to the printer. If the System Printer link is already up, this test passes without making any data call.

Table 8-599. TEST #215 Link Retry Test

Error Code	Test Result	Description / Recommendation
10, 20	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to two times.
30	ABORT	Internal system error. 1. See ''Procedures for Restoring the System Printer Link'' on page 8-1540 for recommended maintenance strategy.
1010	ABORT	The System Printer Link has been busied out. 1. Enter the **release sp-link** command to release the System Printer Link from the busyout state. 2. Reissue the **test sp-link long** command to execute the test.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to five times.
	FAIL	The System Printer Link CANNOT be established. 1. See ''Procedures for Restoring the System Printer Link'' on page 8-1540 for recommended maintenance strategy.
	PASS	The System Printer Link is up.

SYSTEM (System)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run[1]	Full Name of MO
SYSTEM	None	None	System

1. SYSTEM has no associated alarms and thus appears only in the Error Log. There are no tests that run on SYSTEM.

The SYSTEM MO is used to log information about system resets, including interchanges. When software encounters a problem with hardware, or with its own processes, and requests a restart to clear the problem, an error is logged under SYSTEM. For example, if there is a loss of clocking in a system with duplicated servers, the system switches to the other clock and then executes a level-2 system reset to recover from hardware problems caused by the loss of clock. Errors logged under SYSTEM can help to determine the cause of a reset. For more information about interchanges, see:

- ''Recovery'' on page 3-5, including:
  - — ''Reset Level 1 (Warm Restart)''
  - — ''Reset Level 2 (Cold-2 Restart)''
  - — ''Reset Level 4 (MultiVantage Application Reload)''
- ''Troubleshooting a Duplicated Server'' on page 4-10

The **display initcauses** screen should also contain information about the reset. (See ''display initcauses'' on page 7-135.)

Error Log Entries and Test to Clear Values

Table 8-600. System Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
9 (a)	Any	None			
10 (b)	Any	None			
601 (c)	Any	None			
605 (d)	(n)	None			
606 (e)	Any	None			
607 (f)	Any	None			
6001 (g)	Any	None			
6002 (h)	(m)	None			
6003 (i)	(m)	None			
6101 (j)	Any	None			
6102 (k)	(m)	None			
6103 (l)	(m)	None			

Notes:

a. Software requested a System Restart Level 2.

b. Software requested a System Restart Level 1.

c. An error occurred during initialization.

d. A **reset system interchange** or a scheduled server interchange failed. The AUX Data indicates the cause of the failure. Consult the table in note p. Enter the Linux **server** command to determine the current server status, and resolve any problems on the standby server that are preventing the server interchange.

e. A **reset system interchange health-override** command has failed. The standby server's state of health (SOH) would not allow a spontaneous server interchange. Enter the Linux **server** command to determine the current server status, and resolve any problems on the standby server that are preventing the server interchange.

f. Error 6001 indicates that an operating system error occurred on the active server. The aux data gives the source of the error:

Aux-Data Value	Operating System Error Type
5	Software Abort
6	Server Bus Error

g. Error 6002 indicates that an application error occurred on the active server. See note (m) to diagnose the error using the aux data.

h. Error 6003 indicates that an application alarm occurred on the active server. See note (m) to diagnose the error using the aux data.

i. Error 6100 indicates that an operating system error occurred on the standby server. See error 6001 (g) to interpret the aux data.

j. Error 6102 indicates that an application error occurred on the standby server. See note (m) to diagnose the error using the aux data.

k. Error 6103 indicates that an application alarm occurred on the standby server. See note (m) to diagnose the error using the aux data.

l. For error types 6002, 6003, 6102, and 6103, the aux-data value points to the MO that the error or alarm is logged against. The following table lists possible aux-data values and their associated MOs. Locate the Error Log entry for the indicated MO and follow the instructions for that error.

AUX Data	Implicated MO
4137	PKT-INT
16384	PROCR
16385	MEM-BD
16389	DUPINT
16391	SW-CTL
16392	H-ADAPTR
16397	R-MEDIA
16398	DISK

m. The following table and notes give causes and recommendations for each AUX data value for error 605.

Table 8-601. SYSTEM Error 605 AUX Data, Failure of Planned Interchange

Aux Data	See Note	Explanation
1352	1	Standby SOH "non-functional"
1353	1	Standby SOH not "functional"
1355	1	Handshake Communication with standby server is down
1356	1	Memory Shadowing not enabled
1357	1	Standby memory not refreshed
1358	2	Mass Storage System was in use
1359	3	PKT-INT link migration failed
1360	1	Interchange failed *
1361	4	SW-CTL failure
1369	7	Could not suspend G3-MT connectivity *
1370	4	Could not freeze active SW-CTL *
1371	5	Internal Error associated with processor interrupts *
1372	6	Minor alarm on standby SYSAM or PKT-INT
1395		Server Duplication not administered
1396	3	PKT-INT Link Migration failure in Begin Step *
1397	3	PKT-INT Link Migration denied, (peer test in progress)
1398	3	PKT-INT Link Migration failure in Completion Step *
1399	3	PKT-INT Link Migration failure in Finish Step *
1400	4	Could Not Idle SW-CTL dual port RAM *
1401	4	Could Not Refresh SW-CTL dual port RAM *
1402	5	Internal Error (could not get duplication status)
1403	5	Unable to inhibit standby Maintenance Monitor
1404	5	Failure to determine standby server's alarm status
1406	3	Active server's PKT-INT in held-reset state
1418	8	Active Duplication Interface circuit pack is in a bad state and needs to be reset.
2500	5	Internal Software failure (* sometimes)

Notes for SYSTEM Error 605 AUX Data:

1. From the Linux command line, execute the **almdisplay** command, and follow the troubleshooting procedures listed there for “media server alarms.” After fixing that problem, try the interchange again.
2. Mass Storage System is in use. Check disk for activity. Wait until every MSS activity completes, then retry the interchange again. If the problem persists, check for alarms and errors against MSS components.
3. Test the PKT-INT on both carriers with the long test sequence. Follow procedures for “PKT-INT”. Once *every* test of both PKT-INTs passes, try the interchange again.
4. Consult SW-CTL service documentation. Test SW-CTL on both carriers with the long test sequence. Follow repair instructions for any failures. Once *every* test of both SW-CTLs passes, try the interchange again.
5. Make sure the standby server is refreshed, then try the interchange again.
6. Examine alarm log to determine which of the PKT-INT or SYSAM circuit packs has a minor alarm against it. Consult the section in this chapter for that circuit pack.
7. Run **test duplication-interface long**, and follow instructions for any test that does not pass.

TBRI-BD (TN2185 ISDN Trunk-Side BRI)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
TBRI-BD	MINOR	**test board *UUCSS* l *r#***	TBRI-BD

1. Where UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC), C is the carrier designation (A, B, C, D, or E), SS is the carrier slot address where the circuit pack resides (01–21), and pp is the 2-digit port number (1, 2, 3, and so forth).

The TN2185 circuit pack contains eight, 4-wire ports that interface to the network at the ISDN S/T reference point over two 64-kbps channels (B1 and B2) and over a 16-kbps signaling (D) channel. The B1 and B2 channels can be simultaneously circuit-switched or individually packet-switched. Only one channel per trunk can be packet-switched due to PPE (Packet Processing Element) limitations. The D channel is either circuit-switched or packet-switched. Packet switching uses the PPE to combine every D channel into a single physical channel, which is then routed via the concentration highway to the NCE (Network Control Element) and then to the TDM bus. The circuit-switched connections have a Mu-law or A-law option for voice and operate as 64-kbps clear data channels. The packet-switched channels support the LAPD protocol and conform with the CCITT Q.920 Recommendations for D-channel signaling.

LEDs

The three LEDs on the circuit pack's faceplate indicate board status. When illuminated, the red LED indicates a board failure or a major or minor on-board alarm, the green LED indicates that testing is in progress, and the amber LED indicates that the board is in use.

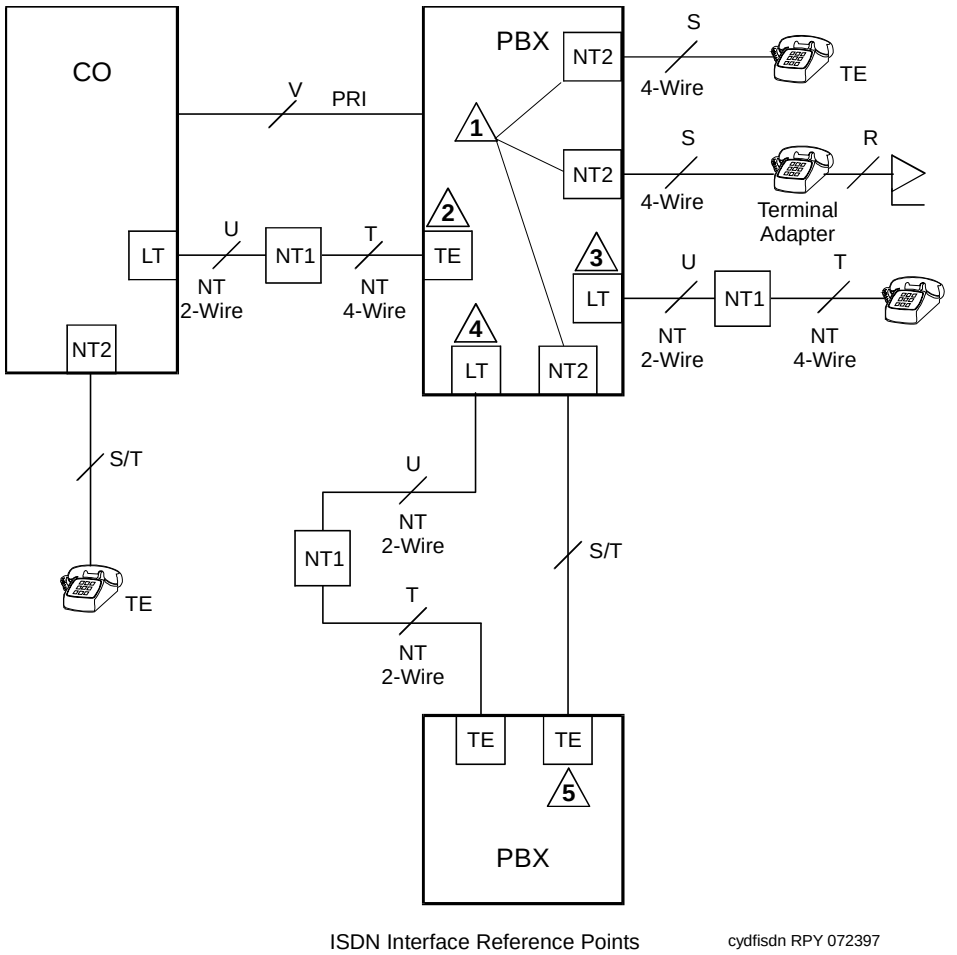

Figure 8-95. Integrated Trunk-Side BRI, ISDN Interface Reference Points

ISDN Interface Reference Point definitions:

LT	Logical Terminal
V	Primary Rate user/network (asymmetrical) trunk interface. The ECS is capable of acting as the user or as the network side of this 1.544- or 2.048-Mbps interface.
R	Interface between Terminal Equipment and Network Termination
S	Basic Rate network-side 4-wire line interface
S/T	4-wire Basic Rate connection to a Network Termination[1].
T	4-wire Basic Rate interface to a Network Termination.[2]
TE	Terminal Equipment
U	Basic Rate network-side 2-wire line interface.

1	TN556B ISDN-BRI 4-Wire S/T-NT Line (A-law)
2	TN2185 ISDN-BRI 4-Wire S Interface (Trunk Side)
3	TN2198 ISDN-BRI 2-Wire U Interface
4	TN2198 ISDN-BRI 2-Wire U Interface
5	TN2185 ISDN-BRI 4-Wire S Interface (Trunk Side)

1. Network Termination 2 (NT2), that terminates Layer 1 and higher layers. PBXs, LANs, and terminal controllers typically provide NT2 functionality including protocol handling and multiplexing for Layers 2 and 3.
2. Network Termination 1 (NT1), that terminates Layer 1 and monitors maintenance, performance, timing, power transfer, multiplexing, and multidrop termination with contention resolution.

Hardware Error Log Entries and Test to Clear Values

Table 8-602. TBRI-BD Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test board *UUCSS* sh r 1**
1 (a)	Any	None	MINOR	ON	
257 (b)	65535	Control Channel Loop test (#52)	MINOR	ON	**test board *UUCSS* r 20**
513 (c)	4352 to 4357		None	ON	
769 (d)	4358				
1025 (e)		NPE/NCE Audit test (#50)	None	ON	
1291 (f)	4359	Clear Error Counters (#270)	MINOR	ON	
1294 (g)	46088 to 46096	SAKI Sanity test (#53)	MINOR	ON	See (h)
1537 (h)	46082		MINOR	ON	
1793 (i)	46080		MINOR	ON	
1794 (i)	46094		MINOR	ON	
1795 (i)	46085		MINOR	ON	
2305 (j)	46104		None	ON	
2306 (i)	46081		None	ON	
3330 (j)	46083		MINOR	OFF	
3586 (k)			MINOR	OFF	

Continued on next page

Table 8-602. TBRI-BD Error Log Entries — *Continued*

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
3840 (l)	4096 to 4101				
3842 (m)	46095				
3843 (n)	46097				

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. The circuit pack stopped functioning or is physically removed from the system.

NOTE:
This alarm logs approximately 11 minutes after removing the circuit pack and/or the SAKI Sanity test (#53) fails.

If the circuit pack is not in the system, insert a circuit pack in the same slot as the error indicates. See note (g).

b. Transient communication problems between the switch and this circuit pack. Execute the **test board *UUCSS*** command and refer to the repair procedures for the ''Control Channel Loop-Around Test (#52)'' on page 8-1848.

c. On-board hardware failure. Aux data values correspond to the following detected errors:

4352	External RAM error
4353	Internal RAM error
4355	ROM Checksum error
4357	Instruction set error

Reset the circuit pack with the **busyout board *UUCSS*** and **reset board *UUCSS*** commands. When reset, the circuit pack executes a set of tests to detect the presence of any of the faults listed above. Detection of one of these errors during initialization causes the circuit pack to lock-up and appear insane to the system. See the repair procedure in Note (a).

d. The circuit pack detects a program logic error. While no action is required, this error can lead to other errors against this circuit pack.

e. The circuit pack cannot update and read back NPE/NCE memory. This error can be ignored, but may lead to other errors against this circuit pack.

f. The TN2185 board notifies maintenance software that it has detected a parity error while accessing its dynamic RAM (that stores the board's translation information and downloadable application firmware). Maintenance software resets the circuit pack.

g. Unable to write LAN Translation RAM Error (internal memory access error). Translation RAM locations for the call connection attempt are not available, and one or more RAM locations are bad due to a translation RAM read-back error. Reset the circuit pack with the **busyout board *UUCSS*** and **reset board *UUCSS*** commands. If the Circuit Pack Restart test (#594) passes, then the on-board circuitry is healthy. Retire the alarm with the **test board *UUCSS* long clear** command. If the Circuit Pack Restart test (#594) fails, replace the circuit pack.

h. Frame overrun at Packet bus interface. Due to an on-board fault or to faulty data received on one of the circuit pack's external ports. If any of the ports on this circuit pack is alarmed, refer to the repair procedures for those MOs. If this error persists, maintenance software removes the board from service; replace the circuit pack.

i. The circuit pack is has problems transmitting/receiving data to/from the Packet bus.

1793	Parity errors are detected when transmitting data to the Packet bus.
1794	Packet bus transmit buffers overflow.
1795	Circuit pack cannot find end of frame when transmitting to Packet bus. Clear the alarm with: **busyout board *UUCSS***, **reset board *UUCSS***, **test board *UUCSS* long clear**, **release board *UUCSS***. If the error recurs within 10 minutes, replace the circuit pack.
2306	Error in a received frame from the Packet bus, most likely caused by a packet bus problem, but may be due to a circuit pack fault. An invalid Link Access Procedure Data (LAPD) frame error occurs if the frame contains a bad Cyclical Redundancy Check (CRC). If bus parity errors occur, run the LAN Receive Parity Error Counter test (#595) to determine whether the condition has cleared. Refer to the maintenance documentation to determine whether the problem is isolated to this circuit pack or is caused by Packet bus faults.

j. Error Type (2305, 3330): A critical failure in the Circuit Pack's Packet bus interface. Possible causes include either a Packet bus fault or an on-board fault, for example, the board received a bad CRC or invalid DLCI. If the Packet bus is alarmed, see ''Isolating and Repairing Packet-Bus Faults'' on page 4-81. The number of ISDN circuit packs displaying this error increases the probability of errors due to Packet bus problems.

If there are no Packet bus alarms, reset the circuit pack with the **busyout board *UUCSS*** and **reset board *UUCSS*** commands. If the Circuit Pack Restart test (#594) passes, then the on-board circuitry is healthy. Retire the alarm with the **test board *UUCSS* long clear** command. If the Circuit Pack Restart test (#594) fails, replace the circuit pack.

k. The server's software detects an excessive number of up-link messages from the TN2185 board within a certain time period. To prevent the faulty board from flooding the switch with data, the switch software takes the board out of service and alarms it. The switch software also tells the Archangel to ignore up-link messages from the board.

   When the board is alarmed due to this error, the switch software periodically puts the board back in service and tells the Archangel to process up-link messages from the board. If the problem still exists, the software takes the circuit pack out of service again. If the circuit pack does not exhibit the problem for a certain time period, then maintenance software resolves the alarm and the circuit pack is left in service.

l. The circuit pack received an inconsistent down-link message (a bad header, port number, data, subqualifier, or logical link) over the Control Channel.

m. The board is receiving data from the bus faster than it can distribute the data to its endpoints, causing the FIFO RAM buffer to overflow. This error can occur occasionally due to the statistical sizing of the buffers. If it occurs frequently, it may indicate a LAPD parameter mismatch. LAPD should recover from this problem, but it may degrade the performance of the LAN bus.

   When this error is reported, maintenance reads and clears the board counter and logs the problem in the maintenance error log.

n. Bad translation RAM detected, but the call continues by using another translation location. The circuit pack reports this error when it cannot update NPE/NCE memory and read it back. This error is not service-affecting and can be ignored, but can lead to other types of errors against this circuit pack.

System Technician-Demanded Tests: Descriptions and Error Codes

When inspecting errors in the system, always investigate tests in the order listed below. For example, by clearing error codes associated with the Control Channel Loop-around test (#52), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Control Channel Loop-around test (#52)	X	X	ND
NPE/NCE Audit test (#50)		X	ND
LAN Receive Parity Error Counter test (#595)		X	ND

1. D = Destructive; ND = Nondestructive

Control Channel Loop-Around Test (#52)

See the repair procedure described in ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872.

NPE /NCE Audit Test (#50)

See the repair procedure described in ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872.

SAKI Sanity Test (#53)

This is a destructive test.

See the repair procedure described in ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872. This test is only run as a part of a reset board procedure.

LAN Receive Parity Error Counter Test (#595)

This test is nondestructive. The test reads and clears the circuit pack's LAN Receive Parity Error Counter. This counter increments when it detects a parity error from the Packet bus. These errors may indicate problems with a circuit pack, Packet bus, or with another circuit pack on the bus. Use this test to verify the repair.

Table 8-603. Test #595 LAN Receive Parity Error Counter Test

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received from the circuit pack within the allowable time period. 1. If the test aborts repeatedly up to 5 times, reset the circuit pack via the **busyout board *UUCSS*** and **reset board *UUCSS*** commands. 2. If the test aborts again, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
1–10	FAIL	The circuit pack is still detecting errors of this type. The error code indicates the value of the on-board error counter. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail, verify the validity of the Packet bus. Run the Packet bus maintenance test with the **test pkt *P* long** command. If any Packet bus tests fail, see "PKT-BUS (Packet Bus)" on page 8-1230 for recommended repair procedures. 3. If the Packet bus test passes, check the validity of the circuit pack. Execute a test that involves data transmission onto the Packet bus. For example, the **test port *UUCSSpp*** command may use the connectivity tests of the BRI-PORT MO. If the test fails, refer to the repair procedures; otherwise, proceed to the next step. 4. Other circuit packs on the Packet bus may be causing of the parity error. Use the **display errors** command to check the Error Log for alarmed other circuit packs. Resolve any alarms for other circuit packs as well. Rerun the LAN Receive Parity Error Counter test (#595).
	PASS	No errors detected.

TBRI-PT (ISDN Trunk-Side BRI Port)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
TBRI-PT	MAJOR	**test port *UUCSS* l *r#***	TBRI-PT
TBRI-PT	MINOR	**test port *UUCSS* l *r#***	TBRI-PT
TBRI-PT	WARNING	**test port *UUCSS* s *r#***	TBRI-PT

1. Where UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC), C is the carrier designation (A, B, C, D, or E), SS is the carrier slot address where the circuit pack resides (01–21), and pp is the 2-digit port number (1, 2, 3, and so forth).

This document describes the port maintenance features of the S8700 Multi-Connect TN2185 Trunk-Side ISDN-BRI board. The circuit pack provides 8 S/T ISDN 2B+D ports that interface to either the central office or another PBX.

The TN2185 circuit pack contains eight, 4-wire ports that interface to the network at the ISDN S/T reference point over two 64-kbps channels (B1 and B2) and over a 16-kbps signaling (D) channel. The B1 and B2 channels can be simultaneously circuit-switched, or individually packet-switched. Only one channel per trunk can be packet-switched due to PPE (Packet Processing Element) limitations. The D channel is either circuit- or packet-switched. Packet switching uses the PPE to combine every D channel into a single physical channel, which is then routed via the concentration highway to the NCE (Network Control Element) and then to the TDM bus. The circuit-switched connections have a Mu-law or A-law option for voice and operate as 64-kbps clear data channels. The packet-switched channels support the LAPD protocol and conform with the CCITT Q.920 Recommendations for D-channel signaling.

LEDs

The three LEDs on the circuit pack's faceplate indicate a board's status. When illuminated, the red LED indicates a board's failure or a major or minor on-board alarm. The green LED indicates that testing is in progress. The amber LED indicates that the board is in use.

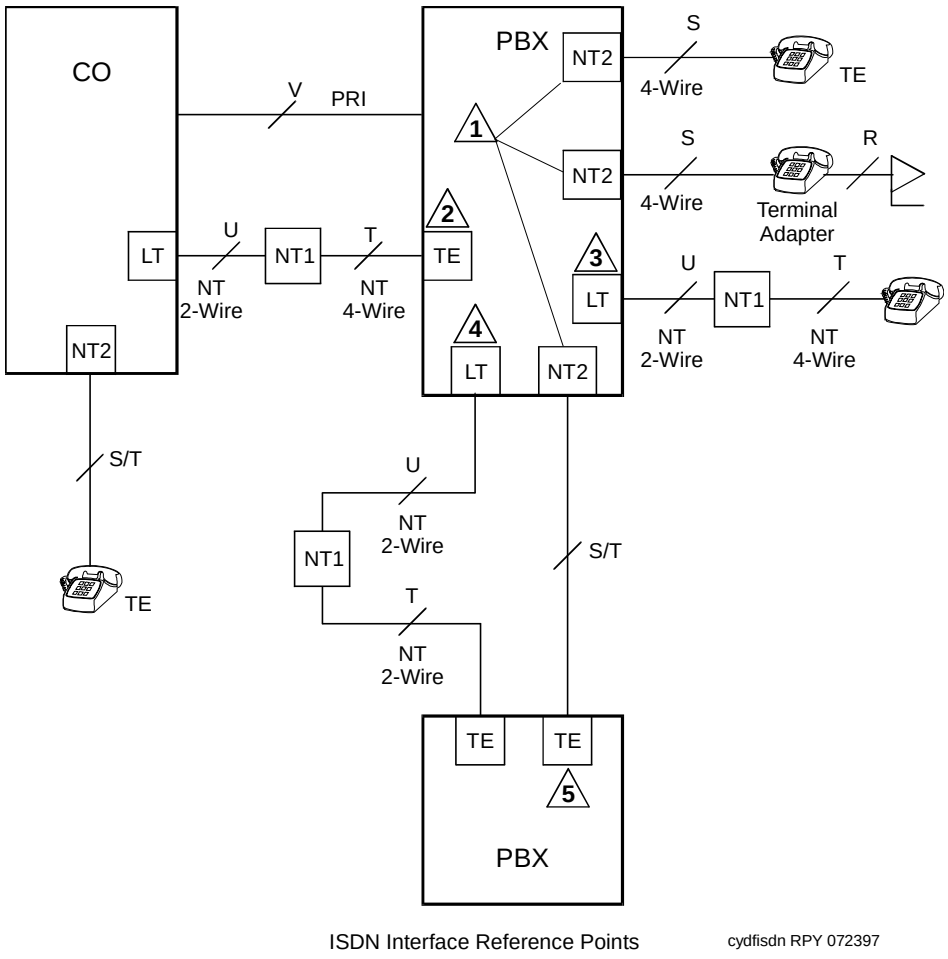

Figure 8-96. Integrated Trunk-Side BRI, ISDN Interface Reference points

ISDN Interface Reference Point definitions:

LT	Logical Terminal
V	Primary Rate user/network (asymmetrical) trunk interface. The ECS is capable of acting as the user or as the network side of this 1.544- or 2.048-Mbps interface.
R	Interface between Terminal Equipment and Network Termination
S	Basic Rate network-side 4-wire line interface
S/T	4-wire Basic Rate connection to a Network Termination[1].
T	4-wire Basic Rate interface to a Network Termination.[2]
TE	Terminal Equipment

U Basic Rate network-side 2-wire line interface.

1 TN556B ISDN-BRI 4-Wire S/T-NT Line (A-law)

2 TN2185 ISDN-BRI 4-Wire S Interface (Trunk Side)

3 TN2198 ISDN-BRI 2-Wire U Interface

4 TN2198 ISDN-BRI 2-Wire U Interface

5 TN2185 ISDN-BRI 4-Wire S Interface (Trunk Side)

1. Network Termination 2 (NT2), that terminates Layer 1 and higher layers. PBXs, LANs, and terminal controllers typically provide NT2 functionality including protocol handling and multiplexing for Layers 2 and 3.
2. Network Termination 1 (NT1), that terminates Layer 1 and monitors maintenance, performance, timing, power transfer, multiplexing, and multi-drop termination with contention resolution.

Hardware Error Log Entries and Test to Clear Values

Table 8-604. TBRI-PT Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test Port *UCSSPP* sh r 1**
1 (a)		Level 1 Status test (#1242)	MINOR	OFF	
129[2]					
257(b)					
513 (c)	46222	XMIT FIFO Overflow	MINOR	ON	
514 (d)		XMIT FIFO Overflow (TDM)	MINOR	ON	
769 (e)		Traffic Hyperactivity	MINOR	OFF	
1025 (f)					
1281 (g)		NPE Crosstalk test (#617)	MINOR	ON	
1537 (h)	46210	CRC error (D-channel)	MINOR	OFF	
1538 (i)		CRC error (TDM D-channel)	MINOR	OFF	
1793 (j)		BRI Port Local TDM Loop-around test (#619)	MINOR	ON	
2049 (k)			MINOR	OFF	
2305 (l)		Layer 3 Query (#1243)	MINOR	OFF	

Continued on next page

Table 8-604. TBRI-PT Error Log Entries — *Continued*

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
3073 (m)		Slip Query test (#1244)	MINOR	OFF	
3585 (n)		Receive FIFO Overflow (TDM D-channel)	Log Only	ON	
3586 (o)					
3587 (p)					
3588 (q)	46223				
3589 (r)					
3590 (s)	46211				
3591 (t)					
3592 (u)					
3841 to 3942 (v)					

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. The far-end switch changed the ISDN service state. This may be a temporary condition.

Notes:

a. Loss of continuity of Layer 1 to the far end. It is assumed that Layer 1 remains active, even when both B channels are idle.

   This test determines whether Layer 1 is active or not. If Layer 1 is not active, the test attempts to activate it. If Layer 1 cannot be activated, the port is taken out of service, and the test fails.

b. The D channel failed at Layer 2. Expiration of this timer indicates that attempts to bring the failed link back into service have not succeeded and some recovery actions should be taken on the associated B channels. Upon expiration, associated in-service B channels are put in the out-of-service/far-end state.

c. Error Type (513) — On-board hardware failure. The FIFO RAM buffers have overflowed, indicating a hardware problem.

d. Error Type (514) — Transmit FIFO Overflow - This error indicates that the circuit pack is having problems transmitting data to the TDM D channel. This error only occurs only a system that switches the packet

implementation of the D channel over the TDM bus. This error indicates an on-board problem related to the packet implementation of the D channel (R6.2 and higher).

e. Error Type (769) — The port is generating too many uplinks. The link is being suspended.

f. Error Type (1025) — An expired timer has created an unexpected event. The timer could be any of the following:

Timer	Event
T3031	ISDN T3031 timeout
T3032	ISDN T3032 timeout
T305	ISDN T305 timeout
T3081	ISDN T3081 timeout
T3082	ISDN T3082 timeout
TL3	Status Inquiry
T304	Setup ACK
T310	Call Proceeding Receive
T313	Connect SEND

g. Error Type (1281) — This error occurs when the NPE Crosstalk test (#617) has failed. The test will be repeated every 15 minutes until it passes. Follow normal trouble shooting procedures for NPE Crosstalk test (#617). If this does not fix the problem, follow normal escalation procedures.

h. Error Type (1537) — The board received a bad Cyclical Redundancy Check (CRC) over the D channel. This error is reported on a per-port basis. When the CRC errors exceed 5 within 15 minutes, the port is taken out of service for 5 seconds. If 5 more CRC errors are received within 15 minutes of the first set of 5 errors, the port is taken out of service for 1 minute. If 5 more CRC errors are received within 15 minutes of the previous 5, the port is taken out of service for 15 minutes.

   This error is most likely due to a problem with backplane wiring, a noise source, or no termination (an open circuit). It usually does not indicate a problem with the circuit pack.

   1. Check the backplane wiring.
   2. If the problem persists escalate the problem.

i. Error Type (1538) — This error occurs when a frame with a bad CRC is received by the BRI trunk board. This error only occurs on a system that switches the packet implementation of the D channel over the TDM bus. This error indicates an off-board problem related to the packet implementation of the TDM D channel (R6.2 and later).

j. Error Type (1793) — The BRI Port Local TDM Loop Around test (#619) failed. Run the long test sequence, and pay particular attention to the results of the BRI TDM Port Loop test (#619).

k. Error Type (2049) — The Layer 2 Link Query failed. The test is repeated every 15 minutes until it passes.

l. Error Type (2305) — The Remote Layer 3 Query failed. The test is repeated every 15 minutes until it passes.

m. Error Type (3073) — A frame of information had to be repeated or deleted. Slips usually occur when the received bit rate is not synchronized with the TDM bus clock.

n. Error Type (3585) — The circuit pack detected an overflow of its receive buffers. This error occurs only a system that switches the packet implementation of the D channel over the TDM bus. This error indicates an on-board problem related to the packet implementation of the TDM D channel (R6.2 and higher).

o. Error Type (3586) — Each port can support up to three Terminal Endpoint Identifiers (TEIs). Each channel on the port can request a TEI assignment from the switch if it supports ISDN-BRI TEI assignment procedures. If switch services gets a request for a fourth TEI on a port, it reports this event to maintenance software and initiates TEI check procedures on the port. Check to see if the correct number of channels are administered for this port.

   The user side supports automatic TEI assignment by the network. Both fixed and automatic TEI assignment are supported on the network side.

p. Error Type (3587) — Service Profiler IDentifier (SPID) value is invalid or is a duplicate of another SPID that is already initialized at Layer 3 on the port. SPIDs are not used on the TN2185 circuit pack. However there will be related events.

q. Error Type (3588) — The board receives D-channel data from the bus faster than it can process the data. The FIFO RAM buffers overflowed. This error occurs occasionally due to the statistical sizing of the buffers; however, frequent occurrences may indicate a LAPD parameter mismatch between the two endpoints of a packet-switched connection. Run the long test sequence, and pay particular attention to the results of the Receive FIFO Overflow test (#625).

r. Error Type (3589) — The BRI Port Local LAN Loop Around test (#618) failed. Run the long test sequence, and pay particular attention to the results of Test #618.

s. Error Type (3590) — An activated BRI port receives a frame containing a DLCI over a D channel for which it does not have a translation. This error normally indicates an off-board problem related to a state mismatch between the far end and the switch. This error is logged only.

t. Error Type (3591) — The port is generating too many uplinks and is taken out of service.

u. Error Types (3841–3942) — Table 8-605 contains the received ISDN cause values for Errors 3841–3942 that are recorded in the hardware error logs. Unless otherwise stated, the cause values are D-channel events. The aux data field shows which port caused the error.

Table 8-605. Cause Values for Error 3841–3942

Value	Type of Problem	Meaning
2	admin	No route to specific transit network
3	admin	No route to destination (or Germany bcap not imp)
6	admin	Channel unacceptable
18	switch problems	No user responding
38	switch problems	Network failure
50	subscription	Requested facility not subscribed
52	admin	Outgoing calls barred
54	admin	Incoming calls barred
62	subscription	Service not authorized
63	admin/sub	Service/option not available
65	admin/sub	Bearer capability not implemented
66	admin/sub	Channel type not implemented
69	admin/sub	Requested facility not implemented
70	admin/sub	Only restricted digital BC available
79	admin	Service/option not implemented
88	admin	Incompatible destination
102	switch problems	Recovery on timer expired

System Technician-Demanded Tests: Descriptions and Error Codes

When inspecting errors in the system, always investigate tests in the order listed below. For example, by clearing error codes associated with the *BRI Local LAN Port Loop Around* test (#618), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
BRI Local LAN Port Loop Around test (#618)		X	D
BRI TDM Port Loop Around test (#619)		X	D
L1 State Query test (#1242)	X	X	D
CRC Error Counter test (#623)		X	ND
Receive FIFO Overflow test (#625)		X	ND
Layer 3 Query test (#1243)		X	ND
Slip Query test (#1244)	X	X	ND
Clear Error Counters test (#270)	X	X	ND
NPE Crosstalk test (#617)		X	D

1. D = Destructive; ND = Nondestructive

Clear Error Counters Test (#270)

This test is nondestructive.

This test clears the various error counters associated with each TBRI-PT. This test passes if maintenance software is able to successfully send the downlink messages; the test aborts otherwise.

Table 8-606. Test #270 Clear Error Counters

Error Code	Test Result	Description / Recommendation
Any	ABORT	Maintenance could not send the downlink message.
	PASS	The message to clear the error counters of the TBRI-PT MO has been sent.

NPE Crosstalk Test (#617)

This test is conditionally destructive.

One or more NPEs reside on each circuit pack with a TDM-bus interface. The NPE controls port connectivity and gain and provides conferencing functions on a per-port basis. The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, 1-way and noisy connections may be observed. This test is part of a port's long test sequence and takes approximately 20 to 30 seconds to complete. Crosstalk testing is performed on both B channels (B1 and B2) associated with a BRI port. If this test fails on either channel, any channel connected to the port is taken out-of-service. This test aborts if the port and its associated channels are not in the idle state.

Table 8-607. Test #617 NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the station extension or trunk group/member number of the port. Use the **status bri-port *UUCSSpp*** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. Wait until the port is idle before retesting. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port has been seized by a user for a valid call. Use the **status bri-port** command to determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort and the port is idle, escalate the problem.
1005	ABORT	This test is not valid for this type of translation. Ports administered as "ASAI" or "ADJK" cannot run this test, because the B channels associated with the port are not used by ASAI or Avaya Adjunct Links. This is a normal condition.
2012	ABORT	Internal system error
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1, 2	FAIL	The NPE of the tested port was found to be transmitting in error, causing noisy and unreliable connections. Error code 1 indicates that the NPE Crosstalk test failed on Channel B1. Error code 2 indicates that the NPE Crosstalk test failed on Channel B2. 1. Replace circuit pack.

Continued on next page

Table 8-607. Test #617 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The port is correctly using its allocated time slots. 1. To be sure that this is not an intermittent problem, repeat this test up to 10 times to ensure it continues to pass. 2. If complaints still exist, examine the connections and wiring.

BRI Port Local LAN Loop-Around Test (#618)

This test is destructive.

This test checks the connectivity of the BRI port across the LAN bus. Because this test is destructive, run this test only if the port is out-of-service.

Failures of this test indicate either on-board faults associated with the TBRI-PT hardware on the circuit pack or problems with the LAN Bus, which is used to form connectivity between the switch and the TBRI-PT.

If the port is in a state other than out-of-service, the BRI Port Local LAN Loop-Around test will abort. If the port is out-of-service, then the port is put into a local loop-around mode and the following test is executed.

A loop-around test is performed across the Packet bus for the D channel. The switch sends data over a packet connection, which is looped back by the BRI port (D channel) and received back by the switch. The test passes if the packet connection can be established and the transmitted data is received unaltered. The test aborts if the Packet bus is alarmed in the Processor Port Network (or the port network where that circuit pack resides) or if the Packet Interface board is out-of-service. The test fails due to either on-board faults associated with the BRI port hardware on the circuit pack or problems with the LAN bus.

Table 8-608. Test #618 BRI Port Local LAN Loop Around

Error Code	Test Result	Description / Recommendation
1015	ABORT	The port is not out-of-service. 1. Use the **status bri-port *UUCSSpp*** command to determine the status of the port. 2. If it is in use, wait until it is idle, and then use the **busyout port *UUCSSpp*** command to place it in the out-of-service state and repeat this test. **CAUTION:** *Since the busyout command is destructive, execution of this command prior to the port being idle causes every call associated with the BRI port to be torn down.*
1139	ABORT	The Packet bus in the port network is out-of-service. 1. Follow the repair procedures for the Packet bus. 2. Run the **test port long *UUCSSpp*** command and verify the repair by viewing the results of the BRI Port Local LAN Loop-Around test (#618).
1141	ABORT	The PKT-CTRL is out-of-service. 1. Follow the repair procedures for the PKT-CTRL. 2. Run the **test port long *UUCSSpp*** command and verify the repair by viewing the results of the BRI Port Local LAN Loop-Around test (#618).
2012 2100	ABORT	Internal system error Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The Loop-Around test has failed. 1. If the test fails repeatedly, attempt to reset the circuit pack with the **busyout board *UUCSS*** and the **reset board *UUCSS*** commands if the other ports on the board are idle. 2. If the test fails again, execute **test pkt *P***. If this fails, follow failure procedures in the PKT-BUS section. 3. If the tests in Step 2 pass, the problem is local to the BRI board. Replace the trunk circuit pack.
	PASS	The BRI Port Local LAN Loop-Around test passed.

BRI Port Local TDM Loop-Around Test (#619)

This test is conditionally destructive.

This test verifies the connectivity of a BRI port across the TDM bus. It aborts if calls associated with the port are in progress. Failure of this test indicates an on-board fault associated with the port hardware on the circuit pack.

This Loop-Around test runs the following individual tests on the two B channels (B1 and B2) associated with the port:

- A Loop-Around test across the TDM bus for B1.
- A Conference Circuit test for B1.
- A Loop-around test across the TDM bus for B2.
- A Conference Circuit test for B2.

The tests are run in the above order. If one fails, the remaining tests in the sequence are not executed, and maintenance software returns an error code.

Table 8-609. Test #619 BRI Port Local TDM Loop Around

Error Code	Test Result	Description / Recommendation
1000	ABORT	The system resources required to run this test are not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the trunk group/member number of the port. Use the **status bri-port *UUCSSpp*** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. Wait until the port is idle before retesting. 2. If the port is idle, then retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present or some Tone Detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.

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Table 8-609. Test #619 BRI Port Local TDM Loop Around — *Continued*

Error Code	Test Result	Description / Recommendation
1004	ABORT	The port has been seized by a user for a valid call. Use the **status trunk** command for the trunks associated with this port and determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort and the port is idle, escalate the problem.
1005	ABORT	This test is not valid for this type of translation. Ports administered as **ASAI** or **ADJK** cannot run this test because the B channels associated with the port are not used by ASAI or Avaya Adjunct Links. This is a normal condition.
2000	ABORT	Response to the test was not received from the BRI-LINE circuit pack within the allowable time period. 1. If this result occurs repeatedly, attempt to reset the circuit pack with the **busyout board *UUCSS*** and the **reset board *UUCSS*** commands if the other ports on the board are idle. 2. If this result occurs again, replace the circuit pack.
2012	ABORT	Internal system error
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2103	ABORT	The system could not make the conference connection for the test. 1. Retry the command at 1-minute intervals up to 5 times.
1, 2	FAIL	The TDM Looparound failed on one of the channels. ■ Error Code 1 — TDM Loop Around test failed on B1. ■ Error Code 2 — TDM Loop Around test failed on B2.
7, 8	FAIL	The Conference Circuit tests failed on a B channel. ■ Error Code 7 — test failed on B1 ■ Error Code 8 — test failed on B2. 1. If the test fails repeatedly, attempt to reset the circuit pack with the **busyout board *UUCSS***, the **reset board *UUCSS***, and then the **release board *UUCSS*** commands (if the other ports on the board are idle). 2. If the test fails again, replace the circuit pack.
	PASS	The BRI Port Local TDM Loop Around test passed.

CRC Error Counter Test (#623)

This test is nondestructive.

This test reads the BRI port's CRC error counters that are maintained on the BRI circuit pack. The Cyclic Redundancy Check (CRC) is a means of error detection used to determine the integrity of data frame contents. The CRC error counter is incremented by the circuit pack when it detects a CRC error. The test passes if the value of the counter is 0 (that is, the error is cleared). If the counter is non-zero, the test fails, and the value of the counter is displayed in the `Error Code` field.

Table 8-610. Test #623 CRC Error Counter Test

Error Code	Test Result	Description / Recommendation
ANY	FAIL	This error occurs when a frame with a bad CRC is received over the D channel by the BRI board. This error is reported on a per-port basis when the counter goes over the threshold. This error is most likely due to a problem with the wiring or interference on the wiring caused by a noise source or no termination. It usually does not indicate a problem with the circuit pack.
	PASS	The CRC error counter was read correctly and has a value of 0.

Receive FIFO Overflow Error Counter Test (#625)

This test is nondestructive.

This test reads and clears the BRI port's Receive FIFO Overflow error counter maintained on the TBRI-BD circuit pack. This counter is incremented by the circuit pack when it detects an overflow of its receive buffers. The test passes if the value of the counter is 0 (that is, the error is cleared). If the counter is non-zero, the test fails, and the value of the counter is displayed in the Error Code field. This error can occur either if:

- Signaling frames are being received from the Packet bus at a rate sufficient to overflow the receive buffers on the circuit pack for a port
- A hardware fault is causing the receive buffers not to be emptied properly by the circuit pack.

This test is useful for verifying the repair of the problem.

Table 8-611. Test #625 Receive FIFO Overflow Error Counter Test

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received from the circuit pack within the allowable time period. 1. If the test aborts repeatedly up to 5 times, reset the circuit pack with the **busyout board *UUCSS*** and **reset board *UUCSS*** commands. 2. If the test aborts again, replace the circuit pack.
2012	ABORT	Internal system error
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
value	FAIL	The TBRI-BD circuit pack is still detecting errors of this type. The Error Code field contains the value of this counter. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail, run the long test sequence, and pay particular attention to the Loop-Around tests (#618 and #619). See the repair procedures for the executed test if it fails. Otherwise, go to the next step. 3. Replace the circuit pack.
	PASS	The Receive FIFO Overflow error counter was read correctly and has a value of 0.

Level 1 Status Inquiry Test (#1242)

This test is nondestructive.

This test determines the state of the transmission facility of a BRI port at the Level 1 (L1) physical layer: Activated, Pending Activation, or Deactivated.

The Activated state is the correct state for an ISDN-BRI port. In this state the L1 interface can send and receive synchronized signals. This test passes if the state of L1 is Activated. This test also passes if software has taken this port out of service. See the description of the L1 “Deactivated State” below for more details.

The Pending Activation state indicates a problem with the channels, the wiring, or the TBRI-BD circuit pack. When in this state, the Level 1 interface is either not receiving any L1 framing from the channel, or it is communicating with the channel but cannot transition to the Activated state.

The Deactivated state indicates a problem with the TBRI-BD circuit pack. When in this state, the Level 1 interface is not active, and an idle signal is transmitted to the channels or that Layer 1 was deactivated by the switch. When an TBRI-PT port is placed in the out-of-service state, Level 1 is also put into the Deactivated state. This could be due either to the system detecting a fault with the port or to a **busyout port UUCSSpp** request.

Table 8-612. Test #1242 Level 1 Status Inquiry

Error Code	Test Result	Description / Recommendation
1187	ABORT	The board or port may be busied out. 1. Look in the Error Log for Error Type 18 (port busied out) for this port and TBRI-BD (board busied out). If this error type is present for TBRI-PT only, then release the port with the **release port *pp*** command and run the test again. If the error is present for both TBRI-BD and TBRI-PT, then release the board with the **release board *UUCSS*** command and run the test again. **NOTE:** When you release a board, you release every port associated with it. If certain ports still need to be busied out, use the **busyout port *UUCSSpp*** command to busy them out. 2. Make sure the endpoint is connected. 3. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received from the circuit pack within the allowable time period. 1. If the test aborts repeatedly up to 5 times, reset the circuit pack with the **busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS*** commands. 2. If the test aborts again, replace the circuit pack.
2012	ABORT	Internal system error
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-612. Test #1242 Level 1 Status Inquiry — *Continued*

Error Code	Test Result	Description / Recommendation
1	FAIL	Received a status of Level 1 Pending Activation. U interface down indicating a problem with a connection between the switch and the NT1, a 2- to 4-wire converter that is used to connect 4-wire terminals to a 2-wire TN2198 or TN2185 circuit pack. 1. Verify that the connections between the switch and the NT1 are good. Verify that the NT1 has power. 2. Execute the **test port *UUCSSpp*** command and review the results of the Level 1 Status Inquiry test to verify the repair. If this test still fails, proceed to Step 3. 3. Follow the manufacturers repair procedures for the NT1. Then execute the **test port *UUCSSpp*** command and review the results of the Level 1 Status Inquiry test to verify repair.
2	FAIL	Received a status of Level 1 Pending Activation. U interface up, S/T interface down, which indicates a problem with the NT1 or the wiring between the NT1 and the BRI endpoint (S/T interface). 1. Execute the **test port *UUCSSpp*** command and review the results of the Level 1 Status Inquiry test to verify the repair. If this test still fails, proceed to Step 2. 2. Follow the manufacturer-recommended repair procedures for the NT1. Then execute the **test port *UUCSSpp*** command and review the results of the Level 1 Status Inquiry test to verify repair.
3	FAIL	Received a status of Level 1 Deactivated; the port is out-of-service. 1. Issue the **status bri-port *UUCSSpp*** command to verify that the service state of the port is out-of-service. If the service state of the port is not out-of-service, escalate the problem to the next tier. Otherwise, proceed to Step 2. 2. If the port has been placed out-of-service with the **busyout port *UUCSSpp*** command, try releasing the port by executing the **release port *UUCSSpp*** command. Then issue the **test port long *UUCSSpp*** command and review the results of Level 1 Status Inquiry test. If this test still fails, proceed to Step 3. 3. After executing the **test port long *UUCSSpp*** command, review the results of every test. Follow the repair procedures for any tests that fail. Verify repair of the problem by executing the **test port *UUCSSpp*** command and by determining that the Level 1 Status test passes. If the test continues to fail for this reason, escalate the problem to the next tier.

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Table 8-612. Test #1242 Level 1 Status Inquiry — *Continued*

Error Code	Test Result	Description / Recommendation
4	FAIL	Received a status of Level 1 Pending Activation, the NT1 has a loss of power indicating a problem with the NT1. 1. Follow the manufacturer-recommended repair procedures for the NT1. 2. Execute the **test port *UUCSSpp*** command and review the results of the Level 1 Status Inquiry test to verify the repair.
	PASS	This test indicates that Level 1 is activated or that software has taken the port out of service.

Layer 3 Query Test (#1243)

This test is nondestructive.

This test is used to check the application layer communications across the in-service ISDN D channel. The test passes if a status enquiry message is successfully sent, fails if the signaling link is down, and aborts if a query is already running or there is an internal error.

Table 8-613. Test #1243 Layer 3 Query

Error Code	Test Result	Description / Recommendation
1005	ABORT	The test aborted due to a configuration problem. This test may not be applicable, or it may be disruptive to terminal equipment other than a voice terminal (for example, a modem pool member or Music on Hold). This error can be ignored.
1019	ABORT	Test is already running.
1113	ABORT	The signaling link is down. 1. Use the **test port *UUCSSpp* long** command to clear any errors which prevent establishment of the signaling link. 2. Examine the results of Test #626, which is executed with the command. If this test aborts or fails, follow the repair procedure for the Signaling Link Status test. 3. Escalate problem if BRI Layer 3 Query test continues to abort.

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Table 8-613. Test #1243 Layer 3 Query — *Continued*

Error Code	Test Result	Description / Recommendation
1139	ABORT	The Packet bus in the port network is out-of-service. 1. Follow the repair procedures for the Packet bus. 2. After completing step 1, execute the **test port long *UUCSSpp*** command and review the results of the BRI Port Local LAN Loop-around test to verify the repair.
1141	ABORT	The PKT-CTRL is out-of-service. 1. Consult the repair procedure for PKT-CTRL. 2. If Step 1 does not resolve the problem, escalate to the next tier.
1187	ABORT	The circuit pack or port may have been busied out by a technician. 1. Look in the Error Log for Error Type 18 (busied out) for TBRI-BD or TBRI-PT. a. If this error type is present for TBRI-PT, then release the port with the **release port *UUCSSpp*** command and run the test again. b. If the error is present for both TBRI-BD and TBRI-PT, then release the circuit pack with the **release board *PUUCSS*** command and run the test again. **NOTE:** When you release the circuit pack, you release every port associated with it. If certain ports still need to be busied out, use the **busyout port *UUCSSpp*** command to busy them out. 2. Make sure the terminal is connected. 3. Retry the command at 1-minute intervals up to 5 times.
2012	ABORT	Internal system error
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	The switch has successfully sent a Status Enquiry message.

Slip Query Test (#1244)

This test is nondestructive.

Slips occur when the transmitter and receiver are not running at precisely the same clock rate. The Slip Alarm Inquiry test polls the total number of slips that have occurred on a link.

When the TN2185 circuit pack detects a slip condition, maintenance software initiates the Slip Alarm Inquiry test to query the slip counters on the TN2185 circuit pack and total the slip counts in the maintenance software.

If the slip count is over the threshold, a Minor alarm is raised against the TN2185 circuit pack, leaving every port of the TN2185 circuit pack in the in-service state. If the TN2185 circuit pack is used to supply the system synchronization source, the MINOR alarm will initiate a synchronization source switch. See ''TDM-BUS (TDM Bus)'' and ''SYNC (Port-Network Synchronization)'' for additional information.

Table 8-614. Test #1244 Slip Alarm Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error
2000	ABORT	Response to the test request was not received within the allowable time period. If Error Type 1538 is present in the Error Log, follow the maintenance strategy recommended for this error type.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1 to 88	FAIL	The circuit pack and the remote endpoint are not synchronized to the same clock rate, which has generated the Slip alarm. The error code equals the number of slips detected by the TN2185 circuit pack since the last Slip Alarm Inquiry test. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the circuit pack is a TN2185, enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 3. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 4. Check the physical connections of DS1 Interface circuit packs and cable. 5. Replace the local DS1 Interface circuit pack and repeat the test. 6. Contact T1 Network Service to diagnose the remote DS1 endpoint.
	PASS	No Slip alarm is detected on the DS1 Interface circuit pack.
0	NO BOARD	The DS1 Interface circuit pack is not administered. 1. Administer the DS1 Interface circuit pack by issuing the **add ds1 *UUCSS*** command. 2. Run the test again. 3. If the test continues to return NO BOARD, escalate the problem.

TBRI-TRK (Trunk-Side ISDN BRI)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
TBRI-TRK[2]	MAJOR[3]	**test trunk *UUCSSpp* l**	MO_TBRI_TRK
TBRI-TRK	MINOR	**test trunk *UUCSSpp* l**	MO_TBRI_TRK
TBRI-TRK	WARNING	**test trunk *UUCSSpp* sh**	MO_TBRI_TRK

1. Where UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC), C is the carrier designation (A, B, C, D, or E), SS is the carrier slot address where the circuit pack resides (01–21), and pp is the 2-digit port number (1, 2, 3, and so forth).
2. For additional repair information, also see "TBRI-BD (TN2185 ISDN Trunk-Side BRI)" and "TBRI-PT (ISDN Trunk-Side BRI Port)" maintenance documentation.
3. A MAJOR alarm on a trunk indicates that alarms on these trunks are not downgraded by the **set options** command and that at least 75 percent of the trunks in this trunk group are alarmed.

The TN2185 circuit pack contains eight, 4-wire ports that interface to the network at the ISDN S/T reference point over two 64-kbps channels (B1 and B2) and over a 16-kbps signaling (D) channel. The B1 and B2 channels can be simultaneously circuit-switched, or individually packet-switched. Only one channel per trunk can be packet-switched due to PPE (Packet Processing Element) limitations. The D channel is either circuit- or packet-switched. Packet switching uses the PPE to combine every D channel into a single physical channel, which is then routed via the concentration highway to the NCE (Network Control Element) and then to the TDM bus. The circuit-switched connections have a Mu-law or A-law option for voice and operate as 64-kbps clear data channels. The packet-switched channels support the LAPD protocol and conform with the CCITT Q.920 Recommendations for D-channel signaling.

LEDs

The three LEDs on the circuit pack's faceplate indicate board status. When illuminated, the red LED indicates a board failure or a major or minor on-board alarm, the green LED indicates that testing is in progress, and the amber LED indicates that the board is in use.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the Service State Audit test (#256), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Signaling Link State Check test (#1251)	X	X	ND
Service State Audit test (#256)	X	X	ND
Call State Audit test (#257)	X	X	ND
ISDN Test Call test (#258)		X	ND

1. Destructive; ND = Nondestructive

Signaling Link State (#1251)

This test is nondestructive.

This test checks the current state of the signaling link. The test looks at the board-level translations, checks that the board is physically inserted, gets the state of the D channel and service state of the port.

The test passes if the signaling link (D channel) is connected and operating normally. The test fails if the board is not installed, the signaling link is disconnected, or if the port is out of service. The test aborts otherwise.

Table 8-615. Test #1251 Signaling Link State Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
1018	ABORT	The test is disabled. 1. Enable the test by entering **enable test #1251**.
1114	ABORT	The signaling link is in a transitional state. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
8	FAIL	The signaling link is down. 1. Consult the procedures for the TBRI-PT MO.
9	FAIL	The port is out of service. 1. Return the port to an in-service state.
	PASS	The signaling link is connected and operating normally.

Service State Audit (#256)

This test is nondestructive.

This test performs a service state audit on an ISDN B channel. The test passes if Call Processing informs Maintenance that the Restart message was transmitted successfully, or if the B channel was busy and could not send the message.

The test fails if the board is not inserted or translated properly, or if a reply is not received within a certain amount of time.

The test aborts if the signaling link is disconnected, if a message is already outstanding, or if the necessary resources could not be allocated.

To investigate the service state of a TN2185 Trunk-Side ISDN-BRI channel, issue the **status trunk *trunk-group/trunk-member*** command.

Table 8-616. Test #256 Service State Audit Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be on a valid call. Use **status trunk** to determine when trunk is available for testing. 1. Check the results of Test #1251 (Signaling Link State Check).
1005	ABORT	The test aborted due to a configuration problem. This test may not be applicable, or it may be disruptive to terminal equipment other than a voice terminal (for example, a modem pool member or Music on Hold). This error can be ignored.
1018	ABORT	The test is disabled. 1. Enable maintenance by entering **y** in the `Maintenance Tests?` field on page 2 of the **change trunk-group** form.
1113	ABORT	The signaling link has failed, so the system cannot send any messages on behalf of this trunk. 1. Check the results of Test #1251 (Signaling Link State test).
1114	ABORT	The signaling link is in a transitional state. 1. Retry the command at 1-minute intervals up to 5 times.
1116	ABORT	The trunk is not in a service state which is appropriate for running the test. This test is only performed in the OOS/FE state.
1117	ABORT	A service state audit message is outstanding. 1. Wait two minutes and then try again.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	Wait 4 minutes and then check the Error Log for any new errors of type 3073. If there are none, then both sides of the ISDN connection agree on the service state; the negotiation succeeded. If there is a new 3073 error, then the negotiation failed (the far-end switch twice failed to respond within 2 minutes). The switch automatically retries every 15 minutes. If the trunk was initially in-service, it is now placed in the maintenance/far-end state. Incoming calls are accepted, but no outgoing calls can be originated. If an incoming call is presented, another Service State Audit is immediately performed in an attempt to put the TN2185 Trunk-Side ISDN-BRI channel in the proper state.

Call State Audit Test (#257)

This test is nondestructive.

This test performs a call state audit on an ISDN B channel, and upon successful completion, guarantees that both sides of the interface are in a consistent call state for connections using the B channel. The test can be helpful when trying to clear a hung call. If the internal call state data to the near-end switch is different from that of the far-end switch, the call will be torn down.

The test passes if the audit is successful.

The test fails if the board is not inserted, if there is an internal system error, or if a reply was not received within the prescribed amount of time.

The test aborts if the signaling link is disconnected, the request is already active, or if the B channel is in an out-of-service state.

Table 8-617. Test #257 Call State Audit Test

Error Code	Test Result	Description / Recommendation
1018	ABORT	The test is disabled. 1. Enable the test by entering **y** in the `Maintenance Tests?` field on page 2 of the **change trunk-group** form.
1019	ABORT	An audit is already in progress. 1. Wait two minutes and try again.
1113	ABORT	The signaling link has failed, so the system cannot send any messages on behalf of this trunk. 1. Check the results of Test #1251 (Signaling Link State Check).
1114	ABORT	The signaling link is in a transitional state. 1. Retry the command at 1-minute intervals up to 5 times.
1116	ABORT	The trunk is in an out-of-service ISDN service state. 1. A call cannot be present if the trunk is in an ISDN out-of-service state, so a call state audit would be inappropriate. No action necessary. (Use the **status trunk** command.)
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	The audit passed successfully.

ISDN Test Call Test (#258)

This test performs a far-end loop around to a far-end switch over an ISDN trunk. The trunk's service state must be in-service, maint-NE, or out-of-service/NE, and no call can be active on the trunk.

A test call connection is established to a far-end switch over the ISDN trunk to be tested. The digital port on a TN711D Maintenance/Test circuit pack generates a test-pattern bit stream that is sent to the far-end switch and echoed back. The received pattern is then compared to the sent pattern and checked for errors that indicate a loss of integrity on the communications path.

If a test call is running when scheduled maintenance starts, the green LED is turned off. To determine whether a test call is still running:

- Issue the **list isdn-testcall** and **status isdn-testcall** commands.
- Check for a lit amber LED on the Maintenance/Test circuit pack.

There are two ways to place an outgoing test call over trunk-side ISDN-BRI facility:

1. The test call connection is established over the TDM bus of the transmit and receive sides of the trunk-side ISDN-BRI facility to a digital trunk testing port on the Maintenance/Test circuit pack. The Maintenance/Test Digital Port generates a pseudo bit stream.
2. The test call connection is established over the TDM bus of the transmit and receive sides of the trunk-side ISDN-BRI facility to a data channel. This method is selected when no Maintenance/Test circuit pack resides in the system.

A test is run periodically to check if the call is hung. If so, it gracefully tears down the call to release the resources.

Synchronous Commands

You can demand a synchronous outgoing test call by using the following maintenance commands:

- **test trunk *trunk-group-no*/*member-no* long [*repeat-number*]**
- **test board *UUCsspp* long [*repeat-number*]**
- **test port *port-location* long [*repeat-number]***

Whenever a circuit translates to a trunk-side ISDN-BRI channel during a long test sequence, an outgoing test call is invoked, and the duration of the test call is 8.6 seconds. Once the test call completes, the bit error rate is retrieved from the Maintenance/Test Digital Port. A bit error rate greater than zero is reported as a failure to the Manager I terminal (MGRI). A failure indicates the need to run further diagnostics.

If no Maintenance/Test circuit pack exists, an outgoing test call over a trunk-side ISDN-BRI facility is established over a high-speed data channel on the Network Control (NETCON) circuit pack (DATA-BD).

Asynchronous Commands

NOTE:
Only one trunk can be tested in a given port network, until the test call is canceled or completes.

Table 8-618. Test #258 ISDN Test Call

Error Code	Test Result	Description / Recommendation
4	ABORT	There is a problem with the Processor Interface Link. 1. See the PI-LINK (Processor Interface Link) Maintenance documentation.
1004	ABORT	B channel in use. 1. Issue the **status trunk** command to determine whether a call is active on this trunk-side ISDN-BRI channel. 2. When the service state indicates in-service/idle, retry the test.
1005	ABORT	Bad Configuration (that is, no Maintenance/Test circuit pack) Issue the **test trunk trunk-group/trunk-member** command and make sure there is a DATA-CHL (NETCON channel) administered**.**
1018	ABORT	Test call is disabled. 1. Enable Maintenance on the Trunk Group form.
1024	ABORT	(M/T-DIG) Maintenance/Test Digital Port in use. 1. Wait until yellow and green LEDs are turned off on the M/T-BD (Maintenance/Test circuit pack). 2. Retry the test. If problem persists, see ''M/T-DIG (Maintenance/Test Digital Port)'' on page 8-1161.
1113	ABORT	The signaling link has failed; the system cannot send any messages on behalf of this trunk. 1. Check the results of Test #1251 (Signaling Link State Check Test).
1114	ABORT	The signaling link is in a transitional state. 1. Retry the command at 1-minute intervals up to 5 times.
1116	ABORT	The switch could not appropriately change the ISDN service state. 1. Issue the **status trunk** command to determine whether a call is active on this trunk-side ISDN-BRI channel. 2. If not, check the error and alarm logs for problems with this TBRI-TRK MO.

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Table 8-618. Test #258 ISDN Test Call — *Continued*

Error Code	Test Result	Description / Recommendation
1117	ABORT	ISDN B-channel maintenance message is already outstanding. 1. Wait two minutes, then try again.
1118	ABORT	Far end of ISDN trunk is not administered. 1. Check the administration of the far-end ISDN trunk. 2. Issue the **status trunk** command, and try the test again.
1119	ABORT	The test call was aborted due to a normal call attempt on this trunk. The test call is performed only if the trunk is idle. 1. Either wait for the normal call to terminate normally, or force it to be dropped by using the **busyout trunk** command**.**
1120	ABORT	The trunk-side ISDN-BRI facility is in the ISDN out-of-service/far-end state. 1. Try to change the service state via Test #256 (Service State Audit test). Then retry this test. However, the trunk may be in the out-of-service/far-end state due to problems at the far-end switch. If that is the case, no remedial action can be taken at this end.
1122	ABORT	There is no test line number for the far-end switch. 1. Check the Trunk Group Administration form.
1123	ABORT	There is no Feature Access Code administration for this Facility test. 1. Check the Dial Plan and Feature Administration forms.
2012, None, 2000	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2035	ABORT	The call has timed out, perhaps because of a lack of system resources. 1. Wait 1 minute and try again.
2036, 2037	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2038, 2039	ABORT	A problem occurred while trying to read the test data. 1. Wait one minute and then try again. 2. If the test aborts again in the same manner, there is a serious internal problem. If so, escalate the problem.
2040	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.

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Table 8-618. Test #258 ISDN Test Call — *Continued*

Error Code	Test Result	Description / Recommendation
2041	ABORT	The call has timed out, perhaps because of a lack of system resources. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2066	ABORT	Could not establish test call. 1. Retry the command at 1-minute intervals up to 5 times.
2067	ABORT	The call has timed out, perhaps because of a lack of system resources. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2074	ABORT	Bit and Block Error query failed. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, there may be a serious internal problem with M/T-DIG (Maintenance/Test Digital Port). If this is the case, see "M/T-DIG (Maintenance/Test Digital Port)" on page 8-1161.
2075	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2104	ABORT	Call dropped or could not be originated. 1. Make sure service is provisioned by the network. 2. Check the administration of the far-end test line extension on the trunk group administration form. 3. Check the administration of the test call BCC (Bearer Capability Class) on the trunk group administration form. 4. Try the test again.
2201–2205	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2206	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.

Continued on next page

Table 8-618. Test #258 ISDN Test Call — *Continued*

Error Code	Test Result	Description / Recommendation
2208	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2209, 2210	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2211	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2212	ABORT	Call terminated by unexpected disconnect. 1. Wait one minute and then try again.
2213	ABORT	The call has timed-out, perhaps because of a lack of system resources. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2214	ABORT	Call terminated by unexpected disconnect. 1. Wait one minute and then try again.
2215–2219	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2220	ABORT	Call terminated prematurely. 1. Wait one minute and try again.
2221–2226	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.
2227	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, escalate the problem.

Continued on next page

Table 8-618. Test #258 ISDN Test Call — *Continued*

Error Code	Test Result	Description / Recommendation
2042	FAIL	**This is the main purpose of the test.** The comparison of the data sent with the data received indicates a loss of integrity on the communications path. 1. The trunk should be taken out-of-service and the quality of the trunk-side ISDN-BRI facility should be investigated. The investigation should include an in-depth analysis of the facility including the transmission facility and any external equipment such as DACs, CSUs, etc.
	PASS	The call worked. A test pattern was sent and received properly; the communications path is OK if the synchronous test call command was issued. An in-depth analysis of the trunk-side ISDN-BRI facility including the transmission facility and any external equipment such as DACs, CSUs, and others should take place if the bit and block error rates are not acceptable.

TDM-BUS (TDM Bus)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run[1]	Full Name of MO
TDM-BUS	MAJOR	**test tdm *P***	TDM bus
TDM-BUS	MINOR	**test tdm *P***	TDM bus
TDM-BUS	WARNING	**test tdm *P***	TDM bus

1. P is the port network's number. Use **list cabinet** to find the port network(s) contained in a given cabinet.

Description

Each port network has a pair of TDM buses, designated TDM bus A and TDM bus B, each with 256 time slots. This division allows for duplication of control channels and dedicated tone time slots. The first five time slots on each bus are reserved for the control channel, which is active on only one bus at a time in each port network. The next 17 time slots are reserved for system tones such as dial tone, busy tone and so on. As with the control channel, these time slots are active on only one bus, A or B, at a time. The rest of the time slots on each bus are for general system use such as carrying call-associated voice data. The 17 dedicated tone time slots that are inactive can also be used for call processing when every other available time slot is in use.

When the system initializes, the control channel is on TDM bus A and the dedicated tones on TDM bus B in each port network. If a failure occurs on one of the two buses, the system will switch any control, tone and traffic channels to the other bus. Service will still be provided, though at a reduced capacity.

The **set tdm *PC*** command has the effect of putting both the control channel and tone time slots on a specified bus, A or B. P specifies the port network's number, and C specifies the TDM bus, A or B. Throughout this discussion, PC refers to a specific TDM bus. References to *port circuit packs* include every circuit pack that terminates on the TDM bus, including the Expansion Interface TN570, and the following service circuit port boards: Call Classifier (TN744), Integrated Announcement (TN750), Maintenance/Test (TN771), Speech Synthesizer (TN725B), Tone Detector (TN748 or TN420). Other terms used are:

- Control Channel Bus: the TDM bus carrying the active control channel
- Non-Control Channel Bus: the TDM bus with the inactive control channel
- Tone Bus: the TDM bus carrying the active tone time slots
- Non-Tone Bus: the TDM bus with the inactive tone time slots

TDM-Bus Fault Detection and Isolation

TDM-bus faults are usually caused by one of the following:

- A defective circuit pack connected to the backplane
- Bent pins on the backplane
- Defective bus cables or terminators

It is possible that a circuit pack can cause a TDM-bus fault and still exhibit trouble-free operation. For example, insertions of any circuit pack into a slot with TDM bus terminations may bend the backplane pins and short two leads together. Since the TDM bus is a shared resource, identification of the cause of a TDM-bus fault can be difficult. If a TDM-bus problem is suspected, run the **test tdm *P*** command. If any of the resulting tests fail, you must perform a manual TDM bus isolation procedure to identify the cause of the problem.

WARNING:
Since the procedure for isolating TDM-bus faults involves removing circuit packs and possibly disconnecting entire carriers, the procedure is extremely destructive to the port network that contains the TDM bus being tested. If possible, arrange to perform this procedure at a time when traffic is minimal.

As circuit packs are removed or entire carriers are disconnected, any active calls terminating on those circuit packs or carriers will be dropped. If you have any hints about a particular circuit pack that may be causing the TDM bus problem investigate those before performing this procedure (for example, look at any circuit packs that were inserted into the PN just before the TDM bus problem appeared.

When straightening or replacing backplane pins in a carrier that contains a CFY1B Current Limiter, power to the *cabinet* must be removed. When straightening or replacing backplane pins in a carrier that does NOT contain a CFY1B Current Limiter, power to that *carrier* must be shut off. Failure to follow this procedure may result in damage to circuit packs and power supplies, and can be hazardous to the technician.

NOTE:
Maintenance software requires TN748 or TN420 Tone Detector circuit pack to test the TDM bus. Before starting these procedures, make sure that one of these is installed in the port network being investigated.

Procedure 1: Isolating TDM-Bus Faults

This procedure is an attempt to isolate the TDM-bus fault to circuit packs that are essential to the system's operation. For each of the following circuit packs in the port network where the TDM-bus fault appears, perform Procedure 1.

Circuit Pack	Error Log Names
Tone-Clock	TONE-BD, TONE-PT, and TDM-CLK
MSS/Network Control*	SW-CTL and H-ADAPTER
Tone Detector	DETR-BD, GPTD-PT, and DTMR-PT
Expansion Interface	EXP-INTF
Packet Interface*	PKT-INT

1. Display the Alarm Log for the circuit pack via the **display alarms** command.
2. If there are alarms for the circuit pack, refer to that section and try to resolve the alarms.
3. Whether or not every alarm can be cleared, test the TDM bus again via the **test tdm *P*** command.
4. If some TDM-bus tests fail, implement Procedure 1 for the next circuit pack.
5. If every TDM-bus test passes, the problem has been fixed.
6. If every circuit pack in the list has been investigated, go to Procedure 2.

Procedure 2: Removing and Reinserting Port Circuit Packs

Procedure 2 removes and reinserts port circuit packs (those in the carrier's purple slots) one or more at a time. Use this procedure for each port circuit pack in the port network until the problem is resolved or until every circuit pack in the port network have been tried. To execute diagnostic procedures on the Expansion Interface and Tone-Clock circuit packs, see ''Procedure 3: Removing and Reinserting EPN Control Circuit Packs''. Although these circuit packs reside in purple slots, procedure 2 does not apply. This procedure *does* apply to the Tone Detector circuit pack.

If the TDM bus problem is present when the circuit pack is inserted, but is resolved when the circuit pack is removed, either the circuit pack or the backplane pins in that slot are causing the problem. If the backplane pins are intact, replace the circuit pack. If some of the tests fail regardless of whether the circuit pack is inserted or removed, and the backplane pins are intact, the circuit pack is not the cause of the problem. In a multiple failure situation, the circuit pack could be one cause of the TDM bus problem. However, other simultaneous failures might also be responsible for TDM-bus faults.

In Procedure 2, an option of working either with one circuit pack at a time or with multiple circuit packs simultaneously is available. In view of this capability, determine the level of service interruption that will be acceptable during the procedure. If causing a disruption to all users in the port network is deemed permissible, large groups of circuit packs should be worked with in order to get the job done quickly. However, *if large service disruptions are to be avoided*, work with one circuit pack at a time. This option is slower, but it disrupts only the users of a single circuit pack.

1. Remove one or several circuit packs as appropriate. Any circuit packs that reside on the TDM bus that have been recently inserted should be checked first.

   If you decide to remove multiple circuit packs, consider working with an entire carrier at a time to more quickly and reliably determine which circuit packs are *not* the source of trouble.

2. Run *test tdm P* to determine whether the TDM-bus fault is still present.

3. If any of the TDM-bus tests fail:

   - Determine whether the backplane pins in the removed circuit pack's slot appear to be bent.
   - If the backplane pins are not bent, reinsert the circuit pack(s), and perform Procedure 2 for the next set of circuit packs.
   - If the backplane pins are bent, remove power to this carrier in the manner described previously.
   - Straighten or replace the pins and reinsert the circuit pack.
   - Restore power and repeat Procedure 2, beginning with Step 2, for the same circuit pack(s).

4. If none of the TDM-bus tests fail:

   - Reinsert the circuit pack(s) *one at a time,* and repeat the following substeps until every circuit pack has been reinserted.
   - Run **test tdm *P*** to determine whether the TDM-bus fault has returned.
   - If any of the TDM-bus tests fail, the reinserted circuit pack is defective. Replace this circuit pack and repeat this procedure for the next circuit pack.
   - If none of the TDM-bus tests fail when every circuit pack has been reinserted, the problem has been fixed and the procedure is completed.

Continue with Procedure 3 if every port circuit pack has been checked, but the TDM-bus fault is still not resolved.

Procedure 3: Removing and Reinserting EPN Control Circuit Packs

This procedure removes and reinserts an EPN's control circuit packs, as listed in the table at the beginning of this section. The following circuit packs should be tested with this procedure:

- TN570 Expansion Interface
- TN768, TN780 Tone-Clock

The Tone-Clock circuit pack should be the next-to-last one checked. The Expansion Interface circuit pack (TN570) should be the last one checked, since removing this circuit pack disconnects its EPN. In a system with duplicated PNC, disruption of traffic can be minimized by following the procedure for the standby TN570 Expansion Interface circuit pack, and then entering **reset pnc interchange**. The formerly active Expansion Interface will now be standby and can be checked without affecting the EPN's service.

For instructions, at each step in a procedure that requires the removal and/or replacement of a circuit pack, refer to the documentation for the specific circuit pack's MO. Server and/or PNC interchanges may be required to complete these steps with the least amount of service disruption.

Procedure for EPN with Unduplicated PNC

1. Remove the suspected circuit pack.
2. As in Procedure 2, determine whether the backplane pins behind the removed circuit pack's slot are bent.
3. If the backplane pins are bent, do the following:
    a. Power down the control carrier as described in the previous warning statement.
    b. Straighten or replace the pins.
    c. Insert the same circuit pack.
    d. Turn the power back on to reboot the system or to restart the EPN.
    e. Run **test tdm *P*** to determine whether the TDM-bus fault still exists.
    f. If none of the TDM-bus tests fail, the procedure is complete.
    g. If some of the TDM-bus tests fail, replace the suspected circuit pack, and go to step 4.

If not:

a. Replace the circuit pack.

b. Turn the power back on to reboot the system.

4. Run **test tdm *P*** to determine whether the TDM-bus fault is still present.

5. If the TDM-bus fault is still present, the suspected circuit pack was not the cause of the TDM-bus failure. Do the following:

   a. Remove the replacement circuit pack that was just inserted and replace it with the previously suspected circuit pack.

   b. Repeat Procedure 3 for the next circuit pack on the list for this procedure.

If none of the TDM-bus tests fail, the procedure is completed.

If Procedure 3 fails to identify the cause of the problem, go to ''Procedure 4: Isolating TDM-Bus Failures to Carriers''.

Procedure for EPN with Duplicated PNC

In this type of configuration, the test procedure is made up of several independent parts. In a duplicated system, it is desirable to investigate whether circuit packs are causing TDM-bus problems when they are in active mode, in standby mode, or both. The procedure utilizes a PNC interchange in an EPN. If the TDM-bus fault disappears after an interchange takes place, the newly standby Expansion Interface (EPN), is suspect and should be replaced. If the problem still exists, the Tone-Clocks are then interchanged. If the TDM-bus failure then disappears, the newly standby Tone-Clock is suspect and should be replaced. If the TDM-bus problem still exists, then the procedure begins diagnostics on individual circuit packs and backplane pins.

Part 1 (EPN Procedure)

1. Execute the **status pnc** command to determine which PNC is currently active.

2. Run **reset pnc interchange** to make the currently active PNC standby.

3. Run **test tdm *P*** to determine whether the TDM-bus fault is still present.

   If the TDM-bus fault is gone, replace the formerly active Expansion Interface circuit pack.

4. Run **reset pnc interchange** again to activate the PNC where the new Expansion Interface circuit pack resides.

5. Run **test tdm *P*** to determine whether the TDM-bus fault is still present.

   If the TDM-bus fault is gone, the procedure is finished.

   If not, replace the new Expansion Interface circuit pack with the originally suspected circuit pack, and continue with Part 2.

Part 2

1. Run **set tone-clock** to make the currently active Tone-Clock standby.
2. Run **test tdm *P*** to determine whether the TDM-bus fault is still present.

   If the TDM-bus fault is gone:

   a. Replace the formerly active Tone-Clock circuit pack.

   b. Run **set tone-clock** again to make the new Tone-Clock circuit pack active.

   c. Run **test tdm *P*** to determine whether the TDM-bus fault is still present.

   If the TDM-bus fault is still present, replace the new Tone-Clock circuit pack with the originally suspected circuit pack, and continue with Part 3.

Part 3

This part should be used for each individual circuit pack listed in the previous table. Run this procedure on every circuit pack in the standby PNC. If the TDM-bus failure still exists (once every standby circuit pack has been tested), execute **reset pnc interchange**, followed by **set tone-clock** to put the currently active circuit packs into standby mode so that this procedure can be run on each of them.

1. Remove the inactive suspected circuit pack.
2. As in Procedure 2, determine whether any backplane pins behind the removed circuit pack's slot are bent.
3. If the pins are bent, do the following:

   a. Remove power as described in the previous warning statement.

   b. Straighten or replace the pins.

   c. Restore power.

   d. Run **test tdm *P*** to determine whether the TDM-bus fault is still present.

      If the TDM-bus failure is still present, the problem is with another circuit pack. Reinsert the originally suspected circuit pack, and repeat Part 3 for the next circuit pack.

   e. If the TDM-bus failure has disappeared, reinsert the circuit pack and run the **test tdm *P*** command to see if the TDM-bus failure is still present.

      If any of the TDM-bus tests fail, replace the suspected circuit pack. The procedure is finished.

      If not, the procedure is finished.

If the backplane pins are not bent, run the **test tdm *P*** command to determine whether the TDM-bus fault is still present.

a. If any of the TDM-bus tests fail, the problem is with another circuit pack. Reinsert the originally suspected circuit pack, and repeat Part 3 for the next circuit pack.

b. If not, replace the suspected circuit pack. The procedure is finished.

4. If every standby circuit pack has been tested but the TDM-bus failure still exists, execute the **reset pnc interchange** and the **set tone-clock** commands to put the currently active circuit packs into standby mode. Repeat Part 3 of this procedure for each of the newly active circuit packs.

Procedure 4: Isolating TDM-Bus Failures to Carriers

Procedure 4 attempts to isolate a TDM-bus failure to a particular set of carriers. Only the circuit packs in selected carriers are checked. Procedure 4 is used if the preceding procedures fail, because it can help locate failures of:

- Multiple circuit packs
- The carrier's hardware itself

In this procedure, the TDM/LAN cable assemblies and TDM/LAN bus terminators are replaced.

If replacement does not resolve the TDM-bus fault, the cabinet is reconfigured so that certain carriers are disconnected from the TDM bus. This is done by moving the TDM/LAN bus terminators (ZAHF4) on the carrier's backplane. To terminate a TDM bus at the end of a particular carrier, the TDM bus cable that connects the carrier to the next carrier should be unplugged and replaced with a TDM/LAN bus terminator (see Figure 8-97). As the length of a TDM bus is *modified*, any essential circuit packs to the system's operation and TDM-bus maintenance (for example, MSSNET and Tone-Clock), must still be connected to the *shortened* TDM bus.

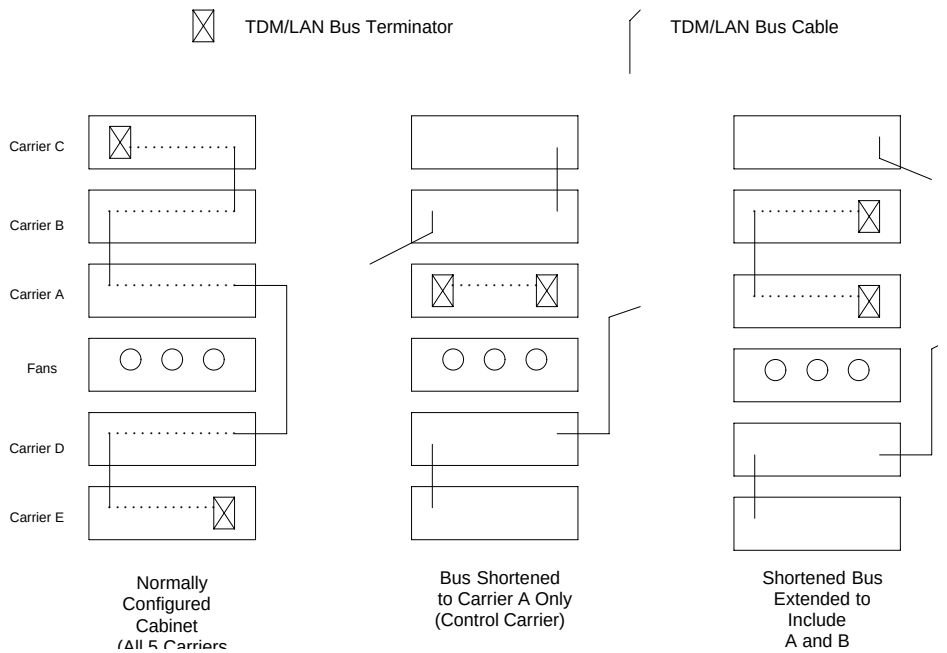

Figure 8-97. Carrier Rewiring Example — Rear View of 5-Carrier Cabinet

After cabling changes are made and verified, power must be restored to the EPN. Circuit packs in carriers outside the shortened bus are not inserted. As a result, these circuit packs are alarmed. Ignore these alarms for now. Every alarm should be resolved when the cabinet is restored to its original configuration.

Procedure 4 is organized into two parts. Part 1 attempts to clear a TDM-bus fault by replacing every bus cable and terminator within an EPN. Part 2 attempts to isolate the fault to a particular carrier by extending the TDM bus from the control carrier to additional carriers one at a time.

WARNING:
Power must be removed from the entire EPN before any cables or terminators are removed. Failure to follow this procedure can cause damage to circuit packs and power supplies, and can be hazardous to the technician.

Part 1

1. If spare TDM/LAN cable assemblies and TDM/LAN bus terminators are not available, go to Part 2 of this procedure.
2. Power down the EPN.
3. Replace every TDM/LAN cable assembly and both TDM/LAN bus terminators.
4. Restore power to the EPN.
5. Run the **test tdm *P*** command to determine whether the TDM-bus fault is still present.
6. If the TDM-bus fault is resolved, the procedure is finished. Otherwise, continue with Part 2.

Part 2

1. Terminate the TDM bus so that it extends only across the carrier that contains the active Expansion Interface.
2. Run the **test tdm P** command to determine whether the TDM-bus fault is still present.

   If the *shortened* TDM bus does not extend to a carrier continuing the Tone Detector circuit pack, the:

   - Non-control channel test (#297) will not be able to run
   - Bus that the non-control channel was on will not be tested.

   If this is the case, run the **set TDM *PC*** command to move the control channel to the non-active bus. The **status port-network *P*** command will show which bus is currently active. After the bus switch has occurred, run the **test tdm P** command again to determine whether the newly active bus is faulted.

   Another option is to move a Tone Detector circuit pack to an empty slot (if one is available) in the carrier where the TDM bus is terminated. This would:

   - Allow both the control channel and non-control channel tests to run
   - Not require the **set tdm *P*** command to be run
3. If none of the TDM-bus tests fail, extend the TDM bus to another carrier, and repeat the procedure in the previous step. When a carrier that causes the fault to recur is added, perform Procedure 2 for only the circuit packs in that carrier.
4. If any of the TDM-bus tests fail and Procedures 2 and 3 did not resolve the problem, the added carrier(s) are defective and must be replaced.

Restarting Non-Functioning Port Circuit Packs

A defective TDM-bus control channel or system-timing reference on one of the EPNs can cause port circuit packs residing outside the EPN's control carrier to enter the reset state. When this situation occurs, the circuit pack will stop functioning, and its red LED will light. The system does not detect the presence of a circuit pack when it is in the reset state. Hence, executing the **list config board** command indicates that the circuit pack is absent.

If a circuit pack enters the reset state, it remains out of service until it receives a restart message from the control channel on the same TDM bus (A or B) that was active when it reset, or until it is powered up again.

To force the system to send a restart message to every circuit pack on a network, try one of the following methods, depending on the circumstances. Any normally functioning circuit pack (i.e., not in reset state) will ignore the restart message.

Procedure 1 (Nondestructive)

If the control channel is on the same TDM bus as it was when the circuit pack entered the reset state, issue the **test tdm *P*** command to execute the Idle Time Slot test (#294).

Procedure 2 (Nondestructive)

If you are on-site, reseat the circuit pack. This action causes the circuit pack in the reset state to begin functioning on the control channel of the *current* bus.

Procedure 3 (Destructive)

Issue the **reset port-network *P* level 2** command to reset the EPN containing the circuit pack in the reset state. During an EPN reset, two restart messages (one on the control channel of each TDM bus) are sent to each circuit pack in the EPN. *Resetting the EPN will disrupt every call going to and originating from the EPN.*

Procedure 4 (Destructive)

Execute the **recycle carrier *PC*** command. *This command removes and restores power to the designated port carrier. Thus, any other circuit packs in this carrier will also be temporarily taken out-of-service.*

Error Log Entries and Test to Clear Values

Table 8-619. TDM Bus Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0	0	Any	Any	Any	**test tdm *P***
1	0	Control Channel test (#296)	MINOR	ON	**test tdm *P* r 3**
18(a)	0	**busyout tdm *PC***	WARNING	ON	**release tdm *PC***
35(b)	0-1	TDM bus Corruption	MINOR	ON	**set tdm *PC***
257(c)	0	None	MAJOR	ON	
513(d)	Any	Idle Time Slot test (#294)	MINOR	ON	**test tdm *P* r 3**
769(e)	Any	Idle Time Slot test (#294)	WARNING	ON	**test tdm *P* r 3**
769(f)	Any	Idle Time Slot test (#294)			(see Notes)
1025(g)	Any	None			
3872(h)	Any	None			
3873(h)	Any	None			
3874(h)	Any	None			
3877(h)	Any	None			

Notes:

a. The TDM bus has been busied out by the technician. The error will retire when the technician releases the TDM bus.

b. This error indicates the TDM bus is corrupted. If the corruption was on the Control Channel bus, TDM bus maintenance will automatically switch the control channel and/or tones to the other bus. The same strategy applies if the corruption was on the bus carrying the tones.

   An aux data value of 0 indicates the last reported TDM bus corruption was on the Control channel bus.

   An aux data value of 1 indicates the last reported TDM bus corruption was on the Non-Control channel bus.

c. This error indicates the TDM bus was switched to the other bus due to TDM bus corruption. The aux data value is not meaningful and no action is required. Look for other TDM-BUS errors to determine the cause of this error.

d. This error indicates that some time slots are corrupted in the specified TDM bus. The Minor alarm is raised when there are more than 50 bad time slots in the bus. The aux data indicates the number of bad time slots found by the test.

e. This error indicates that some time slots are corrupted in the specified TDM bus. The Warning alarm is raised when there are more than 10 bad time slots but less than or up to 50 bad ones in the bus. The aux data value indicates the number of bad time slots found by the test.

f. This error indicates the idle time slot test found less than 10 bad time slots in the TDM bus. The aux data value indicates the number of bad time slots found by the test. There is no alarm associated with this error.

g. This error indicates that the daily TDM bus switch was not successful. The active Expansion Interface (EPN) cannot talk on the bus that software was trying to switch into. There is no alarm associated with this error.

h. These errors indicate communication problems which may be causing message loss. TDM bus maintenance may switch the Control Channel bus and/or Tone bus to the other bus. Test the TDM bus via the **test tdm *P*** command and follow the procedures according to the error codes reported from the test. The aux data value shows the Angel ID number for which a downlink message was lost.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below. For example, by clearing error codes associated with the *Control Channel* test (#296), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Control Channel test on the Control Channel Bus (#296)	X	X	ND
Digit Detection test on the Non-Control Channel Bus (#297)	X	X	ND
Idle Time Slot test (#294)	X	X	ND

1. D = Destructive; ND = Nondestructive

Idle Time Slot Test on TDM bus A or B (#294)

The Idle Time Slot test detects noisy time slots on the bus and takes them out-of-service. The Tone Detector circuit is told to listen to idle time slots and if it detects any noise on a time slot, it returns a failure. At the end of the test, any out-of-service time slots are retested to see if they are still noisy and restored to service if they are idle. After every time slot has been tested, maintenance counts the number of bad time slots and reports the number to the technician in the error code field. No more than 220 time slots will be taken out-of-service on one bus and no more than 300 will be taken out-of-service on both buses at one time.

Table 8-620. Test #294 Idle Time Slot Test on TDM bus A or TDM bus B

Error Code	Test Result	Description / Recommendation
None	ABORT	Could not allocate the necessary system resources to run this test. For example, maintenance could be running on the Tone Detector circuit and it is using the CPTRs.
1115	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 3 times.
Any	FAIL	The error code indicates the number of bad time slots that were detected. The cause of this failure is most likely due to a bad port circuit pack and not the TDM bus itself. 1. Execute the command again. 2. If the error persists, check the Error and Alarm Logs for alarms, on the port network where the faulted TDM bus resides, on port circuit packs from the NPE Crosstalk test. Also check for EXP-INTF alarms associated with error type 1537. 3. Refer to the appropriate circuit pack's documentation to clear the circuit pack's problem. 4. Test the TDM bus again. If the error continues, see ''TDM-Bus Fault Detection and Isolation''.
	PASS	The success of this test indicates every idle time slot that is supposed to be idle is indeed idle. There is no noise on any of the idle time slots.

Control Channel Test (#296)

This tests the integrity of the Control Channel bus by ensuring that communication through the TDM bus is operational. The test attempts to query a circuit pack whose presence is required in each port network for proper operation (Tone-Clock or Tone Detector). If a reply from the queried circuit pack is received, the TDM bus is considered operational and the test passes. If no reply is received, the Bus is not operational and the test fails.

Table 8-621. Test #296 Control Channel Test

Error Code	Test Result	Description / Recommendation
Any other than 1005	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times.
1005	ABORT	Since this test is valid only on the control channel bus, it aborts execution when run on the non-control channel bus. This is a valid response. Use the **status port-network** command to verify which bus is the control channel bus.
None	FAIL	Communication through the Control Channel is not working. The problem is not necessarily the TDM bus itself. 1. Display the hardware error and alarm log for the Tone-Clock circuit and for the Tone Detector circuit in the port network where the faulted TDM bus resides. See ''TONE-BD (Tone-Clock Circuit)'', ''TONE-PT (Tone Generator)'', ''GPTD-PT (General-Purpose Tone Detector Port)'', and ''DTMR-PT (Dual-Tone Multifrequency Receiver Port)''. 2. Resolve the errors and alarms for the Tone-Clock and Tone Detector circuits. 3. If the faulted TDM bus is on an EPN, display the hardware error and alarm log and look for errors and alarms for the active Expansion Interface circuit pack. See ''EXP-INTF (Expansion Interface Circuit Pack)'' on page 8-762 and resolve its errors. 4. Execute the **test tdm *P*** command again. 5. If the test still fails, see ''TDM-Bus Fault Detection and Isolation''.
	PASS	Communication through the control channel bus is operational.

Digit Detection Test (#297)

This test is executed on the Non-Control Channel bus. The Tone-Clock circuit is told to put a tone on the Non-Control Channel bus and the Tone Detector circuit is told to listen to it. The test passes if the tone is successfully transmitted on the Non-Control Channel bus.

Table 8-622. Test #297 Digit Detection Test

Error Code	Test Result	Description / Recommendation
None, 1001, 2100	ABORT	Could not allocate the necessary system resources to run this test.
1005	ABORT	Since this test is valid only on the non-control channel bus, it aborts execution when run on the control channel bus. This is a valid response. Use the **status port-network** command to verify which bus is the control channel bus.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 3 times.
None	FAIL	This failure indicates that communication on the Non-Control Channel is not reliable. 1. Execute the command again. 2. If the problem persists, test the active Tone-Clock circuit and Tone Detector circuit/circuit pack in the port network where the faulted TDM bus resides, to make sure they are healthy. See ''TONE-BD (Tone-Clock Circuit)'', ''TONE-PT (Tone Generator)'', ''GPTD-PT (General-Purpose Tone Detector Port)'', and ''DTMR-PT (Dual-Tone Multifrequency Receiver Port)''. 3. Execute the command again. 4. If the problems persists, see ''TDM-Bus Fault Detection and Isolation''.
	PASS	The non-control channel bus is operational.

TDM-CLK (TDM Bus Clock)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
TDM-CLK	MAJOR	**test tone-clock *UUC* short**	TDM bus Clock
TDM-CLK	MINOR	**test tone-clock *UUC* short**	TDM bus Clock
TDM-CLK	WARNING	**release tone-clock *UUC***	TDM bus Clock

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E).

NOTE:
Replacing the Tone-Clock circuit pack or the IPSI requires a special procedure described in the documentation for ''TONE-BD (Tone-Clock Circuit)'' on page 8-1659. That section also describes the LED displays for these circuit packs.

The Time Division Multiplex (TDM) Bus Clock resides on the Tone-Clock circuit, providing clocking signals both for the TDM bus and the LAN Bus. The Tone-Clock circuit is a critical component in the system and is necessary to ensure the operation of every port circuit pack in the system. The TDM buses of every EPNs is synchronized together. The system timing reference can be derived internally from the Tone-Clock circuit in any PN, or from an external (off-board) timing reference. Currently, the TDM bus Clock supports synchronizing the TDM bus with interface rates from Digital Signal 1 (DS1) facilities as primary or primary and secondary references, and from Stratum-3 clock (STRAT-3) facilities. Only the TN780 tone-clock supports a Stratum-3 clock.

Moreover, the Tone-Clock circuit aids in monitoring and selecting synchronization references. The Tone-Clock circuit, after detecting that the external source of timing is not valid, will automatically begin its escalation procedure, according to the facilities administered. In the following table, successive losses of signal cause escalation from left to right.

NOTE:
Switching back to a DS1 source is handled by synchronization maintenance, once any problems with it have been corrected and tested. However, once synchronization has been switched to the internal timing source of the master Tone-Clock circuit, *switching back to a Stratum-3 clock must be initiated by a technician* after the external reference has been repaired.

Tone-Clock Role	Synchronization Facilities	Initial External Synchronization Source	Backup External Synchronization Source	Internal Source
MASTER	Stratum-3 clock	Source “A”	Source “B”	Local oscillator
SLAVE	DS1 Primary and Secondary	DS1 Primary	DS1 Secondary	
	DS1 Primary Only	DS1 Primary	None	
	No External Source	None	None	
	PNC Duplication	Active EI	Standby EI	
	No PNC Duplication	Active EI	None	

See ‘‘SYNC (Port-Network Synchronization)’’ on page 8-1509 for more details about the escalation plan. There is a strong interdependency among the DS1 Interface circuit pack’s Maintenance, Synchronization Maintenance, and TDM Bus Clock Maintenance MOs.

See ‘‘TONE-BD (Tone-Clock Circuit)’’ on page 8-1659 for a discussion of the relationship of Tone-Clock circuits with the various reliability options.

Error Log Entries and Test to Clear Values

Table 8-623. TDM Bus Clock Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board[1]	Test to Clear Value
0[2]	0	Any	Any	Any	**test tone-clock *UUC* sh r 1**
1 (a)	0	None	MINOR	OFF	
18 (b)	0	**busyout tone-clock *UUC***	WARNING	OFF	**release tone-clock *UUC***
130 (c)		None			
257 (d)		None	WARNING	OFF	
513 (e)	Any	Clock Circuit Status inquiry (#148)	MINOR[3]	OFF	**test tone-clock *UUC***
769 (f)	Any	Clock Circuit Status inquiry (#148)	MAJOR‡	ON	**test tone-clock *UUC* sh r 10**
1025 (g)	Any	Clock Slip inquiry(#149)			**test tone-clock *UUC* sh**
1281, 1282 (h)	Any	None	MINOR	OFF	
1537	Any	Clock PPM inquiry (#150)			**test tone-clock *UUC* sh**
2049 (i)	Any	Standby Reference Health Check test (#651)	MAJOR[3]	ON	**test tone-clock *UUC***
2305 (j)	0	None	WARNING	OFF	

1. As a general rule, any *on-board* errors against the TDM Bus Clock should be resolved before pursuing any other errors against PNC components. *Off-board* clock errors may be caused by other board errors, and should usually be addressed once any on-board errors have been resolved.
2. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
3. Major or Minor alarms on this MO may have been downgraded to Warning alarms based on the values used in the **set options** command.

Notes:

a. The IPSI or Tone-Clock circuit pack may have a clock at the edge of its specified frequency. This can cause Expansion Interface circuit packs and SNI circuit packs to go out-of-frame or report no-neighbor conditions. This can is turn cause EPNs, Expansion Archangel Links (EALs), Remote Neighbor Links (RNLs), and/or Local Neighbor Links (LNLs) to go down. When this error is alarmed, Clock Health Inquiry test (#46) will fail with an error code of 1.

1. Replace the IPSI or Tone-Clock circuit pack identified in the error log. See *"Replacing the IPSI or Tone-Clock Circuit Pack" on page 8-1666*.

b. The indicated Tone-Clock circuit has been made unavailable via the **busyout tone-clock *UUC*** command. It only applies to systems with the high- or critical-reliability option administered, because only a standby Tone-Clock circuit may be made busy by that command. To resolve this error, execute the **release tone-clock *UUC*** command for the alarmed circuit pack.

c. This error type indicates that the circuit pack has been removed or has been insane for more than 11 minutes. To clear the error, reinsert or replace the circuit pack.

d. The Tone-Clock circuit pack in EPN 1 is not a TN780 although Stratum-3 synchronization is administered. Replace this Tone-Clock with a TN780, or change synchronization administration to Stratum 4 if a Stratum-3 clock is not being used.

e. The tone-clock has reported an out-of-lock condition. A aux value of 1 indicates this error is an out-of-lock with the primary reference. A aux value of 2 indicates this error is an out-of-lock with the secondary reference. It could not lock onto the frequency of that synchronization reference. This will lead to a change in the synchronization reference if the condition continues.

f. The IPSI's Tone-Clock circuit or Tone-Clock circuit pack may be defective, however it may be a software failure that can be corrected by testing.

    1. Check to see if the board is duplicated (**list cabinet** and **status port-network**) on the affected port network.

    2. If the board is not duplicated, use **test tone *UUCSS* long** to resolve the errors. The long test resets the board and is required to reload on-board RAM associated with the TN2182's DSPs. The effect is that tone detectors are taken out of service momentarily and tones are removed from the TDM bus for about 10 seconds, meaning that no dial tone or touch tones are available during this interval. This will probably not affect calls in progress, but could cause a call origination to abort or a user not to get dial tone when going off hook.

    3. If every test passes and the alarm does not resolve, retest with **test tone *UUCSS* long clear**.

    4. If the test passes, terminate the repair process. If the test fails, replace the circuit pack at the customer's convenience.

    5. If this error was logged against the standby Tone-Clock, and if the Aux Data value was 18369, SYNC (Synchronization) maintenance acts on this error. No corrective action is required. For any other Aux Data, go to the next step.

    6. If the board is duplicated, switch to the standby side (**set tone**).

    7. Test the alarmed board (**test tone *UUCSS* long)**. This resets the board and is required to reload on-board RAM associated with the TN2182's DSPs.

8. If every test passes and the alarm does not resolve, retest (**test tone *UUCSS* long clear**).
9. If the test passes, terminate the repair process. If the test fails, replace the circuit pack at the customer's convenience.

g. Tone-Clock circuit on-board maintenance has detected one or more *clock slips*, timing differences between its internal reference source and the synchronization signal provided by the master Tone-Clock. Although no clock slip errors are expected during normal operation, both manual and automatic interchanges of Tone-Clock circuit, synchronization references, and PNCs, may result in clock slip counts.

If error 1281 also is logged for the same Tone-Clock circuit, it is related to this problem and should be corrected first. Otherwise, continue with the following procedure.

1. Use **test tone-clock *UUC***, and examine the results of Test #149 to see if slip errors are still occurring. If no new slip errors are reported, and if these errors are not causing a TDM-CLK alarm, they may be ignored. Use **test tone-clock *UUC* long clear** to clear the errors.
2. Otherwise, enter the **display errors** command, and follow corrective procedures for any other TDM-CLK, TONE-BD, SYNC, DS1C-BD, EXP-INTF, SNC-BD, and SNI-BD errors logged, except for those in Table 8-624.

Table 8-624. Error Log Entries for Slip Errors

Circuit Pack Name	Error Log Name	Error Log Entry for Slips
DS1 Interface	DS1-BD	3073 to 3160
Expansion Interface	EXP-INTF	2305
Switch Node Interface	SNI-BD	1537
Tone-Clock	TDM-CLK	1025
UDS1 Interface	UDS1-BD	3073 to 3160
DS1C Circuit Pack	DS1C-BD	3329

3. If 1025 errors persist, see ''SYNC (Port-Network Synchronization)'' and follow the procedures in ''Troubleshooting Approach''.

h. Error Type 1281 — This error is an indication that the Tone-Clock circuit has detected a loss of timing signal from the system's synchronization reference. The Tone-Clock circuit has switched synchronization references.

   1. Resolve any errors logged against the SYNC or STRAT-13 MOs.
   2. See ''SYNC (Port-Network Synchronization)'' maintenance, in the "Approach to Troubleshooting" section, if the error is not resolved by step 1

   Error Type 1282 — Indicates that the TN2182 tone-clock was synchronized to a DS1 facility and that the reference frequency provided by the DS1 drifted beyond a range that could be tracked by the TN2182. Therefore the TN2182 is no longer synchronized to that DS1 reference. If a second DS1 is available, the tone-clock may be synchronized to that reference. If no secondary DS1 reference is available, the tone-clock will run off of its internal clock. This may result in slips being reported by the tone-clock and every DS1 facility.

i. The Tone-Clock circuit in the master port network was unable to detect the incoming synchronization signal, but the other tone-clock was able to detect the references. If the aux data is 0, the problem is with the signal on the primary. If the aux data is 1, the problem is with the signal on the secondary. The system should switch clocks in this situation.

   1. If this error is against EPN 1's clock board and the system is using a Stratum-3 clock, check the cabling that brings the Stratum-3 signal to this clock board.
   2. Replace the current standby IPSI or Tone-Clock circuit pack. See *''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666*.

j. The indicated active Tone-Clock circuit, which is in an EPN that does not contain the system's synchronization reference (a **slave** Tone-Clock), has detected a loss of timing signal from its EXP-INTF synchronization source.

   1. Enter **display errors** and **display alarms**, and follow the associated repair procedures for EXP-INTF, TDM-CLK, and TONE-BD error log entries that have on-board alarms.
   2. If the 2305 errors persist, follow the repair procedures for EXP-INTF error log entries 257, 769, or 770, or any errors logged against SNI-BD, SNC-BD, or FIBER-LK.

3. If the 2305 errors persist:

   a. *For Port Networks with more than one Tone-Clock circuit*, execute the command **test synchronization r 10**, and check to see if new 2305 errors against TDM-CLK were reported. If not, execute **reset PNC interchange** and then **test synchronization r 10** again, and recheck for new 2305 errors against TDM-CLK

   b. *For Port Networks with a single Tone-Clock circuit*, execute the command **test synchronization r 10**, and check to see if new 2305 errors were reported.

   If no new instances of the 2305 errors were logged for either test, then enter **test tone-clock *UUC* long clear** to clear the TDM-CLK errors. The procedure is complete.

4. **For Port Networks with more than one Tone-Clock circuit**:

   a. Enter **set tone-clock UUC** to interchange the Tone-Clocks.

   b. Run **test synchronization r 10**, and check to see if new 2305 errors are reported against the new active Tone-Clock circuit.

   c. If not, replace the standby Tone-Clock circuit. See *''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666*.

   If this clears the error, the problem has been resolved.

5. Replace the EI circuit pack for the active PNC.

6. If the problem is still not cleared ***and*** the IPSI or Tone-Clock circuit pack reported in the error log has not yet been replaced, replace it. See *''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666*.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *SAKI Reset* test (#53), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
SAKI Reset test (#53) (a)		X		D
Clock Health test (#46) (b)	X	X		ND
Control Channel Loop-Around test (#52) (a)	X	X		ND
Tone Generator Crosstalk test (#90) (c)		X		ND
Tone Generator Transmission test (#40) (c)	X	X		ND
Tone Generator Audit/Update test (#41) (c)	X	X		ND
TDM bus Clock Circuit Status Inquiry test (#148)	X	X		ND
TDM bus Clock Slip Inquiry test (#149)(e)	X	X		ND
TDM bus Clock PPM Inquiry test (#150)	X	X		ND
TDM bus Clock Parameter Update test (#151)	X	X		ND
Board Type Check test (#574)	X	X		ND
Standby Reference Health Check test (#651) (d)		X		ND

1. D = Destructive; ND = Nondestructive

Notes:

a. See ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872 for descriptions of these tests.

b. See ''TONE-BD (Tone-Clock Circuit)'' on page 8-1659 for a description of this test.

c. See ''TONE-PT (Tone Generator)'' on page 8-1682 for descriptions of these tests.

d. This test only runs on the standby IPSI or Tone-Clock circuit pack in a port network with more than one IPSI or Tone-Clock circuit pack (high- or critical-reliability option). The Tone-Clock circuit pack must be a TN780 code with firmware revision 2 or above, or be a TN2182.

e. Test #149 is not run on the TN2182.

TDM bus Clock Circuit Status Inquiry Test (#148)

The TDM bus Clock circuitry is checked for sanity. Any problems that are found are reported via error codes

Table 8-625. Test #148 TDM bus Clock Circuit Status Inquiry Test

Error Code	Test Result	Description / Recommendation
None, 1001	ABORT	The system could not allocate the necessary resources for the test. 1. Wait 1-minute, and retry the test.
2000	ABORT	Response to the test was not received within the allowable time period.
2100	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1	FAIL	This error means the Tone-Clock circuit framing verification firmware reports an error in the clock synchronization signal coming into this port network. 1. If the Tone-Clock circuit reporting the problem is a master clock, then the system synchronization reference is providing a bad timing source. See ''SYNC (Port-Network Synchronization)'' on page 8-1509 or ''STRAT-3 (Stratum-3 Clock)'' on page 8-1496 to change the system synchronization reference. 2. If the Tone-Clock circuit is a slave clock, then the EI to which it is listening is providing a bad timing source. Follow the diagnostic procedures specified for TDM-CLK Error Code 2305. 3. If no problem can be found with the incoming synchronization signal, replace the IPSI or Tone-Clock circuit pack. See *''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666*.
2	FAIL	This error indicates that Tone-Clock circuit has inaccurately detected loss of signal on the incoming synchronization timing source.
4, 8	FAIL	The local oscillator on the Tone-Clock circuit has failed.
16, 32	FAIL	The circuitry on the Tone-Clock circuit used to detect synchronization timing errors has failed. 1. Errors 2, 4, 8, 16, and 32 indicate that there is poor synchronization between port networks and external facilities. It may be noticeable to the customer in the form of errors in data communications. The Tone-Clock circuit is defective. See *''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666*.
64	FAIL	This message is only sent when an uplink message has reported the loss of valid synchronization timing information coming into this port network. It has been reported in TDM-CLK Error Log entries; one or more of 1025, 1281, 1537, 2049 and 2305. 1. Resolve the errors indicated. No separate corrective action is required.

Continued on next page

Table 8-625. Test #148 TDM bus Clock Circuit Status Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
65	FAIL	The tone-clock is currently not able to lock on to the current synchronization reference. If this tone-clock is in the master port networK: 1. Examine the error log for any DS1-BD, SYNC or other TDM-CLK errors and resolve as applicable. 2. Run this test again via the **test tone-clock *UUC*** command. 3. Examine the DS1 measurements to determine whether the facility is healthy. 4. Administer a new synchronization reference. 5. Replace the DS1 board currently supplying the reference. If this tone-clock is in the slave port networK: 1. Examine the error log for any SYNC, EXP-INTF, or TDM-CLK errors. 2. Run this test again via the **test tone-clock *UUC*** command.
66	FAIL	There is an on-board failure of TDM clock hardware. 1. Use **test tone *UUCSS* long** to resolve the problem. The long test resets the board and is required to reload on-board RAM associated with the TN2182"s DSPs. The effect is that tone detectors are taken out of service momentarily and tones are removed from the TDM bus for about 10 seconds. This means that no dial tone or touch tones are available during this interval. It probably will not affect calls in progress, but could cause a call origination to abort or a user will not get dial tone when going off hook. 2. If the test passes and the alarm does not resolve, retest (**test tone *UUCSS* long clear**). 3. If the test passes, terminate the repair process. If it fails, replace the circuit pack at the customer's convenience.
	PASS	TDM bus Clock Circuit Status is sane. There are no clock-detection circuit problems on the Tone-Clock circuit.

TDM Bus Clock Slip Inquiry Test (#149)

This test evaluates the quality of the synchronization source for the IPSI circuit pack's Tone-Clock circuit or Tone-Clock circuit pack.

NOTE:
This test does not apply to the TN2182.

Table 8-626. Test #149 TDM bus Clock Slip Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	The system could not allocate the necessary resources for the test.
1001	ABORT	The system could not allocate the necessary resources for the test. 1. Wait 1-minute, and retry the test.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The error code represents the number of timing slips detected on the incoming synchronization source since the last slip inquiry was sent to the Tone-Clock circuit pack. The incoming synchronization signal can be from one of four sources: 1. A DS1 Interface circuit pack, if DS1 Synchronization is administered, and associated with the circuit pack tested. 2. A Stratum-3 clock, if that option is administered and the circuit pack tested was the active Tone-Clock in the EPN 1. 3. The local oscillator on the master IPSI's Tone-Clock circuit or on the master Tone-Clock circuit pack, if it is providing the system's clocking signals. 4. An EXP-INTF circuit pack, if the EPN on which the test was executed does not contain the system's current synchronization reference. The error code is a variable amount ranging from 1 to 255. 1. Small numbers of slips should not result in service degradation. If the error code is small (1 or 2), rerun the test. If the error only occurs infrequently, it may be ignored. 2. Otherwise, see "Troubleshooting Approach" in the "SYNC (Port-Network Synchronization)" section of this manual.
	PASS	The IPSI or Tone-Clock circuit pack does not detect any timing slips. This indicates that the incoming synchronization timing source is valid or that the system's synchronization reference is an IPSI or Tone-Clock circuit pack. The **status synchronization** command should be used to verify that the desired synchronization reference is providing timing for the system.

TDM bus Clock PPM Inquiry Test (#150)

This test evaluates the quality of the synchronization source for the Tone-Clock circuit.

Table 8-627. Test #150 TDM bus Clock PPM Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	The system could not allocate the necessary resources for the test.
1001	ABORT	The system could not allocate the necessary resources for the test. 1. Wait 1-minute, and retry the test.
255	ABORT	The test was not executed because the IPSI or Tone-Clock circuit pack was using its local oscillator rather than synchronizing to an external source. 1. Verify that this IPSI or Tone-Clock circuit pack is expected to be the synchronization source. If not, correct the synchronization information and re-execute the test.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	The error code represents the rate (in Parts Per Million, or PPM) at which clock slip errors have been detected on the incoming synchronization source since the last PPM inquiry was sent to the IPSI or Tone-Clock circuit pack. A failure of this test indicates that we are outside of Stratum-3 or Stratum-4 timing specifications on the incoming timing source. The error code is a variable amount ranging from 1 to 254. 1. If error 1537 is entered in the hardware error log against TDM-CLK, then the board has switched timing sources. Follow the procedures associated with hardware log error code 1537. 2. Otherwise, see ''Troubleshooting Approach'' in the ''SYNC (Port-Network Synchronization)'' section of this manual.
	PASS	The IPSI or Tone-Clock circuit pack does not detect timing any PPM errors. This indicates that the external synchronization timing source is valid or that the system synchronization reference is an IPSI or Tone-Clock circuit pack. Use the **status synchronization** command to verify that the desired synchronization reference is providing timing for the system.

TDM Bus Clock Parameter Update Test (#151)

This test updates the following internal parameters on the IPSI or Tone-Clock circuit pack:

- Disable in-line duplication status messages.
- Disable in-line subrate frame maintenance messages (TN768, TN780 only).
- Set the PPM threshold at 60 PPM for TN768 and TN780. Set the PPM threshold at 85 PPM for TN2182 and TN2312.
- Enable PPM threshold switching
- Set the number of slips to trigger *loss of signal* - currently 30 per 5-millisecond period
- Enable the on-board synchronization switching algorithm (see above)
- Enable holdover operation (TN2182 and TN2312 only)

This is not a test and will always pass without identifying or reporting any IPSI or Tone-Clock circuit pack errors

Table 8-628. Test #151 TDM Bus Clock Parameter Update Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	The IPSI or Tone-Clock circuit pack parameters have been successfully updated.

Board Type Check Test (#574)

This test verifies that a Tone-Clock circuit pack administered with a Stratum-3 clock source has code TN780.

Table 8-629. Test #574 Board Type Check Test

Error Code	Test Result	Description / Recommendation
2012	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
ANY	FAIL	Stratum-3 clock synchronization is administered for the carrier where this Tone-Clock circuit pack resides, but the Tone-Clock does not have code TN780. 1. If the Stratum-3 clock option is incorrectly administered, remove it. 2. Otherwise, replace the circuit pack. See *"Replacing the IPSI or Tone-Clock Circuit Pack" on page 8-1666*.
	PASS	The proper Tone-Clock circuit pack code (TN780) is present for Stratum-3 clock synchronization.

Standby Reference Health Check Test (#651)

This test evaluates the quality of the external synchronization timing source for a standby IPSI or Tone-Clock circuit pack. Every administered synchronization timing source must be valid for this test to pass. If the Tone-Clock circuit and the synchronization timing sources are in different port networks, the EI circuit packs transport the timing sources to the tone-clock.

Table 8-630. Test #651 Standby Reference Health Check Test

Error Code	Test Result	Description / Recommendation
	ABORT	This test may already be running due to a tone-clock installation, scheduled maintenance, alarm activity, or a technician-demand test from another terminal. This abort can also occur due to an internal system error. 1. Try the command again at 1-minute intervals up to five times.
1184	ABORT	This test requires an external synchronization source to be administered (DS1 primary, DS1 primary and secondary, or Stratum-3 clock). 1. Administer the external synchronization source and retry the test.
2500	ABORT	Internal system error 1. Try the command again at 1-minute intervals up to 5 times.
0	FAIL	The external synchronization timing source for side A of the Stratum-3 clock or for the primary DS1 reference is either absent or invalid. The external synchronization timing source for side B of the Stratum-3 clock or the secondary DS1 reference is not yet tested.
1	FAIL	The external synchronization timing source for side B of the Stratum-3 clock or for the secondary DS1 reference is either absent or invalid. 1. Correct the synchronization source problem. See ''SYNC (Port-Network Synchronization)'' on page 8-1509. 2. If the error still exists, replace the IPSI or Tone-Clock circuit pack reported in the error log. See ''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666.
	PASS	The external synchronization timing source is valid.

TDMODULE (Trunk Data Module)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
TDMODULE	MINOR	**test port *UUCSSpp* l**	Trunk Data Module
TDMODULE	WARNING	**test port *UUCSSpp* l**	Trunk Data Module

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21). pp is the 2-digit port number (01, 02, and so forth).

The TDMODULE (Trunk Data Module) is covered in the ''PDMODULE (Processor Data Module) TDMODULE (Trunk Data Module)'' on page 8-1196.

TIE-BD (Tie Trunk Circuit Pack)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command To Run[1]	Full Name of MO
TIE-BD	MINOR	**test board *UUCSS* sh**	Tie Trunk Circuit Pack
TIE-BD	WARNNG	**test board *UUCSS* sh**	Tie Trunk Circuit Pack

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21). pp is the 2-digit port number (01, 02,...).

See "XXX-BD (Common Port Circuit Pack)" on page 8-1872 for circuit-pack level errors. See also "TIE-TRK (Analog Tie Trunk)" on page 8-1638 for related trunk information.

TIE-DS1 (DS1 Tie Trunk)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run	Full Name of MO
TIE-DS1[1]	MAJOR[2]	**test trunk *grp/mbr* l**[3]	DS1 Tie Trunk
TIE-DS1	MINOR	**test trunk *grp/mbr* l**[3]	DS1 Tie Trunk
TIE-DS1	WARNING	**test trunk *grp/mbr***	DS1 Tie Trunk

1. For additional repair information, see "DS1-BD (DS1 Interface Circuit Pack)" on page 8-586 if the tie trunk is on a TN722 or TN767 DS1 circuit pack. See "UDS1-BD (UDS1 Interface Circuit Pack)" on page 8-1707 UDS1-BD documentation if the tie trunk is on a TN464C/D UDS1 circuit pack.
2. A MAJOR alarm on a trunk indicates that alarms on these trunks are not downgraded by the **set options** command and that at least 75% of the trunks in this trunk group are alarmed. For more information about the **set options** command, see Chapter 7, "Maintenance Commands"
3. **For TN767B vintage 8 or 9 circuit packs, a failure of Test #136 causes a subsequent failure of Test #7. Test #136 is part of the short sequence and generates off-board alarms Test #7 is part of the long sequence and generates on-board alarms. Before entering busyout, release, reset or test board long commands, check the vintage number of the circuit pack with list configuration board UUCSS. If it is TN767B vintage 8 or 9, do not use the above commands until first making sure that Test #136 passes via test board short. Otherwise, extraneous on-board alarms may be generated.**

NOTE:
Many trunk problems are caused by incorrect settings of parameters on the trunk group administration form. Settings must be compatible with the local environment and with parameter settings on the far end. The Application Notes section of that book shows the correct settings for administrable timers and other parameters on a country-by-country basis.

The DS1 tie trunk provides both voice and data communications between two PBX switches. There are two types of DS1 interfaces:

- 24 DS0 channels on a 1.544-Mbps link
- 31 DS0 channels + 1 framing channel on a 2.048-Mbps link

  32-channel mode is supported only on TN464 circuit packs and on G3r V2 systems.

DS1 Tie Trunks are used widely in the Distributed Communications System (DCS) and Central Attendant Service (CAS) system features.

A DS1 tie trunk can also be used as an access endpoint which is a non-signaling channel with bandwidth for voice-grade data, 56 Kbps data or 64 Kbps data.

DS1 tie trunk maintenance provides a strategy to maintain a DS1 tie trunk via a port on either the TN722 or TN767 DS1 Interface circuit pack or the TN464C/D UDS1 Interface circuit pack. Throughout this TIE-DS1 section, the term DS1 Interface applies to DS1 and UDS1 circuit packs.

The DS1 tie trunk maintenance strategy covers logging DS1 tie trunk hardware errors, running tests for trunk initialization, periodic and scheduled maintenance, system technician-demanded tests, and alarm escalation and resolution. Three different trunk service states are specified in DS1 tie trunk maintenance:

Out-of-service	The trunk is deactivated and cannot be used for incoming or outgoing calls.
In-service	The trunk is activated and can be used for both incoming and outgoing calls.
Disconnect (ready-for-service)	The trunk is in an activated state but can only be used for an incoming call.

If the DS1 Interface circuit pack is out of service, then every trunk on the DS1 Interface circuit pack is also placed into the out-of-service state and a Warning alarm is raised.

Hardware Error Log Entries and Test to Clear Values

Table 8-631. DS1 Tie Trunk Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test trunk *grp/mbr***
1(a)	57476 57477 57485 57487				
15 (b)	Any	Port Audit and Update test (#36)			
18 (c)	0	**busyout trunk *grp/mbr***	WARNING	OFF	**release trunk *grp/mbr*[2]**
19 (d)	0	None			
130 (e)		None	WARNING	ON	**test trunk *grp/mbr***
257 (f)	57473 57474				
513 (g)	57392	DS1 Tie Trunk Seizure test (#136)	MAJOR[3] MINOR		
769 (h)	57393	DS1 Tie Trunk Seizure test (#136)	MAJOR MINOR[3]		
1025		DS1 Tie Trunk Seizure test (#136)	MINOR WARNING[4]	OFF	**test trunk *grp/mbr* r 2**
1281		Conference Circuit test (#7)	MINOR WARNING[4]	ON	**test trunk *grp/mbr* l r 4** [2]

Continued on next page

Table 8-631. DS1 Tie Trunk Maintenance Error Log Entries — *Continued*

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1537		NPE Crosstalk test (#6)	MINOR WARNING[4]	ON	**test trunk *grp/mbr* l r 3** [2]
1793 (i)					**test board *UUCSS* long** [2]
2305 (j)	50944	DS1 Tie Trunk Seizure test (#136)	MAJOR MINOR[3]	OFF	
2562 (k)	16665				
2817 (l)	52992				
3840 (m)	Any	Port Audit and Update test (#36)			

Continued on next page

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. For TN767B vintage 8 or 9 circuit packs, a failure of Test #136 causes a subsequent failure of Test #7. Test #136 is part of the short sequence and generates off-board alarms. Test #7 is part of the long sequence and generates on-board alarms. Before entering busyout, release, reset or test board long commands, check the vintage number of the circuit pack with list configuration board UUCSS. If it is TN767B vintage 8 or 9, do not use the above commands until first making sure that Test #136 passes via test board short. Otherwise, extraneous on-board alarms may be generated.
3. This alarm will only be raised when the System-Parameter Country form has the Base Tone Generator field set to 4 (Italy). This alarm will be a MINOR alarm unless 75% or more trunks in this trunk group are out of service, then the alarm will be upgraded to a MAJOR alarm.
4. Major or Minor alarms on this MO may be downgraded to Warning alarms based on the values used in the **set options** command.

Notes:

a. Error Type 1 — The DS1 Interface circuit pack detects a hardware error on the DS1 tie trunk. This error can be caused by incompatible translations. Make sure the parameters administered on the DS1 circuit pack form match those administered on the far-end switch.

The Aux Data field indicates the following hardware error types:

57476	On-hook before wink
57477	On-hook before ready to receive digits
57485	Wink too short for valid signal
57487	The timer expired while waiting for an off-hook signal from the far end as a response at end-of-digits dialing. Check the far-end switch for related problems.

If every administration parameter between the switch and the far end match and these errors continue to recur, follow normal escalation procedures.

b. Error Type 15 — This is a software audit error that does not indicate any hardware malfunction. Run the short test sequence, and investigate associated errors (if any).

c. Error Type 18 — The DS1 tie trunk has been busied out by a **busyout trunk *grp/mbr*** command. No calls can be made on this trunk except for the Facility Access Test call.

d. Error Type 19 — This error type indicates that the far end may be out-of-service, or the Electronic Tandem Network may be busied out.

e. Error Type 130 — This error type indicates that the circuit pack has been removed or has been insane for more than 11 minutes. To clear the error, reinsert or replace the circuit pack.

f. Error Type 257 — The DS1 Interface circuit pack detects a hardware error on the DS1 tie trunk. The trunk cannot communicate with the far end because it is unable to interpret digits sent from the far-end switch. The Aux Data field indicates the following:

57473	The rotary dial rate is below 8 pulses per second.
57474	The rotary dial rate is above 12 pulses per second.

Check with the far-end switch or operating company for proper trunk connection.

g. Error Type 513 — DS1 Interface circuit pack detects a hardware error on the DS1 tie trunk. The trunk is in-service/active and waiting for an “on-hook” from the far-end switch. No calls can be routed over the trunk while it is in this state. Aux Data 57392 indicates no external release on PBX disconnect. Check with the far-end switch or operating company for proper trunk connection.

h. Error Type 769 — The DS1 Interface circuit pack detects a hardware error on the DS1 tie trunk. This error usually occurs after an occurrence of error type 513. The trunk has received the belated “on-hook” that it has been waiting for from the far-end switch. The trunk is restored to in-service/idle and can be used for calls. Aux Data 57393 indicates delayed external release on PBX disconnect. This error can be ignored.

i. Error Type 1793 — The DS1 Interface circuit pack is out-of-service. See the appropriate ‘‘DS1-BD (DS1 Interface Circuit Pack)’’/ ‘‘UDS1-BD (UDS1 Interface Circuit Pack)’’ on page 8-1707 documentation for details.

j. Error Type 2305 — Reorder message. The trunk could not be seized. This error causes the Trunk Seizure test (#136) to run and is only a problem if the Seizure test fails (in which case Error Type 1025 also appears). In this case, the trunk may be put in “Ready-for-Service” state (shown as “disconnected” by the status command), which allows only incoming calls. Run the Trunk Seizure test (#136) and follow its procedures.

k. Error Type 2562 — Retry Failure error. This error is logged only. It is not a hardware failure and hence does not start any testing or generate any alarms. This error comes from call processing and is generated when a second attempt (retry) to seize an outgoing trunk fails.

l. Error Type 2817 — Glare error. This error is logged only. It is not a hardware failure and hence does not start any testing or generate any alarms. This error is the result of a simultaneous seizure of a 2-way trunk from both the near and the far ends. Attempt to place the call again. If the error persists, execute the DS1 Tie Trunk Seizure test (#136) and follow its outlined procedures.

m. Error Type 3840 — Port Audit and Update test (#36) failed due to an internal system error. Enter **status trunk** command, and verify the status of the trunk. If the trunk is out-of-service, then enter **release trunk** command to put it back to in-service. Retry the test command.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *NPE Crosstalk* test (#6), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
NPE Crosstalk test (#6)		X	ND
Conference Circuit test (#7)		X	ND
DS1 Tie Trunk Seizure test (#136)	X	X	ND
Port Audit and Update test (#36)	X	X	ND

1. D = Destructive; ND = Nondestructive

For TN767B vintage 8 or 9 circuit packs, a failure of Test #136 causes a subsequent failure of Test #7. Test #136 is part of the short sequence and generates off-board alarms Test #7 is part of the long sequence and generates on-board alarms. Before entering **busyout**, **release**, **reset** or **test board long** commands, check the vintage number of the circuit pack with **list configuration board *UUCSS***. If it is TN767B vintage 8 or 9, do not use the above commands until first making sure that Test #136 passes via **test board short**. Otherwise, extraneous on-board alarms may be generated.

NPE Crosstalk Test (#6)

The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, 1-way and noisy connections may be observed. This test is usually only part of a port's long test sequence and takes on the order of 20 to 30 seconds to complete.

Table 8-632. Test #6 NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test were not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 2. If the port status is active but the port is idle (no calls), check the error log for error type 1025 (see the error log table for a description of this error and required actions). The port may be locked up. 3. If the port status is idle, retry the command at 1-minute intervals up to 5 times.
1001	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions, or it may have time slots out of service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic and the port status is idle, retry the command at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some of the tone detectors may be out of service. Issue the **list measurements tone-receiver** command to display basic information about the system's tone receivers. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a user for a valid call. 1. Use the **display port *UUCSSpp*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 2. If the port status is idle, retry the command at 1-minute intervals up to 5 times.

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Table 8-632. Test #6 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
1020	ABORT	The test did not run because of a previously existing error on the specific port or a more general circuit pack error. 1. Examine the Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
2053	ABORT	At least one of the following errors is found on the DS1 circuit pack: ■ 1281 — Loss of signal ■ 1793 — Blue alarm ■ 2049 — Red alarm ■ 2305 — Yellow alarm ■ 1537 — Hyperactivity Look for the above error types in the Hardware Error Log and follow the procedures given in the appropriate DS1-BD or UDS1-BD maintenance documentation for the listed error types.
	FAIL	This can be due to either on- or off-board problems. Off-board problems of concern include EXP-PN and EXP-INTF faults, TDM-BUS faults, and faults associated with the tone detectors/tone generators. Clear every off-board problem before replacing the board. Keep in mind that a TDM-BUS problem is usually the result of a faulty board connected to the backplane or bent pins on the backplane. 1. Resolve any EXP-PN and/or EXP-INTF errors. 2. Resolve any TDM-BUS errors. 3. Resolve any TONE-BD and/or TONE-PT errors. 4. Retest when the faults from steps 1, 2, and 3 are cleared. Replace the board only if the test fails.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and by examining station, trunk, or external wiring.

Continued on next page

Table 8-632. Test #6 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board's translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to see that there is a valid board inserted.

Conference Circuit Test (#7)

One or more Network Processing Elements (NPEs) reside on each circuit pack with a TDM-bus interface. (The TN464C/D UDS1 circuit pack has one SCOTCH-NPE chip instead of several NPE chips). The NPE controls port connectivity and gain, and provides conferencing functions on a per-port basis. The Conference Circuit test verifies that the NPE channel for the port being tested can correctly perform the conferencing function. The NPE is instructed to listen to several different tones and conference the tones together. The resulting signal is then measured by a Tone Detector port. If the level of the tone is within a certain range, the test passes.

Table 8-633. Test #7 Conference Circuit Test

Error Code	Test Result	Description / Recommendation
	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test were not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 2. If the port status is active but the port is idle (no calls), check the error log for error type 1025 (see the error log table for a description of this error and required actions). The port may be locked up. 3. If the port status is idle, retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions, or it may have time slots out of service due to TDM-BUS errors. The **status health** command can be used to determine whether the system is experiencing heavy traffic. 1. If the system has no TDM-BUS errors and is not handling heavy traffic and the port status is idle, retry the command at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of tone detectors present or some of the tone detectors may be out of service. Issue the **list measurements tone-receiver** command to display basic information about the system's tone receivers. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.

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Table 8-633. Test #7 Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
1004	ABORT	The port was seized by a user for a valid call. 1. Use the **display port *UUCSSpp*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 2. If the port status is idle, retry the command at 1-minute intervals up to 5 times.
1018	ABORT	Test disabled via administration. This only applies to analog stations. 1. To enable test, set the Test field on the station administration screen for the particular analog station being tested to "y." Use the **change station** *extension* command.
1020	ABORT	The test did not run due to a previously existing error on the specific port or because of a more general circuit pack error. 1. Examine the Error Log for existing errors against this port or circuit pack, and attempt to diagnose the previously existing error.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required to run this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
2053	ABORT	At least one of the following errors is found on the DS1 circuit pack: 1281 – Loss of signal,1793 – Blue alarm, 2049 – Red alarm, 2305 – Yellow alarm, or 1537 – Hyperactivity. Look for the previous error types in the Hardware Error Log, and follow the procedures given in the appropriate DS1-BD or UDS1-BD maintenance documentation for the listed error types.

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Table 8-633. Test #7 Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	The NPE of the tested port did not conference the tones correctly. This can cause noisy and unreliable connections. 1. Enter the **list configuration board *UUCSS*** command. If the circuit pack is a TN767B vintage 8 or 9, replace the circuit pack with a TN767C V3 or later. The error log may have error type 1281 entries. 2. Test every administered trunk on the board. If one fails, this could be an off-board problem (such as an incoming seizure or an off-hook port seizure during the test). Retest the board. 3. If every port fails, check the CARR-POW (see note below). 4. If several ports fail, check the error log for TONE-BD or TONE-PT errors. If there are such errors, take the appropriate action. When the TONE errors have cleared, rerun the test. 5. If the retry passes and troubles have been reported, coordinate isolation with the far-end PBX. Make sure that the near- and far-end switches and any NTCE equipment (the CSUs) have the correct administration. 6. Replace the circuit pack. **NOTE:** If the conference circuit test fails for every port on a circuit pack, a -5 Volt power problem is indicated. If a TN736 or TN752 power unit circuit pack is present, either the 631DB AC power unit or the 676B DC power unit may be defective. (The 631DB power unit is used in a medium cabinet powered by an AC source. The 645B power unit is used in a medium cabinet powered by a DC power source.) The system may contain a TN736 or TN752 power unit or a 631DB AC power unit, but not both types of power units. To investigate problems with a 631DB AC or 645B DC power unit, see ''CARR-POW (Carrier Power Supply)'' on page 8-393. If a red LED on TN736 or TN752 power unit circuit pack is on, replace the pack.
	PASS	The port can correctly conference multiple connections. User-reported troubles on this port should be investigated using other port tests and by examining station, trunk, or external wiring.

Continued on next page

Table 8-633. Test #7 Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board's translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to see that there is a valid board inserted.

Port Audit and Update Test (#36)

This test sends port level translation data from switch processor to the DS1 Interface circuit pack to ensure that the trunk's translation is correct. Translation updates include the following data: trunk type (in/out), dial type, timing parameters, and signaling bits enabled. The port audit operation verifies the consistency of the current state of the trunk kept by the DS1 Interface circuit pack and the switch software.

Table 8-634. Test #36 Audit and Update Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-634. Test #36 Audit and Update Test — *Continued*

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test were not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 2. If the port status is active but the port is idle (no calls), check the error log for error type 1025 (see the error log table for a description of this error and required actions). The port may be locked up. 3. If the port status is idle, retry the command at 1-minute intervals up to 5 times.
1006	ABORT	The test was aborted because the trunk is out of service. 1. Use the **status trunk** command to verify that the trunk is out of service. 2. If the trunk is out of service, determine why. 3. If it is OK to put the trunk back in service, issue the **release trunk** command to restore the trunk's service, and then retry the test.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	Trunk translation has been updated successfully. The current trunk states kept in the DS1 Interface circuit pack and switch software are consistent. If the trunk is busied out, the test does not run but returns a PASS. To verify that the trunk is in-service: 1. Enter the **status trunk** command to verify that the trunk is in-service. If the trunk is in-service, no further action is necessary. If the trunk is out-of-service, continue to step 2. 2. Enter the **release trunk** command to put the trunk back into in-service. 3. Retry the test command.

Continued on next page

Table 8-634. Test #36 Audit and Update Test — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board's translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to see that there is a valid board inserted.

DS1 Tie Trunk Seizure Test (#136)

The DS1 Tie Trunk Seizure test is run to verify the trunk's signaling capability. The test is composed of two parts. The first part queries the circuit pack for the following errors: Loss of Signal, Red alarm, Blue alarm, Yellow alarm, and Hyperactivity alarm. The second part of the test is performed by sending a seizure message to the DS1 Interface circuit pack and expecting an active reply by the DS1 Interface circuit pack. If maintenance software does not receive any reply and the timer expires, the test fails. Once the active message is received, a dial pause message is sent to the DS1 Interface circuit pack. If the DS1 Interface circuit pack replies with a dial pulse tone message when the far end responds to the seizure, then the DS1 tie trunk Seizure test passes. If the far end does not respond to the seizure and the timer expires, and the DS1 Interface circuit pack sends a reorder message back to the maintenance software, then the test fails.

This second part of this test *cannot* be run on a trunk if one of the following cases is true:

1. The trunk direction is administered as an incoming only trunk.
2. The trunk is the 24th port on a DS1 Interface circuit pack which is administered using 24th common-channel signaling.
3. The trunk has been seized by a normal trunk call.
4. The trunk is administered with maintenance test disabled.
5. The outgoing signal type of the trunk is either automatic or immediate-start.
6. This test always passes if the associated board is the TN802 IP trunk circuit pack.

Table 8-635. Test #136 DS1 Tie Trunk Seizure Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test were not available. The port may be busy with a valid call. 1. Use the **display port *UUCSSpp*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. If the port status is active but the port is idle (no calls), check the error log for error type 1025 (see the error log table for a description of this error and required actions). The port may be locked up. 3. If the port status is idle, retry the command at 1-minute intervals up to 5 times.
1004	ABORT	Far end is seizing the trunk while the test is ongoing. A glare situation is detected. Current test is designed to be aborted. 1. Use the **display port *UUCSSpp*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the port is in use, wait until the port is idle before testing. 2. If the port status is idle, retry the command at 1-minute intervals up to 5 times.
1005	ABORT	Test failed due to incompatible configuration administered in trunk group form. 1. Verify the following fields on the trunk group administration screen: a. Is trunk direction incoming only? b. Is trunk outgoing type either automatic or immediate-start? c. Is trunk the 24th port of the DS1 Interface circuit pack while common control channel signaling is specified? 2. If the trunk has been administered using the above information, then this test should abort.
1018	ABORT	The test was disabled via translation. You may want to determine why the test has been disabled before you enable it. 1. Verify that the `Maintenance Test` field on the 'Trunk Administration' screen is set to 'n.' To enable the test, change the trunk administration and enter 'y' into the `Maintenance Test` field. 2. Repeat the test.

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Table 8-635. Test #136 DS1 Tie Trunk Seizure Test — *Continued*

Error Code	Test Result	Description / Recommendation
1020	ABORT	The test did not run due to an already existing error on the specific port or due to a more general circuit pack error. 1. Examine the error log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error. 2. Retry the test.
1040	ABORT	The test is invalid for this trunk port because it is administered as an access endpoint. 1. Use **display port** to verify that this port is administered as an access endpoint. In this case the test should abort.
2000	ABORT	Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.
2053	ABORT/ FAIL[1]	At least one of the following errors is found on the DS1 circuit pack: 1281 – Loss of Signal, 1793 – Blue alarm, 2049 – Red alarm, 2305 – Yellow alarm, or 1537 – Hyperactivity. 1. Look for the previous error types in the Hardware Error Log, and follow the procedures given in the appropriate DS1-BD/UDS1-BD maintenance documentation for the listed error types.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The far-end trunk did not respond to the seizure of the near-end trunk within the allowable time period. This test could have associated in-line errors in the error log. 1. Enter the **list configuration board *UUCSS*** command. If the circuit pack is a TN767B vintage 8 or 9, a failure of test 136 causes a subsequent failure of test 7 due to a firmware bug. Eventually, the board and all of its ports are taken out of service, and extraneous on-board alarms are generated. Replace the circuit pack with a TN767C V3 or later. 2. Verify that the 'Trunk Type' field on the 'Trunk Administration' screen matches the trunk type administered on far-end switch. 3. Look for DS1-BD or UDS1-BD errors in the hardware error log. If present, see "DS1-BD (DS1 Interface Circuit Pack)" or "UDS1-BD (UDS1 Interface Circuit Pack)" on page 8-1707 maintenance documentation. 4. Retry the test at 1-minute intervals up to 5 times.

Continued on next page

Table 8-635. Test #136 DS1 Tie Trunk Seizure Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	FAIL	Response to the seizure message was not received within the allowable time period. 1. Enter the **list configuration board *UUCSS*** command. If the circuit pack is a TN767B vintage 8 or 9, a failure of test 136 causes a subsequent failure of test 7 due to a firmware bug. Eventually, the board and all of its ports are taken out of service, and extraneous on-board alarms are generated. Replace the circuit pack with a TN767C V3 or later. 2. Verify that the 'Trunk Type' field on the 'Trunk Administration' screen matches the trunk type administered on far-end switch. 3. Look for DS1-BD or UDS1-BD errors in the hardware error log. If present, see the "DS1-BD (DS1 Interface Circuit Pack)" or "UDS1-BD (UDS1 Interface Circuit Pack)" on page 8-1707 maintenance documentation. 4. Retry the test at 1-minute intervals up to 5 times.
	PASS	The trunk can be seized for an outgoing call.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Check to ensure that the board's translations are correct. Use the **list config** command, and resolve any problems that are found. 2. If the board was found to be correctly inserted in step 1, issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port. If this is not the case, check to see that there is a valid board inserted.

1. Earlier G1 Software Versions reported Error Code 2053 as a FAIL

TIE-TRK (Analog Tie Trunk)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[12]	Full Name of MO
TIE-TRK	MAJOR[3]	**test port *UUCSSpp* l**	Tie Trunk
TIE-TRK	MINOR	**test port *UUCSSpp* l**	Tie Trunk
TIE-TRK	WARNING	**test port *UUCSSpp* sh**	Tie Trunk

1. *UU* is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). *C* is the carrier designation (A, B, C, D, or E). *SS* is the number of the slot where the circuit pack resides (01–21). *pp* is the 2-digit port number (01, 02,...).
2. If ATMS testing is enabled, check the error log for ATMS errors 3840 and 3841. If the error log indicates that measurements exceeded acceptable thresholds, and no other trouble is found with **test trunk**, run the ATMS test call with **test analog-testcall port UUCSSpp full**.
3. A Major alarm on a trunk indicates that alarms on these trunks are not downgraded by the **set options** command and that at least 75 percent of the trunks in this trunk group are alarmed.

   This alarm does not apply to TN497.

NOTE:
Many trunk problems are caused by incorrect settings of parameters on the trunk group administration form. Settings must be compatible with the local environment and with parameter settings on the far end. The Application Notes section of that book shows the correct settings for administrable timers and other parameters on a country-by-country basis.

The following circuit packs, including every suffix such as TN760D, support analog tie trunks:

Table 8-636. Analog Tie Trunk Circuit Packs

Code	Trunk Type	Signaling Leads
TN760	4-wire	E&M
TN437	4-wire	E&M
TN439	2-wire	A&B (2-way circuits only)
TN458	4-wire	E&M
TN497	2-wire	A&B
TN2140	4-wire	E&M

Each tie trunk circuit pack occupies a port circuit pack slot and contains 4 port circuits. Each port circuit supports 1 analog tie trunk used to connect the switch to another PBX across 1- or 2-way dedicated circuits (see preceding list).

A tie trunk port can also be administered as an access endpoint which is a non-signaling channel with a voice-grade data bandwidth. Tie trunk maintenance employs up to 6 tests, depending on the hardware involved, to monitor the operating condition of the trunk and its connections. These are described in the following sections on each test. The port must be idle for these tests to run. If an incoming call seizes the port while a test is in progress, the test aborts and the call proceeds (except for TN497).

Additional in-line testing is performed whenever a call is in progress, logging errors that occur during operation. You can reproduce these types of errors by making a call over the trunk and then checking the Hardware Error Log.

By making translation and cross-connect changes, circuit packs (except for TN497) can be configured for back-to-back testing, also known as connectivity testing. Port operation is tested by connecting two tie trunk ports together in either E&M or simplex modes. See the section *"Analog Tie Trunk Back-to-Back Testing" on page 5-26*.

Error Log Entries and Test to Clear Values

Table 8-637. TIE Trunk Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp* sh r 1**
1(a)	16384	None	WARNING	OFF	
1(b)	57476	None	WARNING	OFF	
1(c)	57477	None	WARNING	OFF	
1(d)	57483	None	WARNING	OFF	
1(e)	57485	None	WARNING	OFF	
15(f)	Any	Port Audit Update test (#36)			
18(g)	0	**busyout trunk *grp/mbr***	WARNING	OFF	**release trunk *grp/mbr***
130(h)		None	WARNING	ON	**test trunk *grp/mbr***
257(i)	57473	None	WARNING	OFF	
257(j)	57474	None	WARNING	OFF	
257(k)	57475	None	WARNING	OFF	
513(l)	Any	EPF M and E Lead (#74)	MAJOR MINOR WARNING[2]	OFF	**test port *UUCSSpp* sh r 3**

Continued on next page

Table 8-637. TIE Trunk Error Log Entries — *Continued*

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
769(l)	57481	EPF M and E Lead (#74)	MAJOR MINOR WARNING[2]	ON	**test port *UUCSSpp* sh r 3**
1025(m)	Any	None	MAJOR MINOR WARNING[2]	OFF	
1281(l)	Any	EPF M and E Lead (#74)	MAJOR MINOR WARNING[2]	ON	**test port *UUCSSpp* sh r 3**
1537		Looparound and Conference (#33)	MAJOR MINOR WARNING[2]	ON	**test port *UUCSSpp* l r 3**
1793		Tie Trunk Seizure (#73) (Dial Test #747 for TN439)	MAJOR MINOR WARNING[2]	OFF	**test port *UUCSSpp* sh r 2**
2049		NPE Crosstalk (#6)	MAJOR MINOR WARNING[2]	ON	**test port *UUCSSpp* l r 3**
2305(n)	57424 50944	None (**l**)			
2561(o)	0	None	WARNING	OFF	
2562(p)	16665				
2817(o)	0	None	MINOR	OFF	
2817(q)	52992				
3073(o)	0	None			
3840(r)	8000	Transmission tests (ATMS)(#844-848)		OFF	**test analog-testcall**
3841(r)		Transmission tests (ATMS)(#844-848)	MINOR	OFF	**test analog-testcall *UUCSSpp* r 2**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. Minor alarms on this MO may be downgraded to Warning alarms based on the values used in the **set options** command. If the MINOR alarm is not downgraded by the **set options** values, then the MINOR alarm will be upgraded to a MAJOR alarm if 75% of the trunks in this trunk group are alarmed. These errors, if applicable, always log a MINOR alarm for TN439 and TN497.

Notes:

a. Digit time-out. This occurs when the far-end PBX began transmitting digits too late (10 seconds) after receiving the signal indicating ready to receive digits (if any). This can occur on an incoming immediate, wink, or delay dial line. Check the far-end PBX to ensure a translation match at both ends. This error does not apply to TN497.

b. Rotary dial before wink. This occurs when the far-end PBX starts dialing before the PBX sends the wink on a wink-start or delay-dial trunk. Check the far-end PBX to ensure a translation match at both ends. This error does not apply to TN497.

c. Rotary dial too early. This occurs when the far-end PBX starts dialing too soon (about 50ms) after seizure on a wink start or delay dial line. Check the far-end PBX to ensure a translation match at both ends. This error does not apply to TN497.

d. On hook before wink. This occurs when the far end goes on hook before a wink. Check the far-end PBX to ensure a translation match at both ends. This error applies only to TN439.

e. On an outgoing wink-start or delay-dial trunk, the wink time was too short (less than 80ms) for a valid signal. Check the far-end PBX to ensure a translation match at both ends. This error does not apply to TN497.

f. This is a software audit error that does not indicate any hardware malfunction. Run the short test sequence, and investigate associated errors (if any).

g. This indicates that the trunk in question has been busied-out by maintenance personnel.

h. The circuit pack has been removed or has been insane for more than 11 minutes. To clear the error, reinsert or replace the circuit pack. TN439 does not alarm this error. This error does not apply to TN497.

i. The rotary dial rate was too slow — less than 8 pulses per second. Check the far-end PBX to ensure a translation match at both ends.

j. The rotary dial rate was too fast — above 12 pulses per second. Check the far-end PBX to ensure a translation match at both ends.

k. The time between digits was too short (less than 300ms). Check the far-end PBX to ensure a translation match at both ends.

l. These errors do not apply to TN439 and TN497.

m. This indicates that the trunk is still seized with an incoming call. The far-end PBX is not releasing the trunk after the call was dropped. Check the far-end PBX for problems.

   Once the trunk is released from the call, the severity of this problem is decreased. If Error Type 1025 does not appear again, this means that the problem has been corrected. Verify that Error Type 1025 does not reappear in the Error Log.

n. Reorder message. The trunk could not be seized. This error causes the Tie Trunk Seizure test (#73) to run and is considered a problem only if that test fails, logging error 1793. In this case, the trunk may be placed in the ready-for-service state, allowing only incoming calls. This service state shows up as `disconnected` on the trunk status screen. Run the Tie Trunk Seizure test, and follow recommended procedures.

   TN439 logs aux data 57424 or 50944. Other circuit packs log 50944. This error is associated with Test #747 for TN439, Test #73 for TN497, and no test for the others.

o. These errors apply only to TN497.

p. Retry Failure error. This error is logged only. It is not a hardware failure and hence does not start any testing or generate any alarms. This error comes from call processing and is generated when a second attempt (retry) to seize an outgoing trunk fails.

q. Glare error. This error is logged only. It is not a hardware failure and hence does not start any testing or generate any alarms. This error is the result of a simultaneous seizure of a 2-way trunk from both the near and the far ends. Attempt to place the call again. If the error persists, execute the Tie Trunk Seizure test (#73), and follow its outlined procedures.

r. Error 3841 indicates that test calls made by the Automatic Transmission Measurement System (ATMS) returned measurements in the unacceptable range. Error 3840 indicates measurements were in the marginal range. Use **list testcall detail** to examine the specific transmission parameters which are out of spec, and investigate the trunk for that kind of noise. If the noise is acceptable, then the AMTS thresholds administered on page 4 of the trunk group form should be changed.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in Table 8-638 when inspecting errors in the system. For example, by clearing error codes associated with the *NPE Crosstalk* test (#6), you may also clear errors generated from other tests in the testing sequence.

Table 8-638. System Technician-Demanded Tests: TIE-TRK

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
NPE Crosstalk test (#6)		X	ND
Looparound and Conference Circuit test (#33)		X	ND
Tie Trunk Seizure test (#73)	X	X	ND
Dial test (#747)	X	X	ND
Tie Trunk EPF test (#74)	X	X	ND
Port Audit and Update test (#36)	X	X	ND
Transmission test - ATMS (#844-848)	[2]	†	ND

1. D = Destructive, ND = Nondestructive
2. ATMS tests are not part of either sequence. They are run either on demand with **test analog-testcall**, or by the ATMS schedule.

NPE Crosstalk Test (#6)

The NPE Crosstalk test verifies that a port's NPE channel talks on the time slot assigned to it and does not cross over to time slots reserved for other connections. If the NPE is not working correctly, 1-way and noisy connections may be observed. The test takes 20 to 30 seconds to complete.

Table 8-639. Test #6 NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The trunk may be busy with a valid call. Use the **display trunk *xx*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 1. If the port status is active, but the port is idle (no connected ports), then check the Error Log for Error Type 1025 (see Error Log table for description of this error and required actions). The port may be locked up. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1001	ABORT	System resources required to run this test are not available. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present or some Tone Detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the test at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the **display trunk *xx*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting.

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Table 8-639. Test #6 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
Any	FAIL	This test can fail due to either on- or off-board problems. Off-board problems of concern include EXP-PN and EXP-INTF faults, TDM-BUS faults, and faults associated with the tone detectors/tone generators. Clear every off-board problem before replacing the board. Keep in mind that a TDM-BUS problem is usually the result of a faulty board connected to the backplane or bent pins on the backplane. 1. Resolve any EXP-PN and/or EXP-INTF errors. 2. Resolve any TDM-BUS errors. 3. Resolve any TONE-BD and/or TONE-PT errors. 4. Test the board when the faults from steps 1, 2, and 3 are cleared. Replace the board only if the test fails.
	PASS	The port is correctly using its allocated time slots. User-reported troubles on this port should be investigated using other port tests and examining station, trunk or external wiring.
0	NO BOARD	The test could not relate the internal ID to the port (no board). 1. Verify that the board's translations are correct. Translate the board, if necessary. 2. Issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board** command. This should re-establish the linkage between the internal ID and the port.

Looparound and Conference Circuit Test (#33)

This test verifies signal transmission and conferencing capabilities of a port using 404-, 1004-, and 2804-Hz tones. This is an on-board test only: each tone is transmitted to and looped around within the port and then returned.

This test can fail due to noise induced by adjacent electric power lines. If this is the case, the customer must resolve it with their local power company. To temporarily alleviate an alarm caused by failure of this test, you can disable it via the `Test` field on the trunk administration form.

Table 8-640. Test #33 Looparound and Conference Circuit Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
7	ABORT	The conference circuit test was aborted. 1. Retry the command at 1-minute intervals up to 5 times.
129	ABORT	The 404-Hz reflective loop around test aborted. Response to the test request was not received within the allowable time period.
131		The 1004-Hz reflective loop around test aborted. Response to the test request was not received within the allowable time period.
133		The 2804-Hz reflective loop around test aborted. Response to the test request was not received within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The trunk may be busy with a valid call. Use the **display trunk *xx*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 1. If the port status is active, but the port is idle (no calls), then check the Error Log for Error Type 1025 (see Error Log table for description of this error and required actions). The port may be locked up. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized force. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the command at 1-minute intervals up to 5 times.

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Table 8-640. Test #33 Looparound and Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the **display trunk *xx*** command to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting.
1018	ABORT	The test has been disabled via administration. Verify that the 'Maintenance Test' field on the 'Trunk Group' form is set to 'n.' To enable the test, issue the 'change trunk-group x' command (x equals the number of the trunk group to be tested). Then, change the entry in the 'Maintenance Test' field on the form to 'y.'
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
7,	FAIL	The conference capabilities of the port failed (Error Code 7).
129,		The reflective 404-Hz Tone test failed. No transmission was detected to or from the port (Error Code 129).
131, or		The reflective 1004-Hz Tone test failed. No transmission was detected to or from the port (Error Code 131).
133		The reflective 2804-Hz Tone test failed. No transmission was detected to or from the port (Error Code 133). FAULT ISOLATION: Proceed as follows unless power or tone problems are suspected (see notes on the next page). 1. To make sure the problem is on-board, disconnect the port from the CO and retry the test. Coordinate this with the CO, or do it after busy hours; otherwise, the CO may put the connection out of service. 2. If the retry fails, replace the circuit pack. 3. If the retry passes and no troubles have been reported, disable the test. If the retry passes and troubles have been reported, refer the problem to the CO. *More information continues on the next page.*

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Table 8-640. Test #33 Looparound and Conference Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
7, 129, 131, or 133 *(cont'd)*	FAIL *(cont'd)*	**NOTE:** If the loop-around and conference circuit test fails for every port on a circuit pack, a -5 Volt power problem is indicated. If a TN736 or TN752 power unit circuit pack is present, either the 631DB AC power unit or the 676B DC power unit may be defective. (The 631DB power unit is used in a medium cabinet powered by an AC source. The 645B power unit is used in a medium cabinet powered by a DC power source.) The system may contain a TN736 or TN752 power unit or a 631DB AC power unit, but not both types of power units. To investigate problems with a 631DB AC or 645B DC power unit, see ''CARR-POW (Carrier Power Supply)'' on page 8-393. If a red LED on TN736 or TN752 power unit circuit pack is on, replace the pack. If the test fails on more than 1 port, check for errors on the TONE-BD or the TONE-PT. If errors, take appropriate actions. When the tone errors are cleared, rerun the test. If the test fails again, see FAULT ISOLATION in this table above.
	PASS	Tie trunk Looparound and Conference test is successful. This port is functioning properly. 1. If users are reporting troubles, examine loop connections to the port.
0	NO BOARD	The test could not relate the internal ID to the port (no board). 1. Verify that the board's translations are correct. Translate the board, if necessary. 2. Issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board** command. This should re-establish the linkage between the internal ID and the port.

Audit Update Test (#36)

This test sends to the circuit pack updates of translations for every administered port on the circuit pack. It is non-disruptive and guards against possible corruption of translation data contained on the circuit pack. No response is expected from the circuit pack. Port translation data includes:

- Start type: immediate, automatic, wink-start, or delay dial
- Rotary or DTMF senderization in or out
- Disconnect timing: 10 to 2550 ms in 10-ms increments
- DMTF time slot
- Continuous-seize-ack? (TN2140)

Table 8-641. Test #36 Audit Update Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate the necessary system resources to run the test. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	This test passed. Translation information was successfully updated on the circuit pack. If the trunk is busied out, the test does not run but returns a PASS (except on TN439 and TN497). 1. If signaling troubles are reported, verify translation information for this port. 2. To verify that the trunk is in-service, enter **status trunk** command to verify that the trunk is in-service. If the trunk is in-service, no further action is necessary. If the trunk is out-of-service, continue to Step 2. 3. Enter **release trunk** command to put trunk back into in-service. 4. Retry the test command.
0	NO BOARD	The test could not relate the internal ID to the port (no board). 1. Verify that the board's translations are correct. Translate the board, if necessary. 2. Issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board** command. This should re-establish the linkage between the internal ID and the port.

Tie Trunk Seizure Test (#73) and Tie Trunk Dial Test (#747)

For wink-start, delay-dial and TN2140 (cont-seize-ack or discont-seize-ack) trunks, this test activates the M lead and checks for a response from the far end within 10 seconds.

For TN497, the test seizes a trunk and outpulses a pause. The port reports uplink the result of the seizure. This test can be disabled via the `Test` field on the trunk group administration form.

For TN439, Test #747 is run instead of #73. This test seizes a trunk and outpulses a pause digit. This test aborts on ports administered as access endpoints.

Table 8-642. Test #73,#747 Tie Trunk Seizure Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The trunk may be busy with a valid call. Use the **display trunk *xx*** to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 1. If the port status is active, but the port is idle (no calls), then check the Error Log for Error Type 1025 (see Error Log table for description of this error and required actions). The port may be locked up. The far-end PBX may not be releasing. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the **display trunk *xx*** to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 1. Retry the command at 1-minute intervals up to 5 times.
1005	ABORT	This test is not valid for this trunk translation. Must be a wink-start or delay dial trunk and must be outgoing or 2-way for this test to run. For the TN2140, the trunk must also be continuous-seize-ack or discontinuous-seize-ack. 1. Check trunk translation. If it is not a wink-start or delay dial trunk, this abort message should be ignored.

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Table 8-642. Test #73,#747 Tie Trunk Seizure Test — *Continued*

Error Code	Test Result	Description / Recommendation
1018	ABORT	Test disabled via administration. 1. Verify that the "Maintenance Tests?" field on the Trunk Group Form is set to "n". To enable the test, issue the **change trunk-group *x*** command where "x" equals the number of the trunk group to be tested. Then change the entry in the "Maintenance Tests?" field on the form to "y."
1040	ABORT	This test is not performed for trunk ports administered as access endpoints. 1. Verify this port is an access endpoint by using the **display port** command. 2. If the port has been administered as an access endpoint, then this test should abort.
2100	ABORT	Could not allocate the necessary system resources to run the test. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
3	FAIL	No dial tone detected from the other end. (TN439 circuit packs only.) 1. Retry the command at one minute intervals up to five times. 2. If the test continues to fail, check the far-end PBX to ensure a translation match at both ends. 3. Check the facility.
2000	FAIL	Seizure message is not received back within 10 seconds. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail, check the far-end PBX to ensure a translation match at both ends. 3. Check the facility.
	PASS	The Tie Trunk Seizure test passes. This port is functioning properly. 1. If users are reporting troubles, examine loop connections to the port, wiring, and stations.
0	NO BOARD	The test could not relate the internal ID to the port (no board). 1. Verify that the board's translations are correct. Translate the board, if necessary. 2. Issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board** command. This should re-establish the linkage between the internal ID and the port.

Tie Trunk EPF Test (#74)

The first part of this test checks for proper activation and deactivation of the port's E lead. The second part checks the M lead electronic power feed current flow.

Table 8-643. Test #74 Tie Trunk EPF Test

Error Code	Test Result	Description / Recommendation
	ABORT	Could not allocate the necessary system resources to run the test. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
1	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The trunk may be busy with a valid call. Use the **display trunk *xx*** to determine trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 1. If the port status is active, but the port is idle (no calls), then check the Error Log for Error Type 1025 (see Error Log table for description of this error and required actions). The port may be locked up. The far-end PBX may not be releasing. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. Use the **display trunk *xx*** to determine the trunk group/member number of the port. Use the **status trunk** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. You must wait until the port is idle before retesting. 1. Retry the command at 1-minute intervals up to 5 times.
1005	ABORT	This test is not valid for this trunk translation. Must be a type-1 standard trunk for this test to run. 1. Check trunk configuration. If it is not a type-1 standard trunk, this abort message should be ignored.
1014	ABORT	The test was aborted because the circuit pack has not been inserted into the system. 1. Use the **list configuration board** command to make sure the circuit pack is inserted in the carrier. 2. If the board is not inserted, make sure the circuit pack is inserted in the carrier and fully seated.

Continued on next page

Table 8-643. Test #74 Tie Trunk EPF Test — *Continued*

Error Code	Test Result	Description / Recommendation
1040	ABORT	This test is not performed for trunk ports administered as access endpoints. 1. Verify this port is an access endpoint by using the **display port** command. 2. If the port has been administered as an access endpoint, then this test should abort.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run the test. This could be due to a failure to seize the port. 1. Retry the command at 1-minute intervals up to 5 times.
1	FAIL	The E lead test failed due to an on-board port problem. 1. Replace the circuit pack.
2	FAIL	The M lead test failed. The EPF has experienced an overcurrent condition, perhaps due to the external M lead. 1. To make sure the problem is on-board, disconnect the facility from the pack and retry the test. 2. If the test fails, replace the circuit pack. Otherwise, check the external wiring toward the far-end PBX.
	PASS	Tie Trunk EPF test is successful. This port is functioning properly. 1. If users are reporting troubles, examine loop connections to the port.
0	NO BOARD	The test could not relate the internal ID to the port (no board). 1. Verify that the board's translations are correct. Translate the board, if necessary. 2. Issue the **busyout board** command. 3. Issue the **reset board** command. 4. Issue the **release busy board** command. 5. Issue the **test board** command. This should re-establish the linkage between the internal ID and the port.

Transmission Test (#844-848)

This test is nondestructive.

NOTE:
Tests #844–848 are not supported on an International switch.

These tests are run by the Automatic Transmission Measurement System (ATMS). They are not part of the long or short trunk test sequences. Instead, they are run on demand with the **test analog-testcall** command or as part of ATMS scheduled testing. For more information, see ''Automatic Transmission Measurement System'' in Chapter 6.

The test call is run from an analog port on a TN771 Maintenance/Test circuit pack. It attempts to seize a port and make a call to a terminating test line (TTL) on the trunk's far end. Transmission performance measurements are made and compared to administered thresholds. Errors are generated when results fall outside of "marginal" or "unacceptable" thresholds. Detail and summary measurement reports are obtainable via the **list testcalls** command.

Table 8-644. Test #844-848 Transmission Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Use **display port *UUCSSpp*** to determine the trunk group/member number of the port. Use the "status trunk" command to determine the service state of the port. If the service state indicates that the port is in use, then the port unavailable for this test. (Refer to section on "status" commands for a full description every possible state). You must wait until the port is idle before retesting. 2. If the port status is idle, then retry the command at 1-minute intervals up to 5 times.
1001	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate timeslots for the test. The system may be under heavy traffic conditions or it may have timeslots out of service due to TDM bus errors. 1. If the system has no TDM bus errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1004	ABORT	The port has been seized by a user for a valid call. Use status trunk to determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-644. Test #844-848 Transmission Test — *Continued*

Error Code	Test Result	Description / Recommendation
1005	ABORT	Trunk has been administered as incoming-only; transmission tests can only be run on outgoing trunks.
1115	ABORT	The near end test line on the TN771 circuit pack could not be allocated. 1. Verify that the TN771 circuit pack is in service and that port 1 is administered and in service with the **status port** command. 2. Retry the command at 1-minute intervals up to 5 times.
1900	ABORT	The test completion message was not received from the TN771 circuit pack. 1. Test the TN771 circuit packs.
1901	ABORT	This error occurs when the TN771 circuit pack uplinks a message that is not the proper response for this test. The anticipated uplink messages are seize, ring or answer. 1. Verify that the Trunk is administered properly.
1905	ABORT	Intercept tone detected from far end. 1. Get the test line data and verify it with the far end. Dial the test number manually to see if the TTL is reached. If it is not, then either the number is wrong, or the far end is administered incorrectly.
1906	ABORT	Reorder tone detected from far end. 1. See actions for error code 1905.
1907	ABORT	Other unexpected tone detected from far end. 1. See actions for error code 1905.
1913	ABORT	Audible Ring detected from far end. 1. See actions for error code 1905.
1914	ABORT	Unidentified interrupted tone detected from far end. 1. See actions for error code 1905
1915	ABORT	Busy tone detected from far end. 1. Since the test line at the far end was busy. Try the test again. 2. If the test continues to abort, the problem is with the far-end system.
1918	ABORT	Test progress tone not removed from far end (type 105 test line only). 1. The problem is with the far-end system; a technician at the far end should test the test line (TN771 or ADFTC).
1919	ABORT	Unexpected far-end release 1. The problem is with the far-end system; a technician at the far end should test the test line (TN771 or ADFTC).

Continued on next page

Table 8-644. Test #844-848 Transmission Test — *Continued*

Error Code	Test Result	Description / Recommendation
1920	ABORT	No response from far end. 1. The problem is with the far-end system; a technician at the far end should test the test line (TN771 or ADFTC).
1921	ABORT	No data returned from far end. 1. The problem is with the far-end system; a technician at the far end should test the test line (TN771 or ADFTC).
1922	ABORT	Steady, unidentifiable tone from far end. 1. See actions for error code 1905.
1923	ABORT	Broadband energy detected from far end (such as voice or announcement). 1. See actions for error code 1905.
1924	ABORT	No test tone from far end 1. See actions for error code 1905.
1938	ABORT	Near-end self test failed. 1. Test the TN771 circuit packs.
1939	ABORT	Loss self check at 0dBm at 1004 Hz failed. 1. Test the TN771 circuit packs.
1940	ABORT	Far-end noise self check failed. 1. The problem is with the far-end system; a technician at the far end should test the test line (TN771 or ADFTC).
1941	ABORT	High frequency singing return loss self check failed. 1. Test the TN771 circuit packs.
1942	ABORT	Echo return loss self check failed. 1. Test the TN771 circuit packs.
1943	ABORT	Singing return loss self check failed. 1. Test the TN771 circuit packs.
1944	ABORT	Loss self check at -16 dBm at 1004 Hz failed. 1. Test the TN771 circuit packs
1945	ABORT	Loss self check at -16 dBm at 404 Hz failed. 1. Test the TN771 circuit packs.
1946	ABORT	Loss self check at -16 dBm at 2804 Hz failed. 1. Test the TN771 circuit packs.

Continued on next page

Table 8-644. Test #844-848 Transmission Test — *Continued*

Error Code	Test Result	Description / Recommendation
1947	ABORT	Noise with tone self check failed. 1. Test the TN771 circuit packs.
2000	ABORT	The test timed out while waiting for a response from the TN771 circuit pack. 1. Retry the command at 1-minute intervals up to 5 times.
2012	ABORT	An internal software error occurred. 1. Retry the command at 1-minute intervals up to 5 times.
2053	ABORT	The test call could not be established, but explanatory information is unavailable. 1. Retry the command at 1-minute intervals up to 5 times.
2056	ABORT	An error occurred while trying to obtain results from the TN771 circuit pack. 1. Test the TN771 circuit packs.
	FAIL	Measured transmission performance was in the unacceptable range as administered on the trunk group form. Retrieve a measurement report via the **list testcalls** command. Make sure that ATMS thresholds are set properly on page 4 of the trunk group form. Besides the facility, test failures can be caused by faulty test lines or switch paths. If the measurements point to a facility problem, report the results to the trunk vendor.
8000	FAIL	Measured transmission performance was in the marginal range as administered on the trunk group form. This generally means that the trunk is usable but has an undesirable amount of noise or loss. If the user does not report unacceptable effects, it may not be necessary to take any action. Retrieve a measurement report via the **list testcalls** command. Make sure that ATMS thresholds are set properly on page 4 of the trunk group form.

TIME-DAY (Time of Day)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command To Run	Full Name of MO
TIME-DAY	MINOR	**set time**	Time of Day

The time of day contains the current year, month, day of the week, day of the month, hour, minute, and second. The Time of Day MO is responsible for monitoring the time-of-day clock and raising an alarm if the time-of-day clock is not set or cannot be read by the software. If the time-of-day clock is not set or cannot be read by the software, many features such as Time-of-Day Routing, CDR, ISDN Call-by-Call, duplication, and so on will be either inoperative or incorrect. The time-of-day clock should be set using the **set time** command whenever the system is initially powered up.

The time-of-day clock can be read with the **display time** command and set via the **set time** command. The time-of-day clock has a backup battery to save the time of day during power failures.

Error Log Entries and Test to Clear Values

Table 8-645. Time-of-Day Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0	0	Any	Any	Any	**display time**
247[1]	0	none	MINOR	OFF	**set time**

1. This error indicates that software cannot read the time-of-day clock. During this condition, every time stamp in Alarm Log entries, Hardware Error Log entries, and Software Error Log entries is potentially inaccurate. In addition, any features that are sensitive to the time of day (such as SMDR, Time-of-Day Routing, ISDN Call-by-Call) will not function correctly.

To resolve the alarm, do the following:

1. Use the **set time** command to set the time of day.
2. Use the **display time** command to display the time of day. If the time of day is displayed correctly, wait 15 minutes and verify that the alarm is retired.

TONE-BD (Tone-Clock Circuit)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
TONE-BD	MAJOR	**test tone-clock *UUC* short**	Tone-Clock circuit
TONE-BD	MINOR	**test tone-clock *UUC* short**	Tone-Clock circuit
TONE-BD	WARNING	**release tone-clock *UUC***	Tone-Clock circuit

1. UU is the universal cabinet number (1–44 for CSS PNC, 1–64 for ATM PNC). C is the carrier designation (A, B, C, D, or E).

The TONE-BD MO supports EPNs in an S8700 Media Server system using either a TN2312 IP Server Interface (IPSI) circuit pack, or for non-IPSI EPNs equipped with Tone Clock circuit packs.

For IPSI-equipped EPNs, the TONE-BD MO consists of a module located on the IPSI circuit pack and provides tone generation, tone detection, call classification, clock generation, and synchronization. (It replaces the TN2182B Tone-Clock board and is inserted into each EPN's Tone-Clock slot.) For non-IPSI EPNs, the TN2182B Tone-Clock circuit pack provide the previous functions.

The TN2312 IPSI circuit pack (for an EPN equipped with IPSIs) or the Tone-Clock circuit pack (for a non-IPSI EPN) both contain two independent components:

- Tone Generator that provides every tone needed by the system
- Clock that generates the system clocks for both the Time Division Multiplex (TDM) bus and the packet (LAN) bus

It also aids in monitoring and selecting internal synchronization references.

When resolving an IPSI or Tone-Clock circuit pack's errors/alarms, the following sections should also be consulted:

- For non-IPSI EPNs, use the **set tone-clock *UC*** command to establish the tone and synchronization resources for the system.
- For IPSI EPNs, use the **set ipserver-interface** command to establish the tone and synchronization resources for the system.
- TONE-PT (Tone Generator)
- TDM-CLK (TDM Bus Clock)
- SYNC (Synchronization)
- ETR-PT
- PKT-INT (IPSI only)

The TN2182 is a combined Tone-Clock/Detector circuit pack, providing Tone-Clock functionality to a non-IPSI EPN. It provides 8 Enhanced Tone Receiver (ETR) ports. Each of these ports combines the individual capabilities of a DTMR-PT, a GPTD-PT, and a CLAS-PT. Thus, each TN2182 port offers any tone-detection function previously provided by a TN748, TN420, or TN744 Tone Detector board.

The TN2182 also provides either Mu-law or A-law tone detection.

Since the TN2182 also provides Tone-Clock function for non-IPSI port networks, only one (or two if your system is duplicated) TN2182 circuit packs may reside in a EPN. If more tone-detection resources are needed, the additional resources must be provided by TN748, TN420, or TN744 circuit packs.

Tone-Clock and the Reliability Configuration

In IPSI-connected port networks, the Tone Clock circuit is found on the IPSI circuit pack. In non-IPSI-connected port networks, there is a Tone Clock circuit pack. The following sections describe the relationship between the various reliability options and the IPSIs or Tone Clock circuits.

S8700 Multi-Connect architecture has three items that can be duplicated: server, IPSI, and PNC. Note that duplicated control networks and duplicated IPSIs go together (that is, when the IPSIs are duplicated, the control networks must be duplicated). While all items can be independently duplicated, the combination of duplicated bearer networks (PNCs) and unduplicated control networks is not allowed. See Table 8-646 below:

Table 8-646. S8700 Multi-Connect Reliability Configurations

Configuration	Server	Control Network and IPSI	Bearer Network
Duplex Reliability	Duplicated	Unduplicated	Unduplicated
High Reliability	Duplicated	Duplicated	Unduplicated
Critical Reliability	Duplicated	Duplicated	Duplicated

Duplex-Reliability Configuration

The duplex-reliability configuration shown in Figure 8-98 has a duplicated server, an unduplicated control network, unduplicated IPSIs in the IPSI-connected port networks, and an unduplicated bearer network. Therefore the Tone Clock is not duplicated in the IPSI-connected port network. In the non-IPSI-connected port network, the Tone Clock boards are also not duplicated.

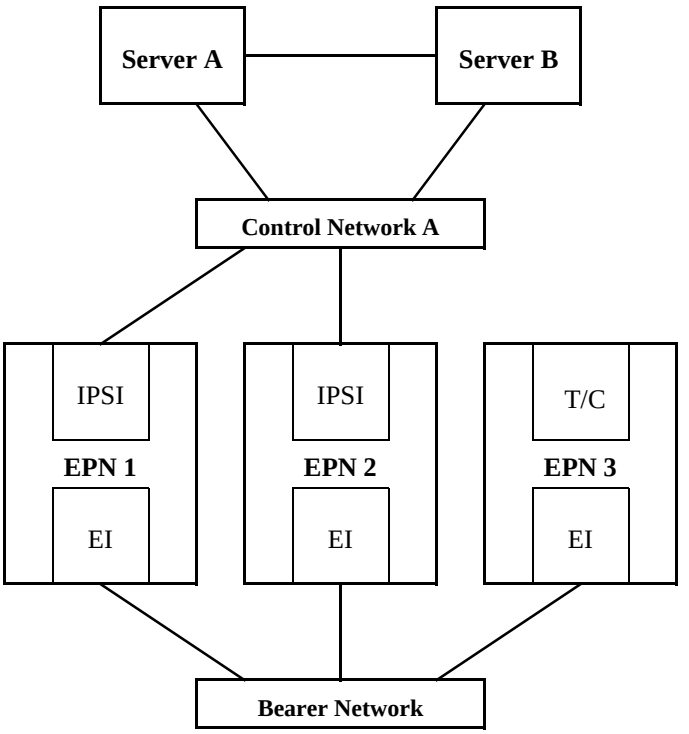

Figure 8-98. Duplex-Reliability Configuration

High-Reliability Configuration

The high-reliability configuration shown in Figure 8-99 has a duplicated server, a duplicated control network, and duplicated IPSIs in the IPSI-connected port networks. With this configuration, every IPSI-connected EPN must have duplicated IPSIs. The control network is duplicated so that a single fault in the control network, such as a bad Ethernet switch, won't bring the whole system down. The non-IPSI-connected port networks have unduplicated Tone-Clock boards. Each EPN's Tone-Clock circuit is active for both tones and clock signals for its port network.

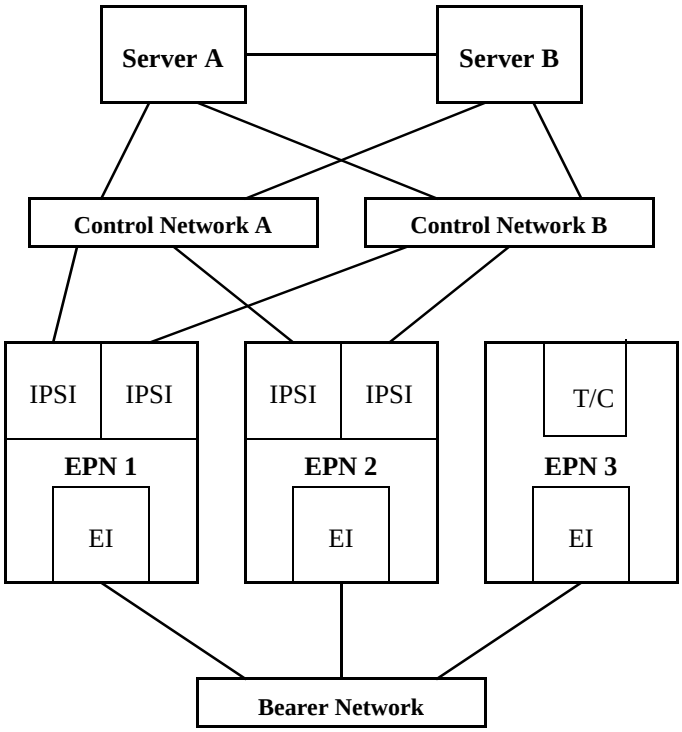

Figure 8-99. High-Reliability Configuration

Critical-Reliability Configuration

The critical-reliability configuration shown in Figure 8-100 has full duplication of the following options: servers, control networks, IPSIs and PNCs (bearer networks). As with the high-reliability configuration, this configuration also requires that IPSI-connected port networks have duplicated IPSIs. This configuration also requires that the non-IPSI-connected port networks have duplicated Tone-Clock boards (either TN2182 or TN780).

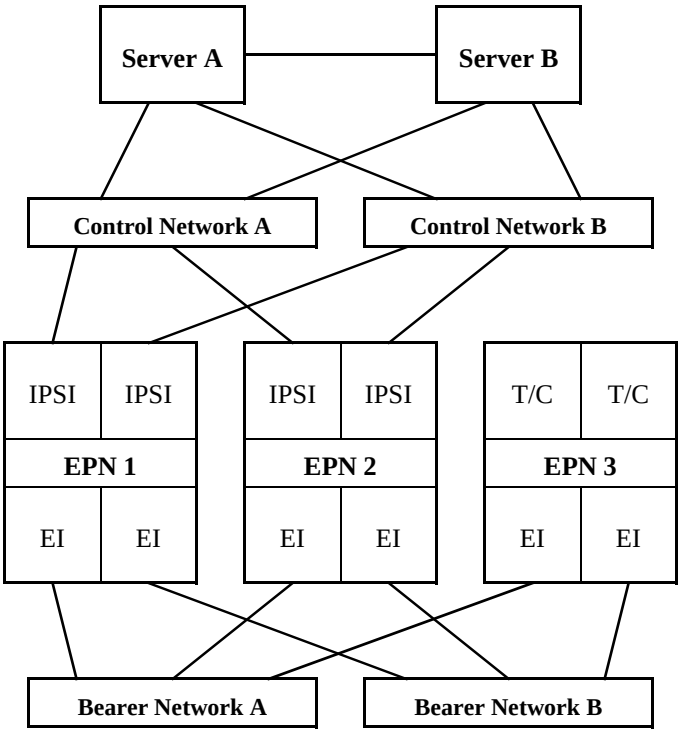

Figure 8-100. Critical-Reliability Configuration

Tone-Clock Interchange Strategy

There are three types of Tone-Clock interchanges:

- Autonomous interchanges initiated as a part of maintenance software strategy for the Tone-Clock or IPSI circuit packs.
- Manual interchanges initiated by entering the **set tone-clock** or **set ipserver-interface** command.
- Firmware-initiated Tone-Clock interchanges

Software Instigated Tone-Clock Interchanges

Tone-Clock interchanges may be initiated by software in three ways:

1. A scheduled Tone-Clock or IPSI circuit pack interchange occurs according to the parameters set by the **change system-parameters maintenance** command. This parameter can be disabled or set to run weekly, the default is for it to occur daily, at a time specified in the system-parameters list for scheduled maintenance to begin. This interchange will be blocked, if the non-preferred Tone-Clock or IPSI circuit pack in an EPN that has been selected with the **set tone-clock** or **set ipserver-interface** command. Also if the standby Tone-Clock or IPSI has been set to the busyout state, or if the clock generation capability is known to be impaired. When this scheduled interchange occurs, the standby Tone-Clock or IPSI circuit pack becomes active for twenty seconds to test its ability to generate clock signals. For IPSI scheduled interchanges, the other IPSI modules located on the IPSI circuit pack, i.e. the Packet interface and Archangel are also tested. After testing the IPSI is returned to standby mode.

   For Non-IPSI Port Networks, unscheduled interchanges occur when on-board Tone-Clock circuit-pack maintenance, or ongoing switch maintenance test of the TONE-BD, TONE-PT or the TDM-CLK uncover failures serious enough to raise a MAJOR or MINOR alarm against the active IPSI or Tone-Clock circuit pack.

   For IPSI Port Networks, unscheduled IPSI/Tone-Clock interchanges may occur any time as a part of an unscheduled IPSI interchange. The IPSI interchange may be the result of Tone-Clock, PKT-INT, or EAL faults.

2. In an EPN with duplicated Tone-Clock or IPSI circuit packs, one circuit pack is always preferred over the other. For the first port network in a cabinet, this is the Tone-Clock or IPSI circuit pack in carrier **A**. If a second port network is configured in a cabinet, its preferred Tone-Clock or IPSI circuit pack is located in carrier **E**. The intention is that if the preferred Tone-Clock or IPSI circuit pack has been replaced or repaired, the system will make it active by interchanging to it as soon as possible.

Firmware Instigated Tone-Clock Interchanges

Firmware-initiated Tone-Clock interchanges occur when the auto clock switching option is enabled, and the TN2312 IPSI circuit pack firmware detects a loss of clock or clock errors. After detecting a loss of clock/clock errors, and rather than waiting for S8700 Multi-Connect software to request a switch, the IPSI firmware will automatically switch the clock (when auto clock switching is enabled). The auto clock switching option is disabled during system restarts.

NOTE:
The auto clock switching option is required by the IPSI circuit pack since the EAL connection to the PKT-INT (one of the IPSI circuit packs many functions) is over the S8700 Multi-Connect packet bus which must have a good clock for proper operation.

Clock Synchronization

NOTE:
Stratum-3 clocking is not available for a port network supported by an IPSI TN2312 circuit pack, or a port network where the Tone-Clock function is supplied by a TN2182.

This section discusses synchronization with a Stratum-3 or -4 clocking device.

Stratum 3

Since the clock module on the TN2312 does not support synchronization with an external Stratum-3 clocking device, you may provide Stratum-3 clocking for a S8700 Media Server system by using the TN780 Tone-Clock circuit pack in a non-IPSI-connected port network. To bring in the external Stratum-3 clocking signals into the TN780, a processor carrier is needed. This new EPN control carrier will replace the processor carrier in the old PPN converted to an EPN 1. The Stratum-3 clocking must come into Port Network #1 because the S8700 Multi-Connect software has the Stratum-3 clocking hard-coded to this port network.

Stratum 4

In G3r, a PPN always resided in the system and was used as a backup synchronization source when either a:

- Synchronization source was not administered
- Designated master and secondary synchronization source failed

With S8700 Multi-Connect, EPN 1 (PPN) may or may not exist and thus cannot be relied on as the backup synchronization source. If a S8700 Multi-Connect system does not have an administered synchronization source, it uses the first EPN that comes up as its source. If the designated master and secondary synchronization sources fail, the system uses any other EPN as its source. No preference is given to EPN 1.

International Settings

NOTE:
The following information is for **non**-IPSI port networks.

The TN780 Tone-Clock circuit pack uses three firmware configuration parameters for international support. The following two are automatically set by the software load for the targeted country:

- The circuit pack's country-code (USA, ITALY, AUSTRALIA, etc.)
- The circuit pack's companding mode (mu-Law or A-Law)

The third configuration parameter is used only for Italy (country code: ITALY), and selects whether *new* versus *old* ISPT (Istituto Superiore Poste Telegrafi) tones will be used for dial and confirmation tones. Values for dial confirmation tone can be set independently on the **change system-parameters miscellaneous** form.

Whenever such changes are made, the effects are immediately enforced on all TN780 Tone-Clock circuit packs without disrupting tone or timing services.

Tone	New ISPT Value (default)	Old ISPT Value
Dial	continuous	cadenced
Confirmation	cadenced	continuous

In addition, the TN780 allows customizing of up to six system tones in order to meet specific country needs. These changes are made via the **change system-parameters country-options** form.

The TN2182 allows the same changes as the TN780 but allows the customizing of up to 24 system tones in order to meet specific country needs. These changes are made via the **change system-parameters country-options** form.

Replacing the IPSI or Tone-Clock Circuit Pack

Replacing a TN2312 IPSI circuit pack or Tone-Clock circuit pack is a service-disrupting procedure in an EPN with a single Tone-Clock, because the IPSI or Tone-Clock circuit pack is always needed to generate clocks for its EPN. When the circuit pack is removed, every call is immediately dropped, the EPN enters emergency transfer within one minute, and no calls can be set up from or to that EPN.

When replacing an IPSI or Tone-Clock circuit pack in an S8700 Multi-Connect system, always be sure to replace it with the appropriate IPSI or Tone-Clock circuit pack for the system. Four circuit-pack codes are supported:

TN768	This is a general-purpose Tone-Clock circuit pack for EPNs in an S8700 Multi-Connect system. It can be used in every situation, except as the Master Tone-Clock circuit pack when a Stratum-3 clock is administered.
TN780	The Stratum-3 clock feature requires the use of this circuit pack code in EPN 1. The Stratum-3 clock will operate only with this code as the Master Tone-Clock circuit pack. The TN780 circuit pack is upward compatible with the TN768 code, and can be used in any place a TN768 would be allowed. The TN780 is used in many countries outside the U.S. where the TN768 does not provide local tones.
TN2182	This Tone-Clock-Detector may be used anywhere a TN768 or TN780 is used, with the exception of configurations requiring Stratum-3 clock. The TN2182 may be used in all country configurations.
TN2312	The TN2312 IPSI circuit pack supplies Tone-Clock functionality for S8700 Multi-Connect systems.

Port Networks with a Single Tone-Clock Circuit Pack

This procedure is destructive.

1. Pull out the defective IPSI or Tone-Clock circuit pack. This will remove the clocks and cause the system to activate emergency measures. If this is an IPSI supported port network, use the **busyout ipserver-interface** command:
   - All calls to and from the EPN will drop, and the EPN will activate Emergency Transfer within about one minute. But the rest of the system should operate normally.
2. Insert a new IPSI or Tone-Clock circuit pack. The system will detect the return of the clocks and will automatically recover as follows:
   - The system will reset the EPN **(EPN cold restart)**, and all of the EPN's red LEDs will come on and go off within 30 seconds.
3. If the red LEDs come on but do not go off within 30 seconds, pull the circuit pack out and reseat it. If the LEDs perform as expected this time, continue with step 6. Otherwise, there may be a problem with the TDM bus; possibly a bent pin in the IPSI or Tone-Clock circuit pack's slot. Follow the directions in the TDM-BUS maintenance section.
4. If the red LEDs did light, as explained above, then go to Step 6. If the red LEDs do NOT light, as explained above, then go on to Step 5.
5. Restart the affected port network:
   - In an EPN, restart the EPN by resetting its Expansion Interface circuit pack via the **reset port-network *PN*# level 2** command, using the port network's number of the affected EPN. (Use the **list cabinet *UU*** command to determine the port network's number for a given cabinet and carrier.)
6. Test the new IPSI or Tone-Clock circuit pack to verify that it is functioning properly, using the **test tone-clock *UUC* long** command, and verify that the system is operational by placing several phone calls. Where possible, try calls into, out from, and within the affected port network.

Port Networks with Two Tone-Clock Circuit Packs

Notes:

1. Use the **list cabinet** command to determine the port network's number of the cabinet and carrier containing the Tone-Clock circuit pack to be replaced. If both of an EPN's Tone-Clock circuit packs need to be replaced, first replace and test the one in standby mode by either:
   - Entering **status port-network** to display its status
   - Making sure its amber LED is off

   Make sure it is healthy and active before replacing the second one.
2. If the Tone-Clock circuit pack to be replaced is active, then switch to the other Tone-Clock circuit pack by doing the following:
   - **set tone-clock *UUC*** — Where UUC is the standby Tone-Clock circuit pack.

     NOTE:
     For a critical-reliability system (duplicated PNC), the system generally expects an EPN to have its "preferred" Tone-Clock circuit pack active. For the first EPN in a given cabinet, this is carrier A. For a second EPN in the cabinet, this is carrier E.

   - **status system** — Verify the Tone-Clock circuit pack switched to the other Tone-Clock circuit pack or check the LEDs. The amber LED of the new standby Tone-Clock circuit pack should be off (provided maintenance is not running on it) and the amber LED of the active Tone-Clock circuit pack should be blinking.
   - If the interchange was not successful, the standby Tone-Clock circuit pack may be defective. In particular, if the error message "must use override" is displayed, fix the standby Tone-Clock circuit pack before attempting to replace the active one.
3. Pull out the defective Tone-Clock circuit pack. No calls should be affected. If this is a TN2182 circuit pack, some ETR-PTs may be in use and removal of the pack will affect some individual users. It may be less disruptive to busyout the standby TN2182 before removing it.
4. Insert a new Tone-Clock circuit pack of the appropriate code in the same slot where the defective Tone-Clock circuit pack was removed.
5. Test the new Tone-Clock circuit pack via the **test tone-clock *UUC* long** command to make sure it is functioning properly. If the Tone-Clock circuit pack is being replaced due to loss of c locks, the Clock Health Inquiry (#46) will still report a failure, proceed with the next step.

To verify that the new Tone-Clock circuit pack can generate clocks for the system, switch to the new Tone-Clock with **set tone-clock *UUC* override**, and execute **test tone-clock *UUC***. If the new Tone-Clock circuit pack is able to generate system clocks, there will be no system disruption.

CAUTION:
If the new Tone-Clock circuit pack is not able to generate system clocks, this procedure becomes destructive. The system will detect a loss of clock and recover accordingly. If the Tone-Clock circuit pack being replaced is in an EPN, the system will reset the EPN (EPN cold restart). After either type of restart, the faulty Tone-Clock circuit pack will be in standby mode.

6. Place several phone calls.
7. After repairs in an EPN, the **set tone-clock *UUC*** command should be used if required to make the preferred Tone-Clock circuit pack active.

IPSI/Tone Clock LED States

For the TN2312 IPSI circuit pack, there are four LEDs on the IPSI's faceplate. The top three LEDs are the standard ones found on any TN circuit pack. The fourth LED imitates the TN2182B Tone-Clock's amber LED. The active/standby state of an IPSI or Tone-Clock circuit pack may also be determined by looking at its LEDs. A continuously lit red LED on the circuit pack indicates a reported fault on one or more of its MOs. Flashing patterns of the yellow and green LEDs correspond to the following service states:

Table 8-647. LED Condition/Tone-Clock Circuit States

Condition	Tone-Clock Circuit State	Explanation
flashing yellow 2.7 seconds on 0.3 seconds off	active	An external timing source is being used as a synchronization reference[1].
flashing yellow 0.3 seconds on 2.7 seconds off	active	The local oscillator on the IPSI or Tone-Clock circuit pack is being used as a synchronization reference.
yellow on continuously	active	The circuit pack has been reset but has not been told which synchronization source to use.
yellow LED off	standby	The circuit pack is in standby mode, (neither generating tones nor supplying clocks).

Continued on the next page

Table 8-647. LED Condition/Tone-Clock Circuit States — *Continued*

Condition	Tone-Clock Circuit State	Explanation
"jingle bells" green and yellow 0.1 sec on, 0.2 sec off, 0.1 sec on, 0.4 sec off, 0.4 sec on, 0.4 sec off	standby	Maintenance software is testing the standby circuit pack (the standby Tone-Clock is providing tones).
"double blink" yellow 0.3 sec on, 0.3 sec off, 0.3 sec on, 2.4 sec off,	active	TN2312 or TN2182 has lost all external references and is in holdover mode.
other green and yellow patterns	active	Maintenance software is testing the active circuit pack.
random yellow	standby	If the circuit pack is a TN2182, the amber LED may come on and off intermittently as ETR-PTs on the board are used for tone-detection services.

1. For a Tone-Clock in the master PN, the external source is a primary or secondary DS1 source, or a Stratum-3 clock. For a Tone-Clock in a slave PN, the external source is the Expansion Interface circuit pack.

Error Log Entries and Test to Clear Values

Table 8-648. Tone-Clock Circuit Pack Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test tone-clock *PC* sh**
1 (a)	0	Circuit pack removed or SAKI Sanity test (#53)	MINOR	ON	
18 (b)	0	**busyout tone-clock *PC***	WARNING	OFF	**release tone-clock *PC***
23 (c)	0	None	WARNING	OFF	
125 (d)		None	MINOR	ON	
126 (e)		None	MINOR	ON	
257 (f)	65535	Control Channel test (#52)	MINOR	ON	**test tone-clock *PC* r 20**
257 (f)	Any	None			
513 (g)	Any	None			
769 (h)	4358	None			
1025 (i)	4363	NPE Audit test (50)			**test tone-clock *PC* sh**
1538 (j)	Any	None	MINOR	ON	
2049 (k)	0	Clock Health Inquiry test (#46)	MAJOR	ON	**set tone-clock *UC* override**[3]
2305 (k)	0	Clock Health Inquiry test (#46)	MAJOR	ON	**set tone-clock *UC* override**[3]
2561 (l)	Any	None	MAJOR	ON	
3329 (m)	0	None	MINOR/ WARNING [2]	OFF	**set tone-clock *UC* override**[3]
3840 (n)	Any	None			
3848 (o)	0	Clock Health Inquiry test (#46)			**set tone-clock *UC* override**[3]
3856 (p)			MAJOR	ON	**set tone-clock *UC* override**[3]
3857, 3858 (q)		NONE	MAJOR	ON	**busyout/release ipserver-interface**
3872 (r)	0	None			**set tone-clock *UC* override**[3]
3999 (s)	Any	None			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. Minor alarms on this MO may be downgraded to Warning alarms based on the value used in the **set options** command.
3. For a TN2312 IPSI-supported port network, use the command ***set ipserver-interface***.

Notes:

a. **Error Type 1** — This error indicates the circuit pack totally stopped functioning or it was physically removed from the system.

NOTE:
The alarm is logged approximately 11 minutes after the circuit pack is removed/SAKI Sanity test (#53) fails.

If the circuit pack is not present in the system, insert a circuit pack in the slot indicated by the error to resolve the error.

If the circuit pack is present in the system, it is faulty and must be replaced. See the preceding section, *"Replacing the IPSI or Tone-Clock Circuit Pack"*.

If the faulty circuit pack is in standby mode, a MINOR alarm is raised, but no other system action is taken. If the circuit pack is the active Tone-Clock, further effects of this error depend on the system's reliability option.

Table 8-649. Effects of Tone-Clock Failures Depending on Reliability

Reliability Option	Effects
Duplex	EPN goes down.
High	IPSI interchange in IPSI-connected EPN Non-IPSI-connected EPN goes down
Critical	IPSI interchange in IPSI-connected EPN Interchange to standby Tone-Clock circuit pack in non-IPSI-connected EPN

If an interchange is attempted in an MCC EPN ***and*** the system is unable to activate the standby Tone-Clock, Emergency Transfer is activated. When this happens, both circuit packs are faulty and must be replaced. See *"Replacing the IPSI or Tone-Clock Circuit Pack"*.

If a successful interchange occurs in response to a failure of the active Tone-Clock ***or*** if a standby Tone-Clock fails, the faulty Tone-Clock should be replaced.

b. **Error Type 18** — The indicated IPSI or Tone-Clock circuit pack has been made unavailable via the **busyout tone-clock *PC*** or the **busyout ipserver-interface *UC*** command. This error applies only to high- or critical-reliability systems (an active Tone-Clock may not be busied out). To resolve this error, execute **release tone-clock PC**, or **release ipserver-interface** command.

c. **Error Type 23** — The circuit pack has been logically administered but not physically installed. Installing the circuit pack will resolve the alarm.

d. **Error Type 125** — A wrong circuit pack is inserted in the slot where this circuit pack is logically administered. To resolve this problem, either:

   1. Remove the wrong circuit pack, and insert the logically administered circuit pack.

      or

      Use the **change circuit-pack** command to re-administer this slot to match the circuit pack inserted.

e. **Error Type 126** — The port network specified in the PORT field of the error log entry booted up without a Tone-Clock circuit pack, or with a one that cannot communicate at all with the system. The error is logged five minutes after the port network is restarted. If no circuit pack is present, install one of the proper code. If there is a circuit pack present, replace it. See *''Replacing the IPSI or Tone-Clock Circuit Pack''*.

f. **Error Type 257** — This error indicates transient communication problems with this circuit pack. This error is not service-affecting and no action is required.

g. **Error Type 513** — This circuit pack has an on-board hardware failure. Replace the circuit pack using the procedure described in *''Replacing the IPSI or Tone-Clock Circuit Pack''*.

h. **Error Type 76** — This error can be ignored, but look for other errors on this circuit pack.

i. **Error Type 1025** — This error is not service-affecting and no action is required.

j. **Error Type 1538** — The circuit pack was taken out of service because of an excessive rate of uplink messages. Use **test tone-clock *PC* long** to reset the circuit pack and put it back into service. If the command is not successful, replace the circuit pack using the procedure described in *''Replacing the IPSI or Tone-Clock Circuit Pack''*. If the alarmed circuit pack is the active Tone-Clock of a duplicated pair, first interchange Tone-Clocks via the **set tone-clock *PC*** command to avoid a service outage. If the error occurs again within 15 minutes, follow normal escalation procedures.

k. **Error Type 2049 or 2305** — These errors indicate the loss of one or more clock signals from the reported IPSI or Tone-Clock circuit pack, which was active at the time of the error. The effect of any of these errors is described in the table for error type 1. Diagnosis of the problem is the same for all four error types, with the exception noted below.

   1. Examine the Hardware Error Log for errors reported against circuit packs in the same port network, especially TDM-CLK, TONE-BD, and EXP-INTF. Follow the repair or replacement procedures indicated for any such errors found.

2. If the error is not corrected by resolving errors found in step 1, the IPSI or Tone-Clock circuit pack should be replaced. See *"Replacing the IPSI or Tone-Clock Circuit Pack"*.

   NOTE:
   Replacing the circuit pack and retesting it with the **test tone-clock** command is not adequate to retire this alarm and return the IPSI or Tone-Clock circuit pack to full service; the Clock Health Inquiry test (#46) will continue to fail. Because the ability to generate clocks was considered lost, once any repairs have been made it is necessary to execute the **set tone-clock *PC* override** command, forcing the circuit pack to become active. If the problem has not actually been corrected, this action may cause a disruption in service for active digital facilities users.

3. If error 2305 or 3848 persists, all clock signals from the indicated board were lost.

   If the reported Tone-Clock circuit is in a port network with duplicated Tone-Clocks, the problem may lie with the circuit pack responsible for selecting the active Tone-Clock circuit (the *t/c selector*). For an EPN, the t/c selector is the active EXP-INTF circuit pack.

   The t/c selector circuit pack of interest is the one which was active at the time the error was logged. This is the currently active t/c selector, unless there has been an EXP-INTF link switch for an EPN problem. In order to determine whether an interchange has occurred since the TONE-BD error, examine the **display initcauses** log for EXP-LNK entries in the hardware error log for expansion link interchanges.

   If the t/c selector circuit pack was not replaced as part of the previous step, replace it now. Follow procedures described in "EXP-INTF (Expansion Interface Circuit Pack)" on page 8-762 for the Expansion Interface.

4. If the error has not been corrected at this point, there is a problem with the TDM bus within the port network containing the reported Tone-Clock circuit. This may include TDM bus intercarrier cables, bus terminators, bent pins on the backplane, and errors on any circuit pack plugged into the same port network. See "TDM-BUS (TDM Bus)" on page 8-1588.

l. **Error Type 2561**—This error indicates that a Tone-Clock circuit pack, with a different circuit-pack code as required for this system, has been inserted in the port slot as shown in the Hardware Error Log. To resolve this error, see ''Replacing the IPSI or Tone-Clock Circuit Pack'' for an appropriate circuit pack code and replace the Tone-Clock circuit pack according to the procedures indicated for this system. The meanings of the aux data values are as follows:

1002	A TN756 Tone-Clock circuit pack (instead of a TN2312) is in a duplex-reliability system's EPN.
1003	Either a TN741, TN714, TN768, TN780, or TN2182 Tone-Clock circuit pack (instead of a TN2312 IPSI) is in a duplex-reliability system's EPN.
1004	Either a TN741 or TN714 Tone-Clock circuit pack (instead of a TN768, TN780, TN2182, or TN2312) is in a high- or critical-reliability system's EPN.
1005	Same as for aux value 1004.

m. **Error Type 3329**—The system attempted but failed to interchange IPSI or Tone-Clock circuit packs. (This error occurs only in port networks with duplicated Tone-Clocks.) The fault may lie in the standby Tone-Clock or in the circuit pack that controls selection of the active Tone-Clock (the *t/c selector*). The goal of the following procedure is to ensure that both Tone-Clocks can be interchanged to while either t/c-selector circuit pack is active.

1. Examine the Error Log for errors reported against circuit packs in the same port network, paying special attention to TDM-CLK, TONE-BD, DUPINT, SW-CTL, and EXP-INTF. Follow the procedures indicated for any such errors found. After eliminating the above potential problem sources, proceed with the following steps.
2. Determine which circuit pack was controlling the choice of Tone-Clock at the time the error occurred.
   - For an EPN, the t/c selector is the active EXP-INTF circuit pack that is connected to the active PN. This is EXP-INTF 2A01 or 2B02 for EPN1 and 3A01 or 3B02 for EPN2.

   The t/c-selector circuit pack of interest is the one which was active at the time the error was logged. An EXP-LNK interchange since the time of the error may have made that circuit pack the current standby. Determine whether an interchange affecting the t/c selector has occurred since the TONE-BD error. When investigation an EPN Tone-Clock, look for EXP-LNK entries in the hardware error log for PNC interchanges, which would affect the EXP-INTF.

3. If the t/c selector has not undergone an interchange since the error occurred, go to the next step. If such an interchange has taken place, interchange back to the formerly active t/c selector. Use the **set expansion-interface** command when investigating an EPN Tone-Clock.) If the interchange attempt fails due to other errors, resolve those problems first.
4. Interchange the IPSI or Tone-Clock circuits, using the **set tone-clock *PC*** command. If the command succeeds, the interchange which previously failed has been accomplished and the problem has been satisfactorily resolved. If it fails, proceed to the next step. (You may want to proceed in any case to definitively test all relevant components.)
5. Interchange the t/c selector using **set expansion-interface** if investigating an EPN. If errors prevent this interchange, resolve them first.
6. Attempt again to interchange Tone-Clocks with the **set tone-clock *PC*** command.

   If the Tone-Clock interchange failed for both t/c selectors, replace the standby Tone-Clock circuit pack which could not be interchanged into and return to this step. (See *''Replacing the IPSI or Tone-Clock Circuit Pack''*.) Test the new circuit pack as follows:

   a. Execute the **set tone-clock *PC*** command.
   b. Execute **set expansion-interface**, if this is an EPN Tone-Clock.
   c. Execute the set tone-clock PC command again.

      If these commands successfully complete, the problem has been resolved.

      — If these commands successfully complete, the problem has been resolved.

      — If the IPSI or Tone-Clock circuit packs successfully interchange when one EXP-INTF is active, but not when the other one is:

      The t/c-selector circuit pack on the failing side is suspect.

   d. Replace the EXP-INTF board that is active when the Tone-Clock interchange fails. (For the Expansion Interface, see ''EXP-INTF (Expansion Interface Circuit Pack)'' on page 8-762.
   e. Make sure the new t/c selector is active and execute the **set tone-clock *PC*** command.

      — If both Tone-Clocks can be interchanged into, and interchanges succeed when either t/c selector is active, the problem has been resolved.

n. **Error Type 3840** — This error is not service-affecting and can be ignored. It indicates that the circuit pack has received a bad control message from the switch.

o. **Error Type 3848** — This error indicates that the IPSI or Tone-Clock circuit pack had a loss of clock. If error 2305 is also logged, see step k.

p. **Error Type 3856** — This error indicates that the IPSI or Tone-Clock circuit pack had a loss of clock. If error 2305 is also logged, see the note for Error Type 2305, step k.

q. **Error Type 3857, 3858** — These errors are reported by software when an uplink message is received from the active IPSI's Archangel firmware. Both error types indicate that a loss of one or more clock signals were detected by the archangel, and subsequently restored by changing the CLKSEL lead[1]. If the IPSI archangel restores the clock signals by activating the [A] IPSI/Tone-Clock, then error type 3857 is reported. If the clock signals are restored by activating the [B] IPSI/Tone-Clock, then error type 3858 is reported. A Cold 2 Restart should occur in a port network immediately after error type 3857 or 3858 is reported.

   Duplex Reliability — Since there is only one IPSI in the port network, error type 3858 can never occur. When error type 3857 occurs, it means the [A] IPSI archangel experienced a loss of clock, but clocking was subsequently restored using the [A] IPSI/Tone-Clock.

   High or Critical Reliability — If the [B] IPSI is active and the [A] IPSI is healthy when error type 3857 is reported, then software attempts to initiate an IPSI interchange to activate the archangel and PKT-INT on the [A] IPSI, thereby ensuring that the active Tone-Clock, PKT-INT, and archangel are all on the same IPSI. If the [A] IPSI is unhealthy, then software initiates a transition to EI-Fallback mode. If the [A] IPSI is active when error type 3857 is reported, it means the archangel for the [A] IPSI had to switch the state of the CLKSEL lead more than once to restore the lost clock signals.

   When error type 3858 is reported, if the [A] IPSI is active and the [B] IPSI is healthy, then software attempts to initiate an IPSI interchange to activate the archangel and PKT-INT on the [B] IPSI. If the [B] IPSI is unhealthy, then software initiates a transition to EI-Fallback mode. If the [B] IPSI is active when error type 3858 is reported, it means the archangel for the [B] IPSI had to switch the state of the CLKSEL lead more than once to restore the lost clock signals.

   For the high and critical reliability configurations, error type 2305 should be logged against MO_TGEN_BD for the standby IPSI/Tone-Clock after error type 3857 or 3858 is reported.

r. **Error Type 3872** — These errors indicates that an IPSI or Tone-Clock circuit pack had a loss of Data Clocks. This error will impact mainly users on station connected to Digital circuit packs. These users could be with out service. If error 2049 is also logged see step k.

1. Whenever, the active archangel detects a loss of clock, it will alternate the state of the CLKSEL lead until the lost clock signals are restored.

s. **Error type 3999** — This error type indicates that the circuit pack sent a large number of control channel messages to the switch within a short period of time. If error type 1538 is also present, then the circuit pack was taken out of service due to hyperactivity. If error type 1538 is not present, then the circuit pack has not been taken out of service, but it has generated 50% of the messages necessary to be considered hyperactive. This may be completely normal during heavy traffic periods. However, if this error type is logged when the circuit pack is being lightly used, it may indicate a problem with the circuit pack or the equipment attached to it.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the SAKI Reset test for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
SAKI Reset test (#53) (a)		X		D
Clock Health test (#46)	X	X		ND
Control Channel Loop-Around test (#52) (a)	X	X		ND
Tone Generator Crosstalk test (#90) (b)		X		ND
Tone Generator Transmission test (#40) (b)	X	X		ND
Tone Generator Audit/Update test (#41) (b)	X	X		ND
Tone Detector Verification test (#42) (e)	X	X		ND
Tone Detector Audit/Update test (#43) (e)	X	X		ND
TDM Bus Clock Circuit Status Inquiry test (#148) (c)	X	X		ND
TDM Bus Clock Slip Inquiry test (#149) (c, e)	X	X		ND
TDM Bus Clock PPM Inquiry test (#150) (c)	X	X		ND
TDM Bus Clock Parameter Update test (#151) (c)	X	X		ND
Board Type Check test (#574) (c)	X	X		ND
Standby Reference Health Check test (#651) (c, d)		X		ND

1. D = Destructive; ND = Nondestructive

Notes:

a. See ''XXX-BD (Common Port Circuit Pack)'' on page 8-1872 for descriptions of these tests.

b. See ''TONE-PT (Tone Generator)'' on page 8-1682 for descriptions of these tests.

c. See ''TDM-CLK (TDM Bus Clock)'' on page 8-1604 for descriptions of these tests.

d. This test runs only on the standby IPSI or Tone-Clock circuit in a port network with duplicated Tone-Clocks (high- or critical-reliability systems). The circuit pack must be a TN780 with firmware version 2 or above.

e. See ''ETR-PT (Enhanced Tone Receiver Port)'' on page 8-755 for descriptions of these tests.

Clock Health Inquiry Test (#46)

This inquiry reads special data stored in memory to determine if this IPSI or Tone-Clock circuit pack had a loss of any of three clock types:

- SYSCLK
- SYSFM
- SYSDCLK

If this data indicates this IPSI or Tone-Clock circuit pack had a loss of any of these clocks, the inquiry reports FAIL. In addition, if TDM-CLK error 1 is at threshold, this test will FAIL. TDM-CLK error 1 indicates a suspect clock is at the edge of its specified frequency. If the circuit pack did not have a loss of clock or TDM-CLK error 1 at threshold, the inquiry reports PASS.

This is not really a test, in the sense that it simply reports status held by the system, and does not generate new information or raise alarms. If this test fails with no error code, there is at least one Major alarm against an IPSI or Tone-Clock circuit pack. If this test fails with an error code of 1, there is at least one Minor off-board alarm against a TDM-CLK.

Table 8-650. Test #46 Clock Health Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error. Retry the command at 11-minute intervals up to 5 times.
none	FAIL	This Tone-Clock or IPSI circuit pack had an apparent loss of clock. One or more of error types 2049, 2305, 3834, 3857, 3858 and 3872 will appear in the error log. Correct the problem according to the appropriate error log entries. ***Tone -Clock circuit pack*** – Once this test fails for a Tone-Clock circuit pack, the only way to make it pass (and to retire its associated alarm) is to repair the problem and to execute the **set tone-clock UUC override** command against the indicated or Tone-Clock circuit pack. ***IPSI's Tone-Clock circuit*** – Once this test fails for an IPSI circuit pack's Tone-Clock circuit, the only way to make it pass (and to retire the associated alarm) is to repair the problem, to execute the **busy ipsi** command, and then issue the **release ipsi** command against the indicated IPSI circuit pack.
1	FAIL	This IPSI or Tone-Clock circuit pack is suspected of having a clock at the edge of its specified frequency. A Tone-Clock circuit pack with this problem can cause Expansion Interface circuit packs and SNI circuit packs to go out-of-frame or report no neighbor conditions, thus causing EPNs, Expansion Archangel Links (EALs), Remote Neighbor Links (RNLs), and/or Local Neighbor Links LNLs) to go down. Replace the IPSI or Tone-Clock circuit pack identified in the error log. See ''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666.
	PASS	This IPSI or Tone-Clock circuit pack has not reported a loss of clock.

Continued on next page

Table 8-651. Test #46 Clock Health Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error. Retry the command at 11-minute intervals up to 5 times.
none	FAIL	This Tone-Clock or IPSI circuit pack had an apparent loss of clock. One or more of error types 2049, 2305, 3834, 3857, 3858, and 3872 will appear in the error log. Correct the problem according to the appropriate error log entries. ***Tone-Clock circuit pack*** – Once this test fails for a Tone-Clock circuit pack, the only way to make it pass, and to retire the associated alarm, is to repair the problem and to execute the **set tone-clock UUC override** command against the indicated Tone-Clock circuit pack. ***IPSI Tone -Clock*** – Once this test fails for an IPSI Tone-Clock, the only way to make it pass (and to retire the associated alarm) is to repair the problem, to execute the **busy ipserver-interface** command, and then issue the **release ipserver-interface** command against the indicated IPSI circuit pack.
1	FAIL	This IPSI or Tone-Clock circuit pack is suspect of having a clock at the edge of its specified frequency. A Tone-Clock circuit pack with this problem can cause Expansion Interface circuit packs and SNI circuit packs to go out-of-frame or report no neighbor conditions, thus causing EPNs, Expansion Archangel Links (EALs), Remote Neighbor Links (RNLs), and/or Local Neighbor Links (LNLs) to go down. Replace the IPSI or Tone-Clock circuit pack identified in the error log. See ''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666.
	PASS	This IPSI or Tone-Clock circuit pack has not reported a loss of clock.

TONE-PT (Tone Generator)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command To Run[1]	Full Name of MO
TONE-PT	MAJOR	**test tone-clock *UUC* short**	Tone Generator
TONE-PT	MINOR	**test tone-clock *UUC* short**	Tone Generator
TONE-PT	WARNING	**release tone-clock *UUC***	Tone Generator

1. UU is the universal cabinet number (1–44 for CSS PNC, 1–64 for ATM PNC). C is the carrier designation (A, B, C, D, or E).

NOTE:
Replacing the IPSI or Tone-Clock circuit pack requires a special procedure which is described in "TONE-BD (Tone-Clock Circuit)" on page 8-1659. That section also describes the LED display for this board.

The tone generator resides on the IPSI or Tone-Clock circuit pack and provides all system tones such as dial tone, busy tone, and so on. If an active tone generator fails, its port network may not have tones (see the "Tone Generator Transmission Test (#40)" on page 8-1686. For instance, a user may go off-hook and hear no dial tone. This problem will affect only users on the same port network where the faulty IPSI or Tone-Clock circuit pack resides. The system will be able to process certain type of calls (that is, internal calls will succeed while outgoing calls will not).

The IPSI or Tone-Clock circuit pack also provides the clocks for the system and can serve as the synchronization reference. Therefore, when resolving alarms on the IPSI or Tone-Clock circuit pack, use the "TDM-CLK (TDM Bus Clock)", "SYNC (Port-Network Synchronization)", and "TONE-BD (Tone-Clock Circuit)" maintenance documentation.

See "TONE-BD (Tone-Clock Circuit)" on page 8-1659 for a discussion of the relationship of Tone-Clock circuit packs with the various reliability options.

Error Log Entries and Test to Clear Values

Table 8-652. Tone Generator Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test tone-clock *UUC* r 1**
1 (a)	17664	Tone Generator Audit/ Update test (#41)	MAJOR/ MINOR[2]	ON	**test tone-clock *UUC* r 2**
18 (b)	0	**busyout tone-clock *UUC***	WARNING	OFF	**release tone-clock *UUC***
130 (c)		None	MINOR	ON	**test tone-clock *UUC* Sh**
257 (d, f)	17667	None	MINOR	ON	
513 (e, f)	17666	Tone Generator Audit/ Update test (#41)	MINOR	ON	**test tone-clock *UUC* r 3**
769	Any	Transmission test (#40)	MAJOR/ MINOR[2]	ON	**test tone-clock *UUC* r 3**
1025		Crosstalk test (#90)	MAJOR/ MINOR[2]	ON	**test tone-clock *UUC* l r 2**
1281 (g)	Any	Tone Generator Audit/ Update test (#41)	MINOR	ON	**test tone-clock *UUC* r 3**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. MAJOR alarm if the alarmed IPSI or Tone-Clock circuit pack is not duplicated; MINOR if it is duplicated within the same EPN.

Notes:

a. A failure in the tone generation facility on the indicated circuit pack has been detected. Replace the circuit pack. See *''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666*.

b. The indicated IPSI or Tone-Clock circuit pack has been made unavailable via the **busyout Tone-Clock *UUC*** command. It only applies to systems which have the high- or critical-reliability option administered, because only a standby Tone-Clock circuit may be made busy by that command. To resolve this error, execute the **release tone-clock *UUC*** command for the alarmed circuit pack.

c. This error type indicates that the circuit pack has been removed or has been insane for more than 11-minutes. To clear the error, reinsert or replace the circuit pack.

d. The tone generation facility is having problems verifying that tones have been connected as requested.

e. The tone generation facility may or may not be able to generate tones.

f. Infrequent errors, at a rate which does not bring up an alarm, probably do not affect service, unless there are customer complaints of no tones, or incorrect tones which can not be explained in any other way. However, if an alarm is raised because this error is being repeatedly logged, then the circuit pack should be replaced. See *''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666*.

g. The system-parameters country-options administration requires a TN780 or TN2182 Tone-Clock or a TN2312 IPSI circuit pack, but the existing Tone-Clock circuit does not provide the needed functionality. The Base Tone Generation Set on page 1 or the custom tones beginning on page 2 of the system-parameters country options form may have values not supported by the existing Tone-Clock.

   This error (1281) indicates that the system parameters country-options form has custom tones translated and that the alarmed tone board does not support the customized tones. TN768 tone boards do not support any customized tones. TN780 tone boards support up to 6 customized tones using the following frequencies/levels only:

Silence	404Hz at 11.0 dB
350Hz at 17.25 dB	404Hz at 16.0 dB
425Hz at 4.0 dB	480Hz+620Hz at 24.0 dB
425Hz at 11.0 dB	404Hz+425Hz at 11.0 dB
425Hz at 17.25 dB	375Hz+425Hz at 15.0 dB
440Hz at 17.25 dB	404Hz+450Hz at 11.0 dB
350Hz+425Hz at 4.0 dB	1000Hz at 0.0 dB
350Hz+440Hz at 13.75 dB	1000Hz at +3.0 dB
480Hz at 17.25 dB	525Hz at 11.0 dB
620Hz at 17.25 dB	1400Hz at 11.0 dB
440Hz+480Hz at 19.0 dB	

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the SAKI Reset test for example, you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
SAKI Reset test (#53) (a)		X		D
Clock Health test (#46) (b)	X	X		ND
Control Channel Loop-around test (#52) (a)	X	X		ND
Tone Generator Crosstalk test (#90)		X		ND
Tone Generator Transmission test (#40)	X	X		ND
Tone Generator Audit/Update test (#41)	X	X		ND
TDM bus Clock Circuit Status Inquiry test (#148) (c)	X	X		ND
TDM Bus Clock Slip Inquiry test (#149) (c)(e)	X	X		ND
TDM bus Clock PPM Inquiry test (#150) (c)	X	X		ND
TDM bus Clock Parameter Update test (#151) (c)	X	X		ND
Board Type Check test (#574) (c)	X	X		ND
Standby Reference Health Check test (#651) (c, d)		X		ND

1. D = Destructive; ND = Nondestructive

Notes:

a. See ''XXX-BD (Common Port Circuit Pack)'' for descriptions of these tests.

b. See ''TONE-BD (Tone-Clock Circuit)'' for descriptions of these tests.

c. See ''TDM-CLK (TDM Bus Clock)'' for descriptions of these tests.

d. This test only runs on the standby IPSI or Tone-Clock circuit in an EPN with more than one IPSI or Tone-Clock circuit pack (high- or critical-reliability system). The circuit pack must be a TN780 code with firmware revision 2 or above.

e. Test #149 does not run on the TN2182 or TN2312.

Tone Generator Transmission Test (#40)

The purpose of this test is to verify that the tone generation hardware on the IPSI or Tone-Clock circuit pack is capable of generating a subset of system tones and a set of test tones. This test does not verify all system tones the tone generator produces during normal system operation.

The test is performed in two parts. For the first part, the Tone Generator is told to generate the touch-tone digits. The digits are received and checked by a Tone Detector's touch-tone detector. If any of the digits fail, the test is repeated using a touch-tone detector in another Tone Detector circuit pack.

For the second part, the Tone Generator is told to generate call-progress tones that are detected and identified by a tone detector. These tones are:

- 440 Hz
- 2225 Hz
- Digital Count

The tone generator is then told to generate a sequence of test tones whose output levels are measured by a tone detector. These tones are:

- 404 Hz at 0 dB
- 1004 Hz at -16 dB
- 1004 Hz at 0 dB
- 2804 Hz at 0 dB

A Tone Detector's general-purpose tone detector listens for tones and measures their quality. If any of the measured values are not within limits, the test is repeated using a general-purpose tone detector in a different Tone Detector circuit pack. If the values are still out of the limits, the test will fail.

For every failure case of Test #40, do the following:

1. Check that all Tone Detector circuit packs have the same companding mode as that administered for the system. Correct the situation if there is a mismatch.
2. Run the long test sequence: **test tone-clock *PC* long repeat 1**.
3. If the problem persists, replace the IPSI or Tone-Clock circuit pack by following the steps outlined in ''Replacing the IPSI or Tone-Clock Circuit Pack'' on page 8-1666.

Table 8-653. Test #40 Tone Generator Transmission Test

Error Code	Test Result	Description / Recommendation
None	ABORT	The system was not able to allocate all the resources needed for this test or there was an Internal system error.
1	ABORT	The system could not allocate all the resources needed to test the DTMF tones.
1001	ABORT	The system was not able to put the tone generation facility in the appropriate mode to test it.
1002	ABORT	The system could not allocate time slots for the test connection. This can happen when the system is heavily loaded. If the system is not heavily loaded, then test the TDM bus via the **test tdm port-network *PN#*** command. 1. Retry the command at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test connection. This can happen when the system is heavily loaded or there is not an IPSI or Tone Detector circuit pack in the port network where this test is being executed. 1. Make sure there is an IPSI or Tone Detector circuit pack in the same port network. 2. If the circuit pack is missing, install one in the same port network. 3. Allow approximately 1-minute for Tone Detector maintenance to run on the newly inserted IPSI or Tone Detector circuit pack. 4. Retry the command at 1-minute intervals up to 5 times.
1022	ABORT	Tone detection for the system is administered as wide broadband (tone detection mode 5), and the Tone Detector used for this test was not a TN420C (the only circuit pack with this capability). GPTD ports on other types of Tone Detector circuit packs are taken out of service since they cannot provide the administered function. Either: ■ Change the tone-detection mode administered on the system-parameters country-options form. (Refer to *Administrator's Guide for Avaya MultiVantage Software*, 555-233-506.) ■ Remove all non-TN420C circuit packs from the system.
2000	ABORT	Response to the test request was not received within the allowable time period. System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1 (a)	FAIL	DTMF generation failed for the active tone generator.
105 (a)	FAIL	Generation of 440-Hz failed.
109 (a)	FAIL	Generation of 2225-Hz failed.
110 (b)	FAIL	Generation of 404-Hz level invalid.

Continued on next page

Table 8-653. Test #40 Tone Generator Transmission Test — *Continued*

Error Code	Test Result	Description / Recommendation
111 (b)	FAIL	Generation of 1004-Hz low level invalid.
112 (b)	FAIL	Generation of 1004-Hz high level invalid.
113 (b)	FAIL	Generation of 2804-Hz level invalid.
115 (b, c)	FAIL	Generation of digital count sequence invalid.
120 (a)	FAIL	Generation of quiet tone failed.
1044 (a)	FAIL	DTMF generation failed to generate Digit 1 for the standby tone generator.
1045 (a)	FAIL	DTMF generation failed to generate Digit 5 for the standby tone generator.
1046 (a)	FAIL	DTMF generation failed to generate Digit 9 for the standby tone generator.
1047 (a)	FAIL	DTMF generation failed to generate Digit D for the standby tone generator.
	PASS	The tone generation facility is able to generate and transmit all the tones.

Notes:

Except in EPNs containing more than one IPSI or Tone-Clock circuit pack, replacing an IPSI or Tone-Clock circuit pack is a service disrupting procedure. The test should be run several times with more than one failure before the replacement policy specified in the following notes is executed. Use the procedure described in *"Replacing the IPSI or Tone-Clock Circuit Pack"*.

a. All the failure error codes marked with (a) may affect users if the failure is on the active tone generator. When this type failure is detected, the system will attempt to move the tone generation function to the alternate IPSI or Tone-Clock circuit pack, if one is present in the affected port network. When the tone generation facility fails in this way, especially in a port network without duplicated IPSI or Tone-Clock circuit packs, the faulty IPSI or Tone-Clock circuit pack should be replaced promptly.

b. All the failure error codes marked with (b) are almost transparent to the user. Again, when this type failure is detected, the system will attempt to move the tone generation function to the alternate IPSI or Tone-Clock circuit pack, if one is present in the affected port network. Users may or may not hear any noisy tones. This type of failure affects maintenance on other objects. Maintenance may not be able to run on other objects which use the tone generation facility (that is, Tone Detector circuit maintenance). In this case, the IPSI or Tone-Clock circuit pack can be replaced as suitable to the customer.

c. Error code 115 may also be caused by TDM bus corruption. This normally means a physical problem with bent backplane pins, TDM/LAN bus cabling, or TDM/LAN bus terminators. Such physical problems should especially be suspected if board replacement or other physical activity has occurred just before this error is observed.

   Use **display errors** to look for errors on other circuit packs in the carriers of the same port network as the indicated Tone-Clock circuit. If any are found, they should be resolved if possible, and the IPSI or Tone-Clock circuit pack retested. If this does not clear the problem, the IPSI or Tone-Clock circuit pack should be replaced and the new one tested. If the problem persists, follow instructions for TDM bus maintenance in this manual.

Tone Generator Update/Audit Test (#41)

The active tone generation facility is refreshed with all the time slot tone information. This test also triggers in-line error messages the IPSI or Tone-Clock circuit pack generates when it detects problems by itself.

A check is also made between the type of Tone-Clock being tested and the type of Tone-Clock needed based on system administration. The administration on the system-parameters country-options form may imply that a TN780 is required.

Table 8-654. Test #41 Tone Generator Update/Audit Test

Error Code	Test Result	Description / Recommendation
none	ABORT	The system was not able to allocate all the resources needed for this test.
2100	ABORT	System resources required for this test are not available.
1	FAIL	The system requires a TN780, TN2182, or TN2312 Tone-Clock circuit to support the administered country-options tone-generation parameters. 1. Check the administration on the system-parameters country-option form. Specifically, the Base Tone Generation Set on page 1 and any custom tone administration beginning on page 2. 2. Replace any existing IPSI with a TN2312, or an existing Tone-Clock circuits packs with a TN780 or TN2182.
	PASS	The tone generation facility has been successfully refreshed with its time-slot translation and system administration is consistent with this type of Tone-Clock. 1. Display the Hardware Error Log via the **display errors** command to make sure this circuit pack did not generate new errors.

Tone Generator Crosstalk Test (#90)

This test checks the ability of the Tone Generator to talk on a specific time slot. The tone generator is told to talk on a specific time slot. The other idle time slots are checked to make sure the Tone Generator put the tone on only the specified time slot.

Table 8-655. Test #90 Tone Generator Crosstalk Test

Error Code	Test Result	Description / Recommendation
None	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1001	ABORT	The system was not able to put the tone generation facility in the appropriate mode to test it.
1002	ABORT	The system could not allocate time slots for the test connection. This can happen when the system is heavily loaded. If the system is not heavily loaded, then test the TDM-BUS via the **test tdm port-network *PN*#** command.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The Tone Generator could be defective. In a port network with more than one IPSI or Tone-Clock circuit pack, the system will attempt to move the tone generation function to the alternate one. 1. Test the IPSI or Tone-Clock circuit pack again via the **test tone-clock *UUC*** command. 2. If the test fails again, look at the Hardware Error Log for Tone Detector circuit pack errors. 3. If there are Tone Detector circuit pack errors, see Tone Detector maintenance documentation (''DTMR-PT (Dual-Tone Multifrequency Receiver Port)'', ''GPTD-PT (General-Purpose Tone Detector Port)'', ''CLSFY-PT (Call Classifier Port)'', ''ETR-PT (Enhanced Tone Receiver Port)'' to resolve these errors first. 4. If there are no Tone Detector circuit pack errors, then the IPSI or Tone-Clock circuit pack should be replaced. See *''Replacing the IPSI or Tone-Clock Circuit Pack''*.
	PASS	The tone generation facility is able to put tones out.

TR-LN-BD (Trunk Line Board)

The TN797 Analog Trunk and Line circuit pack provides 8 ports, any of which may be administered as one of the following:

Table 8-656. TN797 Analog Trunk and Line circuit pack – port administration

Function	Group Type	Trunk Type	LED MWI
Central Office trunk (CO)	co fx wats	loop start ground start	
CAMA/E911 trunk	cama		
Direct Inward Dialing (DID) trunk	did	wink start immed start	
Analog Line on-or-off premises	n/a	n/a	with/ without MWI

In the U.S., Canada, and like countries, every CO trunk port of TN797 Analog Trunk and Line circuit packs should be administered as GS (ground-start) trunks rather than as loop-start trunks, because GS signaling provides disconnect supervision, and loop start does not. If for some reason, a port on the TN797 must be administered as loop start, it must be administered as 1-way only – either incoming or outgoing – not only at the S8700 Multi-Connect switch, but also at the CO switch. This is necessary to avoid collisions (i.e., “glare”) and other highly undesirable conditions.

The TN797 Analog Trunk and Line circuit pack does not support Neon Lamp MWI (Message Waiting Indication). No maintenance of the terminal connected to the Neon Analog Line circuit pack is performed.

For circuit pack problems, see ‘‘XXX-BD (Common Port Circuit Pack)’’ on page 8-1872.

TSC-ADM (Administered Temporary Signaling Connections)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run	Full Name of MO
TSC-ADM	none	none	Administered Temporary Signaling Connections

No alarms are generated for Administered Temporary Signaling Connections (TSC-ADM, also called ADM TSCs).

Administered temporary signaling connections provide a path through ISDN-PRI networks for supplementary D-channel messages. ISDN-PRI applications such as the Distributed Communications System (DCS) use temporary signaling connections to exchange user information across an ISDN-PRI network. What makes Administered TSCs unique is that these particular TSCs stay active for an extended period of time, similar to a permanent data connection. These ADM TSCs are used for DCS features that require Non-Call Associated (NCA) TSCs, and the ADM TSC provides the logical channel function in a DCS network.

An NCA TSC is a virtual connection established within a D channel without associating any B-channel connections. The connection provides user-to-user service by exchanging USER INFORMATION messages without associated B-channel connections.

An Administered TSC is a special NCA TSC defined for the DCS over the ISDN-PRI D channel. The ADM TSC has an administratively defined endpoint and is established for an extended period of time.

There are two types of ADM TSCs:

- Permanent

  These are established by the originating PBX (near-end ADM TSC) or by the terminating PBX (far-end ADM TSC). Once these ADM TSCs are established, they remain active.

- As-Needed

  These are established only when needed.

ADM TSC maintenance provides a strategy to verify that a far end can respond to an ISDN-PRI USER INFORMATION TSC heartbeat message, thereby indicating that user-user signaling is functioning. In addition, maintenance can retrieve the status of the ADM TSC's connection state.

Since ADM TSCs are administered on a per signaling-group basis, the health of an ADM TSC also depends on the state of the D channel or D-channel pair administered per signaling group. See ''ISDN-SGR (ISDN-PRI Signaling Group)'' on page 8-976 documentation for details on ISDN-PRI NFAS and D-channel backup maintenance.

The two administration commands for ADM TSCs are as follows:

- **add signaling-group *number***
- **change signaling-group *number***

The two maintenance commands for ADM TSCs are as follows:

- **test tsc-administered *signaling-group-number*** [***/tsc-index***]
- **status tsc-administered *signaling-group-number*** [***/tsc-index***]

Error Log Entries and Test to Clear Values

Table 8-657. ADM TSC Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
3840-3967 (a)	tsc index #	**test tsc-administered**			

Note:

a. There is no Test to Clear Value for error types 3840–3967. These error types provide the following additional data that may prove useful when tracking down problems.

   Any of these errors indicates that a TSC Heartbeat Inquiry test was run on an active far-end Administered TSC from the switch. Upon receiving the heartbeat message, the network communicated that the call was unable to complete. As a result, the error was logged. Check the signaling group status of the D channel or D-channel pair via the **status signaling-group *group*** command for the Administered TSC. Check the status of the Administered TSC via the **status tsc-administered** command. Also check the administration of the Administered TSC on the switch.

   This error may only be affecting service for some DCS customers. Upon receipt of this error condition, the switch will tear down and re-establish the ADM TSC within 20 minutes.

System Technician-Demanded Tests: Descriptions and Error Codes

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
TSC Heartbeat Inquiry test (#604)			ND

1. D = Destructive; ND = Nondestructive

TSC Heartbeat Inquiry Test (#604)

This test can be invoked by system technician personnel for any ADM TSC administered in the switch. Most of the error conditions on the following table will not log an error, but switched services may take some type of recovery action in certain instances.

This test sends a USER INFORMATION TSC heartbeat message inquiry across an ADM TSC to determine whether the far end can respond to a USER INFORMATION TSC heartbeat message.

Table 8-658. Test #604 TSC Heartbeat Inquiry Test

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Reissue the **test tsc-administered** command at 1-minute intervals up to 5 times.
1005	ABORT	The Administered TSC does not exist. 1. Display the administration for the Administered TSC. 2. If an Administered TSC exists, reissue the **test tsc-administered** command.
1113	ABORT	The D channel is out-of-service. 1. See ''ISDN-LNK (ISDN-PRI Signaling Link Port)'' on page 8-970.

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Table 8-658. Test #604 TSC Heartbeat Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1145	ABORT	There is congestion in the network. 1. Issue the **status tsc-administered** command at 1-minute intervals up to 5 times. 2. If the congestion does not clear, disable and enable the Administered TSC via the **change sig-group *group*** command. **NOTE:** To disable the Administered TSC, display the (administration) Signaling Group Form via the **change sig-group *group*** command where <group> refers to the number of the signaling group under which the suspect TSC is administered. Change the Enable field to “n.” To enable the ADM TSC, change the “Enable” field to “y.” 3. If the congestion still does not clear, check other nodes in the network.
1146	ABORT	The congestion just occurred in the network. 1. Issue the **status tsc-administered** command at 1-minute intervals up to 3 times. 2. If congestion does not clear, disable and enable the Administered TSC via the **change sig-group *group*** command. **NOTE:** To disable the Administered TSC, display the (administration) Signaling Group Form via the **change sig-group *group*** command where <group> refers to the number of the signaling group under which the suspect TSC is administered. Change the Enable field to “n.” To enable the ADM TSC, change the “Enable” field to “y.” 3. If congestion still does not clear, check the other nodes in the network.
1147	ABORT	The ADM TSC is being torn down. 1. Issue the **status tsc-administered** command at 1-minute intervals up to 3 times. 2. If ADM TSC is still down, disable and enable the ADM TSC via the **change sig-group *group*** command. **NOTE:** To disable the ADM TSC, display the (administration) Signaling Group Form via the **change sig-group *group*** command where <group> refers to the number of the signaling group under which the suspect TSC is administered. Change the Enable field to “n.” To enable the ADM TSC, change the “Enable” field to “y.” 3. If the ADM TSC is still down, check the other nodes in the network.

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Table 8-658. Test #604 TSC Heartbeat Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1148	ABORT	The ADM TSC is enabled, but inactive (near end). 1. Disable and enable the ADM TSC. 2. Reissue the **test tsc-administered** command. 3. If the ADM TSC is still inactive, check the other nodes in the network.
1149	ABORT	The ADM TSC is disabled. 1. Enable the TSC, and see if the status indicates “active.” 2. Reissue the **test tsc-administered** command. 3. If the TSC still disabled, remove the ADM TSC from the system.
1181	ABORT	Ran out of ADM TSC resources. 1. Reissue the **test tsc-administered** command at 1-minute intervals up to 3 times.
1182	ABORT	The BX.25 link is down at the gateway. 1. Disable the ADM TSC. 2. Check the status of the gateway link via the **status link *link-num*** command. 3. Once the gateway link indicates an “in-service” state, enable the Administered TSC. 4. Reissue the **test tsc-administered** command.
2000	ABORT	The Administered TSC is not responding to a TSC heartbeat inquiry. 1. Retry the **test tsc-administered** command at 1-minute intervals up to 3 times. 2. If the problem continues to fail, obtain the status of the D channel or D-channel pair associated with the ADM TSC via the **status sig-group *group*** command. If the D channel is INS (i.e., in-service) and the status of the ADM TSC appears to be active, then disable and enable the ADM TSC through administration. **NOTE:** To disable the ADM TSC, display the (administration) Signaling Group Form via the **change sig-group *group*** command where <group> refers to the number of the signaling group under which the suspect TSC is administered. Change the “Enable” field to “n.” To enable the ADM TSC, change the “Enable” field to “y.” 3. Reissue the **test tsc-administered** command. 4. If the test fails, check the ADM TSC node on the other side of the network to verify that the ADM TSC is indeed active.

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Table 8-658. Test #604 TSC Heartbeat Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
2012	ABORT	Internal system error. 1. Reissue the **test tsc-administered** command at 1-minute intervals up to 5 times.
1	FAIL	The Administered TSC is not active (far end). 1. Reissue the **test tsc-administered** command. 2. Verify that the Administered TSC node on the other side of the network is active. 3. Disable and enable the Administered TSC. 4. Retry the **test tsc-administered** command.
2	FAIL	Facility IE (Information Element) reject. 1. Check every other node in the network, and make sure Administered TSC is active.
	PASS	The Administered TSC responded to a heartbeat.

TTR-LEV (TTR Level)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run	Full Name of MO
TTR-LEV	WARNING	1	TTR Level
TTR-LEV	MINOR	1	TTR Level
TTR-LEV	MAJOR	1	TTR Level

1. See Repair Procedure for the TTR-LEV below.

TN748 and TN420 Tone Detector circuit packs and TN744 Call Classifier circuit packs provide tone receivers for detecting various types of signaling tones. These circuit packs are shared resources that serve every user of the PBX. This discussion uses the following terms and abbreviations (note that the maintenance-related system parameters form uses different names than the alarm and error logs):

Type of Tone Receiver	MO	Also Known As	Alternate Abbreviation	Location
Dual-Tone Multifrequency Tone Receiver	DTMR-PT	Touch-Tone Receiver	TTR	4 per TN420/TN748
General-Purpose Tone Detector	GPTD-PT	Call-Progress Tone Receiver	CPTR	2 per TN420/TN748
Call Classifier	CLSFY-PT		CCTR	8 per TN744

TN748s and TN420s each have 4 DTMR-PTs and 2 GPTD-PTs. DTMR-PTs interpret dual-tone multifrequency (DTMF) calling signals and translate them into logical digits 0 through 9, *, and #. GPTD-PTs detect call-progress tones, modem answer tones, and transmission test tones.

TN744 Call Classifier circuit packs have 8 CLSFY-PTs. These ports detect DTMF tones and classify network and MFC (multifrequency compelled) signaling tones. (That is, CLSFY-PTs can function as DTMR-PTs or GPTD-PTs, and have other additional capacities).

When a user goes off-hook to place a call, dial tone is returned to the user, indicating that a tone detector is connected and ready to receive and interpret tones. The tone detector is in use until the total number of digits needed is collected or until a time-out occurs. If every tone detector in the system is being used simultaneously, the next user to go off-hook will not receive dial tone until a tone detector becomes available. It is therefore necessary to have a sufficient number of tone detectors in the system to prevent delays in receiving dial tone. The **list measurements tone-receiver** command shows the level of tone detector usage.

In order to prevent dial-tone delays and other shortcomings in system performance, threshold levels for the 3 types of tone receivers are administered on the **change system-parameters maintenance** form. Whenever the number of tone receivers in service falls below the administered threshold for that type of tone receiver, an alarm is logged against the TTR Level MO. At this point, the system is operating properly, but call processing capacity is reduced. Another alarm is logged if the number falls to zero. At this point, system operation is severely compromised.

Typical causes of these events are:

1. The threshold for GPTD-PTs or DTMR-PTs is administered incorrectly on the maintenance-related system parameters form.
2. Too many GPTD-PTs, DTMR-PTs, or CLSFY-PTs have been taken out of service, possibly by maintenance software or a demand busyout.
3. A tone detector circuit pack has been removed or suffered a fatal failure, resulting in the loss of all its ports.
4. The system has an insufficient number of TN748/TN744/TN420 circuit packs.

Repair Procedure for TTR-LEV

To resolve a TTR-LEV alarm:

1. **Display errors** and use the TTR-LEV Error Log Table to determine which type of tone receiver has fallen below its threshold.

2. Enter **change system-parameters maintenance**, and check the administered value. On the form, TTR represents DTMR-PTs, CPTR represents GPTD-PTs, and Call Classifier represents CLSFY-PTs. If the threshold value is set too high, change it to a lower value and wait a minute for the alarm to clear.

   To determine the correct thresholds, first find the total number of TN478/TN420 Tone Detector and TN744 Call Classifier circuit packs in the system using the **list configuration** command. Then calculate the total number of tone receiver ports of each type. Each Tone Detector circuit pack has 4 TTR (DTMR) ports and 2 CPTR (GPTD) ports. Each TN744 Call Classifier circuit pack has 8 Call Classifier (CLSFY-PT) ports.

   For each type of tone receiver, if the total number of ports installed in the system is less than the administered threshold, then either add more circuit packs to the system or reduce the threshold to match the number already in the system. If the TTR Level alarm is still present, then proceed to Step 3.

3. **Display errors** for error type 18 and look for GPTD-PTs, DTMR-PTs, or CLSFY-PTs that have been busied out.

   For each of the busied-out ports:

   - Determine why the port was busied out.
   - If the port can be placed back into service, then test the port via the **test port *UUCSSpp*** command.
   - If every test passes, **release port** and wait 1 minute for the TTR Level alarm to clear.

   If this does not clear the TTR Level alarm, proceed to Step 4.

4. **Display alarms** and determine the location of the circuit pack with the alarmed GPTD-PT, DTMR-PT, or GPTD-PT.

   Test board *UUCSS* long rep 3 for that circuit pack.

   If this does not clear the TTR Level alarm, replace the Tone Detector or Call Classifier circuit pack with the alarmed GPTD-PT, DTMR-PT, or CLSFY-PT.

Error Log Entries and Test to Clear Values

Table 8-659. TTR Level Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1 (a)	1	None			
2 (b)	2		WARNING (See WARNING message below)	OFF	
3 (c)	3	None			
4 (d)	4		WARNING	OFF	
5 (e)	5	None			
6 (f)	6		WARNING	OFF	
7 (g)	7		MAJOR	OFF	
8 (h)	8		MINOR	OFF	
9 (i)	9		MINOR	OFF	

WARNING:
The Alarm is upgraded to MAJOR if the Base Tone Generator is set to 12 (France).

Notes:

a. Error code 1 does not indicate a current error condition. It indicates that the number of DTMR ports in service was below the administered threshold, but is now equal to or greater than the threshold. These errors are typically generated during boot time or other transitional states when the ports are being brought into service.

b. The total number of DTMR ports currently in service is below the administered threshold. To clear the alarm, see ''Repair Procedure for TTR-LEV'' on page 8-1700.

c. Error code 3 does not indicate a current error condition. It indicates that the number of GPTD ports in service was below the administered threshold, but is now equal to or greater than the threshold. These errors are typically generated during boot time or other transitional states when the ports are being brought into service.

d. The total number of GPTD ports currently in service is below the administered threshold. To clear the alarm, see ''Repair Procedure for TTR-LEV'' on page 8-1700.

e. Error code 5 does not indicate a current error condition. It indicates that the number of Call Classifier ports (CLSFY-PT) service was below the administered threshold, but is now equal to or greater than the threshold. These errors are typically generated during boot time or other transitional states when the ports are being brought into service.

f. The total number of Call Classifier ports (CLSFY-PT) currently in service is below the administered threshold. To clear the alarm, see ''Repair Procedure for TTR-LEV'' on page 8-1700.

g. There are currently no DTMR ports in service. To clear the alarm, see ''Repair Procedure for TTR-LEV'' on page 8-1700.

h. There are currently no GPTD ports in service. To clear the alarm, see ''Repair Procedure for TTR-LEV'' on page 8-1700.

i. There are currently no Call Classifier ports (CLSFY-PT) in service. To clear the alarm, see ''Repair Procedure for TTR-LEV'' on page 8-1700.

USB1 (Modem Testing)

MO's Name (in Alarm Log)	Alarm Level	Initial Linux Command to Run[1]	Full Name of MO
USB1	MAJOR	`testmodem`	USB Port Modem Testing
USB1	MINOR	`testmodem`	USB Port Modem Testing
USB1	WARNING	`testmodem`	USB Port Modem Testing

1. `Usage: testmodem [-s] | [-l] | [-t arg] | [-?]`

```
            no argument      Performs "short" test.
                    -s       Short test, performs handshake and
                             offhook
                             this is also the default option.
                    -l       Performs "short" tests.
                    -t arg   Specific test to perform. Possible
                             values for arg are:  reset_usb |
                             handshake | offhook |
                    -?       Usage (this).
```

USB1 Modem Testing

This MO provides periodic and on-demand testing. The periodic test runs the "handshake" test every 15 minutes. The on-demand tests include the "handshake", "offhook", and "reset_usb" tests.

Alarm Log Entries

Table 8-660. USB1 Alarm Log Entries

EVENT ID#	Aux Data	Associated Test	Alarm Level	On/Off Board	Linux Test to Clear Value
1 (a)		Handshake test	MINOR	ON	`testdupboard`
2 (b)		Modem Offhook test	MAJOR	ON	`testdupboard`

Notes:

a. **Event ID # 1** Handshake Test failed — With three consecutive failures of either the periodic or on-demand test, the following Minor alarm is logged:

`#1,ACT,USB1,A,1,MIN,USB Modem handshake test failed`

b. **Event ID # 2** Modem Offhook test failed — With 3 consecutive failures of this test, the following Major alarm is logged:

```
#1,ACT,USB1,A,2,MIN,USB Modem Offhook test failed
```

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the following table. For example, by clearing error codes associated with the Handshake test, you may also clear errors generated by other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Handshake test	X	X	D
Offhook test	X	X	D
Reset USB test	X	X	D

1. D = Destructive; ND = Nondestructive

Handshake Test

This test is destructive.

This test verifies that modem's hardware is attached and that the modem can "handshake" with the USB port. The test:

1. Tries to open the device
2. Sends a handshake string (ATZ) to the modem

   The modem should return an "OK" string.

The following errors can be detected:

Table 8-661. TEST Handshake Test

Error Code	Test Result	Description / Recommendation
Modem in use, try again later	ABORT	Some other application is currently using the modem. Try again later.
Could not open USB port	ABORT	System error: An attempt to open the USB device failed. Try again later.

Continued on next page

Table 8-661. TEST Handshake Test — *Continued*

Error Code	Test Result	Description / Recommendation
Read error, could not run test	ABORT	After the ATZ is sent, a read of the USB device is done. If the read fails, a probable system error aborted the test. Try again.
Modem Handshake test failed	FAIL	The modem did not return an “OK” string within a 15-second interval.

Offhook Test

This test is destructive.

This test runs an offhook test for the modem attached to the USB port on the server. The test sends an ATH1 string to check that a line is connected to the modem. The following errors can be detected:

Table 8-662. TEST Offhook Test

Error Code	Test Result	Description / Recommendation
Modem in use, try again later	ABORT	Some other application is currently using the modem. Try again later.
Could not open USB port	ABORT	System error: An attempt to open the USB device failed. Try again later
Read error, could not run test	ABORT	After the ATZ is sent, a read of the USB device is done. If the read fails, a probable system error aborted the test. Try again.
Modem Offhook test failed	FAIL	Modem Offhook test failed: The modem did not return an “OK” string within a 15-second interval. This indicates that dial tone was not detected in the allotted time.

Reset USB Test

This test is destructive.

This test causes the modem to be reset, even if the modem is in use. Although no failures are produced by this test, the following error can be detected:

Table 8-663. TEST Reset USB

Error Code	Test Result	Description / Recommendation
Could not open USB port	ABORT	System error: An attempt to open the USB device failed. Try again later.

UDS1-BD (UDS1 Interface Circuit Pack)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
UDS1-BD	MAJOR	**test board *UUCSS* sh**	UDS1 Interface Circuit Pack
UDS1-BD	MINOR	**test board *UUCSS* l**	UDS1 Interface Circuit Pack
UDS1-BD	WARNING	**test board *UUCSS* sh**	UDS1 Interface Circuit Pack

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21).

The UDS1 Interface circuit pack provides an interface to the DS1 facility.

The maintenance strategy for the TN464 UDS1 Interface circuit pack (UDS1-BD) is very similar to the maintenance strategy for the TN767 DS1 Interface circuit pack (DS1-BD). The same commands are used for administering and testing the boards. The differences in maintenance strategy between the boards are due to the UDS1 circuit pack's direct interface to the Packet bus which is used for ISDN-PRI signaling (ISDN-LNK). While both the TN464 and TN767 can support ISDN-PRI B channels, ISDN-PRI D-channel signaling applications require a TN464 UDS1 circuit pack. See the following table for a list of USD1 Interface circuit packs:

Circuit Pack Code	24 Channel	32 Channel	Tie Trunk Signaling	CO Trunk Signaling	DID Trunk Signaling	OPS Line Signaling
TN2242	x	X	x			
TN464C/D/E/F	x	x	x	x	x	x (24-chl only)
TN2464	X	X	X	X	X	X

UDS1 Interface circuit pack Maintenance documentation provides a strategy for maintaining the UDS1 Interface circuit pack. The maintenance strategy deals with logging the in-line errors reported by the UDS1 Interface circuit pack, running tests for error diagnosis and recovery, and raising or clearing maintenance alarms.

The TN464F or later circuit pack combined with an 120A1 CSU module forms an Enhanced Integrated CSU. The 120A1 CSU module, when combined with the functionality provided by the TN464F hardware and firmware, and switch software, provides functionality equivalent to an external stand-alone ESF T1 CSU. The 120A1 CSU module connects to the TN464F circuit pack on the I/O connector panel behind the port carrier. The CSU module, thus becomes an integrated part of the S8700 Multi-Connect system. Throughout the document, the term 120A1 will mean a 120A1 or later suffix CSU module.

The Enhanced Integrated CSU is for use in the United States of America with 1.544-Mbps DS1 service. For further details on the 120A1 CSU module refer to *DEFINITY Communications System Generic 1, Generic 2, and Generic 3 V1 and V2 - Integrated CSU Module Installation and Operation*.

2Mbit Japan Trunk (TN2242)

The TN2242 2-Mbit, 30-port trunk circuit pack supports Japanese TTC private networking environments. This circuit pack interfaces only with network equipment or other circuit packs of the same model and is incompatible with every other digital trunk circuit pack.

The maintenance strategy for the TN2242 is similar to that of the TN464F or later suffix DS1 interface circuit pack. The TN2242 circuit pack is functionally the same as the TN464F (without ICSU) with the following exceptions:

- The Blue Alarm Inquiry test (#139) always passes for the TN2242.
- The **test ds1-loop** command is not executed for the TN2242.
- When **reset board** is run on a TN2242, a different initialization message is sent for the local loop-around test (Test #135) is executed.
- Since an ICSU (Integrated Channel Service Unit) is not supported on this circuit pack, tests associated with an ICSU are not executed.
- Tests associated with new functionality available with the video-enabled TN464F are not executed for the TN2242.
- CRC (cyclical redundancy check) is not defined for this circuit pack.
- The D channel can be user-assigned to any port 1 – 30, when the signaling mode is ISDN PRI.
- Wideband is not supported.
- OPSs (off-premises stations) are not supported.

The TN2242 circuit pack also supports specialized versions of CAS (channel-associated signaling) and ISDN-PRI signaling that pertain to the TTC private networking environment in Japan.

Upgrading to TN2242

Figure 8-101 shows the hardware connections for public network access in Japan. The upgrade procedure requires removing the JRC (Japan Radio Corporation) external converter.

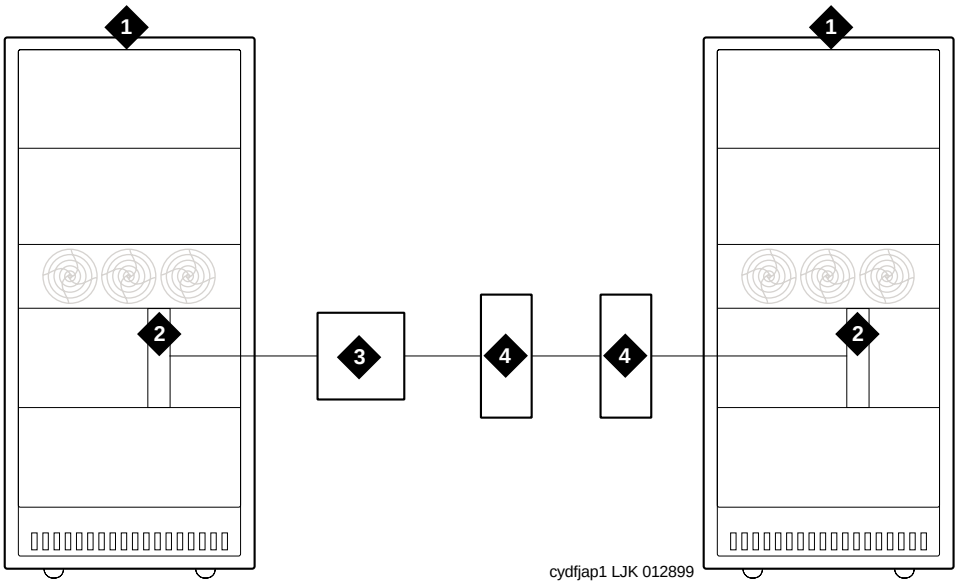


Figure Notes:

1. S8700 Multi-Connect system
2. UDS1-BD DS1-CONV circuit pack (24-trunk digital tie trunk)
3. JRC (Japan Radio Corporation) external converter
4. TDM facilities

Figure 8-101. Japanese TTC public network connections

Figure 8-102 shows the hardware connections for private network access using the TN2242 circuit pack.

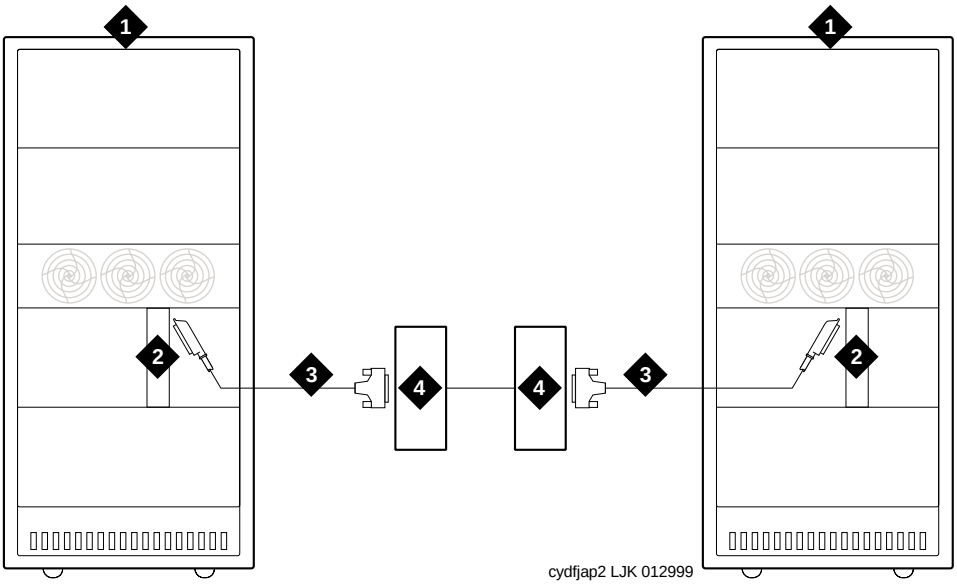


Figure Notes:

1. S8700 Multi-Connect system
2. TN2242 2-Mbit Japan trunk circuit pack
3. H600-513 cable assembly cable. (See ‘‘H600-513 Cable Pinout’’).
4. TDM facilities

Figure 8-102. TN2242 Japan trunk TTC private network connections

To upgrade a system to the TN2242 circuit pack:

1. Busyout the UDS1-BD DS1-CONV circuit pack (**busyout board *UUCSS***).
2. Remove the TN464 administration (**change circuit pack, change ds1**, and **change trunk group *n***).
3. Remove the UDS1-BD circuit packs.
4. Remove the JRC (Japan Radio Corporation) external converter and cable.
5. Insert the TN2242 circuit packs.
6. Connect the TN2242 to the TDM with the H600-513 cable assembly.
7. Administer the TN2242 circuit pack (see ‘‘Administration’’).

H600-513 Cable Pinout

Table 8-664 shows the pinout for the H600-513 cable assembly:

Table 8-664. H600-513 cable assembly pinout

TN2242			TDM	
50-pin connection pin number	Color	Lead Designation	Color	15-pin connection pin number
22	W-BL	Line in +	W-BL	4
23	W-O	Line out -	W-O	9
47	Bl-W	Line in -	Bl-W	11
48	O-W	Line out +	O-W	2

Administration

The TN2242 circuit pack requires board-level translation data. Before administering any ports on the circuit pack, administer the following forms:

- Circuit pack (**change circuit-pack**)
- DS1 (**add ds1**)
- Trunk group (**add trunk-group *n***)

  Table 8-665 outlines the trunk group administration parameters that are required for this interface to operate successfully in Japan.

Table 8-665. TN2242 administration

Field	Value
Trunk Group form, Page 1	
Trunk Type (in/out)	wink, delay, immed (every permutation)
Trunk Signaling Type	blank
Answer Supervision Timeout	0
Receive Answer Supervision	y
Disconnect Supervision - In?	y
Disconnect Supervision - Out?	y
Incoming Dial Type	tone, rotary, mf (to other Avaya systems only)
Wink Timer for wink type	300

Continued on next page

Table 8-665. TN2242 administration — *Continued*

Field	Value
Wink Timer for delay type	4500
Trunk Group form, Page 3 (Administrable Timers)	
Incoming Disconnect	100
Incoming Glare Guard	800ms or higher
Incoming Dial Guard	10
Incoming Incomplete Dial Alarm	25 or higher
Incoming Partial Dial	18
PPS	10 or 20
Make (for PPS 10)	35
Break (for PPS 10)	65
Make (for PPS 20)	15
Break (for PPS 20)	35
Outgoing Disconnect	100
Outgoing Glare Guard	800 or higher
Outgoing Rotary Dial Interdigit	800
Outgoing Seizure Response	5

LEDs

The LEDs on the faceplate of the TN2242 circuit pack indicate its status as described in Table 8-666.

Table 8-666. TN2242 LED interpretation

LED	Meaning
Red	■ MAJOR alarm ■ MINOR alarm ■ Firmware initialization during circuit pack insertion
Amber	A port on the circuit pack is in use.
Green	Maintenance testing is in progress on the circuit pack or its ports.

Interactions with Other MOs

The TN2242 MO directly interacts with these MOs:

- ‘‘Synchronization’’
- ‘‘TN2242 Trunk Ports’’
- ‘‘Call Processing’’

Synchronization

The DS1 facility plays a vital role in the synchronization subsystem. The IPSI or Tone-Clock circuit pack uses either the primary or secondary timing reference, whether internal (local – IPSI or Tone-Clock circuit pack) or external. TN2242 circuit packs can be administered as “primary” or “secondary” synchronization references.

The TN2242 circuit pack sends DS1 link status information to the synchronization reference switching algorithm. This algorithm determines whether timing references should be switched due to failure or restore conditions.

TN2242 Trunk Ports

The TN2242 circuit pack MO is responsible for monitoring the health of the DS1 facility. If a DS1 facility goes down, then that facility’s DS1 circuit pack instructs every MO associated with the DS1facility to place its trunks (or ISDN-PRI signaling link) in an out-of-service state.

Call Processing

The **busyout board** command tears down every call and signaling link associated with a TN2242 circuit pack.

TN2242 Serviceability

Hardware Connections

This circuit pack can be:

- Mated to another circuit pack of the same type when interconnecting two S8700 Multi-Connect systems
- Directly connected to the TDM network device
- Directly connected to another vendor PBX using ISDN-PRI signaling

Loopbacks

There is no automatic process to signal the remote end to provide loopbacks for testing purposes. Every loop back to be tested with a single circuit pack must be a local loop back on the circuit pack.

Remote loopbacks may be possible with the TDM network equipment with appropriate coordination between BCS Services Technicians and the service technicians of the TDM equipment (considered a CPE device).

TN464GP/TN2464BP UDS1 Circuit Packs with Echo Cancellation

The TN464GP and TN2464BP UDS1 circuit packs feature an integrated echo canceller. Echo cancellation is a Software Right-To-Use feature that can be turned as needed. Echo cancellation supports channels carrying voice and is not intended for channels that support data. The TN464GP/TN2464BP will have the capability to detect modem tone and turn off echo cancellation accordingly for the duration of a data call. Echo cancellation on the TN464GP/TN2464BP will be administrable per channel. The echo cancellation circuitry on a given TN464GP/TN2464BP is driven by administrable parameters.

The TN464GP/TN2464BP circuit packs are intended for use with ATM, IP, wideband, or other complex services which are likely to have problems with echo.

The echo cancellation circuitry on a given TN464GP/TN2464BP is a right-to-use feature activated via license file. You can determine whether this option is active by viewing the System-Parameters Customer-Options form. Also on this form is a field `Maximum Number of DS1 Boards with Echo Cancellation` that indicates the number of DS1 boards on which echo cancellation is activated for a specific customer.

The DS1 CIRCUIT PACK form for the TN464GP/TN2464BP circuit packs has fields to support echo cancellation: `Echo Cancellation?`, `EC Direction`, and `EC Configuration`. The `Echo Cancellation?` field displays only if the Echo Cancellation feature has been activated on the **System-Parameters Customer Options** form. The `EC Direction` and `EC Configuration` fields do not display unless the `DS1 Echo Cancellation?` field is enabled.

- EC Direction determines the direction from which echo will be eliminated, ether inward or outward.
- EC Configuration is the set of parameters that will be used when cancelling echo. This information is stored in firmware on the UDS1 circuit pack.

Echo cancellation is turned on or off on a per trunk-group basis using the **change trunk-group** command. If the TRUNK GROUP field, `DS1 Echo Cancellation?` is set to y, echo cancellation will be applied to every TN464GP/TN2464BP trunk member in that trunk group. The echo cancellation parameters used for a given trunk member are determined by the Echo Cancellation Configuration Number administered on the **DS1 Circuit Pack** form for that specific trunk's board.

Echo cancellation on the TN464GP/TN2464BP is selectable per channel, even though it is administrable on a per trunk-group basis. For example, if all but two ports on a TN464GP/TN2464BP need to have echo cancellation applied, those two ports must be put in a trunk group where the `DS1 Echo Cancellation` field is set to n. The remaining ports will be in a trunk group(s) where the `DS1 Echo Cancellation` field is set to y. A user will have the ability to cancel echo coming from the network (far-end echo) or coming from the switch (near-end echo).

The TN464 UDS1 Circuit Pack

The TN464C, D, E, F, and GP Universal DS1 Interface circuit packs provide an interface to the DS1 facility, and are designed to support 24 DS0 channels on a 1.544-Mbps DS1 link, or 32 DS0 channels on a 2.048-Mbps link. (The 32-channel interface is not supported on G3r V1 systems.) The DS0 channels can be administered as trunks to other switches, lines to off-premises stations, ports to line-side PRI terminating devices, or ports to other line-side non-PRI terminating devices. (DS0 channels on TN464/Bs can only be administered as trunks to other switches.) For more information about how TN464 ports can be used, see the MOs (MOs): ''ISDN-SGR (ISDN-PRI Signaling Group)'', ''ISDN-TRK (DS1 ISDN Trunk)'', ''ISDN-LNK (ISDN-PRI Signaling Link Port)'', ''PE-BCHL (PRI Endpoint Port)'', ''TIE-DS1 (DS1 Tie Trunk)'', ''CO-DS1 (DS1 CO Trunk)'', ''DID-DS1 (Direct Inward Dial Trunk)'', ''OPS-LINE (DS1 Off-Premises Station Line)'', and ''WAE-PORT (Wideband Access Endpoint Port)''.

NOTE:
For information about other DS1 circuit packs, see ''DS1-BD (DS1 Interface Circuit Pack)'' on page 8-586.

NOTE:
The TN464GP provides Echo Cancellation, and in addition, the TN464GP firmware may be updated using the firmware download feature.

Throughout this MO on the UDS1-BD, the term TN464 will mean any TN464C or later suffix UDS1 circuit pack. If part of this section refers to a specific suffix TN464 board, it will be noted as such.

The UDS1 maintenance strategy includes logging in-line errors reported by the UDS1 circuit pack, running tests for error diagnosis and recovery, and raising or clearing maintenance alarms.

TN464 circuit packs support the following:

- Digital Tie, CO, and DID trunks
- DS1 off-premises (OPS) lines
- Narrowband and wideband access endpoint ports
- ISDN-PRI trunks and accompanying signaling channel
- PRI endpoint ports (PE-BCHL) and accompanying signaling channel

The TN464 supports digital Tie, CO, and DID trunks, and OPS lines. On-board firmware performs call control signaling for the Tie, CO and DID trunks and OPS lines. ISDN-PRI trunk and PRI-endpoint signaling (Q.921, Q.931) is received and generated by system software and is transmitted on a system link through the TN1655 Packet Interface and packet bus to the UDS1 where it is placed on the D channel. Signaling over the DS1 link has to be synchronized between the transmitting and receiving ends to ensure error-free communication. See ''SYNC (Port-Network Synchronization)'' on page 8-1509 in this MO for details.

Each trunk, line, or endpoint has its own maintenance strategy, but all depend on the health of the UDS1 Interface circuit pack. See the following MOs for details: ''TIE-DS1 (DS1 Tie Trunk)'', ''CO-DS1 (DS1 CO Trunk)'', ''DID-DS1 (Direct Inward Dial Trunk)'', ''OPS-LINE (DS1 Off-Premises Station Line)'', ''ISDN-TRK (DS1 ISDN Trunk)'', ''ISDN-LNK (ISDN-PRI Signaling Link Port)'', ''ISDN-SGR (ISDN-PRI Signaling Group)'', ''WAE-PORT (Wideband Access Endpoint Port)'' and ''PE-BCHL (PRI Endpoint Port)''. The maintenance strategy for the TN464 UDS1 Interface circuit pack (UDS1-BD) is very similar to the maintenance strategy for the TN767 DS1 Interface circuit pack (DS1-BD). The same commands are used for administering and testing the boards. The differences in maintenance strategy between the boards result from the UDS1 circuit pack's direct interface to the Packet bus used for ISDN-PRI signaling (ISDN-LNK). While both the TN464 and TN767 can support ISDN-PRI B channels, ISDN-PRI D-channel signaling applications require a TN464 UDS1 circuit pack.

The UDS1 circuit pack, combined with the 120A1 CSU module forms an Enhanced Integrated CSU. The 120A1 CSU module, when combined with the functionality provided by the TN464F hardware and firmware, and switch software, provides functionality equivalent to an external stand-alone ESF T1 CSU. The 120A1 CSU module connects to the UDS1 circuit pack on the I/O connector panel behind the port carrier. The CSU module thus becomes an integrated part of the S8700 Multi-Connect system. Throughout this MO, the term 120A1 will mean a 120A1 or later suffix CSU module.

The Enhanced Integrated CSU is for use in the United States of America with 1.544-Mbps DS1 service. For further details on the 120A1 CSU module refer to *DEFINITY Communications System Generic 1, Generic 2, and Generic 3 V1 and V2 - Integrated CSU Module Installation and Operation*.

The UDS1-BD and 120A1 CSU module support on-demand loop-back tests that assist in the detection of faults between the UDS1-BD circuit pack and the CSU module, between the Integrated CSU and the optional Customer Premises Loop-Back Jack, or between the Integrated CSU and remote CSU.

These loop-back tests are explained in detail later in this UDS1-BD MO, but Figure 8-103 gives a high level overview of the loop-back points.

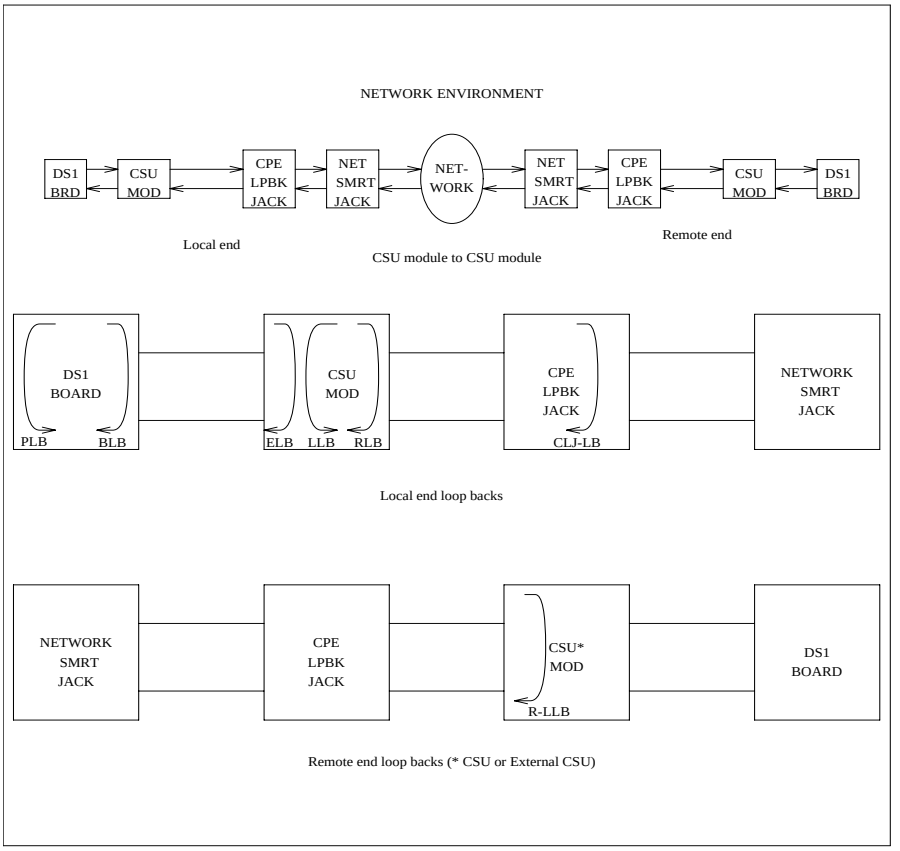


Figure 8-103. High Level Overview Of Loopback Points

The following list of acronym definitions are for the Figure 8-103 on page 8-1717:

- PLB = Payload Loopback
- BLB = Board Loopback
- ELB = Equipment Loopback
- LLB = Line Loopback
- RLB = Repeater Loopback
- CLJ = Loop-Back Jack Loopback
- R-LLB = Remote Line Loopback
- SMRT = Smart Jack
- LPBK = Loopback

Circuit Pack Administration and Options

The DS1 configuration for each circuit pack is administered on the **DS1 Circuit Pack** form. `Bit Rate` is set to 1.544 Mbps for 24-channel systems, and 2.048 Mbps for 32-channel systems. `Country Protocol` is used to drive layer-3 protocol decisions based on PRI specifications specific to a given country (not those related to specific features). This Country Protocol is independent of the `Country` parameter administered on the **country-options system-parameters** form. Different UDS1 circuit packs may be administered with different Country Protocols, allowing the switch to act as a gateway between two incompatible ISDN-PRI implementations (for example, between two different countries). US systems use country protocol 1. `Near-End CSU Type` is set to `other` for no CSU installed or for an external CSU such as an ESF T1 CSU, or set to `integrated` for the 120A1 CSU module or the 401A T1 sync splitter. Answering `integrated` will cause additional fields to be displayed for administering the Enhanced Integrated CSU module. `E1 Sync-Splitter?` is set to `y` if a 402A or 403A E1 sync splitter is used to provide timing to an ATM switch. `Echo Cancellation?` is set to `y` if the echo cancellation right-to-use feature has been activated and this TN464GP/TN2464BP or later suffix board is to supply echo cancellation. In addition to the above there are numerous other fields defining such parameters as framing modes, line coding, companding mode and so on.

Two option jumpers located on the side of the TN464C/D circuit pack must be installed correctly. The figures on the following page show how to configure the circuit pack for 24- or 32-channel DS1, and for 75*W (coaxial) or 120*W trunk connections. The channel selection must match the parameters administered on the corresponding **DS1 Circuit Pack** Form. (US applications use 24 Channels.)

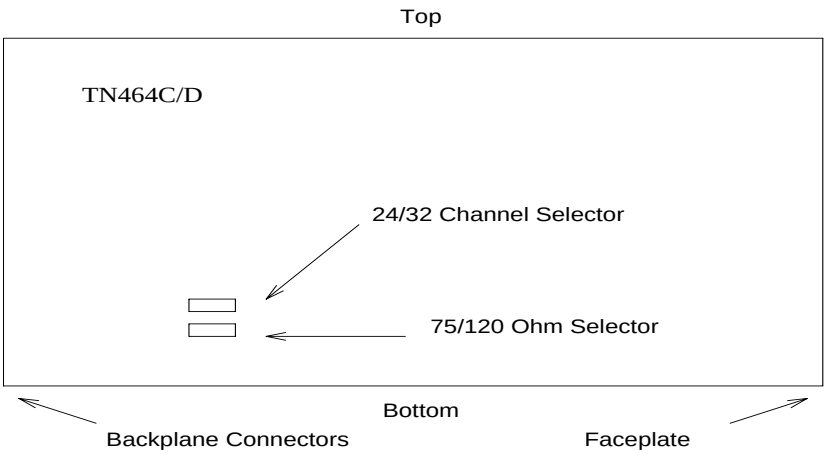
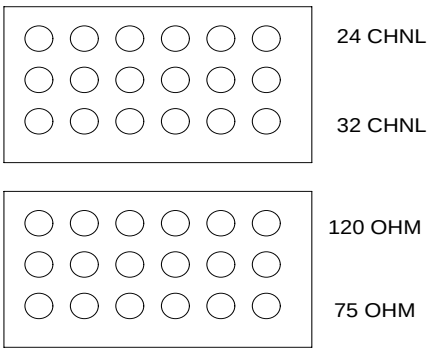


Figure 8-104. TN464C/D DS1 Option Jumpers



Insert the jumpers into the blocks so as to join the center row of pins and the row designating the desired options.

Figure 8-105. TN464C/D DS1 Option Jumpers (Continued)

The option switch located on the component side of the TN464E/F circuit pack must be set correctly. Figure 8-106 shows how to configure the circuit pack for 24-channel or 32-channel DS1. The channel selection must match the parameters administered on the corresponding **DS1 Circuit Pack** form. (US applications use 24 Channels.)

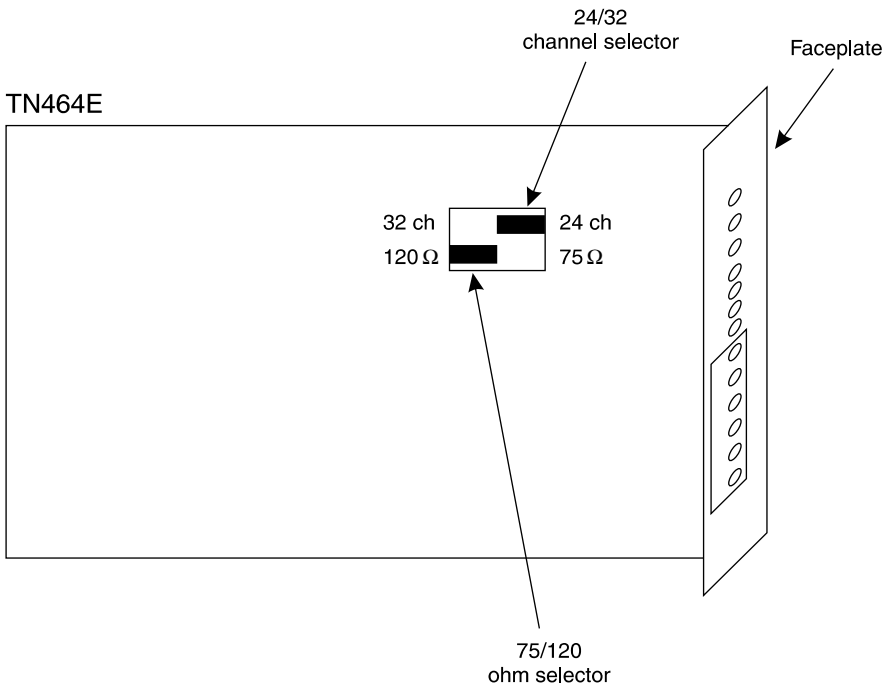


Figure 8-106. TN464E/F DS1 Option switches

Firmware Download Feature

The Firmware Download feature enables S8700 Multi-Connect to download new firmware to one or more UDS1 circuit boards residing in the system. The download image is copied onto a source (C-LAN) board, using FTP. The image is then copied to a target board's flash memory over the TDM bus. The transfer of the download image from the source board to a target board is done under switch software's control. This process is initiated using the S8700 Multi-Connect SAT interface.

If the firmware download fails for this circuit pack, an error is logged, and an alarm raised (See Error Type 174 for this MO). Also, see the FW-DWNLD MO for more information about trouble shooting firmware-download problems.

Error Log Entries and Test to Clear Values

Table 8-667. DS1 Interface Circuit Pack Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test board *UUCSS***
1(a)	0	Circuit pack removed or SAKI test (#53)	WARNING[2] MINOR	ON	
18(b)	0	**busyout board *UUCSS***	WARNING	OFF	**release board *UUCSS***
23(c)	0		WARNING	OFF	**add ds1 *UUCSS***
125(d)	none 3	None	WARNING[3] MINOR	ON	
257	65535	Control Channel Loop test (#52)	MINOR	ON	**test board *UUCSS* l r 20**
257(e)	Any	None			
513(f)	Any		WARNING[3] MINOR	ON	
514(g)	46086		WARNING[3] MINOR	ON	
769(h)	46085		WARNING[3] MINOR	ON	
770(i)	46096		WARNING[3] MINOR	ON	
1025(e)	4363	NPE Audit test (#50)			
1281	Any	Loss of Signal Alarm Inquiry test (#138)	WARNING[3] MINOR	OFF	test board UUCSS
1300(j)	Any	Loss Of Signal Alarm Inquiry test (#138)	WARNING	OFF	**test board *UUCSS***
1301(k)	Any	Loss Of Signal Alarm Inquiry test (#138)	WARNING	OFF	**test board *UUCSS***
1302(l)	Any	Loss Of Signal Alarm Inquiry test (#138)	WARNING[3] MINOR	OFF	**test board *UUCSS***
1303(m)	Any	Loss Of Signal Alarm Inquiry test (#138)	WARNING[3] MINOR	ON	**test board *UUCSS***
1310(n)	Any	Board Loopback test (#1209)	MINOR	ON	**test ds1-loop *UUCSS* ds1/csu-loopback-tests**
1311(o)	Any	Equipment Loopback test (#1210)	WARNING[3] MINOR	OFF	**test ds1-loop UUCSS ds1/csu-loopback-tests**

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Table 8-667. DS1 Interface Circuit Pack Maintenance Error Log Entries — *Continued*

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1312(p)	Any	Repeater Loopback test (#1211)	WARNING[3] MINOR	OFF	**test ds1-loop *UUCSS* ds1/csu-loopback-tests**
1313(q)	Any	CPE Loop-Back Jack test (#1212)	WARNING[3] MINOR	OFF	**test ds1-loop *UUCSS* end-loopback/span-test**
1314(r)	Any	Far CSU Loopback test (#1213)	WARNING[3] MINOR	OFF	**test ds1-loop *UUCSS* end-loopback/span-test**
1320	Any	Loss of Signal Alarm Inquiry test (#138)	WARNING[3] MINOR	OFF	**test board *UUCSS***
1321	Any	Loss of Signal Alarm Inquiry test (#138)	WARNING[3] MINOR	OFF	**test board *UUCSS***
1322	Any	Loss of Signal Alarm Inquiry test (#138)	MINOR	ON	**test board *UUCSS***
1323	Any	Loss of Signal Alarm Inquiry test (#138)	WARNING[3] MINOR	OFF	**test board *UUCSS***
1324	Any	Loss of Signal Alarm Inquiry test (#138)	WARNING	OFF	**test board *UUCSS***
1400, 1401(s)	Any	Loss of Signal Alarm Inquiry test (#138) and Echo Cancellation test (#1420)	MINOR	ON	**test board *UUCSS***
1537(t)	46082		WARNING[3] MINOR	ON	
1538(u)	Any		WARNING[3] MINOR	ON	
1793	Any	Blue Alarm Inquiry test (#139)	WARNING MINOR MAJOR[4]	OFF	**test board *UUCSS***
1794	Any	Blue Alarm Inquiry test (#139)	WARNING MINOR MAJOR[4]	OFF	**test board *UUCSS***
1795	Any	Blue Alarm Inquiry test (#139)	WARNING MINOR MAJOR[4]	OFF	**test board *UUCSS***
2049	Any	Red Alarm Inquiry test (#140)	WARNING[3] MINOR	OFF	**test board *UUCSS***
2305	Any	Yellow Alarm Inquiry test (#141)	WARNING[3] MINOR	OFF	**test board *UUCSS***

Continued on next page

Table 8-667. DS1 Interface Circuit Pack Maintenance Error Log Entries — *Continued*

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
2306	Any	Yellow Alarm Inquiry test (#141)	WARNING[3] MINOR	OFF	**test board *UUCSS***
2561	Any	Major Alarm Inquiry test (#142)	WARNING[3] MINOR	OFF	**test board *UUCSS***
2817		Minor Alarm Inquiry test (#143)	WARNING[3] MINOR	OFF	**test board *UUCSS***
3073 to 3160 (v)	Any	Slip Alarm Inquiry test (#144)	WARNING[3] MINOR	OFF	**test board *UUCSS* r 6**
3330(w)	46083		WARNING[3] MINOR	ON	
3585 to 3601 (x)	Any	Misframe Alarm Inquiry test (#145)	WARNING[3] MINOR	OFF	**test board *UUCSS* r 6**
3840(y)	Any	None			
3841(z)	4358				
3842(aa)	46097				
3843(ab)	46081				
3900(ac)	Any	CPE Loop-Back Jack test (#1212)			
3901(ad)	Any	Far CSU Loopback test (#1213)			
3902(ae)	Any	One-Way Span test (#1214)			
3999(af)	Any	None			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.
2. If ports are assigned to the circuit pack, then a minor alarm is raised. If no ports are assigned to the circuit pack, then a warning alarm is raised. The alarm is raised after the circuit pack has been missing for a period of 15 minutes. Warning alarms are also raised against any ports administered on the circuit pack.
3. Minor alarms on this MO may be downgraded to warning alarms based on values set in the **set options** command.
4. Major alarms on this MO may be downgraded to minor or warning alarms based on values set in the **set options** command.

Notes:

a. **Error Type 1** — Indicates that the circuit pack has totally stopped functioning or is not fully administered. The alarm is logged about 15 minutes after the circuit pack has been removed or 11 minutes after the SAKI test (#53) fails.

   To be fully administered, a UDS1 circuit pack must meet all three of the following conditions:

   1. Have an entry in the circuit plan using the **change circuit pack** command
   2. Be administered using the **add ds1 *UUCSS*** command
   3. Be physically inserted into the correct slot

   If the circuit pack has an entry in the circuit plan and either of the other two conditions are *not* met, a MINOR alarm is logged. To resolve the error either:

   1. Make sure that every condition for administration is met and that a functioning UDS1 circuit pack is inserted in the correct slot, or
   2. Completely remove the UDS1-BD from the system using the following steps:

      a. Remove any administered DS1 trunks, access endpoints or PRI endpoints associated with the circuit pack from their trunk groups.

      b. Execute the **remove ds1 *UUCSS*** and **change circuit-pack *UUCSS*** commands.

   If every administration condition is met for this circuit pack and the red LED is still on, follow the instructions for *LED Alarms with Error Type 1* in Chapter 7.

b. **Error Type 18** — The UDS1 Interface circuit pack has been busied out by a **busyout board *UUCSS*** command.

c. **Error Type 23** — The UDS1-BD circuit pack is not completely administered. To be fully administered, the UDS1 circuit pack must:

   1. Have an entry in the circuit plan using the **change circuit-pack** command
   2. Be administered using the **add ds1 *UUCSS*** command
   3. Be physically inserted into the correct slot

   A DS1 (UDS1-BD and DS1-BD) differs from most circuit packs in that inserting the circuit pack into the switch is not enough to make the board usable. It must also be administered with the **add ds1** command.

d. **Error Type 125: No Aux Data** — An incorrect circuit pack is inserted in the slot where the USD1 circuit pack is logically administered. To resolve this problem, do one of the following:

- Remove the incorrect circuit pack, and insert the logically administered circuit pack.
- Use the **change circuit-pack** command to re-administer this slot to match the circuit pack inserted.

Aux Data 3 — The 24-/32-channel option jumper setting on the circuit pack does not match the option set on the **DS1 Circuit Pack** administration form. The circuit pack must be physically removed to see the setting of the jumper.

e. **Error Type 257** — Associated with the Common Port Circuit Pack Maintenance test. See "XXX-BD (Common Port Circuit Pack)" on page 8-1872 for details.

f. **Error Type 513** — The UDS1 Interface circuit pack has detected a transient hardware problem. The value in the Aux Data field indicates the type of hardware problem:

Aux Data	Problem
4352	External RAM failure
4353	Internal RAM failure
4355	Internal ROM failure

If the UDS1 board detects only one of these hardware problems, then the error will disappear when none of these faults are detected for 10 minutes. If the same Aux Data value is logged more than once in a 24-hour period, the circuit pack should be replaced.

g. **Error Type 514** — LAN External RAM Error. This error occurs when there is a hardware fault in the server's external RAM. The RAM is used for message buffering to and from the Packet bus. This error should not occur frequently. If it does (10 times within 30 minutes), the circuit pack should be replaced.

h. **Error Type 769** — Transmit FIFO Underflow Error. This error occurs when the circuit pack cannot find the "end of frame" bit when transmitting a frame to the Packet bus. An alarm is raised if this error occurs three times within 10 minutes. Clear the alarm using the following commands: **busyout board *UUCSS***, **reset board *UUCSS***, **test board *UUCSS* long**, **release board *UUCSS***. If the error recurs within 10 minutes, replace the circuit pack.

i. **Error Type 770** — Unable to Write LAN Translation RAM Error. This error occurs when a call is aborted because there are no available translation RAM locations for the call connection attempt. An alarm is raised if this error occurs two times within 10 minutes. Clear the alarm using the following commands: **busyout board *UUCSS***, **reset board *UUCSS***, **test board *UUCSS* long**, **release board *UUCSS***. If the error recurs within 10 minutes, replace the circuit pack.

j. **Error Type 1300** — CSU module/T1 sync splitter missing or E1 synchronization splitter (E1SS) missing.

CSU module/T1 sync splitter missing: The `Near-End CSU Type` field on the **add ds1** form has been administered as `integrated` but the 120A1 CSU module or the 401A T1 sync splitter is not physically connected (or is improperly connected) to the UDS1 board behind the port carrier.

If using the 120A1 CSU module or the 401A T1 sync splitter, plug (or replug) the CSU module/T1 sync splitter into the UDS1 circuit pack's connector on the I/O connector panel on back of the carrier. Otherwise, change the `Near-End CSU Type` field using the **change ds1** form to `other`.

If this error remains after plugging the CSU module/T1 sync splitter into the board's connector, there could be a problem with the I/O connector panel.

E1 synchronization splitter missing: The `E1 Sync-Splitter?` field on the **add ds1** form has been administered as `y`, but the 402A or 403A E1 synchronization splitter is not physically connected (or is improperly connected) to the UDS1 board behind the port carrier.

If using the 402A or 403A E1 synchronization splitter, plug (or replug) the E1SS into the UDS1 circuit pack's connector on the I/O connector panel on back of the carrier. Otherwise, change the `E1 Sync-Splitter?` field using the **change ds1** form to `n`.

If this error remains after plugging the E1SS into the board's connector, there could be a problem with the I/O connector panel.

k. **Error Type 1301** — CSU module/T1 sync splitter not expected or E1 synchronization splitter not expected.

CSU Module/T1 Sync Splitter not expected: The 120A1 CSU module or the 401A T1 sync splitter is physically connected to the UDS1 board behind the port carrier, but the `Near-End CSU Type` field on the **add ds1** form has not been administered as `integrated`.

If the 120A1 CSU module or the 401A T1 sync splitter is to be used, use the **change ds1** command to change the `Near-End CSU Type` field to `integrated`. Otherwise, physically remove the 120A1 CSU module or the 401A T1 sync splitter from the back of the port carrier.

E1 synchronization splitter not expected: The 402A or 403A E1 synchronization splitter is physically connected to the UDS1 board behind the port carrier, but the `E1 Sync-Splitter?` field on the **add ds1** form has not been administered as `y`.

If the 402A or 403A E1 synchronization splitter is to be used, use the **change ds1** command to change the `E1 Sync-Splitter?` field to `y`. Otherwise, physically remove the 402A or 403A E1 synchronization splitter from the back of the port carrier.

l. **Error Type 1302** — DS1 configuration error. Attempting to use the 120A1 CSU module with a UDS1 circuit pack that is configured for 32-channel (2.048-Mbps) operation. The CSU module only works with a DS1 board configured for 24-channel (1.544-Mbps) operation in the United States of America.

m. **Error Type 1303** — DS1 circuit pack suffix incorrect for CSU module/T1 sync splitter or for E1 synchronization splitter.

DS1 circuit pack suffix incorrect for CSU module/T1 sync splitter: The `Near-End CSU Type` field on the **add ds1** form has been administered as `integrated` but the DS1 circuit pack is not a TN464F or later suffix UDS1 board.

If the 120A1 CSU module or the 401A T1 sync splitter is to be used, remove the circuit pack and replace it with a TN464F or later suffix board. Otherwise, use the **change ds1** command to change the `Near-End CSU Type` field to `other`.

DS1 circuit pack suffix incorrect for E1 synchronization splitter: The `E1 Sync-Splitter?` field on the **add ds1** form has been administered as y but the DS1 circuit pack is not a TN464F or later suffix UDS1 board.

If the 402A or 403A E1 synchronization splitter is to be used, remove the circuit pack and replace it with a TN464F or later suffix board. Otherwise, use the **change ds1** command to change the `E1 Sync-Splitter?` field to n.

n. **Error Type 1310** — BLB failure. This error occurs when the DS1 Board Loopback (BLB) demand test fails. Repeat the test using the commands **busyout board *UUCSS*, test ds1-loop *UUCSS* ds1/csu-loopback-tests, release board *UUCSS***. If the BLB test continues to fail, then the TN464F circuit pack needs to be replaced.

o. **Error Type 1311** — ELB failure. This error occurs when the Equipment Loopback (ELB) test fails for the Integrated CSU (I-CSU) module/T1 sync splitter or for the 402A or 403A E1 synchronization splitter. This test is executed by the I-CSU/E1SS during I-CSU/E1SS power-up/reset (i.e.- UDS1 board physically inserted and 120A1 CSU module, the 401A T1 sync splitter, or the 402A or 403A E1SS is already installed) or when the 120A1 CSU module, the 401A T1 sync splitter, or the 402A or 403A E1SS is plugged on to an already initialized UDS1 DS1 board.

NOTE:
For the **I-CSU/T1 sync splitter only**, the ELB test is also executed as part of the command **test ds1-loop UUCSS ds1/csu-loopback-tests**. Attempt to clear the alarm using the commands **busyout board *UUCSS*, test ds1-loop *UUCSS* ds1/csu-loopback-tests, release board *UUCSS***. If the ELB test continues to fail, then either the UDS1 board, the CSU module, or the I/O cable between the backplane and the CSU module (or any combination thereof) has failed. Attempt to isolate where the failure is occurring by re-executing the test and by replacing one piece of hardware at a time.

p. **Error Type 1312** — RLB failure. This error occurs when the Repeater Loopback (RLB) test fails for the Integrated CSU (I-CSU) module/T1 sync splitter or for the 402A or 403A E1 synchronization splitter. This test is executed by the I-CSU/E1SS during I-CSU/E1SS power-up/reset (i.e., DS1 board physically inserted and 120A1 CSU module or the 401A T1 sync splitter, or the 402A or 403A E1SS is already installed) or when the 120A1 CSU module or the 401A T1 sync splitter, or the 402A or 403A E1SS is plugged on to an already initialized DS1 board.

NOTE:
For the **I-CSU/T1 sync splitter only**, the RLB test is also executed as part of the command **test ds1-loop *UUCSS* ds1/csu-loopback-tests**. Attempt to clear the alarm using the commands **busyout board *UUCSS*, test ds1-loop *UUCSS* ds1/csu-loopback-tests, release board *UUCSS***. If the RLB test continues to fail, then the CSU module needs to be replaced.

q. **Error Type 1313** — CPE Loop-Back Jack deactivation error. This error occurs when the UDS1 circuit pack could not deactivate a CPE Loop-Back Jack on power-up/reset or upon software request.

Attempt to clear the alarm using the commands **busyout board *UUCSS*, test ds1-loopback *UUCSS* end-loopback/span-test, release board *UUCSS***. If the attempt to deactivate the CPE Loop-Back Jack continues to fail, other steps must be taken to deactivate the loopback.

r. **Error Type 1314** — Far CSU Loopback deactivation error. This error occurs when the UDS1 circuit pack could not deactivate a far-end CSU loop back on power-up/reset or upon software request.

Attempt to clear the alarm using the commands **busyout board *UUCSS*, test ds1-loop *UUCSS* end-loopback/span-test, release board *UUCSS***. If the attempt to deactivate the Far CSU loop back continues to fail, then escalate the problem.

s. **Error Types 1400, 1401** — Echo Cancellation errors are logged when:

- Error 1400 - Echo canceller function failed. The Echo Canceller Function test, which is executed by firmware, failed.
- Error 1401 - Echo canceller memory failed. The Echo Canceller Memory test, which is executed by firmware, failed.

Echo Cancellation is no longer being supplied by the board. Clear the alarm using the following commands: **busyout board *UUCSS***, **test board *UUCSS* long**, **release board *UUCSS***. If Test #1420 (Echo Canceler test) fails, replace the circuit pack.

t. **Error type 1537** — LAN Bus Timeout Error. This error occurs when the circuit pack transmits too many bytes on the LAN bus for a single frame. This condition may be caused by an on-board fault or by faulty data received on one of the circuit pack's external ports. If any of the ports on this circuit pack are alarmed, refer to the repair procedures for those MOs.

If the error occurs three times within 10 minutes, the board is isolated from the Packet bus and the board alarmed. To clear the alarm and restore the board to the Packet bus, use the commands **busyout board *UUCSS***, **reset board *UUCSS***, **test board *UUCSS* long**, **release board *UUCSS***.

If the problem persists, and there are no PKT-BUS alarms or port alarms, then replace the circuit pack.

u. **Error Type 1538** — The hyperactive circuit pack is out-of-service and may exhibit one or more of the following symptoms:

- The common circuit pack level tests such as Test #50 and/or Test #52 abort with error code 2000.
- The tests run on the ports of this circuit pack return a NO-BOARD result.
- A busyout/release of the circuit pack has no effect on test results.
- A **list configuration** command shows that the circuit pack and ports are properly installed.

The circuit pack is isolated from the system and every trunk or port on this circuit pack is placed into the out-of-service state. The system will try to restore the circuit pack within 20-30 minutes. When no faults are detected for 20-30 minutes, the UDS1 Interface circuit pack is restored to normal operation. Every trunk or port of the UDS1 Interface circuit pack is then returned to the in-service state.

If either the board is not restored to normal operation or the error recurs after the board was restored to normal operation, escalate the problem.

v. **Error Types 3073 to 3160** — For later releases of G3V4 and beyond, only Error Type 3073 shows that this board is receiving slips and the AUX data shows the last slip count reported.

w. **Error Type 3330** — LAN Critical Error. A critical failure has been detected in the Packet bus interface of the circuit pack. This failure may be due to an on-board fault or a Packet bus fault. If the Packet bus is alarmed, see "PKT-BUS (Packet Bus)" on page 8-1230 for recommended repair procedures.

This error isolates the board from the Packet bus and raises an alarm. If the Packet bus is not alarmed, enter the commands **busyout board *UUCSS***, **reset board *UUCSS***, **test board *UUCSS***, **release board *UUCSS***. This should clear the alarm and restore the board to the Packet bus.

If the problem persists, and there are no PKT-BUS alarms, then replace the circuit pack.

x. **Error Types 3585 to 3601** — For later releases of G3V4 and beyond, only Error Type 3585 shows that this board is receiving misframes, and the AUX Data shows the last misframe count reported.

y. **Error Type 3840** — Not service-affecting. No action is required. These errors are reported by the circuit pack when it receives a bad control channel message from the switch. The auxiliary data identifies the following error events:

Aux Data	Event
4096	Bad major heading
4097	Bad port number
4098	Bad data
4099	Bad sub-qualifier
4100	State inconsistency
4101	Bad logical link

z. **Error Type 3841** — The UDS1 Interface circuit pack has detected a transient hardware logic error (for example, program logic inconsistency). This error will disappear when no faults are detected for 100 minutes. The value in Aux Data indicates the type of hardware problem.

aa. **Error Type 3842** — Bad Translation RAM Location Found Error. This error is not service-affecting. No action is required. A Bad Translation RAM is detected, but the call continues by using another translation location.

ab. **Error Type 3843** — LAN Receive Parity Error. This error occurs when the circuit pack detects an error in a received frame from the Packet bus. These errors are most likely caused by a Packet bus problem, but may be due to a circuit pack fault.

See ''PKT-BUS (Packet Bus)'' on page 8-1230 to determine whether the problem is isolated to this circuit pack or is caused by Packet bus faults.

ac. **Error Type 3900** — Provides status information about a CPE Loop-Back Jack test. The value in the Aux Data field indicates the status of the loop-back test.

Aux Data	Test Status
1	Currently running
2	Failed because loop back could not be activated
3	Failed because test pattern could not be detected
4	Terminated

ad. **Error Type 3901** — Provides status information about a Far CSU Loopback test. The value in the Aux Data field indicates the status of the loop-back test.

Aux Data	Test Status
1	Currently running
2	Failed because loop back could not be activated
3	Failed because test pattern could not be detected
4	Terminated

ae. **Error Type 3902** — Provides status information about a One-Way Span test. The value in the Aux Data field indicates the status of the span test.

Aux Data	Test Status
1	Currently running
2	Failed because test could not be activated
3	Test pattern was not received from the far end
4	Terminated

af. **Error Type 3999** — Indicates that the circuit pack sent a large number of control channel messages to the switch within a short period of time. If Error Type 1538 is also present, then the circuit pack was taken out-of-service due to hyperactivity. If Error Type 1538 is absent, then the circuit pack was not taken out-of-service, but it has generated 50% of the messages necessary to be considered hyperactive. This may be completely normal during heavy traffic periods. However, if this error type is logged when the circuit pack is being lightly used, it may indicate a problem with the circuit pack or the equipment attached to it.

System Technician-Demanded Tests: Descriptions and Error Codes

Investigate tests in the order they are presented in Table 8-668. For example, by clearing error codes associated with the Echo Cancellation test (#1420), you may also clear errors generated from other tests in the testing sequence.

Table 8-668. System Technician-Demanded Tests

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	test ds1-loop	D/ND[1]
Echo Cancellation test (#1420)		X			D
NPE Connection Audit test (#50)		X			ND
Control Channel Loop test (#52)		X			ND
Loss of Signal Alarm Inquiry test (#138)	X	X			ND
Blue Alarm Inquiry test (#139)	X	X			ND
Red Alarm Inquiry test (#140)	X	X			ND
Yellow Alarm Inquiry test (#141)	X	X			ND
Major Alarm Inquiry test (#142)	X	X			ND
Minor Alarm Inquiry test (#143)	X	X			ND
Slip Alarm Inquiry test (#144)	X	X			ND
Misframe Alarm Inquiry test (#145)	X	X			ND
Translation Update test (#146)	X	X			ND
ICSU Status LEDs test (#1227)	X	X			ND
SAKI Sanity test (#53)			X		D
Internal Loop-Around test (#135)			X		D
DS1/CSU Loopback tests: DS1 Board Loopback test (#1209) CSU Equipment Loopback test (#1210) CSU Repeater Loopback test (#1211)				X X X	D D D
CPE Loop-Back Jack test (#1212)				X	D
Far CSU Loopback test (#1213)				X	D
One-Way Span test (#1214)				X	D
Inject Single Bit Error (#1215)				X	D
End Loopback/Span test (#1216)				X	D

1. D = Destructive; ND = Nondestructive

NPE Connection Audit Test (#50)

The system sends the circuit pack's on-board microprocessor a message to update the network-connectivity translation for its SCOTCH-NPE chip.

Table 8-669. Test #50 NPE Connection Audit Test

Error Code	Test Result	Description / Recommendation
None, 2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1019	ABORT	The test aborted because a test was already running on the port. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	The circuit pack's SCOTCH-NPE chip has been updated with its translation.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If this is the case, the board is shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Control Channel Loop-Around Test (#52)

This test queries the circuit pack for its code and vintage and verifies its records.

Table 8-670. Test #52 Control Channel Loop-Around Test

Error Code	Test Result	Description / Recommendation
None, 2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The circuit pack failed to return the its code or vintage. 1. Retry the command up to 5 times. 2. If the problem continues and if the circuit pack is a port circuit pack, replace the circuit pack. 3. Retry the command several times up to 5 times.
	PASS	Communication with this circuit pack is successful.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If this is the case, the board is shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

SAKI Sanity Test (#53)

This test is destructive.

This test resets the circuit pack. The test is highly destructive and can only be initiated by a system technician-demanded **reset board *UUCSS*** command.

Table 8-671. Test #53 SAKI Sanity Test

Error Code	Test Result	Description / Recommendation
None	ABORT	System resources required for this test are not available. 1. Retry the **reset board** command at 1-minute intervals up to 5 times.
1005	ABORT	Wrong circuit pack configuration to run this test. This error applies only to DS1 Interface circuit packs. It means the DS1 Interface circuit pack is providing timing for the system, and therefore, it cannot be reset without major system disruptions. 1. If the circuit pack needs to be reset, then set synchronization to another DS1 Interface circuit pack or to the IPSI or Tone-Clock circuit pack and try again. See "SYNC (Port-Network Synchronization)" on page 8-1509.
1015	ABORT	Port is not out-of-service. 1. Busyout the circuit pack. 2. Execute the **reset board** command again.
2100	ABORT	System resources required for this test are not available. 1. Retry the **reset board** command at 1-minute intervals up to 5 times.
1 2	FAIL FAIL	The circuit pack failed to reset. The circuit pack failed to restart. 1. Execute the **reset board** command again. 2. If the problem persists, replace the circuit pack.
	PASS	The circuit pack initializes correctly. 1. Run the short test sequence.

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Table 8-671. Test #53 SAKI Sanity Test — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If this is the case, the board is shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Internal Loop-Around Test (#135)

This test is destructive.

The Internal Loop-Around test is run by looping the transmitted DS1 bit stream back into the UDS1 board's receiver. The loop occurs just before the DS1 facility interface. The test is highly destructive and can only be initiated by a technician-demanded **reset board UUCSS** command.

Every trunk or port on the UDS1 Interface circuit pack must be busied out using the technician's **busyout board** command before running the Internal Loop-Around test. When the Internal Loop-Around test is initiated, maintenance software sends appropriate messages to the UDS1 Interface circuit pack to start the test. The test uses the Tone Generator and Tone Detector to exercise a bit-pattern consistency test for every port. If the transmitted and received bit patterns on a trunk or port are different, the test fails.

When the test completes, the maintenance software sends a stop loop around message to the UDS1 Interface circuit pack to put the circuit pack back into the normal operation mode. Every trunk or port of the UDS1 Interface circuit pack is restored to the in-service state after the **release board** command is entered.

Table 8-672. Test #135 Internal Loop-Around Test

Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. 1. If system has no TDM-BUS errors and is not handling heavy traffic, repeat test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be oversized for the number of Tone Detectors present or some Tone Detectors may be out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the **reset board** command at 1-minute intervals up to 5 times.
1004	ABORT	Received an incoming call on a port of the UDS1 circuit pack during the test. 1. Enter the **busyout board *UUCSS*** command to put every trunk or port of the UDS1 Interface circuit pack to out-of-service state. 2. Retry the **reset board** command at 1-minute intervals up to 5 times.

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Table 8-672. Test #135 Internal Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
1015	ABORT	Ports on the UDS1 Interface circuit pack have not been busied out to out-of-service. 1. Enter the **busyout board *UUCSS*** command to put every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. 2. Retry the **reset board** command.
1039	ABORT	The UDS1 Interface circuit pack is providing timing for the system. Therefore, it cannot be reset without major system disruption. If the UDS1 Interface circuit pack needs to be tested, set the synchronization reference to another UDS1 Interface circuit pack or to the IPSI or Tone-Clock circuit pack via the following command sequence: 1. Issue the **disable synchronization-switch** command. 2. Next, issue the **set synchronization *UUCSS*** command. 3. Lastly, issue the **enable synchronization-switch** command.
2000	ABORT	Response to the test request was not received within the allowable time period. If Error Type 1538 is present in the Error Log, follow the maintenance strategy recommended for this error type.
2012	ABORT	Internal system error 1. Retry the **reset board** command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the **reset board** command at 1-minute intervals up to 5 times.
	FAIL	The UDS1 Interface circuit pack failed in the Internal Loop-Around test. If the UDS1 connects to a T1 network facility or another switch: 1. Retry the **reset board** command at 1-minute intervals up to 5 times. 2. Enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 3. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 4. Check the physical connectivity of DS1 Interface circuit packs and cable. 5. Replace the local UDS1 Interface circuit pack and repeat the test. 6. Contact T1 Network Service to diagnose the remote DS1 endpoint.

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Table 8-672. Test #135 Internal Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL *(cont'd)*	If the UDS1 connects to a line-side terminating device such as a PRI terminal adapter: 1. Retry the **reset board** command at 1-minute intervals up to 5 times. 2. Enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 3. Verify that the switch DS1 and the line-side terminating device are administered using the same signaling mode, framing mode, and line coding. 4. Investigate the maintenance status of the line-side terminating device. Obtain the error seconds measurement on the terminating device (if possible). Refer to the line-side terminating device operating manual for information. 5. Check the physical connection of the UDS1 Interface circuit pack to the terminating device. Check premise distribution system (or intra-premise wiring) for physical connection failures. If the error seconds measurement is severe, investigate premise distribution system wiring for noise and distance limitation. 6. Replace the local UDS1 Interface circuit pack, and repeat the test. 7. Contact the vendor of the line-side terminating device to diagnose the equipment.
	PASS	Every administered trunk or port of the UDS1 Interface circuit pack passes the Internal Loop-Around test. The bit pattern consistency test is executed successfully over the path that covers a DS1 port, cable, and the external NCTE device.

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Table 8-672. Test #135 Internal Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If this is the case, the board is shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Loss of Signal Alarm Inquiry Test (#138)

This test verifies the synchronization status, echo cancellation, and continuity of the DS1 link. The Loss of Signal alarm indicates that the UDS1 Interface circuit pack is unable to derive the synchronization clock from the DS1 facility. When the UDS1 Interface circuit pack detects a Loss of Signal alarm, it stops providing the synchronization clock for the system, if it is administered as a timing source, and transmits a Yellow alarm to the remote DS1 endpoint.

When the Loss of Signal alarm is confirmed, maintenance software places every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. The inquiry test will run every 10 minutes until the loss of signal has been restored.

The UDS1 Interface circuit pack raises a Loss of Signal alarm after the signal has been lost for about 1 second. It will not retire the alarm until the signal has returned for about 10 seconds.

120A1 CSU Module/Sync Splitter

This test is also used to maintain the 120A1 CSU module or the 401A T1 sync splitter, and the 402A or 403A E1 synchronization splitter. The CSU module, when combined with the functionality provided by the UDS1 circuit pack, provides functionality equivalent to an external stand-alone ESF T1 CSU. The combination of the UDS1 and 120A1 CSU module is known as an Enhanced Integrated CSU (I-CSU).

The 401A T1 synchronization splitter, when combined with the functionality provided by the UDS1 circuit pack, allows an ATM switch to derive its timing from a T1 connected to the UDS1 in the S8700 Multi-Connect.

The 402A or 403A E1 synchronization splitter, when combined with the functionality provided by the UDS1 circuit pack, allows an ATM switch to derive its timing from an E1 connected to the UDS1 in the S8700 Multi-Connect.

If a UDS1 circuit pack detects certain I-CSU/Sync Splitter hardware errors, it notifies maintenance. When the maintenance subsystem receives notification of the I-CSU/Sync Splitter error, it executes this Loss of Signal Alarm Inquiry test (#138). The test, in addition to querying for a Loss of Signal alarm condition, also queries the UDS1 board to confirm the I-CSU/Sync Splitter error. A Minor or Warning alarm is raised depending on the severity of the I-CSU/Sync Splitter error. The trunks on the board may be taken out of service if the I-CSU/Sync Splitter error is deemed serious.

If a Loss Of Signal alarm and an I-CSU/Sync Splitter error co-exist, the Loss Of Signal alarm condition takes priority, and the board and all of its trunks are put in the out-of-service state. However, errors are logged for both.

When the maintenance subsystem receives notification that the I-CSU/Sync Splitter hardware error condition no longer exists, maintenance will restore the board and its trunks to their previous service state, if the alarm can be cleared (no other I-CSU/Sync Splitter errors or Loss Of Signal alarms exist).

Echo Cancellation

If the TN464GP/TN2464BP or later suffix UDS1 firmware detects a serious echo canceller hardware error, it notifies maintenance software. When the maintenance subsystem receives notification of the echo cancellation error, it executes this *Loss Of Signal Alarm Inquiry* test.

This test, in addition to querying for a loss-of-signal condition and ICSU errors, also queries the TN464GP/TN2464BP to confirm the echo canceller error. A minor alarm is raised if the error is confirmed. The board's trunks remain in-service since the board is still functional except for its echo-cancellation capability.

If a loss-of-signal condition co-exists with ICSU and/or echo-canceller errors, the loss of signal condition takes priority, and the board and every trunk on the board is put in the out-of-service state. Errors are logged, however, for each error type.

When the maintenance subsystem receives notification that the echo-canceller hardware's error condition no longer exists, the maintenance subsystem restores the board and its trunks to their previous service state, if the alarm can be cleared (no other ICSU errors or loss-of-signal conditions exist).

Table 8-673. Test #138 Loss of Signal Alarm Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and the ports are properly installed. When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-673. Test #138 Loss of Signal Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	UDS1 Interface circuit pack detects a Loss of Signal alarm. The physical link is broken or the remote DS1 endpoint is down. Every trunk or port of this UDS1 interface circuit pack is out-of-service. If the UDS1 Interface circuit pack is designated as the supplier of the system synchronization source, then the system synchronization maintenance will adopt a source elsewhere. See "SYNC (Port-Network Synchronization)" on page 8-1509 for details. If the UDS1 connects to a T1 network facility: 1. Check the physical connection of the UDS1 Interface circuit pack and the cable. If a CSU module or a Sync Splitter is physically connected to a UDS1-BD board behind the port carrier, check the physical connection of the CSU module/Sync Splitter and make sure the Network Interface cable is plugged into the CSU module's/Sync Splitter's NETWORK jack. 2. If the UDS1 Interface circuit pack connects to a T1 facility, call the vendor of the T1 carrier to diagnose the remote DS1 endpoint. If the UDS1 Interface circuit pack connects directly to a switch, call the system technician of the remote switch to diagnose the DS1 endpoint. If the UDS1 connects to a line-side terminating device such as a PRI terminal adapter: 1. Check the physical connection of the UDS1 Interface circuit pack to the terminating device. Check premise distribution system (or intra-premise wiring) for physical connection failures. If a CSU module or Sync Splitter is physically connected to a UDS1-BD board behind the port carrier, check the physical connection of the CSU module/Sync Splitter and make sure the Network Interface cable is plugged into the CSU module's/Sync Splitter's NETWORK jack. 2. Contact the vendor of the line-side terminating device to diagnose the equipment.

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Table 8-673. Test #138 Loss of Signal Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1300	FAIL	The CSU module/T1 sync splitter or the E1 Sync Splitter is missing. The CSU module/T1 sync splitter is missing: The `Near-End CSU Type` field on the **add ds1** form has been administered as `integrated` but the 120A1 CSU module or the 401A T1 sync splitter is not physically connected to the UDS1 board behind the port carrier. 1. If using the 120A1 CSU module or the 401A T1 sync splitter, plug the CSU module/T1 sync splitter into the UDS1 circuit pack's connector on the I/O connector panel on back of the carrier. Otherwise, change the `Near-End CSU Type` field using the **change ds1** form to `other`. 2. Run the test again. The E1 Sync Splitter is missing: The `E1 Sync-Splitter?` field on the **add ds1** form has been administered as `y` but the 402A or 403A E1 Sync Splitter is not physically connected to the UDS1 board behind the port carrier. 1. If using the 402A or 403A E1 synchronization splitter, plug the E1SS into the UDS1 circuit pack's connector on the I/O connector panel on back of the carrier. Otherwise, change the `E1 Sync-Splitter?` field using the **change ds1** form to `n`. 2. Run the test again.
1301	FAIL	The 120A1 CSU module or the 401A T1 sync splitter, or the 402A or 403A E1 synchronization splitter is not expected. The 120A1 CSU module or the 401A T1 sync splitter is not expected: The 120A1 CSU module/T1 sync splitter is physically connected to the UDS1 board behind the port carrier, but the `Near-End CSU Type` field on the **add ds1** form has not been administered as `integrated`. 1. If the 120A1 CSU module/T1 sync splitter is to be used, use the **change ds1** command to change the `Near-End CSU Type` field to `integrated`. Otherwise, physically remove the 120A1 CSU module/T1 sync splitter from the back of the port carrier. 2. Run the test again. The 402A or 403A E1 synchronization splitter is not expected: The 402A or 403A E1 synchronization splitter is physically connected to the UDS1 board behind the port carrier, but the `E1 Sync-Splitter?` field on the **add ds1** form has not been administered as `y`. 1. If the 402A or 403A E1 synchronization splitter is to be used, use the **change ds1** command to change the `E1 Sync-Splitter?` field to `y`. Otherwise, physically remove the 402A or 403A E1 synchronization splitter from the back of the port carrier. 2. Run the test again.

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Table 8-673. Test #138 Loss of Signal Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1302	FAIL	Attempting to use the 120A1 CSU module with a UDS1 circuit pack that is configured for 32-channel (2.048-Mbps) operation. The CSU module only works with a DS1 board configured for 24-channel (1.544-Mbps) operation in the United States of America. 1. If the 120A1 CSU module is to be used, physically remove the UDS1 circuit pack and reconfigure for 24-channel (1.544-Mbps) operation. 2. Reinsert the circuit pack and run the test again.
1303	FAIL	The DS1 circuit pack Suffix is incorrect for CSU module/T1 sync splitter or E1 Sync Splitter administration. The DS1 circuit pack Suffix is incorrect for CSU module/T1 sync splitter administration. The `Near-End CSU Type` field on the **add ds1** form has been administered as `integrated` but the DS1 circuit pack is not a TN464F or later suffix UDS1 board. 1. If the CSU module/T1 sync splitter is to be used, and the `Near-End CSU Type` field is set to `integrated` to allow for CSU module/T1 sync splitter administration, remove the circuit pack and replace it with a TN464F or later suffix board. Otherwise, use the **change ds1** command to change the `Near-End CSU Type` field to `other`. The DS1 circuit pack Suffix is incorrect for E1 Sync Splitter administration. The `E1 Sync-Splitter?` field on the **add ds1** form has been administered as `y` but the DS1 circuit pack is not a TN464F or later suffix UDS1 board. 1. If the E1 Sync Splitter is to be used, and the `E1 Sync-Splitter?` field is set to `y` to allow for E1SS administration, remove the circuit pack and replace it with a TN464F or later suffix board. Otherwise, use the **change ds1** command to change the `E1 Sync-Splitter?` field to `n`.
1310	FAIL	The DS1 Board Loopback (BLB) demand test (#1209) failed. 1. Repeat the test using the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command. 2. If the BLB test continues to fail, then replace the UDS1-BD circuit pack. 3. Run this test again.

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Table 8-673. Test #138 Loss of Signal Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1311	FAIL	The Integrated CSU (I-CSU) Module Equipment Loopback (ELB) test (#1210) failed. This test is executed by the I-CSU during I-CSU power-up/reset (i.e., the UDS1 board is physically inserted and a CSU module or a Sync Splitter is already installed) or when the CSU module/Sync Splitter is plugged on to an already initialized DS1 board. The ELB test is also executed as part of the command **test ds1-loop *UUCSS* ds1/csu-loopback-tests** for the CSU module and T1 sync splitter. 1. Execute the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command. 2. If the ELB test continues to fail, then either the UDS1 board, the CSU module/T1 sync splitter, or the I/O cable between the backplane and the CSU module/T1 sync splitter (or any combination thereof) has failed. Attempt to isolate the problem to one of these areas. Begin by replacing the CSU module/T1 sync splitter and running the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command again. 3. If the ELB test continues to fail, then replace the UDS1 board, and run the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command again. 4. If the ELB test continues to fail, the problem could be in the I/O cable between the backplane and the CSU module/T1 sync splitter.
1312	FAIL	The Integrated CSU (I-CSU) Module Repeater Loopback (RLB) test (#1211) failed. This test is executed during I-CSU/Sync Splitter power-up/reset (i.e., the UDS1 board is physically inserted and the CSU module or the Sync Splitter is already installed) or when the CSU module/Sync Splitter is plugged on to an already initialized DS1 board. The RLB test is also executed as part of the command ***test ds1-loop UUCSS ds1/csu-loopback-tests*** for the CSU module/T1 sync splitter. 1. Execute the ***test ds1-loop UUCSS ds1/csu-loopback-tests*** command. 2. If the RLB test continues to fail, then replace the CSU module/T1 sync splitter. 3. Run this test again.
1313	FAIL	The UDS1 circuit pack could not deactivate a CPE Loop-Back Jack loopback. 1. Execute the ***test ds1-loop UUCSS end-loopback/span-test*** command. 2. If the attempt to deactivate the CPE Loop-Back Jack is not successful, check the cabling and investigate the problem at the CPE Loop-Back Jack. 3. Run the test again.
1314	FAIL	The UDS1 circuit pack could not deactivate a far-end CSU loopback. 1. Execute the ***test ds1-loop UUCSS end-loopback/span-test*** command.

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Table 8-673. Test #138 Loss of Signal Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1320	FAIL	Either a CSU module/Sync Splitter hardware failure or an ICSU/Sync Splitter serial-interface audit failure was detected by the UDS1 circuit pack. 1. Replace the CSU module/Sync Splitter, and then run the test again. 2. If the test continues to fail with this error code, replace the UDS1-BD circuit pack, and run the test again. 3. If the test continues to fail with this error code, then the problem could be in the I/O cable between the backplane and the CSU module/Sync Splitter.
1321	FAIL	DTE LOS (loss of signal) was detected between the UDS1 board and the CSU module or the Sync Splitter. Either the UDS1 board, the CSU module/Sync Splitter, or the I/O cable between the backplane and the CSU module/Sync Splitter (or any combination thereof) has failed. Attempt to isolate the problem to one of these areas. 1. Replace the CSU module/Sync Splitter, and run the test again. 2. If the test continues to fail with this error code, then replace the UDS1-BD board, and run the test again. 3. If the test continues to fail with this error code, the problem could be in the I/O cable between the backplane and the CSU module/Sync Splitter.
1322	FAIL	No 5-Volt power detected from the UDS1 circuit pack to the CSU module or the Sync Splitter. Problem is probably due to an open fuse on the DS1 board or to a faulty ICSU/Sync Splitter. **NOTE:** Do not immediately swap a DS1 board as this may blow the fuse on the new board. 1. If the test continues to fail with this error code, then replace the CSU module/Sync Splitter, and run the test again. 2. Remove the UDS1 from the system and reinsert. 3. Run the test again once the board has finished its reset. 4. If the test continues to fail with this error code, then replace the UDS1-BD board, and run the test again. 5. If the test continues to fail with this error code, the problem could be in the I/O cable between the backplane and the CSU module/Sync Splitter.
1323	FAIL	A service-affecting CSU module/Sync Splitter audit failure was detected by the UDS1 circuit pack. Every administered port on the UDS1 circuit pack is affected, and maintenance software will place the ports into the out-of-service state. 1. Replace the CSU module or the Sync Splitter.

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Table 8-673. Test #138 Loss of Signal Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1324	FAIL	A non-service-affecting CSU module/Sync Splitter audit failure was detected by the UDS1 circuit pack. No ports should be affected. No immediate action is required. These errors indicate that the CSU module/Sync Splitter hardware may have a problem, and that it should be replaced when practical to avoid further deterioration.
1400	FAIL	Echo Canceller function failed. This could be a hardware problem on the TN464GP/TN2464BP: 1. Issue the **busyout board** command. 2. Issue the **reset board** command. 3. Issue the **test board long** command. 4. Issue the **release board** command. 5. If Test 1420 still fails, replace the TN464GP/TN2464BP.
1401	FAIL	Echo Canceller memory failed, this could be a hardware problem on the TN464GP/TN2464BP: 1. Issue the **busyout board** command. 2. Issue the **reset board** command. 3. Issue the **test board long** command. 4. Issue the **release busy board** command. 5. If the test still fails, replace the TN464GP/TN2464BP.
	PASS	DS1 signal is present and the physical link is healthy. In addition, no Integrated CSU/Sync Splitter errors or echo cancellation errors are detected.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board is shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Blue Alarm Inquiry Test (#139)

The Blue Alarm is a signal sent by the remote DS1 endpoint when it is out-of-service. The Blue Alarm Inquiry test checks the blue alarm status of the remote DS1 endpoint.

When the UDS1 Interface circuit pack detects a Blue Alarm signal from the remote DS1 endpoint, the circuit pack transmits a Yellow alarm to the remote DS1 endpoint and sends a BLUE ALARM message to the maintenance software. When the Blue alarm is confirmed, the maintenance software places every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. The inquiry test runs every 10 minutes until the Blue alarm is cleared.

The UDS1 Interface circuit pack takes one second to recognize and report a Blue alarm and 16 seconds to recognize and report the resolution of a Blue alarm. When the Blue alarm is cleared, the UDS1 Interface circuit pack stops transmitting the Yellow alarm and places the trunks or ports back into the service state before the Blue alarm occurs.

Line Loop-Back Alarm

The LLB (Line Loopback) is used by the remote DS1 endpoint to put the ICSU or DS1 board into a loop-back mode. When the ICSU or DS1 board is in the LLB mode, the arriving bit pattern is regenerated and sent back. The LLB Alarm activates when the in-band activate LLB bit pattern arrives continuously for 5 seconds on the DS1 line. The LLB deactivates when the in-band deactivate LLB bit pattern arrives continuously for 5 seconds on the DS1 line.

Since LLB is a maintenance condition rendering every DS0 channel unavailable for signaling or bearer traffic, maintenance software treats this the same as a Blue Alarm.

Payload Loopback Alarm

The PLB (Payload Loopback) is used by the remote DS1 endpoint to put the switch DS1 into a loop-back mode. The PLB Alarm activates when a network protocol activate bit pattern arrives over the 4-Kbps ESF data link on the DS1 line. The PLB deactivates when a network protocol deactivate bit pattern arrives over the 4-Kbps ESF data link on the DS1 line.

Since PLB is a maintenance condition rendering every DS0 channel unavailable for signaling or bearer traffic, maintenance software treats this the same as a Blue Alarm.

Table 8-674. Test #139 Blue Alarm Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Test #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and the ports are properly installed. When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The remote DS1 endpoint is out-of-service.
1, 1794	FAIL	The UDS1 Interface circuit pack detects a Line Loopback Alarm (LLB). If the UDS1 interface circuit pack connects to a T1 facility, call the vendor of the T1 carrier to diagnose the remote DS1 endpoint. If the UDS1 interface circuit pack connects directly to a switch, call the system technician of the remote switch to diagnose the DS1 endpoint. If the UDS1 interface circuit pack connects directly to a line-side terminating device (for example, a PRI terminal adapter), call the vendor of the terminating device to diagnose the equipment.

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Table 8-674. Test #139 Blue Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1795	FAIL	The UDS1 Interface circuit pack detects a Payload Loopback Alarm (PLB). If the UDS1 Interface circuit pack connects to a leased T1 facility, call the vendor of the T1 carrier to diagnose the remote DS1 endpoint. If the UDS1 Interface circuit pack connects directly to another DS1 board, call the system technician of the remote switch to diagnose the DS1 endpoint. If the UDS1 Interface circuit pack connects directly to a line-side terminating device such as a PRI terminal adapter contact the vendor of the terminating device to diagnose the equipment.
	PASS	Remote DS1 endpoint is in-service. Neither a Blue alarm nor a Line Loopback alarm nor a Payload Loopback Alarm is detected by the UDS1 Interface circuit pack.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board is shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Red Alarm Inquiry Test (#140)

A UDS1 Interface circuit pack raises a Red alarm when the framing pattern of the incoming DS1 bit stream has been lost. The Red Alarm Inquiry test checks the framing status of a UDS1 Interface circuit pack. A UDS1 Interface circuit pack takes 3 seconds to recognize and report a Red alarm and 10 seconds to recognize and report the resolution of a Red alarm.

When the UDS1 Interface circuit pack detects a Red alarm, the circuit pack transmits a Yellow alarm to the remote DS1 endpoint and sends a **Red** alarm message to the maintenance software. After the Red alarm is confirmed, the maintenance software places every trunk or port of the circuit pack into the out-of-service state. The inquiry test runs every 10 minutes until the Red alarm is cleared.

When the Red alarm is cleared, the UDS1 Interface circuit pack stops transmitting the Yellow alarm to the remote DS1 endpoint. The maintenance software restores all trunks or ports of the UDS1 Interface circuit pack to the service state before the Red alarm occurs.

Loss of Multiframe Alarm

If the UDS1 Interface circuit pack is administered using DMI-BOS signaling, the UDS1 Interface circuit pack raises a LMA (Loss of Multiframe Alarm) when it cannot interpret the incoming signaling bits to synchronize to the multiframe pattern received in the 24^{th} channel. Once the UDS1 Interface circuit pack detects an LMA, the circuit pack transmits a RMA (Remote Multiframe Alarm) to the remote DS1 endpoint. Maintenance software handles both Red and LMA alarms using the same mechanism.

Table 8-675. Test #140 Red Alarm Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Test #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and the ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.

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Table 8-675. Test #140 Red Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	The UDS1 interface circuit pack detected a Red alarm. An out-of-frame condition occurred on the UDS1 interface circuit pack. The UDS1 interface circuit pack will transmit a Yellow alarm to the remote UDS1 endpoint until the Red alarm is retired. If the UDS1 connects to a T1 network facility or to another switch, do the following. 1. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 2. Contact T1 Network Service or a technician at the far-end switch to diagnose the remote DS1 endpoint. 3. Check the physical connectivity of the UDS1 packs and of the cable. 4. Replace the local UDS1 interface circuit pack, and repeat the test. If the UDS1 connects to a line-side terminating device (for example, a PRI terminal adapter), do the following. 1. Verify that the switch DS1 and the line-side terminating device are administered using the same signaling mode, framing mode, and line coding. 2. Investigate the maintenance status of the line-side terminating device. Refer to the 'Line-Side Terminating Device Operating Manual' for information. 3. Contact the vendor of the line-side terminating device to diagnose the equipment. 4. Check the physical connection of the UDS1 interface circuit pack to the terminating device, and check the premise distribution system (or the intra-premise wiring) for physical connection failures. 5. Replace the local UDS1 interface circuit pack and repeat the test.

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Table 8-675. Test #140 Red Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1	FAIL	The test failed. The UDS1 interface circuit pack detected a loss of multiframe alarm (LMA). An out-of-frame condition occurred on the UDS1 interface circuit pack. The UDS1 interface circuit pack will transmit a remote multiframe alarm (RMA) to the remote UDS1 endpoint until the LMA is retired. If the UDS1 connects to a T1 network facility or to another switch, do the following: 1. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 2. Contact T1 Network Service or a technician at the far-end switch to diagnose the remote DS1 endpoint. 3. Check the physical connectivity of the UDS1 packs and of the cable. 4. Replace the local UDS1 interface circuit pack, and repeat the test. If the UDS1 connects to a line-side terminating device (for example, a PRI terminal adapter), do the following. 1. Verify that the switch DS1 and the line-side terminating device are administered using the same signaling mode, framing mode, and line coding. 2. Investigate the maintenance status of the line-side terminating device. Refer to the 'Line-Side Terminating Device Operating Manual' for information. 3. Contact the vendor of the line-side terminating device to diagnose the equipment. 4. Check the physical connection of the UDS1 interface circuit pack to the terminating device, and check the premise distribution system (or the intra-premise wiring) for physical connection failures. 5. Replace the local UDS1 interface circuit pack and repeat the test.

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Table 8-675. Test #140 Red Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	No Red alarm is detected on the UDS1 Interface circuit pack.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board is shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Yellow Alarm Inquiry Test (#141)

Receiving a Yellow alarm from a remote DS1 endpoint indicates that the remote DS1 endpoint has an out-of-frame condition. The Yellow Alarm Inquiry test is used to determine whether the remote DS1 endpoint is transmitting a Yellow alarm. The UDS1 Interface circuit pack takes 500 msec to recognize and report a Yellow alarm, and another 500 msec to recognize and report that the alarm's condition is cleared.

When the UDS1 Interface circuit pack detects a Yellow alarm from the remote DS1 endpoint, it sends a YELLOW-ALARM uplink message to the maintenance software. After the maintenance software receives the YELLOW-ALARM message, the Yellow Alarm Inquiry test is run to confirm the Yellow alarm. Once the alarm is confirmed, the maintenance software places every trunk or port on the circuit pack into the out-of-service state. The Inquiry test runs every 10 minutes until the Yellow alarm is cleared.

When the Yellow alarm is cleared, the maintenance software restores every trunk or port on the UDS1 Interface circuit pack back to its previous service state before the alarm was raised.

This Yellow alarm corresponds to the yellow F2 state documented in CCITT Recommendation I.431.

Remote Multiframe Alarm

An RMA (Remote Multiframe Alarm) indicates that the remote DS1 endpoint is in a Loss of Multiframe Alarm condition while the UDS1 Interface circuit pack is administered using the DMI-BOS common-channel signaling. The RMA is handled as a Yellow alarm.

Yellow F5 Fault Alarm

For 32-channel E1 operation with CRC4 on, the F5 fault state is defined as a fault in the user-network interface, specifically in the direction from the user (PBX) to the network. Refer to CCITT recommendation I.431.

Table 8-676. Test #141 Yellow Alarm Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Test #138 #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and the ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 Interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.

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Table 8-676. Test #141 Yellow Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	The UDS1 interface circuit pack detected a Yellow alarm sent by the remote DS1 endpoint. An out-of-frame condition occurred at the DS1 endpoint. If the UDS1 connects to a T1 network facility or to another switch, do the following: 1. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 2. Contact T1 Network Service or a technician at the far-end switch to diagnose the remote DS1 endpoint. 3. Check the physical connectivity of the UDS1 packs and of the cable. 4. Replace the local UDS1 interface circuit pack, and repeat the test. If the UDS1 connects to a line-side terminating device (for example, a PRI terminal adapter), do the following: 1. Verify that the switch DS1 and the line-side terminating device are administered using the same signaling mode, framing mode, and line coding. 2. Investigate the maintenance status of the line-side terminating device. Refer to the 'Line-Side Terminating Device Operating Manual' for information. 3. Contact the vendor of the line-side terminating device to diagnose the equipment. 4. Check the physical connection of the UDS1 interface circuit pack to the terminating device, and check the premise distribution system (or the intra-premise wiring) for physical connection failures. 5. Replace the local UDS1 interface circuit pack and repeat the test.

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Table 8-676. Test #141 Yellow Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1	FAIL	The UDS1 interface circuit pack detected a remote multiframe alarm (RMA) sent by the remote DS1 endpoint. An out-of-frame condition occurred at the DS1 endpoint. If the UDS1 connects to a T1 network facility or to another switch, do the following: 1. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 2. Contact T1 Network Service or a technician at the far-end switch to diagnose the remote DS1 endpoint. 3. Check the physical connectivity of the UDS1 packs and of the cable. 4. Replace the local UDS1 interface circuit pack, and repeat the test. If the UDS1 connects to a line-side terminating device (for example, a PRI terminal adapter), do the following: 1. Verify that the switch DS1 and the line-side terminating device are administered using the same signaling mode, framing mode, and line coding. 2. Investigate the maintenance status of the line-side terminating device. Refer to the 'Line-Side Terminating Device Operating Manual' for information. 3. Contact the vendor of the line-side terminating device to diagnose the equipment. 4. Check the physical connection of the UDS1 interface circuit pack to the terminating device, and check the premise distribution system (or the intra-premise wiring) for physical connection failures. 5. Replace the local UDS1 interface circuit pack and repeat the test.

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Table 8-676. Test #141 Yellow Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
2	FAIL	The UDS1 interface circuit pack is reporting a Yellow F5 fault alarm. There is a fault in the User-Network interface from the user (PBX) to the network. An out-of-frame condition occurs on the remote DS1 endpoint. If the UDS1 connects to a T1 network facility: 1. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 2. Contact T1 Network Service to diagnose the remote DS1 endpoint. 3. Check the physical connectivity of the DS1 Interface circuit packs and cable. 4. Replace the local UDS1 Interface circuit pack and repeat the test. If the UDS1 connects to a line-side terminating device such as a PRI terminal adapter: 1. Verify that the switch DS1 and the line-side terminating device are administered using the same signaling mode, framing mode, and line coding. 2. Investigate the maintenance status of the line-side terminating device. Refer to the 'Line-Side Terminating Device Operating Manual' for information. 3. Contact the vendor of the line-side terminating device to diagnose the equipment. 4. Check the physical connection of the UDS1 Interface circuit pack to the terminating device. Check premise distribution system (or intra-premise wiring) for physical connection failures. 5. Replace the local UDS1 Interface circuit pack and repeat the test.

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Table 8-676. Test #141 Yellow Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	Neither a Yellow alarm nor a Remote Multiframe Alarm nor a F5 state alarm is being received from the remote DS1 endpoint.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board is shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Major Alarm Inquiry Test (#142)

The Major alarm raised by a UDS1 Interface circuit pack indicates that the average bit error rate on the DS1 facility is greater than 1/1000. The Major Alarm Inquiry test is used to determine that the received DS1 bit error rate is greater than 1/1000. The UDS1 Interface circuit pack takes 10 seconds to recognize and report a Major alarm and 10 seconds to recognize and report that a Major alarm condition is cleared.

When the UDS1 Interface circuit pack detects a Major alarm, it sends a MAJOR-ALARM message to the maintenance software. (32-channel interfaces send a YELLOW alarm to the far end). After the maintenance software receives a MAJOR-ALARM message, the Major Alarm Inquiry test is initiated to confirm the Major alarm on the UDS1 Interface circuit pack. The Inquiry test runs every 10 minutes until the Major alarm is cleared. The maintenance software places every trunk or port on the circuit pack in the out-of-service state if the Major alarm persists for more than 20 minutes.

When the Major alarm is cleared, the maintenance software restores every trunk or port on the circuit pack to its previous service state before a Major alarm occurs.

Table 8-677. Test #142 Major Alarm Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Test #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and its ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 Interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	If the UDS1 connects to a T1 network facility or to another switch, do the following: 1. The performance of the DS1 link between the UDS1 interface circuit pack and the remote DS1 endpoint is very poor. Enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 2. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 3. Contact T1 Network Service or the technician at the remote switch to diagnose the equipment. 4. Check the physical connectivity of the UDS1 interface circuit packs and the cable. 5. Replace the local UDS1 interface circuit pack, and repeat the test.

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Table 8-677. Test #142 Major Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL *(cont'd)*	If the UDS1 connects to a line-side terminating device (for example, a PRI terminal adapter), do the following: 1. The performance of the DS1 link between the UDS1 interface circuit pack and the line-side terminating device is very poor. Enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 2. Verify that the switch DS1 and the line-side terminating device are administered using the same signaling mode, framing mode, and line coding. 3. Investigate the maintenance status of the line-side terminating device. Refer to the 'Line-Side Terminating Device Operating Manual' for information. 4. Contact the vendor of the line-side terminating device to diagnose the equipment. 5. Check the physical connection of the UDS1 interface circuit pack to the terminating device, and check the premise distribution system (or the intra-premise wiring) for physical connection failures. 6. Replace the local UDS1 interface circuit pack and repeat the test.
	PASS	No Major alarm is detected in the UDS1 Interface circuit pack.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board is shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Minor Alarm Inquiry Test (#143)

The Minor alarm raised by a UDS1 Interface circuit pack indicates that the average bit error rate on the DS1 facility is greater than 1/1,000,000, but less than 1/1000. The Minor Alarm Inquiry test is used to determine that the received DS1 bit error rate is greater than 1/1,000,000 and less than 1/1000. When D4 framing mode is selected, the UDS1 Interface circuit pack takes 41 minutes to recognize and report a Minor alarm and 41 minutes to recognize and report that a Minor alarm condition has cleared. If ESF framing mode is selected, the UDS1 Interface circuit pack takes 10 minutes to recognize and report a Minor alarm and 10 minutes to recognize and report that a Minor alarm condition has cleared.

When the UDS1 Interface circuit pack detects a Minor alarm condition, it sends a MINOR-ALARM message to the maintenance software. After the maintenance software receives a MINOR-ALARM message, the Minor Alarm Inquiry test is initiated to confirm the Minor alarm. Every trunk or port on the circuit pack is kept in the in-service state after the Minor alarm is confirmed. The Minor Alarm Inquiry test runs every 10 minutes until the Minor alarm is cleared.

Table 8-678. Test #143 Minor Alarm Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and its ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 Interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-678. Test #143 Minor Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	Minor alarms are often accompanied by slip and misframe alarms against the board. Trunk alarms and hardware error logs may occur on the associated trunks. If the UDS1 connects to a T1 network facility or to another switch, do the following: 1. The performance of the DS1 link between the UDS1 interface circuit pack and the remote DS1 endpoint is poor. Enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 2. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 3. Contact T1 Network Service or the technician at the remote switch to diagnose the equipment. 4. Check the physical connectivity of the UDS1 interface circuit packs and the cable. 5. Replace the local UDS1 interface circuit pack, and repeat the test.
	FAIL *(cont'd.)*	If the UDS1 connects to a line-side terminating device (for example, a PRI terminal adapter), do the following: 1. The performance of the DS1 link between the UDS1 interface circuit pack and the line-side terminating device is very poor. Enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 2. Verify that the switch DS1 and the line-side terminating device are administered using the same signaling mode, framing mode, and line coding. 3. Investigate the maintenance status of the line-side terminating device. Obtain the error seconds measurement on the terminating device (if possible). Refer to the 'Line-Side Terminating Device Operating Manual' for information. 4. Contact the vendor of the line-side terminating device to diagnose the equipment. 5. Check the physical connection of the UDS1 interface circuit pack to the terminating device, and check the premise distribution system (or the intra-premise wiring) for physical connection failures. 6. Replace the local UDS1 interface circuit pack and repeat the test.

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Table 8-678. Test #143 Minor Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	No Minor alarm is detected in the UDS1 Interface circuit pack.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Slip Alarm Inquiry Test (#144)

Slips occur when transmitter and receiver are not running at precisely the same clock rate. The UDS1 Interface circuit pack can detect both positive and negative slips on the DS1 facility. The Slip Alarm Inquiry test is used to acquire the total number of slips that have occurred on a DS1 link.

When the UDS1 Interface circuit pack detects a slip condition, the circuit pack increments the on-board slip counter by one. A SLIP-COUNT message is spontaneously sent to the system software after the counter reaches a threshold (for example, 88). When the maintenance software receives the SLIP-COUNT message, the Slip Alarm Inquiry test is initiated to query the slip counters on a UDS1 Interface circuit pack and total the slip counts in the maintenance software.

If the count of slips is over the threshold, a Minor alarm is raised against the UDS1 Interface circuit pack. Every trunk or port of the UDS1 Interface circuit pack remains in the in-service state. If the UDS1 Interface circuit pack is used to supply the system synchronization source, the MINOR alarm will initiate a synchronization source switch. See ''TDM-BUS (TDM Bus)'' and ''SYNC (Port-Network Synchronization)'' for details.

Table 8-679. Test #144 Slip Alarm Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and its ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 Interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-679. Test #144 Slip Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1 to 88	FAIL	The test failed because the UDS1 interface circuit pack and the remote DS1 endpoint are not synchronized to the same clock rate. The UDS1 interface circuit pack detected a slip alarm. The error code equals the number of slips detected by the UDS1 interface circuit pack since the last slip alarm inquiry test. If the UDS1 connects to a T1 network facility or to another switch, do the following: 1. Retry the command at 1-minute intervals up to 5 times. 2. If the DS1 interface circuit pack is a TN464C, enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 3. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 4. Check the active alarm and error logs for recent alarms and errors against the synchronization (SYNC). Follow the suggested repair procedure for these errors. 5. Contact T1 Network Service or the technician at the remote switch to diagnose the remote DS1 endpoint. 6. Check the physical connectivity of the UDS1 interface circuit packs and the cable. 7. Replace the local UDS1 interface circuit pack, and repeat the test.
1 to 88 *(cont'd)*	FAIL *(cont'd)*	If the UDS1 connects to a line-side terminating device (for example, a PRI terminal adapter), do the following: 1. Retry the command at 1-minute intervals up to 5 times. 2. Enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 3. Verify that the switch DS1 and the line-side terminating device are administered using the same signaling mode, framing mode, and line coding. 4. Investigate the maintenance status of the line-side terminating device. Refer to the 'Line-Side Terminating Device Operating Manual' for information. 5. Contact the vendor of the line-side terminating device to diagnose the equipment. 6. Check the physical connection of the UDS1 interface circuit pack to the terminating device, and check the premise distribution system (or the intra-premise wiring) for physical connection failures. 7) Replace the local UDS1 interface circuit pack and repeat the test.

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Table 8-679. Test #144 Slip Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	No Slip alarm is detected on the UDS1 Interface circuit pack.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Misframe Alarm Inquiry Test (#145)

Misframe Alarm indicates that framing bits observed on a UDS1 Interface circuit pack are in error. The Misframe Alarm Inquiry test queries the total number of misframes that have occurred on a DS1 Interface circuit pack since the last inquiry.

When the DS1 Interface circuit pack detects a misframe error, it increments its misframe counter by one. If the counter reaches a specified threshold (i.e., 17), a MISFRAME-COUNT message is automatically sent to the switch maintenance software. After the maintenance software receives the MISFRAME-COUNT message, the Misframe Alarm Inquiry test is initiated to collect the misframe counts from the UDS1 Interface circuit pack.

When the threshold of misframes is reached, if the UDS1 Interface circuit pack is supplying the system synchronization source, then a switching synchronization source message is sent to the TDM bus Clock. See ''TDM-BUS (TDM Bus)'' on page 8-1588 for details. A Minor alarm against the UDS1 Interface circuit pack is raised, but every trunk or port of the UDS1 Interface circuit pack remains in the in-service state.

Table 8-680. Test #145 Misframe Alarm Inquiry Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and the ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 Interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-680. Test #145 Misframe Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1 to 17	FAIL	The test failed because the UDS1 interface circuit pack detected errors in the received framing bits pattern. The error code equals the number of misframes detected by the UDS1 interface circuit pack since the last misframe alarm inquiry test. Major bit and minor bit error rate (error types 2561 and 2817) error logs often accompany misframe alarms. Clearing the cause of these error logs may clear the misframes which are occurring. If the UDS1 connects to a T1 network facility or to another switch, do the following: 1. Retry the command at 1-minute intervals up to 5 times. 2. If the DS1 interface circuit pack is a TN464C, enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 3. Verify that both endpoints of the DS1 link are administered using the same signaling mode, framing mode, and line coding. 4. Check the active alarm and error logs for recent alarms and errors against the synchronization (SYNC). Follow the suggested repair procedure for these errors. 5. Contact T1 Network Service or the technician at the remote switch to diagnose the remote DS1 endpoint. 6. Check the physical connectivity of the UDS1 interface circuit packs and the cable. 7. Replace the local UDS1 interface circuit pack, and repeat the test. *More information continues on the next page.*

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Table 8-680. Test #145 Misframe Alarm Inquiry Test — *Continued*

Error Code	Test Result	Description / Recommendation
1 to 17 *(cont'd)*	FAIL *(cont'd)*	If the UDS1 connects to a line-side terminating device such as a PRI terminal adapter: 1. Retry the command at 1-minute intervals up to 5 times. 2. Enter the **list measurement ds1-log *UUCSS*** command to read the error seconds measurement. 3. Verify that the switch DS1 and the line-side terminating device are administered using the same signaling mode, framing mode, and line coding. 4. Investigate the maintenance status of the line-side terminating device. Refer to the 'Line-Side Terminating Device Operating Manual' for information. 5. Contact the vendor of the line-side terminating device to diagnose the equipment. 6. Check the physical connection of the UDS1 interface circuit pack to the terminating device, and check the premise distribution system (or the intra-premise wiring) for physical connection failures. 7. Replace the local UDS1 interface circuit pack and repeat the test.
	PASS	No Misframe alarm is detected on the UDS1 Interface circuit pack.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 UUCSS** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Translation Update Test (#146)

The Translation Update test sends the circuit-pack-level information specified by System Administration to the UDS1 Interface circuit pack. Translation includes the following data administered for a UDS1 Interface circuit pack (see output of **display ds1 *UUCSS*** command): DS1 Link Length between two DS1 endpoints, Synchronization Source Control, All Zero Suppression, Framing Mode, Signaling Mode, Time Slot Number of 697-Hz Tone, Time Slot Number of 700-Hz Tone, etc.

If a TN464F or later UDS1 circuit pack is combined with a 120A1 CSU module or the 401A T1 sync splitter to form an Integrated CSU module/T1 sync splitter, this test will also send the administration for this Integrated CSU to the circuit pack to assure the board's translations are correct. The administration of the CSU module/T1 sync splitter is done using the **DS1 Circuit Pack** administration form. Translation for the CSU module/T1 sync splitter includes the following data: Transmit LBO, Receive ALBO, Supply CPE Loop-Back Jack Power?, etc.

Table 8-681. Test #146 Translation Update Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute interval s up to 5 times.
	FAIL	Internal system software error. 1. Enter the **display ds1 *UUCSS*** command to verify the UDS1 Interface circuit pack translation.
	PASS	Translation data has been downloaded to the UDS1 Interface circuit pack successfully.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

DS1 Board Loop-back Test (#1209)

This test is destructive.

The DS1 BLB (Board Loopback) test causes a loop back at the DS1 board edge and tests DS1 board internal circuitry.

The test is destructive and can only be initiated by a system technician demanded **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command.

Every trunk or port on the UDS1 Interface circuit pack must be busied out using the system technician **busyout board** command before running the BLB test.

When the BLB test is initiated, maintenance software sends an appropriate message to the UDS1 Interface circuit pack to start the test. The board sets up the BLB loopback, transmits a test pattern, and verifies that the pattern is received unaltered through the loopback. If the transmitted and received pattern is different, the test fails.

When the test is complete, every trunk or port on the TN464GP/TN2464BPTN UDS1 Interface circuit pack is restored to the in-service state after the **release board** command is entered.

Table 8-682. Test #1209 DS1 Board Loop-Back Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command at 1-minute intervals up to 5 times.
1005	ABORT	DS1 Board Loopback test cannot be executed in the current configuration. To run this, the TN464F or later suffix UDS1 must be administered for 24-channel operation. The “Bit Rate” field on the DS1 circuit pack administration form must be set to “1.544” for 24-channel operation.
1015	ABORT	Ports on the UDS1 Interface circuit pack have not been busied out to out-of-service. 1. Enter the **busyout board *UUCSS*** command to put every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. 2. Retry the command.

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Table 8-682. Test #1209 DS1 Board Loop-Back Test — *Continued*

Error Code	Test Result	Description / Recommendation
1039	ABORT	The UDS1 Interface circuit pack is providing timing for the system. Executing this test could cause major system disruption. If the UDS1 Interface circuit pack needs to be tested, set the synchronization reference to another DS1 Interface circuit pack or to the IPSI or Tone-Clock circuit pack via the following command sequence: 1. Issue the **disable synchronization-switch** command. 2. Next, issue the **set synchronization *UUCSS*** command. 3. Lastly, issue the **enable synchronization-switch** command.
1950	ABORT	Another loopback/span test is already executing on the DS1 board or the board is in a network-requested loop-back mode (line loopback or payload loopback). The hardware error log will indicate whether a Customer Loop-Back Jack test, Far CSU Loopback test, or the One-Way Span test is executing or if the board is in line-loopback or payload-loop-back mode. Only one long-duration loopback/span test can be active at a given time. Thus, if a loopback/span test is already active, that test must be terminated via the **test ds1-loop *UUCSS* end-loopback/span-test** command in order to execute this test.
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and the ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.

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Table 8-682. Test #1209 DS1 Board Loop-Back Test — *Continued*

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	UDS1 Interface circuit pack failed the DS1 Board Loopback test. 1. Retry the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command. 2. If the BLB test continues to fail, then replace the UDS1 circuit pack.
	PASS	The BLB test executed successfully. The test pattern was transmitted and received successfully up to the DS1 board edge.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

CSU Equipment Loop-Back Test (#1210)

This test is destructive.

The CSU Equipment Loopback (ELB) test causes a loopback at the near-edge of the local 120A1 CSU module or the 401A T1 sync splitter and tests the connection from the DS1 board to the CSU module/T1 sync splitter (DS1 board edge interconnecting cable, and CSU module/T1 sync splitter edge). This test is only performed if the 120A1 CSU module or the 401A T1 sync splitter is present, administered, and connected to a 1.544-Mbps DS1 circuit pack behind the port carrier.

The test is destructive and can only be initiated by a system technician demanded **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command.

Every trunk or port on the UDS1 Interface circuit pack must be busied out using the system technician **busyout board** command before running the ELB test.

When the ELB test is initiated, maintenance software sends an appropriate message to the UDS1 Interface circuit pack to start the test. The board sets up the ELB loopback, transmits a test pattern, and verifies that the pattern is received unaltered through the loopback. If the transmitted and received pattern is different, the test fails.

When the test is complete, every trunk or port on the UDS1 Interface circuit pack is restored to the in-service state after the **release board** command is entered.

Table 8-683. Test #1210 CSU Equipment Loop-Back Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command at 1-minute intervals up to 5 times.
1005	ABORT	CSU Equipment Loopback test cannot be executed in the current configuration. To run this test, the *Near-End CSU Type* field on the DS1circuit pack administration form must be set to *integrated* and the “Bit Rate” field on the DS1 circuit pack administration form must be set to “1.544” (24-channel configuration). 1. Use the **change ds1 *UUCSS*** command to set the *Near-End CSU Type* field on the DS1 circuit pack administration form to *integrated*, and/or change the “Bit Rate” field to “1.544” if the board is to be used in 24-channel configuration. 2. Retry the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command.

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Table 8-683. Test #1210 CSU Equipment Loop-Back Test — *Continued*

Error Code	Test Result	Description / Recommendation
1015	ABORT	Ports on the UDS1 Interface circuit pack have not been busied out to out-of-service. 1. Enter the **busyout board *UUCSS*** command to put every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. 2. Retry the command.
1039	ABORT	The UDS1 Interface circuit pack is providing timing for the system. Executing this test could cause major system disruption. If the UDS1 Interface circuit pack needs to be tested, set the synchronization reference to another DS1 Interface circuit pack or to the IPSI or Tone-Clock circuit pack via the following command sequence: 1. Issue the **disable synchronization-switch** command. 2. Next, issue the **set synchronization *UUCSS*** command. 3. Lastly, issue the **enable synchronization-switch** command.
1950	ABORT	Another loopback/span test is already executing on the DS1 board or the board is in a network-requested loop-back mode (line loopback or payload loopback). The hardware error log will indicate whether a Customer Loop-Back Jack test, Far CSU Loopback test, or the One-Way Span test is executing or if the board is in line-loopback or payload-loop-back mode. Only one long-duration loopback/span test can be active at a given time. Thus, if a loopback/span test is already active, that test must be terminated using the **test ds1-loop *UUCSS* end-loopback/span-test** command in order to execute this test.
1951	ABORT	The CSU Equipment Loopback test could not be executed because the 120A1 CSU module or the 401A T1 sync splitter was not physically installed. Physically connect the 120A1 CSU module or the 401A T1 sync splitter to the UDS1-BD board behind the port carrier.

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Table 8-683. Test #1210 CSU Equipment Loop-Back Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and the ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 Interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	UDS1 Interface circuit pack failed the CSU Equipment Loopback test. 1. Retry the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command. 2. If the ELB test continues to fail, then either the UDS1-BD board, the CSU module/T1 sync splitter, or the I/O cable between the backplane and the CSU module/T1 sync splitter (or any combination thereof) has failed. Attempt to isolate the problem to one of these areas. Begin by replacing the CSU module/T1 sync splitter and running the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command again. 3. If the ELB test continues to fail, then replace the UDS1-BD board, and run the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command again. 4. If the ELB test continues to fail, the problem could be in the I/O cable between the backplane and the CSU module/T1 sync splitter.

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Table 8-683. Test #1210 CSU Equipment Loop-Back Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The ELB test executed successfully. The test pattern was transmitted and received successfully over the connection from the DS1 board to the near-edge of the 120A1 CSU module or the 401A T1 sync splitter.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

CSU Repeater Loop-Back Test (#1211)

This test is destructive.

The CSU Repeater Loopback (RLB) test causes a loopback at the far-edge of the local 120A1 CSU module or the 401A T1 sync splitter and tests the connection from the DS1 board to and including the CSU module/T1 sync splitter circuitry. This test is only performed if the 120A1 CSU module or the 401A T1 sync splitter is present, administered, and connected to a 1.544-Mbps DS1 circuit pack behind the port carrier.

The test is destructive and can only be initiated by a technician-demanded **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command.

Every trunk or port on the UDS1 Interface circuit pack must be busied out using the system technician **busyout board** command before running the RLB test.

When the RLB test is initiated, maintenance software sends an appropriate message to the UDS1 Interface circuit pack to start the test. The board sets up the RLB loopback, transmits a test pattern, and verifies that the pattern is received unaltered through the loopback. If the transmitted and received pattern is different, the test fails.

When the test is complete, every trunk or port on the UDS1 Interface circuit pack is restored to the in-service state after the **release board** command is entered.

Table 8-684. Test #1211 CSU Repeater Loop-Back Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command at 1-minute intervals up to 5 times.
1005	ABORT	CSU Repeater Loopback test cannot be executed in the current configuration. To run this test, the `Near-End CSU Type` field on the `DS1 Circuit Pack` administration form must be set to `integrated` and the `Bit Rate` field on the `DS1 Circuit Pack` administration form must be set to `1.544` (24-channel configuration). 1. Use the **change ds1 *UUCSS*** command to set the `Near-End CSU Type` field on the `DS1 Circuit Pack` administration form to `integrated`, and/or change the `Bit Rate` field to `1.544` if the board is to be used in 24-channel configuration. 2. Retry the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command.

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Table 8-684. Test #1211 CSU Repeater Loop-Back Test — *Continued*

Error Code	Test Result	Description / Recommendation
1015	ABORT	Ports on the UDS1 Interface circuit pack have not been busied out to out-of-service. 1. Enter the **busyout board *UUCSS*** command to put every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. 2. Retry the command.
1039	ABORT	The UDS1 Interface circuit pack is providing timing for the system. Executing this test could cause major system disruption. If the UDS1 Interface circuit pack needs to be tested, set the synchronization reference to another DS1 Interface circuit pack or to the IPSI or Tone-Clock circuit pack via the following command sequence: 1. Issue the **disable synchronization-switch** command. 2. Next, issue the **set synchronization *UUCSS*** command. 3. Lastly, issue the **enable synchronization-switch** command.
1950	ABORT	Another loopback/span test is already executing on the DS1 board or the board is in a network-requested loop-back mode (line loopback or payload loopback). The hardware error log will indicate whether a Customer Loop-Back Jack test, Far CSU Loopback test, or the One-Way Span test is executing or if the board is in line-loopback or payload-loop-back mode. Only one long-duration loopback/span tests can be active at a given time. Thus, if a loopback/span test is already active, that test must be terminated using the **test ds1-loop *UUCSS* end-loopback/span-test** command in order to execute this test.
1951	ABORT	The CSU Repeater Loopback test could not be executed because the 120A1 CSU module or the 401A T1 sync splitter was not physically installed. Physically connect the 120A1 CSU module or the 401A T1 sync splitter to the UDS1 board behind the port carrier.

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Table 8-684. Test #1211 CSU Repeater Loop-Back Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and its ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 Interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	UDS1 Interface circuit pack failed the CSU Repeater Loopback test. 1. Retry the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command. 2. If the RLB test continues to fail, and the CSU Equipment Loopback test (#1210) passed, then replace the CSU module/T1 sync splitter.

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Table 8-684. Test #1211 CSU Repeater Loop-Back Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The RLB test executed successfully. The test pattern was transmitted and received successfully over the connection from the UDS1 board to the far-edge of the 120A1 CSU module or the 401A T1 sync splitter.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

CPE Loop-Back Jack Test (#1212)

This test is destructive.

The CPE Loop-Back Jack (CLJ-LB) test causes a loopback at the CPE Loop-Back Jack and tests the building wiring connection between the UDS1-BD DS1 board and the CPE Loop-Back Jack.

The test is highly destructive and can only be initiated by a system technician demanded **test ds1-loop *UUCSS* cpe-loopback-jack-test-begin [*number-of-bits bit-pattern*]** command. The System technician has the choice of entering a loopback activation code on the command line or using the default code *0x47F*.

Every trunk or port on the UDS1 Interface circuit pack must be busied out using the system technician **busyout board** command before running the CPE Loop-Back Jack test.

The CPE Loop-Back Jack test has the UDS1 Interface circuit pack transmit a loopback activation code to the CPE Loop-Back Jack, waits up to 10 seconds for return of the code to verify the loopback has been established, transmits a framed 3-in-24 test pattern, begins counting bit errors in the received test pattern, and returns a PASS result to indicate that the pattern was successfully sent. If the loopback is not established within the 10 seconds, the test returns FAIL or abort.

The status of the CPE Loop-Back Jack test is available in the hardware error log via Error Type 3900. Several distinct Aux values give the user information about the status of the test.

The **list measurements ds1 summary** command will display the length of time the test has been running (`Test Duration` field) and number of bit errors detected (`Loopback/Span Test Bit-Error Count` field). If the test pattern is being passed through the loopback cleanly, the number of bit errors should be very low. The command will also display the type of Loopback/Span test executing (`Test` field), the type of pattern generated for the Loopback/Span test (`Pattern` field), and whether the pattern (i.e., 3-in-24 Pattern) is synchronized (`Synchronized` field).

To terminate the test, enter the **test ds1-loop *UUCSS* end-loopback/span-test** command or the **release board** command. Using the **release board** command will restore every trunk or port on the UDS1 Interface circuit pack to the in-service state.

Table 8-685. Test #1212 CPE Loop-Back Jack Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the **test ds1-loop *UUCSS* cpe-loopback-jack-test-begin** command at 1-minute intervals up to 5 times.
1005	ABORT	CPE Loop-Back Jack test cannot be executed in the current configuration. To run this test, the TN464F or later suffix UDS1 must be administered for 24-channel operation. The "Bit Rate" field on the DS1 circuit pack administration form must be set to "1.544" for 24-channel operation.
1015	ABORT	Ports on the UDS1 Interface circuit pack have not been busied out to out-of-service. 1. Enter the **busyout board *UUCSS*** command to put every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. 2. Retry the command.
1039	ABORT	The UDS1 Interface circuit pack is providing timing for the system. Executing this test could cause major system disruption. If the UDS1 Interface circuit pack needs to be tested, set the synchronization reference to another DS1 Interface circuit pack or to the IPSI or Tone-Clock circuit pack via the following command sequence: 1. Issue the **disable synchronization-switch** command. 2. Next, issue the **set synchronization *UUCSS*** command. 3. Lastly, issue the **enable synchronization-switch** command.
1950	ABORT	Another loopback/span test is already executing on the DS1 board or the board is in a network-requested loop-back mode (line loopback or payload loopback). The hardware error log will indicate whether a Customer Loop-Back Jack test, Far CSU Loopback test, or the One-Way Span test is executing or if the board is in line-loopback or payload-loop-back mode. Only one long-duration loopback/span test can be active at a given time. Thus, if a loopback/span test is already active, that test must be terminated using the **test ds1-loop *UUCSS* end-loopback/span-test** command in order to execute this test.

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Table 8-685. Test #1212 CPE Loop-Back Jack Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and its ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 Interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-685. Test #1212 CPE Loop-Back Jack Test — *Continued*

Error Code	Test Result	Description / Recommendation
2	FAIL	The CLJ-LB test failed because it was not set up properly. The UDS1 interface pack could not successfully put the CPE loopback jack into loop-back mode. 1. Rerun the **test ds1-loop *UUCSS* cpe-loopback-jack-test-begin** command. 2. If the test continues to fail, the problem could be with the UDS1-BD board, the CPE loopback jack equipment, or somewhere between. Run the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command to determine whether the loop-back tests that are closer to the UDS1-BD board are successful. If any of these tests fail, follow the maintenance strategy that is associated with the failing test.
3	FAIL	The CPE Loop-Back Jack test was not set up properly. The framed 3-in-24 test pattern, generated by the UDS1 Interface circuit pack and looped back through the CPE Loop-Back Jack, could not be detected properly by the UDS1 circuit pack. 1. Retry the **test ds1-loop *UUCSS* cpe-loopback-jack-test-begin** command. 2. If the CPE Loop-Back Jack test continues to fail, the problem could be with the UDS1-BD board, the CPE Loop-Back Jack equipment, or somewhere in between. Run the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command to see if the loop-back tests closer to the UDS1-BD board are successful. If any of those loop-back tests fail, follow the maintenance strategy associated with those loopbacks.

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Table 8-685. Test #1212 CPE Loop-Back Jack Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The CPE Loop-Back Jack test has successfully began executing. The test will continue to run until the system technician enters the **test ds1-loop *UUCSS* end-loopback/span-test** command or the **release board *UUCSS*** command.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Far CSU Loop-Back Test (#1213)

This test is destructive.

The Far CSU Loopback (R-LLB) test causes a loopback at the far-end CSU and tests all circuitry and facilities from the local DS1 board to the far-end CSU.

The test is destructive and can only be initiated by a technician-demanded **test ds1-loop *UUCSS* far-csu-loopback-test-begin** command.

Every trunk or port on the UDS1 Interface circuit pack must be busied out using the system technician's **busyout board** command before running the Far CSU Loopback test.

If the far-end CSU is not a 120A1 CSU module or the 401A T1 sync splitter, and the DS1 is administered for ami-zcs line coding, density protection must be disabled on the CSU/T1SS during the test due to the large number of zero's in the 3-in-24 test pattern.

The Far CSU Loopback test has the UDS1 Interface circuit pack transmit a loopback activation code to the remote CSU, waits up to 15 seconds for return of the code to verify the loopback has been established, transmits a framed 3-in-24 test pattern, begins counting bit errors in the received test pattern, and returns a PASS result. If the loopback is not established within the 15 seconds, the test fails.

The status of the Far CSU Loopback test is available in the hardware error log via Error Type 3901. Several distinct Aux values give the user information about the status of the test.

The **list measurements ds1 summary** command will display the length of time the test has been running (`Test Duration` field) and number of bit errors detected (`Loopback/Span Test Bit-Error Count` field). If the test pattern is being passed through the loopback cleanly, the number of bit errors should be very low. The command will also display the type of Loopback/Span test executing (`Test` field), the type of pattern generated for the type of Loopback/Span test (`Pattern` field), and whether the pattern (i.e., 3-in-24 Pattern) is synchronized (`Synchronized` field).

To terminate the test, enter the **test ds1-loop *UUCSS* end-loopback/span-test** command or the **release board** command. Using the **release board** command will restore every trunk or port on the UDS1 Interface circuit pack to the in-service state.

Table 8-686. Test #1213 Far CSU Loop-Back Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the **test ds1-loop *UUCSS* far-csu-loopback-test-begin** command at 1-minute intervals up to 5 times.
1005	ABORT	Far CSU Loopback test cannot be executed in the current configuration. To run this, the TN464F or later suffix UDS1 must be administered for 24-channel operation. The "Bit Rate" field on the DS1 circuit pack administration form must be set to "1.544" for 24-channel operation.
1015	ABORT	Ports on the UDS1 Interface circuit pack have not been busied out to out-of-service. 1. Enter the **busyout board *UUCSS*** command to put every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. 2. Retry the command.
1039	ABORT	The UDS1 Interface circuit pack is providing timing for the system. Executing this test could cause major system disruption. If the UDS1 Interface circuit pack needs to be tested, set the synchronization reference to another DS1 Interface circuit pack or to the IPSI or Tone-Clock circuit pack via the following command sequence: 1. Issue the **disable synchronization-switch** command. 2. Next, issue the **set synchronization *UUCSS*** command. 3. Lastly, issue the **enable synchronization-switch** command.
1950	ABORT	Another loopback/span test is already executing on the DS1 board or the board is in a network requested loop-back mode (line loopback or payload loopback). The hardware error log will indicate whether a Customer Loop-Back Jack test, Far CSU Loopback test, or the One-Way Span test is executing or if the board is in line-loopback or payload-loop-back mode. Only one long-duration loopback/span test can be active at a given time. Thus, if a loopback/span test is already active, that test must be terminated using the **test ds1-loop *UUCSS* end-loopback/span-test** command in order to execute this test.

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Table 8-686. Test #1213 Far CSU Loop-Back Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and its ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every UDS1 Interface trunk is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2	FAIL	The test failed because it was not set up properly. The UDS1 pack could not successfully put the far-end CSU into loop-back mode. 1. Rerun the **test ds1-loop *UUCSS* far-csu-loopback-test-begin** command. 2. If the test continues to fail, the problem could be with the UDS1-BD board, the CPE loopback jack equipment, or somewhere between. Run the **test ds1-loop *UUCSS* cpe-loopback-jack-test-begin** command to determine whether the CPE loopback jack loop-back test is successful. If a CPE loopback jack device is not being used, issue the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command instead. If the closer loop-back test fails, follow the maintenance strategy associated with that test.

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Table 8-686. Test #1213 Far CSU Loop-Back Test — *Continued*

Error Code	Test Result	Description / Recommendation
3	FAIL	The Far CSU Loopback test was not set up properly. The framed 3-in-24 test pattern, generated by the UDS1 Interface circuit pack and looped back through the far-end CSU, could not be detected properly by the UDS1 circuit pack. 1. Retry the **test ds1-loop *UUCSS* far-csu-loopback-test-begin** command. 2. If the Far CSU Loopback test continues to fail with this error code, the problem could be with the UDS1-BD board, the far-end CSU equipment, or somewhere in between. Run the **test ds1-loop *UUCSS* cpe-loopback-jack-test-begin** command to see if the CPE Loop-Back Jack test which is closer to the UDS1-BD board is successful. (If a CPE Loop-back Jack device is not being used, then run the **test ds1-loop *UUCSS* ds1/csu-loopback-tests** command to see if these even closer loop-back tests succeed). If the closer loop-back test fails, follow the maintenance strategy associated with that loopback.
	PASS	The Far CSU Loopback test has successfully began executing. The test will continue to run until the system technician enters the **test ds1-loop *UUCSS* end-loopback/span-test** command or the **release board UUCSS** command.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

One-Way Span Test (#1214)

This test is destructive.

The One-Way Span test allows 1-way span testing to and from remote test equipment or another Avaya communications system. This tests all circuitry and facilities from the local DS1 board to the remote test equipment or other Avaya communications system.

The test is destructive and can only be initiated by a system technician demanded **test ds1-loop *UUCSS* one-way-span-test-begin** command.

Every trunk or port on the UDS1 Interface circuit pack must be busied out using the system technician **busyout board** command before running the One-Way Span test.

The One-Way Span test has the UDS1 Interface circuit pack transmit a framed 3-in-24 test pattern and attempt to receive and verify the pattern. If the UDS1-BD board receives a framed 3-in-24 test pattern sent from another Avaya communications system or test equipment at the far end of the DS1, it begins counting bit errors within the received pattern.

The status of the One-Way Span test is available in the hardware error log via Error Type 3902. Several distinct Aux values give the user information of the status of the test.

The **list measurements ds1 summary** command will display the length of time the test has been running (`Test Duration` field) and number of bit errors detected (`Loopback/Span Test Bit-Error Count` field). If the test pattern is being sent cleanly over the span from the far end, the number of bit errors should be very low. The `Test Duration` field will show `0` until the test pattern is received from the far-end. Upon receiving the test pattern, the board will begin calculating the test duration and number of bit errors. The command will also display the Loopback/Span test executing (`Test` field), the type of pattern generated for the Loopback/Span test (`Pattern` field), and whether the pattern (i.e., 3-in-24 Pattern) is synchronized (`Synchronized` field).

To terminate the test, enter the **test ds1-loop *UUCSS* end-loopback/span-test** command or the **release board** command. Using the **release board** command will restore every trunk or port on the UDS1 Interface circuit pack to the in-service state.

Table 8-687. Test #1214 One-Way Span Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the **test ds1-loop *UUCSS* one-way-span-test-begin** command at 1-minute intervals up to 5 times.
1005	ABORT	One-Way Span test cannot be executed in the current configuration. To run this, the TN464F or later suffix UDS1 must be administered for 24-channel operation. The "Bit Rate" field on the DS1 circuit pack administration form must be set to "1.544" for 24-channel operation.
1015	ABORT	Ports on the UDS1 Interface circuit pack have not been busied out to out-of-service. 1. Enter the **busyout board *UUCSS*** command to put every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. 2. Retry the command.
1039	ABORT	The UDS1 Interface circuit pack is providing timing for the system. Executing this test could cause major system disruption. If the UDS1 Interface circuit pack needs to be tested, set the synchronization reference to another DS1 Interface circuit pack or to the IPSI or Tone-Clock circuit pack via the following command sequence: 1. Issue the **disable synchronization-switch** command. 2. Next, issue the **set synchronization *UUCSS*** command. 3. Lastly, issue the **enable synchronization-switch** command.
1950	ABORT	Another loopback/span test is already executing on the DS1 board or the board is in a network requested loop-back mode (line loopback or payload loopback). The hardware error log will indicate whether a Customer Loop-Back Jack test, Far CSU Loopback test, or the One-Way Span test is executing or if the board is in line-loopback or payload-loop-back mode. Only one long-duration loopback/span test can be active at a given time. Thus, if a loopback/span test is already active, that test must be terminated using the **test ds1-loop *UUCSS* end-loopback/span-test** command in order to execute this test.

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Table 8-687. Test #1214 One-Way Span Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and its ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every trunk for the UDS1 interface circuit pack is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-687. Test #1214 One-Way Span Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The One-Way Span test has successfully began transmitting a framed 3-in-24 test pattern. The test will continue to run until the system technician enters the **test ds1-loop *UUCSS* end-loopback/span-test** command or the **release board UUCSS** command.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Inject Single Bit Error Test (#1215)

This test is destructive.

The Inject Single Bit Error test causes a single bit error to be sent within an active framed 3-in-24 test pattern.

The test is highly destructive and can only be initiated by a system technician demanded **test ds1-loop *UUCSS* inject-single-bit-error** command. An attempt to use this command will be rejected if none of the three long-duration DS1 loopback/span tests (CPE Loop-Back Jack test, Far CSU Loopback test, One-Way Span test) are active on a UDS1-BD circuit pack.

Every trunk or port on the UDS1 Interface circuit pack must be busied out using the system technician **busyout board** command before running the Inject Single Bit Error test.

The **list measurements ds1 summary** command displays the number of bit errors detected (`Loopback/Span Test Bit-Error Count` field). Injecting this single bit error should increment the bit error count of the loopback/span test by one.

Table 8-688. Test #1215 Inject Single Bit Error Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the **test ds1-loop *UUCSS* inject-single-bit-error** command at 1-minute intervals up to 5 times.
1015	ABORT	Ports on the UDS1 Interface circuit pack have not been busied out to out-of-service. 1. Enter the **busyout board *UUCSS*** command to put every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. 2. Retry the command.

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Table 8-688. Test #1215 Inject Single Bit Error Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and the ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every trunk for the UDS1 interface circuit pack is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-688. Test #1215 Inject Single Bit Error Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	A single bit error has been successfully injected into an active framed 3-in-24 test pattern.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

End Loopback/Span Test (#1216)

This test is destructive.

The End Loopback/Span test terminates an active loopback or span test on a UDS1 circuit pack. Bit error counting against the received test pattern stream is terminated and sending of the framed 3-in-24 test pattern is halted. If either the CPE Loop-Back Jack or the far-end CSU is looped, the appropriate loopback deactivate code is sent. If the loopback cannot be deactivated, then the test returns FAIL, and a MINOR alarm is noted in the alarm log until the loopback is cleared.

The test is highly destructive and can only be initiated by a technician-demanded **test ds1-loop *UUCSS* end-loopback/span-test** command. Since only one of these three different long-duration loopback/span tests can be active at a time, the UDS1-BD circuit pack knows which loopback/span test to terminate.

Every trunk or port on the UDS1 Interface circuit pack must be busied out using the system technician **busyout board** command before running this End Loopback/Span test.

The **list measurements ds1 summary** command will display the length of time the test ran (`Test Duration` field) and number of bit errors detected (`Loopback/Span Test Bit-Error Count` field).

To restore the trunks or ports on the UDS1 Interface circuit pack to the in-service state, execute the **release board** command.

Table 8-689. Test #1216 End Loopback/Span Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the **test ds1-loop *UUCSS* end-loopback/span-test** command at 1-minute intervals up to 5 times.
1005	ABORT	End Loopback/Span test cannot be executed in the current configuration. To run this test, the TN464F or later suffix DS1 board must be administered for 24-channel operation. The “Bit Rate” field on the DS1 circuit pack administration form must be set to “1.544” for 24-channel operation.
1015	ABORT	Ports on the UDS1 Interface circuit pack have not been busied out to out-of-service. 1. Enter the **busyout board *UUCSS*** command to put every trunk or port of the UDS1 Interface circuit pack into the out-of-service state. 2. Retry the command.

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Table 8-689. Test #1216 End Loopback/Span Test — *Continued*

Error Code	Test Result	Description / Recommendation
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and its ports are properly installed. **NOTE:** When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every trunk for the UDS1 interface circuit pack is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
1313	FAIL	The UDS1 circuit pack could not deactivate the loopback through the Customer Loop-Back Jack. 1. Retry the **test ds1-loop *UUCSS* end-loopback/span-test** command at 1-minute intervals up to 5 times.
1314	FAIL	The UDS1 circuit pack could not deactivate the loopback through the far-end CSU. 1. Make sure that the far-end DS1 is installed if the far-end CSU is a 120A1 CSU module/T1 sync splitter. 2. Retry the **test ds1-loop *UUCSS* end-loopback | span-test** command at 1-minute intervals up to 5 times.

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Table 8-689. Test #1216 End Loopback/Span Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The active long-duration loopback or span test on the UDS1-BD circuit pack was successfully terminated.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

ICSU Status LEDs Test (#1227)

The UDS1 circuit pack has four status LEDs on the faceplate in addition to the three standard faceplate LEDs. These four status LEDs are associated with the 120A1 Channel Service Unit (CSU) Module that can be connected to the UDS1-BD board through the I/O connector panel behind the port carrier. The UDS1-BD circuit pack, combined with the 120A1 CSU module or the 401A T1 sync splitter, forms an Integrated CSU (I-CSU).

This test is a visual test. It lights the four status LEDs red for 5 seconds, then lights them green for 5 seconds, then lights them yellow for 5 seconds, then turns the LEDs off and returns control of the status LEDs to the circuit pack.

This test is only be executed on TN464F or later suffix UDS1 circuit packs administered for 24-channel operation (1.544 bit rate).

If the 120A1 CSU module or the 401A T1 sync splitter is not physically installed, the status LEDs are always off and this test aborts.

Table 8-690. Test #1227 ICSU Status LEDs Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1005	ABORT	The ICSU Status LEDs test cannot be executed for the current configuration. The test applies only to TN464F or later UDS1 circuit packs administered for 24-channel (1.544-Mbps) operation. 1. If the circuit pack is a TN464F or later suffix UDS1 circuit pack, then retry the command.
1951	ABORT	The ICSU Status LEDs test cannot be executed because a 120A1 or later suffix CSU module or a 401A or later suffix T1 sync splitter is not physically installed. If using a 120A1 CSU module or the 401A T1 sync splitter, physically connect it to the UDS1-BD board behind the port carrier. Otherwise, ignore this abort.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2500	ABORT	Internal system error. 1. Retry the command.

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Table 8-690. Test #1227 ICSU Status LEDs Test — *Continued*

Error Code	Test Result	Description / Recommendation
	PASS	The ICSU Status LEDs test executed successfully. A PASS result, however, does not necessarily mean that the status LEDs behaved properly. It only means that the software successfully attempted to light the status LEDs. This is a visual test. The service technician must visually exam the behavior of the LEDs while the test is running. The LEDs are functioning properly if the four status LEDs are lit red for 5 seconds, then lit green for 5 seconds, then lit yellow for 5 seconds. If the LEDs behave differently, the board should be replaced at the customer's convenience.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

Echo Canceller Test (#1420)

This test is destructive.

NOTE:
This test is executed only for TN464GP/TN2464BP circuit packs that have been administered on the DS1 circuit pack form to provide echo cancellation. The TN464GP/TN2464BP must be busied out before this demand test is run.

This test is for the TN464GP and TN2464BP circuit packs. The test originates from a manually initiated **test board long** demand test of a TN464GP/TN2464BP circuit pack. The test instructs firmware to test the echo cancellation circuity. The TN464GP/TN2464BP firmware tests echo cancellation on a subset of channels. If any channel fails twice or if any two channels fail once, the test fails, and echo cancellation is bypassed on every channel of the board. Otherwise, the test passes, and echo cancellation is configured to the administered parameters.

Table 8-691. Test #1420 Echo Canceller Test

Error Code	Test Result	Description / Recommendation
1015	ABORT	The board is not busied out. This test will abort if the UDS1 circuit pack under test is in service.
2000	ABORT	Response to the test was not received within the allowable time period. This may be due to hyperactivity. Error Type 1538 in the error log indicates hyperactivity. The hyperactive circuit pack is out of service, and one or more of the following symptoms may be exhibited. 1. The UDS1-BD tests (such as Tests #138 and #139) are aborting with error code 2000. 2. The tests run on the ports of this circuit pack are returning a no-board result. 3. A **busyout** or a **release** command has no effect on the test results. 4. A **list config** command shows that the circuit pack and its ports are properly installed. When hyperactivity occurs, the circuit pack is isolated from the system, and all of its trunks are placed into the out-of-service state. The system will try to restore the circuit pack within 15 minutes. When no faults are detected for 15 minutes, the UDS1 interface circuit pack is restored to normal operation. Every trunk for the UDS1 interface circuit pack is then returned to the in-service state. Hyperactivity is often caused by the associated facility. In such a case, faults (such as slips, misframes, or blue alarms) would be entered in the error log. In addition, many hardware errors would be logged against the associated trunk circuits. If the facility is OK and the error occurs again after 15 minutes, replace the circuit pack.

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Table 8-691. Test #1420 Echo Canceller Test — *Continued*

Error Code	Test Result	Description / Recommendation
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times.
1400, 1401	FAIL	The Echo Cancellation test has failed: ■ Error 1400 - Echo canceller function failed. The Echo Canceller Function test, which is executed by firmware, failed. ■ Error 1401 - Echo canceller memory failed. The Echo Canceller Memory test, which is executed by firmware, failed. Echo Cancellation is no longer being supplied by the board. Clear the alarm using the following commands: **busyout board *UUCSS***, **test board *UUCSS* long**, **release board *UUCSS***. If the test still fails, replace the circuit pack. **NOTE:** When this test fails, echo cancellation will be bypassed on every channel of the board. The circuit pack can still be used for a T1/E1 line interface without echo cancellation. This capability provides limited service for the customer until the circuit pack can be changed out.
	PASS	The Echo Cancellation feature is functioning properly.
0	NO BOARD	The test could not relate the internal ID to the port (no board). This could be due to incorrect translations, no board is inserted, an incorrect board is inserted, or an insane board is inserted. 1. Verify that the board's translations are correct. Execute the **add ds1 *UUCSS*** command to administer the UDS1 interface if it is not already administered. 2. If the board was already administered correctly, check the error log to determine whether the board is hyperactive. If so, the board was shut down. Reseating the board will re-initialize it. 3. If the board was found to be correctly inserted in step 1, then issue the **busyout board** command. 4. Issue the **reset board** command. 5. Issue the **release busy board** command. 6. Issue the **test board long** command. This should re-establish the linkage between the internal ID and the port.

UPS (Server UPS)

The UPS MO supports the UPS device for each S8700 Media Server. This MO's maintenance software reacts to UPS-generated inline errors via SNMP traps.

NOTE:
This MO provides no periodic or on-demand tests.

Server UPS Alarms

The following table contains the various UPS-generated SNMP alarms/traps.

Table 8-692. Server's SNMP Traps

Enterprise Specific Trap and Event Numbers	Definition of Traps
Trap #6, Event ID #6	Alarm string = #1, ACT, UPS, A, 6, SUP, power failure: Shutting down in 3 minutes. If the event ID is 6, the UPS battery's power is in a critically low condition, with an estimated 3 minutes of remaining holdover. ■ A warning is written to every logged-in user of the server. ■ When 3 minutes elapse, the server begins shutting down.
Trap #7, Event ID #7	Alarm string = #1, ACT, UPS, A, 7, SUP, power failure: Shutting down in 4 minutes. The UPS battery's power is in a critically low condition, with an estimated 4 minutes of remaining holdover. ■ A warning is written to every logged-in user of the server. ■ When 4 minutes elapse, the server begins shutting down.
Trap #8, Event ID #8	Alarm string = #1, ACT, UPS, A, 7, SUP, power failure: Shutting down in 5 minutes. The UPS battery's power is in a critically low condition, with an estimated 5 minutes of remaining holdover. ■ A warning is written to every logged-in user of the server. ■ When 5 minutes elapse, the server begins shutting down.
Trap #4, Event ID #9 upsAlarmOnBattery	Alarm string = #1, ACT, UPS, A, 9,WRN, Miscellaneous trap, e.g., bad battery. This UPS trap [Event #9] is a miscellaneous environmental alarm sent from the UPS that supports server A. For example, the battery may be bad and should be replaced.

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Table 8-692. Server's SNMP Traps — *Continued*

Enterprise Specific Trap and Event Numbers	Definition of Traps
Trap #3, Event ID #10 upsAlarmShutdownPending	Alarm string = #1, ACT, UPS, A, 10, WRN, Miscellaneous trap, e.g., bad battery. This UPS trap [Event #10] is a miscellaneous environmental alarm sent from the UPS that supports server A. For example the battery may be bad/low and a Shutdown is in progress.
Trap # 4, Event ID #11 upsAlarmShutdownPending	Alarm string = #1,ACT, UPS, A, 11, WRN, Miscellaneous trap, e.g., bad battery. This UPS trap [Event #10] is a miscellaneous environmental alarm sent from the UPS that supports server A. For example, the battery may be bad/low and a Shutdown is in progress.
Trap #3, Event ID #12[1] upsAlarmShutdownImminent	Alarm string = #1,ACT, UPS, A, 12, MAJ, Miscellaneous trap, e.g., bad battery. This UPS trap [Event #10] is a miscellaneous environmental alarm sent from the UPS that supports server A. For example, the battery may be bad/low and a Shutdown is in progress.
Trap (4), Event ID #13[1] upsAlarmShutdownImminent	Alarm string = #1,ACT,UPS,A,13,MAJ,Miscellaneous trap, e.g., bad battery. This UPS trap [Event #10] is a miscellaneous environmental alarm sent from the UPS that supports server A. For example, the battery may be bad/low and a Shutdown is in progress.
Trap (3), Event ID #14[1] upsAlarmDepletedBattery	Alarm string = #1,ACT,UPS,A,14,MAJ,Miscellaneous trap, e.g., bad battery. This UPS trap [Event #14] is a miscellaneous environmental alarm sent from the UPS that supports server A. For example, the battery may be bad/low and should be replaced.
Trap (4), Event ID #15[1] upsAlarmDepletedBattery	Alarm string = #1,ACT,UPS,A,15,MAJ,Miscellaneous trap, e.g., bad battery This UPS trap [Event #14] is a miscellaneous environmental alarm sent from the UPS that supports server A. For example, the battery may be bad/low and should be replaced.
Trap (3), Event ID #16[1] upsAlarmBatteryBad	Alarm string = #1,ACT,UPS,A,16,MIN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #16] is a miscellaneous environmental alarm, sent from the UPS that in this case supports server A. For example, the battery may be bad and should be replaced.
Trap (4), Event ID #17 upsAlarmBatteryBad	Alarm string = #1,ACT,UPS,A,17,MIN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #17] is a miscellaneous environmental alarm, sent from the UPS that in this case supports server A. For example, the battery may be bad and should be replaced.

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Table 8-692. Server's SNMP Traps — *Continued*

Enterprise Specific Trap and Event Numbers	Definition of Traps
Trap (3), Event ID #18 upsAlarmInputBad	Alarm string = #1,ACT,UPS,A,18,MIN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #18] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced.
Trap (4), Event ID #19 upsAlarmInputBad	Alarm string = #1,ACT,UPS,A,19,MIN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #19] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the power source for the UPS is down.
Trap (3), Event ID #20 upsAlarmTempBad	Alarm string = #1,ACT,UPS,A,20,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #20] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (4), Event #21 upsAlarmTempBad	Alarm string = #1,ACT,UPS,A,21,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #21] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (3), Event #22 upsAlarmCommunicationsLost	Alarm string = #1,ACT,UPS,A,22,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #22] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.

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Table 8-692. Server's SNMP Traps — *Continued*

Enterprise Specific Trap and Event Numbers	Definition of Traps
Trap (4), Event #23 upsAlarmCommunicationsLost	Alarm string = #1,ACT,UPS,A,23,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #23] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (3), Event #24 upsAlarmBypassBad	Alarm string = #1,ACT,UPS,A,24,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #24] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (4), Event ID #25 upsAlarmBypassBad	Alarm string = #1,ACT,UPS,A,25,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #25] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (3), Event ID #26 upsAlarmLowBattery	Alarm string = #1,ACT,UPS,A,26,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #26] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (4), Event ID #27 upsAlarmLowBattery	Alarm string = #1,ACT,UPS,A,27,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #27] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.

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Table 8-692. Server's SNMP Traps — *Continued*

Enterprise Specific Trap and Event Numbers	Definition of Traps
Trap (3), Event ID #28 upsAlarmUpsOutputOff	Alarm string = #1,ACT,UPS,A,28,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #28] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (4), Event ID #29 upsAlarmUpsOutputOff	Alarm string = #1,ACT,UPS,A,29,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #29] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (3), Event ID #30 upsAlarmOutputBad	Alarm string = #1,ACT,UPS,A,30,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #30] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (4), Event ID #31 upsAlarmOutputBad	Alarm string = #1,ACT,UPS,A,31,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #31] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (3), Event ID #32 upsAlarmOutputOverload	Alarm string = #1,ACT,UPS,A,32,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #32] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.

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Table 8-692. Server's SNMP Traps — *Continued*

Enterprise Specific Trap and Event Numbers	Definition of Traps
Trap (4), Event ID #33 upsAlarmOutputOverload	Alarm string = #1,ACT,UPS,A,33,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #33] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (3), Event ID #34 upsAlarmChargerFailed	Alarm string = #1,ACT,UPS,A,34,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #34] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (4), Event ID #35 upsAlarmChargerFailed	Alarm string = #1,ACT,UPS,A,35,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #35] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (3) - upsAlarmFanFailure	Alarm string = #1,ACT,UPS,A,36,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #36] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (4) - upsAlarmFanFailure	Alarm string = #1,ACT,UPS,A,37,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #37] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.

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Table 8-692. Server's SNMP Traps — *Continued*

Enterprise Specific Trap and Event Numbers	Definition of Traps
Trap (3) - upsAlarmFuseFailure	Alarm string = #1,ACT,UPS,A,38,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #38] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (4) - upsAlarmFuseFailure	Alarm string = #1,ACT,UPS,A,39,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #39] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (3) - upsAlarmGeneralFault	#1,ACT,UPS,A,40,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #40] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.
Trap (4) - upsAlarmGeneralFault	#1,ACT,UPS,A,41,WRN,Miscellaneous trap, e.g., bad battery This UPS trap [Event #41] is a miscellaneous environmental alarm. This alarm is sent from the UPS that in this case supports server A. For example, the alarm could mean that the battery may be bad and should be replaced. Also, a MAJOR alarm was sent to an alarm receiver and has been acknowledged.

1. These events will degrade the server's state of health.

System Technician-Demanded Tests: Descriptions and Error Codes

This MO provides no on-demand tests for system technicians.

VAL-BD (Voice Announcements over LAN Circuit Pack)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
VAL-BD	MINOR	**test board *UUCSS* long**	Voice Announcements over the LAN Circuit Pack
VAL-BD	WARNING	**test board *UUCSS* short**	Voice Announcements over the LAN Circuit Pack

1. UU is the universal cabinet number (1–44 for CSS PNC, 1–64 for ATM PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21).

Voice Announcements over the LAN Circuit Pack

The Voice Announcements over the LAN (VAL) board (TN2501AP) provides per-pack announcement storage time of up to one hour, up to 31 playback ports, and allows for announcement file portability over a LAN. The VAL circuit pack also allows for LAN backup and restore of announcement files and the use of user-provided (.WAV) files. The circuit pack also provides the ability to download new versions of the firmware to itself.

VAL Congestion Controls

The switch activates congestion controls on VAL when it detects buffers exceeding the threshold. The switch releases the congestion controls when the VAL reports that its buffer level has returned to normal levels.

If congestion:	Then the switch:
Persists for a 14-minute interval,	Raises MINOR alarm.
Exhausts buffers,	Raises MINOR alarm.
Ceases for 12 minutes,	Retires MINOR alarm.

Error Log Entries and Test to Clear Values

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1 (a)	0	Sanity	MINOR	ON	
18 (b)	0		WARNING	OFF	**release board *UUCSS***
217 (c)	0	None	WARNING	ON	
257	65535	Control Channel Loop test (#52)	MINOR	ON	**test board *UUCSS l r 20***
257 (d)					
513 (e)	4352–4357		MINOR	ON	
769 (f)	4358				
1281, 1290–1295 (g)	Any		MINOR	ON	**reset board *UUCSS***
1537, 1796 (h)	Any		MINOR	ON	
1794 (i)			MINOR	ON	
1798 (j)					
2049 (k)		Packet Interface test (#598)	MINOR	ON	**test board *UUCSS* l r 3**
2305 2306 (l)					
2561–2668 (m)	Any				
2817, 2819 (n)		Congestion Query test (#600)	MINOR	ON	**test board *UUCSS* s r 3**
3073 (o)		Link Status test (#601)	MINOR	ON	**test board *UUCSS* s**
3330 (p)			MINOR	ON	**reset board *UUCSS***
3586 (q)					
3999 (q)	Any	None			
3840 (r)	4096–4102				
3841, 3843 (s)					
3842 (t)		Receive FIFO Overflow Error Counter test (#596)			
3844 (u)	Any				

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Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
3845 (v)	Any				
3846 (w)	Any				
3848 (x)	Any				
3851 (y)	Any				
3852 (z)	Any				
3853 (aa)	Any				
3854 (ab)	Any				
3855 (ac)	Any				
3856 (ad)	Any				

Notes:

a. **Error Type 1** — Circuit pack stopped functioning or is not physically present.

   1. Verify that the circuit pack is present.
   2. If circuit pack is present, reset the circuit pack (**reset board *UUCSS***).
   3. If the error persists, replace the circuit pack.

b. **Error Type 18** — The VAL circuit pack is busied out.

c. **Error Type 217** — Applies to 10 circuit packs:

   1. Remove the circuit pack(s) against which the error is logged.

d. **Error Type 257** — Transient communication problem between switch and circuit pack; does not affect service and can be ignored.

   1. Ignore this error, unless the Control Channel Loop test (#52) fails.
   2. If Test #52 fails, replace the circuit pack.

   Repetitive failures of the Control Channel Loop test indicate circuit pack hardware failure.

e. **Error Type 513** — Circuit pack detected and reported hardware failure.

1. Reset the circuit pack (**reset board *UUCSS***).

Aux Data:

4352	External RAM error
4353	Internal RAM error
4355	ROM Checksum error
4356	Angel Message Corruption error
4357	Instruction set error

f. **Error Type 769** — Logic error. By itself this error can be ignored, but it can result in other error types being reported.

g. **Error Type 1281,1290–1295** — Critical hardware or firmware error.

If the switch detects:	Then the switch:
1 error,	Resets circuit pack.
3 errors in 15 minutes,	Raises MINOR alarm.

Error Type descriptions are as follows:

1290	Global HDLC error
1291	Main RAM/ROM error
1292	CPU error
1293	Insane on-board processor
1294	On-board translation RAM error
1295	(Aux 3) RSCL link down (Aux 0) RSCL keep alive failure

1. Attempt to clear the alarm (**reset board *UUCSS***).
2. If alarm persists, replace circuit pack.

h. **Error Type 1537, 1796** — A hyperactive VAL circuit pack that has exceeded the error threshold has been removed from service.

1. Attempt to clear the alarm (**reset board *UUCSS***).
2. If the error recurs within 15 minutes, replace the circuit pack.

i. **Error Type 1794** — Packet bus transmit buffers have overflowed.

1. Attempt to clear the alarm (**reset board *UUCSS***).
2. If the error recurs within 15 minutes, replace the circuit pack.

j. **Error Type 1798** — Unable to write translation RAM.

1. Attempt to clear alarm (**reset board *UUCSS***).
2. If alarm recurs within 15 minutes, replace the circuit pack.

k. **Error Type 2049** — Packet Interface test (#598) failed.

1. Attempt to clear the alarm (**test board *UUCSS* l r 3**).
2. If alarm does not clear, reset the circuit pack (**reset board *UUCSS***).
3. If circuit pack resets, execute Packet Interface test (#598) several times.
4. If Packet Interface test (#598) continues to fail, replace the circuit pack.

l. **Error Type 2305-230** — Error in received frame from packet bus.

Error Type:	Description
2305	Received invalid LAPD frame.
2306	Detected parity error on received frame.

Most likely cause — packet bus problem.
Other cause — circuit pack fault.

Invalid LAPD frame errors occur when the frame

- contains a bad Cyclic Redundancy Check (CRC)
- is greater than the maximum length
- violates the link-level protocol

1. Retry the command (**test board *UUCSS***) and see if the condition clears.
2. If condition persists, execute PPE/LANBIC Receive Parity Error Counter test (#597) and determine whether the condition clears.
3. If condition persists, execute Packet Interface test (#598) to verify circuit pack integrity.
4. If Packet Interface test (#598) fails, consult repair procedure for the packet bus.

m. **Error Type 2561–2668** — System software received an indication that the socket was closed due to an error. Errors are reported as log only. Errors logged here are for the sockets that had *no* processor channels associated with them, for example, sockets to read SNMP data. The counter base is offset by the application type of the application associated with this socket that is down. The Aux Data field of the log entry contains this application's number, for example, a SNMP application would have its application number in the Aux Data field.

NOTE:
2561–2668 is a range of reserved numbers for future applications. 2570 currently represents an SNMP socket failure.

n. **Error Type 2817–2819** — Congestion Query test (#600) failed.

The Error Types correspond to the descriptions:

2817	Every buffer exhausted.
2819	Utilized buffers exceed threshold.

If:	Then:
Active buffers exceed threshold,	VAL enters congested state.

1. See ''Congestion Query Test (#600)'' on page 8-1830 for Abort and Fail 3601s.

o. **Error Type 3073** — Remote Socket Control Link (RSCL) or Link Status test (#601) failed. This failure can be due to:

- This circuit pack
- The packet bus
- The packet interface circuit pack.

If:	Then:
RSCL disconnects at link level	Link fails
Link cannot be reconnected quickly	Switch raises MINOR alarm

p. **Error Type 3330** — Critical failure in Packet bus interface.

Below, Error Types correspond to descriptions.

If the switch detects:	Then it:
1 error,	Resets circuit pack.
2 errors in 15 minutes,	Raises MINOR alarm.

1. Attempt to clear the alarm (**reset board *UUCSS***).
2. If alarm persists, replace circuit pack.

q. **Error Type 3586 and 3999** — Switch removed hyperactive circuit pack that reported threshold number of errors. One or more of the following symptoms can be present:

- Circuit pack port tests return NO BOARD.
- List configuration command shows circuit pack and ports are installed properly.

If Error Type 3999:	And traffic volume is:	Then:
Does not accompany Error Type 3586,	Heavy	Circuit pack is in service, but sent at least half hyperactive threshold. With heavy traffic, this is normal.
Does not accompany Error Type 3586,	Light	Circuit pack is in service, but sent at least half hyperactive threshold. With light traffic, this error indicates a problem with the circuit pack, its links, or the equipment attached to the links.
Accompanies Error Type 3586,	Either Light or Heavy	Switch removed hyperactive circuit pack.

1. Issue the busyout (**busyout board *UUCSS***) and release (**release board *UUCSS***) commands to reset the circuit pack.
2. Allow 30 minutes for condition to clear itself.
3. To re-establish circuit pack into service manually, issue the busyout (**busyout board *UUCSS***), reset (**reset board *UUCSS***), and release (**release board *UUCSS***) commands.
4. If error recurs within 15 minutes, replace the circuit pack.
5. If the same error occurs on a different circuit pack, follow normal escalation procedures.

r. **Error Type 3840** — Circuit pack received bad control channel message from switch.

Aux Data:

4096 Bad major heading
4097 Bad port number
4098 Bad data
4099 Bad sub-qualifier
4100 State inconsistency
4101 Bad logical link
4102 Bad application identifier

s. **Error Type 3841, 3843** — Errors do not affect service.

Below, Error Types correspond to descriptions.

3841 Internal firmware error.

3843 Bad translation RAM. Call uses another translation location.

These errors do not affect service, however, they can cause reports of other errors that do affect service.

If Error Type 3843 begins to affect service, it escalates to Error Type 1294 (See Note g).

t. **Error Type 3842** — Packet interface receive buffers overflowed.

If this error occurs frequently, the overflow can be congesting the circuit pack.

See ''Receive FIFO Overflow Error Counter Test (#596)'' on page 8-1828.

u. **Error Type 3844** — LAPD frame contains LAPD Protocol Error.

By themselves, these errors do not affect service.

v. **Error Type 3845** — Angel interprocessor error.

By themselves, these errors do not affect service.

w. **Error Type 3846** — Main interprocessor error.

By themselves, these errors do not affect service.

x. **Error Type 3848** — Main internal channel error.

By themselves, these errors do not affect service.

y. **Error Type 3851** — Unable to write LAN translation RAM error.

By themselves, these errors do not affect service.

z. **Error Type 3852** — LAN external RAM error.

By themselves, these errors do not affect service.

aa. **Error Type 3853** — Interprocessor LAPD frame error.

By themselves, these errors do not affect service.

ab. **Error Type 3854** — Interprocessor LAPD protocol error.

By themselves, these errors do not affect service.

ac. **Error Type 3855** — Memory allocation error.

By themselves, these errors do not affect service.

ad. **Error Type 3856** — High CPU occupancy error.

By themselves, these errors do not affect service.

System Technician-Demanded Tests: Descriptions and Error Codes

Investigate errors in the order they appear in the table below.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Control Channel Loop-around test (#52)	X	X	ND
Circuit Pack Restart test (#594)			D
Invalid LAPD Frame Error Counter test (#597)		X	ND
PPE/LANBIC Receive Parity Error Counter test (#595)		X	ND
Receive FIFO Overflow Error Counter test (#596)		X	ND
Packet Interface test (#598)	X	X	ND
Congestion Query test (#600)	X	X	ND
Link Status test (#601)	X	X	ND

1. D = Destructive; ND = Nondestructive

Control Channel Loop-Around Test (#52)

This non-destructive test fails if the circuit pack does not return to a sane state after being reset. This test queries the circuit pack for its code and vintage, and verifies its records.

Table 8-693. Test #52 Control Channel Loop-Around Test

Error Code	Test Result	Description / Recommendation
None, 2100	ABORT	Could not allocate the necessary system resources to run test. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the problem persists, escalate the problem.
	FAIL	The circuit pack failed to return the code or vintage. 1. Retry command at 1-minute intervals up to 5 times. 2. Reset the board (**reset board *UUCSS***). 3. If reset aborts with error code 1115, busyout (**busyout board *UUCSS***), reset (**reset board *UUCSS***), and release board (**release board *UUCSS***). 4. If test continues to fail, replace the circuit pack. 5. Escalate the problem if failures continue.
	PASS	Test successful.

Circuit Pack Restart Test (#594)

NOTE:
This test is destructive.

Execute this test (not part of either short or long demand test sequence) to reset the circuit pack only if there are PPCPU errors. This test fails if the circuit pack does not return to a sane state after being reset. The circuit pack resets through the SAKI Sanity test (#53).

Table 8-694. Test #594 Circuit Pack Restart Test

Error Code	Test Result	Description / Recommendation
None	ABORT	Could not allocate the necessary system resources to run test. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the problem persists, escalate the problem.
1015	ABORT	Port is not out-of-service. 1. Busyout the circuit pack (**busyout board *UUCSS***). 2. Retry the command at 1-minute intervals up to 5 times. 3. If the problem persists, escalate the problem.
1966	ABORT	The board is in the process of running the autosave command to save announcements. 1. Retry the command again later.
2100	ABORT	Could not allocate the necessary system resources to run test. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the problem persists, escalate the problem.
1, 2	FAIL	The circuit pack failed to reset. 1. Retry command at 1-minute intervals up to 5 times. 2. If the problem persists, pull out and reseat the circuit pack. 3. If the problem persists, replace the circuit pack.
	PASS	The circuit pack initialized correctly.

PPE/LANBIC Receive Parity Error Counter Test (#595)

This test is non-destructive. When the VAL circuit pack detects a parity error with a received frame, it increments the PPE/LANBIC Receive Parity error counter. This test reads and clears the counter, and can verify repair of the problem.

Errors can indicate a problem with:

- This circuit pack
- A packet bus
- Another circuit pack on the bus

Table 8-695. Test #595 PPE/LANBIC Receive Parity Error Counter Test

Error Code	Test Result	Description / Recommendation
2000	ABORT	Did not receive circuit pack test response within the allowable time period. 1. Retry command at 1-minute intervals up to 5 times. 2. If the problem persists, reset the circuit pack (**reset board *UUCSS***). 3. If the problem persists, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run test.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the problem persists, escalate the problem.
1–10	FAIL	Circuit pack detects parity errors. The Error Code indicates the value of the on-board error counter. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail, execute the Packet Interface test (#598) (**test board *UUCSS***). 3. If Packet Interface test (#598) fails, see repair procedures for Test #598.
	PASS	Circuit pack detects no errors.

Receive FIFO Overflow Error Counter Test (#596)

This test is non-destructive. When the VAL circuit pack detects packet bus buffer overflow, it increments the error on the FIFO Overflow error counter. This test reads and clears the counter.

If errors are:	Then they can be due to:
Occasional	Statistical buffer sizing

Table 8-696. Test #596 Receive FIFO Overflow Error Counter Test

Error Code	Test Result	Description / Recommendation
2000	ABORT	Did not receive circuit pack test response within the allowable time period. 1. Retry command at 1-minute intervals up to 5 times. 2. If the problem persists, reset the circuit pack (**reset board *UUCSS***). 3. If the problem persists, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run test.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the problem persists, escalate the problem.
1–10	FAIL	Circuit pack detects overflow errors. The error code indicates the value of the on-board error counter. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail, execute the Packet Interface test (#598) (**test board *UUCSS***). 3. If Packet Interface test (#598) fails, see repair procedures for Test #598.
	PASS	Circuit pack detects no errors.

Invalid LAPD Frame Error Counter Test (#597)

This test is non-destructive.

The VAL circuit pack detects invalid frames when it receives

- a frame with a CRC error
- an unrecognizable frame
- a recognizable frame in an unexpected state

When the VAL circuit pack detects an invalid LAPD frame, it increments the Invalid LAPD Frame error counter. This test reads and clears the counter, and verifies the repair of the problem.

Errors can indicate a:

- circuit pack problem
- packet bus problem
- problem with another circuit pack on the bus

Table 8-697. Test #597 Invalid LAPD Frame Error Counter Test

Error Code	Test Result	Description / Recommendation
2000	ABORT	Did not receive circuit pack test response within the allowable time period. 1. Retry command at 1-minute intervals up to 5 times. 2. If the problem persists, reset the circuit pack (**reset board *UUCSS***). 3. If the problem persists, replace the circuit pack.
2100	ABORT	Could not allocate the necessary system resources to run this test.
2500	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the problem persists, escalate the problem.
1–10	FAIL	The circuit pack detects LAPD frame errors. The error code indicates the value of the on-board error counter. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to fail, execute the Packet Interface test (#598) (**test board *UUCSS* long**). 3. If Packet Interface test (#598) fails, see repair procedures for Test #598.
	PASS	Circuit pack detects no errors.

Packet Interface Test (#598)

This non-destructive test checks the packet bus interface circuitry on the VAL circuit pack. Test failure indicates faulty circuit pack.

Table 8-698. Test #598 Packet Interface Test

Error Code	Test Result	Description / Recommendation
2000	ABORT	Did not receive circuit pack test response within the allowable time period. 1. Retry command at 1-minute intervals up to 5 times. 2. If the problem persists, reset the circuit pack (**reset board *UUCSS***). 3. If the problem persists, replace the circuit pack.
2012	ABORT	Could not allocate the necessary system resources to run test.
2100	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the problem persists, escalate the problem.
	FAIL	Circuit pack has detected a failure of the Packet Interface test (#598). 1. Retry command at 1-minute intervals up to 5 times. 2. If the problem persists, reset the circuit pack (**reset board *UUCSS***). 3. If the test continues to fail, replace the circuit pack.
	PASS	The Packet Interface test (#598) passed.

Congestion Query Test (#600)

This non-destructive test queries the number of used buffers to determine whether the VAL circuit pack is congested.

If:	Then:
Used buffers are, or are nearly, exhausted,	The test fails.
The test fails,	The switch alarms, and announcements can fail.

Normal call handling resumes when the VAL circuit pack has recovered from congestion.

Table 8-699. Test #600 Congestion Query Test

Error Code	Test Result	Description / Recommendation
2000	ABORT	Did not receive circuit pack test response within the allowable time period. 1. Retry command at 1-minute intervals up to 5 times. 2. If the problem persists, reset the circuit pack (**reset board *UUCSS***). 3. If the problem persists, replace the circuit pack.
2012	ABORT	Could not allocate the necessary system resources to run test.
2100	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the problem persists, escalate the problem.
1	FAIL	The buffer level is nearly exhausted.
2	FAIL	The VAL is congested, and no buffers are available. 1. Retry command at 1-minute intervals up to 5 times. 2. If command continues to fail, examine the VAL port measurements to determine which ports are heavily utilized and the processor occupancy of the circuit pack. *A Low processor occupancy* when VAL is congested indicates circuit pack failure. 1. If the problem persists, reset the circuit pack (**reset board *UUCSS***). 2. If congestion recurs, replace the circuit pack. *High processor occupancy* indicates the VAL is congested due to traffic load. ■ To relieve congestion in the short term, selectively busyout ports (**busyout port *UUCSSpp***) on the VAL circuit pack. ■ To achieve a more permanent resolution, it could be necessary reassign announcements to other integrated announcement circuit packs. Consider replacing affected VAL ports with new ports.
3	FAIL	The VAL circuit pack is not operating normally and is congested.
	PASS	Hardware setting and attached cable type match VAL circuit pack administration. The circuit pack detects no errors.

Link Status Test (#601)

This non-destructive test determines the state of the call-control signaling link for VALs. If the signaling link is physically connected, the test sends a test frame over the link and checks for a response. The test passes only if both the signaling link is connected and the test frame is successfully transmitted.

A failure can indicate a problem with:

- this circuit pack
- the packet bus
- the Packet Interface circuit pack

Table 8-700. Test #601 Link Status Test

Error Code	Test Result	Description / Recommendation
1125	ABORT	RSCL link or VAL board not in service. 1. Release the board. 2. Repeat the test. 3. Escalate if the problem persists.
2012	ABORT	Could not allocate the necessary system resources to run this test.
2100	ABORT	Internal system error. 1. Retry command at 1-minute intervals up to 5 times. 2. If the problem persists, escalate the problem.
2	FAIL	The RSCL control link disconnected. 1. Retry command at 1-minute intervals up to 5 times. 2. If the test continues to fail, execute the Packet Interface test (#598) (**test board *UUCSS***) to see if the problem is in the circuit pack. ■ If the Packet Interface test (#598) fails, see ''Packet Interface Test (#598)'' repair procedures. ■ If the Packet Interface test (#598) passes, see ''Packet Interface Test (#598)'' and Packet bus repair procedures.
3	FAIL	Received no response to RSCL control link test frame. 1. Retry command at 1-minute intervals up to 5 times. 2. If the problem persists, reset the circuit pack (**reset board *UUCSS***). 3. If test continues to fail, replace the circuit pack.
	PASS	RSCL control link connected.

Configurations

The following figure shows the configuration options for the TN2501AP (VAL) circuit pack within a system.

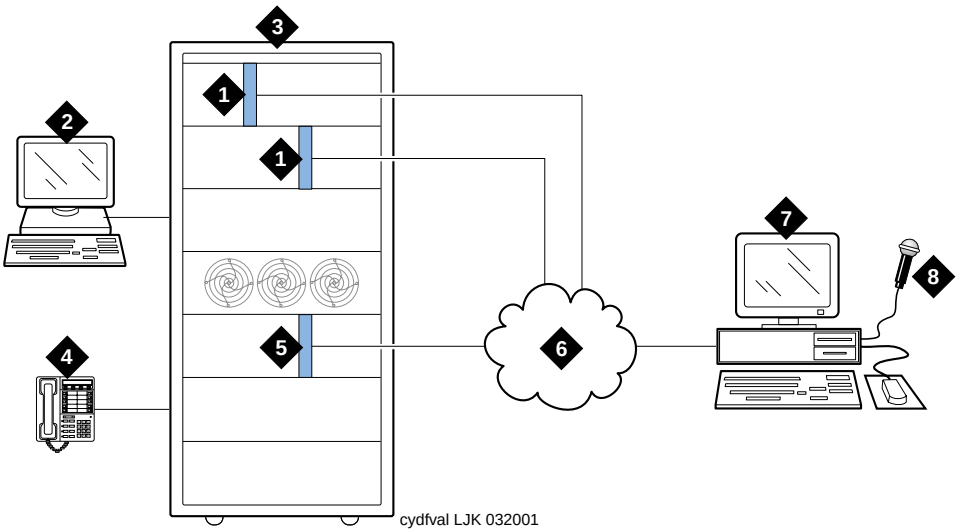


Figure Notes

1. TN2501AP VAL announcement circuit pack
2. System access terminal (SAT)
3. Switch
4. Phone for recording announcements
5. TN799C (C-LAN) is required when using IP SAT or VAL Manager.
6. Your LAN (See LAN cable)
7. Computer or remote recording studio for:
   - recording and storing announcements
   - FTP client application
   - VAL Manager application (PC only)
8. Microphone

Figure 8-107. VAL configuration options

Hardware specifications

The following table contains a list of the required VAL hardware.

Part	Number	Comcode
TN2501AP	1	108772583
Backplane Adapter (Label reads IP Media Processor)	1	848525887

Faceplate LEDs

The following figure shows the 9 LEDs on the TN2051AP faceplate. Descriptions of each LED are in Table 8-701.

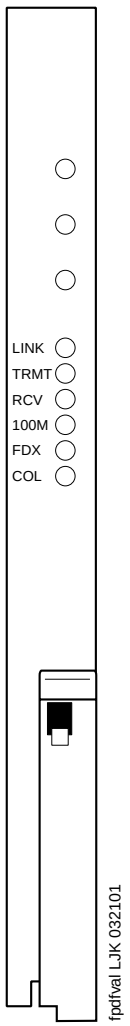


Figure 8-108. TN2501AP faceplate LEDs

The following table lists the TN2501AP faceplate LEDs, the type of behavior (on, off, flashing, or intermittent), and a description of the condition.

Table 8-701. TN2501AP LEDs

LED	Behavior	Description
Red	On solid	Circuit pack failure or a major or minor on-board alarm
Green	On solid	Firmware is self-downloading to the circuit pack or testing in progress.
Amber	On solid	Firmware is self-downloading to the circuit pack. **CAUTION:** *You can lose the resident firmware image file if you reset the circuit pack during firmware download. If this happens, FTP a new firmware image file to the VAL circuit pack and perform the Firmware download procedure again.*
Amber	Fast flash (100 ms on/ 100 ms off)	Occurs during circuit pack insertion or circuit pack reset which the announcement files are being copied from FLASH to RAM. If you reset the circuit pack during this time, your announcement files remain intact.
Amber	Slow flash (200 ms on/ 200 ms off)	Flashes during autosave while copying announcement files from RAM to FLASH. **CAUTION:** *You can lose the announcements on the circuit pack if you reset it during an autosave.*
LINK	On/off	Active Ethernet link
TRMT	Intermittent	Transmit
RCV	Intermittent	Receive
100M	On/off	Off = 10-Mbps Ethernet connection
		On = 100-Mbps Ethernet connection
FDX	On/off	Off = half-duplex connection
		On = full-duplex connection
COL	On/off	Off = no collisions detected
		On = collisions detected

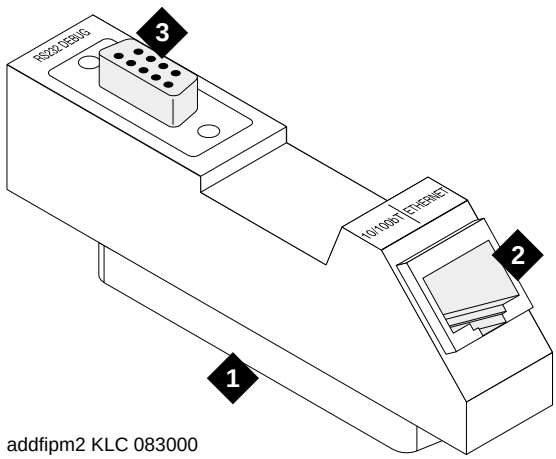
Other hardware

To establish LAN connections the TN2501AP circuit pack requires a

- Backplane Adapter that attaches to the Amphenol connector behind the cabinet, corresponding to the TN2501AP integrated announcement circuit pack slot.
- LAN cable that attaches to the Backplane Adapter.

Backplane Adapter

The following figure shows the Backplane Adapter (label reads IP Media Processor).



addfipm2 KLC 083000

Figure Notes

1. Amphenol connector attaches to the back of the switch cabinet, corresponding to the TN2501AP circuit pack's slot.
2. RJ-45 LAN cable connection
   - 10 Mbps uses Category 3 cable.
   - 100 Mbps uses Category 5 cable.
3. This connector is not used for VAL.

Figure 8-109. Backplane Adapter (Comcode 848525887)

LAN cable

The TN2501AP circuit pack does not include cables to connect the circuit pack to your LAN. The following table lists the cable category and connection port.

Ethernet connection speed	Cable	Connection description
10 Mbps	Category 3	Connects through the RJ45 jack (note #2 in Figure 8-109),
100 Mbps	Category 5	Connects through the RJ45 jack (note #2 in Figure 8-109),

Maintenance Commands

The following table lists several VAL-related maintenance commands and how to use the command for troubleshooting.

Table 8-702. VAL maintenance commands

Command	Use this command to
test board	Test both circuit pack- and port-level maintenance.
test port	Test any of the ports on the VAL circuit pack.
test mo	Test either of the 2 MOs on the VAL circuit pack.
busyout board	Curtail activity on the circuit pack before resetting it (reset board).
release board	Resume activity on the circuit pack after busying out the VAL circuit pack or ports on it (busyout board or busyout port).
busyout port	Isolate a specific port usually during troubleshooting.
release port	Resume activity after busying out a port on the VAL circuit pack (busyout port).
reset board	Re-initialize the circuit pack in the system and upload announcement file information.
reset val	Reset the circuit pack if it is in the insane state and to override querying the board to determine whether an announcement autosave is in process.
status data-module	Obtain general information about the data-module connection to port 33 on the VAL circuit pack
status firmware download	Obtain information about a demand or scheduled firmware download.
list sys-link	Generate a list of administered links and the general status of each.
status sys-link	Generate a detailed status report for a specific administered system link.

Continued on next page

Table 8-702. VAL maintenance commands — *Continued*

Command	Use this command to
status link	Generate a status report about a specific administered Ethernet link. (For VAL this means the administered Ethernet link.)
status val-ip	Generate an IP-related, MIB data status report.
netstat ip-route	Generate a report showing the status of the VAL IP routes on the VAL circuit pack.
list directory board	See the file contents of a VAL circuit pack by location.
remove file	Delete an announcement or firmware image file on a VAL circuit pack.
enable filesystem	Begin an FTP session into a specific TN2501AP circuit pack.
disable filesystem	End an FTP session into a specific TN2501AP circuit pack.
set ethernet-options	Manually or automatically set the Ethernet connection's parameters.
get ethernet options	Generate a report about a specific Ethernet connection.
set boot-image	Direct the system to use 1 of 2 possible firmware image files on the TN2501AP circuit pack.
get boot-image	View the two firmware image parameters on the VAL circuit pack.

VAL-PT (Voice Announcements over LAN Packet/Port)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
VAL-PT	MAJOR	**test port *UUCSSpp* long**	VAL Port Maintenance
VAL-PT	MINOR	**test port *UUCSSpp* long**	VAL Port Maintenance
VAL-PT	WARNING	**test port *UUCSSpp***	VAL Port Maintenance

1. *UU* is the universal cabinet number (1–44 for CSS PNC, 1–64 for ATM PNC). *C* is the carrier designation (A, B, C, D, or E). *SS* is the number of the slot where the circuit pack resides (01–21). *pp* is the 2-digit port number (01, 02, etc.).

An RSCL (remote socket control link) connects the VAL and the server to pass call-control and other management information. Since one link serves every port on the circuit pack, maintenance of the RSCL is part of the VAL circuit pack maintenance.

VAL Congestion Controls

The switch activates congestion controls on VAL when it detects buffers exceeding the threshold. The switch releases the congestion controls when the VAL reports that its buffer level has returned to normal levels.

If congestion:	Then the switch:
Persists for a 14-minute interval	Raises MINOR alarm
Exhausts buffers	Raises MINOR alarm
Ceases for 12 minutes	Retires MINOR alarm

Error Log Entries and Test to Clear Value

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp* l**
1 (a)	0	SCOTCH Sync Loop-Around test (#1275)	MINOR	ON	**test port *UUCSSpp* l r 3**
257 (b)	0		WARNING	OFF	
3585 (c)	0, 1	TDM Loop-Around test (#1285)	MAJOR	ON	**test port *UUCSSpp* l r 3**

1. There is no short test sequence for this MO. Every test is available in the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. **Error Type 001**: SCOTCH Synchronous Loop-Around test (#1275) failed.

   1. Test the port (**test port *UUCSSpp* long**).
   2. See "SCOTCH Synchronous Loop-Around Test (#1275)" on page 8-1843 repair procedures.

b. **Error Type 257**: VAL port detected overrun or underrun condition that can indicate a hardware problem.

   1. Test for hardware problem (**test port *UUCSSpp* long**).
   2. See "SCOTCH Synchronous Loop-Around Test (#1275)" on page 8-1843 repair procedures to verify repair.
   3. Clear the alarm (**test port *UUCSSpp* long clear**).

c. **Error Type 3585**: TDM Port Loop-Around test (#1285) failed.

   1. Test the port (**test port *UUCsspp* long**).
   2. See the TDM Loop-Around Test (#1285) repair procedure.

System Technician-Demanded Tests: Descriptions and Error Codes

Investigate errors in the order they appear in the table below.

Table 8-703. System Technician-Demanded Tests: VAL-PT

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
TDM Loop-Around test (#1285)		X	D
SCOTCH Synchronous Loop-Around test (#1275)		X	D

1. D = Destructive, ND = Non-destructive

TDM Loop-Around Test (#1285)

This test is destructive.

This test verifies whether the VAL port can send and receive data on the TDM bus. This test has a tone generator send tones on a timeslot, and it has a tone receiver receive tones on another timeslot. The tones are looped through the record/playback port.

If the received tones:	Then:
Match the tones sent	The test passes.
Do not match the tones sent	The test fails.

Test failure indicates failure of one or more of the following components:

- VAL (TN2501) circuit pack
- TDM bus
- Tone generator / tone receiver circuit pack

Table 8-704. Test #1285 TDM Loop-Around Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	The port is in use. 1. Retry the command when the port is idle. You can force the port to the idle state with the **busyout port *UUCSS*** command. 2. Escalate if the problem persists. This command is destructive, tearing down every call and link using the port.
1002	ABORT	No TDM bus timeslots available for the test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
1003	ABORT	No more tone receivers idle for use in this test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
2000	ABORT	Did not receive circuit pack test response within the allowable time period. 1. If this problem persists, reset the circuit pack (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). 2. Repeat the test. 3. If the problem persists, replace the circuit pack.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times. 2. Escalate if the problem persists.
2100	ABORT	Could not allocate the necessary system resources to run test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
	FAIL	Received tones do not match transmitted tones. 1. Retry command at 1-minute intervals up to 3 times. 2. If the problem persists, see ''TDM-BUS (TDM Bus)'', ''TONE-PT (Tone Generator)'', and Tone Receiver repair procedures. 3. If the problem persists, reset the board (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). Repeat the test. 4. If the problem persists, replace the circuit pack.
	PASS	Port connections across the TDM bus function properly.

SCOTCH Synchronous Loop-Around Test (#1275)

This test is destructive.

This test verifies the circuit in the data path of a VAL announcement port call. This test fails if the data transmitted on the port does not match the data received in the loop-around mode. Failure of this test indicates a port hardware fault on the circuit pack.

This test aborts if calls are using the port, or if the VAL link associated with the port is connected. To avoid this, at the SAT type **busyout port *UUCSSpp***, which tears down every call and link using the port.

Table 8-705. Test #1275 SCOTCH Synchronous Loop-Around Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	The port is in use. 1. Retry the command when the port is idle. You can force the port to the idle state with the **busyout port *UUCSS*** command. **This command is destructive**, tearing down every call and link using the port.
1002	ABORT	No TDM bus timeslots available for the test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.
1963	ABORT	The port is in use. 1. Retry the command when the port is idle. You can force the port to the idle state with the **busyout port *UUCSS*** command. **This command is destructive,** tearing down every call and link using the port.
2000	ABORT	Did not receive circuit pack test response within the allowable time period. ■ If this problem persists, reset the circuit pack (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). ■ If the problem persists, replace the circuit pack.
2012	ABORT	Internal system error. 1. Retry the command at 1-minute intervals up to 3 times. 2. Escalate if the problem persists.
2100	ABORT	Could not allocate the necessary system resources to run test. 1. Retry the command at 1-minute intervals up to 5 times. 2. Escalate if the problem persists.

Continued on next page

Table 8-705. Test #1275 SCOTCH Synchronous Loop-Around Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	VAL circuit pack detected test failure. ■ If the problem persists, reset the circuit pack (**busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS***). ■ If the problem persists, replace the circuit pack.
	PASS	Port circuitry functioning properly.

VC-BD

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
VC-BD	MAJOR	**test board *UUCSS* l *r#***	Voice Conditioner circuit pack
VC-BD	MINOR	**test board *UUCSS* l *r#***	Voice Conditioner circuit pack
VC-BD	WARNING[2]	**test board *UUCSS* s *r#***	Voice Conditioner circuit pack

1. Where UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC); C is the carrier designation (A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack resides (01–21); and pp is the 2-digit port number (01, 02, 03, ...).
2. See"XXX-BD (Common Port Circuit Pack)" on page 8-1872.

CAUTION:
If the TN788 Voice Conditioner circuit pack (VC-BD) is not Vintage 2 or later, it must be replaced.

The TN788 Voice Conditioner circuit pack (VC-BD) is a service circuit pack that provides conditioning for the audio signals from multimedia equipment based on the CCITT H.221 standard. The TN788 transcodes, gain adjusts, and bridges the audio bit streams demultiplexed by the TN787 (MMI) circuit pack and transmits encoded, exclusive audio conference sums onto the TDM bus so that the MMI can multiplex the audio, video, and data streams for the H.221 endpoints.

Error Log Entries and Test to Clear Values

Table 8-706. VC-BD Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test board *UUCSS* sh r 1**
1 (a)	Any	None	MINOR	ON	
18 (b)	0	**busyout board *UUCSS***	WARNING	OFF	**release board *UUCSS***
257 (c)	Any	Control Channel Loop test (#52)	MINOR	ON	**test board *UUCSS* r 20**
513 (d)	4352 to 4357				
769 (e)	4358				

Continued on next page

Table 8-706. VC-BD Error Log Entries — *Continued*

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1025 (f)	4363	NPE Audit test (#50)			
1281 (g)	Any	SAKI Sanity test (#53)	MAJOR	ON	
1293 to 1294 (h)	46088 to 46096	SAKI Sanity test (#53)	MINOR	ON	
1538 (i)	46082		MINOR	ON	

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. The circuit pack stopped functioning or it was removed from the system. This alarm is logged approximately 11 minutes after the circuit pack is removed and/or the SAKI Sanity test (#53) fails.

   To resolve this error, insert a circuit pack in the same slot as the error indicates, if the circuit pack is not already in the system. Or, if the circuit pack is in the system and the red LED is on, then follow instructions for Red alarms.

   CAUTION:
   If the TN788 Voice Conditioner circuit pack (VC-BD) is not Vintage 2 or later, it must be replaced.

b. This circuit pack is busied out by the **busyout board *UUCSS*** command.

c. Transient communication problems exist between the switch and this circuit pack. Execute the **test board *UUCSS*** command and see the repair procedures for the "Control Channel Loop-Around Test (#52)" on page 8-1848.

d. The circuit pack detected an on-board hardware failure. The reported aux data values correspond to the following detected errors:

Error	Description
4352	External RAM error
4353	Internal RAM error
4355	ROM Checksum error
4357	Instruction set error

Reset the circuit pack by executing the **busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS*** commands. When it is reset, the circuit pack executes a set of tests to detect the presence of any of the above faults. The detection of one these errors during initialization causes the circuit pack to lock-up and appear insane to the system. See the repair procedures in footnote (a) for error type 1.

e. The circuit pack detects a program logic error. While no action is required, this error may lead to errors of other types being reported against this circuit pack.

f. The circuit pack cannot update NPE memory and read it back. This error type can be ignored, but it may lead to other error types being reported against this circuit pack.

g. A critical hardware failure has been detected on the circuit pack. Use **busyout board *UUCSS*, reset board *UUCSS***, followed by **release board *UUCSS***. If Test #53 passes, the on-board circuitry is healthy. Use **test board *UUCSS* long clear** to retire the alarm. If Test #53 fails, replace the circuit pack.

h. The circuit pack detected a critical hardware failure. Reset the circuit pack by issuing the **busyout board *UUCSS***, **reset board *UUCSS***, and **release board *UUCSS*** commands. If the Circuit Pack Restart test (#594) passes, then the on-board circuitry is healthy. Retire the alarm by issuing the **test board *UUCSS* long clear** command. If the Circuit Pack Restart test (#594) fails, replace the circuit pack.

The reported error types correspond to the following detected errors:

Error	Description
1293	On-board auxiliary processor insane
1294	Internal memory access error

i. The circuit pack is hyperactive — it is flooding the switch with messages sent over the control channel. The circuit pack is taken out of service when a threshold number of these errors is reported to the switch. Clear the alarm by using **busyout board *UUCSS***, **reset board *UUCSS***, **test board *UUCSS* long clear**, and **release board *UUCSS***. If the error recurs within 10 minutes, then replace the circuit pack.

System Technician-Demanded Tests: Descriptions and Error Code

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
Control Channel Loop-around test (#52)[2]	X	X	ND

1. D = Destructive; ND = Nondestructive
2. See repair procedures described in ''XXX-BD (Common Port Circuit Pack)''.

CAUTION:
If the TN788 Voice Conditioner circuit pack (VC-BD) is not Vintage 2 or later, it must be replaced.

Control Channel Loop-Around Test (#52)

See the repair procedure described in ''XXX-BD (Common Port Circuit Pack)'' as ''Control Channel Loop-Around Test (#52)''.

VC-DSPPT

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
VC-DSPPT	MAJOR	**test port *UUCSSpp***	Voice Conditioner DSP Port
VC-DSPPT	MINOR	**test port *UUCSSpp***	Voice Conditioner DSP Port
VC-DSPPT	WARNING	**test port *UUCSSpp***	Voice Conditioner DSP Port

1. Where UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC); C is the carrier designation (A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack resides (01–21); and pp is the 2-digit port number (01, 02, 03, ...).

Each Voice Conditioner circuit pack (VC-BD) provides two types of resources:

1. Transcoder Resources used for encoding and decoding audio formats
2. Summer Resources used for summing audio from different sources

The eight Voice Conditioner DSP ports are the transcoder resources on the VC-BD.

Error Log Entries and Test to Clear Values

Table 8-707. VC-DSPPT Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp* sh r 1**
18 (a)	0	**busyout port *UUCSSpp***	WARNING	OFF	**release port *UUCSSpp***
257 (b)	Any	NPE Crosstalk test (#6)	MINOR	ON	**test port *UUCSSpp* 1 r 3**
513 (c)	Any	VC DSP Port Local TDM Loopback test (#1104)	MINOR	ON	**test port *UUCSSpp* sh r 3**
778 – 781 (d)	Any	VC Port Reset DSP test (#1106)	MAJOR	ON	**See note (d)**
1025 (e)			WARNING	ON	
1281 (f)	Any	VC DSP Port DSP Loopback test (#1105)	MINOR	ON	**test port *UUCSSpp* sh r 3**
3840 (g)					

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. This port has been busied out by the **busyout port *UUCSSpp*** command.

b. The VC DSP Port NPE Crosstalk test (#1103) failed.

c. The VC DSP Port Local TDM Loopback test (#1104) failed. Run the long test sequence.

d. A critical hardware failure has been detected on the circuit pack. Reset the port by the **busyout port *UUCSSpp*** and **reset port *UUCSSpp*** commands. If the VC Reset DSP test (#1106) passes, then the on-board circuitry is healthy. Retire the alarm with the **test port *UUCSSpp* long clear** command.

e. The VC DSP port reported loss of framing on the Service Channel between the VC and MMI circuit packs.

f. The VC DSP Port DSP Loopback test (#1105) failed.

g. The DSP corresponding to this port on the VC circuit pack reported a firmware error. No action is required.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below. For example, by clearing error codes associated with the DSP NPE Crosstalk test (#1103), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
DSP NPE Crosstalk test (#1103)		X	D
TDM Loopback test (#1104)	X	X	D
DSP Loopback test (#1105)	X	X	D

1. D = Destructive; ND = Nondestructive

DSP NPE Crosstalk Test (#1103)

This test is destructive.

The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, 1-way and noisy connections may be observed. This test is part of the port's long test sequence and takes approximately 20 to 30 seconds to complete.

Table 8-708. Test #1103 NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Retry the command at 1-minute intervals up to 5 times.
2012	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate the necessary resources for this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The NPE of the tested port was transmitting in error, causing noisy and unreliable connections. 1. Replace the circuit pack.
	PASS	The port is correctly using its allocated time slots. 1. To be sure that this is not an intermittent problem, repeat this test up to 10 times. 2. If complaints still persist, examine the station, connections, and wiring.

VC DSP Port Local TDM Loop-Back Test (#1104)

This test is destructive.

This test verifies the connectivity of a VC DSP Port across the TDM bus. It aborts if calls associated with the port are in progress. Failure of this test indicates an on-board fault associated with the port hardware on the circuit pack. The Loopback test runs the following tests:

1. A Loop-Around test across the TDM bus.
2. A conference Circuit test.

The tests are run in the above order; if one test fails, an error code is returned and the remaining tests in the sequence are not executed.

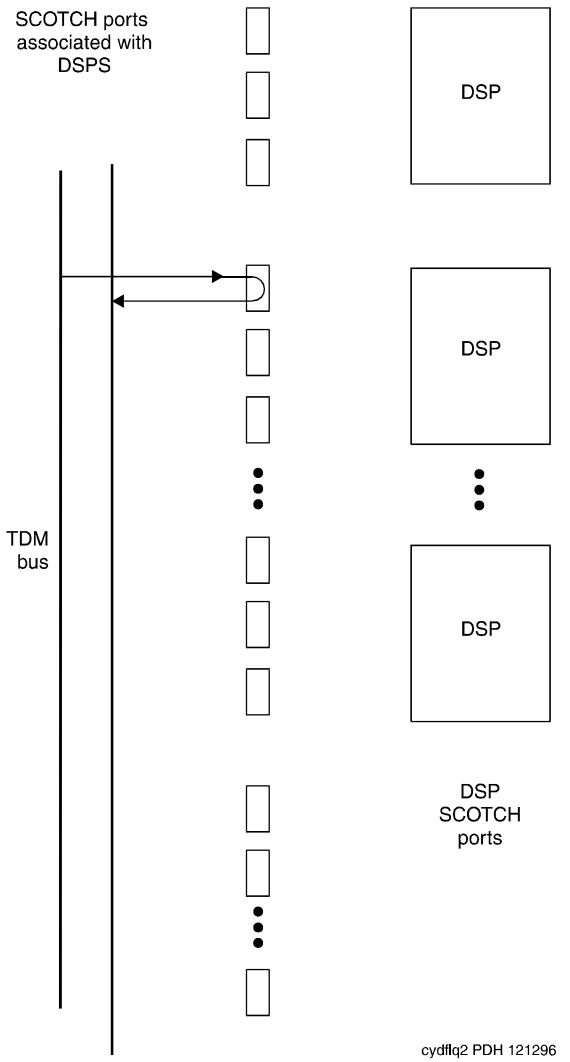


Figure 8-110. VC Circuit Pack DSP Port Local TDM Loop-Back Test

Table 8-709. Test #1104 VC DSPPT Local TDM Loop-Back Test

Error Code	Test Result	Description / Recommendation
1000 1001	ABORT	System resources required to run this test are not available, or the port is busy with a valid call. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The traffic load on the system is very high, or time slots may be out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, repeat the test at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a Tone Detector for the test. The system is oversized for the number of Tone Detectors present, or some Tone Detectors are out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port is seized by a user for a valid call. Use the **status station** command for the station associated with this port and determine whether the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test was not received from the VC-BD circuit pack within the allowable time period. 1. If this result occurs repeatedly, attempt to reset the port by using the **busyout port *UUCSSpp*** and **reset port *UUCSSpp*** commands. 2. If this result occurs again, replace the circuit pack.
2012	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2103	ABORT	The system could not make the conference connection for the test. 1. Retry the command at 1-minute intervals up to 5 times.
0–3	FAIL	The TDM Loop-Around test failed. 1. Replace circuit pack.
4–7	FAIL	The Conference Circuit test failed. 1. Replace circuit pack.
	PASS	The VC DSP Port Local TDM Loop-Around test passed.

VC-DSP Port DSP Loop-Back Test (#1105)

This test is destructive.

This test verifies the connectivity of a VC-DSPPT across the TDM bus. It aborts if calls associated with the port are in progress. Failure of this test indicates an on-board fault associated with the port hardware on the circuit pack.

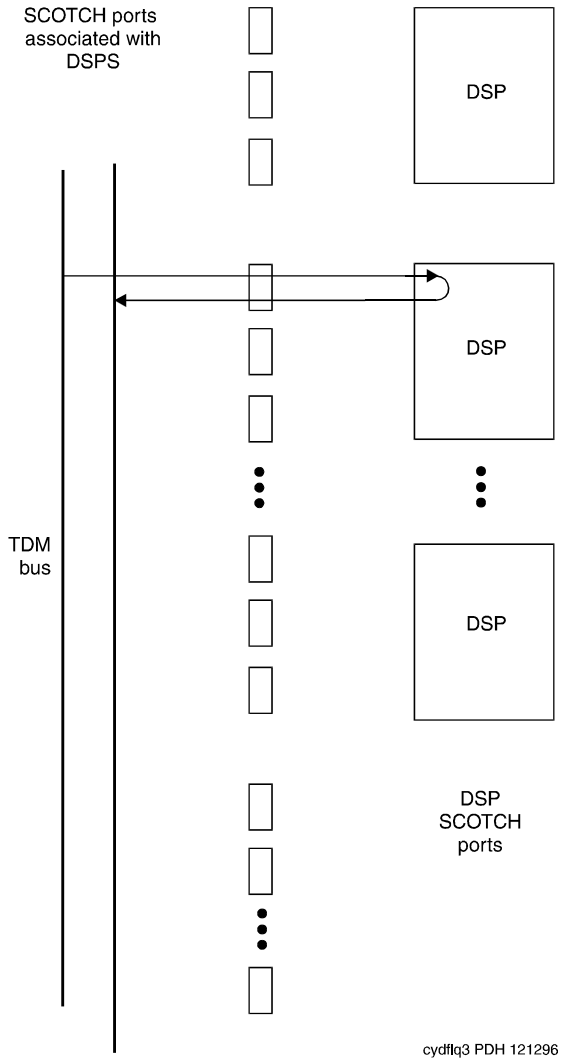


Figure 8-111. VC Circuit pack DSP Port DSP Loop-Around Test

Table 8-710. Test #1105 VC-DSP Port DSP Loop-Back Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available, or the port is busy with a valid call. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test, the traffic load on the system is very high, or time slots are out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, retry the command at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a Tone Detector for the test, the system is oversized for the number of Tone Detectors present, or some Tone Detectors are out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port has been seized by a user for a valid call. Use the **status station** command for the station associated with this port and determine whether the port is available for testing 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received from the VC-BD circuit pack within the allowable time period. 1. If this result occurs repeatedly, reset the circuit pack if the other ports are idle by using the **busyout port *UUCSSpp*** and **reset port *UUCSSpp*** commands. 2. If this result occurs again, replace the circuit pack.
2012	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
0, 1	FAIL	The VC-DSPPT DSP Loopback test failed. 1. Replace the circuit pack.
	PASS	The VC DSPPT DSP Loopback test passed

VC Port Reset DSP Test (#1106)

This test is destructive.

This test resets the VC-DSPPT and the DSP associated with it. As part of the reset procedure, the VC-DSPPT will execute a series of self-tests on the hardware. If these self-tests fail, the test will fail; otherwise the test will pass.

Before executing the test, the VC-DSPPT must be busied out by executing the **busy port *UUCSSpp*** command. After the completion of the test, the VC-DSPPT must be released by executing the **release port *UUCSSpp*** command.

Table 8-711. Test #1106 VC Port Reset DSP Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available, or the port may be busy with a call. 1. Retry the command at 1-minute intervals up to 5 times.
1015	ABORT	The VC-DSPPT is not busied out. 1. Busyout the VC-DSPPT by executing the **busy port *UUCSSpp*** command, and then retry the test.
2000	ABORT	Response to the test was not received from the VC-DSPPT within the allowable time period. 1. Retry the command at 1-minute intervals up to 5 times. 2. If this result occurs again, replace the circuit pack.
2012	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The reset of the VC-DSPPT was unsuccessful. 1. Replace circuit pack.
	PASS	The VC-DSPPT was successfully reset. 1. Release the VC-DSPPT by executing the **reset port *UUCSSpp*** command.

VC-LEV (Voice Conditioner DSP Port Level)

MO's Name (in Alarm Log)	Alarm Level	Initial Command to Run	Full Name of MO
VC-LEV	MAJOR	See "Resolving VC-LEV Errors/Alarms"	VC-LEV

The MMCH feature must be enabled on the *system-parameters customer-options* form before you can change these fields.

The Voice Conditioner (VC) Port Level MO monitors VC efficiency by tracking the number of VC ports that are in-service, and then comparing that number with the value entered in the VC field on the System-Parameters Maintenance form. This VCs field is located under the Minimum Maintenance Thresholds section. The VCs field contains the minimum number of VC ports needed for the Multimedia Call Handling (MMCH) feature, and is an administrable field. The VCs field must contain a number between 0 and 126, and is entered by the system administrator. The MMCH feature must be enabled on the System-Parameters Customer-Options form before the VCs field can be changed to a number greater than 0. For example, administering 8 in that field means 1 circuit pack. The algorithm for determining that a low level of VC resources exists uses the number entered in the VCs field, and the number of VCs that are in-service in the system.

Each VC circuit pack contains 16 physical ports: 8 ports are reserved for VC-DSPPT ports, and the remaining 8 ports are designated as VC-SUMPT ports. The 8 DSP ports are made up of 4 encoder and 4 decoder resources that encode and decode audio formats. Thus, *one VC circuit pack is required for every 8 ports of MMCH port capacity.* If the number of in-service VC ports falls below the MMCH port capacity (value entered on the System-Parameters Maintenance form under the Minimum Maintenance Thresholds section and in the VCs field), a VEC-LEV error is logged. If this outage continues for 15 minutes a MAJOR alarm is raised.

Resolving VC-LEV Errors/Alarms

VC ports are a key part of the MMCH feature, any loss in the number of ports available for use degrades the MMCH customer defined service level.

If a VC circuit pack or port is busied out using the **busyout board** or **busyout port** command, these out-of-service ports are not included in the VC level calculation, thus allowing a technician to busyout a VC circuit pack for maintenance reasons without causing a MAJOR alarm to be raised.

NOTE:
When diagnosing a VC-LEV problem, resolve any alarms raised against VC-BD or VC-DSPPT MOs. Clearing VC-BD or VC-DSPPT alarms may clear the VC-LEV alarm.

The VC circuit pack is maintained by the software similarly to the Tone Detector circuit pack. Tone Detector circuit packs may be removed and reinserted in any port-board slot without administration. The same rule applies to VC circuit packs. If a VC circuit pack is removed from service logically (by failing the Archangel sanity scan test) or is removed from service physically (by physically removing the circuit pack from the carrier), no error/alarm is raised against VC-BD or VC-DSPPT MOs. Therefore, if a VC-LEV error/alarm exists, and none has been raised against VC-BD or VC-DSPPT MOs, a VC circuit pack may have been removed from service causing the VC-LEV error/alarm. To resolve a VC-LEV MAJOR alarm, restore the number of VC ports available for service to be equal to or more than the calculated port capacity (value entered in the VCs field).

To determine how many VC circuit packs are needed for the MMCH feature:

1. Display the System-Parameters Maintenance form by executing the command **display system-parameters maintenance**.
2. Locate the number listed in the Minimum Maintenance Threshold (VCs) field. The MMCH feature requires one VC circuit pack for each four ports listed in the Minimum Maintenance Threshold (VCs) field.
3. Divide the Minimum Maintenance Threshold value by 8 to determine the number of VC circuit packs needed. For example, a port capacity of 12 listed in the Minimum Maintenance Threshold (VCs) field would require 2 VC circuit packs.
4. Use the **list configuration** command to verify that the number of VC circuit packs listed agrees with the required number of VC circuit packs (determined in step 3). If the number of VC circuit packs listed in the step 3 differs from the calculated number, restore the number of VC circuit packs to the correct value, in order to resolve the VC-LEV alarm.

Error Log Entries and Test to Clear Values

Table 8-712. VC-LEV Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1 (a)	Any	None	MAJOR	OFF	

Notes:

a. The number of VC resources in the system that are in service has fallen below the calculated minimum value. If the number of in-service VC ports falls below the MMCH port capacity (value entered in the Minimum Maintenance Threshold VCs field on the system parameters maintenance form), a VEC-LEV error is logged. If this outage continues for 15 minutes a MAJOR alarm is raised. To resolve this alarm, correct the out-of-service problem by following the procedures below:

   1. See ''VC-DSPPT'' on page 8-1849 and ''VC-BD'' on page 8-1845 to resolve any associated alarms.
   2. If a VC-LEV error/alarm exist and none has been raised against VC-BD or VC-DSPPT MOs, a VC circuit pack may have been removed from service causing the VC-LEV error/alarm. To resolve a VC-LEV MAJOR alarm, restore the number of VC ports available for service to be equal to or more than the calculated port capacity. See ''Resolving VC-LEV Errors/Alarms'' on page 8-1858 for details.

System Technician-Demanded Tests: Descriptions and Error Code

There are no System Technician-Demanded test for VC-LEV.

VC-SUMPT

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
VC-SUMPT	MAJOR	**test port *UUCSSpp***	Voice Conditioner Summer Port
VC-SUMPT	MINOR	**test port *UUCSSpp***	Voice Conditioner Summer Port
VC-SUMPT	WARNING	**test port *UUCSSpp***	Voice Conditioner Summer Port

1. Where UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC); C is the carrier designation (A, B, C, D, or E); SS is the address of the slot in the carrier where the circuit pack resides (01–21); and pp is the 2-digit port number (01, 02, 03, ...).

Each Voice Conditioner circuit pack (VC-BD) provides two types of resources:

1. Transcoder Resources that are used for encoding and decoding audio formats
2. Summer Resources that are used for summing audio formats from different sources.

The Voice Conditioner Summer ports (VC-SUMPT) are the summer resources on the VC-BD. There are 8 such ports on a VC-BD.

Error Log Entries and Test to Clear Values

Table 8-713. VC-SUMPT Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test port *UUCSSpp* sh r 1**
18 (a)	0	**busyout port *UUCSS***	WARNING	OFF	**release port *UUCSSpp***
130 (b)			WARNING	ON	**test port *UUCSSpp* sh**
257 (c)	Any	Control Channel Loop test (#52)	MINOR	ON	**test board *UUCSSpp* 1 r 3**
513 (d)	Any	VC Summer Port Local Loopback test (#1100)	MINOR	ON	**test board *UUCSSpp* sh r 3**

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. This port has been busied out with the **busyout port *UUCSSpp*** command.

b. The circuit pack has been removed or has been insane for more than 11 minutes. To clear the error, replace or reinsert the circuit pack.

c. The NPE Crosstalk test (#1103) failed.

d. The VC Summer Port Local TDM Loopback test (#1100) failed.

System Technician-Demanded Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below. For example, by clearing error codes associated with the NPE Crosstalk test (#6), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
NPE Crosstalk test (#6) (a)		X	D
TDM Loopback test (#1100)	X	X	D

1. D = Destructive; ND = Nondestructive

VC-SUMPT Port NPE Crosstalk Test (#6)

This test is destructive.

The NPE controls port connectivity and gain and provides conferencing functions. The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, 1-way and noisy connections may be observed. This test is part of the port's long test sequence and takes approximately 20 to 30 seconds to complete.

Table 8-714. Test #6 VC-SUMPT Port NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
1000 1001	ABORT	System resources required to run this test are not available. The port may be busy with a valid call. 1. Retry the command at 1-minute intervals up to 5 times.
2012	ABORT	Internal system error
2100	ABORT	Could not allocate the necessary resources for this test. 1. Retry the command at 1-minute intervals up to 5 times.
0–3	FAIL	The NPE of the tested port was transmitting in error. This causes noisy and unreliable connections. 1. Replace circuit pack.
	PASS	The port is correctly using its allocated time slots. 1. Verify that this is not an intermittent problem by repeating this test up to 10 times. 2. If complaints continue, examine the station, connections, and wiring.

VC Summer Port Local TDM Loopback Test (#1100)

This test is destructive.

This test verifies the connectivity of a VC Summer Port across the TDM bus. It aborts if calls associated with the port are in progress. Failure of this test indicates an on-board fault associated with the port hardware on the circuit pack. The Loopback test runs the following tests:

- A Loop-Around test across the TDM bus.
- A conference circuit test.

The tests are run in the above order. If the first test fails, the switch returns an error code, and the second test is not executed.

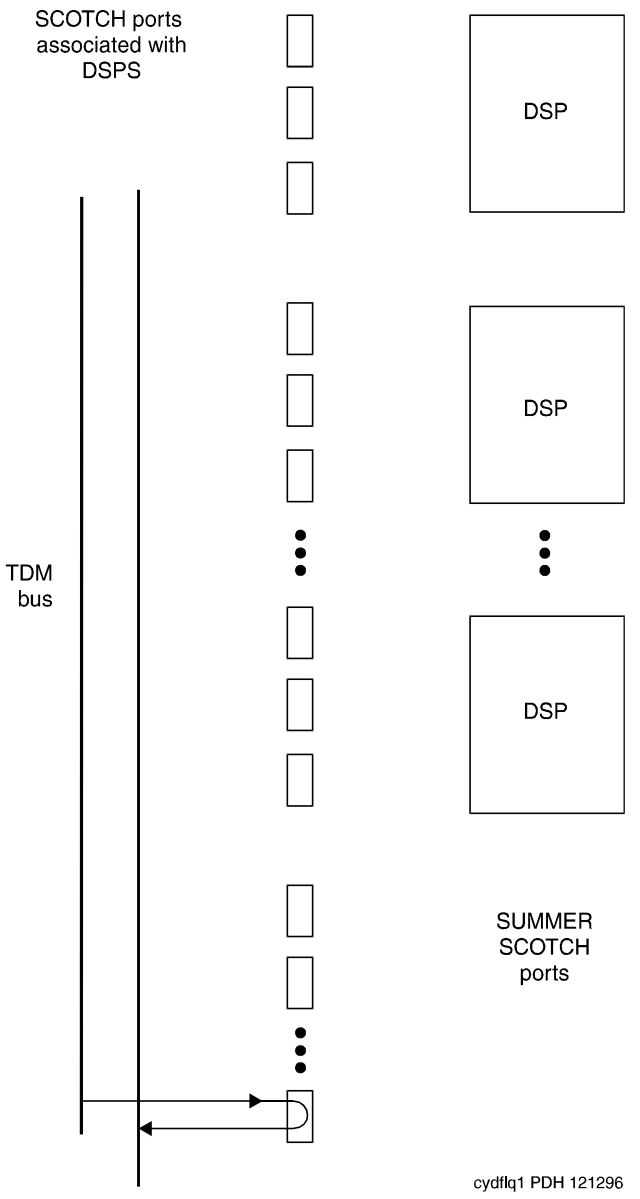


Figure 8-112. VC Circuit Pack Summer Port Loop-Back Test

Table 8-715. Test #1100 VC Summer Port Local TDM Loop-Back Test

Error Code	Test Result	Description / Recommendation
1000	ABORT	System resources required to run this test are not available, or the port may be busy with a valid call. 1. Retry the command at 1-minute intervals up to 5 times.
1002	ABORT	The system could not allocate time slots for the test. The traffic load on the system is very high, or time slots are out-of-service due to TDM-BUS errors. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, retry the command at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a Tone Detector for the test, the system is oversized for the number of Tone Detectors present, or some Tone Detectors are out-of-service. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port has been seized by a user for a valid call. Use the **status station** command for the station associated with this port to determine whether the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
2000	ABORT	Response to the test request was not received from the VC-BD circuit pack within the allowable time period. 1. If this result occurs repeatedly, reset the circuit pack if the other ports are idle. Reset the circuit pack by issuing the **busyout board *UUCSS*** and the **reset board *UUCSS*** commands. 2. If this result occurs again, replace the circuit pack.
2012	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
2103	ABORT	The system could not make the conference connection for the test. 1. Retry the command at 1-minute intervals up to 5 times.
0	FAIL	The TDM Loop-Around test failed.
1	FAIL	The Conference Circuit test failed. 1. Replace circuit pack.
	PASS	The VC Summer Port Local TDM Loopback test passed.

WAE-PORT (Wideband Access Endpoint Port)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run[1]	Full Name of MO
WAE-PORT (a)	MINOR	**test access-endpoint *extension* l**	Wideband Access
WAE-PORT	WARNING	**test access-endpoint *extension***	Endpoint Port

1. For additional repair information, see also ''DS1-BD (DS1 Interface Circuit Pack)'' on page 8-586.

Wideband Switching supports end-to-end connectivity between customer endpoints at data rates from 128 to 1536 kbps over T1 facilities and to 1984 kbps over E1 facilities. S8700 Multi-Connect switching capabilities support wideband calls comprised of multiple DS0s that are switched end-to-end as a single entity.

Wideband Switching extends the Administered Connections feature to include non-signaling wideband access endpoints. Endpoint application equipment with direct T1 or E1 interfaces may connect directly to the switch's line-side facilities; application equipment without T1 or E1 interfaces requires a terminal adapter such as a DSU/CSU. The terminal adapter or endpoint application equipment is connected to the TN464C Universal DS1 circuit pack.

These endpoints are administered as wideband access endpoints and have no signaling interface to switch; they simply transmit and receive data. (Some applications detect and respond to the presence or absence of data). Calls are initiated from these endpoints using the Administered Connections feature.

Multiple access endpoints on one line-side UDS1 circuit pack facility are separate and distinct within the facility. Endpoint application equipment must be administered to send and receive the correct data rate over the correct DS0s. Every Administered Connection originating from a wideband access endpoint uses the entire bandwidth administered for the endpoint. An incoming call with a different data rate than that administered for the endpoint cannot be routed to the endpoint.

Although Wideband Access Endpoints are used primarily for line-side facilities, these endpoints can also be administered on network DS1 facilities to connect S8700 Multi-Connect to non-switched network services, such as the Avaya fractional T-1 service. An example of this is the Avaya Static Integrated Network Access, where a trunk group to AT&T 4ESS Switched Services shares an access T-1 facility with a Wideband Access Endpoint. In this case, the Wideband Access Endpoint is connected to the AT&T fractional T-1 service, and it does not terminate on local endpoint equipment but is connected to a far-end CPE (for example, another S8700 Multi-Connect) via the dedicated fractional T-1. All Wideband Access Endpoint functionality and operation is identical on both line-side and network facilities. However, because maintenance capabilities are limited to the Wideband Access Endpoint interface, and because faults can occur end-to-end, troubleshooting procedures based on an end-to-end view of the network is required.

Wideband access endpoint port maintenance provides a strategy to maintain a wideband access endpoint port via a port on the Universal DS1 interface circuit pack hardware. The maintenance strategy covers logging wideband access endpoint port hardware errors, running tests for port initialization, periodic and scheduled maintenance, demand tests, and alarm escalation and resolution. Two different port service states are specified in the wideband access endpoint port maintenance:

- *out-of-service*: the port is in a deactivated state and cannot be used for calls
- *in-service*: the port is in an activated state and can be used for calls

  If the UDS1 Interface circuit pack is out of service, every port on it is taken out of service, and a Warning alarm is raised.

Error Log Entries and Test to Clear Values

Table 8-716. Wideband Access Endpoint Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test access-endpoint *extension* sh r 1**
18 (a)	0	**busyout access-endpoint**	WARNING	OFF	**release access-endpoint *extension***
130 (b)		None	WARNING	ON	**test access-endpoint *extension***
1281 (c)		Conference Circuit test (#7)	MINOR	ON	**test access-endpoint *extension* l r 4**
1537 (d)		NPE Crosstalk test (#6)	MINOR	ON	**test access-endpoint *extension* l r 3**
1793 (e)		None			**test board *UUCSS* long**
3840 (f)	Any	Port Audit and Update test (#36)			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. The wideband access endpoint has been busied out by a **busyout access-endpoint** extension command. No calls can be made to this extension.

b. The circuit pack has been removed or has been insane for more than 11 minutes. To clear the error, reinsert or replace the circuit pack.

c. The Conference Circuit test (#7) failed on this port. See Test #7 for repair procedures.

d. The NPE Crosstalk test (#6) failed on this port. See Test #6 for repair procedures.

e. The TN464C UDS1 Interface circuit pack has failed. See "UDS1-BD (UDS1 Interface Circuit Pack)" on page 8-1707.

f. The Port Audit and Update test (#36) failed due to an internal system error. Enter **status access-endpoint** extension and verify the status of the port. If the wideband access endpoint port is out of service, enter **release access-endpoint** extension to put it back into service. Retry the test command.

Technician-Demand Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *NPE Crosstalk* test (#6), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	D/ND[1]
NPE Crosstalk test (#6)		X	ND
Conference Circuit test (#7)		X	ND
Port Audit and Update test (#36)	X	X	ND

1. D = Destructive; ND = Nondestructive

NPE Crosstalk Test (#6)

The NPE Crosstalk test verifies that this port's NPE channel talks on the selected time slot, and does not cross over to time slots reserved for other connections. If the NPE is not working correctly, 1-way and noisy connections may be observed. This test is usually part of a port's long test sequence and takes 20 to 30 seconds to complete

Table 8-717. Test #6 NPE Crosstalk Test

Error Code	Test Result	Description / Recommendation
	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use the **status access-endpoint** extension or command to determine when the port is available for testing. 1. Retry the command at 1-minute intervals up to 5 times.
1001	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.

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Table 8-717. Test #6 NPE Crosstalk Test — *Continued*

Error Code	Test Result	Description / Recommendation
1002	ABORT	The system could not allocate time slots for the test. The system may be under heavy traffic conditions or it may have time slots out-of-service due to TDM-BUS errors. Use **status health** to determine whether the system is experiencing heavy traffic. 1. If the system has no TDM-BUS errors and is not handling heavy traffic, retry the command at 1-minute intervals up to 5 times.
1003	ABORT	The system could not allocate a tone receiver for the test. The system may be too big for the number of Tone Detectors present, or some Tone Detectors may be out of service. **List measurement tone-receiver** displays information about the system's tone receivers. 1. Resolve any TTR-LEV errors. 2. Resolve any TONE-PT errors. 3. If neither condition exists, retry the command at 1-minute intervals up to 5 times.
1004	ABORT	The port has been seized by a user for a valid call. Use **status access-endpoint** extension to determine when the port is available for testing. The port is available when it is in the **in-service/idle** state. 1. Retry the command at 1-minute intervals up to 5 times.
1020	ABORT	The test did not run because of a previously existing error on the specific port or a more general circuit pack error. 1. Examine the Error Log for existing errors against this port or the circuit pack and attempt to diagnose the already existing error.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The NPE of the tested port was found to be transmitting in error. This causes noisy and unreliable connections. 1. Replace the circuit pack.
	PASS	The port is correctly using its allocated time slots. 1. Investigate user-reported troubles on this port using other port tests and by examining the terminal adapter or external wiring.

Conference Circuit Test (#7)

The Conference Circuit test verifies that the NPE channel for the port being tested can correctly perform the conferencing function. The NPE is instructed to listen to several different tones and conference the tones together. The resulting signal is then measured by a Tone Detector port. If the level of the tone is within a certain range, the test passes.

Table 8-718. Test #7 Conference Circuit Test

Error Code	Test Result	Description / Recommendation
	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1000	ABORT	System resources required to run this test are not available. The port may be in use on a valid call. Use the **status access-endpoint** extension command to determine when the port is available for testing.
1004	ABORT	The port has been seized by a user for a valid call. Use the **status access-endpoint** extension command to determine when the port is available for testing. The port is available when it is in the **in-service/idle** state. 1. Retry the command at 1-minute intervals up to 5 times.
1020	ABORT	The test did not run due to a previously existing error on the specific port or because of a more general circuit pack error. 1. Examine the Error Log for existing errors against this port or circuit pack, and attempt to diagnose the previously existing error.
2000	ABORT	Response to the test was not received within the allowable time period.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The NPE of the tested port did not conference the tones correctly. This causes noisy and unreliable connections. Even though wideband calls do not use the conferencing feature on the NPE, this failure indicates problems with the circuit pack hardware. 1. Replace the circuit pack.
	PASS	The port can correctly conference multiple connections. 1. Investigate user-reported troubles on this port using other port tests and by examining the terminal adapter or external wiring.

Port Audit and Update Test (#36)

This test sends port level translation data from switch processor to the UDS1 Interface circuit pack to ensure that the wideband access endpoint port's translation is correct.

Table 8-719. Test #36 Audit and Update Test

Error Code	Test Result	Description / Recommendation
	ABORT	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
1006	ABORT	The port is out-of-service. If the port is busied out: 1. Issue **release access-endpoint *extension*** command to put the port back into in-service. 2. Retry the test command. If the port is not busied out: a. Check the error and alarm logs for WAE-PORT and UDS1-BD errors and alarms and follow the recommended repair procedures.
2000	ABORT	Response to the test request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	Port translation has been updated successfully.

XXX-BD (Common Port Circuit Pack)

MO's Name (in Alarm Log)	Alarm Level	Initial SAT Command to Run [1]	Full Name of MO
XXX-BD[2]	MAJOR	**test board *UUCSS***	Common Port Circuit Pack maintenance
XXX-BD[2]	MINOR	**test board *UUCSS***	Common Port Circuit Pack maintenance
XXX-BD[2]	WARNING	**test board *UUCSS***	Common Port Circuit Pack maintenance

1. UU is the universal cabinet number (1–64 for ATM PNC, 1–44 for CSS PNC). C is the carrier designation (A, B, C, D, or E). SS is the number of the slot where the circuit pack resides (01–21).
2. Refer to the appropriate circuit pack documentation for the correct MO name displayed in this field. It usually ends with BD.

Common Port Circuit Pack maintenance is a set of common tests used by every circuit pack listed in the following tables. The common portion of these circuit packs is the generic hardware that interfaces with the TDM bus. The XXX-BD designation is also used on G3-MT displays when **reset board** is entered with an empty circuit pack slot, or with a circuit pack type that is in conflict with the actual board type administered for that slot. Every circuit pack suffix (B,C, D, and so forth) are supported by "XXX-BD."

When any of the Common Port circuit packs are physically removed from the backplane, no alarm will be logged for approximately 11 minutes. (In the case of the TN754 Digital Line,TN566 EMBEDDED AUDIX, and TN758 Pooled Modem circuit packs, approximately 21 minutes will elapse before an alarm is logged.) When a circuit pack that has been removed is alarmed, the alarm type is minor and is classified as an on-board alarm. The time delay permits maintenance activity to be performed without triggering an additional alarm.

Alarms are logged against only those common port circuit packs on which ports have been administered. In a heavily loaded system, the interval between the removal of a Common Port circuit pack and the logging of the alarm may be several minutes longer. The circuit packs in the following list contain ports on the TDM bus. Suffixes are not shown; for a list of every circuit pack supported, see the table in Chapter 2, ''Hardware Configurations''. Those that appear in **bold** type are documented separately under their own MO name.

The following list of circuit packs are listed by apparatus code.

Table 8-720. XXX-BD Common Circuit Packs

Apparatus Code	Name	Type
CPP1	Memory Expansion	Control
ED-1E546 (TN2169) (TN2170) (TN566) (TN567)	EMBEDDED AUDIX R3 System	Port Assembly
ED-1E546 (TN2208) (TN2170)	Call Visor ASAI over the DEFINITY (LAN) Gateway R1	Port Assembly
TN417	Auxiliary Trunk	Port
TN419B	Tone-Clock	Control
TN420B/C	Tone Detector	Service
TN429	Direct Inward/Outward Dialing (DIOD) Trunk	Port
TN433	Speech Synthesizer	Service
TN436B	Direct Inward Dialing Trunk	Port
TN437	Tie Trunk	Port
TN438B	Central Office Trunk	Port
TN439	Tie Trunk	Port
TN447	Central Office Trunk	Port
TN457	Speech Synthesizer	Service
TN458	Tie Trunk	Port
TN459B	Direct Inward Dialing Trunk	Port
TN464C/D/E/F	DS1/E1 Interface – 24-channel T1, 32-channel E1	Port
TN465/B/C	Central Office Trunk	Port
TN467	Analog Line	Port
TN468B	Analog Line	Port
TN479	Analog Line	Port
TN497	Tie Trunk	Port
TN556/B	ISDN-BRI 4-Wire S/T-NT Line (A-Law)	Port
TN570/B/C	Expansion Interface	Port
TN572	Switch Node Clock	Control
TN573/B	Switch Node Interface	Control
TN574	DS1 Converter - T1, 24 Channel	Port

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Table 8-720. XXX-BD Common Circuit Packs — *Continued*

Apparatus Code	Name	Type
TN722B	Digital Signal Level 1 Tie Trunk	Port
TN725B	Speech Synthesizer	Service
TN726/B	Data Line	Port
TN735	MET Line	Port
TN742	Analog Line	Port
TN744/B	Call Classifier	Service
TN744/C/D	Call Classifier - Detector	Service
TN746/B	Analog Line	Port
TN747B	Central Office Trunk	Port
TN748/B/C/D	Tone Detector	Service
TN750/B/C	Announcement	Service
TN753	Direct Inward Dialing Trunk	Port
TN754/B	Digital Line 4-Wire DCP	Port
TN755B	Neon Power Unit	Power
TN756	Tone Detector	Service
TN758	Pooled Modem	Port
TN760B/C/D	Tie Trunk	Port
TN762B	Hybrid Line	Port
TN763B/C/D	Auxiliary Trunk	Port
TN767B/C/D/E	DS1 Interface - T1, 24 Channel	Port
TN768	Tone-Clock	Control
TN769	Analog Line	Port
TN771D	Maintenance/Test	Service
TN775/B	Maintenance	Service
TN776	Expansion Interface	Port
TN777/B	Network Control	Control
TN778	Packet Control	Control
TN780	Tone-Clock	Control
TN787F	Multimedia Interface	Service
TN788/B	Multimedia Voice Conditioner	Service
TN789	Radio Controller	Control
TN793	Analog Line, 24-Port, 2-Wire	Port

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Table 8-720. XXX-BD Common Circuit Packs — *Continued*

Apparatus Code	Name	Type
TN797	Analog Trunk and Line	Port
TN800	Multi-Application Platform for DEFINITY (MAPD)	Service
TNPRI/BRI	PRI-to-BRI Converter	Port
TN1654	DS1 Converter - T1, 24 Channel/E1, 32 Channel	Port
TN2135	Analog Line	Port
TN2136	Digital Line 2-Wire DCP	Port
TN2138	Central Office Trunk	Port
TN2139	Direct Inward Dialing Trunk	Port
TN2140/B	Tie Trunk	Port
TN2144	Analog Line	Port
TN2146	Direct Inward Dialing Trunk	Port
TN2147/C	Central Office Trunk	Port
TN2149	Analog Line	Port
TN2180	Analog Line	Port
TN2181	Digital Line 2-Wire DCP	Port
TN2182/B	Tone-Clock, Tone Detector, and Call Classifier	Control
TN2183	Analog Line	Port
TN2184	DIOD Trunk	Port
TN2198	ISDN-BRI 2-Wire U Interface	Port
TN2199	Central Office Trunk	Port
TN2202	Ring Generator	Power
TN2224	Digital Line, 24-Port, 2-Wire DCP	Port

Error Log Entries and Test to Clear Values

Table 8-721. Common Port Circuit Pack Maintenance Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0[1]	0	Any	Any	Any	**test board *UUCSS* sh r 1**
1 (a)	0	Circuit pack removed or SAKI Sanity test (#53)	MINOR	ON	
18 (b)	0	**busyout board *UUCSS***	WARNING	OFF	**release board *UUCSS***
23(c)	0	None	WARNING	OFF	
36 (d)	4368	none			
125 (e)		None	MINOR	ON	
217 (f)	0	None	WARNING	ON	
257	65535	Control Channel test (#52)	MINOR	ON	**test board *UUCSS* sh r 20**
267 (f)	0	None	WARNING	ON	
513 (h)	Any	None	MINOR	ON	**test board *UUCSS* sh**
769 (i)	4358	None			
1025 (j)	4363	NPE Audit test (#50)			**test board *UUCSS* l r 20**
1281 (k)		Ringing Application test (#51)	MINOR	ON	**test board *UUCSS* r 2**
1538 (l)	Any	None	WARNING MINOR	ON	
1793 (m)		Neon test (#220)	MINOR	ON	**test board *UUCSS* r 2**
3840 (n)	Any	None			
3999 (o)	Any	None			

1. Run the short test sequence first. If every test passes, run the long test sequence. Refer to each appropriate test's description, and follow its recommended procedures.

Notes:

a. Error type 1 indicates the circuit pack has stopped functioning or has been physically removed from the system. This error type does not apply to ANN-BD, DETR-BD, S-SYN-BD, M/T-BD, or CLSFY-BD. The alarm is logged approximately 11 minutes after removal of the circuit pack or failure of the SAKI Sanity test (#53).

   Check for the physical presence of the circuit pack in the slot indicated by the alarm. If the circuit pack is absent, insert one of the proper type. If the circuit pack is present and its red LED is lit, see *"LED Alarms without Alarm Log Entry or with Error Type 1" on page 6-5*.

b. This error indicates the circuit pack has been busied out. Release the circuit pack via **release board *UUCSS***.

c. The circuit pack has been logically administered but not physically installed. The alarm should clear when the circuit pact is installed.

   If the circuit pack is already installed:

   1. Run **test board *UUCSS* long** and look at any test failures or error codes generated.
   2. If the test does not clear error 23, then execute **reset board *UUCSS*** and run the long test again.
   3. If the reset/test does not clear error 23, replace the circuit pack.

d. This error applies only to the Maintenance/Test circuit pack (TN771B or TN771C). The error indicates that the hardware associated with the Analog Trunk Testing port of the circuit pack failed to initialize. Note that when this error occurs, the Maintenance/Test circuit pack may report an invalid vintage. Although this error is not service-affecting, the Maintenance/Test circuit pack should be replaced.

e. The circuit pack physically installed in the slot does not match the type that is administered for that slot. Do one of the following:

   - Remove the incorrect circuit pack and replace it with one of the type that is administered for that slot.
   - Use **change circuit-pack** to readminister the slot so that it matches the board that is installed, and follow with **reset board**.

f. This error applies to the Maintenance/Test circuit pack TN771D), Tone Detector (TN748B, TN748C, or TN748D), and Call Classifier (TN748) circuit packs. For the Maintenance/Test circuit pack, the error indicates that there is more than one Maintenance/Test circuit pack in the port network. For the Tone Detector or Call Classifier packs, the error indicates that there are more than 10 circuit packs in the system. Remove the circuit pack against which the error is logged.

g. This error indicates transient communication problems with this circuit pack. This error is not service-affecting and no action is required.

h. This error, when reported with Aux data in the range of 4352 to 4358, indicates that the circuit pack has reported an on-board hardware failure. The circuit pack will continuously test the hardware and report the results approximately every 10 minutes. If the hardware problem is resolved, the “leaky bucket” strategy should clear the alarm in approximately 30 minutes. However, if the alarm does NOT clear in 30 minutes, then the circuit pack should be replaced.

i. This error can be ignored, but look for other errors on this circuit pack.

j. This error is not service-affecting and no action is required.

k. This error indicates that no ringing current is detected. Run Test #51, Ringing Application test, and follow the procedures for Test #51. This error is only applicable to Analog Line circuit packs.

l. The hyperactive circuit pack is out-of-service and may exhibit one or more of the following symptoms:

   1. The common circuit pack level tests such as Test #51 and/or Test #220 are aborting with error code 2000.
   2. The tests run on the ports of this circuit pack are returning with a NO-BOARD.
   3. A busyout/release of the circuit pack has no effect on test results.
   4. A **list configuration** command shows that the circuit pack and ports are properly installed.

   If the XXX-BD is not a TN754 Digital Line Circuit Pack (DIG-BD), and if this error happens again within 15 minutes, then replace the circuit pack. If the XXX-BD is a TN754 Digital Line Circuit Pack (DIG-BD), then check the alarm level. If the alarm level is a WARNING, this indicates that users are probably causing the hyperactivity by playing with their digital stations. If the circuit pack is really hyperactive then this alarm will be upgraded to a MINOR alarm within 1 hour. If the alarm level is a MINOR alarm, then replace the circuit pack.

m. This error indicates that no neon current is detected. Run **test board *UUCSS* short** and follow the procedures for Test #220. This error is only applicable to TN769 and TN746 Analog Line circuit packs.

n. This error is not service-affecting and no action is required.

o. Error type 3999 indicates that the circuit pack sent a large number of control channel messages to the switch within a short period of time. If error type 1538 is also present, then the circuit pack was taken out-of-service due to hyperactivity. If error type 1538 is absent, then the circuit pack was not taken out-of-service, but it has generated 50% of the messages necessary to be considered hyperactive. This may be completely normal during heavy traffic periods. However, if this error type is logged when the circuit pack is being lightly used, it may indicate a problem with the circuit pack or the equipment attached to it.

Technician-Demand Tests: Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. For example, by clearing error codes associated with the *NPE Audit* test (#50), you may also clear errors generated from other tests in the testing sequence.

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND[1]
NPE Audit test (#50)		X		ND
Ringing Application test (#51) (a)	X	X		ND
Control Channel Loop-Around test (#52)	X	X		ND
SAKI Sanity test (#53) (b)		X	D	
Neon test (#220) (c)	X	X		ND

1. D = Destructive; ND = Nondestructive

Notes;

a. Only applicable to Analog Line circuit packs.

b. The SAKI Sanity test is run in the long test sequence for the Tone-Clock circuit packs (TN768, TN780) **only**. The test is run on other circuit packs only when they are reset via the **reset board** command.

c. Only applicable to TN746 and TN769 Analog Line circuit packs.

NPE Audit Test (#50)

The system sends a message to the on-board microprocessor to update the network connectivity translation for every NPE (Network Processing Element) on the circuit pack.

Table 8-722. Test #50 NPE Audit Test

Error Code	Test Result	Description / Recommendation
None 2100	ABORT	System resources required for this test are not available.
1019	ABORT	Test already in progress.
	FAIL	Internal system error 1. Retry the command at 1-minute intervals up to 5 times.
	PASS	The circuit pack's NPEs have been updated with their translation.
	EXTRA BD	Certain circuit packs have limitations on how many circuit packs can be in the system or port network such as the Maintenance/Test circuit pack (TN771B or TN771C), the Tone Detector circuit pack (TN748B, TN748C or TN748D) and the Call Classifier (TN744). The Maintenance/Test circuit pack allows only one circuit pack per port network. The Tone Detector and Call Classifier allow only 10 circuit packs in each system. All additional circuit packs will return EXTRA-BD and should be removed.
Any	NO BOARD	This is normal if the test is being done when: (a) the board is not physically in the system or (b) the system is booting up. Otherwise, there is some inconsistency between the physical configuration and the data kept in the system. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Retry the command at 1-minute intervals up to 5 times.

Ringing Application Test (#51)

This test checks the ringing application circuitry common to every port on an Analog Line circuit pack.

Table 8-723. Test #51 Ringing Application Circuit Test

Error Code	Test Result	Description / Recommendation
1000 2100	ABORT	Could not allocate the necessary system resources to run test.
	ABORT	Could not allocate the necessary system resources to run test. The circuit pack is not installed. Internal system error
2000	ABORT	There was no response from the board. 1. If error type 1538 (hyperactivity) is present in the error log, follow the maintenance strategy that is recommended for this error type. 2. Run the **busyout board**, **reset board**, and **release busy board** commands, and then retest. 3. If the test still aborts, dispatch with the circuit pack. 4. Check the off-board wiring and the terminal, and, if there are no problems found, replace the circuit pack.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. 1. Use the **display port *UUCSSpp*** command to determine the station extension. Use the **status station** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. (Refer to Chapter 8, for a full description of all possible states). You must wait until the port is idle before retesting. 2. Retry the command at 1-minute intervals up to 5 times.

Continued on next page

Table 8-723. Test #51 Ringing Application Circuit Test — *Continued*

Error Code	Test Result	Description / Recommendation
1008	ABORT	Could not allocate a ringing circuit for one of the following reasons: all the ringing circuits are in use; the ringing generator is defective; ringing generator is not wired correctly. 1. If the test continues to abort, look for RING-GEN error in Error Log. a. If there are RING-GEN errors, see ''RING-GEN'' on page 8-1357 and try to resolve any problem(s). Then, go to step 2. b. If there are no RING-GEN errors, and the test continues to abort, issue the **test board *UUCSS*** command on other TN742, TN769, or TN746 Analog circuit packs. If an ABORT with error code 1008 occurs for this test on other circuit packs as well, then the ringing generator may be defective or may not be wired properly. See ''RING-GEN'' on page 8-1357 maintenance documentation for details. If an ABORT with error code 1008 does NOT occur on the other ports, then all four ring generators are in use. Exit from this documentation. 2. Retry the command.
	FAIL	No ringing current is detected. The ringing application circuitry on this circuit pack probably is not healthy. 1. Retry the command again. 2. If the test continues to fail, look for RING-GEN error in Error Log. a. If there are RING-GEN errors, see ''RING-GEN'' on page 8-1357 and try to resolve any problem(s). b. If there are no RING-GEN errors, then replace the circuit pack. 3. Retry the command again.
	PASS	Ringing current is detected or this vintage of the Analog Line circuit pack does not support the Ringing Application Circuit Test. Analog Line circuit packs that DO NOT support Test #51 include TN712 Vintage 13 and earlier and TN742 Vintage 3 and earlier.
Any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up. Otherwise, there is some inconsistency between the physical configuration and the data kept in the system. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Retry the command at 1-minute intervals up to 5 times.

Control Channel Loop-Around Test (#52)

This test queries the circuit pack for its circuit pack code and vintage and verifies its records.

Table 8-724. Test #52 Control Channel Loop-Around Test

Error Code	Test Result	Description / Recommendation
None 2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
	FAIL	The test failed because the circuit pack failed to return the circuit pack code or vintage. 1. Retry the command up to 5 times. 2. If the test still fails, issue the **busyout board**, **reset board**, and **release busy board** commands, and then retest. 3. If the problem continues, replace the circuit pack. 4. Run the test again.
	PASS	Communication with this circuit pack is successful.
	EXTRA BD	This result should only appear when more than one TN771D Maintenance/Test circuit pack has been installed in this port network. Remove this circuit pack.
Any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up. Otherwise, there is some inconsistency between the physical configuration and the data kept in the system. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Retry the command at 1-minute intervals up to 5 times.

SAKI Sanity Test (#53)

This test is destructive.

This test resets the circuit pack. It is executed as part of the long test sequence only for the Tone-Clock circuit pack and DS1 interface circuit packs. Other common circuit packs can be reset with the **reset board *UUCSS*** command which also executes this test.

Table 8-725. Test #53 SAKI Sanity Test

Error Code	Test Result	Description / Recommendation
None	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1005	ABORT	Wrong circuit pack configuration to run this test. This error applies only to DS1 interface circuit packs. It means the DS1 interface circuit pack is providing timing for the system and, therefore, it cannot be reset without major system disruptions. 1. If the circuit pack needs to be reset, then set synchronization to another DS1 interface circuit pack or the Tone-Clock circuit pack and try again. See ''SYNC (Port-Network Synchronization)'' on page 8-1509.
1015	ABORT	Port is not out-of-service. 1. Busy out the circuit pack. 2. Execute command again.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at 1-minute intervals up to 5 times.
1	FAIL	The circuit pack failed to reset.
2	FAIL	The circuit pack failed to restart. 1. Execute command again. 2. If the problem persists, replace the circuit pack.
	PASS	The circuit pack initializes correctly. 1. Run the short test sequence.
Any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up. Otherwise, there is some inconsistency between the physical configuration and the data kept in the system. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Retry the command at 1-minute intervals up to 5 times.

Neon Test (#220)

This test checks the voltage required to light the neon lamp on an analog terminal. A relay connects a 150V DC source from the backplane of the circuit pack onto the voltage bus, and another relay connects a 2K shunt from the bus to ground. Current in the line is then monitored to determine if the voltage is present. The neon test runs only for TN746 and TN769 Analog circuit packs. If the circuit pack is not a TN746 or TN769, the test will return PASS, but the test is not actually run.

Table 8-726. Test #220 Neon Test

Error Code	Test Result	Description / Recommendation
	ABORT	Cannot get the list of translated ports on the circuit pack.
1004	ABORT	The port was seized by a valid call during the test. The test has been aborted. 1. Use the **display port *UUCSSpp*** command to determine the station extension. Use the **status station** command to determine the service state of the port. If the service state indicates that the port is in use, then the port is unavailable for certain tests. Refer to the status commands described in Chapter 8 for a full description of all possible states.) You must wait until the port is idle before retesting. 2. Retry the command at 1-minute intervals up to 5 times.
1008	ABORT	Could not allocate a ringing circuit. Either all the ringing circuits are in use, or the ringing generator is defective or is not wired correctly. 1. Retry the command at 1-minute intervals up to 5 times. 2. If the test continues to abort, look for RING-GEN errors in the Error Log. If an ABORT 1008 occurs for this test on other circuit packs as well, then the ringing generator may be defective or is not wired correctly (see errors for RING-GEN). If it does not occur on port test 48 for ANL-16-L, then all four ring phases are in use.
2000	ABORT	Response to the request was not received within the allowable time period.
2100	ABORT	Could not allocate the necessary system resources to run this test.
	ABORT	Could not allocate the necessary system resources to run this test. Internal system error. 1. If Error Type 1538 is present in the Error Log, follow the recommended maintenance strategy.

Continued on next page

Table 8-726. Test #220 Neon Test — *Continued*

Error Code	Test Result	Description / Recommendation
	FAIL	The test failed because no neon current was detected. 1. Determine if there is a TN755 or TN752 power unit circuit pack installed in the same carrier as the TN746 or TN769 analog line circuit pack that failed the test. Look for the failure of test 220 on other TN746 or TN769 circuit packs in the carrier. If test 220 fails on the other circuit packs, replace the TN755 or TN752 power unit circuit pack. 2. Retry the command again. 3. If the test continues to fail, replace the circuit pack. 4. Retry the command again.
	PASS	This circuit pack is a TN746 or TN769 Analog Line circuit pack and the neon current is detected. If this test passes, it can also mean that this circuit pack is not a TN746 or TN769 Analog Line circuit pack.
Any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up. Otherwise, there is some inconsistency between the physical configuration and the data kept in the system. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Retry the command at 1-minute intervals up to 5 times.

Index

Numerics

120A ICSU 5-7
8-port analog line (ANL-LINE, ANL-NE-L) 8-81

A

AC power
  distribution in multi-carrier cabinets 8-394
AC Power Distribution Unit 8-395
AC-powered systems 8-4, 8-1302
administered temporary signaling connections (TSC-ADM) 8-1692
administration
  circuit packs 6-5, 8-1718
ADX12-BD 8-319
ADX8D-BD 8-319
ADX8D-RS 8-320
air filters 5-24
alarm notification 4-2
alarms
  categories 6-2
  classifications 1-4
  external leads 1-9
  INADS Link MO 8-925
  levels 6-2
  maintenance objects (MOs) 1-4
  spontaneous interchanges 4-11
  Terminal Alarm Notification 6-3
  warning 6-2
American National Standards Institute, see ANSI
analog
  carrier signal 1-13
analog port
  insertion loss 1-20
analog ring generator (RING-GEN) 8-1357
analog transmission by a modem 1-13
analog-to-analog
  echo path delay 1-22
  frequency response 1-19
  intermodulation distortion 1-20
  peak noise level 1-22
  quantization distortion loss 1-21
analog-to-digital
  coder/decoder 1-13
  frequency response 1-19
  intermodulation distortion 1-20
  peak noise level 1-22
  quantization distortion loss 1-21
ANSI 1-18
application protocols 1-22
ASAI ISDN-BRI port (ABRI-PORT) 8-330
Asynchronous Data Unit
  proprietary signal 1-13
ATM (Asynchronous Transfer Mode)
  B-channel 8-253
  circuit emulation service (CES) 8-253
  D-channel 8-253
  signaling group 8-253
  trunking 8-253
ATMS, see Automatic Transmission Measurement System
attendant console, LEDs 6-4
audits (tests), see tests and audits
AUDIX circuit pack (ADXDP-BD) 8-15
AUDIX digital port (ADXDP-PT) 8-16
Automatic Transmission Measurement System (ATMS) 5-34, 8-1147
auxiliary error codes 4-13
AXA12-BD 8-319
AXA12-RS 8-320
AXD12-RS 8-320

B

backup power 8-398
batteries, preventive maintenance 5-24
battery
  charger 8-396
BIU 4-9

C

cabling
  DS1 connectors 4-27
  DS1 CONV 2-5
  fiber optic 2-3
  metallic 2-5
Cajun Ethernet switch LEDs 6-18
capabilities, system 1-10 to 1-22
CE marks 4
center stage switches 8-766
CEPT1 1-13
channel associated signaling (CAS) 8-1708
character code
  8-bit 1-13
characteristics, transmission 1-18 to 1-22
charger, battery 8-396
circuit breaker 8-395, 8-401
circuit packs
  administration 6-5, 8-1718
  combined tone/generators 8-755
  DS1 CONV 4-8
  DS1 CONV LEDs 6-10
  electrostatic discharge (ESD) 4-4
  expansion interface (EI) 8-774
  expansion interface (IE) LEDs 6-7

circuit packs, (continued)
Generic 3r 2-8
green LEDs 6-5
LEDs 6-5
miantenance/test LEDs 6-15
Net Packet/Packet Interface 7-205
packet bus failures 4-86
red LEDs 6-5
replacing 4-7
requiring special procedures 4-8
reseating 4-7
TN2182 8-1014, 8-1180, 8-1659
TN2242 8-1708
TN2305 8-253
TN2306 8-253
TN464 8-586
TN464F 8-1708
TN570 6-7, 8-763
TN572 4-8
TN573 4-8
TN722 8-586
TN750 4-8
TN767 8-586
TN768 8-1014, 8-1180, 8-1604, 8-1659, 8-1682
TN775 8-773
TN780 8-1604
TN802 MAPD 8-1039
TONE-BD, tone-clock 8-1014, 8-1180, 8-1659
tone-clock 8-774, 8-1014, 8-1180, 8-1659
tone-clock LEDs 6-14
universal DS1 (UDS1) interface 8-586, 8-929, 8-1039, 8-1069, 8-1707
using the packet bus 4-85
yellow LEDs 6-5
TN775 circuit packs
port networks 8-772
CLAN-BD 8-411
clocks, system 8-1014, 8-1180, 8-1604, 8-1659
CODEC 1-13
coder/decoder, analog-to-digital, see CODEC
codes
service 1-23
cold restarts 3-10
combined tone generator/detectors, circuit packs 8-755
command lines
syntax 7-5
commands
error messages 7-5
ipserver-interface 7-2
platform/server 7-3
release 7-13, 7-247
reset pnc interchange 4-104
reset system interchange 4-104
SAT, new 7-2
set tone-clock 4-104
status 4-99
status port-network 4-103
companding 8-755, 8-1665
Conference, Transfer, and Call-Forwarding Denial 1-18
connecting/connectivity
ISDN-BRI/packet bus 4-73
packet bus 4-84
connectivity
rules 1-15
Control LAN Circuit Pack 8-411
CO-trunk-to-digital interface frequency response 1-19
country codes 8-1665

D

DAJ1 8-485
alarm log entries 8-485
error codes 8-486
local loop test 8-488
data
service unit 1-12
Data Communications Equipment, see DCE
data terminal equipment 1-10
data-link layer, OSI 1-10
DC power
distribution unit 8-401
relay 8-396
DCE 1-10
D-channel
protocol 1-10
DCP 1-12
DC-powered systems 8-9, 8-1311
delay, echo path 1-22
Digital IP Station 8-531
Digital Multiplexed Interface 1-13
digital port
insertion loss 1-20
Digital Signal Level 1 (DS1) 1-13
digital-to-analog
peak noise level 1-22
quantization distortion loss 1-21
digital-to-digital
echo path delay 1-22
Disconnect Supervision 1-17
distortion
intermodulation 1-20
quantization loss 1-21
distribution unit, power 8-401
DS0 channels 8-1715
DS1
cable connectors 4-27
CO trunk (CO-DS1) 8-435, 8-562
converter (DS1 CONV-BD) 8-683
convertor complex 8-768
facility LEDs 6-11
interface circuit packs 8-586, 8-929, 8-1039, 8-1069, 8-1707
option jumpers 8-1718
signaling 8-586
trunks 8-929, 8-1039, 8-1069, 8-1707

DS1 CONV
cabling 2-5
circuit pack LEDs 6-10
circuit packs 4-8
loopbacks 4-26
DS1 Interface Circuit Pack 8-586
DS1 span 5-2, 5-3
DSO frequency response 1-19
DSO Loop-Around Test Call 5-16
DSU, see Data Service Unit
DTE, see data terminal equipment
DTMR Test Call 5-17
duplicated PNCs 8-765
duplicated servers
spontaneous interchanges 4-10
duplication
reliability options 2-9
Duplication-Related System Parameters form 7-142

E

echo path delay 1-22
Echo-Return Loss 1-22
EIA 1-18
electrical components in power distribution unit 8-395
electromagnetic compatibility standards 3
electromagnetic interference filter 8-395
Electronic Industries Association, see EIA
electrostatic discharge (ESD), circuit packs 4-4
Emergency Transfer (ET) 8-736
EMI filter 8-395
enhanced integrated CSU 8-1708, 8-1716
enhanced tone receiver (ETR) ports 8-756
ERL, see Echo-Return Loss
error
control 1-10
error logs
hardware 1-4
spontaneous interchanges 4-11
errors
codes, auxiliary 4-13
codes, busyout commands 7-15
codes, release commands 7-15
codes, reset commands 7-15
codes, test commands 7-15
messages, commands 7-5
reporting, maintenance objects (MOs) 1-4
ESD, See electrostatic discharge
European conference of postal/ telecom rate 1, see CEPT1
expansion interface (EI)
circuit packs 8-774
fiber links, viability 8-774
TN570 circuit packs 6-7, 8-763
tone-clock interactions 8-774
expansion port networks (EPNs)
troubleshooting packet bus 4-110

F

Facility Interface Code 1-24
Facility Test Calls 5-15
fan units
power converter 631DA 8-401
FCC 1-23
feature capacities 1-10 to 1-22
Federal Communications Commission, see FCC
fiber administration 2-3
fiber connections, metallic cabling 2-5
fiber fault isolation procedure 4-19
fiber hardware 2-3
fiber link (FIBER-LK) 8-830
fiber links, DS1 converter complex 8-768, 8-830
fiber optic cables 2-3
FIC, see Facility Interface Code
filter, circuits 8-401
flow control 1-10
frequency response
analog-to-analog 1-19
analog-to-digital 1-19
fuses
20 Amp 8-395

G

Global AC MCC (J58890CH) 8-1309
global AC/DC power
distribution in multi-carrier cabinets 8-398
grounding jacks 4-5

H

H.323
B-Channel 8-888
H323-BCH 8-888
H323-SGRP 8-890
IP Station 8-897
H323-BCH 8-888
H323-SGRP 8-890
hot restarts 3-9

I

impedances
loop in 1-22
termination 1-22
Incomplete Command Time-Out 8-584

initialization
and recovery 3-1
reboots 3-8
insertion loss 1-20
install a BIU or Rectifier 4-9
interchanges, tone-clocks 8-1663
interface
physical 1-12
intermodulation distortion 1-20
Internet Telephony Server (ITS-E) 8-1039
intervening switching systems 1-15
IPSI
LEDs 6-21
IPSI connectivity 1-7
ISDN
BRI definition 1-12
D-channel treatment 1-10
PRI definition 1-12
ISDN-BRI
data module (BRI-DAT) 8-329
line circuit pack (BRI-BD) 8-321
port (BRI-PORT) 8-330
ISDN-BRI/ASAI, troubleshooting 4-73
ISDN-PRI
DS0 channels 8-929, 8-1039, 8-1069, 8-1707
signaling link port (ISDN-LNK) 8-970
troubleshooting 4-69

J

jacks, network 1-24
Japan Radio Corporation external converter 8-1709, 8-1710

L

layers, protocol 1-12
LEDs
attendant consoles 6-4
Cajun Ethernet switch 6-18
circuit packs 6-5
DS1 CONV circuit packs 6-10
DS1 facility 6-11
electrostatic discharge (ESD) 4-4
expansion interface (IE) circuit packs 6-7
interpreted 6-1
IP Connect IPSI 6-22
IPSI board 6-21
maintenance/test circuit packs 6-15
Multi-Connect IPSI 6-23
server 6-16
switch node interface 6-14
testing server LEDs 6-17
LEDs, (continued)
TN573 circuit packs 6-14
tone-clock circuit packs 6-14
UPS 6-19
yellow 6-15
loop input impedances 1-22
loopback tests
fiber fault isolation procedure 4-24
loopbacks
DS1 CONV 4-26
DS1 CONV tests 4-26
loss
echo return 1-22
insertion 1-20
quantization distortion 1-21
single-frequency 1-22

M

maintenance
common port circuit pack 8-1872
packet bus 4-87
preventive 5-24
test circuit pack LEDs 6-15
wideband access endpoint port 8-1866
maintenance object repair procedures
ADXDP-PT (AUDIX Digital Port) 8-16
BRI-DAT (ISDN-BRI Data Module) 8-329
BRI-PORT (ISDN-BRI Port), ABRI-PORT (ASAI ISDN-BRI Port) 8-330
BRI-SET, ASAI-ADJ, BRI-DAT 8-354
ISDN-LNK (ISDN-PRI Signaling Link Port) 8-970
M/T-DIG (Maintenance/Test Digital Port) 8-1161
M/T-PKT (Maintenance/Test Packet Bus Port) 8-1175
TIE-BD (Tie Trunk Circuit Pack) 8-1620
maintenance objects (MOs)
alarms 1-4
defined 1-3
display alarms commands 7-17
display errors commands 7-17
error conditions 1-4
INADS 8-925
maintenance/test circuit pack (M/T-BD) 8-1157
maintenance/test digital port 8-1161
maintenance/test packet bus port (M/T-PKT) 8-1175
major alarms 6-2
management information system (MIS) 8-1109
MAPD 8-1081
Media Processor 8-929, 8-1069, 8-1081
MET line (MET-LINE) 8-1089
metallic cabling 2-5
minor alarms 6-2
mismatch of signals 1-15
MO, see maintenance objects (MOs) 1-5
Modem Testing, see USB1 8-1703

N

NetMeeting 8-897
network interface 5-7
network jacks 1-24
noise, peak level 1-22

O

Off-Premises Station (OPS) Line 8-1183
Open System Interconnect model 1-10
  data-link layer 1-10
  physical layer 1-10
option jumpers
  TN464 8-1718
  universal DS1 (UDS1) interface circuit packs 8-1718
Originating Test Line (OTL) 8-1147
OSI, see Open System Interconnect model

P

packet bus
  circuit pack failures 4-86
  circuit packs 4-85
  connectivity 4-84
  correcting faults 4-103
  definition 4-83
  duplicated systems 4-104
  fault detection 8-1175
  faults 4-84
  ISDN-BRI connectivity 4-73
  maintenance 4-87
  reconfiguration 8-1175
  repair 4-81
  reset pnc interchange 4-104
  reset system interchange 4-104
  set tone-clock 4-104
  TDM bus comparison 4-88
  troubleshooting 4-100, 4-105
packet control driver (PCD) 8-1241
PBX standard RS-464A 1-18
pcANYWHERE 8-1045
PCM-encoded analog signal 1-13, 1-16
peak noise level 1-22
performance 1-10 to 1-22
  echo-return loss 1-22
  single-frequency return loss 1-22
physical layer, OSI 1-10
pinout
  H600-513 cable 8-1711
PMS printer link (PMS-PRNT/JN) 8-1278
PNC duplication (PNC-DUP) 8-242, 8-950, 8-959, 8-1283
TN775 circuit packs
  port networks 8-772
port network connectivity (PNC) 7-141
port networks
  Sanity Handshake test #106 8-1029
port networks (PNs) 8-773
TN775 circuit packs
  port networks 8-772
port-to-port insertion loss 1-20
power 8-398
  distribution in multi-carrier cabinets
    AC 8-394
    AC/DC 8-398
  distribution unit 8-401
    electrical components 8-395
  distribution units 5-24
  removing 5-32
  restoring 5-32
  single-carrier cabinets 8-4
power converter
  631DA 8-401
power interruptions 1-8
power units
  397B 8-396
  397C 8-396
  electrical components 8-395
preventative maintenance
  air filters 5-24
  logs 5-24
preventive maintenance 5-24
  batteries 5-24
  procedures 5-24
PRI 1-12
PRI endpoint port (PE-BCHL) 8-1213
private line service codes 1-23
procedures
  fiber fault isolation 4-19
  SNI/EI manual loop back 4-23
process sanity audits (PROC-SAN) 8-1331
property management system (PMS) 8-1270, 8-1278
property management system link (PMS-LINK) 8-1270
Proshare 8-897
protocols
  8-bit character code 1-13
  ADU 1-13
  analog 1-13
  BRI 1-12
  CEPT1
  DCP 1-12
  Digital Multiplexed Interface 1-13
  for applications 1-22
  layers 1-12
  PRI 1-12
  summary of states 1-14
  system 1-10
  voice-grade data 1-13

PSTN fallback 8-1043

Q

quantization distortion loss 1-21

R

R2-MFC signaling 8-755
rear panel connector 1-24
reboots
  initialization 3-8
  reset level 4 3-11
Rectifer 4-9
relay, DC power 8-396
release commands 7-13, 7-247
reliability options
  critical 2-12
  duplication 2-9
REN, see ringer equivalency numbers
replacement procedures, tone-cock circuit packs 8-1666
reset levels
  1 (warm restarts) 3-9
  2 (cold-2 restarts) 3-10
  4 (reboots) 3-11
reset pnc interchange command 4-104
reset system command 4-15
reset system interchange command 4-104
reset translation-id 8-1357
ringer equivalency numbers 1-24
RS-232
  connector 8-395
  interface 1-12
RS-449
  physical interface 1-12
RS-464A 1-18
rules, connectivity 1-15

S

safety precautions 4-2, 4-7
sanity audits 8-1331
server LEDs 6-16
Server UPS, see UPS 8-1810
servers
  duplicated, troubleshooting 4-10
  interchange, prerequisites 4-15
  standby, testing 4-13
service codes 1-23
service slot (SVC-SLOT) 8-1507
set tone-clock command 4-104
SFRL, see single-frequency return loss 1-22
signals
  mismatch 1-15
  PCM-encoded analog 1-16
single carrier cabinet environment (DC-POWER) 8-498
single-carrier cabinets
  power system 8-4
single-frequency return loss 1-22
SNI circuit pack (SNI-BD) 8-1429
SNI peer link (SNI-PEER) 8-1491
SNI, see switch node interface (SNI)
SNI/EI manual loop back procedure 4-23
specifications 1-10 to 1-22
spontaneous interchanges 4-10, 4-11
SRP-EPN 8-1495
standards
  electromagnetic compatibility 3
station-to-CO trunk frequency response 1-19
station-to-digital interface frequency response 1-19
station-to-station frequency response 1-19
status commands 4-99
  diagnosing ISDN-BRI problems 4-74
status port-network command 4-103
summary of protocol states 1-14
switch
  transmission characteristics 1-18 to 1-22
switch node interface (SNI), LEDs 6-14
synchronization 1-10
  SYNC MO 8-1509
synchronization (SYNC) 8-264
system
  insertion loss 1-20
  protocols 1-10
  quantization distortion loss 1-21
  resets 6-5
  specifications 1-10 to 1-22
System Tone Test Call 5-20

T

T1 5-2
TDM bus
  clocks 8-1014, 8-1180, 8-1604, 8-1659
  packet bus comparison 4-88
  time slots 5-18
TDM bus (TDM-BUS) 8-1588
TDM bus clock (TDM-CLK) 8-1604
TDM Bus Time Slot Test Call 5-18
technical specifications 1-10 to 1-22
terminal
  blocks 8-401
  equipment port wiring 1-23
Terminal Alarm Notification
  alarms 6-3
  description 6-3
Terminating Test Line (TTL) 8-1147
Terminating Trunk Transmission (TTT) 5-31

termination impedances 1-22
testing
analog tie trunk back-to-back 5-26
common port circuit pack maintenance 8-1872
fiber fault isolation 4-24
standby server 4-13
standby servers 4-13
system technician-demanded 8-786, 8-934, 8-1073, 8-1083, 8-1732
tests and audits
#0 Dial Tone Test 8-460
#106 Sanity Handshake Test 8-1029
#11 Digital Line Electronic Power Feed Test 8-553, 8-1350
#115 Customer-Provided Alarming Device Test 8-484
#117 Analog Ring Generator Initialization Test 8-1360
#118 Analog Ring Generator Query Test 8-1361
#120 External Device Alarm Test 8-829
#1201 Digital Terminal Remote Loop Around Test 8-548
#1209 Board Loopback Test 8-630
#1209 DS1 Board Loopback Test 8-630, 8-1776
#1210 CSU Equipment Loopback Test 8-633, 8-634, 8-1779
#1211 CSU Repeater Loopback Test 8-637, 8-638, 8-1783
#1212 CPE Loopback Jack Test 8-641, 8-1788
#1213 Far CSU Loopback Test 8-646, 8-1793
#1214 One-Way Span Test 8-650, 8-1797
#1215 Inject Single Bit Error Test 8-653, 8-1800
#1216 End Loopback/Span Test 8-655, 8-1803
#122 Cabinet Temperature Query Test 8-388
#1227 ICSU Status LEDs Test 8-658, 8-1806
#124 Emergency Transfer Query Test 8-740
#126 OLS Recycle Test 8-405
#127 OLS Query Test 8-407
#13 Analog Port Digital Loop Around Test 8-1152
#13 Information and Control Channel Local Loop Test 8-1205
#13 Voice and Control Channel Local Loop Test 8-21, 8-554, 8-732
#135 Customer-Provided Alarming Device Test 8-484
#135 Internal Loop Around Test 8-601, 8-1737
#136 DS1 Tie Trunk Seizure Test 8-1635
#138 Loss of Signal Alarm Inquiry Test 8-604, 8-605, 8-1742, 8-1808
#139 Blue Alarm Inquiry Test 8-611, 8-1750
#139 Red Alarm Inquiry Test 8-614
#140 Red Alarm Inquiry Test 8-613, 8-1753
#141 Yellow Alarm Inquiry Test 8-616, 8-1758
#142 Major Alarm Inquiry Test 8-619, 8-1763
#143 Minor Alarm Inquiry Test 8-621, 8-1766
#144 Slip Alarm Inquiry Test 8-624, 8-1576, 8-1769
#145 Misframe Alarm Inquiry Test 8-626, 8-1772
#146 Translation Update Test 8-629, 8-1068, 8-1076, 8-1775
#148 TDM Bus Clock Circuit Status Inquiry Test 8-1612
tests and audits, (continued)
#149 TDM Bus Clock Slip Inquiry Test 8-1614
#150 TDM Bus Clock PPM Inquiry Test 8-1615
#151 TDM Bus Clock Parameter Update Test 8-1616
#16 DIG-LINE Station Lamp Updates Test 8-557, 8-734, 8-1351
#161 Loop Around Test 8-993, 8-1565
#163 Speech Synthesis DTMF Receiver 8-1369
#164 Speech Synthesis DTMF Receiver Inquiry Test 8-1370
#165 Speech Synthesis DSP Tone Test 8-1371
#166 Speech Synthesis Memory Test 8-1372
#167 Speech Synthesis SSD Inquiry Test 8-1373
#168 Speech Synthesis PSS Handshake Test 8-1374
#169 Speech Synthesis Parameter Update Test 8-1375
#17 Data Module Audits Test 8-1207
#17 Station (Digital) Audits Test 8-559, 8-1353
#171 Digital Loop Around Test 8-495
#175 Data Module Internal Loop Around Test 8-1210
#205 Channel Administration Memory Array (CAMA) Test 8-138
#206 Playback Speech Memory Array (PSMA) Test 8-140
#208 Angel-Speech Processor (SP) Handshake Test 8-128
#209 Announcement Checksum Test 8-129
#210 140AY Loop Around Test 8-132
#211 Super Frame Match Inquiry 8-134
#213 Link Tear Down Test 8-1276, 8-1281, 8-1329, 8-1542
#215 Link Retry Test 8-1277, 8-1282, 8-1330, 8-1543
#220 Neon Test 8-1885
#228 Management Terminal Channel Local Loop-Around Test 8-1031
#229 Serial Channel Local Loop Around Test 8-1032
#237 Expansion Interface Neighbor Query Test 8-787, 8-836
#238 Expansion Interface Fiber Out-of-Frame Query Test 8-789, 8-837
#240 Expansion Interface Local Looparound 8-260, 8-790
#241 Expansion Interface 2-way Transmission Test 8-794
#242 Expansion Interface Lightwave Transceiver Loopa-round 8-800, 8-945, 8-948, 8-1085, 8-1087
#252 Circuit Pack Restart Test 8-419, 8-420
#255 Signaling Link State Check Test 8-175, 8-1002
#256 Service State Audit Test 8-176, 8-1003, 8-1225, 8-1226, 8-1227
#257 Call State Audit Test 8-178, 8-1005, 8-1228
#258 ISDN Test Call 8-179, 8-1007
#270 Clear Error Counters 8-166, 8-1564
#294 Idle Time Slot Test on TDM Bus A or TDM Bus B 8-1601
#296 Control Channel Test 8-1602
#297 Digit Detection Test 8-1603

tests and audits, (continued)
#3 CO Demand Diagnostic Test 8-463
#303 PN Maintenance Circuit Pack Sanity Maze Test 8-1034, 8-1037
#306 PN Maintenance Circuit Pack Reset Test 8-1035
#312 DS1 OPS Switchhook Inquiry Test 8-1194
#314 DS1 CO Dial Tone Seizure Test 8-449, 8-571
#316 Expansion Interface Control Channel Test 8-804
#33 Loop Around and Conference Circuit Test 8-468, 8-522, 8-1646
#33 Loop Around and ConferenceCircuit Test 8-581
#336 Expansion Interface Reset Test 8-806
#337 PN Maintenance Circuit Pack Serial Link Test 8-1038
#35 Battery Feed Test 8-43
#35 Battery Feed Test Results 8-87
#35 Port Diagnostic Test 8-526, 8-1096
#36 Audit and Update Test 8-1001, 8-1192, 8-1632, 8-1871
#36 Audit Update Test 8-317, 8-494, 8-1649
#36 Port Audit and Update Test 8-447, 8-513, 8-570
#36 Port Audit Update Test 8-471, 8-528, 8-582
#36 Station Status and Translation Audits and Updates 8-56, 8-73, 8-1338
#36 Station Status and Translation Audits and Updates Test 8-45, 8-90
#40 Tone Generator Transmission Test 8-1687
#41 Tone Generator Update/Audit Test 8-1689
#417 Test Synchronization Test 8-270
#42 Tone Detection Verification Test 8-431, 8-487, 8-488, 8-721, 8-759, 8-885, 8-1704, 8-1705, 8-1706
#43 Tone Detector Audit/Update Test 8-433, 8-722, 8-760, 8-887
#46 Clock Health Inquiry Test 8-1680, 8-1681
#47 Loop Around and Conference Test 8-94
#48 Station Present Test 8-58, 8-75, 8-98, 8-1339
#5 Battery & Battery Charger Query Test 8-1306, 8-1313
#50 NPE Audit Test 8-1880
#50 NPE Connection Audit Test 8-597, 8-1062, 8-1733
#51 Ringing Application Circuit Test 8-1881
#52 Control Channel Loop Around Test 8-598, 8-1063, 8-1074, 8-1734, 8-1883
#52 Control Channel Loop-Around Test 8-419
#53 SAKI Sanity Test 8-599, 8-938, 8-1064, 8-1075, 8-1078, 8-1080, 8-1735, 8-1884
#56 Hybrid Electronic Power Feed Test 8-910
#56 MFAT Electronic Power Feed Test 8-1098
#565 Digital Port Sanity Test 8-1171
#567 Consistency Test 8-1179
#57 Hybrid Circuit and Conference Circuit Test 8-912, 8-1100
#572 Maintenance/Test Circuit Pack Query Test 8-1235
#573 Packet Circuit Pack Audit Test 8-1237
#574 Board Type Check Test 8-1617
#58 Hybrid Line Local Digital Loop Around Test 8-915

tests and audits, (continued)
#589 Expansion Interface Packet Interface Test 8-811
#59 Hybrid Line Remote Digital Loop Around Test 8-917
#595 LANBIC Receive Parity Error Counter Test 8-328, 8-421, 8-1556
#596 Receive FIFO Overflow Error Counter Test 8-422
#597 Invalid LAPD Frame Error Counter Test 8-423
#598 Packet Interface Test 8-424
#599 Packet Gateway Switched Port Loop-Around Test 8-1318
#6 NPE Crosstalk Test 8-36, 8-84, 8-313, 8-440, 8-466, 8-491, 8-507, 8-520, 8-566, 8-579, 8-908, 8-998, 8-1093, 8-1185, 8-1222, 8-1626, 8-1644, 8-1868
#60 Hybrid Line Lamp Updates Test 8-919
#60 MET Line Station Lamp Updates Test 8-1104
#600 Congestion Query Test 8-425
#601Link Status Test 8-427, 8-1324
#604 TSC Heartbeat Inquiry Test 8-1694
#61 Hybrid Line Audits Test 8-921
#61 MET Line Station Audits Test 8-1106
#610 Packet Gateway Port Local Loop-Around Test 8-748, 8-749, 8-1320
#613 Level 1 State Inquiry Test 8-751, 8-753, 8-892, 8-896, 8-1323
#617 NPE Crosstalk Test 8-338
#618 BRI Port Local LAN Loop Around 8-159, 8-1567
#619 BRI Port Local TDM Loop Around 8-1568
#62 Hybrid Line Ringer Update Test 8-923
#620 Electronic Power Feed Restoral 8-345
#621 Level 1 Status Inquiry 8-161, 8-1572
#624 Layer 1 Transmission Error Counter Test 8-163, 8-164, 8-165
#625 Receive FIFO Overflow Error Counter Test 8-1570, 8-1571
#626 Signaling Link Status Test 8-154
#629 BRI Layer 3 Query 8-376, 8-1574
#630 BRI Set Audits 8-379
#637 Remote Layer 3 Query 8-262, 8-893, 8-938, 8-984, 8-1077
#639 Secondary Signaling Link Hardware Check 8-986
#643 Signaling Link Board Check 8-968, 8-973
#651 Standby Reference Health Check Test 8-1618
#7 Conference Circuit Test 8-51, 8-68, 8-443, 8-493, 8-510, 8-568, 8-1000, 8-1188, 8-1224, 8-1368, 8-1629, 8-1870
#73 Tie Seizure Test 8-1650
#747 Tie Trunk Dial Test 8-1650
#755 SNI Circuit Path Test 8-1443
#756 SNI Off-Board Destructive Facility Test 8-839, 8-1454
#757 SNI Destructive Facility Test 8-842, 8-1456
#759 Configuration Audit 8-844, 8-1460
#760 Processor Route Audit Test 8-1382, 8-1411
#767 Packet Neighbor Link Test 8-1472
#768 Fiber Link Reset Test 8-860
#777 Failure Audit 8-861, 8-1413, 8-1483
#778 SNC On-Board Test 8-1415

tests and audits, (continued)
#779 TPN Test 8-1417
#78 Power Query Test 8-7, 8-11
#780 Switch Node Clock Reset Test 8-1419
#787 Reset Board 8-706
#788 Far-end DS1 Converter Board Loopback Test 8-708
#789 Far-end FOT (Lightwave Transceiver) Loopback Test 8-710
#79 Single Carrier Cabinet Power Query Test 8-501
#790 DS1 Facilities Connectivity Loopback Test 8-713
#795 Board Options Audit 8-716
#797 Far-End Internal Loopback Test 8-677
#798 DS1 Interface Options Audit 8-679
#799 Near-end External Loopback Test 8-681
#844-848 Transmission Test 8-472, 8-1654
#884 Memory Checksum Test 8-1256
#885 Private Loop Around Tests 8-1258
#886 Maintenance Loop Around Test 8-1260
#887 Read and Clear Board Counters 8-1263
#9 Digital Line NPE Crosstalk Test 8-551, 8-729
#9 NPE Cross Talk Test 8-1150, 8-1165
#9 NPE Crosstalk Test 8-19, 8-29, 8-1203
#90 Tone Generator Crosstalk Test 8-1690
#939 Signaling Port LAN Loopback 8-969, 8-975
#949 Failure Audit 8-682, 8-717
#955 PN Cold Restart 8-825
#956 PN Warm Restart 8-826
#96 Modem Pool NPE Crosstalk Test 8-1138
#97 Modem Pool Conference Test 8-1140
#976 Session Status Query Test 8-894, 8-900, 8-902, 8-1077, 8-1321
#98 Modem Pool Conversion Resource Loop Around Test 8-1143
#985 System Link Status 8-1538
#989 SNI Fiber Out of Frame Query 8-863, 8-1486
114 Diagnostic Test—Auxiliary Trunk Test 8-318
761 Switch Node Interface Reset Test 8-1470
tie trunk circuit pack (TIE-BD) 8-1620
time slots, TDM bus 5-18
time-division multiplex (TDM) 8-1588
Timing Priority Number (TPN) link 8-1384
TN1655 circuit packs 8-798, 8-808
TN2182 circuit packs
description 8-755
enhanced tone receiver (ETR) ports 8-756
interchanges 8-1663
international settings 8-1665
replacing 8-1666
time division multiplex (TDM) bus clocks 8-1604
tone-clock 8-1014, 8-1180, 8-1659
TN2242 8-1708
TN2501AP (integrated announcements)
faceplate LEDs, interpretation 8-1835
TN264 circuit packs 8-1183
TN2793B 8-101
TN464 circuit packs
DS1 interface 8-586, 8-929, 8-1039, 8-1069, 8-1707
option jumpers 8-1718
trunks 8-1716
TN464C 8-586
TN570 circuit packs 8-763
TN572 circuit packs 4-8
TN573 circuit packs 4-8
LEDs 6-14
switch node interface (SNI) 6-14
TN722 circuit packs 8-586
TN750 circuit packs 4-8
TN767 circuit packs 8-586, 8-1183
TN768 circuit packs
description 8-1014, 8-1180, 8-1659
interchanges 8-1663
international settings 8-1665
replacing 8-1666
time division multiplex (TDM) bus clocks 8-1604
tone generator 8-1682
TN775 circuit packs
port networks (PNs) 8-773
TN775C 8-772, 8-773
TN780 circuit packs
interchanges 8-1663
international settings 8-1665
replacing 8-1666
time division multiplex (TDM) bus clocks 8-1604
tone generator 8-1682
TN793B 8-101
TN797 8-101, 8-1691
TN799 8-411
TN799 (C-LAN)
in Voice Announcements over LAN (VAL) application 8-1833
TN799B 7-463
TN802B 7-463, 8-929, 8-1069, 8-1081
tone clocks, circuit packs 8-774
tone detectors, enhanced tone receiver ports 8-755
tone generators 8-1014, 8-1180, 8-1659, 8-1682
tone-clock circuit packs
interchanges 8-1663
international settings 8-1665
LEDs 6-14
replacing 8-1666
time division multiplex (TDM) bus clocks 8-1604
TN2182 8-1014, 8-1180, 8-1659
tone generators 8-1682
tones, Italian 8-1665
traceroute 7-463
Transfer on Ringing 1-17
transmission
characteristics 1-18 to 1-22
errors 1-10
stream 1-10

TR-LN-BD 8-485, 8-1269, 8-1332, 8-1691, 8-1703
troubleshooting
duplicated switch processing element (SPE) 4-10
ISDN-BRI/ASAI problems 4-73
ISDN-PRI endpoints (wideband) 4-71
ISDN-PRI problems 4-69
ISDN-PRI test call problems 4-77
outgoing ISDN-testcall command 4-80
packet bus 4-100, 4-105
VAL 8-1837
trunk data module (TDMODULE) 8-1619
trunk speed 1-16
Trunk Test Call 5-15
trunking facilities 1-15
trunks, DS1 8-929, 8-1039, 8-1069, 8-1707
TTC privante networking (Japan) 8-1708
TTT. See Terminating Trunk Transmission

U

UDS1 Interface Circuit Pack 8-1707
uninterruptible power supply (UPS) 1-8
uninterruptible power supply, see also UPS
universal DS1 (UDS1) interface circuit packs 8-586, 8-929, 8-1039, 8-1069, 8-1707, 8-1718
UPS 8-398, 8-1810
alarms 8-1810
LEDs 6-19
SNMP traps 8-1810
USB1 8-1703
handshake test 8-1704
offhook test 8-1705
resetting the modem 8-1706

V

V.35 1-12
Voice Announcements over LAN (VAL)
backplane adapter—comcode 8-1833
backplane adapter—installing 8-1836
equipment configuration 8-1833
maintenance objects 8-1817
troubleshooting commands 8-1837
voice-grade
data 1-13

W

warm restarts, reset level 1 3-9
warning alarms 6-2
wideband access endpoints 8-1866
wiring
premises 1-23
terminal equipment ports 1-23