DEFINITY®
Enterprise Communications Server

Release 10

Reports

555-233-505
Issue 3
December 2001

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. For additional support telephone numbers, see the Avaya web site:
http://www.avaya.com
Click on Support, click on Escalation Lists US and International. This web site includes phone numbers for escalation within the United States. For escalation phone numbers outside the United States, click on Global Escalation List.

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).

Your Responsibility for Your Company's Telecommunications Security

The final responsibility for securing both this system and its networked equipment rests with you - an Avaya customer's 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.

How to get help

For support phone numbers, see the Avaya web site:
http://www.avaya.com
Click on Support, click on Escalation Lists US and International. This web site includes phone numbers for escalation within the United States. For escalation phone numbers outside the United States, click on Global Escalation List.

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 DEFINITY® System 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.

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 DEFINITY® 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 DEFINITY® systems 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.

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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.

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Contents

About This Document

This document provides a description of the performance reports that are available with the DEFINITY Enterprise Communications Server (ECS).

Purpose of Traffic Reports

The traffic measurements and their associated reports are designed to monitor and collect traffic data (also called usage data) for trunk groups, hunt groups, the attendant group, and so on. The system accumulates and stores the traffic data. You can display and/or print traffic data as an organized report by issuing the appropriate command from the management terminal.

Use the system reports and the supporting information in this document to:

- monitor and evaluate system performance
- monitor security violations data, which identifies illegal attempts to access the system
- observe usage trends and recommend possible corrective actions
- determine the source of performance degradations (for example, processor overload)
- determine possible trunk problems (for example, blocking level too high)
- recommend system updates and upgrades

Who Should Read This Document

This document is intended for:

- system administrators
- communications system managers
- technicians who resolve certain usage-related customer complaints
- technicians who plan system expansions and upgrades
- personnel involved in traffic engineering

NOTE:
You do not need a thorough knowledge of traffic theory to use the information in this document. However, such knowledge is helpful if you want to perform in-depth analysis of the traffic data presented in the various reports.

How This Document Is Organized

This document contains the following sections:

- Chapter 1, ''How to Enter Commands, and Display and Print Reports'' lists each traffic command, describes the different types of commands, and describes how to enter a command to display and/or print a report.
- Chapter 2, ''System Printer and Report-Scheduler'' describes the Report Scheduler software and how to schedule and print reports on the system printer.
- Chapter 3, ''Traffic Data Analysis'' provides detailed descriptions of the traffic measurement reports, excluding processor occupancy and security violations reports.
- Chapter 4, ''Processor Occupancy Reports'' describes the purpose of these reports, when to use each report, and how to interpret each report's data. It also lists "Suggested Actions" that may be taken if a particular field shows data that indicates an abnormal condition.
- Chapter 5, ''Security Violations Reports'' describes the reports that contain data on possible security violations.
- Chapter 6, ''History Reports'' describes the History report that lists the administration and maintenance changes, and the Access Security Gateway Session History report of all session establishment and rejection events.

- Appendix A, ‘‘Blank Worksheets’’.
  - — Attendant Group Data Worksheet — used for historical purposes to record the Attendant Group daily measurements for the selected days.
  - — Routing Pattern Data Worksheet — used for historical purposes to record the Routing Pattern daily measurements for the selected pattern number and days.
  - — Hunt Group Data Worksheet — used for historical purposes to record the Hunt Group daily measurements for the selected hunt group and days.
  - — Trunk Group Data Worksheet — used for historical purposes to record the Trunk Group daily measurements for the selected trunk group and days.
  - — Wideband Trunk Group Worksheet — used for historical purposes to record the Wideband Trunk Group daily measurements for the selected trunk groups and days.
  - — Processor Occupancy Data Worksheets — used for historical purposes to record the Processor Occupancy daily measurements for the selected days.
  - — General Traffic, ACD, and CallVisor. ASAI/OCM Applications — used to calculate the BHCC for complex traffic applications.
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Conventions Used in This Document

This manual uses the following conventions:

- Anything that you type at the command prompt appears in the following typeface:

  list measurements blockage pn

- Any required fields for commands appear enclosed by <>, for example:

  list measurements blockage pn <yesterday-peak/today-peak/last-hour>

- Any optional fields appear enclosed by [], for example:

  list measurements blockage pn <yesterday-peak/today-peak/last-hour> [print/schedule]

- Keyboard keys are shown as follows: RETURN

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How to Enter Commands, and Display and Print Reports

1

Commands and the Command Line Format

The DEFINITY Enterprise Communications Server (ECS) management terminal is the primary device for issuing commands to the system. Following a successful login procedure, the screen displays the prompt:

```
Command:
```

If you know it, enter the complete command. You can also use HELP to obtain the list of permissible commands.

The command line consists of three parts:

- the **ACTION** to be taken
- the **OBJECT** for the specified action
- the **QUALIFIER** for the specified object

Table 1-1 on page 1-2 lists all of the commands associated with traffic measurements.

NOTE:
Not all commands and reports are available with every switch model or software version. To see which commands you can use with your switch, type the list, monitor or display command, then press HELP.

Table 1-1. Traffic Measurement Commands

COMMANDS		
Action	**Object**	**Qualifier**
change	meas-selection coverage	
change	meas-selection principal	
change	meas-selection route-pattern	
change	meas-selection trunk-group	
change	meas-selection wideband-trunk-group	
change	report-scheduler	<report number>
clear	measurements ds1	<CabCarSSF> [options]
clear	measurements ds1-facility	<CabCarSSF> [options] [print or schedule]
clear	measurements occupancy	busiest-intervals
clear	measurements security-violations	
display	communications-interface links	[print or schedule]
display	meas-selection coverage	[print or schedule]
display	meas-selection principal	[print or schedule]
display	meas-selection route-pattern	[print or schedule]
display	meas-selection trunk-group	[print or schedule]
display	meas-selection wideband-trunk-group	[print or schedule]
list	aca-parameters	[options] [print or schedule]
list	asg-history	[print or schedule]
list	emergency	[print or schedule]
list	hunt group	[option] [print or schedule]
list	logins	[print or schedule]
list	measurements aca	[print or schedule]
list	measurements attendant group	[print or schedule]
list	measurements attendant positions	[print or schedule]
list	measurements blockage pn	<required field> [print or schedule]
list	measurements blockage sn	[option] [print or schedule]
list	measurements call-rate	<required field> [print or schedule]
list	measurements call-summary	[print or schedule]
list	measurements cbc-trunk-group	<ISDN CBC tgn> last-hour [print or schedule]
list	measurements cell-traffic cell-addr	<CabCarSSF> [options] [print or schedule]
list	measurements cell-traffic summary	[option] [print or schedule]
list	measurements clan ethernet	<CabCarSSF> [print or schedule]
list	measurements clan ppp	<CabCarSSF> [print or schedule]

Continued on next page

Table 1-1. Traffic Measurement Commands — *Continued*

COMMANDS		
Action	**Object**	**Qualifier**
list	measurements clan sockets hourly	<CabCarSSF> [print or schedule]
list	measurements clan sockets summary	[options] [print or schedule]
list	measurements clan sockets detail	<CabCarSSF> [options] [print or schedule]
list	measurements communications-links	<xx-yy> [print or schedule]
list	measurements coverage-path	<required field> [options] [print or schedule]
list	measurements ds1 summary	<CabCarSSF> [options] [print or schedule]
list	measurements ds1 log	<CabCarSSF> [options] [print or schedule]
list	measurements ds1-facility summary	<CabCarSSF> [options] [print or schedule]
list	measurements ds1-facility log	<CabCarSSF> [options] [print or schedule]
list	measurements expansion-services-mod hourly	[print or schedule]
list	measurements expansion-services-mod summary	[options] [print or schedule]
list	measurements hunt-group	<required field> [print or schedule]
list	measurements ip codec hourly	[options] [print or schedule]
list	measurements ip codec summary	<required field> [print or schedule]
list	measurements ip codec detail	<required field> [options] [print or schedule]
list	measurements ip dsp-resource hourly	<required field> [print or schedule]
list	measurements ip dsp-resource summary	[options] [print or schedule]
list	measurements ip dsp-resource detail	<required field> [options] [print or schedule]
list	measurements ip signaling group	[options] [print or schedule]
list	measurements lar-route-pattern	<required fields> [option] [print or schedule]
list	measurements lightly-used-trunk	<required field> [print or schedule]
list	measurements load-balance incoming	<required field> [print or schedule]
list	measurements load-balance intercom	<required field> [print or schedule]
list	measurements load-balance outgoing	<required field> [print or schedule]
list	measurements load-balance tandem	<required field> [print or schedule]
list	measurements load-balance total	<required field> [print or schedule]
list	measurements modem-pool	<required field> [print or schedule]
list	measurements multimedia-interface hourly	[print or schedule]
list	measurements multimedia-interface summary	[options] [print or schedule]
list	measurements occupancy busiest-intervals	[print or schedule]
list	measurements occupancy last-hour	[print or schedule]
list	measurements occupancy pktint	[print or schedule]
list	measurements occupancy summary	[print or schedule]

Continued on next page

Table 1-1. Traffic Measurement Commands — *Continued*

COMMANDS		
Action	**Object**	**Qualifier**
list	measurements outage-trunk	<required field> [print or schedule]
list	measurements principal	<required field>[options] [print or schedule]
list	measurements route-pattern	<pat_no><required field>[print or schedule]
list	measurements security-violations detail	[print or schedule]
list	measurements security-violations summary	[print or schedule]
list	measurements summary	[print or schedule]
list	measurements tone-receiver detail	<required field>[print or schedule]
list	measurements tone-receiver summary	<required field>[print or schedule]
list	measurements trunk-group hourly	<tgn> [print or schedule]
list	measurements trunk-group summary	<required field>[print or schedule]
list	measurements voice-conditioners hourly	[print or schedule]
list	measurements voice-conditioners summary	[options] [print or schedule]
list	measurements wideband-trunk-group hourly	<tgn>[print or schedule]
list	measurements wideband-trunk-group summary	<required field>[print or schedule]
list	performance attendant	<required field>[print or schedule]
list	performance hunt-group	<required field>[print or schedule]
list	performance summary	<required field>[print or schedule]
list	performance trunk-group	<required field>[print or schedule]
list	report-scheduler	[print or schedule]
monitor	security-violations	<required field>[print]
monitor	system	<conn>, <scr>, <view1>, <view2>
monitor	traffic hunt-groups	<hgn> starting group number
monitor	traffic trunk-groups	<tgn> starting group number
monitor	trunk	<tgn>[member #]
remove	report-scheduler	<report number>

Monitor Commands

Use the **monitor** command to display real-time status reports. When a status report is displayed on the management terminal, it is automatically updated every thirty seconds. Press CANCEL to abort the **monitor** command.

NOTE:
When canceling out of some monitor commands, the management terminal interface is automatically logged off. This is not administrable.

If the status report consists of more than one page, use NEXT PAGE to display any subsequent pages and PREV PAGE to display previous pages.

If you enter the **monitor** command incorrectly, or if the qualifier is not applicable or cannot be measured, a descriptive error message appears on the message line at the bottom of the screen. Usually the error messages provide enough detail to determine the problem. You may also press HELP when needed.

List Commands

Use the **list** command to obtain historical information for a list of all (or a selected range of) attendants, trunk groups, hunt groups, and so on.

Display Commands

Use the **display** command to identify the parameters associated with a specific object/qualifier (for example, the parameters being measured).

Change Commands

Use the **change** command to alter the group of parameters being measured.

Clear Commands

Use the **clear** command to remove the measurement data generated as a result of an alarm or a system irregularity.

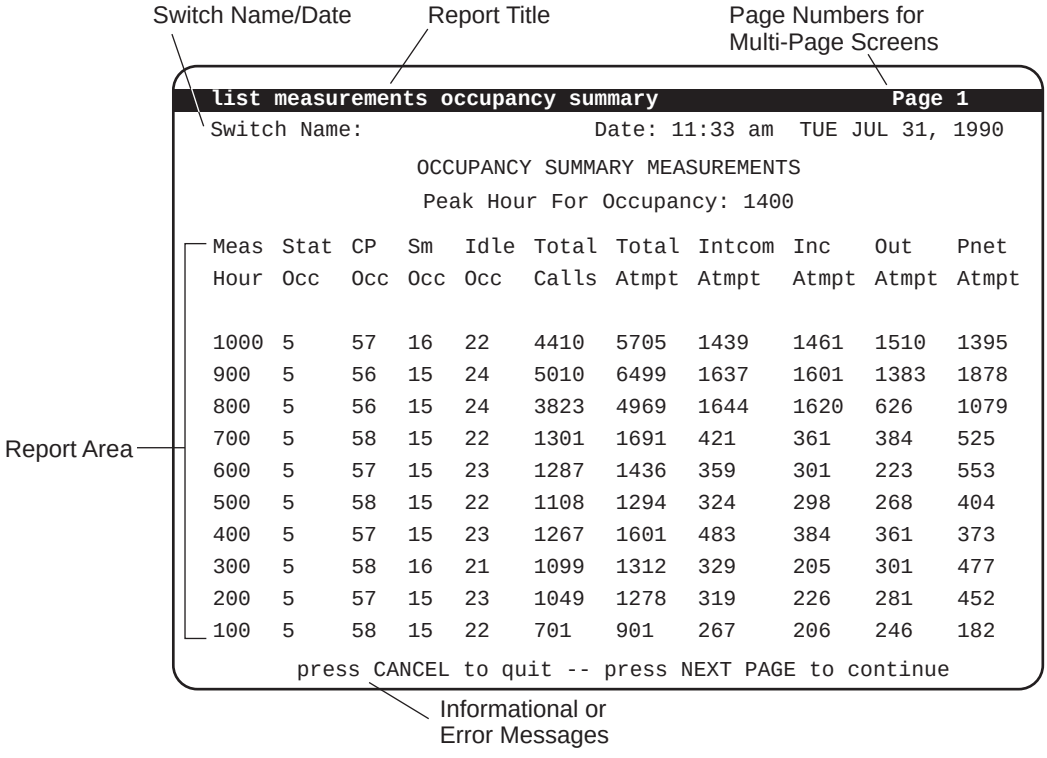
Displaying Reports

The commands, listed in Table 1-1 on page 1-2, and the resulting reports are described in detail in Chapters 2–6.

Each of the **monitor** and **list** commands, depicted in Table 1-1 on page 1-2, produces or displays a different report on the management terminal screen. If the command line qualifier **print** is selected, the report is immediately printed on the slave printer associated with the management terminal. When the command line qualifier **schedule** is initially executed, the system defaults the report for immediate printing (on the System Printer unless a day and time of day is scheduled) and generates a Job Id. The Job Id is required by the Report Scheduler feature for updating and deleting the schedule of reports. The Report Scheduler, which is described in Chapter 2, ‘‘System Printer and Report-Scheduler’’, is used to administer a time/day schedule for each desired report.

Screen Format

The on-screen format for reports is as shown in Figure 1-1.




```
list measurements occupancy summary                    Page 1
Switch Name:                    Date: 11:33 am  TUE JUL 31, 1990
                    OCCUPANCY SUMMARY MEASUREMENTS
                     Peak Hour For Occupancy: 1400

Meas  Stat  CP   Sm   Idle  Total  Total  Intcom  Inc    Out    Pnet
Hour  Occ   Occ  Occ  Occ   Calls  Atmpt  Atmpt   Atmpt  Atmpt  Atmpt

1000  5     57   16   22    4410   5705   1439    1461   1510   1395
900   5     56   15   24    5010   6499   1637    1601   1383   1878
800   5     56   15   24    3823   4969   1644    1620   626    1079
700   5     58   15   22    1301   1691   421     361    384    525
600   5     57   15   23    1287   1436   359     301    223    553
500   5     58   15   22    1108   1294   324     298    268    404
400   5     57   15   23    1267   1601   483     384    361    373
300   5     58   16   21    1099   1312   329     205    301    477
200   5     57   15   23    1049   1278   319     226    281    452
100   5     58   15   22    701    901    267     206    246    182

        press CANCEL to quit -- press NEXT PAGE to continue
```

Figure 1-1. Screen Format

Error messages appear highlighted above the command line, as shown in Figure 1-2.

```
]"x" an invalid identifier; please press HELP[
command:
```

Error Message

Figure 1-2. Error Message

Commands that you type appear as shown in Figure 1-3.

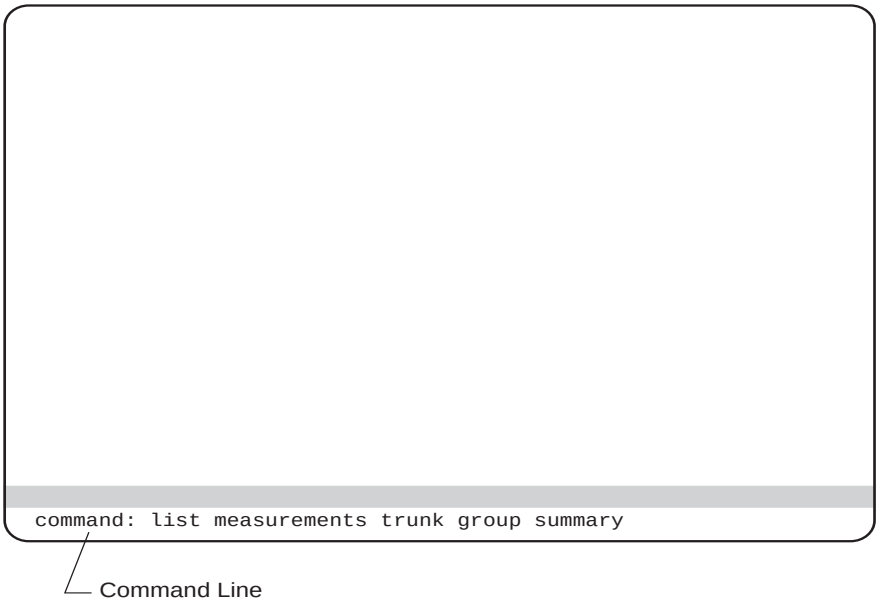


Figure 1-3. Command Line

System Printer and Report-Scheduler

2

System Printer

The system printer, rather than the “slave” printer attached directly to the management terminal, is used to schedule reports to be printed. However, when desired and on demand, you can use the system printer to print individual reports.

The Report Scheduler feature uses the system printer as its output device. The hardware parameters for the system printer must have been previously administered.

Use the Feature Related System Parameters screen to administer the hardware parameters of the system printer. To access this screen, use the **change system-parameters features** command. Screen 2-1 on page 2-2 shows this screen. Table 2-1 on page 2-2 describes the data fields for this screen.

```
change system-parameters features  (page 4)
                          FEATURE-RELATED SYSTEM PARAMETERS

SYSTEM PRINTER PARAMETERS
              System Printer Endpoint: ____                  Lines Per Page: 60
                  EIA Device Bit Rate: 9600

SYSTEM-WIDE PARAMETERS
                          Switch Name: _______________
         Emergency Numbers - Internal:          External: 911
      No-License Incoming Call Number:

MALICIOUS CALL TRACE PARAMETERS
               Apply MCT Warning Tone? n     MCT Voice Recorder Trunk Group: ___

SEND ALL CALLS OPTIONS
           Send All Calls Applies to: station
      Auto Inspect on Send All Calls? n

UNIVERSAL CALL ID
     Create Universal Call ID (UCID)? n                UCID Network Node ID: ___
```

Screen 2-1. Feature-Related System Parameters screen

NOTE:
The system printer must use either a TCP/IP or Electronic Industries Association (EIA) RS-232 asynchronous serial interface. Depending upon the type/model of serial printer you use, you may have to administer certain hardware option switch settings as part of the installation procedure.

Table 2-1. System Printer Hardware Administration

Field	Description
`System Printer Endpoint`	Enter the extension number if connected to a switched port, SYS_PRNT if the system printer is connected over a TCP/IP link and the link is defined as SYS_PRNT on the IP Services screen, or “eia” (see note below). **NOTE:** If your system is a G3si or G3csi, you may connect the printer to the EIA, unless the EIA is used for Call Detail Record (CDR) collection.
`Lines Per Page`	The number of lines on the computer form. The range is from 24 to 132. Generally, 60 will be the appropriate selection.
`EIA Device Bit Rate`	1200, 2400, 4800, 9600 (This field appears when the System Printer Extension field is set to **eia.**)

System Printer Data-Link Operation and Maintenance

Operation and maintenance of the system printer data link is significantly different from the CDR and journal printer data links. For example, the CDR and journal printer data links are maintained in a constant link up state, while the system printer data link is brought up once every 15 minutes, provided there are reports to be printed, or when an immediate report is scheduled.

The system printer data link has three states that identify its operational condition:

- link up
- link down
- maintenance busy-out

When the communication path (including software processes, hardware cabling, and printer) functions properly and data is exchanged successfully between them, the data link is defined as being in the link up state. The link down state refers to all times except when reports are printed and when maintenance personnel disable the link. The maintenance busy-out state is the result of executing the **busyout sp-link** command from the management terminal. While in the maintenance busy-out state, the switch software processes and link retry operations are disabled.

It is assumed all customers monitor the operating status of the system printer and, as necessary, refill the paper bin, relieve any paper jams, verify the printer is receiving power, and so on.

NOTE:
The Basic Call Management System (BCMS) login cannot execute the **busyout sp-link** command. This is normally only performed via the maintenance login. Therefore, as necessary, all non-maintenance personnel should simply flip the printer power switch to the OFF position to refill the paper bin and remove jammed paper. Subsequently, the system-printer can be restored on-line by turning the power switch ON.

If the system printer link generates either a warning alarm or a minor alarm, the problem should be referred to the proper maintenance personnel.

Report Scheduler

The Report Scheduler can be used with many switch features. Specifically, virtually all **list**, **display**, or **test** commands can be executed with the **schedule** qualifier. Therefore, the system administrator login, maintenance login, and other logins can schedule reports.

When a command containing the **schedule** option is executed, it generates a Job Id. A maximum of 50 different Job Ids (50 different reports) can be scheduled for printing. The Report Scheduler feature is used to specify the actual day(s) and time of day each report is printed. For a list of measurement commands that can be scheduled, refer to Table 1-1 on page 1-2.

Print Intervals

For purposes of printing reports, three print intervals are available:

- **Immediate** — The report prints immediately.
- **Scheduled** — The report prints each week for the time and days specified. The date, time, and day(s) parameters for the report are set administratively. To change them, re-administration is required.
- **Deferred** — The report generates once for the time and day specified

Adding a Report to the Report Scheduler

To add a report to the Report Scheduler, enter a **list**, **test**, or **display** command followed by the **schedule** option. When a report is initially scheduled, the print interval of **immediate** is automatically assigned as the default. Therefore, if **immediate** is not desired, change the print interval to **deferred** or **scheduled** and add a day and print time to the Report Scheduler. Screen 2-2 shows this screen with sample data. Table 2-2 describes the data fields for this screen.

```
list measurements attendant-group                                    Page 1
                                  REPORT SCHEDULER
     Job Id: 1                         Job Status: none
     Command: list measurements attendant-group
     Print Interval: immediate
```

Screen 2-2. Report Scheduler screen — Immediate Print Interval

Table 2-2. Report Scheduler Field Descriptions

Field	Description
`Job Id`	This is a display-only field. When a command is executed with the qualifier **schedule**, the system generates a unique Job Id number. The Job Id assigned by the system is the lowest number from 1 to 50 not already in use.
`Job Status`	This is a display-only field. It identifies the print status of the report. Since the job is not yet on the report scheduler, our example shows “none.”
`Command`	This is a display-only field. It displays the ACTION, OBJECT, and QUALIFIER entered when the report was scheduled.
`Print Interval`	This field has three options: **immediate**, **deferred**, and **scheduled**. The default is **immediate**. When the Print Interval field is changed from **immediate** to **deferred** or **scheduled**, the screen changes to the format depicted in Screen 2-3 and the administrator is prompted to enter values for the Print Time and the days of the week fields. **NOTE:** Use **deferred** when you want to schedule a report for a single printing. Thereafter, the Job Id is automatically removed from the Report Scheduler. Those reports administered as scheduled print on a week-after-week basis.
`Print Time`	Within a given hour, reports can be scheduled at 15-minute intervals (that is, xx:00, xx:15, xx:30, or xx:45). The system printer requires significant switch processor resources, so it is important that reports be scheduled for off-peak hours. Do not schedule all reports for the same hour and time interval, but stagger them across multiple off-peak time intervals. If, because of printing volume or other problems, a report is not printed within 4 hours of its scheduled time interval, it is not printed until its next scheduled time interval. This is a 4-hour (non-administrable) limit. Immediate and deferred jobs are removed from the report scheduler under this scenario and require reentry to print.
`Days of Week`	Enter ***y*** (yes) for each day of the week the report is to be printed. Enter ***n*** (no) for those days when the report should not be printed. Selecting an ***n*** for all seven days of the week effectively disables a report from being printed.

```
list measurements attendant groups                                  Page 1
                                  REPORT SCHEDULER
     Job Id: 1                         Job Status: none
     Command: list report scheduler
     Print Interval: scheduled
     Print Time: xx:xx
          Sun: n   Mon: n   Tue: n   Wed: n   Thu: n   Fri: n   Sat: n
```

Screen 2-3. Report Scheduler screen — Scheduled Print Interval

Other commands, such as those described in Chapter 3, ‘‘Traffic Data Analysis’’, are added to the Report Scheduler in a similar manner. Add the **schedule** qualifier to the command (for example, **list aca-parameters schedule**). When the first screen appears, change the Print Interval field from **immediate** to **scheduled** and subsequently administer the Print Time and the days of the week fields.

Steps for Printing Reports on the System-Printer

1. Execute a command with the **schedule** qualifier.

   The Report Scheduler screen appears (for example, Screen 2-2 on page 2-4 with the appropriate command). It indicates the print interval is immediate.

2. Choose one of these options:

   - press ENTER to print the report immediately on the system printer

     or

   - type scheduled or deferred in the Print Interval field and press ENTER

   When you change the print interval to **scheduled** or **deferred**, the Print Time and the days of the week fields appear (for example, Screen 2-3 on page 2-6).

3. Type in the desired Print Time and press ENTER.

   The cursor is now on the days of the week field.

4. Type ***y*** for the days that you want to print the report.

5. Press ENTER to execute the command.

Listing Scheduled Reports

The list report scheduler command lists all the reports in the Report Scheduler. The order of the list is according to scheduled print time. Reports are printed according to this list (for example, first report on the list is the first report printed).

Instructions

To display a list of all reports on the Report Scheduler:

1. Type **list report-scheduler [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available.

Screen 2-4 shows the screen for the **list report-scheduler** command. Table 2-3 on page 2-8 describes the data fields for this screen.

```
list report-scheduler                                                Page 1 of x
                                   Report Scheduler
     Job Id     Days (smtwtfs)         Time      User      Status     Type
          Command
     4              nynnnnn             18:45      bcms      printing   immediate
          list measurements attendant-group
     2              nynynyn             19:00      bcms      waiting    scheduled
          list measurements call-rate
     7              nnnnnyn             19:15      bcms      waiting    deferred
          list bcms agent 5000
     23             nnynnnn             19:15      bcms      waiting    scheduled
          list bcms agent 4000 day 09/11     09/15
```

Screen 2-4. List Report Scheduler screen

NOTE:
In instances such as for Job Id 4, if an immediate report is scheduled, the Days field is completed with one ***y*** for the current day and ***n*** for all others.

All fields are display-only. Use **change report-scheduler** if you want to change the schedule of reports.

Table 2-3. Report Scheduler Screen

Field	Description
`Job Id`	When a command is executed with the **schedule** qualifier, the system responds by generating a unique Job Id number. The Job Id assigned by the system is the lowest number from 1 to 50 not already in use.
`Days (smtwtfs)`	On a per-day basis, an n indicates the report is not printed that day; a y indicates the report is printed that day. Selecting an n for all seven days of the week effectively disables a report from printing.
`Time`	The time interval the report is scheduled to print.
`User`	The user login that scheduled the identified report.
`Status`	This is a display-only field. It identifies the print status of the report. The four possible states are: ■ Waiting — Indicates the report is not scheduled for any activity during the current 15-minute time interval. ■ Print-Next — Indicates the report is scheduled to print within the current 15-minute time interval. ■ Printing — Indicates the report is currently printing. ■ Printed — Indicates the report has successfully printed during the current 15-minute time interval.
`Type`	The type of print interval scheduled for the report.
`Command`	This is a display-only field. It displays the ACTION, OBJECT, and QUALIFIER entered when the report was scheduled.

Change Report Scheduler

Use **change report-scheduler** to change the schedule of a report. To display this screen, use **change report-scheduler xx**, where xx corresponds to the Job Id. Screen 2-5 shows the Change Report Scheduler screen. Table 2-4 describes the data fields for this screen.

```
change report-scheduler 23                                          Page 1
                                Report Scheduler
     Job Id: 23                       Job Status: printed
     Command: list bcms agent 4000 time start 08:00 stop 12:00
     Print Interval: scheduled
     Print Time: 19:15
      Sun: n    Mon: y    Tue: n    Wed: y    Thu: n    Fri: y    Sat: n
```

Screen 2-5. Change Report Scheduler

Table 2-4. Change Report Scheduler Screen

Field	Description
`Job Id`	This is a display-only field. It is the unique identifier for the report. The Job Id assigned by the system is the lowest number from 1 to 50, not already in use.
`Job Status`	This is a display-only field. It identifies the print status of the report. The four possible states are: ■ Waiting — Indicates the report is not scheduled for any activity during the current 15-minute time interval. ■ Print-Next — Indicates the report is scheduled to print within the current 15-minute time interval. ■ Printing — Indicates the report is currently printing. ■ Printed — Indicates the report has successfully printed during the current 15-minute time interval. **NOTE:** The Print Time and the days of the week fields may be changed and effect a change of the Job Status.
`Command`	This is a display-only field. It displays the ACTION, OBJECT, and QUALIFIER entered when the report was scheduled.

Continued on next page

Table 2-4. Change Report Scheduler Screen — *Continued*

Field	Description
`Print Interval`	The three possible options are immediate, scheduled, and deferred. If the print time of a report is changed so its scheduled time now falls inside the current 15-minute time interval (that is, the Job Status field changes from waiting to print-next), the report is not printed in the current interval. The report is printed during the next scheduled time interval. As a contrast, if a report scheduled for a time interval (other than the current 15-minute time interval) has its print interval changed from scheduled to immediate, the report is printed immediately.
`Print Time`	Within a given hour, reports can be scheduled at 15-minute intervals (that is xx:00, xx:15, xx:30, xx:45). This field may be changed as desired. The system printer requires significant switch processor resources; therefore, it is important that the reports be scheduled for off-peak hours. Do not schedule all reports for the same hour and time interval, but stagger them across multiple off-peak time intervals. If, because of printing volume or other problems, a report is not printed within 4 hours of its scheduled time interval, it is not printed until its next scheduled time interval. This is a 4-hour shows limit.
`Days of Week`	On a per-day basis, an n indicates the report is not to be printed that day; a y indicates the report is to be printed that day. This field can be changed as desired. Selecting an n for all seven days of the week effectively disables a scheduled printing of a report.

Remove Report Scheduler

The **remove report-scheduler** command is used to remove a report from the Report Scheduler. Enter **remove report-scheduler *xx***, where xx corresponds to the Job Id. Screen 2-6 on page 2-10 shows this screen. Table 2-5 on page 2-11 describes the data fields for the screen.

```
remove report-scheduler 23                                          Page 1
                                Report Scheduler
     Job Id: 23                      Job Status: printed
     Command: list bcms agent 7000 time start 08:00 stop 12:00
     Print Interval: scheduled
     Print Time: 19:15
     Sun: n    Mon: y    Tue: n    Wed: y    Thu: n    Fri: y    Sat: n
```

Screen 2-6. Remove Report Scheduler

NOTE:
All fields are display-only. Once the user verifies the identified report is the one to be removed, press RETURN. Following this action, the system waits for the next command.

Table 2-5. Remove Report Scheduler Command Screen

Field	Description
`Job Id`	The unique identifier for the report. The Job Id assigned by the system is the lowest number from 1 to 50 not already in use.
`Job Status`	This is a display-only field. It identifies the print status of the report. The four possible states are: ■ Waiting — Indicates the report is not scheduled for any activity during the current 15-minute time interval. ■ Print-Next — Indicates the report is scheduled to print within the current 15-minute time interval. ■ Printing — Indicates the report is currently printing. ■ Printed — Indicates the report has successfully printed during the current 15-minute time interval.
`Command`	This is a display-only field. It displays the ACTION, OBJECT, and QUALIFIER entered when the report was scheduled.
`Print Interval`	The three possible options are immediate, scheduled, and deferred.
`Print Time`	Within a given hour, reports can be scheduled at 15-minute intervals (for example, xx:00, xx:15, xx:30, xx:45).
`Days of Week`	On a per-day basis, an n indicates the report is not to be printed that day; a y indicates the report is to be printed that day. Selecting an n for all seven days of the week effectively disables a report from printing.

Traffic Data Analysis

3

How This Chapter Is Organized

This chapter describes traffic measurement reports, excluding history, processor occupancy, and security reports. The reports are in alphabetical order. Each report description includes the following elements:

- an explanation of the report
- the full command used to call up the report (elements of the command may be abbreviated as long as they are unique), including a description of any required fields and options
- an illustration of a typical report screen
- a table that defines all field labels in the report and, when appropriate, a “Suggested Actions” list

The following reports are provided:

- **Attendant**. Describes the traffic measurements and performance reports for attendant groups and attendant positions, and provides an analysis of the data provided in the reports.
- **Automatic Circuit Assurance**. Describes the parameters and measurements reports for the Automatic Circuit Assurance (ACA) feature.
- **ARS/AAR/UDP Route Pattern Measurements**. Describes the measurements selection screen and routing pattern measurements report for the Automatic Route Selection (ARS), Automatic Alternate Routing (AAR), and User Datagram Protocol (UDP) features, and provides an analysis of the data provided in the measurements report.
- **Call Rate**. Describes the Call Rate measurements and summary reports available with DEFINITY systems.
- **Call Summary**. Lists the number of completed calls for the last 24 hours.

- **Call Coverage Measurements**. Describes the Principal Coverage and Coverage Path measurement reports available with DEFINITY systems.
- **Cell Traffic Measurements**. Describes the wireless traffic data reports available with DEFINITY systems.
- **DS1 Link Performance Measurements**. Describes performance measurements for DS1 links. The reports available include detailed log and summary reports.
- **DS1 Converter Link Performance Measurements**. Describes performance measurements for DS1 Converter links. The reports available include detailed log and summary reports.
- **Emergency Access Calls**. Tracks emergency calls by extension, event, type of call, and time of day. This report prints in the system journal printer with name, time and event code (attendant crisis alert).
- **Hunt Groups**. Lists the hunt groups on your system. Describes the traffic measurements, performance, and status reports for Automatic Call Distribution (ACD)/Uniform Call Distribution (UCD)/Direct Department Calling (DDC) Hunt Groups and provides the analysis of the data provided in the reports.
- **IP Media Processor Measurements**. Lists the activity on IP media processors for specific regions and time periods.
- **LAN Performance Measurements**. Describes the performance measurements report for traffic over ethernet, clan and ppp LAN connections.
- **LAR Route Pattern Measurements**. Describes the route pattern measurements report for the Look Ahead Routing feature.
- **Logins**. Describes the login ID information for each system user.
- **Modem Pool Groups**. Describes the traffic measurements report for modem pool groups.
- **Multimedia**. Describes the traffic measurement reports used to determine multimedia traffic resources.
- **Performance Summary**. Describes the traffic measurements Performance Summary report.
- **Port Network /Load Balance**. Describes the Blockage Study report which provides information on loading and blocking for each port network as well as between switch node pairs; and the Load Balance report which provides information on load and balance for each port network and indications of the source of the load.
- **System Status**. Describes the System Status reports, which provide an overall view of how the system is performing.
- **Tone Receiver**. Describes the Tone Receiver Summary and Tone Receiver Detailed Measurements reports which display traffic data for tone receivers.

- **Traffic Summary**. Describes the Traffic Measurements Summary report.
- **Trunk Groups**. Describes the traffic, outage, lightly used and measurements/selection reports, call-by-call (CBC), performance and status reports for Trunk Groups; it also provides the validation and analysis of the data provided in the reports.
- **Wideband Trunk Groups**. Describes the Wideband Trunk Group Summary and Hourly reports and the Wideband Trunk Group Selection screen.

General Information about Reports

Report Screen Fields

Switch Name

The Switch Name field appears at the top left of all the traffic data analysis screens, just below the command. The field value is a 20-character string administered by the customer that uniquely defines the switch being measured.

Time and Date

The time and date the report is requested displays at the top right.

When a question mark appears in the time fields, three possible explanations exist.

1. The attendant presses start immediately followed by pressing cancel.
2. Pressing start and letting calls time-out after ten seconds.
3. No staffing, but making calls.

Measurement Hour

The Measurement Hour field displays the starting time (using a 24-hour clock) of the hour during which the data was recorded.

Changing the Time

If you change the time, the hour in which the time was changed is shown on the measurements reports as `hh**`.

Attendant Group Reports

The Attendant Group reports are used to assess the quality of service provided to customers calling through the Listed Directory Numbers, and to facilitate the management of the attendant group so it is neither under- nor over-staffed.

The Attendant Group Measurements consist of two reports: The Attendant Group report provides hourly traffic measurements for the Attendant Group as a whole. The Attendant Positions report gives peak individual Attendant Position Measurements.

Both reports are available as PEAK reports for yesterday's peak hour, today's peak hour, and the last hour. A peak hour is the hour within a 24-hour period with the greatest usage (`Time Talk` plus `Time Held`) for the specified day.

Hourly data for the entire attendant group can be obtained by polling the Attendant Group report on an hourly basis.

Attendant Group Measurements Report

Command

To display the Attendant Group measurement report:

1. Type **list measurements attendant group [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-1 shows a typical screen for the Attendant Group measurement report. Table 3-1 on page 3-5 describes the data fields presented in the Attendant Group measurement report.

```
list measurements attendant group                                        SPE A
Switch Name: Cust_Switch_Name                  Date: 4:47 pm WED NOV 27, 19xx
                            ATTENDANT GROUP MEASUREMENTS

Grp  Meas  --------- Calls ---------  ----- Time ----  Time  Speed
Siz  Hour  Ans  Abnd Qued H-Abd Held  Avail Talk Held  Abnd  Ans(sec)

0    0     0    0    0    0     0     0     0    0     0     0      YEST PEAK
10   1200  1006 0    0    0     0     212   76   0     0     0      TODAY PEAK
10   1500  1007 0    0    0     0     224   64   0     0     1      LAST HOUR
```

Screen 3-1. Attendant Group measurement report

Table 3-1. Attendant Group Report

Field	Description
`Grp Siz`	*Group Size*. The number of attendant positions (consoles) administered for the groups.
`Meas Hour`	*Measurement Hour*. The hours represented are indicated by the labels in the right-hand column (YEAS PEAK — the hours of yesterday's peak activity, TODAY PEAK — today's peak activity, and LAST HOUR — the last hour activity). **NOTE:** A pair of asterisks in the minute portion of the measurement hour indicates the switch time was changed during the measurements interval. All measurement data for this interval is set to zero.
`Calls Ans`	*Calls Answered*. The number of calls answered by all active attendants during the measurement hour. With Total Usage and Calls Answered, you can determine the Average Work Time (AWT), which is the time it takes an attendant to handle a call (refer to ''Data Analysis Guidelines'' on page 3-14). Calls placed to individual attendant extensions or that route to an attendant via a hunt group do not increment the *Calls Ans* counter.
`Calls Aband`	*Calls Abandoned*. The number of calls that ring an attendant group and drop (the caller hangs up) before an attendant answers. Where applicable, this total includes calls abandoned from the attendant queue before answered. A call abandoned after placed on hold is *not* included in this measurement, because it is already added to the calls answered measurement. **Suggested Action:** Observe times during which the calls abandoned number may be higher than desirable, and then schedule additional attendants in the group as needed during the indicated times. Also, see "Percent Occupancy," located under ''Data Analysis Guidelines'' on page 3-14.

Continued on next page

Table 3-1. Attendant Group Report — *Continued*

Field	Description
`Calls Qued`	*Calls Queued*. The total number of calls placed in the attendant queue (delayed) because no attendants are available. Calls remain in the queue: ■ Until an attendant becomes available and the call is connected. ■ Until the caller, while waiting in the queue, abandons the call (hangs up) before an attendant is available. See "Suggested Action" in the description of the `Calls Aband` field. ■ The call covers to another point in a coverage path.
`Calls H-Abd`	*Calls Held-Abandoned*. The number of calls that abandon while the caller is in hold mode. Held calls which time out and re-alert are included in the held-abandoned call count. **Suggested Action:** If this number is determined to be excessive, you should investigate and attempt to identify the reasons.
`Calls Held`	*Calls Held*. The number of calls answered by the attendant group and subsequently placed on hold by the attendant group.
`Time Avail`	*Time Available*. The time during which the "pos avail" lamp is lit on all attendant consoles, and the attendants are not talking on calls but are available to handle new calls. Measured in Centum (Hundred) Call Seconds or CCS. **NOTE:** An attendant can have calls on hold and still be available. For example, if two attendants are available for 15 minutes each during the measurement hour, the total available time would be 30 minutes or 18 CCS (0.5 hour X 36 CCS per hour).

Continued on next page

Table 3-1. Attendant Group Report — *Continued*

Field	Description
`Time Avail (cont.)`	Consoles may be administered either with their own unique extension number or without any extension number. For the “with extension number” case, traffic measurements for outgoing calls and incoming calls to the extension are allotted to the console’s extension number and not to the attendant group. For the “without” case, all traffic measurements are allotted to the attendant group. The time the console is on outgoing calls is not included in the attendant group’s Time Avail measurement. Attendants are not available and do not accumulate time available when: ■ The position is in Night Service ■ The position was busied-out ■ The headset is unplugged ■ The attendant is servicing a call **Suggested Actions:** 1. If the Time Avail plus Time Talk fields total to a number less than 36 CCS X the number of attendants, then some of the attendant positions are not staffed for the measurement hour. If this is a problem, then it is appropriate to staff additional positions during the busy hour(s). 2. If the Time Avail plus Time Talk fields equal 36 CCS X the number of attendants, then any time available is idle time or time not spent on calls. A large number for the `Time Avail` field indicates a low occupancy. If this is a problem, then it is appropriate to reduce the number of attendant positions that are staffed. Staffed time is usually very close to the sum of the Time Avail and Time Talk fields.

Continued on next page

Table 3-1. Attendant Group Report — *Continued*

Field	Description
`Time Talk`	Also referred to as *Talk Time*. The total time, during the measurement interval, attendant(s) are active or talking on a loop (measured in CCS). Talk time is not started until the call is answered by the attendant. The duration of time between the call terminating at the attendant console and when the call is answered is not accumulated as either *Avail Time* or *Talk Time.* Calls split by the attendant do not accumulate talk time from the point when the attendant presses the start button until the call is placed. Calls routed to an attendant via a hunt group are treated as calls to the attendant extension and therefore do not accumulate talk time. **NOTE:** An attendant can have up to six calls on hold at any one time. However, each attendant can only be active on one loop at a time. **Suggested Action:** If talk time is acceptable, but one or more of the other measurements are unacceptable, then all parameters should be studied in order to identify what should be changed (the number of consoles, number of attendant positions staffed, attendants schedule, faulty trunks, and so on).

Continued on next page

Table 3-1. Attendant Group Report — *Continued*

Field	Description
`Time Held`	Also referred to as *Held Time*. The total amount of time (measured in seconds) the attendants have calls on hold.
`Time Abnd`	Also referred to as *Time to Abandoned*. The average amount of time calls spend in queue and/or ringing at the console before the callers hang up (measured in seconds). **NOTE:** Time to abandoned does not include calls that overflow the attendant group queue. $$Time\ To\ Abandoned = \frac{Total\ Delay\ For\ All\ Abandoned\ Calls\ (in\ seconds)}{Total\ Number\ of\ Calls\ Abandoned}$$ **Suggested Action:** If the Time to Abandoned number is smaller than the Speed of Answer number then you need more agents. As a contrast, if the Time to Abandoned number is larger than the Speed of Answer number, then the attendant group should process the calls faster. **The attendant group should be engineered so "Time to Abandoned" approximately equals "Avg Delay"**. $$Total\ Delay = (Time\ To\ Abandoned) \times (\#\ of\ Abandoned\ Calls) + (Speed of Answer) \times (\# of Calls Answered)$$ $$Avg\ Delay = \frac{Total\ Delay}{Calls\ Answered + Calls\ Aband}$$ **NOTE:** If the average time to abandon is equal to or exceeds 9999 seconds, the value 9999 displays in the field.

Continued on next page

Table 3-1. Attendant Group Report — *Continued*

Field	Description
Speed Ans (Sec)	*Speed of Answer*. The average elapsed time from when a call terminates at the attendant group to when the call is answered by an attendant (measured in seconds). The average time calls wait to ring an attendant (Queue Usage / Calls Answered). The Queue Usage is the total time calls spend in the Attendant Queue. **NOTE:** Calls terminate either directly to an attendant console and subsequently begin ringing or in the attendant queue when there are no attendant positions available. $Speed\ of\ Answer\ =$ $\frac{Total\ Delay\ For\ All\ Answered\ Calls\ (in\ seconds)}{Total\ Number\ of\ Calls\ Answered}$ **NOTE:** If the average time to abandon is equal to or exceeds 9999 seconds, the value 9999 displays in the field. **Suggested Action:** If this number appears to be too high and all attendants are working at acceptable efficiency levels, consider additional training that may help the attendants complete calls more quickly. Alternatively, observe the hours during which speed of service becomes unacceptable and consider adding consoles and staffing additional attendants during those hours.

Attendant Positions Report

The Attendant Positions report provides hourly individual attendant position measurements. It is used to assess personnel performance, and to identify when additional training may be necessary.

Command

To display the Attendant Positions report:

1. Type **list measurements attendant positions [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-2 and Screen 3-3 show a typical Attendant Positions report. Table 3-2 on page 3-12 describes the data fields presented in the Attendant Positions report.

```
list measurements attendant positions
Switch Name: Customer_Switch_Name                Date: 4:46 pm WED NOV 27, 19xx
                         ATTENDANT POSITIONS MEASUREMENTS
 Yesterday's Peak            Today's Peak             Last Hour
   Meas Hour: 0             Meas Hour: 1200        Meas Hour: 1500
Attd ------ Time ------ Calls ------ Time ------ Calls ------ Time ------ Calls
ID   Avail  Talk  Held  Ans   Avail  Talk  Held  Ans   Avail  Talk  Held  Ans
1    0      0     0     0     0      0     0     0     0      0     0     0
2    0      0     0     0     0      0     0     0     0      0     0     0
6    0      0     0     0     27     9     0     127   28     8     0     126
7    0      0     0     0     26     10    0     125   28     8     0     126
8    0      0     0     0     26     10    0     125   28     8     0     126
9    0      0     0     0     26     10    0     125   28     8     0     126
10   0      0     0     0     27     9     0     126   28     8     0     126
15   0      0     0     0     26     10    0     126   28     8     0     125
    press CANCEL to quit -- press NEXT PAGE to continue
```

Screen 3-2. Typical Attendant Positions report — Page 1

```
list measurements attendant positions                                Page 2
Switch Name: Customer_Switch_Name                Date: 4:46 pm WED NOV 27, 19xx
                         ATTENDANT POSITIONS MEASUREMENTS
 Yesterday's Peak            Today's Peak             Last Hour
   Meas Hour: 0             Meas Hour: 1200        Meas Hour: 1500
Attd ------ Time ------ Calls ------ Time ------ Calls ------ Time ------ Calls
ID   Avail  Talk  Held  Ans   Avail  Talk  Held  Ans   Avail  Talk  Held  Ans
20   0      0     0     0     27     9     0     126   28     8     0     126
25   0      0     0     0     27     9     0     126   28     8     0     126
```

Screen 3-3. Typical Attendant Positions report — Page 2

Table 3-2. Attendant Positions Report

Field	Description
`Attd ID`	*Attendant ID*. A number between 1 and the maximum number of attendants to identify which attendant's data is being displayed This number is chosen by the user upon administering this attendant.
`Time Talk`	The time the attendant is active on calls (in CCS). Time Talk is measured from the time the attendant activates an attendant loop until the loop is released. If more than one loop is active on an attendant console at one time, the usage is counted only once (for example, one attendant is not counted as being busy more than once at a single time).
`Time Held`	The time the attendant had calls on hold (measured in seconds).
`Time Avail`	*Time Available*. The total time the subject attendant is available to receive calls during the polling interval (measured in CCS).
`Calls Ans`	*Calls Answered*. The total number of calls answered by this attendant (measured in CCS). Calls placed to an individual attendant extension or that route to an attendant via a hunt group do not increment the *Calls Ans.* counter.

Attendant Performance Report

The Attendant Performance report gives the console attendant group average speed of answer for each hour of a 24-hour period, for either yesterday or today.

Command

To display the Attendant Performance report:

1. Type **list performance attendant <yesterday/today> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday/today**.

   - Enter **yesterday** to list the attendant group activity for yesterday.
   - Enter **today** to list the attendant group activity for today.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-4 and Screen 3-5 show typical screens for the Attendant Performance report, using the yesterday option.

Page 1 of the display shows hours from 0000 (midnight) through 1100 (11:00 am), and Page 2 shows hours from 1200 (noon) through 2300 (11:00 pm). As shown at the bottom of Page 1, press CANCEL to exit the Attendant Performance report, or press NEXT PAGE to see the Page 2.

Table 3-3 on page 3-14 describes the data fields presented in the Attendant Performance report.

```
list performance attendant yesterday                                Page  1
Switch Name: Customer_Switch_Name          Date: 1:58 pm  THU MAR 29, 19xx
                              ATTENDANT SPEED OF ANSWER
Meas  ----------------Average Speed of Answer (sec) -------------   Speed
Hour  1  2  3  4  5  6  7  8  9  10  15  20  30  40  50  100  200   Ans(sec)
0                                                                     0
100                                                                   0
200                                                                   0
300                                                                   0
400                                                                   0
500                                                                   0
600                                                                   0
700  ///////                                                          3
800  /////////////                                                    5
900  /////////////                                                    5
1000 /////////////                                                    5
1100 ///////////////////                                              7
          press CANCEL to quit --  press NEXT PAGE to continue
```

Screen 3-4. Attendant Performance report — Page 1

```
list performance attendant yesterday                                Page  2
Switch Name: Customer_Switch_Name          Date: 1:58 pm  THU MAR 29, 19xx
                              ATTENDANT SPEED OF ANSWER
Meas  ----------------Average Speed of Answer (sec) -------------   Speed
Hour  1  2  3  4  5  6  7  8  9  10  15  20  30  40  50  100  200   Ans(sec)
1200 ////////////////                                                  6
1300 /////////////                                                    5
1400 ////////////////////////////////////                             17
1500 /////////////                                                    5
1600 ////////////////////////////                                      9
1700 ////                                                             2
1800                                                                  0
1900                                                                  0
2000                                                                  0
2100                                                                  0
2200                                                                  0
2300                                                                  0
Command successfully completed
Command:
```

Screen 3-5. Attendant Performance report — Page 2

Table 3-3. Attendant Performance Report

Field	Description
`Meas Hour`	*Measurement Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded.
`Average Speed of Answer (sec)`	A graphic display of the average time taken by attendants to answer calls.
`Speed Ans (sec)`	*Speed of Answer (in seconds).* The average speed of answer is also displayed numerically in seconds for each hour in the report interval. **Suggested Action:** If this number appears to be too high and all attendants are working at acceptable efficiency levels, consider additional training that may help the attendants complete calls more quickly. Alternatively, observe the hours during which speed of answer becomes unacceptable and consider adding consoles and scheduling more attendants during those hours.

Data Analysis Guidelines

The following guidelines are intended to show an easy method for determining whether currently reported data is acceptable or not. These guidelines represent the minimum you should do to verify the recorded measurement values are consistent with expected and historic values. You should perform additional checks as necessary.

To check the acceptability of hourly Attendant Measurements reports, verify the following:

- The system clock or group size was not changed during the measurement hour. If the system clock was changed, the minutes field displays double asterisks (for example, 11**) and all other fields (for the indicated time interval) display zero.
- The Average Work Time (AWT) typically ranges between 10 and 30 seconds per call (different values may be acceptable for specific applications).

NOTE:
Time Talk (in CCS) plus Time Avail (in CCS) should not exceed 36 X the group size. For example, with two attendant positions, this should not exceed 2 X 36 = 72 CCS for data collection.

NOTE:
The attendant can have up to six calls on hold at one time.

Analyzing the Report Data

To use the Attendant Measurements reports to estimate the number of attendant positions for the application, you need additional data. The additional data needed can be calculated using data from the reports which you subsequently recorded on the Worksheet 1. The following paragraphs describe how to use data from the completed Worksheet 1 to evaluate Average Work Time, Staffed Time, Attendant Offered Load, Percent Occupancy, and Percent of Calls Queued.

NOTE:
The Attendant Data Worksheet serves to backup the data from the reports and to provide an easy means for identifying the peak hour. The data from the identified peak hour should be used in subsequent calculations.

Average Work Time

The AWT is the average number of seconds it takes attendants to process calls. The number of calls answered and the total time the attendants are busy handling these calls (Talk Time) are used to determine the AWT.

To determine AWT, use the figures for Talk Time, Time Held (provided that time held is considered to be a part of the agent's normal work time), and Calls Answered from the measurements report in the following equation:

$$AWT = \left[\frac{Talk\ Time + Time\ Held\ CCS}{Calls\ Answered} \right] \times \left[\frac{100\ Seconds}{CCS} \right]$$

Example: The typical report screen shown earlier in this section (see Screen 3-1 on page 3-4) lists the following data for yesterday's peak hour:

- Time Talk = 43 CCS or 4300 seconds
- Time Held = 4 CCS or 400 seconds
- Calls Answered = 170

Using these figures as an example, the average work time is:

$$AWT = \left[\frac{43\ CCS + 4\ CCS}{170\ calls} \right] \times 100\ Seconds = 27.6\ Seconds\ per\ call$$

Staffed Time

Staffed time is the time the attendant positions are active (ready for calls). If staffed time (per agent) equals 36 CCS, then all agents were active for the full hour. Using Screen 3-1 on page 3-4 as an example, staffed time per agent is:

$$Staffed\ Time\ (per\ Agent) = \frac{Time\ Available\ +\ Talk\ Time}{\#\ of\ Agents}$$

$$Staffed\ Time\ (per\ Agent) = \frac{29\ CCS\ +\ 43\ CCS}{2} = 36\ CCS$$

Attendant Offered Load

The Attendant Offered Load (AOL) is the sum of the Calls Answered plus Calls Abandoned times the AWT (Average Work Time). You can determine the AOL with the following equation:

$$AOL\ (in\ seconds) = (Calls\ Ans\ +\ Calls\ Aband) \times AWT\ in\ seconds$$

$$AOL\ (in\ CCS) = \frac{AOL\ in\ seconds}{100}$$

Example:

The typical report screen shown earlier in this section (see Screen 3-1 on page 3-4) lists the following data for yesterday's peak hour:

- Calls Answered = 170
- Calls Abandoned = 3

And from the calculations in the previous example:

- AWT = 27.6 Seconds

Percent Occupancy

The occupancy level may be expressed as a function of the total time of the measurement hour or a function of the time the positions were active and attended. Generally, it is expected all positions are staffed 100 percent of the time during the peak busy hour. Therefore, the measurement Percent Occupancy (total time) is sufficient in most instances.

Assuming attendant positions are staffed 100 percent of the time, then each position can handle 36 CCS of load during the peak hour. Therefore, based upon the calculated AOL of 47.75 CCS, two attendant positions are required.

The two status reports **monitor system view1** and **monitor system view2**, can be used to display status of the attendant console positions. Specifically, you can use these two reports to determine, on an instantaneous basis, how many attendant positions are activated, and the identifying number of those deactivated.

NOTE:
Since the **monitor system view1** and **view2** commands not only display status of the attendant consoles but also maintenance and traffic status, they are included in this chapter under the heading System Status.

For this example, the percent occupancy is calculated as follows:

$$Maximum\ Possible\ Usage = 36\ CCS \times Total\ \#\ of\ Members$$

Suggested Actions: You should staff a sufficient number of positions so the attendants are neither underworked nor overworked. If the percent occupancy is high and the time available (from the Worksheet) is low, the recommendation is to staff another attendant position. If the percent occupancy is low and the time available (from the worksheet) is high, the recommendation is to staff fewer attendant positions.

NOTE:
The Percent Occupancy should not exceed 92% (even on large systems with several attendant consoles). The 92% is a human factors limitation and does not apply to hardware servers.

The formula for calculating “Percent Occupancy (attended)” is as follows:

$$Percent\ Occupancy\ (attended) = \frac{AOL}{Time\ Avail + Time\ Talk} \times 100$$

When all positions of the attendant group are staffed, the equation for percent occupancy (attended) yields the same results as the equation for percent occupancy (total time).

Percent of Calls Queued

As the percent of calls queued increases, the Speed of Ans field also increases. Callers are more likely to become frustrated as they are delayed and more likely to abandon their calls, thus contributing to the perception that the level of service has decreased.

Percent of Calls Queued (or delayed) is defined as follows:

$$\%\ Queued = \frac{Calls\ Queued}{Calls\ Ans + Calls\ Aband}$$

$$\%\ Queued = \frac{78\ calls}{170\ calls + 3\ calls} = \frac{78\ calls}{173\ calls} = 45\%$$

Analyzing Customer Supplied (Theoretical) Data

For an installed system, the measurement reports are always recommended over theoretical data derived from traffic tables. However, it is recognized there are occasions when the use of traffic tables is necessary and desirable. For example, as a part of responding to a request for proposal (RFP), a potential customer may supply certain traffic data obtained independent of the switch, and request that the RFP include calculations indicating how well the switch accommodates the specified traffic. It may also be desirable to use traffic tables during the system engineering and planning stage.

NOTE:
Traffic Engineering Capacity tables such as the Erlang-C Infinite Queue, Erlang-C Finite Queue, and Retrial Capacity are used for data analysis when necessary. Traffic Engineering Capacity tables are based on mathematical models in which certain assumptions are made about call arrivals, the serving process, and the disposition of blocked calls.

Speed of Answer. Given the appropriate variables, you can estimate the Speed of Answer. You need the following:

- Erlang-C Infinite Queue Capacity tables (found in *Basic Traffic Analysis*)
- AWT (Average Work Time)
- Number of Attendant Positions Staffed (Working Servers)
- AOL, where: AOL = (Calls Ans + Calls Aband) X AWT

Example:

Given the following data, estimate the Speed of Answer:

- Time Talk = 43 CCS
- Time Held = 4 CCS
- Calls Answered = 170
- Using Time Talk, Time Held, and Calls Answered, the calculations indicate AWT= 27.6 Seconds
- Number of Attendant Positions Staffed = 2
- Calls Abandoned = 3
- Using Calls Answered, Calls Abandoned, and AWT, the calculations indicate that AOL = 47.83 CCS

  1. In the table shown in Figure 3-1 on page 3-20, locate the row that corresponds to two attendant positions (working servers).
  2. Read across to find the offered load closest to 47.83 CCS. (The closest is 46.2 CCS, when rounding up.)
  3. Read up to find the Average Delay in Multiples of Average Holding Time that corresponds to 46.2 CCS (for this example, the Average Delay in Multiples of Average Holding Time is.700).
  4. Estimate the theoretical Speed of Answer by multiplying the Average Delay in Multiples of Average Holding Time by AWT (that is, Speed of Answer =.7 X 27.6 seconds = 19.3 seconds).

NOTE:
This example implies all calls have an average of 19.3 seconds delay. Some of the calls are answered immediately, while the remaining calls are delayed. To find the portion of calls that experience a delay before service can be estimated, use the table shown in Figure 3-2 on page 3-21. The average delay of these calls can be estimated using the table shown in Figure 3-3 on page 3-21.

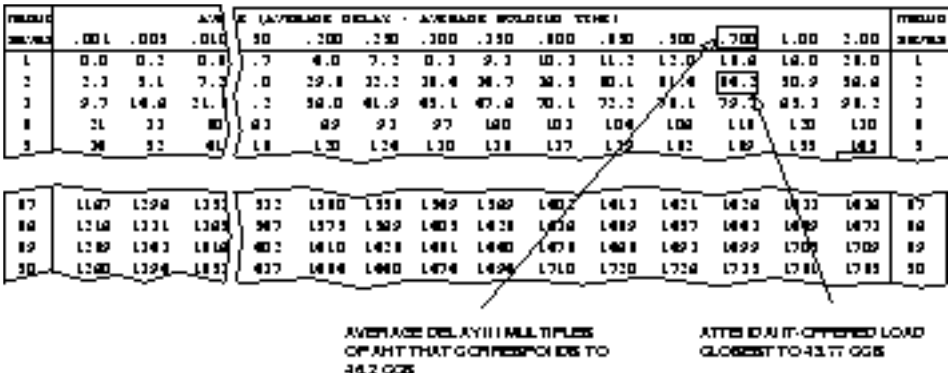


Figure 3-1. Estimating the Speed of Answer

5. To determine the percentage of calls that experience a delay, use the Average Delay in Multiples of Average Holding Time that is closest to the expected AOL.

    a. In the Erlang-C Infinite Queue Capacity table shown in Figure 3-1, locate the row that corresponds to two working servers.

    b. Read across until you find the value closest to the expected AOL (the value closest to 47.83 CCS is 46.2 CCS).

    c. Read up to find the Average Delay in Multiples of Average Holding Time that corresponds to 46.2 CCS (the Average Delay in Multiples of AHT is .700).

    d. In the Erlang-C Probability of Delay table shown in Figure 3-2 on page 3-21, find the .700 column.

    e. Read down this column until it intersects the row with two servers. The value at the intersection is .502, which represents the probability of delay. This value shows that 50.2 percent of the calls experience some delay before being answered.

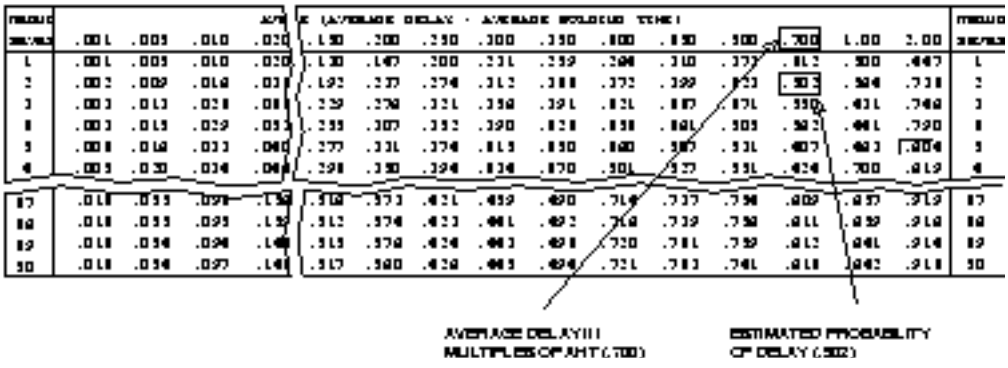


Figure 3-2. Estimating the Percentage of Delayed Calls

6. To determine the Average Delay of the Delayed Calls, proceed as follows:

   a. In Figure 3-3, locate the .700 column.

   b. Read down this column until it intersects the row with two servers. (The value at the intersection is 1.40. This is the Average Delay of Delayed Calls in Multiples of Average Holding Time).

   c. To obtain the Average Delay of Delayed Calls in seconds, multiply the Average Holding Time by 1.40 (1.40 X 27.6 seconds = 38.6 seconds).

In summary, when two attendant positions are provided to accommodate 173 calls during the busy hour, the speed of answer for all calls is 19.3 seconds. While 49.8 percent of the calls are answered immediately, the remaining 50.2 percent have an average delay of 38.6 seconds.

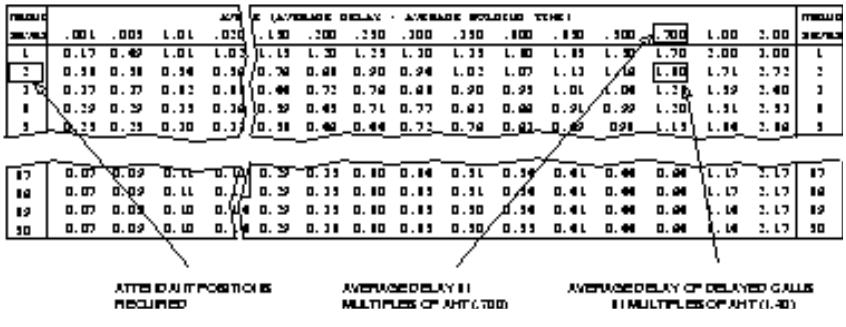


Figure 3-3. Estimating the Average Delay of Delayed Calls

Estimating the Number of Attendant Positions Required. Given the appropriate variables, you can estimate the number of attendant positions required to achieve a desired Speed of Answer. You need the following:

- Erlang-C CCS Capacity Tables
- AWT
- AOL
- Desired Speed of Answer

Example:

For this example, we continue with the previous example's data; that is:

- AWT = 27.6 seconds
- AOL = 47.83 CCS
- Assuming that the Desired Speed of Answer = 13 seconds

To determine the Average Delay in Multiples of AWT:

$$\textit{Average Delay in Multiples of AWT} =$$

$$\frac{\textit{Desired Speed of Answer}}{\textit{AWT}} = \frac{13\ \textit{seconds}}{27.6\ \textit{seconds}} = .4710$$

Figure 3-4. Estimating the Average Delay of Delayed Calls

a. In the table shown in Figure 3-9 on page 3-91, Erlang-C Infinite Queue Capacity, locate the column that most closely corresponds to the objective delay of .4710 (this falls between .450 and .500, so use the .500 column).

b. Read down the column until the offered load closest to 47.83 CCS is found (this falls between 41.6 and 74.3, so use the 41.6 row).

c. Read horizontally to the left or right margin to find the number of servers required (number of servers required = 2).

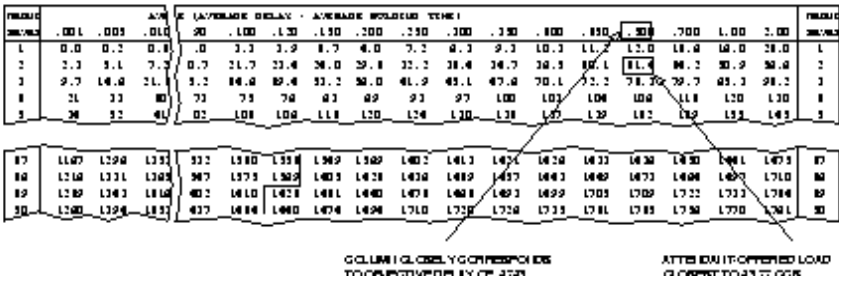


Figure 3-5. Estimating Attendant Position Requirements

Estimating Percent Occupancy. To determine the percent occupancy (total time) you need the following data:

- Number of attendant positions staffed
- AOL

Example:

For this example we continue with the previous example's data; that is:

- AOL = 47.83 CCS
- # of positions staffed = 2

Assume the attendant positions are staffed 100 percent of the time, then each position can handle 36 CCS of load during the peak hour.

$$\%\ Occupancy\ (total\ time) = \frac{AOL}{\#\ positions\ \ x\ \ 36\ CCS} \times 100 =$$

$$\frac{47.83\ CCS}{2\ \ x\ \ 36\ CCS} \times 100 = 66\%$$

Figure 3-6. Estimating Attendant Position Requirements

Automatic Circuit Assurance Reports

This section describes the parameters and measurements reports for the Automatic Circuit Assurance (ACA) feature. Specifically, these two reports are identified as the ACA Parameters report and ACA Measurements report.

The ACA feature can be used to identify possible malfunctioning trunks by providing an alerting mechanism that monitors:

- The occurrence of an excessive number of short holding time calls
- The occurrence of calls that have an abnormally long holding time

When the number of short holding time calls exceeds the threshold administered for a trunk group, or the duration of a call exceeds the administrated long holding time limit for the trunk group, the following actions occur:

1. An entry is made on the ACA Measurement Report.
2. A referral call is placed to a designated attendant console or display-equipped voice terminal.

NOTE:
For a more complete description of the ACA feature, refer to *DEFINITY ECS Administrator's Guide*.

Background Information:

1. To determine if the ACA feature is enabled, use the **display system-parameters feature** command.
2. When ACA is enabled, it may be used either on a single system basis or in a Distributed Communications System (DCS) network. Administration of the ACA Referral Calls field (also displayed on the System Parameters screen) determines where referral calls terminate. For DCS networks, one switch (the primary) is administered to receive ACA referred calls from remote nodes in the network for all switches within the network. Furthermore, the field ACA Remote PBX Identification must be administered with the PBX ID of the node that is designated as primary.

   For non-DCS arrangements, the switch is administered as local.
3. The switch that displays the ACA measurements must have a valid number administered in the ACA Referral Destination field.
4. A valid ACA referral destination can be any of the following:
   - An individual attendant
   - The attendant group
   - A designated station that is equipped with an alphanumeric display
5. Those systems equipped with a Speech Synthesizer circuit pack may also provide an audio (voice synthesized) report of the referral calls.

ACA Parameters Report

The ACA Parameters report lists all trunk groups in the system and displays the current definitions (parameters) for long and short holding times.

NOTE:
The parameters are administered on the trunk group screens.

Command

To display the ACA Parameters report:

1. Type **list aca-parameters [number *x*] [to number *x*] [name *x*] [aca-on *x*] [count *n*] [print/schedule]** and press RETURN.

   Options: There are six options for this command:

   1. **number *x***

      Enter the beginning trunk group number.

   2. **to-number *x***

      Enter the ending trunk group number.

   3. **name *x***

      Enter the trunk group name.

   4. **aca on *x***

      Enter **y** to indicate the trunk group is monitored by aca.

   5. **count *n***

      Enter the number of trunk groups to list.

   6. **print** and **schedule**

      This option allows you to print the report immediately or schedule the report to print at another time.

Screen

Screen 3-6 shows a typical screen for the ACA Parameters report. Table 3-4 describes the data fields presented in the ACA Parameters report.

```
list aca-parameters
                                    ACA PARAMETERS
Group        Group    Group           ACA    Short     Short      Long
Number  TAC  Type     Name            On? Hold Time   Thres    Hold Time
41      351  tie      MARKETING        n      10        15          1
42      352  tie      PURCHASING       n      10        15          1
43      353  isdn-pri D5-G2 PRI Tie    n      10        15          1
44      354  tie      FINANCE          n      10        15          1
45      355  tie      SALES            n      10        15          1
46      356  tie      NEW YORK         n      10        15          1
54      373  wats     SERVICE-WATS     y      10        15          1
55      371  tie      DATA LINK        n      10        15          1
57      387  tie      2 WAY TIE LINE   y      10        15          1
58      386  wats     NJ-WATS          y      10        15          1
59      385  wats     WATS-800         y      10        15          1
60      384  did      DID              y      10        15          1
61      383  co       WASHINGTON       y      10        15          1
Command successfully completed
Command:
```

Screen 3-6. Typical ACA Parameters report

Table 3-4. ACA Parameters Report

Field	Description
Group Number	A unique number (assigned during administration) that identifies each trunk group. It may be any number within the range of one to the maximum number of trunk groups supported by the system.
TAC	*Trunk Access Code*. The TAC (assigned during administration) for the trunk group.

Continued on next page

Table 3-4. ACA Parameters Report — *Continued*

Field	Description
`Group Type`	The type of trunk. The system allows the following trunk types: ■ Access (`access`) ■ Advanced Private Line Termination (`aplt`) ■ Central Office (`co`) or Public Network Service ■ Customer Provided Equipment (`cpe`) ■ Digital Multiplexed Interface-Bit Oriented Signaling (`dmi-bos`) ■ Direct Inward Dialing (`did`) ■ Direct Inward/Outward Dialing (`diod`) ■ Foreign Exchange (`fx`) ■ Integrated Services Digital Network (`isdn-pri`) ■ Release Link Trunk (`rlt`) ■ Tandem (`tandem`) ■ Tie Trunk (`tie`) ■ Wide Area Telecommunications Service (`wats`) **NOTE:** For a complete description of these trunk group types, refer to the *DEFINITY ECS Administrator's Guide*.
`Group Name`	The trunk group identification administered on the Trunk Group screen.
`ACA On?`	Indicates whether or not the trunk group is monitored by ACA. **Suggested Actions:** The decision to monitor a trunk group (field entry y) may depend on a complaint from a user, historical problems, or suspicious data from another report. ACA measurements may be used in conjunction with other measurement reports for confirmation purposes. These other reports include: ■ The list performance trunk-group ■ The list performance summary ■ The list measurements outage-trunk ■ The list measurements trunk-group summary or hourly

Continued on next page

Table 3-4. ACA Parameters Report — *Continued*

Field	Description
`Short Hold Time`	The maximum number of seconds a call is considered a short holding time call. A holding time t longer than this value is considered as a normal call up until the long holding time is exceeded. The short holding time value is specified on the Trunk Group screen when the trunk group is administered. The field range is from 0 to 160 seconds with 10 seconds being the default.
`Short Thres`	*Short Threshold*. The system maintains a running count of each call with a duration of less than or equal to the administered short holding time. The count is increased by one for each call that meets the short holding time criteria. When this count reaches the designated threshold, an entry is made in the ACA Measurements report, and a referral call is placed. The threshold value is specified on the Trunk Group screen when the trunk group is administered. The field range is from 0 to 30 with 15 being the default.
`Long Hold Time`	The minimum time of seizure, in hours, the system considers a call as having a long holding time. This number is specified on the Trunk Group screen when the trunk group is administered. The number has a range of zero to ten hours with one hour as the default. A referral call is placed as soon as a single long holding call is detected.

ACA Measurements Report

The ACA Measurements report displays the audit trail list of short and long holding time referral calls placed.

Command

To display the ACA Measurements Report:

1. Type **list measurements aca [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-7 on page 3-30 and Screen 3-8 on page 3-30 show typical screens for the ACA Measurements report. The date and time the report was requested is displayed to the right, following the name of the report.

This report may contain up to 64 entries on several pages. If more than 64 referrals have been entered since the last system reinitialization, the report shows the 64 most recent entries; older entries, if any, are overwritten. As shown in Screen 3-7 on page 3-30, if more than 14 referrals have occurred since the last system re-initialization, press NEXT PAGE to see additional entries, or press CANCEL to exit the report.

NOTE:
For wideband calls that consume more than 64 kbps of bandwidth, only the lowest numbered B-channel is shown on the ACA Measurements report. In addition, on the report, entries that pertain to referral calls associated with wideband facilities are designated by a “W” in the far right position of the report entry.

NOTE:
If the ACA measurements report contains entries for referral calls pertaining to wideband facilities the subtitle (w = Wideband Support) will append to the report title.

Table 3-5 on page 3-31 describes the data fields presented in the ACA Measurements report.

```
list measurements aca                                                Page  1
Switch Name: Cust_Switch_Name                   Date: 2:11 pm TUE May 1, 19xx
Automatic Circuit Assurance Measurements (W=Wideband Support)
Day & Time          Trunk            Trunk          Trunk       Type of
of Referral       Group No.       Access Code       Member      Referral
29/10:00            57               387             6           Long
28/14:00            62               382             4           Short
27/20:00            59               385             1           Long
27/19:00            59               385             1           Long
24/15:58            59               385             2           Long
24/10:00            63               381             1           Long
24/09:00            63               381             1           Long
23/11:00            61               383             9           Short
23/09:00            61               383             9           Long
22/13:18            63               381             5           Long
22/11:42            62               382             12          Long
22/06:44            57               387             11          Short
21/13:00            62               382             5           Long
20/21:22            61               383             1           Long
              press CANCEL to quit --  press NEXT PAGE to continue
```

Screen 3-7. ACA Measurements Report — Page 1

```
list measurements aca                                                Page  2
Switch Name:  Cust_Switch_Name                  Date: 2:11 pm TUE May 1, 19xx
Automatic Circuit Assurance Measurements (W=Wideband Support)
Day & Time          Trunk            Trunk          Trunk       Type of
of Referral       Group No.       Access Code       Member      Referral
20/15:52            63               381             3           Long
20/13:00            60               384             8           Long
17/16:26            63               381             2           Long
17/13:38            63               381             3           Short
16/22:17            60               384             7           Long
16/12:26            57               387             5           Short
16/12:26            43               353             2           Long  W
16/11:46            60               384             7           Long
Command successfully completed
Command:
```

Screen 3-8. ACA Measurements Report — Page 2

Table 3-5. ACA Measurements Report

Field	Description
`Day & Time of Referral`	The day and time at which either the threshold for short holding time calls was exceeded or long holding time call was reached and a referral call was placed (see Table 3-4 on page 3-26 for definitions of short and long holding times and the short threshold counter). Expressed as: day of the current month/hour:minute The report lists referral calls beginning with the most recent and continuing back in time until either all referrals are listed or the most recent 64 are listed. A referral call is completed if the call is answered. A call that is not answered is attempted again at the top of the next hour and each subsequent hour until it is answered or when a new ACA call is received.
`Trunk Group No.`	*Trunk Group Number*. The number of the trunk group over which the referral call was placed.
`Trunk Access Code`	Trunk Access Code for the trunk group.
`Trunk Member`	The specific trunk in the group that experienced the short or long holding time infraction. This information can be used, with other maintenance tests, to identify the equipment location (circuit pack) of the trunk group member. For wideband trunk groups, the number shown is the lowest numbered trunk used in the wideband call.
`Type of Referral`	Indicates whether the referral occurred as the result of too many *short* holding time calls or an excessively *long* holding time call. **Suggested Action:** Generally, a referral call should serve as a warning of potential trunk failures. In addition, an excessively long-holding call may indicate a security breach. Resolution of the problem should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it may be appropriate to alert maintenance personnel if they have not already been alerted.
`Wideband Flag`	If the call was a wideband call, a “W” appears next to the entry. In addition, if any wideband calls appear on the report, the tag “W = Wideband Support” appears in the report heading.

ARS/AAR/UDP Route Pattern Reports

Automatic Route Selection (ARS), Automatic Alternate Routing (AAR), and the Uniform Dial Plan (UDP) are features that route calls over public and private networks. To route the calls, ARS, AAR, and UDP select a routing pattern. A routing pattern is a list of trunk groups and a set of parameters that define the conditions under which each trunk group should be chosen to route calls.

There are two measurement screens related to routing patterns.

Route Pattern Measurements Selection Report

The Route Pattern Measurements Selection screen displays the list of patterns to be measured. The Route Pattern Measurements report displays traffic data for the specified pattern (as a whole) as well as the distribution of traffic on the trunk groups in the pattern.

Command

To display the list of route patterns to be measured:

1. Type **display meas-selection route-pattern [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for the display command only (see Note).

NOTE:
Routing pattern numbers are administered as a part of the system implementation process; more specifically, as a part of administering the ARS, AAR, or UDP features. This procedure is fully described in the *DEFINITY ECS Administrator's Guide*.

To change the list of routing patterns to be measured:

1. Type **change meas-selection route-pattern** and press RETURN.
2. Enter the route pattern number to be measured and press ENTER.

   Pattern numbers do not have to be in numerical order. If the pattern number you want is not listed, add the number (if there is space available), or replace an existing pattern number you no longer need. Press RETURN until the cursor is placed on the unwanted pattern number and enter the new number, or press CLEAR FIELD and enter the new number.

Screen

Screen 3-9 shows a typical Route Pattern Measurements Selection screen containing entries for the 25 patterns to be measured. Table 3-6 describes the data fields presented in the Route Pattern Measurements Selection screen.

```
change meas-selection route-pattern
                    ROUTE PATTERN MEASUREMENT SELECTION
Pattern No.    Pattern No.    Pattern No.    Pattern No.    Pattern No.
1: _____       6: _____       11: _____      16: _____      21: _____
2: _____       7: _____       12: _____      17: _____      22: _____
3: _____       8: _____       13: _____      18: _____      23: _____
4: _____       9: _____       14: _____      19: _____      24: _____
5: _____      10: _____       15: _____      20: _____      25: _____
```

Screen 3-9. Route Pattern Measurements Selection screen

Table 3-6. Route Pattern Measurements Selection screen

Field	Description
`Pattern No.`	*Pattern number*. Lists the numbers of the 25 patterns selected for measurement.

Route Pattern Measurements Report

The Route Pattern Measurements report contains usage measurements for each of the 25 selected routing patterns. This report displays traffic data for the specified pattern (all trunk groups within the pattern, as a whole) as well as the distribution of traffic on each trunk group in the pattern.

Command

To display the Route Pattern Measurements Report:

1. Type **list measurements route-pattern <assigned pattern number (1-254)> <yesterday/today/last-hour> [print/schedule]** and press RETURN.

   Required Fields: There are two required fields for this command.

   1. **assigned pattern number**

      - Enter the identifying **pattern number** you wish to display.

        This number must previously have been assigned to one of the numbers on the Route Pattern Measurement Selection screen. In order to obtain data for the pattern, it must previously have been administered on the ARS/AAR/UDP screens.

   2. **yesterday/today/last-hour**

      - Enter **yesterday** to list the route pattern activity for yesterday.
      - Enter **today** to list the route pattern activity for today.
      - Enter **last-hour** to list the route pattern activity of the most recently completed hour.

        For example, to display yesterday's measurements for route pattern 27, type **list measurements route-pattern 27 yesterday**.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-10 shows a typical screen for the Route Pattern Measurements report. Table 3-7 describes the data fields presented in the Route Pattern Measurements report.

```
list measurements route-pattern 1 last-hour
Switch Name: Cust_Switch_Name                  Date:  1:54 pm MON SEP 16, 19xx
                  ROUTE PATTERN MEASUREMENTS (W=Wideband Support)
Pat.    Queue    Calls     Calls     Calls     Calls    Queue
No.     Size     Offered   Carried   Blocked   Queued   Ovflo.
1       5        7         7         0         0        0
                       TRUNK GROUP MEASUREMENTS FOR PATTERN
      (trunk groups are shown in order of selection)
Grp  Grp       Grp     Grp     ------ % Calls Carried -------     %    Total
No.  Type      Size    Dir     10 20 30 40 50 60 70 80 90 100   Calls  Calls
37  isdn-pri   22      two     ////////////////////////////////    100   7     W
```

Screen 3-10. Routing Pattern Measurements Report

Table 3-7. Route Pattern Measurements Report

Field	Description
`Pat. No.`	*Pattern number*. The number of the route pattern measured.
`Queue Size`	The size (length) of the queue for the first trunk group in the route pattern. This is commonly referred to as the route pattern queue size. A queue is an ordered sequence of calls waiting to be processed. For this example, a maximum of five calls may be in queue at any one time.
`Calls Offered`[1]	The total number of calls offered to the route pattern. $Calls\ Offered\ (With\ Queue) = \#\ of\ Calls\ Carried + \#of QueueOverflowCalls + \#of QueueAbandonCalls$ $Calls\ Offered\ (Without\ Queue) = \#\ of\ Calls\ Carried + \#of CallsBlocked$

Continued on next page

Table 3-7. Route Pattern Measurements Report — *Continued*

Field	Description
`Calls Carried`	The total number of seizures (for all trunk groups) in the routing pattern.
`Calls Blocked`	The number of offered outgoing calls that found all trunk groups in the pattern busy. If the queue overflows, then the call is still blocked. Specifically, a blocked call is a call that: 1. Arrives when there are no available resources 2. Arrives and gets queued 3. Arrives when the queue is full 4. Arrives and cannot queue because the queue length is set to zero 5. Cannot queue because the Automatic Callback (ACB) button is busy 6. Cannot queue because there is no ACB button
`Calls Queued`	The number of offered calls that found all trunk groups in the pattern busy and were placed in queue for the first trunk group (first-choice trunk group) in the pattern. These calls also increment the blocked calls counter.
`Queue Ovflo.`	*Queue Overflow*. The number of calls that find the queue on the first trunk group full. Calls attempted while the queue is in overflow receive a reorder signal. These calls also increment the blocked calls counter.
`Grp No.`	*Group Number*. The number, assigned via the Trunk Group screen, that identifies each trunk group associated with the displayed data. Trunk groups are listed in the same order as they are assigned on the Route Pattern screen. The first trunk group listed is the first selected (preference 1); the second listed is the second selected (preference 2), and so on.

Continued on next page

Table 3-7. Route Pattern Measurements Report — *Continued*

Field	Description
`Grp Type`	*Group Type*. The type of trunk in the group. The following types of trunk groups can be accessed through the route pattern: ■ Access (`access`) ■ Advanced Private Line Termination (`aplt`) ■ Local Central Office (`co`) ■ Direct Inward/Outward Dialing (`diod`) ■ Foreign Exchange (`fx`) ■ Integrated Services Digital Network-Primary Rate Interface (`isdn-pri`) ■ Tandem (`tandem`) ■ Tie Trunk (`tie`) ■ Wide Area Telecommunications Service (`wats`)
`Grp Size`	*Group Size*. The number of trunks in the group.
`Grp Dir`	*Group Direction*. Identifies whether the assigned trunk groups are outgoing (`out`) or 2-way (`two`). Incoming trunks are not included in route patterns.
`% Calls Carried`	*Percentage of Calls Carried*. A graphic display showing the percentage of total calls carried over the route pattern by the trunk groups.

Continued on next page

Table 3-7. Route Pattern Measurements Report — *Continued*

Field	Description
`% Calls`	*Percentage of Calls*. The percentage of the total calls carried over the route pattern by the trunk group. **Suggested Action:** The first trunk group listed in the report is the first choice trunk group. This trunk group should always carry a significantly larger percentage of the calls than any of the other trunk groups. If not, you should add more members so the first choice trunk group has significantly more members than any other group in the pattern.
`Total Calls`	The total number of calls carried by the route pattern by the trunk group. For the **today** report, this field indicates the number of calls carried since the previous midnight. For the **yesterday** report, this field indicates the number of calls carried all day (24 hours) yesterday. **NOTE:** This column displays a cumulative number; there are no peak data measurements for the route pattern reports. However, you can use the trunk group reports to display "peak" as well as other data for the trunk groups.
`Wideband Flag`	If a trunk group is administered to support wideband switching, a "W" appears next to the trunk group entry. In addition, if any of the trunk groups on the report support wideband switching, the tag "W = Wideband Support" appears in the report heading.

1. See the "Trunk Group Measurement Selection" for this measurement.

Specifically the number of offered calls includes:

- The number of calls carried on all trunks in the route pattern.
- The number of calls that could not queue because there were no available queue slots.
- The number of calls that queued, but abandoned the queue before seizing a trunk.
- The number of calls that could not be queued because the queue length was zero.

Data Analysis Guidelines

The following guidelines are intended to show an easy and fast method of determining whether the collected data is invalid or questionable. These guidelines represent the least that you should do for validation. You should perform additional validation as necessary.

To validate the Route Pattern Measurements report, verify the following data is in order:

- Total Calls Offered to a pattern should always be equal to the sum of the columns “Calls Carried” plus “Queue Overflow” plus “Queue Abandoned” if there is a queue on the first preference.
- Total percent of all calls carried in a pattern (sum of the % Calls column for each trunk group) should never exceed 100.

Analyzing the Data

The Routing Pattern Data worksheet serves to back up the data from the reports and to provide an easy means to view overall performance of the specified route-pattern. The routing pattern reports/worksheet do not identify a peak hour but do total the data for the identified time period.

The Routing Pattern Measurements report summarizes data for the specified routing pattern. This report is intended to assist you in determining the following:

- How traffic is distributed over the trunk groups in the pattern
- Whether the Facility Restriction Levels (FRL) are administered properly
- The proper number of trunk members and trunk groups

Routing Patterns are administered as a part of ARS/AAR/UDP administration. If, after analyzing the data presented with this report, you determine the Routing Pattern should be changed (for example, you need to increase the number of trunk members or trunk groups), then you must go back to the Routing Pattern screen to make the changes. For example, if the FRL for the Routing Pattern is to be changed, you must go back to the ARS/AAR/UDP Routing Pattern screen to make this change. A more likely scenario is that the users, attempting to originate calls over the routing pattern, are blocked because the number assigned to their FRL is lower than that assigned to the trunk group. A user can only access trunk groups with numbers the same as or lower than their FRL number. (They cannot access trunk groups with numbers higher than their FRL).

A pattern may have enough trunks but may not have proper FRL assigned to the users attempting to originate calls with the pattern. If the report indicates a high number for the Calls Queued column and/or Queue Overflow column, but the usage on trunks in the groups following the first choice trunk group is low, consider identifying the group of users who are attempting to originate calls but are blocked. Then raise this group's FRL. This can be accomplished by accessing the Class of Restriction screen and increasing the FRL number for the identified group or groups of users.

If the report indicates a high Queue Overflow rate and a high usage rate for all trunk groups in the pattern, then this probably indicates there are not enough trunks. For this scenario a variety of solutions may be implemented. Generally, the simplest is to increase the number of first choice trunks. Another consideration is to add more trunk groups to the pattern. Perhaps the most drastic change is to reorganize the ARS/AAR/UDP Routing Patterns.

Generally, you want to minimize the number in the Calls Blocked column. In addition, there may be certain users' calls you want to block.

Additional and somewhat related information is available on the Performance Summary report. For example, the Performance Summary report lists the five trunk groups with the highest percent of blocking during their peak hour. Furthermore, the report lists the trunk group members out of service. Also listed are the trunk members, by trunk group, that were not used during the reporting period.

The Trunk Groups and Wideband Trunk Groups reports provide measurement data that relates to the Routing Pattern Measurements report. For example, the total number of calls that overflow from the first choice trunk group is listed in the Grp Ovfl field. It should be understood that, depending on how the trunk group is administered, these overflow calls are rerouted to the other (second, third, and so on) trunk groups.

Call Rate Measurements Reports

This section describes the Call Rate Measurements reports available with DEFINITY ECS systems.

The Call Rate Measurements reports provides traffic data for all calls (incoming, outgoing, and intercom) completed on the system during the following time intervals:

- Last hour
- Current day's peak hour
- Previous day's peak hour

The peak hours are the hours with the greatest number of calls and the hours with the busiest 36-second intervals. A 36-second interval (1 one-hundredth of an hour) is used so the number of busy intervals X 100 gives the peak call rate for the listed hour. For example, assume you have normal traffic and there were 31 calls for the peak 36-second interval of the last hour, then the peak calling rate would have been 3100 calls for an equivalent hour. The number of calls actually completed is normally much less than this number.

Command

To display a Call Rate Measurements report:

1. Type **list measurements call-rate <total/service-link/ multimedia/data/voice> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **total/service-link/multimedia/data/voice**.

   - Enter **total** to list the traffic data for all calls (incoming, outgoing, and intercom).
   - Enter **voice** to list the traffic data for voice calls (incoming, outgoing, and intercom).
   - Enter **data** to list the traffic data for data calls (incoming, outgoing, and intercom).
   - Enter **multimedia** to list the traffic data for multimedia calls (incoming, outgoing, and intercom). This command is only available if MMCH (Basic) is enabled. (G3si and G3r only)
   - Enter **service-link** to list the traffic data for service link calls (incoming, outgoing, and intercom). This command is only available if MMCH (Basic) is enabled. (G3si and G3r only)

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-11 shows the Total Call Rate Measurements report. Each Call Rate Measurements report contains the same data fields. Table 3-8 on page 3-43 describes the data fields presented in the Call Rate Measurements reports.

```
list measurements call-rate total                                Page 1
Switch Name: Cust_Switch_Name                   Date: 2:24 pm WED SEP 25, 19xx
                            TOTAL CALL RATE MEASUREMENTS

                                   Last Hour
                 ------------------------------------------------------------
                Hour    # Compl   Busy Int. (36 sec.)  # Busy Int. Calls Compl
                1300     18532          13:58:48                 193

                                    Today Peak
                ------------------------------------------------------------
                   Hour    # Compl   Busy Int. (36 sec.)  # Busy Int. Calls Compl
Busiest Hour:      900      20481          09:51:00                 224
Busiest Interval:  900      20481          09:51:00                 224

                                   Yesterday Peak
   ------------------------------------------------------------
                   Hour    # Compl   Busy Int. (36 sec.)  # Busy Int. Calls Compl
Busiest Hour:      1000     21560          00:00:00                 220
Busiest Interval:  1000     21560          00:00:00                 220
Command successfully completed
Command:
```

Screen 3-11. Total Call Rate Measurements report

The primary purpose of these reports is to identify system-level peak calling activity and the hour the activity occurred. Typically, the busiest hour for peak calling activity (such as, the 9:00 AM hour in this example) is the same as the peak hour for all trunk groups, which is identified on the Trunk Group Measurements report. However, conditions could be such that the two reports indicate different hours.

NOTE:
The call summary report, described next, lists the number of completed calls for the last 24 hours. Therefore, if you compare the Call Rate Measurement reports with the Call Summary Report you should see some of the same information.

Table 3-8. Call Rate Measurements Report

Field	Description
`Hour`	*Measurement Hour*. The starting time (using 24-hour clock) of the hour during which the data was recorded. **NOTE:** A pair of asterisks in the minute portion of the measurement hour indicates the switch time was changed during the measurements interval (for example, 10**).
`# Compl`	*Number of Calls Completed*. The number of calls completed, or answered (including incoming, outgoing, and intercom), during the listed hour.
`Busy Int. (36 sec.)`	*Busy Interval (36 seconds)*. The 36-second interval within the listed hour that had the most calls completed. There are one hundred 36-second intervals in a 1 hour period.
`# Busy Int. Calls Compl`	*Number of Busy Interval Calls Completed*. The number of calls completed in the listed busy interval. **NOTE:** All originated calls except those directed to an announcement or those generated by maintenance are counted. For example, a facility access test call is not counted as a completed call. Wideband calls count as a single call.
`Busiest Hour:`	For peak listings, this row identifies the busiest hour for today's and yesterday's peak hour. This is the hour with the largest number of completed calls.
`Busiest Interval:`	For peak listings, this row identifies the hour with the busiest 36-second interval for today and yesterday. The hour containing the busiest 36-second interval is not necessarily the same hour as the one reported as the busiest complete hour of the 24-hour period.

Call Summary Measurements Report

The Call Summary Measurements Report provides an hourly summary of the traffic data for the last 24 hours. All call completions, except those generated by maintenance, are counted. For example, a Facility Test Call is not counted as a call completion.

NOTE:
Calls are counted on initial completion and not as conference and transfer calls.

Command

To display the Call Summary Measurements Report:

1. Type **list measurements call-summary [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-12 shows a typical screen for the Call Summary Measurements report. Table 3-9 on page 3-45 describes the data fields presented in the Call Summary Measurements report.

```
list measurements call-summary
Switch Name: Cust_Switch_Name                 Date: 3:50 pm TUE AUG 18, 19**
                             CALL SUMMARY MEASUREMENTS
                              Summary of Last 24 Hours
     ------# Calls Completed-------          ------# Calls Completed------
               Multi Service                          Multi Service
Hour VoiceData Media Link     Total     Hour VoiceData Media Link     Total
1400 46   15   0     0        61        0200 0    0    0     0        0
13** 23   20   0     0        43        0100 0    0    0     0        0
1200 22   16   0     0        38        0000 0    0    0     0        0
1100 45   22   0     0        67        2300 0    0    0     0        0
1000 33   22   0     0        55        2200 0    0    0     0        0
0900 21   14   0     0        35        2100 0    0    0     0        0
0800 11   10   0     0        21        2000 3    0    0     0        3
0700 1    0    0     0        1         1900 4    2    0     0        6
0600 0    0    0     0        0         1800 4    2    0     0        6
0500 0    0    0     0        0         1700 4    7    0     0        11
0400 0    0    0     0        0         1600 21   12   0     0        33
0300 0    0    0     0        0         1500 21   15   0     0        36
Command successfully completed
Command:
```

Screen 3-12. Call Summary Measurements Report

Data is displayed beginning with the most recently completed hour and going back for 24 consecutive hours. For example, since the report is displayed during the 1500-hour time interval, the last completed hour is 1400. Therefore, the left hour column begins with 1400 and lists (from top to bottom) the 12 preceding hours.

This report indicates the system clock was reset during the 1300 hour interval. Therefore, the hour is displayed as `13**`.

Table 3-9. Call Summary Measurements Report

Field	Description
`Hour`	*Measurement Hour*. The starting time (using 24-hour clock) of the hour during which the data was recorded. **NOTE:** A pair of asterisks in the minute portion of the measurement hour indicates the switch time was changed during the measurements interval (for example, `10**`).
`# of Calls Completed`	*Number of Calls Completed*. This field contains the following five subfields: ■ *Voice* — The number of voice calls completed during the listed hour. ■ *Data* — The number of data calls completed during the listed hour. A data call carries digital signals between two end points, enabling end terminals to communicate directly. ■ *Multi Media* — The number of multimedia calls completed during the listed hour. A multimedia call is a call involving one or more media calls (for example, voice, video, and data) between a multimedia user and other users. This subfield only applies to customers using MMCH (Basic). ■ *Service Link* — The number of service links established during the listed hour. A service link provides voice, video, and data connectivity to a multimedia user. This subfield only applies to customers using MMCH (Basic). ■ *Total* — The total number of calls completed during the listed hour. Calls are counted in the hour they are answered and not in the hour they are dropped. Therefore, a call that starts in one hour and ends in another hour is counted only in the hour it originates. **Suggested Action:** To determine the types of calls during the measurement hour, use the List Measurements Occupancy Summary Report.

Cell Traffic Reports

The Cell Traffic Reports provide hourly and daily summaries of the wireless traffic data.These reports are designed to study the wireless traffic patterns. Used in conjunction with maintenance tests and other tools they are useful for trouble analysis. For example; excessive load on a cell of Wireless Fixed Base (WFB) or too many handovers may indicate deficiencies or potential problem areas in the system.

Command

To display the Cell Traffic Cell Address Report:

1. Type **list measurements cell-traffic [cell-addr <cell-address./summary] [print/schedule]** and press RETURN.

   Options: The **wfb-address, cell-number, yesterday/peak, today/peak/ last-hour, print** and **schedule** options are available for this command.

Screen

Screen 3-13 shows a typical screen for the Cell Traffic summary last-hour report. Table 3-10 on page 3-47 describes the data fields presented in the Cell Traffic summary last-hour report.

```
list measurements cell-traffic summary last-hour
Switch Name:                                Date: 1:01 pm TUE SEP 19, 2000**
                            WIRELESS REPORT : CELL TRAFFIC
                                            =No Measurements *=Invalid Hour
                      Total wireless call connectivity for the hour: 2044
                      Total wireless call connectivity for the day: 2096

Cell      Meas    %Time     Usage     TotBch     PeakBch    %Time    %Time   Hand
Address   Hour    In-Sys    (CCS)     Seized     In-Use     ACB      OutServ Overs
SYSTEM    1400    NA        1224      2112       NA         NA       NA      850
01B03A1   1400    NA        76        132        NA         NA       NA      44
01B03A2   1400    NA        150       240        NA         NA       NA      68
01B03A3   1400    NA        100       140        NA         NA       NA      68
01B03A4   1400    NA        56        140        NA         NA       NA      48
01B03A    1400    100       382       652        10         15       12      NA
01B03A1   1400    NA        72        120        NA         NA       NA      88
01B18A    1400    89        72        120        7          11       10      NA
01B18B1   1400    NA        78        112        NA         NA       NA      48
01B18B2   1400    NA        158       212        NA         NA       NA      68
01B18B3   1400    NA        34        84         NA         NA       NA      80
01B18B4   1400    NA        72        120        NA         NA       NA      88
01B18B    1400    100       342       528        9          15       12      48
```

Screen 3-13. Cell Traffic Summary Last-Hour Report

Table 3-10. Cell Traffic Report

Field	Description
Total Wireless Call Connectivity for the hour	Provides a count of the actual number of calls originated and calls offered as a whole. These are call attempts that may or may not have been completed.
Total Wireless Call Connectivity for the day	Provides a count of the actual number of calls originated and calls offered as a whole. These are call attempts that may or may not have been completed. For the interval extending from midnight until the last hour of the current day.
Cell Address	Location and number in terms of Port Network Number and the Port ID associated with number.
Meas Hour	The starting time (using 24-hour clock) of the hour during which the data was recorded.
%Time In-Sys	The percentage of time during the polling interval that a WFB was administered.
Usage (CCS)	The total time in CCS (Centum Call Seconds/Hundred Call Seconds) that bearer channels are allocated for the WTs (Wireless Terminals) at a cell
TotBch Seized	The number of times the bearer channels were seized by this cell for call or mobility related activities during the polling interval.
PeakBch In-Use	Peak number of traffic bearer channels that are simultaneously in use at a WFB.
%Time ACB	The percentage of time that all ACB (All Channels Busy) traffic bearer channels are simultaneously in use at a WFB during the measurement interval.
%Time OutServ	The percentage of time during the polling interval that a WFB was made busy by maintenance and was not available for call related activities.
Hand Overs	The number of handovers handled by the cell during the measuring period.

Coverage Reports

Call Coverage Measurements Reports

There are two reports that provide measurement information about call coverage.

- The Coverage Path Measurement report describes coverage activity as it relates to the coverage paths.
- The Principal Coverage Measurement Report describes coverage activity as it relates to principal extensions and Personal Central Office Line (PCOL) groups.

For each report, there is a selection screen that lists the specific coverage paths or principal extensions to be measured.

These reports are used to provide information about what happens to calls that go to coverage. The reports can be used to refine and improve call coverage patterns and to manage the system's principals. The reports are used in conjunction with the **list coverage path** and **display coverage sender-group [number]** commands.

Terms

Typically, a principal is the party or group for which a call is originally intended. A principal may be a station user, a hunt group, a terminating extension group, or a PCOL.

Feature Interactions

Bridged Call. A call answered by a bridge of a coverage point extension is considered answered by the coverage point. A call answered by the bridge of a principal is considered answered by the principal.

Call Pick-Up. If the principal is a member of a pickup group, a call ringing at the principal and picked up by a member of the pickup group is considered answered by the principal. If the coverage point extension is a member of a pickup group, a call ringing at the coverage point and picked up by a member of the pickup group is considered answered by the coverage point.

Leave Word Calling and Automatic Callback. A call for which the calling party activates Leave Word Calling (LWC) or Automatic Callback (ACB) before the call is redirected and before it is answered is considered a call back for the principal. If LWC or ACB is activated after the call is redirected, it is considered a call back for the coverage path.

Trunks. CO trunks and other trunks that have ring-back provided by the CO repeatedly attempts to complete the call to the principal. Each attempt is considered a new offered call and is counted for principal or coverage as appropriate.

Data Analysis Guidelines

There is no column for answered calls for principals. Normally, you can assume:

$$Answered\ Calls = Calls\ Offered - [Calls\ Redirected + Calls\ Abandoned + Callback]$$

However, this is not always the case. A number of interactions affect the totals on the measurement reports so that the column totals do not sum to the total calls offered.

Call Forwarding. A forwarded call from the principal is counted as offered or abandoned to the principal. If the call abandons, the call is counted as abandoned at the principal. If the forwarded-to extension is a measured principal, the call is counted as an offered call to the forwarded-to extension, but it does not have an “abandon” or a “redirection” associated with it and appears as answered.

Bridging and Pickup Groups. The principal, the principal bridge and members of their pickup group(s) all have access to a call *even if* it goes to coverage.

If one of these parties answers the call, the count shows the call was offered to the coverage path without a corresponding count of “answered” or “abandoned.” The count is thrown off and the columns do not add up.

Distributed Communications System (DCS). Call Forwarding abandon interactions are different than those described above if forwarding is done off-switch. In that case, each extension is treated as a principal and calls are counted as abandoned if the caller drops the call.

When a call is forwarded across DCS it goes to coverage based on the forwarded-to principal’s path criteria rather than the principal’s unless the principal is using cover-all.

Because the one-switch appearance of DCS is achieved using more than one trunk, ACB and LWC calls are counted as abandoned.

Coverage Path Measurements Selection

You can select up to 100 coverage paths for measurement.

Command

To display the list of coverage paths to be measured:

1. Type **display meas-selection coverage [print/schedule]** and press RETURN.

To display the list of all the coverage paths on your system:

1. Type **list coverage path [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for the display and list commands only.

To change the list of coverage paths to be measured:

1. Type **change meas-selection coverage** and press RETURN.
2. Enter the coverage path number to be measured and press ENTER.

   Coverage path numbers do not have to be in numerical order. If the coverage path you want is not listed, add the coverage path number (if there is space available), or replace an existing coverage path number you no longer need. Press RETURN until the cursor is placed on the unwanted coverage path and enter the new coverage path number, or press CLEAR FIELD and enter the new coverage path number.

Screen

Screen 3-14 shows a typical screen for the Coverage Path Measurements Selection report containing entries for the 100 coverage paths to be measured. Table 3-11 describes the data fields presented in the Coverage Path Measurements Selection report.

```
change meas-selection coverage
                                MEASURED COVERAGE PATHS
Path No.    Path No.    Path No.    Path No.    Path No.    Path No.    Path No.
 1: 1       17:         33:         49:         65:         81:         97:
 2: 6       18:         34:         50:         66:         82:         98:
 3: 68      19:         35:         51:         67:         83:         99:
 4:         20:         36:         52:         68:         84:        100:
 5:         21:         37:         53:         69:         85:
 6:         22:         38:         54:         70:         86:
 7:         23:         39:         55:         71:         87:
 8:         24:         40:         56:         72:         88:
 9:         25:         41:         57:         73:         89:
10:         26:         42:         58:         74:         90:
11:         27:         43:         59:         75:         91:
12:         28:         44:         60:         76:         92:
13:         29:         45:         61:         77:         93:
14:         30:         46:         62:         78:         94:
15:         31:         47:         63:         79:         95:
16:         32:         48:         64:         80:         96:
Command successfully completed
Command:
```

Screen 3-14. Coverage Path Measurements Selection

Table 3-11. Coverage Path Measurements Selection screen

Field	Description
`Path No.`	*Path Number*. Displays the numbers of up to 100 coverage paths selected for measurement.

Coverage Path Measurements Report

The Coverage Path Measurements report contains measurements for each of the 100 selected coverage paths from the Coverage Path Measurement Selection screen.

Command

To display the Coverage Path Measurements Report:

1. Type **list measurements coverage-path [starting path] [count (1-100)] <yesterday-peak/today-peak/last-hour> [external] [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**. You must choose one of these.

   - Enter **yesterday-peak** to list the activity for yesterday's peak hour.
   - Enter **today-peak** to list the activity for today's peak hour.
   - Enter **last hour** to list the activity of the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: There are four options for this command:

   1. **starting path**

      Enter the number of the coverage path you wish to display. This number must have been previously assigned to one of the available numbers on the Coverage Path Measurement Selection screen. If you do not enter a number, all the measured coverage paths are displayed.

   2. **count (1-100)**

      Enter a number between 1 and 100.

   3. **external**

      This option produces a version of the report showing incoming trunk calls only. Attendant extended calls are considered external.

   4. **print** or **schedule**

      This option allows you to print the report immediately or schedule the report to print at another time.

For example, to display yesterday's peak measurements for coverage path 68, type **list measurements coverage-path 68 count 1 yesterday-peak**.

Screen

Screen 3-15 shows a typical screen for the Coverage Path Measurements report. The time and date the report is requested displays at the top right. Table 3-12 describes the data presented in the Coverage Path Measurements report.

```
list measurements coverage-path 68 count 1 yesterday-peak
Switch Name: Cust_Switch Name                      Date: 3:00 pm  Fri MAY 4, 19xx
                              COVERAGE PATH MEASUREMENTS
Path  Meas   Calls  ------ Criteria -------        Point1/4  Point2/5  Point3/6
No.   Hour   Offrd  Act  Bsy   DA  All  SAC  Cback Ans  Abd  Ans  Abd  Ans  Abd
68   1400    20       2    0    4    0   14     3   5    2    3    3    1    3
                                                     1    1    0    0    2    4

Command successfully completed
Command:
```

Screen 3-15. Coverage Path Measurements report

Table 3-12. Coverage Path Measurements Report

Field	Description
`Path No.`	*Path Number*. The number that identifies the measurement coverage path.
`Meas Hour`	*Measurement Hour*. The starting time (using a 24-hour clock) of the last hour or the hour during which the greatest number of calls are offered to the coverage path. **NOTE:** A pair of asterisks in the minute portion of the measurement hour indicates that the switch time was changed during the measurements interval (for example, 10**).
`Calls Offrd`	*Calls Offered*. The total number of calls offered to the path. **Suggested Action:** If this number is large, review the principal report and investigate why calls are not being answered. To find the principal for this coverage path, use the **display coverage sender-group [number]** command.

Continued on next page

Table 3-12. Coverage Path Measurements Report — *Continued*

Field	Description
`Act Criteria`	*Active Criteria*. The number of calls offered to this path due to the principal being active. **Suggested Action:** If this number is large compared to the Calls Offrd field, you should investigate. A possible reason is the path is administered for “active” only.
`Bsy Criteria`	*Busy Criteria*. The number of calls offered to this path due to the principal being busy.
`DA Criteria`	*Don’t Answer Criteria.* The number of calls offered to this path because the principal did not answer the call after the administered number of rings. To find the administered number of rings, use the **display coverage path [number]** command. **Suggested Action:** If this number is large compared to the Calls Offrd field, investigate the reason these calls are leaving the principal. A possible reason is, the path is only administered for “don’t answer”.
`All Criteria`	The number of calls offered to this path due to the use of Cover All.
`SAC Criteria`	*Send-All-Calls Criteria.* The number of calls offered to this path due to the principal’s use of Send-All-Calls, or the calling party using Go To Coverage. **Suggested Action:** If this number, or the All Criteria field, are unusually large, you should investigate why calls are still offered to this principal.
`Cback`	*Call Back.* The number of calls offered to this path where the calling party used LWC or ACB before a coverage point answered the call. These cases are separated out because they are usually considered abandons but counting them as such would be misleading. **Suggested Action:** If this number appears high, verify why calls are not being answered.

Continued on next page

Table 3-12. Coverage Path Measurements Report — *Continued*

Field	Description
`Point Ans`	*Point Answered.* The total number of calls answered by the specified point.
`Point Abd`	*Point Abandoned.* The total number of calls abandoned by the caller while ringing at the specified point. **Suggested Action:** If this number is high, you may want to re-engineer the coverage paths so less traffic is offered to this point.

Principal Coverage Measurements Selection

You can select up to 100 principal extensions or PCOL TACs for measurement.

For definitions of principal extensions and TACs, refer to “Terms” earlier in the ‘‘Call Coverage Measurements Reports’’ section.

Command

To display the list of principal extensions to be measured:

1. Type **display meas-selection principal [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for the display command only.

To change the list of principal extensions to be measured:

1. Type **change meas-selection principal** and press RETURN.
2. Enter the extension to be measured and press ENTER.

   Extension numbers do not have to be in numerical order. If the extension you want is not listed, add the extension number (if there is space available), or replace an existing extension you no longer need. Press RETURN until the cursor is placed on the unwanted extension and enter the new extension number, or press CLEAR FIELD and enter the new extension number.

Screen

Screen 3-16 shows a typical Principal Coverage Measurements Selection screen containing entries for the 100 principal extensions or TACs to be measured. Table 3-13 describes the data fields presented in the Principal Coverage Measurements Selection screen.

```
change meas-selection principal
                                   MEASURED PRINCIPALS
Ext/TAC     Ext/TAC     Ext/TAC     Ext/TAC     Ext/TAC     Ext/TAC     Ext/TAC
 1: 76068   17:         33:         49:         65:         81:         97:
 2: 76069   18:         34:         50:         66:         82:         98:
 3: 76075   19:         35:         51:         67:         83:         99:
 4:         20:         36:         52:         68:         84:        100:
 5:         21:         37:         53:         69:         85:
 6:         22:         38:         54:         70:         86:
 7:         23:         39:         55:         71:         87:
 8:         24:         40:         56:         72:         88:
 9:         25:         41:         57:         73:         89:
10:         26:         42:         58:         74:         90:
11:         27:         43:         59:         75:         91:
12:         28:         44:         60:         76:         92:
13:         29:         45:         61:         77:         93:
14:         30:         46:         62:         78:         94:
15:         31:         47:         63:         79:         95:
16:         32:         48:         64:         80:         96:
Command successfully completed
Command:
```

Screen 3-16. Principal Coverage Measurements Selection

Table 3-13. Principal Coverage Measurements Selection screen

Field	Description
Ext/TAC	*External/Trunk Access Code*. Lists the extension or PCOL TAC numbers of up to 100 principals whose coverage is selected for measurement.

Principal Coverage Measurements Report

The Principal Coverage Measurements report contains measurements for each of the 100 selected principal extensions or TACs from the Principal Coverage Measurements Selection screen.

Command

To display the Principal Coverage Measurements report:

1. Type **list measurements principal [starting extension/tac] [count(1-100)] <yesterday-peak/today-peak/last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**. You must choose one of these.

   - Enter **yesterday-peak** to list the activity for yesterday's peak hour.
   - Enter **today-peak** to list the activity for today's peak hour.
   - Enter **last hour** to list the activity of the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: There are three options available for this command:

   1. **starting extension/tac**

      Enter the number of the extension or PCOL TAC you wish to display. This number must have been previously assigned to one of the 100 available numbers on the Principal Coverage Measurement Selection screen. If you don't enter a number, all the measured principals are displayed.

   2. **count**

      Enter a number between 1 and 100.

   3. **print** or **schedule**

      This option allows you to print the report immediately or schedule the report to print at another time.

   For example, to display yesterday's peak measurements for extension 76068 and the next two principals, in order, type **list measurements principal 76068 count 3 yesterday-peak**.

Screen

Screen 3-17 shows a typical screen for the Principal Coverage Measurements report. The time and date the report is requested displays at the top right. Table 3-14 describes the data fields presented in the Principal Coverage Measurements report.

```
list measurements principal 76068 count 3 yesterday-peak
Switch Name:  Cust_Switch_Name                    Date: 9:14 am  SAT MAY 5, 19xx
                                PRINCIPAL MEASUREMENTS
        Meas  Calls                --------Criteria--------
Ext/TAC Hour  Offrd  Aband  Redir  Act  Bsy  DA  All  SAC  Cback Coverage-Paths
76068   1000  120        6     15    0   15   0   0    0    0     12
76069   1100    8        0      0    0    0   0   0    8    0      1
76075   1400   40        4     30   15   15   0   0    0    5      1    2      5
Command successfully completed
Command:
```

Screen 3-17. Principal Coverage Measurements Report

Table 3-14. Principal Coverage Measurements Report

Field	Description
`Ext/TAC`	*Extension/Trunk Access Code*. The principal extension or PCOL group/TAC being reported.
`Meas Hour`	*Measurement Hour*. The starting time (using 24-hour clock) of the hour during which the data is recorded.
`Calls Offrd`	*Calls Offered*. The total number of calls offered to the principal.
`Aband`	*Abandoned*. The total number of abandoned calls, where the calling party hung up before the call was answered or sent to coverage. **Suggested Action:** If this number is high at the principal, you may need to redirect traffic. $\textit{The number of calls answered by principal} =$ $\textit{Calls Offered} - \textit{Calls Abandoned} - \textit{Calls Redirected}$

Continued on next page

Table 3-14. Principal Coverage Measurements Report — *Continued*

Field	Description
`Redir`	*Redirected.* The total number of calls not answered by the principal and subsequently sent to coverage. **Suggestion Action:** If this number is large compared to `Calls Offrd`, investigate the reasons.
`Act Criteria`	*Active Criteria.* The number of calls sent to coverage by this principal due to the principal being active.
`Bsy Criteria`	*Busy Criteria.* The number of calls sent to coverage by this principal due to the principal being busy.
`DA Criteria`	*Don't Answer Criteria.* The number of calls sent to coverage by this principal because the principal didn't answer the call after the administered number of rings. To find the administered number of rings, use the **display coverage-path [number]** command.
`All Criteria`	The number of calls sent to coverage by this principal due to the principal's use of Cover All.
`SAC Criteria`	*Send All Calls Criteria.* The number of calls sent to coverage by this principal due to the principal's use of Send All Calls, or because the calling party used the Go To Cover feature.
`Cback`	*Call Back.* The number of calls offered to this principal where the calling party used LWC or ACB before the principal answered the call and before it went to coverage. These cases are separated out because they look like abandons and counting them as such would be misleading.
`Coverage-Paths`	The coverage paths used by this principal. To find the associated extensions, use the **display coverage sender-group** command. **NOTE:** This command displays other principals using some coverage paths.

DS1 Link Performance Measurements

This section describes performance measurements for DS1 links. It includes the DS1 Link Performance Measurements Summary Report and the DS1 Link Performance Measurements Detailed Log Report.

Many conventional error measurements rely on the parameter Bit Error Rate to describe the quality of digital transmission facilities. However, with DS1 links, when errors do occur, they tend to be as error bursts rather than single bit errors. Therefore, the Errored Seconds, Bursty-Errored Seconds, Severely-Errored Seconds, and Failed Seconds measurements more accurately describe the operational characteristics of DS1 links.

DS1 link performance is based on the number of error events counted per second. An error event is defined as any one of the following:

- *Misframe*. An error detected as an erroneous bit pattern in the bits used to frame on the DS1 signal.
- *Slip*. An error detected as the deletion or repetition of a single frame. The error is caused by clock differences between systems due to improper synchronization.
- *Extended Superframe Format (ESF) CRC-6 Error*. A data communications error over a DS1 link using the ESF format that is detected as a mismatch between the calculated CRC-6 (6-bit cyclic redundancy check) character appended to the transmitted data and the CRC-6 character recalculated by the receiver.

DS1 link performance is measured by the following error event counts:

- *Errored Second*. Any second that contains one or more error events.

  The percent of Error Free Seconds (%EFS) is defined as:

$$\%EFS = \left[1 - \frac{Errored\ Seconds}{Total\ Seconds}\right] \times 100$$

- *Bursty-Errored Second*. Any second that contains from 2 to 319 error events.
- *Severely-Errored Second*. Any second that contains 320 or more error events.
- *Failed Second*. A state that exists when ten or more consecutive severely-errored seconds are detected. A Failed Second state is cleared when no severely-errored seconds are detected for a period of 10 consecutive seconds.
- *Controlled Slip Second*. Any second with one or more controlled slips (a replication or deletion of a DS1 frame by the receiver).

- *Loss of Frame Count*. The number of times a loss of frame is declared. A loss of frame is declared when there is a continuous loss of signal or out of frame condition for greater than 2.5 seconds.

NOTE:
Events such as a Failed Second or Severely-Errored Second typically result in a serious impact on the customers' applications.

If the misframe or slip errors become too severe, an alarm is raised. The actual rate at which the errors occur determines whether the alarm is minor or major. *DEFINITY ECS Maintenance for G3r* and *DEFINITY ECS Maintenance for G3si*, identify the recommended procedures maintenance personnel should perform to resolve these alarms.

The error event data, collected by the DS1 Interface circuit pack, is available for up to 24 hours in 15-minute increments. Measurement data older than 24 hours is overwritten by the current measurement data.

A system re-boot from tape clears the error event counters. The DS1 error event counters may also be cleared using the **clear measurements ds1 log CabCarSSF** maintenance command.

This command uses the following qualifiers:

Cab	=	Port network number
Car	=	Carrier
SSF	=	Slot

If a TN767 or TN464 circuit pack is removed, or taken out of service, data for that circuit pack is not available for the time the pack is removed. In addition, if a TN767E or TN464F or later suffix circuit pack administered for ESF framing is removed or taken out of service, data for the entire 24-hour collection period is lost since ESF measurements are stored on the board rather than in switch memory.

Summary Report

The DS1 Link Performance Measurements Summary Report provides an indication of the quality of a DS1 link that connects to a DS1 Interface circuit pack.

NOTE:
The error message “Measurements command has timed out. See Traffic Reports manual (555-230-511).” indicates no response was received from the DS1 circuit pack. Try the command again (maximum of two more times). Note, however, this error message may be returned from a “list measurements ds1” or “clear measurements ds1” command that uses the “remote” option (for example, “list measurements ds1 summary 1c19 remote”), if Interface Unit (IU) equipment in the network is deliberately configured not to respond to ESF performance measurements message inquiries. This is a common network setup and should be considered normal. In this case, the command will never succeed. If, however, this error message is displayed when the network or far-end PBX should be responding to the remote ESF performance measurements inquiries, then the IU itself could have problems or there could be problems on the Facility Data Link span. If the command times out three times, and the configuration is one where a reply to the request should be returned, the problem should be escalated to Tier III.

Command

To display the DS1 Link Performance Measurements Summary Report:

1. Type **list measurements ds1 summary <CabCarSSF> [local/carrier-local/remote] [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **CabCarSS**. Enter the port network number, the Carrier number, and the slot number.

   Options: There are four options available for this command:

   1. **local**

      Displays user (local) measurements. These are the user copies of the local (near-end) performance measurements and can be cleared by the user. These measurements cannot be cleared by the carrier.

   2. **carrier-local**

      Displays carrier (network) measurements. These are the carrier copies of the local (near-end) performance measurements. They can only be cleared by the carrier.

3. **remote**

   Displays remote CSU measurements. These measurements are available from the CSU at the far end of the link. They can be cleared from the near end of the link.

4. **print/schedule**

   This option allows you to print the report immediately or schedule the report to print at another time.

Screen

Screen 3-18 shows a typical screen for the DS1 Link Performance Measurements Summary Report. Table 3-15 on page 3-64 describes the data fields presented in DS1 Link Performance Measurements Summary Report.

```
list measurements ds1 summary 1c05
Switch Name: Cust_Switch_Name             Date: 17:59 pm WED APR 13, 19xx

               DS-1 LINK PERFORMANCE MEASUREMENTS SUMMARY REPORT

                               Counted Since: 4:27 pm WED APR 13, 19xx
  Valid 15-Minute Intervals in Last 24 Hours: 6
         Seconds Elapsed In Current Interval: 135   ESF Error Events: 0
  Test: far-csu-loopback             Pattern: 3-in-24   Synchronized: y
          Loopback/Span Test Bit-Error Count: 53       Test Duration: 00:13:26

                              Worst 15-Minute Interval  24-Hour  Current
            Category             Date  Time   Count     Count    Interval Count
            Errored Seconds      4/13  16:42  68        133      24
      Bursty Errored Seconds     4/13  17:57  540       636      0
    Severely Errored Seconds     4/13  17:57  0         0        0
  Unavailable/Failed Seconds     4/13  17:57  3         5        0
     Controlled Slip Seconds     4/13  17:57  100       167      5
         Loss Of Frame Count     4/13  17:57  2         2        0
```

Screen 3-18. DS1 Link Performance Measurements Summary Report

NOTE:
ESF Error Events, Test, Pattern, Synchronized, Loopback/Span Test Bit-Error Count, Test Duration, Controlled Slip Seconds, and Loss Of Frame Count apply only to the TN767E and TN464F or later suffix circuit packs.

Table 3-15. DS1 Link Performance Measurements Summary Report

Field	Description
Counted Since:	The date and time the counters were last cleared and restarted. The counters are set to 0 and start accumulating data when the system is administered or reinitialized. The current system time appears in this field after the system clock is set. Because the Counted Since field is calculated based on the current time, an error message results if the system clock is not set following a system reinitialization.
Valid 15-Minute Intervals in Last 24 Hours:	The total number of 15-minute intervals (0 to 96) in the past 24-hour period with valid values. (An invalid interval is any 15-minute interval during which the system clock was changed, a system reinitialization occurred, or the specified TN767 or TN464 circuit pack was pulled from the carrier. Refer to the DS1 log report for details.)
Seconds Elapsed In Current Interval:	The number of seconds (0 to 899) counted in the current 15-minute interval.
ESF Error Events:	The number of ESF errors (CRC-6 errors or out-of-frame errors) counted with a maximum cumulative value of 65535.
Test:	The type of DS1 loopback/span test currently active. None indicates no test is currently active.
Pattern:	The type of bit pattern generated during an extended duration DS1 loopback/span test. None indicates no pattern is being sent.
Synchronized:	Indicates whether the test pattern generated by the DS1 board is synchronized (detected properly by the receiving DS1 circuit pack). N/A is displayed if no pattern is generated.
Loopback/ SpanTest Bit-Error Count:	The number of bit-errors detected in the received signal when an extended duration loopback test is performed.
Test Duration:	The duration in seconds the extended loopback test has run. The maximum value is 99:59:59 (99 hours, 59 minutes, and 59 seconds).
Errored Seconds	The number of errored seconds for the specified interval (maximum of 900). An errored second is any second in which one or more data transmission errors occurred. N/A indicates the count for that interval is not available, typically because the circuit pack was not inserted during the interval.

Continued on next page

Table 3-15. DS1 Link Performance Measurements Summary Report — *Continued*

Field	Description
Bursty Errored Seconds	The number of bursty errored seconds for the specified interval (maximum of 900). A bursty errored second is any second in which 2 to 319 data transmission errors occurred. N/A indicates the count for that interval is not available. An error count of this severity results in a minor alarm. **Suggested Action:** Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it may be appropriate to alert maintenance personnel if they have not already been alerted.
Severely Errored Seconds	The number of severely errored seconds for the specified interval (maximum of 900). A severely errored second is any second in which 320 or more data transmission errors occurred. N/A indicates the count for that interval is not available. **Suggested Action:** Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it may be appropriate to alert maintenance personnel if they have not already been alerted.
Unavailable/ Failed Seconds	A count of one-second intervals during which service is unavailable (0 to 900).
Controlled Slip Seconds	The number of seconds (0 to 255 — counts greater than 255 are still displayed as 255) with one or more controlled slips (a replication or deletion of a DS1 frame by the receiver).
Loss of Frame Count	The accumulation of the number of times a loss of frame is declared (0 to 255 — counts greater than 255 are still displayed as 255). A loss of frame is declared when there is a continuous loss of signal or out of frame condition for greater than 2.5 seconds. The condition is cleared after 15 seconds without a loss of signal or out-of-frame condition.
Worst 15-Minute Interval	The date, ending time, and count for the 15-minute period that contained the maximum count in each error category. If there are no errors, the field displays 0 with the most recent interval.

Continued on next page

Table 3-15. DS1 Link Performance Measurements Summary Report — *Continued*

Field	Description
`24-Hour Count`	The total count in each error category for the last 24-hour period (0 to 65535 — counts greater than 65535 are displayed as 65535). See Screen 3-22 on page 3-75 to view the last 96 intervals.
`Current Interval Count`	The count in each error category for the 15-minute interval in progress when the report is requested. If no errors have occurred yet in any of the categories during the current 15-minute interval, the respective field contains the number 0. If the system is busy performing call processing functions and cannot respond within 8 seconds, then the field displays N/A.

Detailed Log Report

Th DS1 Link Performance Measurements Detailed Log Report lists errored event records for the past 24 hours. The errored event records are listed for each 15-minute interval. This shows the 96 records (the number of 15-minute intervals in 24 hours) from the current 15-minute interval back to 24 hours before the current interval.

Command

To display the DS1 Link Performance Measurements Detailed Log Report:

1. Type **list measurements ds1 log <CabCarSS> [local/carrier-local/remote] [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **CabCarSS**. Enter the port network number, the Carrier number, and the slot number.

   Options: There are two options available for this command:

   1. **local/carrier-local/remote**

      - Enter **local** to display user (local) measurements.

        These are the user copies of the local (near-end) performance measurements and can be cleared by the user. These measurements cannot be cleared by the carrier.

      - Enter carrier-local to display carrier (network) measurements.

        These are the carrier copies of the local (near-end) performance measurements. They can only be cleared by the carrier.

- Enter **remote** to display remote CSU measurements.

  These measurements are available from the CSU at the far end of the link. They can be cleared from the near end of the link.

2. **print/schedule**

   This option allows you to print the report immediately or schedule the report to print at another time.

NOTE:
The errored event records for TN767E and TN464F or later suffix circuit packs administered for ESF framing are displayed starting from the most recent interval. Measurements for previous suffix TN767 and TN464 boards and for later suffix boards administered for D4 framing are displayed from oldest to newest interval.

Screen

Screen 3-19 and Screen 3-20 on page 3-68 show a typical screen for the DS1 Link Performance Measurements Detailed Log Report. Table 3-16 on page 3-68 describes the data fields presented in the DS1 Link Performance Measurements Detailed Log Report.

```
list measurements dsl log 1c05                                  Page 1  SPE A
Switch Name: cust_switch_name_____              Date: 10:44 pm  WED AUG 31, 19xx

              DS-1 LINK PERFORMANCE MEASUREMENTS DETAILED LOG REPORT

                    Counted Since:10:42 am  TUE AUG 30, 19xx

        Date    Time        ES      BES     SES     UAS/FS CSS      LOFC
        08/30  10:57        0__     0__     0__     0__     N/A     N/A
        08/30  11:12        0__     0__     0__     0__     N/A     N/A
        08/30  11:27        0__     0__     0__     0__     N/A     N/A
        08/30  11:42        0__     0__     0__     0__     N/A     N/A
        08/30  11:57        0__     0__     0__     0__     N/A     N/A
        08/30  12:12        0__     0__     0__     0__     N/A     N/A
        08/30  12:27        0__     0__     0__     0__     N/A     N/A
        08/30  12:42        0__     0__     0__     0__     N/A     N/A
        08/30  12:57        0__     0__     0__     0__     N/A     N/A
        08/30  13:12        0__     0__     0__     0__     N/A     N/A
        08/30  13:27        0__     0__     0__     0__     N/A     N/A
```

Screen 3-19. DS1 Link Performance Measurements Detailed Log Report — Page 1

```
list measurements dsl log 1c05                                    Page 2
Switch Name: cust_switch_name_____              Date: 12:15 pm  WED SEP 14, 19xx

              DS-1 LINK PERFORMANCE MEASUREMENTS DETAILED LOG REPORT

                    Counted Since: 10:42am  TUE AUG 30, 19xx

        Date    Time        ES      BES     SES     UAS/FS  CSS     LOFC

        08/30  13:42        0__     0__     0__     0__     N/A     N/A
        08/30  13:57        0__     0__     0__     0__     N/A     N/A
        08/30  14:12        0__     0__     0__     0__     N/A     N/A
        08/30  14:27        0__     0__     0__     0__     N/A     N/A
        08/30  14:42        0__     0__     0__     0__     N/A     N/A
        08/30  14:57        0__     0__     0__     0__     N/A     N/A
        08/30  15:12        0__     0__     0__     0__     N/A     N/A
        08/30  15:27        0__     0__     0__     0__     N/A     N/A
        08/30  15:42        0__     0__     0__     0__     N/A     N/A
        08/30  15:57        0__     0__     0__     0__     N/A     N/A
        08/30  16:12        0__     0__     0__     0__     N/A     N/A
```

Screen 3-20. DS1 Link Performance Measurements Detailed Log Report — Page 2

Table 3-16. DS1 Link Performance Measurements Detailed Log Report

Field	Description
Date	The date of the 15-minute interval.
Time	The ending time for the 15-minute interval.
ES	*Errored Second*. The number of errored seconds for the specified interval (maximum of 900). An errored second is any second in which one or more data transmission errors occurred. N/A indicates the count for that interval is not available, typically because the circuit pack was not inserted during the interval.
BES	*Bursty Errored Seconds*. The number of bursty errored seconds for the specified interval (maximum of 900). A bursty errored second is any second in which 2 to 319 data transmission errors occurred. N/A indicates the count for that interval is not available. An error count of this severity results in a minor alarm. **Suggested Action:** Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it may be appropriate to alert maintenance personnel if they have not already been alerted.

Continued on next page

Table 3-16. DS1 Link Performance Measurements Detailed Log Report — *Continued*

Field	Description
SES	*Severely Errored Seconds*. The number of severely errored seconds for the specified interval (maximum of 900). A severely errored second is any second in which 320 or more data transmission errors occurred. N/A indicates the count for that interval is not available. An error count of this severity results in a major alarm. **Suggested Action:** Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements it may be appropriate to alert maintenance personnel if they have not already been alerted.
UAS/FS	*Unavailable/Failed Seconds*. The number of seconds the link is in the failed seconds state for the specified interval (maximum of 900). A failed second state exists any time 10 or more consecutive severely-errored seconds occur. N/A indicates the count for that interval is not available. An error count of this severity results in a major alarm. **Suggested Action:** Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it may be appropriate to alert maintenance personnel, if they have not already been alerted.
CSS	*Controlled Slip Seconds*. The number of seconds (maximum of 255) with one or more controlled slips (a replication or deletion of a DS1 frame by the receiver).
LOFC	*Loss of Frame Count.* The accumulation of the number of times a loss of frame is declared (maximum of 255). A loss of frame is declared when there is a continuous loss of signal or out of frame condition for greater than 2.5 seconds. The condition is cleared after 15 seconds without a loss of signal or out-of-frame condition.

DS1 Converter Reports

This section describes performance measurements for the four facilities associated with a DS1 Converter board. It includes the DS1 Converter Link Performance Measurements Summary Report and the DS1 Converter Link Performance Log Report. These reports are available only on the G3r server.

The DS1 Converter board is part of the DS1 Converter Complex which consists of two DS1 Converter boards connected by between one and four facilities (DS1 Facility).

Errors on DS1 facilities tend to occur in error bursts rather than single bit errors. Therefore, the Errored Seconds, Bursty Errored Secs, Severely Errored Secs and Failed Seconds measurements more accurately describe the operational characteristics of DS1 facilities.

There are two DS1 Converter Link Performance Measurements reports:

1. The DS1 Converter Link Performance Measurements Summary Report provides information about the worst 15 minutes, the last 24 hours, and the current 15 minutes for each measurement type.
2. The DS1 Converter Link Performance Measurements Detailed Report displays a detailed log for the last ninety-six 15-minute intervals for each type of data measured.

DS1 facility performance is based on the number of error events counted per second. An error event is defined as any one of the following:

- *Misframe*. An error detected as an erroneous bit pattern in any single frame.
- *Slip*. An error detected as the deletion or repetition of a single frame.
- *Extended Superframe Format (ESF) CRC-6 Error.* A data communications error over a DS1 facility using the ESF format detected as a mismatch between the calculated CRC-6 (6-bit cyclic redundancy check) character appended to the transmitted data and the CRC-6 character recalculated by the receiver.

DS1 link performance is measured by the following error event counts:

- *Errored Second*. Any second that contains one or more error events.

  The percent of Error Free Seconds (%EFS) is defined as:

$$\%EFS = \left[1 - \frac{Errored\ Seconds}{Total\ Seconds}\right] \times 100$$

Figure 3-7. Estimating Attendant Position Requirements

- *Bursty-Errored Second*. Any second that contains from 2 to 319 error events.
- *Severely-Errored Second.* Any second that contains 320 or more error events.
- *Failed Second.* A state that exists when ten or more consecutive severely-errored seconds are detected. A Failed Second state is cleared when no severely-errored seconds are detected for a period of 10 consecutive seconds.

NOTE:
Such events as a Failed Second or Severely-Errored Second typically result in a serious impact on the customers' applications.

If the errors become too severe, an alarm is raised. The actual rate the errors occurred at determines whether the alarm is minor or major. *DEFINITY ECS Maintenance for G3r* and *DEFINITY ECS Maintenance for G3si* identify the recommended procedures maintenance personnel should perform to resolve these alarms.

The error event counters, located on each DS1 Converter board for each administered facility, are polled every 900 seconds (15 minutes). The data is available for up to 24 hours. Measurement data older than 24 hours is overwritten by current measurement data.

A system re-boot from tape clears the error event counters. The DS1 error event counters may also be cleared using the **clear measurements ds1-facility log | esf-error-events | loopback/spantest CabCarSSF** maintenance command.

If a DS1 Converter circuit pack is removed, or taken out of service, data for that circuit pack is not available for the time periods it is removed.

Command

To clear the DS1 Converter measurements:

1. Type **clear measurements ds1-facility log | esf-error-events | loopback/spantest CabCarSSF [local/remote] [print/schedule]** and press RETURN.

   This command uses the following qualifiers:

Cab	=	Cabinet Number
Car	=	Carrier
SS	=	Slot
F	=	Facility

This command is only available on the G3r model. In addition, the user can reset all software counters associated with the specified DS1 Converter circuit pack facility. The **Counted Since** time is also reset and the **Number of Valid Intervals** count is set to zero.

To display the DS1 Converter Performance Measurements Summary:

1. Type **list measurements ds1-facility summary CabCarSSF [local/carrier-local/remote] [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

To display theDS1 Converter Performance Measurements Detailed report:

1. Type **list measurements ds1-facility log CabCarSSF [print/schedule]** and press RETURN.

   This command uses the same qualifiers as the “clear measurements” command above.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-21 on page 3-73 shows a typical screen for the DS1-Facility Summary Report. Table 3-17 on page 3-73 describes the data fields presented in the DS1-Facility Summary Report. Screen 3-22 on page 3-75 shows a typical DS1-Facility Detailed Log Report. Table 3-18 on page 3-75 describes the data fields presented in the DS1-Facility Log Report.

```
list measurements dsl-facility summary 1c21a
Switch Name: Cust_Switch_Name                    Date: 2:51 pm WED SEP 25, 19xx

    DS-1 FACILITY LINK PERFORMANCE MEASUREMENTS SUMMARY REPORT

                              Counted Since: 9:03 am WED SEP 25, 19xx
Valid 15-minute Intervals in Last 24 Hours: 96
     Seconds Elapsed Into Current Interval: 875   ESF Error Events: N/A
Test: N/A                           Pattern: N/A       Synchronized: N/A
        Loopback/Span Test Bit-Error Count: N/A      Test Duration: N/A

                         Worst 15-Minute Interval   24-Hour   Current
        Category            Date   Time   Count     Count     Interval Count

           Errored Seconds  9/24   09:03  0         0         0
    Bursty Errored Seconds  9/24   09:03  0         0         0
  Severely Errored Seconds  9/24   09:03  0         0         0
Unavailable/Failed Seconds  9/24   09:03  0         0         0
   Controlled Slip Seconds  N/A    N/A    N/A       N/A       N/A
       Loss of Frame Count  N/A    N/A    N/A       N/A       N/A
```

Screen 3-21. DS1-Facility Summary Report

Table 3-17. DS1 Converter Performance Measurements Summary Report

Field	Description
Counted Since	The date and time when the associated measurement counters are cleared or the DS1 Converter facility is administered. The counters are set to 0 and start accumulating data when the system is administered or re-initialized. The current system time appears in this field after the system clock is set. Since the Counted Since field is calculated based on the current time, an error message is prompted back to the user if the system clock is not set following a system re-initialization.
Valid 15-Minute Intervals in Last 24 Hours	The total number of 15-minute intervals (0 to 96) in the past 24-hour period that contain valid data. The Valid Interval field indicates whether or not a valid count is provided by the DS1 interface circuit pack. A value of y indicates that all counts are valid for the interval. A value of n indicates that the interval is invalid. An invalid interval is any 15-minute time interval during which the system clock is changed, a system re-initialization occurred, or the specified circuit pack is pulled from the carrier.

Continued on next page

Table 3-17. DS1 Converter Performance Measurements Summary Report — *Continued*

Field	Description
Seconds Elapsed In Current Interval	The number of seconds (0 to 899) counted in the current 15-minute interval.
ESF Error Events	The number of ESF errors (CRC-6 errors or out-of-frame errors) counted with a maximum cumulative value of 65535.
Test	The type of DS1 loopback/span test currently active. None indicates no test is currently active.
Pattern	The type of bit pattern generated during an extended duration DS1 loopback/span test. None indicates that no pattern is being sent.
Synchronized	Indicates whether the test pattern being generated by the DS1 board is synchronized (detected properly by the receiving DS1 circuit pack). N/A is displayed if no pattern is generated.
Loopback/ SpanTest Bit-Error Count	The number of bit-errors detected in the received signal when an extended duration loopback test is performed.
Test Duration	The duration in seconds the extended loopback test runs. The maximum value is 99:59:59 (99 hours, 59 minutes, and 59 seconds).
Category	The type of error to which the count applies (errored seconds, bursty errored seconds, severely errored seconds, unavailable/failed seconds, controlled slip seconds, and loss of frame count). For more information about these categories, refer to Table 3-6 on page 3-33.
Worst 15-Min Interval	The date, ending time, and count for the 15-minute period that contains the maximum value for each error category. If there are no errors, the field displays 0 with the most recent interval, or N/A if no data is collected.
24-Hour Count	The total count in each error category for the last 24-hour period (0 to 65535 — counts greater than 65535 are still displayed as 65535). To view the last 96 intervals, refer to Screen 3-22 on page 3-75.
Current Interval Count	The count so far in each category for the 15-minute interval in progress when the report is requested. If no errors have occurred yet in any of the categories during the current 15-minute interval, the respective field contains the number 0. If the system is busy performing call processing functions and cannot respond within 8 seconds, then the field displays N/A.

Screen 3-22 shows one page of a typical DS1 Facility Log Report. This report shows errors in fifteen-minute intervals, over the last twenty-four hour period, and usually extends for several pages. The headings and type of information shown here do not change on subsequent pages.

```
list measurements ds1-facility log le21a                          Page 1
Switch Name: Cust_Switch_Name                Date: 2:55 pm WED SEP 25, 19xx

     DS-1 FACILITY LINK PERFORMANCE MEASUREMENTS DETAILED LOG REPORT

                Counted Since:  9:03 am WED SEP 25, 19xx

     Date    Time       ES     BES    SES    UAS/FS   CSS     LOFC
     9/25    09:18      0      0      0      0        N/A     N/A
     9/25    09:33      0      0      0      0        N/A     N/A
     9/25    09:48      0      0      0      0        N/A     N/A
     9/25    10:03      0      0      0      0        N/A     N/A
     9/25    10:18      0      0      0      0        N/A     N/A
     9/25    10:33      0      0      0      0        N/A     N/A
     9/25    10:48      0      0      0      0        N/A     N/A
     9/25    11:03      0      0      0      0        N/A     N/A
     9/25    11:18      0      0      0      0        N/A     N/A
     9/25    11:33      0      0      0      0        N/A     N/A
press CANCEL to quit -- press NEXT PAGE to continue
```

Screen 3-22. DS1-Facility Log Report

Table 3-18. DS1 Converter Performance Measurements Detailed Log Report

Field	Description
Date	The time and date of the current report.
Counted Since	The start time and date when the associated measurement counters are cleared or the DS1 Converter facility is administered.
Date and Time	The date and end time of the 15-minute interval.
ES	*Errored Seconds.* The number of the errored seconds for the specified 15-minute interval (maximum of 900). An errored second is any second in which one or more data transmission errors occurred. “N/A” indicates the count for that interval is not available, typically because the circuit pack was not inserted during that interval.

Continued on next page

Table 3-18. DS1 Converter Performance Measurements Detailed Log Report — *Continued*

Field	Description
BES	*Bursty Errored Seconds.* The number of bursty errored seconds for the specified interval (maximum of 900). A bursty errored second is any second in which 2 to 319 data transmission errors occurred. “N/A” indicates the count for that interval is not available. An error count of this severity results in a minor alarm. **Suggested Action:** Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it may be appropriate to alert maintenance personnel if they have not already been alerted.
SES	*Severely Errored Seconds.* The number of the severely errored seconds counter for the specified interval (maximum of 900). A severely errored second is any second in which 320 or more data transmission errors occur. N/A indicates the count for that interval is not available. An error count of this severity results in a major alarm. **Suggested Action:** Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements it may be appropriate to alert maintenance personnel, if they have not already been alerted.
UAS/FS	The value of the unavailable or failed seconds counter for the specified interval (maximum of 900). A failed second state exists any time that 10 or more consecutive severely errored seconds occur. An error count of this severity results in a major alarm. N/A indicates the count for that interval is not available. **Suggested Action:** Resolution of the alarm should, in most cases, be the function of maintenance personnel. Depending upon local arrangements, it may be appropriate to alert maintenance personnel, if they have not already been alerted.
CSS	*Controlled Slip Second*. Any second with one or more controlled slips (a replication or deletion of a DS1 frame by the receiver).
LOFC	*Loss of Frame Count*. The number of times a loss of frame is declared. A loss of frame is declared when there is a continuous loss of signal or out of frame condition for greater than 2.5 seconds.

Emergency Access Calls Report

The Emergency Access Calls report tracks emergency calls by extension, event, type of call, and time of day. This report prints in the system journal printer with name, time and event code (attendant crisis alert).

Command

To display the Emergency Access Calls report:

1. Type **list emergency [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available with this command.

Screen

Screen 3-23 shows a typical screen for the Emergency Access Calls report. Table 3-19 describes the data presented in the Emergency Access Calls report.

```
list emergency

                              EMERGENCY ACCESS CALLS
          Extension     Event                 Type of Call              Time
          3104          crisis alert          ars alrt call type        11:21 A
          3405          crisis alert ack'd    ars alrt call type        11:22 A
          3104          crisis pager1 pass    ars alrt call type        11:23 A
          3104          crisis pager2 pass    ars alrt call type        11:24 A
          3104          crisis pager3 pass    ars alrt call type        11:25 A
          3104          crisis pager1 fail    ars alrt call type        11:23 A
          3104          crisis pager2 fail    ars alrt call type        11:24 A
          3104          crisis pager3 fail    ars alrt call type        11:25 A
```

Screen 3-23. Emergency Access Calls report

Table 3-19. Emergency Access Calls report

Field	Description
Extension	The extension where the crisis alert originated.
Event	The event code for the emergency access call: ■ crisis alert—crisis alert sent ■ crisis alert ack'd—crisis alert acknowledged ■ crisis pager pass—crisis alert sent to a pager ■ crisis pager fail—crisis alert sent to a pager and the page failed
Type of Call	The type of call that is being logged: ■ ars slrt call type ■ feature access code ■ off hook alert
Time	The time (A–AM or P–PM) the crisis alert originated (for example, 11:21 A).

Hunt Group Reports

This section describes the traffic measurements, performance, and status reports for ACD/UCD/DDC Hunt Groups.

For more detailed ACD measurements, the BCMS or CMS option is recommended. Contact your Avaya Account Team.

Hunt Groups List Report

The Hunt Groups List report lists the hunt groups on your system.

Command

To display the Hunt Groups list report:

1. Type **list hunt group [number] [to-number *x*] [name *x*] [type *x*] [ext *x*] [to-ext *x*] [count *n*] [print/schedule]** and press RETURN.

   Options: There are eight options for this command:

   1. **number *x***

      Enter the beginning hunt group number.

   2. **to-number *x***

      Enter the ending hunt group number.

   3. **name *x***

      Enter the hunt group name.

   4. **type *x***

      Enter the hunt group type.

   5. **ext *x***

      Enter the beginning hunt group extension.

   6. **to-ext *x***

      Enter the ending hunt group extension.

   7. **count *n***

      Enter the number of hunt groups to list.

   8. **print** and **schedule**

      This option allows you to print the report immediately or schedule the report to print at another time.

Screen

Screen 3-26 shows a typical screen for the Hunt Groups list report. Table 3-22 describes the data presented in the Hunt Groups list report.

```
list hunt-group
                                        HUNT GROUPS
Grp Grp
No. Name/                   Grp      ACD/          Que No. Cov  Notif/  Dom    Message
    Ext.                    Typ     MEAS  Vec MCH   Siz Mem Path Ctg Adj Ctrl   Center

1   hu 1 meas vec
    3001                    ucd-mia  y/B   y  many 5   4        n              n
2   hu 2 meas vec
    3002                    ucd-mia  n/-   y  none 5   11       n              n
33  hu 33 non acd
    3003                    ucd-mia  n/-   n  none S   5    1   n              n
```

Screen 3-24. Hunt Groups List report

Table 3-20. Hunt Groups List Report

Field	Description
Grp No.	*Group Number*. This display-only field shows the number of a hunt group.
Grp Name/Ext	*Group Name/Extension*. This display-only field shows the name administered for the hunt group and the extension.
Grp Typ	*Group Type*. This display-only field shows the type of the hunt group. See the Group Type field description for page 1 of the Hunt Group screen.
ACD/MEAS	*Automatic Call Distribution/Measured*. ACD indicates whether Automatic Call Distribution is used. Measured provides the measurement data for the ACD split/skill collected (internal to the switch) for VuStats or BCMS. **y**/**n**—Indicates whether the hunt group functions as an ACD split/skill. **I** (internal), **E** (external), **B** (both), or **N** (none)—Indicates how it is measured.
Vec	*Vector*. This display-only field shows an indicator of whether the hunt group is controlled by a vector. See the Vector field description for page 1 of the Hunt Group screen.

Continued on next page

Table 3-20. Hunt Groups List Report — *Continued*

Field	Description
MCH	*Multiple Call Handling*. This display-only field shows the MCH type assigned to the hunt group. ■ **none**— ■ **req**—For on-request ■ **one**—For one-forced ■ **per**—For one-per-skill ■ **many**—For many-forced
Que Siz	*Queue Size*. This display-only field shows the maximum number of calls that can be in queue for the hunt group.
No. Mem	*Number of Members*. This display-only field shows the actual number of hunt group members.
Cov Path	*Coverage Path*. This display-only field shows the number of the coverage path for the hunt group.
Notif/Ctg Adj	*Notifying/Controlling Adjunct*. A display-only field. ■ **N—**Notification. Contains the extension of the ASAI application link that has the notification. You can have up to three ASAI applications monitoring a single hunt group. ■ **C—**Controlling adjunct. Displays the extension of the controlling adjunct. You can have one controlling adjunct for each hunt group. ■ **n—**None.
Dom Ctrl	*Domain Control*. This display-only field shows the extension of the ASAI link over which the domain split is set up.
Message Center	This display-only field shows an indicator of the type of message (if any) used. See the Messaging Center field description for page 2 of the Hunt Group screen.

Hunt Group Members Report

The Hunt Group Members report helps you administer a split or skill to verify that all agents are logged out and to identify any agents logged in. This report lists all logged in agents for a split or skill, or limits the list to a range of login IDs or physical extensions.

NOTE:
You can use the **list members hunt-group** command to list the agents administered in non-ACD hunt groups. However, since non-ACD hunt groups do not use agent logins, the report will display all administered agents.

Command

To display the Hunt Group Members report:

Type **list members hunt-group <hunt group number> [name *x*] [logname *x*] [loginid *x*] [to-loginid *x*] [ext *x*] [to-ext *x*] [count *n*] [print/schedule]**

Required Fields: There is one required field for this command — **hunt group number**. Enter the hunt group number

Options: There are eight options for this command:

1. **name *x***

   Enter the hunt group member extension name.

2. **logname *x***

   Enter the login ID extension name.

3. **loginid *x***

   Enter the beginning login ID extension.

4. **to-loginid *x***

   Enter the ending login ID extension.

5. **ext *x***

   Enter the beginning hunt group member extension.

6. **to-ext *x***

   Enter the ending hunt group member extension.

7. **count *n***

   Enter the number of members to list

8. **print** and **schedule**

   This option allows you to print the report immediately or schedule the report to print at another time.

Screen

Screen 3-26 shows a typical screen for the Hunt Groups Members report. Table 3-22 describes the data presented in the Hunt Groups Members report.

```
list members hunt-group 37
                                   HUNT GROUP MEMBERS
Group Number:  37     Group Name:  Platinum Card     Group Extension:  3002
  Group Type:  ucd-mia      ACD?  y      Skill?  y           Members:  4


    Phys   Phys              Login  Login            Agt     Per       Wrk
    Ext    Name              Ext    Name             Prf Lvl All SO DL Tim Occ
1:  1002   1002-Al MacInni   2902   Agent 2902       grt 04      y      10  33
2:  1022   1022-Kelly Chas   2901   Agent 2901       lvl 14      n      15  55
3:  1001   1001-Chris Pron   2904   Agent 2904       pal R2               0   0
4:  1021   1021-Maria Esta   2903   Agent 2903       pal 08   30         18  45
```

Screen 3-25. Hunt Group Members report

Table 3-21. Hunt Group Measurements Report

Field	Description
Group Number	The number of the hunt group.
Group Name	The name administered for the hunt group.
Group Extension	The extension administered for the hunt group.
Group Type	Indicates the type of the hunt group. See the Group Type field description for page 1 of the Hunt Group screen.
ACD	*Automatic Call Distribution*. Indicates whether Automatic Call Distribution is used.
Skill	Indicates whether the hunt group functions as an ACD skill.
Members	The number of hunt group members.
Phys Ext	*Physical Extension (ACD, non-ACD, or EAS)*. The physical station extension of the hunt group member.
Phys Name	*Physical Name (ACD, non-ACD, or EAS)*. The physical station name of the hunt group member.
Login Ext	*Login ID Extension (EAS only)*. The login ID extension of the hunt group member.

Continued on next page

Table 3-21. Hunt Group Measurements Report — *Continued*

Field	Description
Login Name	*Login ID Name (EAS only)*. The login ID extension name of the hunt group member.
Agt Prf	*Call Handling Preference (EAS only)*. The call handling preference routes calls based on agent skill level, greatest need, or percent allocation. ■ lvl—skill level ■ grt—greatest need ■ pal—percent allocation
Lvl	*Skill Level or Reserve Level (EAS only)*. The skill level routes incoming calls to an available agent with the skill assigned. The skill levels are as follows: ■ 01 - 02 (Skill Level)—without EAS PHD ■ 01 - 16 (Skill Level)—with EAS PHD ■ R1 - R2 (Reserve Level)—with EAS and CentreVu Advocate
Per All	*Percent Allocation (EAS and Centrevu Advocate only)*. Indicates percentage of this agents time devoted to this skill (0 - 100). Displays only if Call Handling Preference (Agt Prf) is percent allocation.
SO	*Service Objective (EAS and Centrevu Advocate only)*. Indicates whether Service Objective is active for this agent. Displays only if Call Handling Preference (Agt Prf) is skill level or greatest need.
DF	*Direct Agent Calls First (EAS and Centrevu Advocate only)*. Indicates whether Direct Agent Calls delivered first to this agent. Displays only if Call Handling Preference (Agt Prf) is percent allocation.
Wrk Tim	*Work Time (EAS and Centrevu Advocate only)*. The ratio of agent work time in this skill and agent staffed time.
Occ	*Occupancy (EAS and Centrevu Advocate only)*. The ratio of agent work time in all skills and agent staffed time.

Hunt Group Measurements Report

The Hunt Group Measurements Report assists you in monitoring and managing the DDC and UCD hunt groups and ACD splits. These features permit incoming calls to be terminated directly to a prearranged group of answering positions.

This report shows hunt group measurements for yesterday's peak hour, today's peak hour (as of the time of day that this report is run), and the last hour. A peak hour is the hour within a 24-hour period with the greatest usage for the specified day.

Command

To display the Hunt Group Measurements Report:

1. Type **list measurements hunt-group <yesterday-peak/today-peak/last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**.

   - Enter **yesterday-peak** to list the hunt group activity for yesterday's peak hour.
   - Enter **today-peak** to list the hunt group activity for today's peak hour.
   - Enter **last hour** to list the hunt group activity of the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-26 shows a typical screen for the Hunt Group Measurements report, using the last-hour option. The time and date the report is requested displays at the top right. Table 3-22 describes the data presented in the Hunt Group Measurements report.

```
list measurements hunt-group last-hour
Switch Name: Customer-Name                        Date: 4:16 pm  MON JUL 1, 19xx
                            HUNT GROUP MEASUREMENTS
Grp  Grp                       Grp  Meas Total Calls Que Calls Que  Time  Speed
No.  Name                      Siz/ Hour Usage Ans/  Siz Que.  Ovfl Avail Answer
                               Typ.            Aban.                       (sec)
1   Dial-up SAT’s               4   1500 36    0     0   0     0    108   0
                                ucd            0
2   manual hunt group           1   1500 0     0     5   0     0    36    0
                                ucd            0
3   CC_Capacity_3               0   1500 0     0     15  0     0    0     0
                                ead            0
4   CC_Capacity_4               0   1500 0     0     15  0     0    0     0
                                ead            0
5   CC_Capacity_5               0   1500 0     0     15  0     0    0     0
                                ead            0
6   CC_Capacity_6               0   1500 0     0     15  0     0    0     0
                                ead            0
                press CANCEL to quit --  press NEXT PAGE to continue
```

Screen 3-26. Hunt Group Measurements Report

Table 3-22. Hunt Group Measurements Report

Field	Description
`Grp No.`	*Group Number*. A number that identifies each hunt group.
`Grp Name`	*Group Name*. Name assigned, during administration, to the hunt group.
`Grp Siz/Typ`	*Group Size*. The number of extensions assigned to the hunt group (not necessarily staffed). *Group Type*. Identifies the type of hunt group, which may be one of the following: ■ DDC - direct department calling ■ UCD - uniform call distribution ■ EAD - expert agent distribution
`Meas Hour`	*Measurement Hour*. The starting time (using the 24-hour clock) of the hour during which the data was recorded.

Continued on next page

Table 3-22. Hunt Group Measurements Report — *Continued*

Field	Description
`Total Usage`	The sum of all times (in CCS) that the members of a hunt group are busy on hunt group calls. Total Usage is the most important parameter for this report. The maximum possible usage is: $Maximum\ Possible\ Usage = 36\ CCS \times Total\ \#\ of\ Members$ **Suggested Action:** If the Total Usage number approaches the total CCS, you may consider adding another extension to the hunt group but only staffing it during the peak hours. If the hunt group has several extensions and the Total Usage is low, this may be acceptable if the personnel perform other duties. **NOTE:** ACD hunt groups administered to support Multiple Call Handing displays a series of 5 asterisk (*****) in the total usage field. This measurement is not collected for ACD hunt groups that support Multiple Call Handling.
`Calls Ans/Aban.`	*Calls Answered/Abandoned*. The total number of calls which attempt to reach the hunt group but abandon the attempt before being answered. Calls may abandon either while in the hunt group queue or while ringing a hunt group extension. This total does not include calls answered by Call Pick Up, other hunt groups, or calls abandoned while listening to a forced first announcement. **NOTE:** ACD calls redirected to other splits within the system via the intraflow feature are not counted as abandoned calls. ACD calls redirected to another switch (interflow feature) are not counted as abandoned calls. **Suggested Actions:** Observe times during which the Calls Abandoned number may be higher than desired. Subsequently, consider adding one or more agents to the hunt group and staffing these additional positions during the problem times. Also, see “Suggested Action” in the “Total Usage” description.

Continued on next page

Table 3-22. Hunt Group Measurements Report — *Continued*

Field	Description
`Que Size`	*Queue Size*. The length of the queue assigned to the hunt group during administration. **Recommendations:** There are no specific guidelines for setting queue size. However, the following general recommendations apply. The queue size should be larger than the group size; but, typically not more than three times as large as the group size. An indication the queue size is too large is the observance of a higher than expected number for the Calls Aban field. An indication the queue size is too small is that a larger than expected number of Queue Ovfls occurred.
`Calls Que.`	*Calls Queued*. Total number of calls that arrive to find all members of the hunt group busy and are placed in the hunt group queue. Calls Queued includes all calls that go to coverage.
`Que Ovfl`	*Queue Overflow*. The number of calls that arrive when all slots in the hunt group queue are occupied.
`Time Avail`	*Time Available*. The total time (in CCS) the hunt group extensions are not in use but are available to receive hunt group calls during the measurement hour. Time Available is calculated only when an agent (extension) is ready to receive calls from the specified hunt group. For example, if the hunt group had four extensions and each was available for 15 minutes during the measurement hour, the total time available would be 60 minutes or 36 CCS. **NOTE:** ACD hunt groups administered to support Multiple Call Handing displays a series of 5 asterisk (*****) in the total usage field. This measurement is not collected for ACD hunt groups that support Multiple Call Handling.
`Speed Answer (sec)`	*Speed of Answer (seconds)*. The average time interval (in seconds) from when the call first enters the hunt group or hunt group queue until the call is answered by a hunt group member. This does not include the time taken by a forced first announcement.

Data Analysis Guidelines

The following guidelines are intended to show an easy method for determining whether currently reported data is acceptable or not. These guidelines represent the minimum you should do to verify the recorded measurement values are consistent with expected and historic values. You should perform additional checks as necessary.

To check the acceptability of hourly Hunt Group Measurements Reports, verify the following:

- The system clock or group size has not been changed during the measurement hour.
- The average time agents spend working on calls is typically between 60 and 300 seconds. The actual application and specific types of work being performed may permit you to arrive at a more precise number. If your calculated average call length is out of this range, it should be investigated.

NOTE:
Total Usage plus Total Avail (both in CCS) should not exceed 36 X the group size. For example, with a hunt group containing two extensions, total usage measured should not exceed 2 X 36 = 72 CCS for data collection.

Analyzing the Data

The Hunt Group Data Worksheet serves to back up the data from the reports and to provide an easy means for identifying the peak hour. The data from the identified peak hour should be used in subsequent calculations.

Before analyzing data obtained from the hunt group reports, several additional considerations relating to both ACD hunt groups and non-ACD hunt groups need mentioning. This information includes their similarities and differences.

NOTE:
It should be realized that data collected in a real-time environment, such as what actually happens, virtually always deviates from the theoretically predicted data because of the asynchronous nature of processes and interactions with other events such as maintenance.

Important Considerations for Both ACD and Non-ACD Hunt Groups

1. *Total Usage:* If the extension is a member of more than one hunt group, then Total Usage is only accumulated for the group that answers the call. But, Time Avail is decremented for all groups. For example, assume extension x3000 belongs to hunt groups 1, 2, and 3. Furthermore, assume a call terminates on hunt group 2 and x3000 answers the call. The end result is that usage time is accumulated for hunt group 2 (thus increasing Total Usage for group 2 and decrementing Time Avail for groups 1, 2, and 3).

   Time (Total Usage) is not accumulated when a hunt group member is on an incoming or outgoing personal call.

2. *Time Avail:* If an extension is a member of more than one hunt group, then Time Avail is accumulated for each group. For example, assume extension x3000 belongs to hunt groups 1, 2, and 3. Furthermore, assume extension x3000 is available for the full measurement hour. The end result is that 36 CCS is added to Time Avail for hunt groups 1, 2, and 3.

   Time (Time Available) is not accumulated when a hunt group member is on an incoming or outgoing personal call.

Differences Between Non-ACD and ACD Hunt Groups

For Non-ACD Hunt Groups

1. *Calls Ans:* Incoming calls that route to call coverage (or don't answer criteria) accumulate time (Total Usage and Time Avail) as if they are answered within the hunt group. Furthermore, calls to a hunt group picked up by a member of a pickup group are counted as answered within the hunt group.
2. *Calls Aband:* Incoming calls that route to call coverage (or don't answer criteria) are counted as abandoned, for the hunt group, if the caller hangs up when the call is at the ringing coverage point.
3. *Speed of Answer:* Speed of Answer includes any and all times spent in covering to other stations, but does not include the time spent for forced first announcements.

For ACD Hunt Groups

1. *Calls Aband:* If the caller hangs-up when the call is in queue or while ringing at the agent's position, the call is counted as abandoned. If all members of an ACD split are logged out or in Aux-work mode, incoming ACD calls are not queue for the split and, therefore, are never counted as abandoned.
2. *Speed of Answer:* The Speed of Answer count is set to zero every time a call reaches a new coverage point.

   NOTE:
   Because of this difference, the Speed of Answer values for ACD hunt groups tend to be less (smaller) than for non-ACD type hunt groups.
3. *Calls Ans:* Calls that go to call coverage (or don't answer criteria) and are answered at the coverage point are not included in the number displayed for this report. Unlike non-ACD hunt groups, the ACD hunt group member who initially received the call is available to answer other ACD calls while the coverage point is answering the covered call.
4. *Time Avail* — Not accumulated for ACD calls that go to coverage.
5. *Total Usage* — Not accumulated for ACD calls that go to coverage.

Total Usage

Total Usage is the sum of all times the members of a hunt group are busy on incoming group calls.

$$Total\ Holding\ Time\ (in\ seconds) = \sum of\ the\ individual\ Holding\ Time\ (in\ sec)$$

$$Total\ Usage\ (in\ seconds) = Total\ Holding\ Time\ (in\ seconds)$$

Figure 3-8. Estimating Attendant Position Requirements

For demonstration purposes, we consider a hunt group with 3 calls. Assume the call durations were of 480, 300, and 220 seconds.

$$Total\ Usage\ (in\ seconds) = 480 + 300 + 220\ seconds$$

$$Total\ Usage\ (CCS) = \frac{1000\ seconds}{100\ seconds\ per\ CCS}$$

$$Total\ Usage\ (CCS) = 10\ CCS$$

Figure 3-9. Estimating Attendant Position Requirements

Average Holding Time

With the number of Calls Answered and the number for Total Usage, the average length of time the hunt group members spend answering the calls (Average Holding Time) may be calculated. The calculation is as follows:

$$Average\ Holding\ Time = \left[\frac{Total\ Usage\ CCS}{Calls\ Answered}\right] \times \frac{100\ Seconds}{CCS}$$

Figure 3-10. Estimating Attendant Position Requirements

For demonstration purposes, we consider the following calculations.

$$Average\ Holding\ Time = \left[\frac{10\ CCS}{3\ calls}\right] \times \frac{100\ seconds}{CCS}$$

$$Average\ Holding\ Time = 333\ seconds\ (or\ 5\ minutes\ \text{and}\ 33\ seconds\ per\ call)$$

Figure 3-11. Estimating Attendant Position Requirements

Hunt Group Performance Report

The Hunt Group Performance report gives the slowest hourly average speed of answer for each hunt group for either the previous day or the current day (yesterday or today) along with the hour the measurement occurred. The report displays the information both graphically and numerically.

Command

To display the Hunt Group Performance Report:

1. Type **list performance hunt-group <yesterday/today> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday/today**.

   - Enter **yesterday** to list the hunt group performance activity for yesterday.
   - Enter **today** to list the hunt group performance activity for today.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-27 shows a typical screen for the Hunt Group Performance report, using the **yesterday** option. Table 3-23 describes the data fields presented in the Hunt Group Performance report.

```
list performance hunt-group yesterday
Switch Name: Cust_Switch_Name              Date: 6:13 pm  THU MAR 30, 19xx
                              Hunt Group Performance

No. Size Type 1 2 3 4 5 6 7 8 9 10 20 40 60 80 100 200  Ans(sec) Hour  Avg.
1   3    ucd  ///                                        2       1800   3
2   2    ddc  ///////////////////////                    23      1500   4
3   5    ddc  //////////////////////                     17      1100   3
4   9    ucd  ///////////////                            8       1100   4
5   2    ucd  ////////////////////////                   31      1500   7
6   1    ddc  ////////////////////                       11      1600   5
7   6    ucd  /////////                                  5       1600   3
8   4    ddc  //////////////////                         10      1600   7
Command successfully completed
Command:
```

Screen 3-27. Hunt Group Performance Report

Table 3-23. Hunt Group Performance Report

Field	Description
`No.`	*Number*. A number that identifies each hunt group.
`Size`	The number of extensions assigned to the hunt group (not necessarily staffed).
`Type`	Identifies the type of hunt group, which may be one of the following: ■ DDC - direct department calling ■ UCD - uniform call distribution ■ EAD - expert agent distribution
`1 2 3 4 5 6 7 8 9 10 20 40 60 80 100 200`	*Slowest Speed of Answer (seconds)*. A bar graph representation of the “slowest hourly average speed of answer” for the report interval (either yesterday or today).
`Ans (sec)`	*Answer* in seconds. The number of seconds corresponding to the “slowest hourly average speed of answer” (longest amount of time to answer) for the report interval. This time includes queue time and ring time, but does not include the time spent on a forced first announcement.

Continued on next page

Table 3-23. Hunt Group Performance Report — *Continued*

Field	Description
`Hour`	*Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded**.** **Suggested Actions:** From analyzing Screen 3-27 on page 3-93 you can determine hunt group #5 has the "slowest hourly speed of answer" for all of yesterday. The value was 31 seconds and the time interval was 1500 hours (3:00 p.m. to 4:00 p.m.). If this time interval happens to be the peak usage hour as indicated from the list measurements hunt group yesterday-peak report, then consider adding/staffing more agents during the peak hour.
`Avg.`	*Average*. The number corresponding to the 24-hour daily "average speed of answer" for each hunt group. $$Daily\ Average = \frac{\sum\ of\ the\ Delays\ For\ Each\ Answered\ Call}{Total\ \#\ of\ Answered\ Calls\ (so\ far\ today)}$$

Hunt Group Status Report

The Hunt Group Status report gives an instantaneous indication of the load pending (number of calls waiting to be serviced) for various hunt groups. The report also indicates the length of time the oldest call in the queue has been waiting for service.

NOTE:
The information on this report is updated every 60 seconds.

Command

To display the Hunt Group Status report:

1. Type **monitor traffic hunt-groups [starting group number]** and press RETURN.

   Options: Enter the number of the hunt group that you want to begin the list. This is referred to as the starting group number. The report displays a list of 32 consecutively numbered hunt groups. The default is to begin the report with hunt group 1.

   Because the command is constantly updating, you must press cancel key to end the report.

Screen

Screen 3-28 shows a typical screen for the Hunt Group Status Report.

Each screen displays 32 hunt group fields, even though they may not all be administered. If the hunt group is not administered then its corresponding fields are blank. For each administered hunt group, the report displays the time the first call in the queue has been waiting for service, the LCIQ field. The data on the screen is updated every 60 seconds.

Table 3-24 on page 3-96 describes the data fields presented in the Hunt Group Status report. The abbreviated labels are also identified in a key at the bottom of the screen.

```
monitor traffic hunt-groups
                      HUNT GROUP STATUS    14:27 TUE APR 3 19xx
 #   S   A   Q   W   LCIQ           #   S   A   Q   W   LCIQ
 1   3   0   10  0   0              17
 2   2   0   20  0   0              18
 3   5   2   10  0   0              19
 4   1   0   40  0   0              20
 5   6   0   10  1   67             21
 6   1   0   10  0   0              22
 7   6   1   10  1   141            23
 8   4   0   0   0   0              24
 9                                  25
 10                                 26
 11                                 27
 12                                 28
 13                                 29
 14                                 30
 15                                 31
 16                                 32
(#: Group;  S: Grp Size;  A: Active Members;  Q: Q Length;  W: Calls Waiting)
(LCIQ: Longest Call In Queue in seconds                                     )
```

Screen 3-28. Hunt Group Status Report

Table 3-24. Hunt Group Status Report

Field	Description
#	*Group Number*. The number that identifies the hunt groups.
S	*Group Size*. The number of extensions assigned to the hunt group (not necessarily staffed).
A	*Active Hunt Group Members*. The number of members in a group currently active (only) on incoming hunt group calls. **NOTE:** This measurement does not include individual extension type calls.
Q	*Queue Length*. The number of calls allowed to wait for an agent.
W	*Waiting Calls*. The number of calls currently waiting in the hunt group queue to be serviced by an agent.
LCIQ	*Longest Call In Queue*. The time in seconds the oldest call in the hunt group queue has been waiting to be serviced. **Suggested Actions:** 1. If the number of calls waiting (W) is too high (for example, the queue is full or approaching its maximum) it may be desirable to increase the number of active members (A). 2. If the LCIQ field indicates calls are having to wait in queue too long, it may be appropriate to determine if the calls can be processed faster. Alternately, it may be appropriate to increase the number of active members (A).

IP Signaling Group Latency and Loss Reports

There are four reports that list the latency and loss on your IP signaling groups:

- List measurements ip signaling group current hour—lists the 10 worst signaling groups for the current hour.
- List measurements ip signaling group last hour—lists the 10 worst signaling groups for the last full hour
- List measurements ip signaling group today—lists the 10 worst signaling groups for each hour of the current day, starting with the most recent whole hour. This report will take 24 pages, one for each hour. The groups for each hour will be rank ordered from worst to least worst based on the Hour Average Latency.
- List measurements ip signaling group yesterday—lists the 10 worst signaling groups for the previous day's 24 hours. This report will take 24 pages, one for each hour. The groups for each hour will be rank ordered from worst to least worst based on the Hour Average Latency.

Commands

To display the IP measurements signaling group current hour report:

1. Type **list measurements ip signaling group current hour** and press RETURN.

1. ***Options***: The **list measurement ip signaling group last hour; list measurements ip signaling group today; list measurements ip signaling yesterday; print** and **schedule** options are available for this command.

   The region number is assigned on the Ip-interfaces screen during switch administration.

Screens

Screen 3-36 shows a typical screen for the IP signaling group current hour report. Table 3-32 describes the data fields presented in any IP signaling latency and loss report.

```
list measurements ip-signaling-group current-hour            Page 1 of 1

Switch Name: sierra                                Date:6:28pm THU FEB 04,1997

                            IP SIGNALING GROUPS LATENCY AND LOSS REPORT
                         CURRENT HOUR 10 WORST PERFORMING IP SIGNALING GROUPS
                               RANK ORDERED WORST TO LEAST WORST
Sig              Hour        Hour     Hour    Hour&       Interval  Interval Interval
Grp            Average    Packets Packets   Worst        Average    Packets Packets
No    Region  Latency (ms)  Sent   %Lost    Interval     Latency (ms)  Sent    %Lost
001    01       10000        xx     100%     18:03        10000         xx      100%
001    02       10000        xx     100%     18:06        10000         xx      100%
001    03       10000        xx     100%     18:09        10000         xx      100%
001    04       10000        xx     100%     18:12        10000         xx      100%
001    05       10000        xx     100%     18:15        10000         xx      100%
001    06       10000        xx     100%     18:18        10000         xx      100%
001    07       10000        xx     100%     18:21        10000         xx      100%
001    08       10000        xx     100%     18:24        10000         xx      100%
```

Screen 3-29. IP Signaling Group Current Hour

Table 3-25. IP Signaling Group Report

Field	Description
Grp No	The group number in rank order.
Region	The network region of the group.
Hour Average Latency (ms)	The average latency for the whole hour.
Hour Packets Sent	The number of packets sent during the whole hour.
Hour Packets % Lost	The percent of lost packets for the whole hour (if100% the corresponding latency is shown as ****)
Hour & Worst Interval	The hour and the worst 3 minute interval within the hour.
Interval Average Latency (ms)	The interval is identifies by the last minute of the interval.
Interval Packets Sent	The number of packets sent during the interval.
Interval Packets % Lost	The percent lost packets for the interval (if 100%, the corresponding latency is shown as ****).

IP Traffic Measurements

There are six reports that list the activity on your IP media processor circuit packs.

- List measurements ip codec hourly - lists the codec resources used on all IP media processors for the last 24 hours, from the current hour backwards, for a specific region. This report lists separate information for the G.711 codecs and the G.723/G.729 codecs.
- List measurements ip codec summary - lists the codec resources used on all IP media processors for a specific peak hour for all regions. You can list reports for yesterday's peak, today's peak, or the last hour. This report lists separate information for the G.711 codecs and the G.723/G.729 codecs.
- List measurements ip codec detail - lists the codec resources used on all IP media processors for a specific peak hour for a specific region. You can list reports for yesterday's peak, today's peak, or the last hour. This report lists separate information for the G.711 codecs and the G.723/G.729 codecs.
- List measurements ip dsp-resource hourly - lists the codec resources used on all IP media processors for the last 24 hours, from the current hour backwards, for a specific region.
- List measurements ip dsp-resource summary - lists the codec resources used on all IP media processors for a specific peak hour for all regions. You can list reports for yesterday's peak, today's peak, or the last hour.
- List measurements ip dsp-resource detail - lists the codec resources used on all IP media processors for a specific peak hour for a specific region. You can list reports for yesterday's peak, today's peak, or the last hour.

NOTE:
The peak hour is the hour in which the IP media processors are used the most in a specific region.

NOTE:
On IP traffic measurements reports, the report shows ** if the switch clock time is changed.

IP Measurements Codec Hourly Report

Commands

To display the IP measurements codec hourly report:

1. Type **list measurements ip codec hourly <region number> [print/schedule]** and press RETURN.

   For example, to display the traffic on media processors for the last 24 hours in region 4, type **list measurements ip codec hourly 4.**

   Options: The **print** and **schedule** options are available for this command.

   The region number is assigned on the Ip-interfaces screen during switch administration.

Screens

Screen 3-36 shows a typical screen for the IP codec hourly measurements report. Table 3-32 describes the data fields presented in the report.

```
list measurements ip codec hourly 4                                Page 1 of x

Switch Name: sierra                                Date:4:07pm MON AUG 01,2000

                              IP CODEC RESOURCE HOURLY REPORT

                         G&11                              G723/9
                     ---------------------          -------------------------
Meas          DSP    Usage   In Reg  Out of         Usage   In Reg  Out of
Hour Region   Rscs   (ERL)   peg     Reg peg        (ERL)   peg     Reg peg
0400 4        xxxx   xxxx.x  xxxxx   xxxxx          xxxx.x  xxxxx   xxxxx
0300 4        xxxx   xxxx.x  xxxxx   xxxxx          xxxx.x  xxxxx   xxxxx
0200 4        xxxx   xxxx.x  xxxxx   xxxxx          xxxx.x  xxxxx   xxxxx
0100 4        xxxx   xxxx.x  xxxxx   xxxxx          xxxx.x  xxxxx   xxxxx
0000 4        xxxx   xxxx.x  xxxxx   xxxxx          xxxx.x  xxxxx   xxxxx
2300 4        xxxx   xxxx.x  xxxxx   xxxxx          xxxx.x  xxxxx   xxxxx
2200 4        xxxx   xxxx.x  xxxxx   xxxxx          xxxx.x  xxxxx   xxxxx
```

Screen 3-30. IP Codec Resource Hourly Report

Table 3-26. IP Codec Resource Hourly Report

Field	Range	Description
Meas Hour	0000-2300	The hour that the data was collected, from the current hour backwards.
Region	1-44	The network region of the IP media processors being measured. The region number is assigned on the Ip-interfaces screen during switch administration.
DSP Rscs	0-9999	Total number of IP codec resources, or voice channels, in the region.
G.711 Usage (ERL)	0-9999	Amount of time (in erlangs) that G.711 codecs were in use during the measurement period. The time is measured from the time the voice channel is allocated until it is released, including the time that the voice channel is on a call. This measurement is calculated by adding the total time (in seconds) that G.711 resources on all IP media processors are in use, divided by 3600.

Continued on next page

Table 3-26. IP Codec Resource Hourly Report — *Continued*

Field	Range	Description
G.711 In Reg Peg	0-65535	The total number of times an IP media processor port in the region was allocated to a G.711 call.
G.711 Out of Reg peg	0-65535	The total number of times an IP media processor port was needed in the region for a G.711 call, but was successfully allocated to a resource in another region. If the “Region” fields on the Inter Network Region Connection Management screen are blank, then this measurement will always be 0.
G.723/9 Usage (ERL)	0-9999	Amount of time (in erlangs) that G.723 or G.729 codecs were in use during the measurement period. The time is measured from the time the voice channel is allocated until it is released, including the time that the voice channel is on a call. This measurement is calculated by adding the total time (in seconds) that G.723 or G.729 resources on all IP media processors are in use, divided by 3600.
G.723/9 In Reg peg	0-65535	The total number of times an IP media processor port in the region was allocated to a G.723 or G.729 call.
G.723/9 Out of Reg peg	0-65535	The total number of times an IP media processor port was needed in the region for a G.723 or G.729 call, but was successfully allocated to a resource in another region. If the “Region” fields on the Inter Network Region Connection Management screen are blank, then this measurement will always be 0.

IP Measurements Codec Summary Report

Commands

To display the IP measurements codec summary report:

1. Type **list measurements ip codec summary <yesterday-peak> <today-peak> <last-hour> [print/schedule]** and press RETURN.

   For example, to display the previous day’s peak hour traffic for all regions with media processors, type **list measurements ip codec summary yesterday-peak.**

Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**.

- Enter **yesterday-peak** to list the peak hour traffic on media processors for all regions for yesterday.
- Enter **today-peak** to list the peak hour traffic on media processors for all regions for today.
- Enter **last-hour-peak** to list the peak hour traffic on media processors for all regions in the most recently completed hour.

Options: The **print** and **schedule** options are available for this command.

Screens

Screen 3-36 shows a typical screen for the IP codec resource summary report. Table 3-32 describes the data fields presented in the report.

```
list measurements ipcodec summary yesterday-peak                        Page 1

Switch Name: sierra                                Date:4:07pm MON AUG 01,2000

                            IP CODEC RESOURCE SUMMARY REPORT

                        G&11                            G723/9
                    ----------------------        -------------------------
Meas          DSP    Usage   In Reg  Out of       Usage   In Reg  Out of
Hour Region   Rscs   (ERL)   peg     Reg peg      (ERL)   peg     Reg peg
0400 1        xxxx   xxxx.x  xxxxx   xxxxx        xxxx.x  xxxxx   xxxxx
0300 2        xxxx   xxxx.x  xxxxx   xxxxx        xxxx.x  xxxxx   xxxxx
0600 44       xxxx   xxxx.x  xxxxx   xxxxx        xxxx.x  xxxxx   xxxxx
```

Screen 3-31. IP Codec Resource Summary Report

Table 3-27. IP Codec Resource Summary Report

Field	Range	Description
Meas Hour	0000-2300	The hour that the data was collected.
Region	1-44	The network region of the IP media processors being measured. The region number is assigned on the Ip-interfaces screen during switch administration.
DSP Rscs	0-9999	Total number of IP codec resources, or voice channels, in the region.

Continued on next page

Table 3-27. IP Codec Resource Summary Report — *Continued*

Field	Range	Description
`G.711 Usage (ERL)`	0-9999	Amount of time (in erlangs) that G.711 codecs were in use during the measurement period. The time is measured from the time the voice channel is allocated until it is released, including the time that the voice channel is on a call. This measurement is calculated by adding the total time (in seconds) that G.711 resources on all IP media processors are in use, divided by 3600.
`G.711 In Reg Peg`	0-65535	The total number of times an IP media processor port in the region was allocated to a G.711 call.
`G.711 Out of Reg peg`	0-65535	The total number of times an IP media processor port was needed in the region for a G.711 call, but was successfully allocated to a resource in another region. If the “Region” fields on the Inter Network Region Connection Management screen are blank, then this measurement will always be 0.
`G.723/9 Usage (ERL)`	0-9999	Amount of time (in erlangs) that G.723 or G.729 codecs were in use during the measurement period. The time is measured from the time the voice channel is allocated until it is released, including the time that the voice channel is on a call. This measurement is calculated by adding the total time (in seconds) that G.723 or G.729 resources on all IP media processors are in use, divided by 3600.
`G.723/9 In Reg peg`	0-65535	The total number of times an IP media processor port in the region was allocated to a G.723 or G.729 call.
`G.723/9 Out of Reg peg`	0-65535	The total number of times an IP media processor port was needed in the region for a G.723 or G.729 call, but was successfully allocated to a resource in another region. If the “Region” fields on the Inter Network Region Connection Management screen are blank, then this measurement will always be 0.

Commands

To display the IP measurements codec detail report:

1. Type **list measurements ip codec detail <region number> <yesterday-peak> <today-peak> <last-hour> [print/schedule]** and press RETURN.

   For example, to display the previous day's peak hour traffic for media processors in region 4, type **list measurements ip codec detail 4 yesterday-peak.**

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**.

   - Enter **yesterday-peak** to list the peak hour traffic on media processors for a specific region for yesterday.
   - Enter **today-peak** to list the peak hour traffic on media processors for a specific region for today.
   - Enter **last-hour-peak** to list the peak hour traffic on media processors for a specific region in the most recently completed hour.

   Options: The **print** and **schedule** options are available for this command.

Screens

Screen 3-36 shows a typical screen for the IP codec detail report. Table 3-32 on page 3-115 describes the data fields presented in the report.

```
list measurements ip codec resource detail yesterday-peak                Page 1

Switch Name: sierra                              Date:4:07pm MON AUG 01,2000

                           IP CODEC RESOURCE DETAIL REPORT

                        G711                           G723/9
                    ---------------------        -------------------------
Meas          DSP   Usage   In Reg  Out of       Usage   In Reg  Out of
Hour Region   Rscs  (ERL)   peg     Reg peg      (ERL)   peg     Reg peg
0400 4        xxxx  xxxx.x  xxxxx   xxxxx        xxxx.x  xxxxx   xxxxx
```

Screen 3-32. IP Codec Resource Detail Report

Table 3-28. IP Codec Resource Detail Report

Field	Range	Description
`Meas Hour`	0000-2300	The hour that the data was collected.
`Region`	1-44	The network region of the IP media processors being measured. The region number is assigned on the Ip-interfaces screen during switch administration.
`DSP Rscs`	0-9999	Total number of IP codec resources, or voice channels, in the region.
`G.711 Usage (ERL)`	0-9999	Amount of time (in erlangs) that G.711 codecs were in use during the measurement period. The time is measured from the time the voice channel is allocated until it is released, including the time that the voice channel is on a call. This measurement is calculated by adding the total time (in seconds) that G.711 resources on all IP media processors are in use, divided by 3600.
`G.711 In Reg Peg`	0-65535	The total number of times an IP media processor port in the region was allocated to a G.711 call.
`G.711 Out of Reg peg`	0-65535	The total number of times an IP media processor port was needed in the region for a G.711 call, but was successfully allocated to a resource in another region. If the “Region” fields on the Inter Network Region Connection Management screen are blank, then this measurement will always be 0.

Continued on next page

Table 3-28. IP Codec Resource Detail Report — *Continued*

Field	Range	Description
`G.723/9 Usage (ERL)`	0-9999	Amount of time (in erlangs) that G.723 or G.729 codecs were in use during the measurement period. The time is measured from the time the voice channel is allocated until it is released, including the time that the voice channel is on a call. This measurement is calculated by adding the total time (in seconds) that G.723 or G.729 resources on all IP media processors are in use, divided by 3600.
`G.723/9 In Reg peg`	0-65535	The total number of times an IP media processor port in the region was allocated to a G.723 or G.729 call.
`G.723/9 Out of Reg peg`	0-65535	The total number of times an IP media processor port was needed in the region for a G.723 or G.729 call, but was successfully allocated to a resource in another region. If the “Region” fields on the Inter Network Region Connection Management screen are blank, then this measurement will always be 0.

Commands

To display the IP DSP Resource Hourly report:

1. Type **list measurements ip dsp-resource hourly <region number> [print/schedule]** and press RETURN.

   For example, to display the previous day’s peak hour traffic for ip dsp processors in region 4, type **list measurements ip dsp-resource hourly 4 yesterday-peak.**

   Options: The **print** and **schedule** options are available for this command.

Screens

Screen 3-36 shows a typical screen for the IP dsp-resource hourly report. Table 3-32 describes the data fields presented in the report.

```
list measurements ip dsp-resource hourly                        Page 1

Switch Name: sierra                              Date:4:07pm MON AUG 01,2000
                              IP DSP RESOURCE HOURLY REPORT

Meas          DSP    DSP Usage   In Reg  Out of      Denied    %      % Out
Hour Region   Rscs   (ERL)       peg     Reg peg     Peg       Blk    of Srv
0400 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
0300 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
0200 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
0200 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
0100 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
0000 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
2300 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
2200 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
2100 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
2000 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
```

Screen 3-33. IP DSP Resource Hourly Report

Table 3-29. IP DSP Resource Hourly Report

Field	Range	Description
Meas Hour	0000-2300	The hour that the data was collected.
Region	1-44	The network region of the IP media processors being measured. The region number is assigned on the Ip-interfaces screen during switch administration.
DSP Rscs	0-9999	Total number of IP codec resources, or voice channels, in the region.
DSP Usage (ERL)	0-9999	Amount of time (in erlangs) that all codecs were in use during the measurement period. The time is measured from the time the voice channel is allocated until it is released, including the time that the voice channel is on a call. This measurement is calculated by adding the total time (in seconds) that G.711 resources on all IP media processors are in use plus twice the total time (in seconds) that G.723 and G.729 resources are in use plus twice the time (in seconds) that fax relay resources are in use, divided by 3600.
In Reg Peg	0-65535	The total number of times an IP media processor port in the region was allocated to a call

Continued on next page

Table 3-29. IP DSP Resource Hourly Report — *Continued*

Field	Range	Description
`Out of Reg peg`	0-65535	The total number of times an IP media processor port was needed in the region for a call, but was successfully allocated to a resource in another region. If the “Region” fields on the Inter Network Region Connection Management screen are blank, then this measurement will always be 0.
`Denied Peg`	0-65535	The total number of times an IP media processor port was needed in the region for a call, but all media ports in all regions were busy and the call did not go through.
`% Blk`	0-99	The percent of attempted use of IP media processor ports in the region that were not successful (blocked). This percent includes calls that were denied after they were successfully allocated out of the region.
`% out of Srv`	0-99	The percent of CCS time that any IP media processor ports were out of service during the measurement period. This percent includes ports that were manually busied out or maintenance busy during the measured interval. This measurement is calculated by multiplying by 100 the following: Total time (in CCS) that any port was out of service divided by the number of available resources times 36

Commands

To display the IP DSP Resource Summary report:

1. Type **list measurements ip dsp-resource summary <region number> <yesterday-peak> <today-peak> <last-hour> [print/schedule]** and press RETURN.

   For example, to display the previous day’s peak hour traffic for ip dsp processors in all regions, type **list measurements ip dsp summary yesterday-peak.**

Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**.

- Enter **yesterday-peak** to list the peak hour traffic on media processors for a specific region for yesterday.
- Enter **today-peak** to list the peak hour traffic on media processors for a specific region for today.
- Enter **last-hour-peak** to list the peak hour traffic on media processors for a specific region in the most recently completed hour.

Options: The **print** and **schedule** options are available for this command.

Screens

Screen 3-36 shows a typical screen for the IP DSP Summary report. Table 3-32 describes the data fields presented in the report.

```
list measurements ip dsp-resource summary yesterday-peak                    Page 1

Switch Name: sierra                                Date:4:07pm MON AUG 01,2000
                              IP DSP RESOURCE SUMMARY REPORT

Meas          DSP    DSP Usage   In Reg  Out of      Denied    %      % Out
Hour Region   Rscs   (ERL)       peg     Reg peg     Peg       Blk    of Srv
0400 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
0300 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
0060 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
```

Screen 3-34. IP DSP Resource Summary Report

Table 3-30. IP DSP Resource Summary Report

Field	Range	Description
Meas Hour	0000-2300	The hour that the data was collected.
Region	1-44	The network region of the IP media processors being measured. The region number is assigned on the Ip-interfaces screen during switch administration.
DSP Rscs	0-9999	Total number of IP codec resources, or voice channels, in the region.

Continued on next page

Table 3-30. IP DSP Resource Summary Report — *Continued*

Field	Range	Description
DSP Usage (ERL)	0-9999	Amount of time (in erlangs) that all codecs were in use during the measurement period. The time is measured from the time the voice channel is allocated until it is released, including the time that the voice channel is on a call. This measurement is calculated by adding the total time (in seconds) that G.711 resources on all IP media processors are in use plus twice the total time (in seconds) that G.723 and G.729 resources are in use, plus twice the time (in seconds) that fax relay resources are in use, divided by 3600.
In Reg Peg	0-65535	The total number of times an IP media processor port in the region was allocated to a call
Out of Reg peg	0-65535	The total number of times an IP media processor port was needed in the region for a call, but was successfully allocated to a resource in another region. If the “Region” fields on the Inter Network Region Connection Management screen are blank, then this measurement will always be 0.
Denied Peg	0-65535	The total number of times an IP media processor port was needed in the region for a call, but all media ports in all regions were busy and the call did not go through.
% Blk	0-99	The percent of attempted use of IP media processor ports in the region that were not successful (blocked). This percent includes calls that were denied after they were successfully allocated out of the region.
% out of Srv	0-99	The percent of CCS time that any IP media processor ports were out of service during the measurement period. This percent includes ports that were manually busied out or maintenance busy during the measured interval. This measurement is calculated by multiplying by 100 the following: Total time (in CCS) that any port was out of service divided by the number of available resources times 36.

IP DSP Resource Detail Report

Commands

To display the IP DSP Resource Detail report:

1. Type **list measurements ip dsp-resource detail <region number> <yesterday-peak> <today-peak> <last-hour> [print/schedule]** and press RETURN.

   For example, to display the previous day's peak hour traffic for ip dsp processors in region 4, type **list measurements ip dsp detail 4 yesterday-peak.**

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**.

   - Enter **yesterday-peak** to list the peak hour traffic on media processors for a specific region for yesterday.
   - Enter **today-peak** to list the peak hour traffic on media processors for a specific region for today.
   - Enter **last-hour-peak** to list the peak hour traffic on media processors for a specific region in the most recently completed hour.

   Options: The **print** and **schedule** options are available for this command.

Screens

Screen 3-36 shows a typical screen for the IP DSP Detail report. Table 3-32 on page 3-115 describes the data fields presented in the report.

```
list measurements ip dsp-resource detail 4 yesterday-peak                Page 1

Switch Name: sierra                              Date:4:07pm MON AUG 01,2000
                              IP DSP RESOURCE DETAIL REPORT

Meas          DSP    DSP Usage   In Reg  Out of      Denied    %      % Out
Hour Region   Rscs   (ERL)       peg     Reg peg     Peg       Blk    of Srv
0400 4        xxxx   xxxx.x      xxxxx   xxxxx       xxxxx    xx.xx   xx.xx
```

Screen 3-35. IP DSP Resource Detail Report

Table 3-31. IP DSP Resource Detail Report

Field	Range	Description
Meas Hour	0000-2300	The hour that the data was collected.
Region	1-44	The network region of the IP media processors being measured. The region number is assigned on the Ip-interfaces screen during switch administration.
DSP Rscs	0-9999	Total number of IP codec resources, or voice channels, in the region.
DSP Usage (ERL)	0-9999	Amount of time (in erlangs) that all codecs were in use during the measurement period. The time is measured from the time the voice channel is allocated until it is released, including the time that the voice channel is on a call. This measurement is calculated by adding the total time (in seconds) that G.711 resources on all IP media processors are in use plus twice the total time (in seconds) that G.723 and G.729 resources are in use, plus twice the time (in seconds) that fax relay resources are in use divided by 3600.
In Reg Peg	0-65535	The total number of times an IP media processor port in the region was allocated to a call
Out of Reg peg	0-65535	The total number of times an IP media processor port was needed in the region for a call, but was successfully allocated to a resource in another region. If the “Region” fields on the Inter Network Region Connection Management screen are blank, then this measurement will always be 0.
Denied Peg	0-65535	The total number of times an IP media processor port was needed in the region for a call, but all media ports in all regions were busy and the call did not go through.

Continued on next page

Table 3-31. IP DSP Resource Detail Report — *Continued*

Field	Range	Description
`% Blk`	0-99	The percent of attempted use of IP media processor ports in the region that were not successful (blocked). This percent includes calls that were denied after they were successfully allocated out of the region.
`% out of Srv`	0-99	The percent of CCS time that any IP media processor ports were out of service during the measurement period. This percent includes ports that were manually busied out or maintenance busy during the measured interval. This measurement is calculated by multiplying by 100 the following: Total time (in CCS) that any port was out of service divided by the number of available resources times 36.

LAN Performance Reports

These reports provide a 24-hour history of important packet-level statistics from which you can infer some LAN performance characteristics. For example,

- high collision counts could indicate high traffic on the LAN segment (congestion on the bus).
- high Cyclic Redundancy Check (CRC—detects and corrects errors on every frame) errors could suggest that
  - the LAN connection may be “noisy”
  - a wire connection is loose
  - a wire is frayed or broken.

The 24-hour histories give the ability to look back at these measures if the trouble cleared.

The data is collected at 15-minute intervals over 24 hours for the Cyclic Redundancy Check (CRC) and collisions for ethernet connections. If the data cannot be retrieved for the 15-minute interval, `N/A` displays in the field. The delta (the change from the last inquiry) and the total are provided for each error count. After the occurrence of “N/A” (not available), the delta equals the total.

The primary use of these reports is to quickly and unambiguously determine if the fault lies within the Avaya-provided equipment or if the fault is with the LAN or LAN administration to which the DEFINITY ECS switch is connected.

C-LAN Ethernet Performance Measurement Report

Commands

To display the LAN Ethernet Performance Measurements report:

1. Type **list measurements clan ethernet <cabinet-carrier-slot address of circuit pack> [print/schedule]** and press RETURN.

   For example, to display the performance of the ethernet circuit pack with the address 1C1017, type **list measurements clan ethernet 1C1017.**

   Options: The **print** and **schedule** options are available for this command.

Screens

Screen 3-36 shows a typical screen for the C-LAN Ethernet Performance Measurement report. Table 3-32 describes the data fields presented in the report.

```
list measurements clan ethernet 1C1017                          Page 1 of x

Switch Name: sierra                              Date:4:07pm MON AUG 01,1999

               C-LAN ETHERNET PERFORMANCE MEASUREMENT DETAILED REPORT



Date      Time           CRC Check                Collision Count
                         total        delta       total           delta
08/01     0308             650           50         650            250
08/01     0253             600          600         400            400
08/01     0238             N/A          N/A         N/A            N/A
08/01     0223      1000000570           20 10000000570             20
08/01     0208      1000000550  10000000550 10000000550    10000000550
```

Screen 3-36. C-LAN Ethernet Performance Measurement Report

Table 3-32. C-LAN Ethernet Performance Measurement Report

Field	Description
Date	The date that the data was collected.
Time	The current 15-minute interval in which the action was performed
CRC Check	The error count for CRC errors
Total	The total value of the counter on the board **NOTE:** The counter value can be up to 11 digits long because of the 32-bit counter on the board. After the occurrence of an “N/A,” the delta equals the total. Busyout or release of a board or a port, the **reset board** command, and reseating the board all clear the firmware counters.
Delta	The difference between the current and the previous sample
Collision Count	The error count for collisions on the ethernet

C-LAN PPP Performance Measurement Report

Commands

To display the LAN PPP Performance Measurements reports:

1. Type **list measurements clan ppp <cabinet-carrier-slot address of circuit pack> [print/schedule]** and press RETURN.

   For example, to display the performance of the ppp circuit pack with the address 1C1017, type **list measurements clan ppp 1C1017.**

   Options: The **print** and **schedule** options are available for this command.

Screens

Screen 3-37 shows a typical screen for the C-LAN PPP Performance Measurement report. Table 3-33 describes the data fields presented in the report.

```
list measurements clan ppp 1C1001                                  Page 1 of x
Switch Name: sierra                                                Date:02/02/1999
    C-LAN PPP PERFORMANCE MEASUREMENT DETAILED REPORT

Date      Time         CRC Check           Invalid Frame           CHAP Failures
                     Total     Delta     Total    Delta          Total    'Delta

02/01     03:08          85        25      185       85              5         0
02/01     02:53          60        60      100      100              5         5
02/01     02:38         N/A       N/A      N/A      N/A            N/A       N/A
02/01     02:23     1000060        10  1000090       10             25         5
02/01     02:08     1000050   1000050  1000080  1000080             20        20
```

Screen 3-37. C-LAN PPP Performance Measurement Report

Table 3-33. C-LAN PPP Performance Measurement Report

Field	Description
Date	The date that the data was collected.
Time	The current 15-minute interval in which the action was performed
CRC Check	The error count for CRC errors

Continued on next page

Table 3-33. C-LAN PPP Performance Measurement Report — *Continued*

Field	Description
`Total`	The total value of the counter on the board **NOTE:** The counter value can be up to 11 digits long because of the 32-bit counter on the board. After the occurrence of an "N/A," the delta equals the total. Busyout or release of a board or a port, the **reset board** command, and reseating the board all clear the firmware counters.
`Delta`	The difference between the current and the previous sample
`Invalid Frame`	The number of invalid frames detected. Invalid frames are the frames that are misaligned.
`CHAP Failures`	The number of failed attempts for ppp authentication

C-LAN Sockets Hourly Report

Commands

To display the clan Sockets Hourly reports:

1. Type **list measurements clan sockets hourly <board location>** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

Screens

Screen 3-36 on page 3-115 shows a typical screen for the clan hourly report. Table 3-32 on page 3-115 describes the data fields presented in the report.

```
list measurements clan sockets hourly 01B12                    Page 1

Switch Name:                                   Date:5:27pm WED MAR 26,1992
                           CLAN SOCKETS HOURLY REPORT
                                 Socket              Socket
Meas                      Avail     Usage   Sockets   Denial  %          %Time
Hour      Board  Region   Sockets   (ERL)   peg       peg     Denials    ASB
0400      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
0300      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
0200      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
0100      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
0000      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
2300      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
2200      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
2100      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
2000      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
1900      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
1800      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
1700      01B12  3        xxxx.x    xxxxx   xxxxx     xxxxx   xx.xx   xx.xx
Command successfully completed
```

Screen 3-38. C-LAN Sockets Hourly Report

Table 3-34. C-LAN Sockets Hourly Report

Field	Range	Description
Meas Hour	0000-2300	The hour the measurement was taken. Switches in multiple time zones are treated as in the current MMI reports. We do not assume that the customer has made any correlation between LAN regions and time zones.
Board	CCccss	The cabinet, carrier, and slot for the specified board.
Region	1-44	The network region that the CLAN for this measurement is in. (The increase to 44 regions is required by [75101-2])
Avail Sockets	0-999	The number of available sockets on the specified Clan board.
Socket Usage (ERL)	0-9999.9	The total time, in Erlangs, that is available from sockets on this C-lan board. Calculated by: (Total Socket Seconds of usage)/3600
Socket peg	0-65535	Total number of times a C-lan socket on the board was allocated to a call or link.
Socket Denial peg	0-65535	Total number of times a C-lan socket on the board was needed for a call or link, but was not available.
% Denials	0-99	(Socket Denial peg)/(Socket Denial peg + Socket peg)
% Time ASB	0-99	The percentage of time during the measured interval that all C-lan sockets on the board were unavailable for use.

C-LAN Sockets Summary Report

Commands

To display the clan Sockets Summary reports:

1. Type **list measurements clan sockets summary yesterday-peak** and press RETURN.

Screens

Screen 3-39 shows a typical screen for the clan summary report. Table 3-35 describes the data fields presented in the report.

```
list measurements clan summary yesterday-peak                    Page 1

Switch Name:                                     Date:5:27pm WED MAR 26,1992
                           CLAN SOCKETS PEAK REPORT

                         Peak Hour: 0400
                                  Socket              Socket
Meas                      Avail     Usage   Sockets   Denial  %          %Time
Hour     Board  Region    Sockets   (ERL)   peg       peg     Denials    ASB
0400     01B12  2         xxx       xxxx.x   xxxxx    xxxxx    xx.xx    xx.xx
0400     01B13  3         xxx       xxxx.x   xxxxx    xxxxx    xx.xx    xx.xx
0100     01B14  4         xxx       xxxx.x   xxxxx    xxxxx    xx.xx    xx.xx
0100     01B15  1         xxx       xxxx.x   xxxxx    xxxxx    xx.xx    xx.xx
Command successfully completed
```

Screen 3-39. C-LAN Sockets Summary Report

Table 3-35. C-LAN Sockets Summary Report

Field	Range	Description
Meas Hour	0000-2300	The hour the measurement was taken. Switches in multiple time zones are treated as in the current MMI reports. We do not assume that the customer has made any correlation between LAN regions and time zones.
Board	CCccss	The cabinet, carrier, and slot for the specified board.
Region	1-44	The network region that the CLAN for this measurement is in. (The increase to 44 regions is required by [75101-2])

Continued on next page

Table 3-35. C-LAN Sockets Summary Report — *Continued*

Field	Range	Description
Avail Sockets	0-999	The number of available sockets on the specified Clan board.
Socket Usage (ERL)	0-9999.9	The total time, in Erlangs, that is available from sockets on this C-lan board. Calculated by: (Total Socket Seconds of usage)/3600
Socket peg	0-65535	Total number of times a C-lan socket on the board was allocated to a call or link.
Socket Denial peg	0-65535	Total number of times a C-lan socket on the board was needed for a call or link, but was not available.
% Denials	0-99	(Socket Denial peg)/(Socket Denial peg + Socket peg)
% Time ASB	0-99	The percentage of time during the measured interval that all C-lan sockets on the board were unavailable for use.

C-LAN Sockets Detail Report

Commands

To display the clan Sockets Detail reports:

1. Type **list measurements clan sockets detail yesterday-peak <board location>** and press RETURN.

Screens

Screen 3-40 on page 3-121 shows a typical screen for the clan detail report. Table 3-36 on page 3-121 describes the data fields presented in the report.

```
list measurements clan detail yesterday-peak 01B12                    Page 1

Switch Name:                                      Date:5:27pm WED MAR 26,1992
                            CLAN SOCKETS PEAK REPORT

                          Peak Hour: 0400
                                   Socket              Socket
Meas                       Avail     Usage   Sockets   Denial  %          %Time
Hour      Board  Region    Sockets   (ERL)   peg       peg     Denials    ASB
0400      01B12  3         xxx       xxxx.x   xxxxx    xxxxx    xx.xx   xx.xx

Command successfully completed
```

Screen 3-40. C-LAN Sockets Detail Report

Table 3-36. C-LAN Sockets Summary Report

Field	Range	Description
Meas Hour	0000-2300	The hour the measurement was taken. Switches in multiple time zones are treated as in the current MMI reports. We do not assume that the customer has made any correlation between LAN regions and time zones.
Board	CCccss	The cabinet, carrier, and slot for the specified board.
Region	1-44	The network region that the CLAN for this measurement is in. (The increase to 44 regions is required by [75101-2])
Avail Sockets	0-999	The number of available sockets on the specified Clan board.
Socket Usage (ERL)	0-9999.9	The total time, in Erlangs, that is available from sockets on this C-lan board. Calculated by: (Total Socket Seconds of usage)/3600
Socket peg	0-65535	Total number of times a C-lan socket on the board was allocated to a call or link.
Socket Denial peg	0-65535	Total number of times a C-lan socket on the board was needed for a call or link, but was not available.
% Denials	0-99	(Socket Denial peg)/(Socket Denial peg + Socket peg)
% Time ASB	0-99	The percentage of time during the measured interval that all C-lan sockets on the board were unavailable for use.

Look-Ahead Routing Route-Pattern Measurements Report

The Look Ahead Routing (LAR) Route Pattern Measurements report contains usage measurements for LAR processing. This report displays the number of reroute attempts performed and the number of successful ISDN call attempts.

Command

To display the LAR Route Pattern Measurements report:

1. Type **list measurements lar-route-pattern <assigned pattern number (1-254)> <yesterday/today/last-hour> [print/schedule]** and press RETURN.

   Required Fields: There are two required fields for this command.

   1. **assigned pattern number (1-254)**

      - Enter the identifying **pattern number** you wish to display.

        This number must previously have been assigned to one of the numbers on the meas-selection route-pattern screen. In order to obtain data for the pattern, it must previously have been administered on the ARS/AAR/UDP screens.

   2. **yesterday/today/last-hour**.

      - Enter **yesterday** to list the LAR route pattern activity for yesterday.
      - Enter **today** to list the LAR route pattern activity for today.
      - Enter **last-hour** to list the LAR route pattern activity of the most recently completed hour.

      For example, to display last-hour's measurements for route pattern 1, type **list measurements lar-route-pattern 1 last-hour**.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-41 shows a typical screen for the LAR Route Pattern Measurements report. Table 3-37 describes the data fields presented in the LAR Route Pattern Measurements report.

```
list measurements lar-route-pattern 1 last-hour
                                                          Page 1 of  1
                 LAR MEASUREMENTS FOR PREFERENCES IN PATTERN 1
              (trunk groups are shown in order of selection)
          Pref  Grp  LAR    LAR     Total  Suc.     Total  Suc.
          No.   No.  Type   Calls   Rehunt Rehunt   Next   Next
          1     10  *rehu   0       0      0        0      0
          2    *1   *none   0       0      0        0      0
          3     11   next   0       0      0        0      0
          4    *2   *none   0       0      0        0      0
```

Screen 3-41. LAR Route Pattern Measurements Report

Table 3-37. LAR Route Pattern Measurements Report

Field	Description
`Pref No.`	*Route Preference Number*. The number of the administered route preference.
`Grp No.`	*Trunk Group Number*. The number, assigned via the Trunk Group screen, that identifies each trunk group associated with the displayed data. Trunk groups are listed in the same order as they are assigned on the Route Pattern screen. The first trunk group listed is the first selected (preference 1); the second listed is the second selected (preference 2), and so on. If an entry in the column is prefixed with an *, it indicates LAR administration for the preference was changed during the measurement period currently displayed. (LAR valid for ISDN-PRI trunk groups.)
`LAR Type`	Type of LAR administered on the AAR and ARS Route Pattern screen for the trunk group including. Possible values are: ■ none — no LAR ■ rehu — rehunt in the same preference ■ next — reroute to next preference
`LAR Calls`	The number of calls initiating LAR processing in the displayed trunk group. Only the initial call is counted, not subsequent rerouting attempts.

Continued on next page

Table 3-37. LAR Route Pattern Measurements Report — *Continued*

Field	Description
`Total Rehunt`	The number of LAR rehunt attempts within the trunk group.
`Suc. Rehunt`	*Successful Rehunt*. The number of successful hunts out of Total Rehunt attempts within the trunk group that ended in the LAR call rerouted successfully.
`Total Next`	The total number of LAR attempts directed to this trunk group from a previous preference in the route pattern.
`Suc. Next`	*Successful Next.* The number of successful LAR attempts directed to this trunk group from a previous preference in the route pattern.

Logins Report

The Logins report shows logins with the same, or lower, service level as the person making the request.

Command

To display a list of logins (with the same or lower service level as you):

1. Type **list logins [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-42 shows a typical Login screen. Table 3-38 describes the data fields presented in the Login screen.

```
list logins
                                    LOGINS

Login   Service         Status   Pwd.   Aging  ASG  Blk  Exp.     No. of Sess.
        Level                    Cycle (Days)           Date     Sess   Used
csoll   super-user      active   90             y    n    09/20/98 20     2
cowles  super-user      active   40             n
mehrda  super-user      inactive 90             y    y    12/30/98 50     23
jones   non-super-user  inactive 30             n
bsmith  non-super-user  disabled 30             y    y    09/30/98 500    102
```

Screen 3-42. Login

Table 3-38. Logins

Valid values	Usage
`Login`	The user login ID.
`Service Level`	The service level of the login ID.
`Status`	The status of the login ID.
`Pwd. Aging Cycle (Days)`	*Password Aging Cycle (Days)*. The number of days from creation before the password must be changed.
`ASG`	*Access Security Gateway*. This field indicates whether the login ID must use ASG authentication to access the system.
`Blk`	*Block*. This field indicates whether the login ID is temporarily disabled from accessing the system through the Access Security Gateway interface or not.
`Exp. Date`	*Expiration Date*. The date the login ID expires.
`No. of Sess`	*Number of Sessions*. The number of sessions allowed before the login ID is disabled.
`Sess. Used`	*Sessions Used*. The number of session this login ID has already used.

Modem Pool Groups Report

This section describes the traffic measurements report for Modem Pool Groups.

The Modem Pool Group Measurements report contains measurements for monitoring the performance of the Modem Pooling feature. The system records data for the current day's peak hour, the previous day's peak hour, and the last hour. A peak hour is the hour within a 24-hour period that had the greatest usage for the specified day.

Command

To display the Modem Pool Group Measurements Report:

1. Type **list measurements modem-pool <yesterday-peak/today-peak/ last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**.

   - Enter **yesterday-peak** to list the modem pool activity for yesterday's peak hour.
   - Enter **today-peak** to list the modem pool activity for today's peak hour.
   - Enter **last hour** to list the modem pool activity of the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-43 shows a typical screen for the Modem Pool Group Measurements report. The time and date the report is requested displays at the top right. Table 3-39 on page 3-127 describes the data fields presented in the Modem Pool Group Measurements report.

```
list measurements modem-pool last-hour
Switch Name: Cust_Switch_Name                  Date: 1:51 pm MON SEP 16, 19xx
                              MODEM POOL MEASUREMENTS
Meas  Pool Pool Pool Total Inc   Tan   Calls   Inc   Tan   Calls Calls %
Hour  No.  Size Type Usage Usage Usage Carried Calls Calls Blk   Ovfl  AMB
1200   1     2  integ  0     0     0      0      0     0     0    0     0
```

Screen 3-43. Modem Pool Group Measurements Report

Table 3-39. Modem Pool Group Measurements Report

Field	Description
`Meas Hour`	*Measurement Hour*. The starting time (using 24-hour clock) of the hour during which the data was recorded.
`Pool No.`	*Pool Number*. A number that identifies the modem pool group. The number is assigned during administration.
`Pool Size`	The number of conversion resources administered in the modem pool group (up to 16 for integrated or up to 32 for combined).
`Pool Type`	The type of group, either integrated (integ) or combined (comb).
`Total Usage`	The time in CCS the members of the modem pool group are active on calls during the polling interval. $$Maximum\ Usage = Pool\ Size \times 36\ CCS$$
`Inc Usage`	*Incoming Usage*. The usage in CCS for modem pool calls (originating from incoming or two-way trunks) that terminate on the switch. $$Outgoing\ Usage = Total\ Usage - Inc\ Usage$$
`Tan Usage`	*Tandem Usage*. The usage in CCS for tandem calls that used a modem pool member.
`Calls Carried`	The number of calls carried, during the polling interval, by the identified modem pool. This includes both incoming and outgoing calls.
`Inc Calls`	*Incoming Calls*. The number of calls (originating from incoming or two-way trunks) that terminate on the switch. $$Outgoing\ Calls = Calls\ Carried - Inc\ Calls$$
`Tan Calls`	*Tandem Calls*. The number of tandem calls that used a modem pool member.

Continued on next page

Table 3-39. Modem Pool Group Measurements Report — *Continued*

Field	Description
`Calls Blocked`	The number of calls blocked due to the unavailability of a conversion resource. **Suggested Actions:** 1. If this field indicates a significant number of modem pool calls are blocked, then verify the users have their data modules set for autobaud. 2. An alternate option is to increase the `Pool Size`.
`Calls Overflow`	The number of calls directed to a modem pool group that overflow and terminate successfully in another group.
`% AMB`	*Percent All Modems Busy*. The percent of the time all modem pool members are busy processing calls.

Multimedia Reports

These reports are available to help you determine the amount of traffic your switch carries for multimedia conferences and conversion calls. All reports show traffic over multimedia circuit packs housed within the same switch, although not necessarily in the same port network. Use these reports to determine if you have adequate resources to handle the multimedia traffic on your system.

NOTE:
Point-to-point multimedia calls between Basic mode or standalone multimedia endpoints do not use MulitMedia Interfaces (MMI) or Voice Conditioners (VC), and therefore do not count in these measurements.

The following reports are available:

- Multimedia Interface (MMI) Hourly and Summary
- Expansion Service Module (ESM) Hourly and Summary
- Voice Conditioners (VC) Hourly and Summary

The Hourly and Summary reports provide the same types of information. The hourly report shows measurements for the last 24 hours, whereas the summary reports show measurements for one hour, according to the type of summary you request.

Expansion Services Module Reports

Command

Expansion Service Module (ESM) reports show traffic over the MMI that is cabled to the ESM.

To display a ESM hourly report:

1. Type **list measurements expansion-service-mod hourly [print/schedule]** and press RETURN.

To display a ESM summary report:

1. Type **list measurements expansion-service-mod summary <yesterday-peak/today-peak/ last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**. You must choose one of these.

   - Enter **yesterday-peak** to list the activity for yesterday's peak hour.
   - Enter **today-peak** to list the activity for today's peak hour.
   - Enter **last hour** to list the activity of the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-44 shows a typical screen for the ESM Hourly Report. Screen 3-45 shows a typical screen for the ESM Summary Report. The time and date the report is requested displays at the top right. Table 3-40 on page 3-131 describes the data presented in the ESM Hourly and ESM Summary Reports.

```
list measurements expansion-service-mod hourly                    Page 1

Switch Name: Cust_Switch_Name             Date: 11:33 am  TUE JUL 31, 19xx
                          EXPANSION SERVICE MOD HOURLY REPORT

Meas Avail Avail Total Total  MMI    Out of  %   %
Hour Ports Usage Usage Alloc Denials Srv-CCS APB Blockage
1900 0     0     0     0     0       0       0   0
1800 0     0     0     0     0       0       0   0
1700 0     0     0     0     0       0       0   0
1600 0     0     0     0     0       0       0   0
1500 0     0     0     0     0       0       0   0
1400 0     0     0     0     0       0       0   0
1300 0     0     0     0     0       0       0   0
1200 0     0     0     0     0       0       0   0
1100 0     0     0     0     0       0       0   0
1000 0     0     0     0     0       0       0   0
0900 0     0     0     0     0       0       0   0
0800 0     0     0     0     0       0       0   0
       press CANCEL to quit -- Press NEXT PAGE to continue
```

Screen 3-44. Expansion Service Module Hourly Report — Page 1

```
list measurements expansion-service-mod summary
today-peak                          Page 1

Switch Name: Cust_Switch_Name             Date: 11:33 am  TUE JUL 31, 19xx
                      EXPANSION SERVICE MOD SUMMARY REPORT

                Peak Hour for all ESM-MMIs : 1100

Meas Avail Avail Total Total  MMI    Out of  %   %
Hour Ports Usage Usage Alloc Denials Srv-CCS APB Blockage

1100 0     0     0     0     0       0       0   0
```

Screen 3-45. Expansion Service Module Summary Report

Table 3-40. Expansion Service Module Summary Report

Field	Description
`Switch Name`	The name of the switch that contains the ESM-MMIs.
`Date`	The date and time that you requested the report, or that the report was run, if scheduled.
`Peak Hour For All ESM-MMIs`	If you use the yesterday-peak or today-peak qualifiers, this field displays the hour of greatest usage for the specified day.
`Meas Hour`	The hour for which these measurements apply, on the 24-hour clock.
`Avail Ports`	Total network ESM-MMIs in the system.
`Avail Usage`	Total time, in CCS units, that is available in the system for ESM-MMI ports.
`Total Usage`	The total time, in CCS units, that ESM-MMI ports are in use on a call. Includes the time that the ports are out of service or maintenance busy. Usage is measured from the time the port is allocated until it is released.
`Total Alloc`	The total number of times that an ESM-MMI port was allocated to a call.
`MMI Denials`	Total number of times an ESM-MMI port was needed but could not be allocated because all ports were busy.
`Out Srv`	The total time, in CCS units, that any ESM-MMI ports were out of service during any part of the measured interval.
`%APB (all ports busy)`	The percentage of time during the measured interval that all ESM-MMI ports are unavailable to carry a new call.
`% Blockage`	The percentage of attempted allocations of ESM-MMI ports that are not successful.This value is calculated as % blockage = (MMI Denials / Total Alloc + MMI Denials) * 100

Multimedia Interface Report

Command

To display a Multimedia Interface (MMI) hourly report:

1. Type **list measurements multimedia-interface hourly [print/schedule]** and press RETURN.

To display a MMI summary report:

1. Type **list measurements multimedia-interface summary <yesterday-peak/today-peak/ last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**. You must choose one of these.

   - Enter **yesterday-peak** to list the activity for yesterday's peak hour.
   - Enter **today-peak** to list the activity for today's peak hour.
   - Enter **last hour** to list the activity of the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-46 shows a typical screen for the MMI Hourly Report. Screen 3-47 shows a typical screen for the MMI Summary Report. The time and date the report is requested displays at the top right. Table 3-41 on page 3-134 describes the data presented in the MMI Hourly and MMI Summary Reports.

```
list measurements mmi hourly                                        Page 1

Switch Name: Cust_Switch_Name             Date: 11:33 am  TUE JUL 31, 19xx
                          MMI HOURLY REPORT

Meas Avail Avail Total Total  MMI    Out of  %   %
Hour Ports Usage Usage Alloc Denials Srv-CCS APB Blockage
1900 0     0     0     0     0       0       0   0
1800 0     0     0     0     0       0       0   0
1700 0     0     0     0     0       0       0   0
1600 0     0     0     0     0       0       0   0
1500 0     0     0     0     0       0       0   0
1400 0     0     0     0     0       0       0   0
1300 0     0     0     0     0       0       0   0
1200 0     0     0     0     0       0       0   0
1100 0     0     0     0     0       0       0   0
1000 0     0     0     0     0       0       0   0
0900 0     0     0     0     0       0       0   0
0800 0     0     0     0     0       0       0   0
       press CANCEL to quit -- Press NEXT PAGE to continue
```

Screen 3-46. MMI Hourly Report

```
list measurements mmi summary today-peak                            Page 1

Switch Name: Cust_Switch_Name             Date: 11:33 am  TUE JUL 31, 19xx
                          MMI SUMMARY REPORT

                   Peak Hour for all MMIs : 1100

Meas Avail Avail Total Total  MMI    Out of  %   %
Hour Ports Usage Usage Alloc Denials Srv-CCS APB Blockage

1100 0     0     0     0     0       0       0   0
```

Screen 3-47. MMI Summary Report

Table 3-41. MMI Summary Report

Field	Description
Switch Name	The name of the switch that contains the MMIs.
Date	The date and time that you requested the report, or that the report was run, if scheduled.
Peak Hour For All MMIs	If you use the yesterday-peak or today-peak qualifiers, this field displays the hour of greatest usage for the specified day.
Meas Hour	The hour for which these measurements apply, on the 24-hour clock.
Avail Ports	Total network MMI ports in the system. This does not include any MMIs that are cabled to an ESM. ESM-MMIs are measured separately.
Avail Usage	Total time that is available in the system for network MMI ports, in CCS units.
Total Usage	The total time, in CCS units, that MMI ports are in use on a call. Includes the time that the ports are out of service or maintenance busy. Usage is measured from the time the port is allocated until it is released.
Total Alloc	The total number of times that an MMI port was allocated to a call. Keep in mind that a 2-channel call occupies 2 ports, so this number does not necessarily reflect the number of calls that took place. Also, point-to-point calls do not use MMI resources, so these allocations are for conversion calls of multimedia conferences.
MMI Denials	Total number of times an MMI port was needed but could not be allocated because all ports were busy. Ideally, this number should be zero. If you see denials on a regular basis, you should consider adding MMIs to your system.
Out of Srv - CCS	The total time, in CCS units, that any MMI ports were out of service during any part of the measured interval.
% APB	Percent All Ports Busy. The percentage of time during the measured interval that all MMI ports are unavailable to carry a new call.
% Blockage	The percentage of attempted allocations of MMI ports that are not successful. This value is calculated as % blockage = (MMI Denials / Total Alloc + MMI Denials) * 100

Voice Conditioners Reports

Command

To display a voice conditioners (VC) hourly report:

1. Type **list measurements voice-conditioners hourly [print/schedule]** and press RETURN.

To display a VC summary report:

1. Type **list measurements voice-conditioners summary <yesterday-peak/today-peak/ last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**. You must choose one of these.

   - Enter **yesterday-peak** to list the activity for yesterday's peak hour.
   - Enter **today-peak** to list the activity for today's peak hour.
   - Enter **last hour** to list the activity of the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-48 shows a typical screen for the VC Hourly Report. Screen 3-49 shows a typical screen for the VC Summary Report. The time and date the report is requested displays at the top right. Table 3-42 on page 3-137 describes the data presented in the VC Hourly and VC Summary Reports.

```
list measurements voice-conditioners hourly                              Page 1

Switch Name: Cust_Switch_Name                Date: 11:33 am  TUE JUL 31, 19xx
                          VOICE CONDITIONERS HOURLY REPORT

Meas #  ---------USAGE--------- --ALLOCATIONS--- -----DENIALS---- Out  %  %
Hour Prt Avail H320 Voice Total H320 Voice Total H320 Voice Total Srv APB Blk
1900 0   0     0    0     0     0    0     0     0    0     0     0   0   0
1800 0   0     0    0     0     0    0     0     0    0     0     0   0   0
1700 0   0     0    0     0     0    0     0     0    0     0     0   0   0
1600 0   0     0    0     0     0    0     0     0    0     0     0   0   0
1500 0   0     0    0     0     0    0     0     0    0     0     0   0   0
1400 0   0     0    0     0     0    0     0     0    0     0     0   0   0
1300 0   0     0    0     0     0    0     0     0    0     0     0   0   0
1200 0   0     0    0     0     0    0     0     0    0     0     0   0   0
1100 0   0     0    0     0     0    0     0     0    0     0     0   0   0
1000 0   0     0    0     0     0    0     0     0    0     0     0   0   0
0900 0   0     0    0     0     0    0     0     0    0     0     0   0   0
0800 0   0     0    0     0     0    0     0     0    0     0     0   0   0
       press CANCEL to quit -- Press NEXT PAGE to continue
```

Screen 3-48. Voice Conditioners Hourly Report — Page 1

```
list measurements voice-conditioners summary today-peak                  Page 1

Switch Name: Cust_Switch_Name                Date: 11:33 am  TUE JUL 31, 19xx

                 VOICE-CONDITIONERS SUMMARY REPORT

                 Peak Hour for all VC : 1100

Meas #  ---------USAGE--------- --ALLOCATIONS--- -----DENIALS---- Out  %  %
Hour Prt Avail H320 Voice Total H320 Voice Total H320 Voice Total Srv APB Blk
1100 0   0     0    0     0     0    0     0     0    0     0     0   0   0
```

Screen 3-49. Voice Conditioners Summary Report

Table 3-42. Voice-Conditioners Summary

Field	Description
Switch Name	The name of the switch that contains the Voice-Conditioners.
Date	The date and time that you requested the report, or that the report was run, if scheduled.
Peak Hour For All VC	If you use the yesterday-peak or today-peak qualifiers, this field displays the hour of greatest usage for the specified day.
Meas Hour	The hour for which these measurements apply, on the 24-hour clock.
# Prt	Total number of VC ports in the system.
Usage - Avail	Total time, in CCS, that all VC ports are available in the system. Calculated as #MMI ports x 36.
Usage - H320	Total time that VC ports are allocated to H320 endpoints.
Usage - Voice	Total time VC ports are allocated to voice endpoints.
Usage -Total	Total time, in CCS units, that VC ports are unavailable to carry a new call. This includes time that the ports are busy on a call, out of service or maintenance busy. Measured from the time that the port is allocated until it is released.
Allocations - Total	Total number of times a VC port was allocated to a call. Each B-channel used on a multimedia call counts as one allocation.
Denials-H320	Number of times a port was needed for an H320 call, but was not available.
Denials -voice	Number of times a port was needed for a voice call, but was not available.
Denials-Total	Total number of times a VC port was needed for any call, but was not allocated because all VC ports were busy.
Out Srv	The total time, in CCS units, that any MMI ports were out of service during any part of the measured interval.
%APB (all ports busy)	The percentage of time during the measured interval that all MMI ports are unavailable to carry a new call.
% Blockage	The percentage of attempted allocations of MMI ports that are not successful. This value is calculated as % blockage = (MMI Denials / Total Alloc + MMI Denials) * 100

Performance Summary Report

This section describes the traffic measurements Performance Summary Report. The Performance Summary Report summarizes the Peak Hour Trunk Blocking Daily Routing Pattern traffic data, Trunks Out of Service, and Trunks Not Used. The system gives a summary report for the previous day or the current day.

Command

To display the Performance Summary Report:

1. Type **list performance summary <yesterday/today> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday/today**.

   - Enter **yesterday** to list a summary of the activity for yesterday.
   - Enter **today** to list a summary of the activity for today.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-50 and Screen 3-51 show typical screens for the Performance Summary Report. On each screen, the time and date the report is requested displays at the top right. The report displays the information both graphically and numerically. Table 3-43 on page 3-140 describes the data fields presented in the Performance Summary Report.

```
list performance summary yesterday                                  Page 1
Switch Name:  Cust_Switch_Name            Date: 4:38 pm  SAT MAY 19, 19xx
                            SUMMARY PERFORMANCE REPORT
PEAK HOUR TRUNK BLOCKING                DAILY ROUTE PATTERN CALLS CARRIED
Grp  - %Out Blocking or % ATB - Grp     Grp   - % Calls Per Group Type -   %
No.  1 2 3 4 5 6 7 8 9 10 20 50 Blk     Type  1 10 20 30 40 50 60 80 100 Calls
54   ///////////////////////   42      co    ///////////////////        62
59   //////////////////////    39      fx    ////////                   28
58   //////////////////////    36      wats  //                          5
63   //////////////////////    34      tie   //                          5
61   ////////////////////      10      misc                              0
```

Screen 3-50. Performance Summary Report (Page 1)

```
list performance summary yesterday                                  Page 2
Switch Name:  Cust_Switch_Name            Date: 4:38 pm  SAT MAY 19, 19xx
                            SUMMARY PERFORMANCE REPORT

      TRUNKS OUT OF SERVICE                   TRUNKS NOT USED
Grp  Trunks Out Of Service All Day      Grp  Trunks Not Used All Day
No.  -----------------------------      No.  -------------------------------
41     9 19                             55   1
73     7                                60   9
211    1 2 3 4 5 6 7 8 9 10             223  19 20 21 22 23
more trunks out of service              more trunks not used
Command successfully completed
Command:
```

Screen 3-51. Performance Summary Report (Page 2)

Table 3-43. Performance Summary Report

Field	Description
PEAK HOUR TRUNK BLOCKING	Lists up to a maximum of five trunk groups with the highest percent of blocking in a measurement hour (for example, Grp No. 54 had 42 percent blocking). For incoming trunk groups, the percent of blocking is referred to as Percent All Trunks Busy (% ATB). For outgoing and two-way trunk groups, the percent blocking is referred to as % Out Blocking. % ATB is the percentage of time that all trunks in the trunk group were simultaneously in use during the measurement interval. % Out Blocking is the percentage of outgoing calls that arrive when all trunks are busy (ATB). For trunk groups with no queue, the calls not carried are those calls that could not be carried over any trunk member. For trunk groups with queues, the calls not carried are those calls that could not be carried over any trunk member and could not be queued because the queue was full (for example, the Queue Overflow calls). **Suggested Action:** You should determine the exact reason that a trunk group is blocking calls. To determine if blocking is being caused by a high volume of calls, refer to Trunk Group Performance Report (for the indicated trunk group). If it is because of calling volume alone, consider the possibility of adding more members to the trunk group. The Total Calls field on the Trunk Group Performance report indicates the calling volume. If blocking is not because of calling volume, the reason must be because trunks are in the maintenance busy state. Determine whether maintenance personnel have been or should be alerted.

Continued on next page

Table 3-43. Performance Summary Report — *Continued*

Field	Description
DAILY ROUTING PATTERN CALLS CARRIED	The percentage of calls carried, on a per trunk type basis by the 25 routing patterns selected and measured (with the **change meas-selection route-pattern** command). The report displays the information both graphically and numerically. This measurement is simply a summation of the Total Calls Carried on a per trunk type basis for the trunk groups listed in the measured route-patterns, divided by the system wide Total Calls Carried for all trunk types all day. The trunk group types for which routing pattern performance is reported in the summary report are: co, fx, wats, tie, and misc. The tie trunk group type includes both internal and external tie, both internal and external Advanced Private Line Termination (APLT) access, and tandem trunk group types. The term misc represents all other remaining trunk group types over which ARS/AAR/UDP calls may be routed.
TRUNKS OUT OF SERVICE	Lists trunk groups with out-of-service trunks over the report interval. A list of the first ten trunks out of service is also given. The indication “more trunks out of service” is given if there are more than four trunk groups with out of service trunks or more than 10 members are out of service in any of the groups listed. **NOTE:** This measurement is a summary of the **list measurements outage-trunk** report.
TRUNKS NOT USED	Lists trunk groups with trunks not used over the report interval (yesterday or today). A list of the first five trunks, in each of the identified groups, not used is also listed. The indication “more trunks not used” is given if there are more than four trunk groups with trunks not used or whenever more than five members are not used in any of the groups listed. **Suggested Action:** You should determine the exact reason the trunks are not being used. Is the reason because there are more trunks than actually needed or because there is a problem? If the identified trunk group has a large number of members and there are several trunks within that trunk group that receive few or zero calls, then the obvious conclusion is there are more trunk members than needed for the trunk group. As a contrast, if there is only one trunk member identified for the trunk group and that member has zero calls, then the trunk probably is defective.

Port Network Load Balance Reports

The PNL Load Balance Reports are designed to show the loading on each PN and give an indication of the load source by call type. Knowing the load source means informed decisions can be made on how best to decrease the load or the effect of adding various kinds of ports to the PN. Growth can be accommodated with a minimum of new equipment.

There are five PN Load Balance Reports.

- The Total report provides an overview of time slot usage, blockage, pegs, and occupancy for time slots on the TDM bus and port network links. This report also contains an EI board control utilization field (G3r only).
- The other four reports include time slot usage and pegs for the following call types:
  - Intercom
  - Incoming Trunk
  - Outgoing Trunk
  - Tandem Trunk

  These reports show characteristic patterns of the load on each port network for each of the call types.

  All the reports are peak reports; so, data is provided for yesterday-peak, today-peak, and last-hour. The peak for each of the four call-type reports is time coincident with the peak from the Total Report (TDM usage field).

Command

To display the Port Network Load Balance Report:

1. Type **list measurements load-balance <total/intercom/incoming/outgoing/tandem> <yesterday-peak/today-peak/last-hour> [print/schedule]** and press RETURN.

   Required Fields: There are two required fields for this command.

   1. **total/intercom/incoming/outgoing/tandem**
      - Enter **total** for an overview of time slot usage, blockage, pegs, and occupancy.
      - Enter **intercom** for time slot usage and pegs for the intercom call type.
      - Enter **incoming** for time slot usage and pegs for the incoming call type.
      - Enter **outgoing** or time slot usage and pegs for the outgoing call type.
      - Enter **tandem** for time slot usage and pegs for the tandem call type.

2. **yesterday-peak/today-peak/last-hour**
   - Enter **yesterday-peak** to list the load balance activity for yesterday's peak hour.
   - Enter **today-peak** to list the load balance activity for today's peak hour.
   - Enter **last hour** to list the load balance activity of the most recently completed hour.

   The peak hour is the hour (within a 24-hour period) with the greatest usage.

Options: The **print** and **schedule** options are available for this command.

Total Calls Report

Screen

Screen 3-52 depicts an example of a typical screen for the Port Network Load Balance Total Calls Report. Table 3-44 on page 3-144 describes the data fields presented in the Port Network Load Balance Total Peak Report.

```
list measurements load-balance total today-peak                          Page 1
Switch Name: Cust_Switch_Name                   Date: 05:45 pm THU FEB 23, 19xx
                          PORT NETWORK LOAD BALANCE STUDY REPORT
TOTAL CALLS
    Meas  Time Division Multiplexed (TDM)   Port Network (PN) Link        Control
PN  Hour  Usage Peg  Peak  Blockage Occ     Usage Peg  Peak Blockage  Occ   Util
1   1500   625  1522   59   0         6     1103  100  35   0         4     15
2   1500   625  1522   48   0         6     1103  100  35   0         4     15
 .
 .
 .
```

Screen 3-52. Port Network Load Balance Total Calls Report

Table 3-44. Port Network Load Balance Total Calls Report

Field	Description
PN	*Port Network*. Identifies the port network being measured.
Meas Hour	*Measurement Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded.
TDM Usage	*Time Division Multiplexed Usage*. The total TDM time-slot usage, in CCS, for the PN being measured: *TDM Usage = Sum of the allocated TDM Time Slots at the end of each 100 second interval in a measurement hour* *TDM Total Potential Usage = 483 x 36 CCS = 17,388 CSS*
TDM Peg	*Time Division Multiplexed Peg*. The total count of circuit switch TDM time-slot seizure attempts for the PN during the measurement hour (requests for maintenance processes are not included).
TDM Peak	*Time Division Multiplexed Peak*. The maximum number of TDM time-slots allocated at any one time during the measurement hour.
TDM Blockage	*Time Division Multiplexed Blockage*. The total count of TDM blockages, that is, the total number of times a TDM time-slot request is denied for the PN being measured, during the measurement hour.
TDM Occ	*Time Division Multiplexed Occupancy*. The percent TDM Occupancy is computed as follows: *(TDM Usage/TDM Total Potential Usage) x 100* **Suggested Action:** Generally, the load should be distributed evenly across port networks. If the percent occupancy is out of line with the occupancy on other port networks, consideration should be given to shifting resources. Use the Intercom, Outgoing, Incoming, and Tandem reports to help determine which resources to shift.
Port Network (PN) Link Usage	The total circuit switch usage (Measured in CCS) of the PN Link(s). *PN Link Usage = Sum of the allocated PN link time-slots at the end of each 100 second interval in a measurement hour.* *PNL Total Potential Usage = 766 x 36 CCS = 27,576 CCS*

Continued on next page

Table 3-44. Port Network Load Balance Total Calls Report — *Continued*

Field	Description
PNL Peg	*Port Network Link Peg*. The total number of circuit switched time slot seizure attempts for the PN during the measurement hour.
PNL Peak	*Port Network Link Peak*. The maximum number of PNL time slots allocated at any one time during the measurement.
PNL Blockage	*Port Network Link Blockage*. The total count of circuit switched PN link blockages, that is, the total number of times a PN link time-slot is denied, during the measurement hour. This count includes calls originating or terminating on this PN. This field should be zero for all configurations that do not use T1 remoting and are smaller than 16 PNs since the center stage is non-blocking in these configurations. **Suggested Action:** If blockages occur in the switching fabric, consider shifting resources. Use the Intercom, Outgoing, Incoming and Tandem reports to determine which resources to switch.
PNL Occ	*Port Network Link Occupancy*. The percent Port Network Link Occupancy is computed as follows: *(PN Link Usage/PNL Total Potential Usage) x 100*
Control Util (G3r only)	The fraction of the total capacity of the processor on the measured EI board. This value is expressed in percent, where 0% is the processor occupancy corresponding to no control measure traffic, and 100% is the processor occupancy corresponding to the maximum message traffic that can be handled and meet delay criteria. The data used to calculate this field is obtained as a traffic counter from the EI board. When the processor is idle, it usually reads about 14%.

Intercom Calls Report

Screen

Screen 3-53 shows a typical screen for the Port Network Load Balance Intercom Calls Report. Table 3-45 describes the data fields presented in the Port Network Load Balance Intercom Calls Report.

```
list measurements load-balance intercom last-hour
Switch Name: Cust_Switch_Name                    Date: 1:52 pm MON SEP 16, 19xx
                        PORT NETWORK LOAD BALANCE STUDY REPORT
INTERCOM CALLS
      Meas      Intra PN                  Inter PN
PN    Hour    Usage    Peg              Usage    Peg
1     1200    441      490              1329     1964
3     1200    2401      75              6221     1020
4     1200    1031     520              5754     2972
```

Screen 3-53. Port Network Load Balance Intercom Calls Report

Table 3-45. Port Network Load Balance Intercom Calls Report

Field	Description
PN	*Port Network*. The port network measured.
Meas Hour	*Measurement Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded.
Intra PN Usage	*Intra Port Network Usage*. The TDM time-slot usage caused by station-to-station calls between terminals on the same port network. Usage is displayed in CCS.
Intra PN Peg	*Intra Port Network Peg.* The count of TDM time-slot seizures caused by station-to-station calls between terminals on the same port network.
Inter PN Usage	*Inter Port Network Usage*. The TDM time slot usage caused by station-to-station calls between terminals on different port networks. Usage is displayed in CCS.
Inter PN Peg	*Inter Port Network Peg*. The TDM time slot seizures caused by station-to-station calls between terminals on different port networks. **Suggested Action:** Generally, load across port networks should be evenly distributed. If inter PN usage is high on a particular network, you should consider shifting station resources to another port network. Although usage data is not displayed for each port network pair, analyzing the distribution of data across each port network can provide insight.

Incoming Calls Report

Screen

Screen 3-54 shows a typical screen for the Port Network Load Balance Incoming Calls Report. Table 3-46 describes the data fields presented in the Port Network Load Balance Incoming Calls Report.

```
list measurements load-balance incoming last-hour
Switch Name: Cust_Switch_Name                    Date: 1:52 pm MON SEP 16, 19xx
                        PORT NETWORK LOAD BALANCE STUDY REPORT
INCOMING TRUNK
     Meas     Intra PN                  Incoming                Outgoing
PN    Hour    Usage    Peg              Usage    Peg             Usage Peg
1     1200    0        0                1784     506              0     0
3     1200    0        0                6111     80               0     0
4     1200    6932     916              0        0                532   586
```

Screen 3-54. Port Network Load Balance Incoming Calls Report

Table 3-46. Port Network Load Balance Incoming Calls Report

Field	Description
PN	*Port Network*. The port network measured.
Meas Hour	*Measurement Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded.
Intra PN Usage	*Intra Port Network Usage*. The TDM time-slot usage caused by incoming trunk calls to a station on the same port network. Usage is displayed in CCS.
Intra PN Peg	*Intra Port Network Peg*. The count of TDM time-slot seizures caused by incoming trunk calls to a station on the same port network.
Incoming Usage	The TDM time-slot usage caused by calls to a station on the port network from an incoming trunk on another port network. Usage is displayed in CCS.
Incoming Peg	The count of TDM time-slot seizures caused by calls to a station on the port network from an incoming trunk on another port network.
Outgoing Usage	The TDM time-slot usage caused by calls to a station on another port network from an incoming trunk on the measured port network. Usage is displayed in CCS.
Outgoing Peg	The count of TDM time-slot seizures caused by calls to a station on another port network from an incoming trunk on the measured port network.

Outgoing Calls Report

Screen

Screen 3-55 shows a typical screen for the Port Network Load Balance Outgoing Calls Report. Table 3-47 describes the data fields presented in the Port Network Load Balance Outgoing Calls Report.

```
list measurements load-balance outgoing last-hour
Switch Name: Cust_Switch_Name                    Date: 1:53 pm MON SEP 16, 19xx
                        PORT NETWORK LOAD BALANCE STUDY REPORT
OUTGOING TRUNK
      Meas      Intra PN                    Incoming                  Outgoing
PN    Hour     Usage     Peg               Usage     Peg             Usage Peg
1     1200     318       506               1260      1160            0     0
2     1200     0         0                 0         0               950   186
3     1200     52        38                72        28              404   1002
```

Screen 3-55. Port Network Load Balance Study Report

Table 3-47. Port Network Load Balance Outgoing Calls Report

Field	Description
PN	*Port Network*. The port network measured.
Meas Hour	*Measurement Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded.
Intra PN Usage	*Intra Port Network Usage*. The TDM time-slot usage caused by outgoing calls made by stations on the measured port network and serviced by outgoing trunks on the same port network. Usage is displayed in CCS.
Intra PN Peg	*Intra Port Network Peg.* The count of TDM time-slot seizures caused by outgoing calls made by stations on the measured port network and serviced by outgoing trunks on the same port network.
Incoming Usage	The TDM time-slot usage resulting from outgoing calls originated at stations on another port network but serviced by trunks on the port network measured. Usage is displayed in CCS.

Continued on next page

Table 3-47. Port Network Load Balance Outgoing Calls Report — *Continued*

Field	Description
`Incoming Peg`	The count of TDM time-slot seizures resulting from outgoing calls originated at stations on another port network but serviced by trunks on the port network measured.
`Outgoing Usage`	The TDM time-slot usage resulting from outgoing calls originated at stations on the port network measured but serviced by trunks on another port network. Usage is displayed in CCS.
`Outgoing Peg`	The count of TDM time-slot seizures resulting from outgoing calls originated at stations on the port network measured but serviced by trunks on another port network.

Tandem Calls Report

Screen

Screen 3-56 shows a typical screen for the Port Network Load Balance Tandem Calls Report. Table 3-48 on page 3-150 describes the data fields presented in the Port Network Load Balance Tandem Calls Report.

```
list measurements load-balance tandem last-hour
Switch Name: Cust_Switch_Name                    Date: 1:53 pm MON SEP 16, 19xx
                        PORT NETWORK LOAD BALANCE STUDY REPORT
TANDEM TRUNK
      Meas     Intra PN                    Incoming                 Outgoing
PN    Hour     Usage    Peg               Usage    Peg             Usage Peg
1     1200     0        0                 0        0               0     0
3     1200     0        0                 0        0               0     0
4     1200     0        0                 0        0               0     0
```

Screen 3-56. Port Network Load Balance Tandem Calls Report

Table 3-48. Port Network Load Balance Tandem Calls Report

Field	Description
PN	*Port Network*. The port network measured.
Meas Hour	*Measurement Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded.
Intra PN Usage	*Intra Port Network Usage*. The TDM usage caused by tandem trunk calls originating and terminating on the port network being measured. The usage is represented in CCS.
Intra PN Peg	*Intra Port Network Peg*. The count of TDM time-slot seizures caused by tandem trunk calls originating and terminating on the port network being measured.
Incoming Usage	The TDM usage resulting from tandem trunk calls originating on another port network but terminating on the port network measured. The usage is represented in CCS.
Incoming Peg	The count of TDM time-slot seizures resulting from tandem trunk calls originating on another port network but terminating on the port network measured.
Outgoing Usage	The TDM usage resulting from tandem trunk calls originating on the port network measured but terminating on another port network. The usage is represented in CCS.
Outgoing Peg	The count of TDM time-slot seizures resulting from tandem trunk calls originating on the port network measured but terminating on another port network.

Port Network/Switch Node Blockage Study Report

The Blockage Study Reports provide information on usage and blockage for each port network as well as between switch node pairs.

There are two reports: One provides port network (PN) and port network link (PNL) data and the other provides switch node link (SNL) data. The latter report is available only on the G3r server.

A port network link is the hardware that provides a bridge between two port networks in a direct-connect configuration or between a port network and a switch node in a center stage configuration. A switch network link is the hardware that provides a bridge between two switch nodes.

The Blockage Study Reports are designed to identify where congestion is occurring within the switching fabric and provide insight on how ports (load) can be adjusted to achieve satisfactory service. Planning for growth additions is also simplified because the report allows quick identification and quantification of reserve switching capacity.

Both reports are available for the following time intervals:

- Last Hour
- Today's Peak
- Yesterday's Peak

The Port Network Report provides local Time Division Multiplexed (TDM) time slot usage, pegs, and blockages, as well as PNL time slot usage, pegs, and blockages. The Switch Node Report provides SN to SN time-slot usage, pegs, blockages, and overflow.

Of the 512 TDM time slots in each port network, usage measurements are only provided for 483 time slots employed in call processing, data links, and maintenance. Usage is not reported for the remaining 29 time slots, which primarily serve system functions.

The TDM time slots are sampled every one hundred seconds. Usage measurements for these sampled intervals are expressed in hundred call seconds or CCS. For example, any time slot in use when the sample is taken is assumed busy for the entire sampling interval and is counted as one CCS for the interval. Because there are 36 CCS in an hour and 483 reported time slots, the maximum TDM usage per port network is:

Maximum TDM usage = 483 X 36 CCS = 17,388 CCS

It should be understood that 17,388 CCS represents the maximum calling volume a single port network can support. Any calls that attempt to exceed this maximum are blocked because there are no time slots available. When this happens, the blockage field (TDM blockage) is incremented.

There are a maximum of 766 port network fiber time slots associated with a port network connected to another port network or between a port network and a switch node in a center stage configuration. Some of those time slots may be allocated for packet bandwidth, in which case the number is lower. For T1 remoting, there is a maximum of 188 fiber time slots (PNL Time Slots).

The PNL time slots are sampled every one hundred seconds. Usage measurements for these sampled intervals are expressed in hundred call seconds or CCS. For example, any time slot in use when the sample is taken is assumed busy for the entire sampling interval and is counted as one CCS for the interval. Because there are 36 CCS in an hour and 766 reported time slots, the maximum PNL usage per port network is:

Maximum PNL usage = 766 x 36 CCS = 27,576 CCS

It should be understood that 27,576 CCS represents the maximum calling volume supported between port networks or between a port network and a switch node. Any calls that attempt to exceed this maximum are blocked because there are no time slots available. When this happens, the blockage field (TDM blockage) is incremented.

Command

To display the Blockage Study Report:

1. Type **list measurements blockage pn/sn <yesterday-peak/today-peak/ last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**.

   - Enter **yesterday-peak** to list the blockage activity for yesterday's peak hour.
   - Enter **today-peak** to list the blockage activity for today's peak hour.
   - Enter **last hour** to list the blockage activity of the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: The **print** and **schedule** options are available with this command.

Port Network Screen

Screen 3-57 shows a typical Blockage Study Port Network Report. Table 3-49 on page 3-154 describes the data fields presented in the Blockage Study Port Network Report.

```
list measurements blockage pn last-hour
Switch Name: Cust_Switch_Name                    Date: 1:45 pm MON SEP 16, 19xx
                                BLOCKAGE STUDY REPORT

    Meas  Time Division Multiplexed (TDM)    Port Network (PN) Link
PN  Hour  Usage  Peg   Peak Blockage    Time-slots Usage  Peg   Peak Blockage
1   1200  2650   5435  125   0            758      2125   3696    72  0
3   1200  7887   1581  250   0            762      6265   1272   170  0
4   1200  6199   8197  190   0            760      5862   4667   195  0
```

Screen 3-57. Blockage Study Port Network Report

Table 3-49. Blockage Study Port Network Report

Field	Description
PN	*Port Network.* The port network being measured.
Meas Hour	*Measurement Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded.
TDM Usage	*Time Division Muliplexed Usage.* The total TDM time-slot usage, in CCS, for the PN being measured, during the measurement hour. This is calculated as follows: *TDM Usage = Sum of the allocated TDM time slots at the end of each 100 second interval in a measurement hour.* *TDM usage max = 483 x 36 CCS = 17,388 CCS* After each 100-second interval, a snapshot is taken of the number of TDM time-slots used on each port network.
TDM Peg	*Time Division Muliplexed Peg.* The total count of circuit switch TDM time-slot seizure attempts for the PN during the measurement hour (requests for maintenance processes not included).
TDM Peak	*Time Division Muliplexed Peak.* The maximum number of time-slots allocated at any one time during the measurement hour.
TDM Blockage	*Time Division Muliplexed Blockage.* The total count of TDM blockages, that is, the total number of times a TDM time-slot request is denied for the PN measured, during the measurement hour. **Suggested Action:** Generally, it is desirable to balance the traffic across port networks. If the usage nears the maximum CCS, some resources should be moved to another port network.
PNL Time-Slots	*Port Network Link.* The number of port network link time-slots available between port networks or between port networks and switch nodes. At any given time interval, this translation value is fixed. (Remember, this refers to available time slots, not measurement data.)

Continued on next page

Table 3-49. Blockage Study Port Network Report — *Continued*

Field	Description
`Port Network Link Usage`	The total circuit switch usage of the available PN Link(s) connecting the PN to the SN or to other PNs. For directly connected PNs in three PN systems, this is the **sum of the usage** for both links. *PN LINK USAGE = Sum of the allocated PN Link time-slots at the end of each 100 second interval in a measurement hour.* *PN Link Usage Max = 766 x 36 CCS = 27,576 CCS.*
`Port Network Link Peg`	The total count of circuit switched time-slot seizure attempts for the link(s) during the measurement hour.
`Port Network Link Peak`	The maximum number of time slots allocated at any one time on the port network links.
`Port Network Link Blockage`	The total count of circuit switched PN blockages, that is, the total number of times a PN link time-slot is denied during the measurement hour. This count includes calls originating or terminating on this PN. This field should be zero for all configurations that do not use T1 remoting and are smaller than 16 PNs since the center stage is non-blocking in these configurations. **Suggested Action:** Generally, it is desirable to balance traffic between port networks, or between port networks and switch nodes. If the usage is high for a port network, resources may need to be moved from one port network to another.

Switch Node Screen

Screen 3-58 shows a typical Blockage Study Switch Node Report. Table 3-50 describes those data fields presented in the Blockage Study Switch Node Report different from those in the Port Network Report. Refer to Table 3-49 on page 3-154 for data fields that are the same. This report is only accessible from the G3r server.

```
list measurements blockage sn last-hour                                Page 1
Switch Name: Cust_Switch_Name                 Date: 05:45 pm THU FEB 23, 19xx
                                  BLOCKAGE STUDY REPORT
CENTER STAGE
             Meas                 Switch Node (SN) Link
SN Pair      Hour       Time-slots     Usage      Peg     Blockage   Overflow
1/2          1600          766          9800      49267       0          0
```

Screen 3-58. Blockage Study Switch Node Report

Table 3-50. Blockage Study Switch Node Report

Field	Description
SN Pair	*Switch Node Pair*. Identifiers for the two SNs connected by the SNL being measured.
Meas Hour	*Measurement Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded.
Switch Node Link (SN) Time-Slots	The number of switch node link time-slots available between switch nodes. At any given time interval, this translation value is fixed. The SNL time slot maximum is 766; for T1 remoting it is 94.
Switch Node Link Usage	The total circuit switch usage of the SNL connecting the two SNs. This is the total usage on **interconnecting fibers**. At the end of each 100-second interval, a snapshot is taken of the number of SNL time-slots used on each port network. *Max SNL usage = 766 x 36 CCS = 27,576.*
Switch Node Link Peg	The total count of circuit switched SNL time-slot seizure attempts during the measurement hour between the two measured SNs. This is the total peg count on **all interconnecting fibers**.

Continued on next page

Table 3-50. Blockage Study Switch Node Report — *Continued*

Field	Description
`Switch Node Link Blockage`	The total count of circuit switched SNL blockages, that is, the total number of times a call is blocked because no time-slots are available either in the most direct route or through any alternate route, during the measurement hour.
`Switch Node Link Overflow`	The total number of times a call is routed over an alternate route. This counter is incremented when a call was not successfully routed over the most direct route and is routed over an alternate route. This allows you to distinguish true blockage of a call from the direct route blockage. **Suggested Action:** Generally, the usage between switch nodes should be equally distributed. If the usage between switch nodes is high, you may want to move resources to another switch node or add a new switch node.

System Status Reports

This section describes the Monitor System Status reports which provide an overall view of how the system is performing in real-time.

The Monitor System Status commands generate dynamic one-page status reports that summarize the overall current condition of the system and last hour traffic status.

Using the Monitor System Status commands, you can generate two different status report screens. These two screens contain the following information:

- **Monitor System View1**. Includes the attendant status, maintenance status, and last hour's traffic data for attendant, hunt, and trunk groups. The screen also shows the date and time of day at which you requested the report.
- **Monitor System View2**. Includes attendant status, maintenance status, and last hour's traffic data for attendant and trunk groups. The screen also shows the date and time of the day at which you requested the report.

  Data for attendant and maintenance status updates every 60 seconds. Data for the traffic status updates once every hour because traffic status is obtained from existing measurements collected on an hourly basis.

  NOTE:
  Requesting either of the system status reports should be your last request during your current log on. The screens are exited by pressing CANCEL, which also logs you off the system, or after a 30-minute time-out.

Command

To display the desired Monitor System Status Report:

1. Choose one of the following:
   - Type **monitor system view1**
   - Type **monitor system view2**
2. Press RETURN.

Screen

Screen 3-59 shows a typical screen for the Monitor System View1 report and Screen 3-60 shows a typical screen for the Monitor System View2 report. Table 3-51 on page 3-160 describes the data fields presented in both reports.

```
monitor system view1

             ATTENDANT STATUS                  MAINTENANCE STATUS

               Console no.                   # of alarms for trunks: 0
Activated: 3                               # of alarms for stations: 0
Deactivated: 1 2                          # of alarms for other res: 0
                                 First OSS number has been informed? n

                                 TRAFFIC STATUS
                              Measurement Hour: 18
    Trunk Group Measurement                Hunt groups Measurement
(4 grps with highest %time ATB)        (4 grps with highest # of queued calls)
      Grp no:  41  12  23  221                    Grp no: 6
     Grp dir:  inc out two two                 Calls qued: 2
  Calls qued:   17   9  19   12                 Calls aban: 2
   %Out blkg:   *    9  18   11                 Attendant Group Measurement
   %Time ATB:   86   79  91   93                 Calls qued: 9     Calls aban: 1

                                                          19:27 FRI MAY 18 19xx
              - press CANCEL to quit -
```

Screen 3-59. Monitor System View1 Report

```
monitor system view2

             ATTENDANT STATUS                  MAINTENANCE STATUS

             Console no.                     # of alarms for trunks: 0
Activated: 3                                  # of alarms for stations: 0
Deactivated: 1 2                             # of alarms for other res: 0
                                 First OSS number has been informed ? n


TRAFFIC STATUS  Measurement Hour: 18
  Trunk Group Measurement
(4 grps with highest %time ATB
     Grp no:  41  12  23  221
    Grp dir:  inc out two two
 Calls qued:  17   9  19  12
  %Out blkg:   *   9  18  11
  %Time ATB:  86  79  91  93
  Attendant Group Measurement
Calls qued: 9     Calls aban: 1
                                                          19:28 FRI MAY 18 19xx
                        - press CANCEL to quit -
```

Screen 3-60. Monitor System View2 Report

Table 3-51. Monitor System View1 and View2 Reports

Field	Description
ATTENDANT STATUS	Shows the activated and deactivated attendant consoles. In the sample screens, console #1 and console #2 are deactivated and console #3 is activated. **NOTE:** Activated means the agent's headset/handset is plugged into the console, and the console is not busied-out or set for Night Service. To obtain other details, use the **status attendant** command.
MAINTENANCE STATUS	Shows the number of alarms (including minor and major alarms) that may indicate problems on trunks, stations, and other resources. If any alarm exists in the system or if remote maintenance has acknowledged an alarm, indications are shown on the report. A y indicates acknowledgment. An n indicates no acknowledgment. To determine exactly what alarms currently exist, use the **display alarms** command.

Continued on next page

Table 3-51. Monitor System View1 and View2 Reports — *Continued*

Field	Description
TRAFFIC STATUS	View1 displays the call handling status for trunk, hunt, and attendant groups; View2 only displays the call handling status for trunk and attendant groups. For trunk groups, the reports indicate the number of queued calls during the previously completed measurement interval for the identified trunk groups. For hunt groups, the reports indicate the number of queued calls and abandoned calls during the previously completed measurement interval for the identified trunk groups. For the trunk group measurements, only the four trunk group numbers with the highest percentage of blocking are listed. The reports also display trunk group direction (two-way, outgoing, or incoming), the number of calls queued, the percentage of outgoing blocking (for outgoing and two-way trunks), and the percentage of all trunks busy. For outgoing and two-way trunk groups only experiencing a high number in the %Time ATB field, no action is required since this indicates that the trunks are used very efficiently. However, a bad condition is when both the %Time ATB and %Out blkg fields display high numbers, indicating calls arrive and are blocked because all trunks are already in use. For incoming trunk groups experiencing a high number in the %Time ATB field, then some incoming calls are probably blocked. **Suggested Actions:** 1. For outgoing and two-way trunk groups experiencing a high number in both the %Time ATB and %Out blkg fields, use the **list performance trunk-group** command and follow the suggested actions specified for that command. 2. For incoming trunk groups experiencing a high number in the %Time ATB field, use the **list performance trunk-group** command and follow the suggested actions specified for that command.

Tone Receiver Reports

Tone Receiver Summary Report

The Tone Receiver Summary Measurements report provides traffic data for Dual Tone Multifrequency (DTMF) receivers, general purpose tone detectors (GPTDs), and Call Classifiers (CCs). DTMF receivers detect touch tones, GPTDs detect call progress tones. CCs can function either as Call Progress Tone Receivers (CPTRs), touch-tone receivers (TTRs), or multifrequency compelled receivers (MFCRs).

NOTE:
Tone receivers are required to support the ARS, Terminal Dialing, Abbreviated Dialing, LND, and Call Prompting features. for additional details, refer to the *DEFINITY ECS System Description*.

Reports can be requested on tone receiver activity for yesterday's peak hour, today's peak hour, or the last hour. The peak is the hour of the day with the highest Peak Req measurement. The data in this report can be used to determine if there is a need for additional Tone Detector or Tone Detector/Generator circuit packs.

Command

To display the Tone Receiver Summary Measurements Report:

1. Type **list measurements tone-receiver summary <yesterday-peak /today-peak/last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**.

   - Enter **yesterday-peak** to list the tone receiver activity for yesterday's peak hour.
   - Enter **today-peak** to list the tone receiver activity for today's peak hour.
   - Enter **last-hour** to list the tone receiver activity of the most recently completed last hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-61 shows a typical screen for the Tone Receiver Measurements Summary report. Table 3-52 describes the data fields presented in the Tone Receiver Measurements Summary report.

```
Switch Name:                                  Date: 11:27 am  MON JUL 17, 19xx
                        TONE RECEIVER SUMMARY MEASUREMENTS
      Meas              Total     Peak      Total     Peak      Total     Peak
Hour  Type              Req       Req       Queued    Queued    Denied    Denied
1000  DTMF                0         0         0         0         0         0
1000  GPTD                0         0                           0         0
1000  CC-TTR              0         0         0         0         0         0
1000  CC-CPTR             0         0                           0         0
1000  CC-MFCR             0         0                           0         0
      TR Type           Total Avail         Capabilities
      DTMR-PT               4               DTMF
      GPTD-PT               2               GPTD
      CLAS-PT               0               DTMF,CC-TTR,CC-CPTR,MFCR
      ETR-PT                0               DTMF,CC-TTR,CC-CPTR,MFCR,GPTD

Command successfully completed
Command:
```

Screen 3-61. Tone Receiver Measurements report

Table 3-52. Tone Receiver Measurements Summary Report

Field	Description
Hour	*Measurement Hour*. The starting time (using 24-hour clock) of the last hour or the hour with the highest Peak Req measurement.
Type	The type of tone receiver measured.
Total Req	*Total Requests*. The system-wide total number of requests, by call processing, for DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers during the listed hour. The total number of requests is calculated by incrementing a counter for each request.

Continued on next page

Table 3-52. Tone Receiver Measurements Summary Report — *Continued*

Field	Description
`Peak Req`	*Peak Requests*. The system-wide peak number of simultaneous requests for DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers that occurred at any one time for the listed hour. The peak (or maximum) number is calculated by incrementing a counter for each request and decreasing the counter when the request fails or a tone receiver is released. **NOTE:** If the Peak Req field indicates a number higher than listed in the Avail field, then certain requests were either queued or denied during the peak time interval. Denied requests fail and are given the reorder tone.
`Total Queued`	The system-wide total number of requests queued during the listed hour. A request is queued when there are no receivers immediately available. Only DTMF and CC-TTR requests are queued. **NOTE:** If a request for a receiver is made in one port network, and no receivers are available, then the request is offered to the next port network. If no receivers are available on any port network, then the request is queued. Queued call requests do not receive dial tone until a tone receiver becomes available.
`Peak Queued`	The system-wide maximum number of call requests queued at any one time during the listed hour. **NOTE:** The system has a maximum queue size of 4 for DTMF requests and 80 for CC-TTR call vectoring requests.
`Total Denied`	The system-wide total number of requests denied because no receivers were available during the listed hour. For DTMF-receiver or CCTR requests, this happens only after the queue is full. Those requests denied are given reorder tone.

Continued on next page

Table 3-52. Tone Receiver Measurements Summary Report — *Continued*

Field	Description
`Peak Denied`	The system-wide peak number of requests denied because no receivers were available during the listed hour. **Suggested Action:** At a minimum you should increase the number of tone receivers by the number displayed in the Peak Denied field. Furthermore, you may want to consider engineering the switch as “non-blocking” for tone receivers. This involves increasing the number of tone receivers (the Avail field) so all requests receive service immediately and no requests are queued. For example, keep the value displayed in the Avail field greater than that displayed in the Peak Req field.
`TR Type`	*Tone Receiver Type*. The tone receiver circuit packs physically connected at the time of the hour measurement.
`Total Avail`	*Total Available*. The number of the ports available for the type of tone receiver listed in the previous column.
`Capa-bilities`	The types of tone(s) the tone receiver can detect.

Tone Receiver Detail Report

The Tone Receiver Measurements Detail report provides traffic data for Dual Tone Multifrequency (DTMF) receivers, general purpose tone detectors (GPTDs), and Call Classifiers (CCs) as Call Progress Tone Receivers (CC-CPTRs) for call classification, as touch-tone receivers (CC-TTRs) for call vectoring, and as multifrequency compelled receivers (MFCRs).

NOTE:
Tone receivers are required to support the ARS, Terminal Dialing, Abbreviated Dialing, LND, and Call Prompting features. For additional details, refer to the *DEFINITY ECS System Description*.

Reports can be requested on tone receiver activity for yesterday’s peak hour, today’s peak hour, or the last hour. The peak is the hour of the day with the highest Peak Req measurement. The data in this report can be used to determine if there is a need for additional Tone Detector or Tone Detector/Generator circuit packs.

Command

To display the Tone Receiver Measurements Detail report screen:

1. Type **list measurements tone-receiver detail <yesterday-peak /today-peak/ last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**.

   - Enter **yesterday-peak** to list the tone receiver activity for yesterday's peak hour.
   - Enter **today-peak** to list the tone receiver activity for today's peak hour.
   - Enter **last-hour** to list the tone receiver activity of the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-62 and Screen 3-64 on page 3-170 show typical screens for the Tone Receiver Measurements Detail report for a two-port network system. Table 3-53 on page 3-167 describes the data fields presented in the Tone Receiver Measurements Detail report. One page of data is displayed per port network.

```
list measurements tone-receiver detail last-hour                Page  1
Switch Name: Cust_Switch_Name                    Date: 3:16 pm TUE OCT 17, 19xx
                 TONE RECEIVER DETAIL MEASUREMENTS
                              PN    PN      Peak     Total    Peak
Hour    PN      Type          Req   Alloc   Alloc    OFF-PN   OFF-PN
1400    1       DTMF           8     8       8         0        5
1400    1       GPTD          12    12       3         0        0
1400    1       CC-TTR         0     0       0         0        0
1400    1       CC-CPTR        0     0       0         0        0
1400    1       CC-MFCR        0     0       0         0        0

         Press CANCEL to quit   -   press NEXT PAGE to continue
```

Screen 3-62. Tone Receiver Detailed Measurements report

Table 3-53. Tone Receiver Detailed Measurements Report

Field	Description
`Hour`	*Measurement Hour*. The starting time (using 24-hour clock) of the last hour or of the hour with the highest Peak Req measurement.
`PN`	*Port Network*. The port network in which the circuit pack containing the type of tone receiver listed is physically located.
`Type`	The type of tone receiver measured. **NOTE:** Each TN748 and TN420 circuit pack provides four DTMF ports (for touch-tone reception) and two GPTD ports (for call progress tone reception). The TN744 Call Classifier Circuit Pack provides eight ports for call progress tone reception (CC-CPTR), touch-tone reception (CC-TTR), or MFC (CC-MFCR) reception.
`PN Req`	*Port Network Requests*. The number of requests for DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers within the port network during the listed hour.
`PN Alloc`	*Port Network Total Allocation*. The total number of DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers located in the listed port network allocated for use during the listed hour.
`Peak Alloc`	*Peak Allocation*. The peak number of DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers located in the listed port network in use simultaneously during the listed hour.

Continued on next page

Table 3-53. Tone Receiver Detailed Measurements Report — *Continued*

Field	Description
`Total Off-PN`	*Total Off-Port Network*. For the identified hour and port network, this is the total number of DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers allocated on a different port network for requests originated on this port network. **NOTE:** With ideal conditions, this field displays the number 0. However, with more practical conditions, the field displays a larger number. **Suggested Actions:** Locate communities of interest within the same port network. Provide sufficient tone receivers for each port network.
`Peak Off-PN`	*Peak Off-Port Network*. For the identified hour and port network, this is the peak number of DTMF, GPTD, CC-TTR, CC-CPTR, or MFCR receivers simultaneously allocated on a different port network for requests originated on this port network. **NOTE:** A desirable goal is to minimize (within reason) the number displayed with this field. **Suggested Actions:** Locate communities of interest within the same port network. Provide sufficient tone receivers for each port network. Perhaps you should move one TN748 and TN420 circuit pack (or, if you are working with a CC-TTR, CC-CPTR, and MFCR, move a TN744 circuit pack) to the PN with the Off-PN counts to minimize Off-PN allocations.

Traffic Summary Report

The Traffic Summary Report provides an overview of system performance. Summarized in the report are peak hour call processing and system management occupancy, peak hour blocking for TDM time slots on each port network, peak hour blocking for port network links and switch node links, and the peak hour for the TDM time slots, port network links and switch node links combined, peak hour for the worst attendant speed of service, and the peak for today and yesterday for trunk blocking for the worst five trunk groups.

Also included are a series of traffic flags and counters provided for the last hour of measurement data. They include a time stamp for a major alarm, trunk group, wideband trunk group, coverage path, coverage principals, and routing-pattern time stamps for measurement selection modifications.

There are, as well, for last hour, totals for Trunks Out of Service, CDR high water mark and overflow, and total security violations.

NOTE:
Data in this report is not updated on demand. It is generated every hour on the hour and can be used to identify problem areas in the system. More detailed data can be retrieved from other measurements reports, as noted in the field descriptions.

When a potential problem is identified from this report, other more detailed reports in the suspect area are required to adequately characterize the problem.

Command

To display the Traffic Summary Report screen:

1. Type **list measurements summary [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-63, Screen 3-64 and Screen 3-65 on page 3-171 show typical screens for the Traffic Summary Reports. Table 3-54 on page 3-171 describes the data fields presented in these screens.

```
list measurements summary
Switch Name: Cust_Switch_Name                    Date: 8:13 am THRU SEP 19, 19xx
                                TRAFFIC SUMMARY REPORT
                          Last Hour  Today's  Yesterday's
OCCUPANCY MEASUREMENTS
       Meas Hour:         700        500      1300
Static Occupancy:         7          7        0
    CP Occupancy:         0          3        5
    SM Occupancy:         18         1        16
BLOCKAGE MEASUREMENTS
       Meas Hour:         700        700      2300
  Total Blockage:         0          0        0
     High PN Blk:         0          0        0
High SNL/PNL Blk:         0          0        0
ATTENDANT SPEED MEASUREMENTS
       Meas Hour:         700        700      2300
 Attendant Speed:         0          0        0
```

Screen 3-63. Traffic Summary Report — Page 1

```
list measurements summary
Switch Name: Cust_Switch_Name                    Date: 8:13 am THRU SEP 19, 19xx

                              TRAFFIC SUMMARY REPORT

TRAFFIC FLAGS
                         Major Alarm: NO MAJOR ALARM
                         Trunk Group: 11:08 pm SEP 16, 19xx
                 Wideband Trunk Group: 11:08 pm SEP 16, 19xx
                        Coverage Path: 11:08 pm SEP 16, 19xx
                   Covered Principals: 11:08 pm SEP 16, 19xx
                        Route Pattern: 11:08 pm SEP 16, 19xx
          Total Trunks Out of Service: 4
                  Security Violations: 0
                  CDR High-Water-Mark: 0
                         CDR Overflow: 0
```

Screen 3-64. Traffic Summary Report — Page 2

```
list measurements summary
Switch Name: Cust_Switch_Name                    Date: 8:13 am THRU SEP 19, 19xx
                                TRAFFIC SUMMARY REPORT

FIVE TRUNK GROUPS LOWEST SPEED OF SERVICE

-----Today's Peak-----       -----Yesterday's Peak---
Grp No  Meas Hour  %ATB      Grp No   Meas Hour  %ATB
30      700        100       30       2300       100
40      700        0         40       1000       5
39      700        0         39       2300       0
38      700        0         38       2300       0
37      700        0         37       2300       0
```

Screen 3-65. Traffic Summary Report — Page 3

Table 3-54. Traffic Summary Report

Field	Description
`Meas Hour`	*Measurement Hour.* The starting time (using the 24-hour clock) of the hour during which the data was recorded.
`Static Occupancy`	*Static Occupancy.* The percentage of processor occupancy required by background processes in support of call processing, maintenance, and system management. Examples of this activity are high-level sanity checks, system timing, and polling of adjuncts.
`CP Occupancy`	*Call Processor Occupancy*. The percentage of processor occupancy due to high priority processing and dynamic call processing. The peak hour is determined by the hour with the largest combined call processing and static occupancy. To correlate data as well as to determine necessary actions, refer to Screen 4-1 on page 4-4.
`SM Occupancy`	*System Management Processor Occupancy*. The percentage of processor occupancy due to system management processes. This measurement is time coincident with the peak value of the combined call processing and static processor occupancy.
`Total Blockage`	The percent of total circuit switched time slot seizures blocked due to insufficient TDM or CSS time slots. *Total Blocking = ((TDM Blockage + SNL Blockage + PNL Blockage) x 100) / (TDM Pegs + SNL Pegs + PNL Pegs)*

Continued on next page

Table 3-54. Traffic Summary Report — *Continued*

Field	Description
`High PN Blk`	*Highest Port Network Blocking*. The highest percent of TDM time slot seizure failures due to insufficient time slots for any PN. This is time coincident with Peak Total Blocking above. It is computed as follows: *Highest PN Blk = (TDM Blockage x 100) / TDM Pegs*
`High PNL/SNL Blk`	*Highest Port Network Link/Switch Node Link Blocking*. (G3r only). The highest percent of SNL and PNL seizure failures due to insufficient time slots. This measurement is only meaningful for links between Center Stage Nodes or T1 remote PNs since connectivity to the Center Stage from any PN is non-blocking with fiber connectivity. This is time coincident with Peak Total Blocking. It is computed as follows: *Highest PNL/SNL Blk = ((SNL Blockage + PNL Blockage) *100)) / SNL Pegs + PNL Pegs)* The data from Total Blockage, High PN Blk and High PN/SNL Blk can be correlated to data on the Blockage PN and Blockage SN Reports. The peak hour has the worst total (TDM, PNL, and SNL) blockage.
`Attendant Speed`	*Attendant Group Speed of Service.* The average time calls are in the attendant queue. The peak hour has the slowest speed of service. *Attendant Speed = Total Delay for all Answered Call (in seconds) / Total Number of Calls Answered* **Suggested Action** If the speed of answer is not acceptable, review the attendant group and attendant positions reports for suggested actions.
`Major Alarm`	The time stamp of the last major alarm active when the report was generated for the last hour. **Suggested Action** If measurement data on reports seems inconsistent, further study of alarms may point to a potential problem (“display alarms”).
`Trunk Group`	The time stamp that indicates when the Trunk Groups Measurement Selection screen was last updated. This time stamp is retrieved when the measurements for the Trunk Group Hourly Report are collected each hour.

Continued on next page

Table 3-54. Traffic Summary Report — *Continued*

Field	Description
`Wideband Trunk Group`	The time stamp that indicates when the Wideband Trunk Group Measurement Selection screen was last updated. This time stamp is retrieved when the measurements for the Wideband Trunk Group Hourly Report are collected each hour.
`Coverage Path`	The time stamp that indicates when the Coverage Measurement Selection screen was last updated. This time stamp is retrieved when the measurements for the associated report(s) are collected each hour.
`Covered Principals`	The time stamp that indicates when the Principal Measurement Selection Administration screen was last updated. This time stamp is retrieved when the measurements for the associated report(s) are collected each hour.
`Route Pattern`	The time stamp that indicates when the Measurement Route Pattern Selection Administration screen was last updated. This time stamp is retrieved when the measurements for the associated report(s) are collected each hour. The time at which the identification of routing patterns to be studied was last changed.
`Total Trunks Out of Service`	The total number of trunks out of service for the entire system as of the last hour. For more details and suggested actions, refer to Screen 3-70 on page 3-190.
`Security Violations`	The total number of security violations, login, barrier code, and authorization code, as recorded in the Security Violations Summary Report. Generally, this number should not be high. If it is, refer to Screen 5-1 on page 5-2 and Screen 5-2 on page 5-8 for suggested actions.
`CDR High Water Mark`	*Call Detail Recording High Water Mark*. The number of times during the measurement interval the CDR Record Buffer High Water Mark is exceeded. This is a warning level reached when the number of CDR records stored on the switch is close to the maximum number of buffers allocated.

Continued on next page

Table 3-54. Traffic Summary Report — *Continued*

Field	Description
`CDR Overflow`	*Call Detail Recording Overflow*. The number of times during the last hour the CDR record buffer overflowed invoking the administration selectable overflow response. Special handling procedures occur when all CDR buffers are filled. To prevent undesired loss of data, options are put in effect to redirect calls generating CDR records to the attendant or to give those calls intercept treatment. **Suggested Actions** Both the above conditions may indicate that the CDR primary link is down and that maintenance tests should be done to check the link doesn't have hardware problems ("test cdr-link primary").
`Grp No`	*Group Number*. The trunk group number.
`% ATB`	*Percent All Trunks Busy.* The observed blocking as determined by All Trunks Busy (ATB) for the trunk group. This is reported for the 5 trunk groups with the highest % ATB for today and yesterday.

Trunk Group Reports

This section describes the traffic, outage, performance, status, call-by-call, and lightly used reports for Trunk Groups, and describes the validation and analysis of the data provided in the reports.

Trunk Group Summary Report

The Trunk Group Summary Report gives traffic measurements for all trunk groups except for Personal Central Office Line Groups. By using this report, you can determine the trunk group total usage (in CCS), the total number of calls, trunk blockage, and other measurement data.

Command

To display the Trunk Group Summary report:

1. Type **list measurements trunk-group summary <yesterday-peak/today-peak/last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday-peak/today-peak/last-hour**.

   - Enter **yesterday-peak** to list a summary of the trunk group activity for yesterday's peak hour.
   - Enter **today-peak** to list a summary of the trunk group activity for today's peak hour.
   - Enter **last-hour** to list a summary of the trunk group activity for the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-66 shows a typical screen for the Trunk Group Summary Report. Table 3-55 describes the data fields presented in the Trunk Group Summary Report.

```
list measurements trunk-group summary last-hour
Switch Name: Cust_Switch_Name                    Date: 1:58 pm MON SEP 16, 19xx
                                TRUNK GROUP SUMMARY REPORT
     Peak Hour For All Trunk Groups: 1000 (W = Wideband Support)           %
Grp Grp  Grp  Grp Meas Total Total Inc.  Grp  Que  Call  Que Que Out   %  Out
No. Siz  Type Dir Hour Usage Seize Seize Ovfl Siz  Qued  Ovf Abd Srv  ATB Blk
20  1    did  inc 1200 0     0     0     0    0    0     0   0   0    0   *
30  1    tie  two 1200 36    0     0     0    0    0     0   0   0    100 0
37  22   tand two 1200 598   179   0     0    0    0     0   0   0    0   0
38  23   isdn two 1200 171   654   0     0    0    0     0   0   0    0   0  W
39  22   isdn two 1200 270   762   762   0    0    0     0   0   0    0   0
40  5    co   two 1200 61    32    0     6    0    0     0   0   0    6   15
```

Screen 3-66. Trunk Summary Report

Table 3-55. Trunk Group Summary Report

Field	Description
Peak Hour for All Trunk Groups	The hour during the specified day with the largest total usage, when summed over all trunk groups. Peak hour and busy hour are synonymous. With conventional traffic theory data analysis, there are two methods for determining the peak hour. One is the time-coincident peak hour, meaning that hourly usage values are averaged across days for each hour of the day. The other is the bouncing peak hour, meaning that the highest usage is selected for each day without regard to the average across days. For the bouncing peak hour the highest load on a given day may or may not occur during the time-coincident busy hour. These traffic reports and accompanying trunk group data worksheet only use the bouncing peak hour method. Note that if the total usage for the current hour equals the total usage for the previous peak hour, then the peak hour is the hour with the greatest number of total seizures.
Grp No.	*Group Number*. A number that identifies each trunk group associated with the displayed data. Group numbers are displayed in numerical order, beginning with the lowest administered number and continuing to the highest administered number.
Grp Siz	*Group Size*. The number of administered trunks in the trunk group.

Continued on next page

Table 3-55. Trunk Group Summary Report — *Continued*

Field	Description
`Grp Type`	*Group Type*. The type of trunk in the trunk group. The system monitors/measures the following trunk types: ■ Access Tie Trunk (`Access`) ■ Advanced Private Line Termination (`aplt`) ■ Central Office (`co`) ■ Public Network Service Customer Provided Equipment (`cpe`) ■ Direct Inward Dialing (`did`) ■ Direct Inward/Outward Dialing (`diod`) ■ Digital Multiplexed Interface Bit Oriented Signaling (`dmi-bos`) ■ Foreign Exchange (`fx`) ■ Integrated Services Digital Network (`isdn-pri`) ■ Release Link Trunk (`rlt`) ■ Tandem (`tan`) ■ Tie Trunk (`tie`) ■ Wide Area Telecommunications Service (`wats`)
`Grp Dir`	*Trunk Group Direction*. Identifies whether the trunk group is incoming (`inc`), outgoing (`out`), or two-way (`two`).
`Meas Hour`	*Measurement Hour*. The hour (using 24-hour clock) in which the measurements are taken. For the **last-hour** report, it is the last hour of measurement (each trunk group's measurement hour is identical; but not necessarily the same as the indicated peak hour for the day). For the **today-peak** report, the measurement hour is the peak hour for each trunk group thus far today (each trunk group's measurement hour could be different). For the **yesterday-peak** report, the measurement hour is the peak hour for each trunk group yesterday (each trunk group's measurement hour can be different).

Continued on next page

Table 3-55. Trunk Group Summary Report — *Continued*

Field	Description
`Total Usage`[1]	Total usage (in CCS) for all trunks in the trunk group. Represents the total time the trunks are busy (with calls) during the one-hour measurement period. Total usage measures each time a trunk is seized for use by an incoming call (whether it is picked up or not) or an out going call (only after digits have been dialed).
`Total Seize`	The number of incoming and outgoing seizures carried on the trunk group. This includes the number of times a trunk in the group is seized, including false starts, don't answer, and busy.
`Inc. Seize`	*Incoming Seize.* The number of incoming seizures carried on the trunk group.
`Grp Ovf`	*Group Overflow*. The number of calls offered to a trunk group not carried or queued (if a queue is present). Calls rejected for authorization reasons are not included.
`Que Siz`	*Trunk Group Queue Size*. A number (0 to 100) that identifies the number of slots assigned to the trunk group queue. This number represents how many calls may be held in queue by the trunk group. If 0 is displayed, then no queue is administered. Hence, the other queue measurements are also 0. Generally, the queue size should be larger than the trunk group size; however, not more than three times as large as the trunk group size.
`Call Qued`	*Calls Queued*. The total number of calls that entered the trunk group queue after finding all trunks busy.
`Que Ovf`	*Queue Overflow*. The total number of calls not queued because the queue is full. These calls receive a reorder signal. **Suggested Actions:** Generally, this field indicates the number 0. If this field indicates a high number, then either the queue size may be too small, or add more trunks to reduce the number of calls queuing.

Continued on next page

Table 3-55. Trunk Group Summary Report — *Continued*

Field	Description
`Que Abd`	*Queue Abandoned*. The number of calls removed from the queue in one of the following manners: ■ By the system because they have been in the queue for more than 30 minutes ■ By the user (for example, dialing the cancel code). **Suggested Action:** Typically, this field indicates a small number. However, a large number generally indicates the queue size is too large and people are abandoning because they remained in queue for a long holding time and gave up.
`Out Srv`	*Out of Service*. The number of trunks in the trunk group out of service (listed as maintenance busy) at the time data is collected. An individual trunk may be taken out of service by the switch whenever an excessive number of errors occur, or by maintenance personnel to run diagnostic tests. **Suggested Action:** If the trunks are removed from service by the switch, then the appropriate maintenance personnel should be notified. The objective is to keep all members of a trunk group "in service." Generally, you should not make adjustments to the trunk group because of "Out of Service" trunks, but should get those trunks returned to service. For specific details, refer to ''Trunk Outage Measurements Report''.

Continued on next page

Table 3-55. Trunk Group Summary Report — *Continued*

Field	Description
% ATB	*Percentage All Trunks Busy*. The percentage of time all trunks in the trunk group were simultaneously in use during the measurement interval. **NOTE:** In use means the trunks are busy — either serving calls or because they are busied-out by maintenance. **Suggested Actions:** 1. If the group direction is outgoing or two-way, then a high number in the % ATB field and nothing in the Grp Ovfl or Que Ovfl indicates everything is functioning normally. However, a more typical scenario is a high number in this field and a high number in the Grp Ovfl field. This indicates a possible problem that necessitates further analysis. Unless it is the last trunk group in the pattern, overflow is to the next choice trunk group, and the number in the Grp Ovfl field is of no great significance. Otherwise, the obvious choice is to add more trunks to the trunk group. 2. If the group direction is incoming, then a high number in this field is bad. It indicates some incoming calls are probably blocked. Generally, you want to add more trunks, thus lowering the % ATB and decreasing the number of calls blocked.

Continued on next page

Table 3-55. Trunk Group Summary Report — *Continued*

Field	Description
`% Out Blk`	*Percentage Outgoing Blocking*. The percentage of offered calls not carried on the trunk group. It does not include unauthorized calls denied service on the trunk group (due to restrictions) or calls carried on the trunk group but do not successfully complete at the far end (that is, where there is no answer). For trunk groups without a queue, the calls not carried are those calls that arrive when all trunks are busy. The number of Outgoing Seizures is calculated as follows: $$Outgoing\ Seizures = Total\ Seizures - Incoming\ Seizures$$ Similarly, the equation for calculating Outgoing Calls Offered is as follows: $$Outgoing\ Calls\ Offered = Group\ Overflow + Outgoing\ Seizures$$ $$\%\ OutBlk = \left[\frac{Group\ Overflow}{Outgoing\ Calls\ Offered}\right]$$ For trunk groups with a queue, the calls not carried are those calls that arrive when all trunks are busy and the queue is full (Queue Overflow) and calls removed from queue before being carried (Queue Abandoned). For this scenario, the Percentage Outgoing Blocking is calculated as follows: $$Outgoing\ Calls\ Offered = Que\ Ovf + Que\ Abd + Outgoing\ Seizures$$ $$\%\ OutBlk = \left[\frac{Queue\ Overflow + Que\ Abd}{Outgoing\ Calls\ Offered}\right] \times 100$$ **Suggested Actions:** 1. You can increase the length of the queue rather than adding more trunks. Subsequently, you should monitor the Que Abd field to insure it stays within reasonable limits. 2. If conditions are such that Step 1 is not appropriate, then you may find it necessary to add more trunks. **NOTE:** If you are using ARS you may see a high number in this field. This only indicates calls are overflowing to the next choice.

Continued on next page

Table 3-55. Trunk Group Summary Report — *Continued*

Field	Description
`Wideband Flag`	If the trunk group supports wideband (n X DS0) switching, a “W” appears next to the trunk group entry. In addition, if any trunk group on the report supports wideband switching, the tag “W = Wideband Support” appears in the report heading.

1. The usage that wideband calls contribute to this measurement is proportional to the resources the calls consume. For example, a 384-kbps call contributes six times more to the total usage than does a 64-kbps call.

Trunk Group Hourly Report

The Trunk Group Hourly Report provides data necessary to validate the information in the Trunk Group Summary Report and to size the trunk groups. A separate report is generated for each trunk group. On the G3r, a maximum of 75 trunk groups can be studied hourly at the same time. On the G3csi and G3si, a maximum of 25 trunk groups can be studied.

NOTE:
In order to display these hourly reports, you must first complete the Trunk Group Measurement Selection screen. The Trunk Group Measurement Selection screen is explained immediately after this section about the Trunk Group Hourly Report.

Command

To display the Trunk Group Hourly Report:

1. Type **list measurements trunk-group hourly <assigned trunk group number> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command —**assigned trunk group number**. Enter the trunk group number for which you want to list trunk group activity.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-67 shows a typical screen for the Trunk Group Hourly Report. Table 3-56 and Table 3-57 on page 3-184 describe the data fields presented in the Trunk Group Hourly Report. The report contains two sections: a header section that provides report ending time and trunk group administrative information; and a data section that provides the measurement data for 24 hours.

Note that if a translation change has occurred during a particular hour, an asterisk (*) appears in front the data for the hour in which the translation change occurred.

```
list measurements trunk-group hourly 40
Switch Name: Cust_Switch_Name                    Date: 1:58 pm MON SEP 16, 19xx
                    TRUNK GROUP HOURLY REPORT ── WIDEBAND Support
Grp No: 40      Grp Size: 5      Grp Type: isdn  Grp Dir: two  Que Size: 0
Meas  Total  Maint  Total   Inc.   Tandem  Grp    Call Que  Que  Out   %  %Out
Hour  Usage  Usage  Seize   Seize  Seize   Ovfl   Qued Ovf  Abd  Srv  ATB Blk
1200  61     0      32      0      0       6      0    0    0    0    6   15
1100  62     0      33      0      0       0      0    0    0    0    0   0
1000  69     0      63      0      0       4      0    0    0    0    3   5
*900  26     0      0       0      0       0      0    0    0    0    0   0
 800  1      1      4       0      0       0      0    0    0    0    0   0
```

Screen 3-67. Trunk Group Hourly Report

Table 3-56. Trunk Group Hourly Report (Header)

Field	Description
`Grp No`	*Group Number*. A number that identifies the trunk group associated with the displayed data.
`Grp Size`	*Group Size*. The number of trunks in the trunk group.
`Grp Type`	*Group Type*. All trunk group types except PCOL trunk groups.
`Grp Dir`	*Group Direction*. Incoming, outgoing, or two-way.
`Que Size`	*Queue Size*. The size of the trunk group queue. If there is no queue, the size is zero and the other queue measurements are irrelevant.

Table 3-57. Trunk Group Hourly Report (Data)

Field	Description
Meas Hour	*Measurement Hour*. The starting time (using 24-hour clock) of the hour during which the data was recorded.
Total Usage[1]	The total time (in CCS) trunks in the trunk group are unavailable to carry a new call. It includes the time the trunks are busy on calls, false starts, don't answers, or any other reason the trunk is unavailable. Not included are calls denied service on the trunk group for authorization reasons or because of queue overflow.
Maint Usage	*Maintenance Usage.* The total usage (in CCS) of trunks in this trunk group for Maintenance Busy or any other non-call situation where trunks are not available to carry a call.
Total Seize	*Total Seizures.* The total number of seizures on the trunk group.
Inc. Seize	*Incoming Seizures.* The number of incoming seizures on the trunk group.
Tandem Seize	*Tandem Seizures.* The number of trunk-to-trunk call seizures. This count is incremented on the outgoing-trunk side of the connection.
Grp Ovfl	*Group Overflow.* The outgoing calls offered to the trunk not carried. These are calls that arrive when all trunks in the group are busy and are not queued on the trunk group. It does not include calls denied service on the trunk group because of authorization reasons.
Call Qued	*Calls Queued*. The calls that enter the trunk group queue. This can happen automatically for analog terminal users or at the request of the caller for other terminal types.
Que Ovf	*Queue Overflow*. The number of calls that arrive when all slots in the Trunk Group Queue are occupied.
Que Abd	*Queue Abandoned*. Calls removed from the queue either by the system because they have been in the queue for the maximum allowed time (currently fixed at thirty minutes), or forced by users when they cancel the auto-call back, set earlier to put the call in the queue.
Out Serv	*Out of Service*. The number of trunks in the trunk group out of service at the time the data is collected.

Continued on next page

Table 3-57. Trunk Group Hourly Report (Data) — *Continued*

Field	Description
`% ATB`	*Percent All Trunks Busy*. The percentage of time during the measurement interval all trunks in the group are unavailable to carry a new call (All Trunks Busy).
`%Out Blk`	*Percent Outgoing Blocking.* The percent of the outgoing seizures, including tandem seizures, offered to that trunk group that are not carried on that trunk group. The value is calculated as follows: *% Out Blk = {Grp Ovfl / [Total Seize - Inc Seize]} x 100*
`Wideband Flag`	If the trunk group supports wideband (n X DS0) switching, “Wideband Support” appears in the report heading.

1. The usage that wideband calls contribute to this measurement is proportional to the resources the calls consume. For example, a 384-kbps call contributes six times more to the total usage than does a 64-kbps call.

Trunk Group Measurement Selection

To specify which trunk groups to monitor for the Trunk Group Hourly report, use the Trunk Group Measurement Selection screen. The Summary Report lists all administered trunks. You can administer a maximum of 75 trunk groups for the hourly report studied hourly on the G3r; on the G3csi and G3si, the maximum is 25. If you do not select which trunk groups to study, none appear on the hourly report.

Command

To display the Trunk Group Measurement Selection screen:

1. Type **display meas-selection trunk-group [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for the display command only.

To change a Trunk Group Measurement Selection:

1. Type **change meas-selection trunk-group** and press RETURN.
2. Enter the trunk group number to be monitored and press ENTER.

   Trunk group numbers do not have to be in numerical order. If the trunk group number you want is not listed, add the trunk group number (if there is space available), or replace an existing trunk group number you no longer need. Press RETURN until the cursor is placed on the unwanted trunk group number and enter the new number, or press CLEAR FIELD and enter the new trunk group number.

Screen

Screen 3-68 shows a typical screen for the Trunk Group Measurement Selection screen on the G3r. Table 3-58 describes the data fields presented in the Trunk Group Measurement Selection screen.

```
display meas-selection trunk-group
                          TRUNK GROUP MEASUREMENT SELECTION
                                   Trunk Group Numbers
 1:   78         16:  15         31:    96         46:  333         61:  580
 2:   80         17:  16         32:    97         47:  444         62:  590
 3:  666         18:  17         33:    98         48:  555         63:  591
 4:    1         19:  18         34:   100         49:  101         64:  592
 5:    2         20:  81         35:   120         50:  102         65:  10
 6:    3         21:  82         36:   200         51:  103         66:  99
 7:    4         22:  83         37:    22         52:  104         67:  357
 8     5         23:  88         38:   234         53:  201         68:  467
 9:    6         24:  89         39:   245         54:  203         69:  665
10:    7         25:  90         40:   246         55:  205         70:  664
11:    9         26:  91         41:   247         56:  207         71:  663
12:   11         27:  92         42:   250         57:  209         72:  662
13:   12         28:  93         43:   255         58:  550         73:  661
14:   13         29:  94         44:   256         59:  560         74:  599
15:   14         30:  95         45:   257         60:  570         75:  588
```

Screen 3-68. Trunk Group Measurement Selection screen

Table 3-58. Trunk Group Measurement Selection screen

Field	Description
`Trunk Group Numbers`	The trunk group(s) to be studied hourly.

Trunk Group Performance Report

The Trunk Group Performance report gives a graphical and numerical display of the peak hour blocking for each trunk group. You can display the Trunk Group Performance report for the previous day or the current day (yesterday or today).

Command

To display the Trunk Group Performance report:

1. Type **list performance trunk-group <yesterday/today> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday/today**.

   - Enter **yesterday** to list the trunk group activity for yesterday.
   - Enter **today** to list the trunk group activity for today.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-69 shows a typical screen for the Trunk Group Performance report. Table 3-59 on page 3-188 describes the data fields presented in the Trunk Group Performance report.

```
list performance trunk-group yesterday
Switch Name:  Cust_Switch_Name           Date: 4:28 pm SAT MAY 19, 19xx
      HIGHEST HOURLY TRUNK GROUP BLOCKING PERFORMANCE
Grp Grp  Grp Grp   --% Outgoing Blocking or % ATB-- %Out  %Time Meas  Total
No. Type Dir Size  1 2 3 4 5 6 7 8 9 10 20 30 40 50 Blkg  ATB   Hour  Calls
1   fx   in  6     ////////////////                 *     9     1200  876
2   wats in  5     ///////////////////////////      *     30    1400  94
3   tie  two 14    /////////////                    7     36    1300  312
5   did  in 10     //////////////////////           *     99    1300  542
12  co   two 18    /////////////////                9     96    1400  614
23  tie  two 7     ////////////////////             18    81    1400  359
41  tie  two 8     ///////////////////////          26    91    1300  411
221 tie  two 5     ////////////////////             11    77    1300  109
Command successfully completed
Command:
```

Screen 3-69. Trunk Group Performance Report

Table 3-59. Trunk Group Performance Report

Field	Description
`Grp No.`	*Group Number*. The number that identifies the trunk group associated with the displayed data.
`Grp Type`	*Group Type*. The type of trunk associated with the accumulated data. The system monitors the following trunk types (see *DEFINITY ECS Administrator's Guide*): ■ Access (`access`) ■ Advanced Private Line Termination (`aplt`) ■ Central Office (`co`) or Public Network Service ■ Customer Provided Equipment (`cpe`) ■ Direct Inward Dialing (`did`) ■ Direct Inward/Outward Dialing (`diod`) ■ Digital Multiplexed Interface Bit Oriented Signaling (`dmi-bos`) ■ Foreign Exchange (`fx`) ■ Integrated Services Digital Network (`isdn-pri`) ■ Release Link Trunk (`rlt`) ■ Tandem (`tandem`) ■ Tie Trunk (`tie`) ■ Wide Area Telecommunications Service (`wats`)
`Grp Dir`	*Trunk Group Direction*. Identifies whether the trunk group is incoming (`inc`), outgoing (`out`), or two-way (`two`).
`Grp Size`	*Group Size*. The number of trunks in the trunk group.
`%Out Blkg`	*Percentage Outgoing Blocking*. The percentage of calls that arrive when all trunks are busy.

Continued on next page

Table 3-59. Trunk Group Performance Report — *Continued*

Field	Description
`% Outgoing Blocking` or `% ATB`	*Percent Outgoing Blocking or Percent All Trunks Busy*. A graphical representation equivalent to the numerical value of calls offered but not carried. For two-way and outgoing trunk groups, peak hour blocking is the largest % Outgoing Blocking. For incoming trunks, peak hour is the largest % ATB. Since % Outgoing Blocking is meaningless for incoming trunks, it is displayed as * in that column. For trunk groups without a queue, calls not carried are those calls that arrive when all trunks are busy. For trunk groups with a queue, calls not carried are calls that arrive when all trunks are busy and the queue is full (Queue Overflow) and calls removed from queue before being carried (Queue Abandoned). **Suggested Actions:** If a trunk group has a higher percent of blocking than desired, determine the exact reason that the trunk group is blocking calls. 1. The Total Calls field indicates the calling volume. If excessive blocking is because of calling volume alone, consider the possibility of adding more members to the trunk group. 2. If excessive blocking is not because of calling volume, the reason might be because trunks are in the maintenance busy state. You can use the Trunk Outage Report (described next) to identify those trunks determined to be out of service. Furthermore, and as required, use the ACA feature to monitor any trunk group still experiencing unexplained excessive blockage. 3. For identified problems, determine whether maintenance has been or should be alerted.
`% Time ATB`	*Percent of Time All Trunks Busy*. The percent of time all trunks in the trunk group are simultaneously in use during the measurement interval. **NOTE:** In use means the trunks are busy — either serving calls, or because they are busied-out by maintenance.
`Meas Hour`	*Measurement Hour*. The starting time (using 24-hour clock) of the hour during which the data is recorded.
`Total Calls`	The total number of calls (seizures) for the trunk group during the peak hour of blocking.

Trunk Outage Measurements Report

The Trunk Outage Measurements Report lists up to a maximum of five trunks (in each trunk group) out of service when sampled. The number of times the trunks are out of service when sampled is also given. The trunk outage data is kept for the current day, the previous day, and the last hour.

Command

To display the Trunk Outage Measurements Report:

1. Type **list measurements outage-trunk <yesterday/today/last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is one required field for this command — **yesterday/today/last-hour**.

   - Enter **yesterday** to list the trunk group activity for yesterday.
   - Enter **today** to list the trunk group activity for today.
   - Enter **last-hour** to list the trunk group activity for the most recently completed hour.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-70 shows a typical screen for the Trunk Outage Measurements Report. Table 3-60 on page 3-191 describes the data fields presented in the Trunk Outage Measurements Report.

```
list measurements outage-trunk yesterday
Switch Name: Cust_Switch_Name       Date:  4:01 pm SAT MAY 19, 19xx
                        TRUNK OUT OF SERVICE REPORT
(trunks sampled for "out-of-service" condition once each hour)
Grp     Grp    Grp    Grp    Grp    #Sampled
No.     Type   Dir    Size   Mbr#   Outages
1       co     two    20      2      1
1       co     two    20      4      8
1       co     two    20      5      3
1       co     two    20      6      2
4       wats   out    10      2      5
4       wats   out    10      4      3
4       wats   out    10      9      2
4       wats   out    10      10     1
Command successfully completed
Command:
```

Screen 3-70. Trunk Outage Measurements Report

Table 3-60. Trunk Outage Measurements Report

Field	Description
`Grp No.`	*Group Number*. The number that identifies each trunk group associated with the displayed data.
`Grp Type`	*Group Type*. The type of trunk associated with the accumulated data. The system monitors the following trunk types (see *DEFINITY ECS Administrator's Guide*): ■ Access (`access`) ■ Advanced Private Line Termination (`aplt`) ■ Central Office (`co`) or Public Network Service ■ Customer Provided Equipment (`cpe`) ■ Digital Multiplexed Interface Bit Oriented Signaling (`dmi-bos`) ■ Direct Inward Dialing (`did`) ■ Direct Inward/Outward Dialing (`diod`) ■ Foreign Exchange (`fx`) ■ Integrated Services Digital Network (`isdn-pri`) ■ Release Link Trunk (`rlt`) ■ Tandem (`tandem`) ■ Tie Trunk (`tie`) ■ Wide Area Telecommunications Service (`wats`)
`Grp Dir`	*Group Direction*. Identifies whether the trunk group is incoming (`inc`), outgoing (`out`), or two-way (`two`).

Continued on next page

Table 3-60. Trunk Outage Measurements Report — *Continued*

Field	Description
`Grp Size`	*Group Size*. The number of trunks in the trunk group.
`Grp Mbr#`	*Group Member Number*. The number that identifies a specific trunk member (in the group) out of service.
`#Sampled Outages`	*Number of Sampled Outages*. The number of times the group member is sampled as out of service over the period covered by the report (yesterday, today, or last hour). Yesterday includes the 24 hours beginning at midnight and ending at midnight. Today includes those hours from midnight to the most recently completed hour. Last hour only includes the most recently completed hour. **NOTE:** If there are no outages, no data is displayed. **Suggested Actions:** 1. The sampling period is once per hour. Therefore, if the report covers several hours (for example, the yesterday or today report) but the column only indicates a small number of outages, then the trunk member may be providing intermittent service. To determine whether a specific trunk member is functioning, use the Facility Test Calls feature. 2. If a trunk is suspected of causing problems, use the ACA feature to monitor the particular trunk group. 3. If a trunk member is totally out of service, then (depending on local arrangements) you may choose to refer the problem to maintenance personnel.

Trunk Group Status Report

The Trunk Group Status report gives a current indication of the load on various trunk groups in terms of the number of calls waiting to be serviced.

For each trunk group, the Trunk Group Status Report displays the number of calls in the queue waiting to be serviced. For comparative analysis, the trunk members in the group active on calls are also displayed. With this data, it is possible to rearrange the members in the groups to provide load balancing. For example, if one group shows a higher number of calls waiting in the queue and the size of the group is too small, more members can be added to that group.

Command

To display the Trunk Group Status Report:

1. Type **monitor traffic trunk-groups [option]** and press RETURN.

   Options: Entering the command without an option produces a display of the first 60 administered trunk groups. To display higher numbered trunk groups, enter the number of the first group of the 60 trunk groups to be displayed. Only those trunk groups administered are shown on the report.

   Because the command is constantly updated, you must press CANCEL to cancel the command.

Screen

Screen 3-71 shows a typical screen for the Trunk Group Status report. If the system has less than 60 groups administered, then some of the right-hand columns are blank. The date and time at which the report was requested are displayed to the right of the screen title. Table 3-61 on page 3-194 describes the data fields presented in the Trunk Group Status report.

The data on the screen is updated every 60 seconds. If the values of any of the fields for a given trunk group are changed, all fields for that trunk group are updated.

```
monitor traffic trunk-groups

                  TRUNK GROUP STATUS       19:03 SAT MAY 19 19xx
 #    S   A   Q   W     #   S   A   Q   W     #   S  A  Q  W    #  S  A  Q  W
 1   20  10   0   0    16  14   3   0   0    59   9  1  0  0
 2   21  21  20  10    23   4   6   8   0    60   8  1 18  0
 3   31  12   0   0    25   5   0   0   0    61   2  0  0  0
 4   10   5  10   8    27  12   2  18   0    62   4  1  8  0
 5    9   5  10   0    30   7   2  14   0    63   6  1 15  0
 6   10   8  10   0    41   5   1   0   0    73   6  0  8  0
 7    4   1   8   0    42  12   4  20   0   211  22  2  0  0
 8    4   4   8   2    43   6   3   0   0
 9    5   2  10   0    44  16   6  18   0
10    7   3  14   0    45   8   0   0   0
11    6   2  12   0    46   8   3  18   0
12    5   2  10   0    54   9   2   0   0
13    4   1   0   0    55   6   6  12   3
14    5   4   8   0    57   8   4  10   0
15    5   3   9   0    58   4   1   0   0
(#: Group; S: Grp Size; A: Active Members; Q: Q length; W: Call Waiting.)
```

Screen 3-71. Trunk Group Status Report

Table 3-61. Trunk Group Status Report

Field	Description
#	*Group Number*. The number that identifies each trunk group.
S	*Group Size*. The number of trunks administered for the trunk group.
A	*Active Group Members*. The number of trunk members in the group active on a call. Busied-out trunks are not active.
Q	*Queue Length*. The length of the queue administered for the group.
W	*Waiting Calls*. The number of calls waiting in the group queue.

Data Analysis Guidelines

The following guidelines are intended to show an easy and fast method of determining whether the collected data is invalid or questionable. These guidelines represent the least you should do for validation. Perform additional validation as necessary.

Use the list performance trunk-group report to obtain an overall indication of those trunk groups that may be providing poor service. The five trunk groups with the highest percentage of blocking are listed in the list performance summary report. However, this report (summary) has the following limitations:

- The Group Blocking shown on this report is the percentage of blocking for outgoing and two-way trunk groups. For incoming trunk groups, the Group Blocking value is the percentage of all trunks busy (ATB). A high value for either % ATB or the % Out Blocking is an indication of possible traffic load problems.
- A two-way trunk group with undesirable incoming blocking do not show any problems on this report, since only outgoing blocking is displayed on two-way trunks.

Use data from the Trunk Group Measurements report for a more accurate estimate of service levels on incoming and two-way trunk groups. To validate the Trunk Group Measurements report, verify the following data is in order:

- Total Usage (in CCS) should not exceed 36 times group size. For example, with two trunks, the total usage measured should not exceed 2 X 36 = 72 CCS.
- On incoming trunks, total seizures should be equal to total incoming seizures.
- Incoming trunk groups should have a queue length of zero.
- The number of incoming calls should never be greater than the total number of calls carried by all trunks in the group.
- Outgoing trunk groups should indicate zero as their number of incoming calls.
- Out-of-service trunks should never be greater than group size.
- For trunk groups with queues, the two fields (Calls Queued and Queue Overflow) should total the number displayed in the Group Overflow field.
- For trunk groups with queues, the Queue Overflow field is incremented whenever a call finds the all trunks busy condition and the queue is full.
- For trunks groups without queues, the Calls Queued and Queue Overflow fields are always zero. The blocked call count is reflected in the Group Overflow field.
- If the Percent Outgoing Blocking field shows a value greater than zero, the Queue Overflow (if a queue is administered for the trunk group), Queue Abandon, and Group Overflow fields should also have values greater than zero.
- Measurement hour data reported in the System Status Report (for example, monitor system view1 or monitor system view2) should correspond to those shown on the hourly trunk group measurements and performance reports.

Analyzing the Data

The Trunk Group Summary Report may be used to determine:

- Average Holding Time
- Trunk Blockage
- Number of trunks required for a specified Grade of Service

NOTE:
Data collected in a real-time environment virtually always deviates from the theoretically predicted data because of the asynchronous nature of processes and interactions with other events such as maintenance.

Determining Average Holding Time

Determine the Average Holding Time (in seconds) of a trunk group by dividing the Total Usage CCS by Calls Answered and multiplying the result by 100. A short holding time can indicate trouble.

Example:

Assume the following data is reported for a one-way trunk group:

- Total Usage CCS = 656 CCS
- Total Seizures = 280

Determine the Average Holding Time as follows:

$$Average\ Holding\ Time = \left[\frac{Total\ Usage\ CCS}{Total\ Seizures}\right] \times \frac{100\ Seconds}{CCS}$$

$$Average\ Holding\ Time = \left[\frac{656\ CCS}{280}\right] \times \frac{100\ Seconds}{CCS}$$

$$Average\ Holding\ Time = 234\ seconds\ (or\ 3\ minutes\ \text{and}\ 54\ seconds)$$

Determining Trunk Group Blockage

Generally, use either the list measurements trunk-group summary or list performance trunk-group report for determining trunk group blockage. All of the appropriate calculations are performed by the system and the results are displayed via the reports. However, to be complete, the equations and an example are included.

To determine the Percent Blocking for one-way outgoing and two-way trunk groups, respectively, use the following equations:

One-Way Trunk Group (outgoing)

$$Percent\ Out\ Blocking = \left[\frac{Group\ Overflow}{Total\ Seizures + Group\ Overflow}\right] \times 100\ \%$$

Two-Way Trunk Group

$$Percent\ Out\ Blocking\ =$$

$$\left[\frac{Group\ Overflow}{Total\ Seizures - Incoming\ Seizures + Group\ Overflow}\right] \times 100\ \%$$

NOTE:
If the trunk group has a queue, group overflow is calculated as follows:

$$Group\ Overflow\ =\ Queue\ Overflow\ +\ Queue\ Abandons$$

Example:

With the following data, determine the Percent Blocking of a two-way CO trunk group without a queue:

- Total Seizures = 280
- Incoming Seizures = 170
- Group Overflow = 6

Using the equation for two-way trunk groups, you can calculate average Percent Blocking as follows:

$$Percent\ Blocking\ =\ \left[\frac{6}{(280\ -\ 170)\ +\ 6}\right] \times 100\ =\ 5.2\ \%$$

Determining the Number of Trunks Required for a Specified Grade of Service

For both stand-alone and last-choice trunk groups, use the trunk group peak traffic reports to determine the number of trunks required to provide a specified Grade of Service. The number of trunks required strictly depends on the Grade of Service you want to provide.

NOTE:
Stand-alone and last-choice trunk groups do not reroute their blocked calls. As a contrast, Alternate Routing trunks do reroute their blocked calls.

The procedure for determining the optimal number of trunk members for a particular trunk group requires you initially generate the appropriate reports and subsequently record the data on the Trunk Group Data Worksheets. What you attempt to accomplish is to identify the peak hour and the traffic data for that hour. The **list measurements trunk-group summary yesterday-peak scheduled** command results in generating all of the necessary data on a daily basis. You can enter 20 weekdays of data on each Trunk Group Data Worksheet. Subsequently, you need only scan the worksheet to identify which measurement hour occurs most frequently. The most frequent measurement hour is considered the peak hour. You should use the data for the identified peak hour, that has the highest total usage, to calculate the required number of trunks.

Example 1:

Assumptions

1. You obtain data (daily) and record that data on appropriately identified Trunk Group Data Worksheets.
2. 1300 is the peak hour (or bouncing peak hour).
3. Trunk Group 1 is suspected of not providing the desired Grade of Service.

For two-way trunk groups the equation for determining Calls Carried is as follows:

$$Calls\ Carried = Total\ Seize$$

$$Calls\ Carried = 280$$

For Trunk Groups Without a Queue

$$Total\ Calls\ Offered = Calls\ Carried + Group\ Overflow$$

For Trunk Groups With a Queue

$$Total\ Calls\ Offered =$$

$$Calls\ Carried + Queue\ Overflow + Queue\ Abandoned$$

Since Trunk Group 1 has a queue, the equation for Calls Offered is as follows:

$$Total\ Calls\ Offered = Calls\ Carried + Queue\ Overflow$$

$$Total\ Calls\ Offered = 280 + 50 + 1$$

$$Total\ Calls\ Offered = 331$$

The Average Holding Time is determined as follows:

$$Average\ Holding\ Time\ (in\ seconds) = \left[\frac{Total\ Usage\ (in\ CCS)}{Total\ Seizures}\right] \times \frac{100\ seconds}{CCS}$$

$$Average\ Holding\ Time\ (in\ seconds) = \left[\frac{656\ CCS}{280\ seizures}\right] \times \frac{100\ seconds}{CCS}$$

$$Average\ Holding\ Time\ (in\ seconds) = 234.29\ seconds$$

Offered Load is defined as the number of calls in progress if there had been no blocking or delay. The Offered Load is calculated as follows:

$$Offered\ Load = Average\ Holding\ Time\ (in\ seconds) \times Calls\ Offered$$

$$Offered\ Load\ (in\ CCS) = \frac{234.29\ (in\ seconds) \times 331\ calls}{100\ seconds\ per\ CCS}$$

$$Offered\ Load\ (in\ CCS) = 775.5$$

The calculated Offered Load is used with the Retrial Capacity tables, to determine the number of trunks required to provide a specified Grade of Service. For more information, refer to *Basic Traffic Analysis*.

The desired Grade of Service is dependent on the particular trunk type (for example, CO, did, tie, FX, WATS, and so on) and the nature of the business the trunk type supports. Generally, those trunk types that are least expensive (for example, CO) are engineered for a 1 percent (P.01) Grade of Service. Those trunk types that are more expensive are engineered to provide from 2 percent to 5 percent (P.02 to P.05) Grade of Service.

NOTE:
A one percent Grade of Service means the fraction of calls blocked during the identified bouncing peak hour should not exceed 1 percent.

Assuming we desire a P.01 Grade of Service on Trunk Group 1, for the calculated Offered Load of 775.5 CCS, the Retrial Capacity tables in *Basic Traffic Analysis* indicate (under the column heading GROUP SIZE) 32 trunks are required.

The number of currently functioning (or in service) trunks is calculated as follows:

$$\#\ of\ In-Service\ Trunks = Trunk\ Group\ Size - Out\ of\ Service\ Trunks$$

$$\#\ of\ In-Service\ Trunks = 23 - 0$$

$$\#\ of\ In-Service\ Trunks = 23$$

Therefore, since 32 trunks are required but only 23 are currently in service, nine additional trunks must be added to obtain the desired Grade of Service.

Example 2:

Assumptions

1. You obtain data (daily) and record that data on appropriately identified Trunk Group Data Worksheets.
2. 1300 is the peak hour (or bouncing peak hour).
3. Data on trunk group 4 indicates a higher than desired percentage of outgoing blockage.

For one-way outgoing trunk groups, the equation for determining Calls Carried is as follows:

$$Calls\ Carried = Total\ Seize$$

$$Calls\ Carried = 81$$

Since Trunk Group 4 does not have a queue, the equation for Calls Offered is as follows:

$$Calls\ Offered = Calls\ Carried + Group\ Overflow$$

$$Calls\ Offered = 81 + 5$$

$$Calls\ Offered = 86$$

The Average Holding Time is determined as follows:

$$Average\ Holding\ Time\ (in\ seconds) = \left[\frac{Total\ Usage\ (in\ CCS)}{Total\ Calls}\right] \times \frac{100\ seconds}{CCS}$$

$$Average\ Holding\ Time\ (in\ seconds) = \left[\frac{73\ CCS}{81\ calls}\right] \times \frac{100\ seconds}{CCS}$$

$$Average\ Holding\ Time\ (in\ seconds) = 90.12\ seconds$$

Offered Load is defined as the number of calls in progress if there is no blocking or delay. The Offered Load can be calculated as follows:

$$Offered\ Load = Average\ Holding\ Time\ (in\ seconds) \times Calls\ Offered$$

$$Offered\ Load\ (in\ CCS) = 90.12\ (in\ seconds) \times 86\ calls$$

$$Offered\ Load\ (in\ CCS) = 77.50\ CCS \quad or \quad 78\ CCS$$

The calculated Offered Load is used, with the Retrial Capacity tables, to determine the number of trunks required to provide a specified Grade of Service.

Assuming we desire a P.03 Grade of Service on Trunk Group 4, then for the calculated Offered Load of 78 CCS the Retrial Capacity tables in *Basic Traffic Analysis* indicate (under the column heading GROUP SIZE) six trunks are required. The number of currently functioning (or in-service) trunks is as follows:

$$\#\ of\ In-Service\ Trunks\ =\ Trunk\ Group\ Size\ -\ Out\ of\ Service\ Trunks$$

$$\#\ of\ In-Service\ Trunks\ =\ 5\ -\ 1$$

$$\#\ of\ In-Service\ Trunks\ =\ 4$$

Therefore, since six trunks are required but only four are currently in-service, two additional trunks are needed to obtain the desired Grade of Service. The obvious options are have the out-of-service trunk repaired and just add one new trunk, or add two new trunks.

Example 3:

Assumptions

1. You obtain data (daily) and record that data on appropriately identified Trunk Group Data worksheets.
2. 1300 is the peak hour (or bouncing peak hour).
3. That Trunk Group 2 indicates a higher % ATB than desired.

Incoming trunk groups do not have queues. Therefore, from the switch perspective you cannot determine the number of calls blocked. But, in this case Total Usage is actually the Carried CCS. You can use the Carried CCS, with the Retrial Capacity tables, to determine the number of trunks required to provide a specified Grade of Service.

Assuming you desire a P.05 Grade of Service on trunk group #2, then for a Carried CCS of 201 CCS the Retrial Capacity tables in the *DEFINITY Communications System and System 75 and System 85 Traffic Tables*, 555-104-503, indicates (under the column heading GROUP SIZE) 10 trunks are required. The number of currently functioning (or in-service) trunks is as follows:

$$\#\ of\ In-Service\ Trunks\ =\ Trunk\ Group\ Size\ -\ Out\ of\ Service\ Trunks$$

$$\#\ of\ In-Service\ Trunks\ =\ 6\ -\ 0$$

$$\#\ of\ In-Service\ Trunks\ =\ 6$$

Therefore, since 10 trunks are required but only 6 are currently in-service, four additional trunks are needed to obtain the desired Grade-of-Service. The solution is to add four trunk members to the trunk group.

Trunk Group Call-By-Call Measurements Report

The Trunk Group Call-By-Call (CBC) Measurements report displays last-hour traffic data for any specified cbc trunk group, provided the trunk group had a Usage Allocation Plan (UAP) administered for the last-hour. Use the report to monitor the trunk group and to determine if the UAP meets current needs. Whenever it is determined changes are required, you must make these changes on the appropriate trunk group screen(s). Note that if the trunk group is administered to support wideband switching, the tag “WIDEBAND Support” appears in the report title.

Command

To display the Trunk Group CBC Measurements Report:

1. Type **list measurements cbc-trunk-group <ISDN CBC trunk group number> last-hour [print/schedule]** and press RETURN.

   Required Fields: There is only one required field for this command—**ISDN CBC trunk group number**. Enter the ISDN CBC trunk group number for which you want to list the last-hour traffic data.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-72 shows a typical screen for the Trunk Group Call-By-Call Measurements report. The line just above the report title displays the date and time for which the report was requested. Table 3-62 on page 3-203 describes the data fields presented in the CBC Trunk Group Measurements report.

```
list measurements cbc-trunk-group 99 last-hour
Switch Name:  Cust_Switch_Name             Date: 2:15 pm WED MAY 9, 19xx
                 CBC TRUNK GROUP MEASUREMENTS (WIDEBAND Support)
                      Peak Hour For CBC Trunk Group 99 : 1300
        Queue Size:40                              Usage Allocation Plan Used
       Calls Queued:23                     Plan Number:  1  0   0   0   0   0
     Queue Overflow: 0                        Duration: 60  0   0   0   0   0
 Queue Abandonments: 4
 Out of Service: 0
 Service/     Min Max Meas Total Total Inc.  Tan  Ovf Ovf Ovf %    %  %Out
 Feature      Chn Chn Hour Usage Seize Seize Seize TG S/F Max TBM ATB BLK
 outwats-bnd    5  12 1300   240   333   0    55    0  0  23   10   2   1
 sdn            4   8 1300    40    30  22     1    0  0   0   62   1   0
 other          0  20 1300    70    41  36     3    0  0   0    0   0   0
Command successfully completed
Command:
```

Screen 3-72. Trunk Group Call-By-Call Measurements Report

Table 3-62. Trunk Group Call-By-Call Measurements Report

Field	Description
`Queue Size`	Size of the queue for the ISDN-PRI CBC trunk group. If zero is displayed, then no queue is administered. Hence, the other queue measurements is also zero. If the queue is administered, then it serves all of the network services/features administered for the trunk group. However, its functional operation is somewhat different than the queue used with conventional trunk groups. When a particular service/feature uses its allotted maximum number of channels, then any additional call attempts are queued, even though not all of the trunks are currently in use. If the queue is already full, any additional call attempts simply overflow with the caller receiving reorder tone. **Recommendations:** Since one service/feature generally does not experience peak traffic the same time as another service/feature, there is an averaging effect. Furthermore, the queue size for a CBC trunk group need not be much larger than for a non-CBC trunk group. The Queue Size should be larger than the trunk group size; but, typically, not more than three times as large as the trunk group size.
`Calls Queued`	The total number of calls entered the CBC trunk group queue during the hour.
`Queue Overflow`	The total number of calls denied access to a trunk, found the queue full, and the caller received reorder tone. **Suggested Actions:** Generally, this field indicates the number 0. If this field indicates a high number, then the queue size may be too small, more trunks may be needed so fewer calls will queue, or the UAP may be too restrictive (for example, some of the “Min Chn” values may be too high, or some of the “Max Chn” values may be too low). Also, see Suggested Actions in the % TBM description.

Continued on next page

Table 3-62. Trunk Group Call-By-Call Measurements Report — *Continued*

Field	Description
Queue Abandonments	The number of calls removed from the queue by either the system or the user. The system automatically removes calls from the queue after 30 minutes. A user may abandon his/her call by canceling the Automatic Callback feature (set earlier to place their call in the queue). **Suggested Action:** Recall that a trunk group and its associated queues are sized to accommodate peak-hour traffic loads. Typically, this field indicates a small number. However, a large number generally indicates the queue size is too large and people are abandoning because they remained in queue for a long time. Consider adding more trunks so fewer calls queue.
Out of Service	The number of trunks in the trunk group out of service at the time the measurements are collected. An individual trunk may be taken out of service either automatically by the switch whenever an excessive number of errors occur, or by maintenance personnel in order to run diagnostic tests. **Suggested Action:** If the trunks were removed from service by the switch, then the appropriate maintenance personnel should be notified. The objective is to keep all members of a trunk group in service. Generally, you should not make adjustments to the CBC trunk group because of Out of Service trunks, but should get those trunks returned to service.
Usage Allocation Plan Used	A list of the Usage Allocation Plan numbers followed by a list of the durations (in minutes) each plan was in effect during the measurement interval. The Number field can display up to a maximum of six plan numbers. A maximum of three different UAPs (identified by the numbers 1, 2, and 3) may be defined for each trunk group. All three plans are defined on Page 3 of the trunk group screen. Page 4 of the corresponding trunk group screen is where you administer plan assignments.
Usage Allocation Plan Used (Contd)	Each CBC trunk group is administered with either “fixed” allocation or “scheduled” allocation. If fixed, it remains in effect continuously. If scheduled, the designated plans are activated on a per-day and time-of-day basis determined by the schedule.
Service Feature	The names of up to ten services/features and the special identifier “other” for which the associated measurements are reported.

Continued on next page

Table 3-62. Trunk Group Call-By-Call Measurements Report — *Continued*

Field	Description
`Min Chn`	*Minimum Number of Channels*. The minimum number of channels in the ISDN-PRI CBC trunk group allocated to the specified service/feature at the time the measurements are collected.
`Max Chn`	*Maximum Number of Channels*. The maximum number of channels in the ISDN-PRI CBC trunk group allocated to the specified service or feature at the time the measurements are collected.
`Total Usage`	The sum of time, in hundred-call-seconds (CCS), for all channels used by the specified service/feature during the measurement interval.
`Total Seize`	*Total Seizures.* The total number of incoming and outgoing calls that requested the specified service/feature through the ISDN-PRI CBC trunk group.
`Inc. Seize`	*Incoming Seizures*. The total number of incoming calls that requested the specified service/feature through the ISDN-PRI CBC trunk group. For two-way and outgoing trunks, the number of *Outgoing Seizures* can be calculated as follows: $$Out\ Seize = Total\ Seize - In\ Seize$$
`Tan Seize`	*Tandem Seizures*. The total number of trunk-to-trunk call seizures using this Service/Feature.
`Ovf TG`	*Overflow Trunk Group*. The number of outgoing calls that requested the specified service/feature, on the ISDN-PRI CBC trunk group, but are not carried because the calls arrived to find no idle trunk members available. **NOTE:** There are three overflow fields, each with a different priority. They are: overflow trunk group (`Ovf TG`) (priority 1), overflow maximum (`Ovf Max`) (priority 2), and overflow services/features (`Ovf S/F`) (priority 3). If more than one of the overflow conditions is met, only the field that represents the condition with the highest priority is incremented.

Continued on next page

Table 3-62. Trunk Group Call-By-Call Measurements Report — *Continued*

Field	Description
`Ovf S/F`	*Overflow Services/Features*. The number of calls that requested the specified service/feature but denied because the calls arrived under the following conditions: ■ The specified service/feature is at or above its minimum channel allocation and below its maximum allocation. ■ There are idle channels available in the trunk group, but they are reserved to meet the minimum channel allocation for other services/features. **Suggested Actions:** 1. Investigate the possibility of raising the “Min Chn” requirements for this service/feature. 2. Investigate the possibility of increasing the number of members for the trunk group. 3. Determine whether or not the “Min Chn” assignments for the other services/features are appropriate. For example, if the column “% TBM” displays a high number for one or more of the other service/features, then you can lower the minimums (for one or more of the other services/features). This makes more trunks available for this service/feature.

Continued on next page

Table 3-62. Trunk Group Call-By-Call Measurements Report — *Continued*

Field	Description
`Ovf Max`	*Overflow maximum*. The number of calls not carried because the calls originated at a time when the service/feature already used-up its allotted maximum number of channels. In this case, the trunk group may still have trunk members available for the other services/features. **Suggested Actions:** 1. Investigate the possibility of raising the number administered in the Max Chn field. This is only possible provided the free pool is not exceeded. To determine whether or not you have more trunks available for a S/F calculate the following: $Max - Min\ (for\ the\ identified\ S/F) \leq Free\ Pool$ For example, use the above equations with the data in the formula as follows: $Free\ Pool = Total\ \#\ of\ in-service\ trunks - \sum Min\ \text{for}\ each\ S/F$ $Free\ Pool = 18 - (5+4)$ $Free\ Pool = 9$ $8 - 4\ (for\ SDN) \leq 9$ $4 \leq 9 \quad Therefore,\ you\ can\ increase\ the\ Max$ 2. Consider adding more trunks to the trunk group and increase the maximum for the identified service/feature.
`% TBM`	*Percentage of Trunks Below Minimum*. The percentage of time during the polling interval that the number of channels in use by the specified service/feature is below the specified minimum. **Suggested Action:** Lower the “Min Chn” since this may be the cause for the “Ovf S/F”. **NOTE:** If the % TBM field is high, then you are reserving more trunk members than will be used. Determine if another service/feature needs more trunks and, if so, lower the “Min Chn” for this service/feature.

Continued on next page

Table 3-62. Trunk Group Call-By-Call Measurements Report — *Continued*

Field	Description
% ATB	*Percentage All Trunks Busy (ATB)*. The percentage of time (0 to 100%) during the measurement interval that the specified service/feature could not get a channel because of at least one of the following reasons: ■ All trunks in the ISDN-PRI CBC trunk group are busy on a call or busied-out by maintenance. ■ This service/feature is above its minimum; and all available trunks are reserved for other features/services below their minimums. ■ The specified feature or service is at its maximum number of channels. **Suggested Actions:** 1. A number in the Ovf TG field indicates the physical maximum number of trunks is exhausted. Unless the trunk group is the last preference in the routing pattern, overflow is to the next trunk group. Otherwise, the obvious choice is to add more trunks to the trunk group. 2. If the Ovf S/F field indicates a problem (for example, a significant number), refer to **Suggested Actions** in the Ovf S/F description. 3. If the Ovf Max field indicates a problem (for example, a significant number), refer to **Suggested Actions** in the Ovf Max description. **NOTE:** If the ISDN-PRI CBC trunk group is administered to support wideband switching, the title WIDEBAND Support appears in the report title.

Continued on next page

Table 3-62. Trunk Group Call-By-Call Measurements Report — *Continued*

Field	Description
% BLK	*Percentage Outgoing Blocking*. The ratio of outgoing calls not carried for a specified service/feature to the outgoing calls offered by the service/feature. For an ISDN-PRI CBC trunk group without a queue, the calls not carried are those calls that find all facilities busy for the specified service/feature. For an ISDN-PRI CBC trunk group with a queue, the calls not carried are queue abandons plus those calls that find all facilities for the specified service/feature busy and cannot be queued because the queue is full. **Suggested Actions:** 1. Look at the % ATB column and identify any service/feature with a high value. Follow the **Suggested Actions** in the % ATB description. 2. You can increase the length of the queue rather than adding more trunks. Subsequently, you should monitor the Queue Abandonments field to insure it stays within reasonable limits. 3. If conditions are such that Item 1 above is not appropriate, you may find it necessary to add more trunks.

Background Information

1. In a non-Call-By-Call Service Selection environment, a trunk group must be preassigned and provisioned for each desired service (for example, MEGACOM telecommunications service, WATS, SDN, and so on). With this arrangement, each trunk group must be designed to accommodate the peak traffic load for the intended service application. Furthermore, the time when one service application encounters peak traffic may not coincide with when another service application encounters peak traffic. As an alternative, if multiple network services are accommodated with a single trunk group (referred to as a CBC Trunk Group), and that trunk group is provided with allocation and scheduling controls, significant trunking efficiencies may be realized by distributing the total traffic for all of the specified network services over the total number of available trunk members.

2. By implementing Usage Allocation Plans (UAPs) you can optimize, within certain limits, the CBC trunk group without involving any of the Inter-Exchange Carrier/Local Exchange Carrier (IXC/LEC) network services personnel. Each Usage Allocation Plan specifies the network services/features that may be accommodated with the trunk group. It also specifies the minimum number of reserved channels and maximum number of channels each service/feature may use at a given time.

3. The free pool concept is associated with UAP's. Specifically, free pool refers to the number of trunks not reserved for a specific service/feature and free to be assigned to another service or feature. The free pool is calculated as:

$$Free\ Pool\ =\ Total\ \#\ of\ in-service\ Trunks\ -\ \sum\ of\ the\ Mins^{*}\ (for\ each\ S/F)$$

* Minimum channel assignment.

4. Each UAP may be administered as fixed or scheduled. If fixed, a specified plan remains in effect continuously. If scheduled, two or three UAPs may be scheduled to vary both by day of week and time of day.

5. Before you analyze the Trunk Group CBC Measurements Report, you must know the intent of the strategy for each UAP. You should have (in hand) a completed copy of the CBC Trunk Group UAP and the associated Assignment Schedule, which are Pages 3 and 4 of the Trunk Group Administration screen. For additional details, refer to your *DEFINITY ECS Administrator's Guide*, or to the *DEFINITY ECS Communications System Generic 1 DS1/DMI/ISDN-PRI Reference*.

6. For wideband calls that consume more than 64 kbps of bandwidth, the total usage consumed is reflected in the Total Usage field. (For example, the usage for a 384-kbps call is six times more than for a 64-kbps call.) However, these calls are counted only as a single call. The call counts that may be incremented due to wideband calls are: Total Seize, Incoming Seize, Overflow Trunk Group, Overflow Service/Feature, and Overflow Maximum Service/Feature. The %ATB and %Out Blk fields are also affected by wideband calls.

Trunk Lightly Used Measurements Report

The Trunk Lightly Used Measurements Report lists the five trunk members with the lowest number of calls carried for each trunk group. The trunk lightly used data is kept for the current day, the previous day, and the last hour.

Command

To display the Trunk Lightly Used Measurements Report:

1. Type **list measurements lightly-used-trunk <yesterday/today/last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is only one required field for this command—**yesterday/today/last-hour**.

   - Enter **yesterday** to list the trunk activity for yesterday.
   - Enter **today** to list the trunk activity for today.
   - Enter **last-hour** to list the trunk activity of the most recently completed hour.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-73 shows a typical screen for the Trunk Lightly Used Measurements Report. The time and date the report is requested displays at the top right. Table 3-63 on page 3-212 describes the data fields presented in the Trunk Lightly Used Measurements Report.

```
list measurements lightly-used-trunk yesterday
 Switch: Cust_Switch_Name                    Date:  4:03 pm SAT MAY 19, 19xx
                          TRUNK LIGHTLY USED REPORT
 (five trunks with lowest number of calls carried  W = Wideband Support)
 Grp     Grp    Grp    Grp    Grp    Calls
 No.     Type   Dir    Size   Mbr#   Carried
 1       co     two    5      3      0
 1       co     two    5      4      3
 2       isdn   two    5      3      7          W
 2       isdn   two    5      4      8          W
 2       isdn   two    5      5      10         W
 4       wats   out    10     2      6
 4       wats   out    10     6      6
 4       wats   out    10     9      7
 4       wats   out    10     4      12
 4       wats   out    10     10     13
Command successfully completed
Command:
```

Screen 3-73. Trunks Lightly Used Report

Table 3-63. Trunk Lightly Used Measurements Report

Field	Description
`Grp No.`	*Group Number.* A number that identifies the trunk group associated with the displayed data.
`Grp Type`	*Group Type.* The type of trunk associated with the accumulated data. The system monitors the following trunk types (see *DEFINITY ECS Administrator's Guide*): ■ Access (`acc`) ■ Advanced Private Line Termination (`aplt`) ■ Central Office (`co`) or Public Network Service ■ Customer Provided Equipment (`cpe`) ■ Direct Inward Dialing (`did`) ■ Direct Inward/Outward Dialing (`diod`) ■ Foreign Exchange (`fx`) ■ Integrated Services Digital Network (`isdn-pri`) ■ Release Link Trunk (`rlt`) ■ Tandem (`tan`) ■ Tie Trunk (`tie`) ■ Wide Area Telecommunications Service (`wats`)
`Grp Dir`	*Group Direction.* Identifies whether the trunk group is incoming (`inc`), outgoing (`out`), or two-way (`two`).
`Grp Size`	*Group Size.* The number of administered trunks in a specified trunk group. For additional details, refer to the *DEFINITY ECS System Description*.

Continued on next page

Table 3-63. Trunk Lightly Used Measurements Report — *Continued*

Field	Description
`Grp Mbr#`	*Group Member Number.* The number that identifies a specific trunk member (in the group number).
`Calls Carried`	The number of calls carried on the trunk member over the report interval (yesterday, today, or last hour). Wideband calls increment this counter once for every trunk or 64-kbps channel that they use. **Suggested Action:** 1. If the identified trunk member has zero or a very small number of calls (seizures) in comparison to other listed trunk members, use the Facility Test Calls feature to determine whether a specific trunk member is functioning. 2. If a trunk is just suspected of causing problems, use the ACA feature to monitor the particular trunk group.
`Wideband Flag`	If any trunks in the trunk group are used in a wideband (n X DS0) connection, a “W” appears next to the trunk entry. In addition, the tag “W = Wideband Support” appears in the report heading.

Voice Announcements Measurements Report

The Use this command to generate a detailed report about the announcement usage for all integrated and non-integrated announcements.

Command

The command syntax is

list measurements announcements <*all, integ-all, board-loc*> <*period*>

The type qualifiers are

- ***all*** lists announcements regardless of type (analog, aux-trunk and integrated).
- ***integ-all*** lists all active integrated announcement circuit packs (TN2051AP or TN750) in the order they were activated. The report for each circuit pack starts on a new page.
- ***board-loc*** lists announcements for the specified circuit pack.

The period qualifiers are

- ***yesterday-peak*** (for yesterday's peak hour)
- ***today-peak*** (for today's peak hour)
- ***last-hour*** (for today's previous hour)

Applicable fields

All of the fields on the Voice Announcement Measurements report apply to announcements that are administered as Type **integrated** or **integ-rep**.

The following fields do not apply for all other announcement types (for example, **analog**, **aux-trunk**):

- Mport Plays
- Max Pts
- Max Call

Screen 3-74 shows an example of a report for all administered announcements with the ***today-peak*** reporting period.

```
list measurements announcements all today-peak                          Page 1

Switch Name: Portsmouth-Main                 Date: 9:23 am  TUE Jan 9, 2001

                    VOICE ANNOUNCEMENTS MEASUREMENTS

Ann                                     Meas Play  Calls      Queue MPort Max Max
No.  Ext     Name (first 24 chars)      Hour Reqts Queued ASP Drops Plays Pts Call
1    3001    Announcement-num-3001      1000 0     0      0   0     0     0   0
2    3002    Announcement-num-3002      1000 0     0      0   0     0     0   0
3    3003    Announcement-num-3003      1000 0     0      0   0     0     0   0
4    3004    Announcement-num-3004      1000 0     0      0   0     0     0   0
5    3005    Announcement-num-3005      1000 0     0      0   0     0     0   0
6    3005    Announcement-num-3005      1000 0     0      0   0     0     0   0
7    3005    Announcement-num-3005      1000 0     0      0   0     0     0   0
8    3005    Announcement-num-3005      1000 0     0      0   0     0     0   0
9    3005    Announcement-num-3005      1000 0     0      0   0     0     0   0
10   3005    Announcement-num-3005      1000 0     0      0   0     0     0   0
11   3005    Announcement-num-3005      1000 0     0      0   0     0     0   0
12   3005    Announcement-num-3005      1000 0     0      0   0     0     0   0
```

Screen 3-74. Voice Announcements Measurements report

Screen 3-75 shows an example of a report for a specific integrated announcement circuit pack with the ***last-hour*** reporting period.

```
list measurements announcements board 01B01 last-hour                   Page 1

Switch Name:                                 Date: 9:23 am  TUE Jan 9, 2001

                    VOICE ANNOUNCEMENTS MEASUREMENTS

Board Location: 01C04                  Play Ports: 31
Max. Callers On Board in Period: 0     All-Ports-Busy in Period: 0

Ann                                     Meas Play  Calls      Queue MPort Max Max
No.  Ext     Name (first 24 chars)      Hour Reqts Queued ASP Drops Plays Pts Call
23   3023    Announcement-num-3001      1000 0     0      0   0     0     0   0
24   3024    Announcement-num-3024      1000 0     0      0   0     0     0   0
25   3025    Announcement-num-3025      1000 0     0      0   0     0     0   0
26   3026    Announcement-num-3026      1000 0     0      0   0     0     0   0
27   3027    Announcement-num-3027      1000 0     0      0   0     0     0   0
28   3028    Announcement-num-3028      1000 0     0      0   0     0     0   0
29   3029    Announcement-num-3029      1000 0     0      0   0     0     0   0
30   3030    Announcement-num-3030      1000 0     0      0   0     0     0   0
31   3031    Announcement-num-3031      1000 0     0      0   0     0     0   0
32   3032    Announcement-num-3032      1000 0     0      0   0     0     0   0
33   3033    Announcement-num-3033      1000 0     0      0   0     0     0   0
34   3034    Announcement-num-3034      1000 0     0      0   0     0     0   0
```

Screen 3-75. Voice Announcements Measurements report (last hour)

Table 3-64. Voice Announcements Measurements Report

Field	Description
`Switch Name`	The administered switch name.
`Date`	The date and time of the report submission.
`Board Location`	The physical location (UUCSS) of the TN750B or C or TN2501AP circuit packs. This field displays only with the ***integ-all*** and ***board-loc*** qualifiers.
`Play Ports`	The number of ports available on the circuit pack. This field displays only with the ***integ-all*** and ***board-loc*** qualifiers.
`Max Callers on Board in Period`	The peak number callers simultaneously connected to a circuit pack (sum of the ports) at the same time. This field displays only with the ***integ-all*** and ***board-loc*** qualifiers.
`All-Ports-Busy in Period`	A count of how many times the all-ports-busy condition occurred within the reporting period. This field displays only with the ***integ-all*** and ***board-loc*** qualifiers.
`Ann No.`	The administered announcement number
`Ext`	Assigned extension
`Name`	The first 24 characters of the 27-character announcement name as administered on the announcement form
`Calls Queued`	The number of announcements that were held in queue while waiting for a port during the period.
ASP	Average speed-to-play from the time the request to play the announcement went into the queue until the time it starts playing. Abandoned calls that are waiting for announcement port are not included in the calculation (sum of the queue time divided by the number of calls queued).
`Queue Drops`	Calls that dropped while in queue. A count of the individual calls that had to queue but dropped while waiting during the period - this includes calls abandoned by the caller and VOA aborts but excludes calls that were waiting but answered by an agent.

Continued on next page

Table 3-64. Voice Announcements Measurements Report — *Continued*

Field	Description
`MPort Plays`	Multi-port plays; a count of how many times the announcement played through more than one port simultaneously during the period.
`Max Pts`	The peak number of ports used simultaneously for playing the same announcement during the period (1-16 for TN750; 1-31 for TN2501AP).
`Max Call`	The peak number callers simultaneously connected to a port by announcement during the period.

Wideband Trunk Groups

This section describes the traffic reports and selection screen for wideband trunk groups. It also provides guidelines for validating and analyzing the wideband trunk group data.

Wideband Trunk Group Summary Report

The Wideband Trunk Group Summary Report gives traffic measurements for all trunk groups administered to support wideband switching. By using this report, you can determine the trunk group total wideband usage (in CCS), the total number of wideband calls, the percentage of wideband calls blocked, and other measurement data.

Command

To display the Wideband Trunk Group Summary report:

1. Type **list measurements wideband-trunk-group summary <yesterday-peak/today-peak/last-hour> [print/schedule]** and press RETURN.

   Required Fields: There is only one required field for this command—**yesterday-peak/today-peak/last-hour**.

   - Enter **yesterday-peak** to list the wideband call activity for yesterday's peak hour.
   - Enter **today-peak** to list the wideband call activity for today's peak hour.
   - Enter **last-hour** to list the wideband call activity of the most recently completed hour.

     The peak hour is the hour (within a 24-hour period) with the greatest usage.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-76 shows a typical screen for the Wideband Trunk Group Summary Report. Table 3-65 describes the data fields presented in the Wideband Trunk Group Summary Report.

```
list measurements wideband-trunk-group summary last-hour
 Switch Name: Cust_Switch_Name                    Date: 1:58 pm MON SEP 16, 19xx
                         WIDEBAND TRUNK GROUP SUMMARY REPORT
             Peak Hour For Wideband Usage For All Trunk Groups: 1000
 Grp Grp  Grp Service Meas Total Total Inc.  Grp  Out   %  %Out
 No. Size Dir Type    Hour Usage Seize Seize Ovfl Srv  ATB Blk
 37  22   two access  1200 598   5     0     0    0    0   0
 38  23   two cbc     1200 171   2     0     0    0    0   0
 39  22   two sdn     1200 270   3     0     0    0    0   0
```

Screen 3-76. Wideband Trunk Summary Report

Table 3-65. Wideband Trunk Group Summary Report

Field	Description
`Peak Hour for Wideband Usage for All Trunk Groups`	The hour during the specified day with the highest total wideband call usage, when summed over all trunk groups. Peak hour and busy hour are synonymous. With conventional traffic theory data analysis, there are two methods for determining the peak hour. One is the time-consistent peak hour, meaning hourly usage values are averaged across days for each hour of the day. The other is the bouncing peak hour, meaning the highest usage is selected for each day without regard to the average across days. For the bouncing peak hour, the highest load on a given day may or may not occur during the time-consistent busy hour. These traffic reports and accompanying trunk group data worksheet only use the bouncing peak hour method. Note that if the total usage for the current hour equals the total usage for the previous peak hour, the peak hour is the hour with the greatest number of total seizures.
`Grp No.`	*Group Number*. A number that identifies each trunk group associated with the displayed data. Group numbers are displayed in numerical order, beginning with the lowest administered number and continuing to the highest administered number.
`Grp Size`	*Group Size*. The number of administered trunks in the trunk group.

Continued on next page

Table 3-65. Wideband Trunk Group Summary Report — *Continued*

Field	Description
`Grp Dir`	*Trunk Group Direction*. Identifies whether the trunk group is incoming (`inc`), outgoing (`out`), or two-way (`two`).
`Service Type`	*Service Type*. The administered Service Type for the trunk group. Valid entries are `accunet, i800, inwats, lds, mega800, megacom, multiquest, operator, other, outwats-bnd, public-ntwrk, sdn, sub-operator, and wats-max-bnd.`
`Meas Hour`	*Measurement Hour*. The hour (using 24-hour clock) in which the measurements are taken. For the **last-hour** report, it is the last hour of measurement (each trunk group's measurement hour is identical; but not necessarily the same as the indicated peak hour for the day). For the **today-peak** report, the measurement hour is the peak hour for each trunk group thus far today (each trunk group's measurement hour could be different). For the **yesterday-peak** report, the measurement hour is the peak hour for each trunk group yesterday (each trunk group's measurement hour could be different).
`Total Seize`	*Total Seizures*. The number of wideband call attempts. This measurement includes completed calls, false starts, don't answers, and busies.
`Inc. Seize`	*Incoming Seizures*. The number of wideband incoming call attempts. This measurement includes completed calls, false starts, don't answers, and busies. The number of Outgoing Seizures can be calculated as follows: $$Out\ Seize = Total\ Seize - Inc\ Seize$$
`Total Usage`	Total wideband call usage (in CCS) for all trunks in the trunk group. Represents the total time the trunks are busy processing wideband calls.
`Grp Ovfl`	*Group Overflow*. The number of outgoing wideband calls attempted when the remaining trunk group capacity is insufficient to accommodate the call or the trunk group's remaining bandwidth is in the wrong configuration. This measurement does not include unauthorized calls denied service on the trunk group (due to restrictions). The number of wideband calls equals the number of actual calls, regardless of the number of trunks involved in the call.

Continued on next page

Table 3-65. Wideband Trunk Group Summary Report — *Continued*

Field	Description
`Out Serv`	*Out of Service*. The number of trunks in the trunk group out of service (listed as maintenance busy) at the time the data is collected. **Suggested Action:** If the trunks are removed from service by the switch, then the appropriate maintenance personnel should be notified. The objective is to keep all members of a trunk group "in service." Generally, you should not make adjustments to the trunk group because of "Out of Service" trunks, but should get those trunks returned to service. For specific details, refer to the "Trunk Outage Measurements Report".
`% ATB`	*Percentage All Trunks Busy*. The percentage of time all trunks in the trunk group were simultaneously in use during the measurement interval. **NOTE:** In use means that the trunks are busy — either serving calls or because they are busied-out by maintenance. **Suggested Actions:** 1. If the group direction is outgoing or two-way, a high number in the % ATB field and nothing in the Grp Ovfl indicates everything is functioning normally. However, a more typical scenario is a high number in this field and a high number in the Grp Ovfl field. This indicates a possible problem that necessitates further analysis. Unless this trunk group is the last preference in the pattern, overflow is to the next choice trunk group, and the number in the Grp Ovfl field is of no great significance. Otherwise, the obvious choice is to add more trunks to the trunk group. 2. If the group direction is incoming, a high number in this field is bad. It indicates some incoming calls are probably blocked. Generally, you want to add more trunks, thus lowering the % ATB and decreasing the number of calls blocked.

Continued on next page

Table 3-65. Wideband Trunk Group Summary Report — *Continued*

Field	Description
`% Out Blk`	*Percentage Outgoing Blocking*. The percentage of offered wideband calls not carried on the trunk group. It does not include unauthorized wideband calls denied service on the trunk group (due to restrictions) or calls carried on the trunk group but do not successfully complete at the far end (where there is no answer). The calls not carried are calls made when the remaining trunk group capacity is insufficient to serve them. The Percentage Outgoing Blocking is calculated as follows: $$\%\ OutBlk = \left[\frac{Group\ Overflow}{Outgoing\ Calls\ Offered}\right] \times 100$$ The number of Outgoing Seizures is calculated as follows: *Outgoing Seizures = Total Seizures - Incoming Seizures* Similarly, the equation for calculating Outgoing Calls Offered is as follows: *Outgoing Calls Offered = Group Overflow + Outgoing Seizures*

Wideband Trunk Group Hourly Report

For trunk groups chosen at the Wideband Trunk Group Selection screen, the Wideband Trunk Group Hourly Report lists the wideband call activity for all hours of switch activity. This information helps you validate the information in the Wideband Trunk Group Summary Report.

Command

To display the Trunk Group Hourly Report:

1. Type **list measurements wideband-trunk-group hourly <assigned wideband-trunk-group number> [print/schedule]** and press RETURN.

   Required Fields: There is only one required field for this command—**assigned wideband-trunk-group number.** Enter a specific trunk group number to list the wideband call activity for all hours of switch activity.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 3-77 shows a typical screen for the Wideband Trunk Group Hourly Report. Table 3-66 and Table 3-67 on page 3-224 describe the data fields presented in the Wideband Trunk Group Hourly Report. This report contains two sections:

- a header section that provides the report ending time and trunk group administrative information
- a data section that provides the measurement data for 24 hours.

```
list measurements wideband-trunk-group hourly 40
Switch Name: Cust_Switch_Name                    Date: 1:58 pm MON SEP 16, 19xx
                         WIDEBAND TRUNK GROUP HOURLY REPORT
 Grp No: 40       Grp Size: 23    Grp Dir: two  Service Type: access
 Meas  Total  Maint  Total   Inc.   Tandem  Grp    Out   %  %Out
 Hour  Usage  Usage  Seize   Seize  Seize   Ovfl   Serv ATB Blk
 1200  262    0      3       0      0       6      0    6   15
 1100  312    0      3       0      0       0      0    0   0
 1000  169    0      1       0      0       4      0    3   5
 900   26     0      0       0      0       0      0    0   0
 800   1      1      4       0      0       0      0    0   0
```

Screen 3-77. Wideband Trunk Group Hourly Report

Table 3-66. Wideband Trunk Group Hourly Report (Header)

Field	Description
`Grp No:`	*Group Number*. A number that identifies the trunk group associated with the displayed data.
`Grp Size:`	*Group Size*. Number of trunks in the trunk group.
`Grp Dir:`	*Group Direction*. Incoming (`inc`), outgoing (`out`), or two-way (`two`).
`Service Type:`	*Service Type*. The administered Service Type for the trunk group. Valid entries are `accunet, i800, inwats, lds, mega800, megacom, multiquest, operator, other, outwats-bnd, public-ntwrk, sdn, sub-operator, and wats-max-bnd.`

Table 3-67. Wideband Trunk Group Hourly Report (Data)

Field	Description
`Total Usage`	Total wideband call usage (in CCS) for all trunks in the trunk group. Represents the total time the trunks are busy processing wideband calls.
`Maint Usage`	*Maintenance Usage.* The total usage of trunks in this trunk group for Maintenance Busy or any other non-call situation where trunks are not available to carry a call.
`Total Seize`[1]	*Total Seizures*. The number of wideband call attempts. This measurement includes completed calls, false starts, don't answers, and busies.
`Inc. Seize*`	*Incoming Seizures*. The number of wideband incoming call attempts. This measurement includes completed calls, false starts, don't answers, and busies. The number of Outgoing Seizures can be calculated as follows: $$Out\ Seize = Total\ Seize - Inc\ Seize$$ $$\%\ OutBlk = \left[\frac{Group\ Overflow}{Outgoing\ Calls\ Offered}\right] \times 100$$
`Tandem Seize*`	*Tandem Seizures.* The number of trunk-to-trunk wideband call seizures. This count is incremented on the outgoing-trunk side of the connection.
`Grp Ovfl`	*Group Overflow.* The number of outgoing wideband calls attempted when the remaining trunk group capacity is insufficient to accommodate the call or the trunk group's remaining bandwidth is in the wrong configuration. This measurement does not include unauthorized calls denied service on the trunk group (due to restrictions).

Continued on next page

Table 3-67. Wideband Trunk Group Hourly Report (Data) — *Continued*

Field	Description
`Out Serv`	*Out of Service*. The number of trunks in the trunk group out of service during the measurement hour.
`% ATB`	*Percent All Trunks Busy*. The percentage of time during the measurement interval all trunks in the group are unavailable to carry a new call (All Trunks Busy).
`%Out Blk`	*Percent Outgoing Blocking.* The percent of the outgoing wideband call seizures, including tandem wideband call seizures, offered to a trunk group that are not carried on that trunk group. The value is calculated as follows: *% Out Blk = {Grp Ovfl / [Total Seize - Inc Seize + Grp Ovfl]} x 100*

1. The number of logical calls equals the number of actual calls, regardless of the bandwidth.

Wideband Trunk Group Measurement Selection

The Wideband Trunk Group Measurement Selection screen is used at administration time to specify trunk groups to list on the Wideband Trunk Group Hourly reports. It permits the user to administer which trunk groups are to be reported for the hourly report. (Measurements on administered trunk groups are collected to list them on the wideband summary and hourly reports.) A maximum of 10 trunks can be studied on the G3csi and G3si. On the G3r, the maximum is 30. If no selections are made, no trunk groups are studied hourly.

Command

To display the Wideband Trunk Group Measurement Selection screen:

1. Type **display meas-selection wideband-trunk-group [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for the display command only.

To change a Wideband Trunk Group Measurement Selection:

1. Type **change meas-selection wideband-trunk-group** and press RETURN.
2. Enter the wideband trunk group number to be measured and press ENTER.

   Wideband trunk group numbers do not have to be in numerical order. If the wideband trunk group number you want is not listed, add the wideband trunk group number (if there is space available), or replace an existing wideband trunk group number you no longer need. Press RETURN until the cursor is placed on the unwanted wideband trunk group number and enter the new wideband trunk group number, or press CLEAR FIELD and enter the new wideband trunk group number.

Screen

Screen 3-78 shows a typical screen for the Wideband Trunk Group Measurement Selection on the G3r. Table 3-68 on page 3-227 describes the data fields presented in the Wideband Trunk Group Measurement Selection screen.

```
display meas-selection wideband-trunk-group
WIDEBAND TRUNK GROUP MEASUREMENT SELECTION
 Trunk Group Numbers
1:   78          7:  15         13:    96         19:  333         25:  580
2:   80          8:  16         14:    97         20:  444         26:  590
3:  666          9:  17         15:    98         21:  555         27:  591
4:    1         10:  18         16:   100         22:  101         28:  592
5:    2         11:  81         17:   120         23:  102         29:  10
6:    3         12:  82         18:   200         24:  103         30:  99
```

Screen 3-78. Wideband Trunk Group Measurement Selection screen

Table 3-68. Wideband Trunk Group Measurement Selection screen

Field	Description
`Trunk Group Numbers`	The trunk group(s) to be studied hourly for wideband activity.

Data Analysis Guidelines

The wideband summary and hourly reports closely parallel the other trunk group summary and hourly reports. That is, visually they contain similar fields, except there is no queuing for wideband calls, so queuing fields are eliminated. Logically, the difference is that only the wideband reports isolate wideband call usage. If the trunk group processes ordinary narrowband calls during the measurement period, the narrowband measurements are *not* included in the wideband traffic measurements.

With the overall trunk group measurements and the wideband trunk group measurements, you have data for all usage and can calculate the narrowband call usage and counts by subtracting the wideband measurement from the overall measurements.

Summary Report

The Wideband Trunk Group Summary Report provides data essential for monitoring trunk groups supporting wideband service to assure they provide the expected level of service. The report is modeled after the Trunk Group Summary Report but only trunk groups administered to provide wideband service are reported. Other trunk groups do not appear on the report. If a trunk group is administered to provide wideband service but had no wideband traffic during the measurement period, then zeros are shown on the report.

The yesterday-peak and today-peak reports list the wideband call activity for the peak wideband traffic hour. That is, the measurements shown are those that occurred during the hour in which the Total Usage for wideband service for that trunk group was highest. This is not necessarily the same peak hour as the peak hour for total usage as shown on the overall Trunk Group Summary Report. Note that on the Wideband Trunk Group Summary Report, the measurements for different trunk groups are not necessarily time-coincident with each other.

CAUTION:
The yesterday-peak and today-peak reports cannot be used to determine narrowband usage except in cases where the peak traffic hour for total usage (shown on the overall report) is the same as the peak hour for wideband usage (shown on this report) for a particular trunk group in the same measurement period. In this case alone, narrowband measurements for that trunk group may be determined by subtracting the wideband measurements from the measurements shown on the overall report for the same trunk group.

CAUTION:
For trunk groups where the peak hour is different on the overall summary report from that shown on the wideband summary report, the narrowband usage must be determined by using the measurements on the Wideband Trunk Group Hourly Report. In addition, if there were calls blocked at that time, the group should be studied using both the overall and wideband hourly reports to determine whether wideband calls were blocked.

Hourly Report

The Wideband Trunk Group Hourly Report shows the wideband call activity for each hour in the current 24-hour period. A separate report is generated for each measured wideband trunk group.

For trunk groups having mixed wideband and narrowband traffic, it is best to administer the trunk group to appear on both the overall and wideband hourly trunk group reports. In this way a complete picture of usage and blockages is possible. For these trunk groups, direct comparisons can be made between measurements for the same hour on the overall and wideband reports. For example, if the hour beginning at 1:00 p.m. is examined for the same trunk group on both the overall hourly report and on the wideband hourly report, the narrowband usage measurements may be determined by subtracting the wideband data from the overall data. This can be done for each hour in the 24-hour period.

Note that some measurements, such as trunks-out-service and all-trunks-busy, are identical for the same hour on both the wideband and the overall reports for the same trunk group.

Performance Considerations

Although the DEFINITY ECS supports wideband transmission for from 2 to 30 channels, the most common transmissions are at the H channel rates:

H Rate	Speed	# 64-Kbps Channels
H0	384 Kbps	6
H11	1.536 Mbps	24
H12	1.920 Mbps	30

When considering how many trunks to put in a trunk group that supports wideband call activity, remember:

- Every wideband call must be carried on a single DS1 interface. That is, when the bandwidth on one interface is insufficient for the call, another interface must be found that can accommodate the entire call. The bandwidth for the call *cannot* be spread over 2 or more interfaces. The chances for finding enough bandwidth on a single interface are far less than finding the bandwidth on several interfaces.
- Some far end switches (for example, the 4ESS) require the bandwidth for a call be contiguous. That is, not only must the call be carried over a single interface, but the channels over which the call is carried must be consecutively numbered. The chances for finding contiguous bandwidth are far less than for finding the bandwidth on a single interface alone.

To increase the chances of providing the bandwidth a wideband call requires, either put as many trunks as possible in the trunk groups you have designated for wideband call usage or put as many trunk groups as possible in the wideband routing pattern.

Processor Occupancy Reports

4

Processor Occupancy Reports

The term Processor Occupancy (or simply, Occupancy) is defined as the percentage of time the switch processor is busy performing call processing tasks, maintenance tasks, administration tasks, and operating system tasks. As a contrast, the percentage of time the processor is not used is referred to as Idle Occupancy.

The primary objectives of the processor occupancy reports are:

- To provide a summary of customer usage data so processor occupancy and available capacity can be determined.
- To display, on a per time interval basis, the processor occupancy and associated calling rates which facilitates the isolation of certain customer reported problems.

There are five different processor occupancy commands:

- **list measurements occupancy summary**
- **list measurements occupancy last-hour**
- **list measurements occupancy busiest-intervals**
- **list measurements occupancy pktint (G3r only)**
- **list measurements communications-links**

The first three commands provide processor occupancy data and associated call traffic for different measurement intervals. The pktint report provides 24 hours of occupancy data for each of the processor packet interface (pktint) boards in the system. The last command provides a picture of the traffic data generated on each processor interface link.

The processor occupancy commands can be executed from all user logins if allowed to. However, for most systems, the two primary users are the customers' telecommunications manager and the service technician.

The type of application can significantly affect processor occupancy. For purposes of determining processor occupancy, the customers' calling traffic is defined as one of the following applications:

- General Business — The majority of applications. It does not include the impact of the Inbound Call Management (ICM)/Call Management System (CMS) or CallVisor Adjunct Switch Applications Interface (ASAI)/Outbound Call Management (OCM) applications.
- ICM/CMS — Only includes the impact due to the ICM traffic (using the ACD, Call Vectoring, CallVisor ASAI, and CMS features).
- CallVisor ASAI/OCM — Only includes the impact due to ASAI/OCM applications.

NOTE:
A particular switch may have a traffic load that consists of any combination of the three defined applications.

Depending on the customers' specific application, the calling traffic may be as simple as a single switch with only CO trunks and analog sets or as complex as a switch in a multinode private network that uses both DCS and ISDN features and is configured with digital sets. In order to describe this wide range of traffic, four call categories are defined as follows:

- **Intercom (INTCOM)** — Locally made and completed station-to-station calls.
- **Incoming (INC)** — Calls which come into the switch over trunks from a CO. The following trunk types are considered public network incoming (CO, DID, FX, WATS, and ISDN-PRI calls with a public network service type).
- **Outgoing (OUT)** — Calls which exit the switch on trunks that terminate in a CO. The following trunk types are considered public network outgoing (CO, WATS, FX, and ISDN-PRI calls with a public network service type).
- **Private Network (PNET)** — Incoming and outgoing calls made over private network trunks. The following trunk types are considered private network (Access, CPE, DMI-BOS, RLT, Tandem, Tie, APLT, and ISDN-PRI with a private network service type).

A customer's Usage Profile is defined as the percent mix of traffic from each of the four call categories. An example of one Customer Usage Profile would be: INTCOM = 34%, INC = 33%, OUT = 33%, and PNET = 0%. Obviously, many other different combinations are also possible.

Once the traffic application, usage profile, and certain feature use loading factors are determined it is then possible to calculate the Busy Hour Call Capacity (BHCC). The BHCC is a measure of the switch's capacity and is defined as the maximum number of completed calls the switch can support in an hour without degradation of service.

It should also be understood that, as a part of the RFP process, Avaya marketing, when given a description of the customer's usage profile, traffic application, and certain feature use loading factors for the proposed switch, can calculate the theoretical maximum BHCC for the specified application. This enables the determination of whether the proposed switch can accommodate the traffic load. This number, the theoretical maximum BHCC, is an estimate and is referred to as the predicted maximum BHCC.

The Summary Command

This section describes the Summary Command and the Processor Occupancy Summary report.

When to Use the Summary Command

The main function of this command is to answer the question, "How much of the system is being used?" More specifically, this command should be used whenever you want to:

- Monitor resource usage
- Validate the customer's usage profile (for example, once the switch is installed and calling traffic is normal, use the summary reports to determine if the actual usage profile is the same as the estimated usage profile)
- Determine the idle occupancy and how much is available for growing the switch
- Determine the processor occupancy and call levels on an hourly basis for the last 24 hours

Processor Occupancy Summary Report

Command

To display the Processor Occupancy Summary report:

1. Type **list measurements occupancy summary [print or schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 4-1 and Screen 4-2 show typical output for the Processor Occupancy Summary report. The time and date the report is requested displays at the top right. Table 4-1 on page 4-5 describes the data fields presented in the Processor Occupancy Summary report, as well as the Last Hour and Busiest Interval reports.

```
list measurements occupancy summary                                  Page 1
Switch Name: Cust_Switch_Name            Date: 11:33 am  TUE JUL 31, 19xx
                      OCCUPANCY SUMMARY MEASUREMENTS
                       Peak Hour For Occupancy: 0900
Meas Static CP   Sm  Idle Total Tandem Total Intcom  Inc    Out    Pnet
Hour Occ    Occ  Occ  Occ  Calls Calls  Atmpts Atmpts Atmpts Atmpts Atmpts
1900 5      58   15   22   761   149    989    247    193    251    298
1800 5      58   16   21   1032  165    1341   335    371    301    334
1700 5      57   16   22   1442  273    1875   468    451    421    535
1600 5      58   15   22   2301  365    2991   747    710    753    781
1500 5      57   15   22   2769  476    3509   877    932    748    952
1400 5      58   15   22   2959  483    3846   961    991    928    966
1300 5      57   15   23   2997  499    3896   974    1021   900    1001
1200 5      59   15   21   4221  923    5487   1371   1520   745    1851
1100 5      59   15   21   5001  826    6501   1625   2000   1223   1653
1000 4      59   13   24   5241  915    6813   1703   2066   1165   1879
       press CANCEL to quit -- Press NEXT PAGE to continue
```

Screen 4-1. Processor Occupancy Summary Report — Page 1

```
list measurements occupancy summary                                  Page 2
Switch Name: Cust_Switch_Name            Date: 11:33 am  TUE JUL 31, 19xx
                      OCCUPANCY SUMMARY MEASUREMENTS
                       Peak Hour For Occupancy: 0900
Meas Static CP   Sm  Idle Total Tandem Total  Intcom Inc    Out    Pnet
Hour Occ    Occ  Occ Occ  Calls Calls  Atmpts Atmpts Atmpts Atmpts Atmpts
0900 5      65   12   18  5392  1002   7011   1752   2045   1203   2011
0800 5      64   14   17  5364  941    6973   1743   2056   1283   1891
0700 5      58   15   22  5423  935    7049   1762   2070   1346   1871
0600 6      60   17   17  4399  761    5719   1430   2195   569    1525
Command successfully completed
Command:
```

Screen 4-2. Processor Occupancy Summary Report — Page 2

Table 4-1. Processor Occupancy Summary Report

Field	Description
`Meas Hour`	*Measurement Hour.* The starting time (using 24-hour clock) of the hour during which the data is recorded. Data is listed beginning with the most recently completed hour in the preceding 24-hour interval. For additional details, refer to the *DEFINITY ECS System Description*.
`Meas Minute`	*Measured Minute.* (Last-Hour Report) The end-time of the 3-minute interval for which the measurement is taken. It takes the form hh:mm, where “hh” is the hour and “mm” is the end-time for the 3-minute interval.
`Date of Occurrence`	(Busiest-Interval Report) The date and end-time of the 3-minute interval for which the data is collected. It takes the form MM/dd/mm:hh, where “MM” is the month, “dd” is the day, “hh” is the hour, and “mm” is end of the 3-minute interval.
`Stat Occ`	*Static Occupancy.* The amount of time (in CCS) taken by high priority background processes in support of call processing, maintenance, and administration functions. Examples of this activity are high level sanity checks, system timing, polling of adjuncts, and operating system support. This also includes some call processing occupancy for BX.25 and ISDN-PRI traffic. **NOTE:** Static Occupancy remains fairly consistent in an idle switch. However, it increases as traffic is introduced into the system.

Continued on next page

Table 4-1. Processor Occupancy Summary Report — *Continued*

Field	Description
CP Occ	*Call Processing Occupancy.* The amount of time (in CCS) taken by call processing level processes. The processing of CDR, DCS, ISDN, and other adjunct interfaces is also included in this level. Note that some occupancy due to BX.25 and ISDN-PRI call traffic is counted as static occupancy instead of CP Occ. **NOTE:** It is not desirable for any system to function at 100 percent Processor Occupancy. Rather, the CP Occ and Stat Occ fields should total no more than a maximum of 75 percent. By maintaining this 75 percent maximum limit, other system functions can be performed and bursts of caller activity can also be accommodated. **Suggested Actions:** If the 75 percent maximum limit is exceeded, take one or more of the following steps to lower Call Processing Occupancy: Item #1 If the users do not get a dial tone immediately, they should be encouraged to wait 10 to 15 seconds before going on-hook and off-hook again. Item #2 If the switch is part of a private network and is receiving a large amount of traffic from another switch in the private network, investigate the possibility of reconfiguring the network. Item #3 Check the administration translation and verify all digital sets, administered with display modules, actually have display modules. For those sets without display modules, change the administration translations to indicate the digital sets do not have a display module. Item #4 Check the hardware error log for high levels of maintenance activity.

Continued on next page

Table 4-1. Processor Occupancy Summary Report — *Continued*

Field	Description
`Sm Occ`	*System Management Occupancy.* The amount of time taken by lower priority activities such as administration and maintenance command processing, maintenance activity, error logging, and Light-Emitting Diode (LED) audits. For additional details, refer to your *DEFINITY ECS System Description*.
`Idle Occ`	*Idle Occupancy.* The amount of time the processor is unused. There are several factors that drive down this number, including: — a large offered load, increases CP occupancy — a switch with many stations and trunks requires a high level of background maintenance, increases SM occupancy — frequent demand testing or administration, increases SM occupancy These factors may reduce the idle occupancy to almost 0% during several 3-minute intervals. On a heavily-loaded switch with frequent demand testing, the idle occupancy may drop to low levels for longer periods (perhaps 1–2 hours). These situations are normal and do not indicate a problem with the switch. However, a lightly-loaded switch with few stations translated and little demand maintenance or administration should not experience long periods of low idle occupancy (less than 15%). If this is the case, a problem is likely.
`Total Calls`	*Total Calls.* The total number of calls connected during the listed hour. Calls are counted in the time interval they are answered and not in the time interval they are dropped. Therefore, a call that starts in one time interval and ends in another is counted only in the time interval where it originates.
`Tandem Calls`	*Tandem Calls.* The number of trunk-to-trunk calls connected during the last hour.

Continued on next page

Table 4-1. Processor Occupancy Summary Report — *Continued*

Field	Description
`Total Atmpts`	*Total Attempts.* The number of call attempts made during the measurement interval. The following occurrences count as an attempt: ■ A user lifts the station handset and hangs up before dialing any digits (off-hooks) ■ A user lifts the station handset, dials the destination number, the far end rings but does not answer, and the user hangs up (no answer) ■ A user lifts the station handset, dials the destination number, the far end is busy ■ A user places a call answered by the dialed number ■ A user conferences a second party onto the call ■ An incoming trunk seizure ■ Maintenance requests an outgoing trunk be seized ■ Tandem calls (either pnet or public network) result in 2 attempts, but only one total call ■ AUDIX audits of message waiting lamps ■ AUDIX Leave Word Calling activations **NOTE:** Mathematically, the Total Atmpts field is the total of the Intcom, Inc, Out, and Pnet attempts.
`Intcom Atmpts`	*Intercom Attempts.* This field includes the sum of two types of calls. The first type is extension-to-extension calls on the same switch. The second type is partially completed calls where a local extension goes off-hook and then hangs up before the call is answered. This includes both busy and no-answer calls.

Continued on next page

Table 4-1. Processor Occupancy Summary Report — *Continued*

Field	Description
`Inc Atmpts`	*Incoming Attempts.* The number of incoming trunk seizures from public network facilities.
`Out Atmpts`	*Outgoing Attempts.* The number of outgoing trunk seizures made over public network facilities.
`Pnet Atmpts`	*Private Network Attempts.* The number of incoming and outgoing seizures made over private network facilities. Note that a tandem call is counted as two private network attempts, since it includes both incoming and outgoing trunk seizures. **NOTE:** The determination of whether a call is over public network or over private network facilities depends on the trunk type (for ISDN-PRI facilities it is also dependent on the service type).

The Last-Hour Command

When to Use the Last-Hour Command

The main function of the last-hour command is to:

- Provide a detailed view of the occupancy levels for the last-hour
- Identify potential load related problems that may have occurred during the last hour

Processor Occupancy Last-Hour Measurements Report

Command

To display the Processor Occupancy Last-Hour report:

1. Type **list measurements occupancy last-hour [print or schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 4-3 shows typical output for the Processor Occupancy Last-Hour Measurements report. The time and date the report is requested displays at the top right.

```
list measurements occupancy last-hour                                Page 1
Switch Name: Customer_Switch_name          Date:  3:13 pm  MON NOV 11, 19xx
                        OCCUPANCY LAST-HOUR MEASUREMENTS
Meas    Static CP   Sm   Idle Total  Tandem Total  Intcom Inc    Out    Pnet
Minute  Occ    Occ  Occ   Occ  Calls  Calls  Atmpts Atmpts Atmpts Atmpts Atmpt
15:11     2     5   26    67    646   710     1421      0     0     0    1421
15:08     4     5   22    69    641   704     1412      0     0     0    1412
15:05     5     6   25    64    639   705     1410      0     0     0    1410
15:02     4     6   24    66    645   710     1420      0     0     0    1420
14:59     3     4   22    71    639   703     1411      2     0     0    1409
14:56     3     5   24    68    639   704     1412      2     0     0    1410
14:53     6     6   24    64    645   704     1418      3     0     0    1415
14:50     4     5   27    64    641   707     1418      3     0     0    1415
14:47     4     6   19    71    648   706     1429      3     0     0    1426
14:44     2     5   26    67    639   701     1405      3     0     0    1402
14:41     4    14   19    63   1624  1075     2399    243     0     0    2156
14:38     6    15   28    51   1786  1133     2556    290     0     0    2266

Command successfully completed
Command:
```

Screen 4-3. Processor Occupancy Last-Hour Measurements Report

NOTE:
The fields on this report are the same as the summary report, but the data is calculated over a 3-minute time interval. The Meas Minute field represents the end of the time interval.

Using the Last-Hour Report to Resolve Problems

The following list identifies some areas pursued when investigating a problem believed to be processor occupancy (load) related.

1. Multiply the number in the Total Calls field by 20 for the identified 3-minute time interval (the time when the problem occurred). If the product exceeds the advertised BHCC of the switch, it is the load for this time interval causing the problem. If the product does not exceed the BHCC for the switch, this load is not the problem.
2. Compare the number in the Total Atmpts field with the Total Calls field for the identified 3-minute time interval (the time when the problem occurred). If the number of attempts is significantly greater than the number of calls, a significant percent of the occupancy is due to call processing stimuli that do not result in completed calls.
3. Examine the hardware error log for an excessive amount of maintenance activity (for example, a high number of errors).
4. Refer to the **list measurements communications-links** report to determine if any of the links are receiving an abnormal amount of traffic.
5. Check with the users to determine if a certain feature(s) is used heavily during the identified time interval.
6. Refer the problem to maintenance personnel with the suggestion they check the software error log.

The Busiest-Interval Command

This section describes the Processor Occupancy Busiest-Interval Measurements report.

When to Use the Busiest-Interval Command

The main function of the **busiest-interval** command is to provide a long-term history report of potential performance-related problems.

NOTE:
This report provides a collection of the 20 busiest 3-minute intervals within the last two months. Therefore, this command is most useful to the service technician for investigating habitual performance problems or those problems not reported exactly when they happen.

Processor Occupancy Busiest-Interval Measurements Report

Command

To display the Processor Occupancy Busiest-Interval Measurements report:

1. Type **list measurements occupancy busiest-intervals [print/schedule]** and press RETURN.

   Options: The **print** and **schedule** commands are available for this command.

Screen

Screen 4-4 show typical output for the Processor Occupancy Busiest-Interval Measurements Report. The time and date the report is requested displays at the top right. The Date of Occurrence field identifies the month, day, and time of day for 20 of the busiest intervals (that is, the sum of Stat Occ + CP Occ). All other fields are described in Table 4-1 on page 4-5.

```
list measurements occupancy busiest-intervals                        Page 1
Switch Name:  Customer_Switch_Name         Date:  3:13 pm  MON NOV 11, 1991
                OCCUPANCY BUSIEST 3-MINUTE INTERVALS MEASUREMENTS
Date of     Static CP   Sm  Idle Total Tandem Total  Intcom Inc    Out    Pnet
Occurrence  Occ    Occ  Occ Occ  Calls Calls  Atmpts Atmpts Atmpts Atmpts Atmpts
11/11/10:20 16      9   26  49    686  490    1225   245     0      0      980
11/11/11:14  8     16   27  49   1788  1130   2558   286     0      0     2272
11/11/12:38  7     15   21  57   1786  1131   2554   286     0      0     2268
11/11/13:41  6     16   26  52   1786  1129   2553   290     0      0     2263
11/11/14:11  7     15   25  53   1780  1135   2557   285     0      0     2272
Command successfully completed
Command:
```

Screen 4-4. Processor Occupancy Busiest-Interval Measurements Report

NOTE:
The fields on this report are the same as on the summary report. However, the data is calculated over 3-minute intervals rather than 1-hour intervals.

Using the Busiest-Interval Report to Resolve Problems

The following list identifies some areas that may be pursued when investigating a problem that is believed to be processor occupancy (load) related.

1. Multiply the number in the Total Calls field by 20 for the identified 3-minute time interval (the time when the problem occurred). If the product exceeds the advertised BHCC of the switch, it is the load for this time interval causing the problem. If the product does not exceed the BHCC for the switch, this load is not the problem.
2. Compare the number in the Total Atmpts field with the Total Calls field for the identified 3-minute time interval (the time when the problem occurred). If the number of attempts is significantly greater than the number of calls, a significant percent of the occupancy is due to processing off-hook and on-hook stimuli that do not result in a completed call.
3. Examine the hardware error log for an excessive amount of maintenance activity (for example, a high number of errors).
4. Refer to the **list measurements communications-links** report to determine if any of the links are receiving an abnormal amount of traffic.
5. Check with the users to determine if a certain feature(s) is used heavily during the identified time interval.
6. Refer the problem to maintenance personnel with the suggestion they check the software error log.

After a serious performance problem is detected and corrected, use the **clear measurements occupancy busiest-intervals** command and clear the log of busiest entries. This allows attention to be focused on any current performance problems.

NOTE:
The **clear measurements occupancy busiest-intervals** command should only be used to clear out data from resolved problems.

The Pktint Command

This section describes the Processor Occupancy Pktint Command. This command is available on the G3r switch.

When to Use the Pktint Command

Use the Pktint command to provide a 24-hour history of the occupancy of each (up to three) packet interface (pktint) boards.

Processor Occupancy Pktint Report

Command

To display the Processor Occupancy Pktint Report:

1. Type **list measurements occupancy pktint [print or schedule]** and press RETURN.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 4-5 shows typical output for the Processor Occupancy Pktint Report. Table 4-2 on page 4-15 describes the fields unique to the Processor Occupancy Pktint Report.

```
list measurements occupancy pktint
Switch Name:  Customer_Switch_Name          Date:  5:35 pm  FRI NOV 22, 1991
                        PROCESSOR PACKET INTERFACE REPORT
Meas             PKT_INT1             PKT_INT2             PKT_INT3
Hour               Occ                  Occ                  Occ
1600                2                   0    BRDNINST        0    BRDNINST
1500                2                   0    BRDNINST        0    BRDNINST
1400                2                   0    BRDNINST        0    BRDNINST
1300                2                   0    BRDNINST        0    BRDNINST
1200                2                   0    BRDNINST        0    BRDNINST
1100                2                   0    BRDNINST        0    BRDNINST
1000                2                   0    BRDNINST        0    BRDNINST
 900                2                   0    BRDNINST        0    BRDNINST
 800                2                   0    BRDNINST        0    BRDNINST
 700                2                   0    BRDNINST        0    BRDNINST
 600                2                   0    BRDNINST        0    BRDNINST
 500                2                   0    BRDNINST        0    BRDNINST
      press CANCEL to quit -- press NEXT PAGE to continue
```

Screen 4-5. Processor Occupancy Pktint Report

Table 4-2. Processor Occupancy Pktint Report

Field	Description
`Meas Hour`	*Measurement Hour.* The starting hour in which the measurements are taken.
`PKT-INTN Occ`	*Packet-Interface Occupancy*. Where N is either 1, 2, or 3, representing each of the 3 PKT-INT boards. The percent occupancy is retrieved from each PKT-INT board for the hour. If a board is not inserted, this field displays a 0 with the note **BRDNINST** indicating the board is not inserted. If the board is out of service this field displays a 0 with the note **OUTSERV** indicating the board is out of service. If the data cannot be retrieved from the board because of some internal problem, this field displays a 0 with the note **DA_N_AVAIL** indicating the data cannot be retrieved. **Suggested Action:** The occupancy should generally run about two percent. As occupancy nears 100%, consider adding another PKT-INT.

The Communications Links Command

This section describes the Processor Occupancy Communications Links command.

When to Use the Communications Links Command

The main function of the communications links command is to:

- Obtain a report that facilitates the monitoring of traffic over the processor interface links
- Determine if it is necessary to perform load balancing
- Identify defective processor interface links

NOTE:
The three processor occupancy commands described earlier may (depending upon the application) indicate the switch is running at capacity, in keeping with user perceptions. However, these commands, with the exception of pointing to a call overload, do not provide any extra information as to why it is running at capacity. This command provides additional insight into how the processor interface links affect occupancy (for example, link overload, link transmission problems, and so on.).

Processor Occupancy Communications Link Measurements Report

Command

To display the Processor Occupancy Communications Link Measurements report:

1. Type **list measurements communications-links <1-8/9-16/17-24/25> [print/schedule]** and press RETURN.

   Required fields: There is one required field for this command— **1-8/9-16/17-24/25**. Enter the range of links you want to display.

   Options: The **print** and **schedule** options are available for this command.

Screen

Screen 4-6 and Screen 4-7 on page 4-17 show typical output for the Processor Occupancy Communication Link Measurements report. The time and date the report is requested displays at the top right. Table 4-3 on page 4-18 describes the data fields presented in the Processor Occupancy Communications Link Measurements report.

```
list measurements communications-links 1-8                          Page 1
Switch Name: Cust_Switch_Name               Date:  1:55 pm  TUE JUL 31, 1990
    COMMUNICATION LINK MEASUREMENTS
Meas     Link     Link     Link     Link     Link     Link     Link     Link
Hour     1        2        3        4        5        6        7        8
1200     10471    576      24       4        0        40       2        0
1100     13764    612      24       14       0        313      4        0
1000     12217    550      24       4        0        36       9        0
900      12365    601      26       4        0        32       2        0
800      12630    559      28       4        0        36       4        0
700      12714    412      24       4        0        36       4        0
600      12531    299      24       4        0        40       4        0
500      12407    352      24       4        0        42       2        0
400      12173    311      34       4        0        32       2        0
300      12121    301      24       4        0        36       4        0
200      12561    412      24       4        0        36       4        0
100      12501    478      24       4        0        36       2        0
       press CANCEL to quit -- Press NEXT PAGE to continue
```

Screen 4-6. Processor Occupancy Communication Measurement Report — Page 1

```
list measurements communications-links 1-8                          Page 2
Switch Name: Cust_Switch_Name                Date:  1:55 pm  TUE JUL 31, 1990
    COMMUNICATION LINK MEASUREMENTS
Meas     Link     Link     Link     Link     Link     Link     Link     Link
Hour     1        2        3        4        5        6        7        8
0        12460    345      28       4        0        44       4        0
2300     12413    301      28       4        0        44       4        0
2200     12313    267      24       4        0        26       4        0
2100     12526    472      26       4        0        32       4        0
2000     12297    376      71       4        0        36       4        0
1900     12330    321      24       13       0        32       4        0
1800     12210    283      24       4        0        36       2        0
1700     12549    356      24       4        0        40       2        0
1600     12361    519      34       4        0        23       2        0
1500     12384    494      24       4        0        29       2        0
1400     12422    0        24       4        0        16       2        0
1300     12318    0        26       4        0        32       2        0
Command successfully completed
Command:
```

Screen 4-7. Processor Occupancy Communication Measurement Report — Page 2

The Processor Occupancy Communication Link Measurements reports for each customer application varies significantly since a particular link on one switch may serve a different function than the same link for another switch. Furthermore, what is considered to be normal link traffic for one service (for example, DCS) may vary widely from what is considered to be normal link traffic for another service (for example, CMS). Therefore, it is recommended the customer obtain a printed report of what is deemed to be normal traffic (for each switch) and use that report for comparison purposes.

This report is of significant value in determining the long term impact processor link traffic has on processor occupancy. The report can also be used to identify certain types of link failure (for example, total failure at 1400 hours on link 2 [on Page 2]). However, since the report summarizes data at 1-hour time intervals, some types of intermittent problems are not easily recognized with this report. Intermittent transmission problems may be more easily identified by reviewing the software error log.

Table 4-3. Communications Link Measurements Report

Field	Description
`Meas Hour`	*Measurement Hour.* The starting time (using 24-hour clock) of the hour during which the data is recorded. Data is listed beginning with the most recently completed hour and extending back for 24-hour intervals.
`Link #`	*Link Number.* The links are identified by numbers 1 through 8, 9 through 16, 17 through 24, or 25. The numbers in each column represent the number of messages traversing the link. Once a link is established and traffic begins flowing over it, the messages are counted automatically; no command is required.

Mapping Links to Applications

Command

To see what applications are running on the links:

1. Type **display communications-interface links** and press RETURN.

Screen

Screen 4-8 shows typical output for the Processor Occupancy Interface Links report for the G3r, G3si and G3csi systems. Table 4-4 on page 4-19 describes the data fields presented in the Processor Occupancy Interface Link report.

```
display communication-interface links                                    SPE B
                                INTERFACE LINKS
Link  Enable  Est  Ext    Type   Destination  DTE  Conn    Name
              Conn                Number      DCE  Mod.
1:     n       n
2:     n       n    25902  BX25                DTE         proc 02 - audix
3:     n       n
4:     y       y    25904  BX25   28007        DTE         proc 04
5:     n       n
6:     n       n
7:     n       n
8:     n       n
```

Screen 4-8. Processor Occupancy Interface Links report

Table 4-4. Processor Occupancy Interface Links report

Field	Description
`Link`	A display-only field. Indicates the interface link number that connects to another node in a DCS network, a Message Server, CMS, ISDN Gateway, or AUDIX. Interface Links always terminate on a port in a PGATE circuit pack for R5r and later configurations or on the PI circuit pack for R5si configurations
`Enable`	A display-only field. Indicates whether the link is enabled.
`Est Conn`	*Establish Connection*. A display-only field. This field displays a **y** when the system is responsible for any part of the call setup required for the link between the system and the far-end data module.
`Ext`	*Extension*. A display-only field. This is the data extension assigned on the Processor Interface Data Module screen. If the data module has not been administered, this field will be blank.
`Type`	A display-only field. Displays the protocol type that is to be established on the link. Valid entries are **BX25**, and **isdn**.
`Destination Number`	A display-only field. Displays either **external**, **switched**, **TAC**, or **eia** if the system is involved in establish any part of the connection.
`DTE` `DCE`	A display-only field. Specifies either **DTE** or **DCE** to define the type of interface. This field only contains information if the Type field is BX25. If one endpoint of a link is DTE, then the other must be DCE, and vice versa.
`Conn Mod.`	*Connected Data Module*. A display-only field. This is the data module extension to which the link connects.
`Name`	A display-only field. Displays the 15-character name for the link (for identification purposes only). It may be used to identify the destination machine.

Data Analysis Guidelines

The following guidelines are intended to show an easy method for determining whether currently reported data is acceptable or not. These guidelines represent the minimum you should do to verify the recorded measurement values are consistent with expected and historic values. Perform additional checks as necessary.

To check the acceptability of hourly data, verify the system clock was not changed during the measurement hour. If the system clock was changed, the Minutes field displays double asterisks (for example, `11**`).

During a partial system reset (for example, 1 or 2 or Cold 1 or Cold 2) the measurement data is retained for the affected time interval. However, during a full system reset (for example, 3, 4, or 5) the measurement data is not retained for the affected time interval.

Analyzing the Data

In order to calculate the measured BHCC, use the summary report to collect measurement data. Subsequently, record data for the identified peak hour on Worksheet 5. After recording four weeks of data, calculate the column averages and record the averages in the appropriate row and column at the bottom of Worksheet 5.

NOTE:
Before recording each day's data review the whole day in order to ensure the peak hour is not the result of an abnormality (for example, caused by a snow storm, and so on). If you determine the peak hour is the result of an abnormality, disregard that day's data. Additionally, the weeks you select to record data from should NOT be times of slack business activity. Furthermore, the weeks should NOT be four consecutive weeks; but should be the weeks from two or more months of normal business activity.

''WORKSHEET 5'' in Appendix A, ''Blank Worksheets'' provides space to record seven-day-per-week data. If your application is a five-day operation, data should only be recorded for the five days (Monday through Friday). When averaging the data, take care to only divide by the number of days that data was actually recorded (for example, 20 or 28).

Table 4-5. Procedures for Calculating Processor Occupancy

Step	Description
Step 1.	Is there available sufficient Processor Occupancy to grow the switch? ■ If the sum of Call Processing Occupancy plus Static Occupancy is greater than 70 percent, there is no room to grow and no need to complete Steps 2 through 7. ■ If the sum of Call Processing Occupancy plus Static Occupancy is less than 70 percent, continue with the following steps.
Step 2.	Calculate the Usage Profile. Use the four-week average data (obtained from your completed copy of Worksheet 5) to solve the following equations. $\% \ INTCOM = \frac{Int\ Atmpt}{Total\ Atmpt} \times 100$ $\% \ INC = \frac{Inc\ Atmpt}{Total\ Atmpt} \times 100$ $\% \ OUT = \frac{Out\ Atmpt}{Total\ Atmpt} \times 100$ $\% \ PNET = \frac{Pnet\ Atmpt - Tandem\ Calls}{Total\ Atmpt} \times 100$

Continued on next page

Table 4-5. Procedures for Calculating Processor Occupancy — *Continued*

Step	Description
Step 3.	Determine the Traffic Application. Is the traffic application ICM/CMS, or CallVisor ASAI/OCM. You can make this determination based on the type of business served by the switch, the percentages of incoming and outgoing traffic, and personal knowledge of which features in use. For example, a General Business application has a more even (in terms of incoming, outgoing, and intercom) distribution of traffic. An ICM/CMS application has a high percentage of incoming calls and also provide those features specific to ACD or Call Vectoring. Some of these include agent and trunk tracking capability (for example, CMS or BCMS), recurring announcements, and so on. If the switch supports more than one traffic application (for example, ICM/CMS as the primary and General Business as the secondary), then the processor occupancy required for the primary application must be determined first and then the remainder is available for the secondary application. **NOTE:** This document describes the method for calculating the BHCC for a simple General Business traffic application. Those switches that provide the DCS, CMS, BCMS, and/or ISDN-PRI feature(s) are termed complex and the Design Center must be consulted in order to calculate their BHCC. All ICM (ACD and Call Vectoring), ASAI/OCM, and vectoring and interflow/traffic applications are also termed complex and currently are only evaluated by the Design Center. For more information, contact your Account Team.
Step 4.	Determine the maximum number of calls the switch should be able to complete in one hour. In order to make this determination, to the configuration guidelines for the switch.

Continued on next page

Table 4-5. Procedures for Calculating Processor Occupancy — *Continued*

Step	Description
Step 5.	Determine the normal calling rate for the given level of occupancy. a. Calculate how many completed calls the switch makes for the given level of occupancy. This number is referred to as Calls predicted. $$Calls\ Predicted = \frac{Static\ Occ + CP\ Occ}{70} \times BHCC$$ **NOTE:** 1) The divisor number, 70, is the constant from Step 1 and refers to the percentage of the processor used by call processing. 2) The number for BHCC is the number that is obtained in Step 4. b. Compare the Calls Predicted number to the four-Week average Total Calls field on Worksheet 5. $$Calls\ Predicted < Total\ Calls$$ *or* $$Calls\ Predicted > Total\ Calls$$ c. If the Calls Predicted number is less than the Total Calls number, then either the customer has a low feature usage rate or is completing more than 70 percent of calls. Therefore, if additional capacity is used in the same way, the following predictions should provide reliable results. If the Calls Predicted number is greater than the Total Calls number, then either the customer has a high feature usage rate or is completing less than 70 percent of calls. Therefore, care must be taken in predicting how many additional calls can be supported. **NOTE:** If the Calls Predicted number equals or approximately equals the Total Calls number, then the customer is using the switch in a typical manner.

Continued on next page

Table 4-5. Procedures for Calculating Processor Occupancy — *Continued*

Step	Description
Step 6.	Determine how many additional calls the switch can complete. The number of additional calls can be calculated with the following equation. $$Number\ of\ Additional\ Calls = \frac{Total\ Calls\ (4\ Week\ Avg)}{Static\ Occ + CP\ Occ} \times (Idle\ Occ - 15)$$
Step 7.	Determine how many additional extensions can be added. $$Additional\ Extensions = \frac{Number\ of\ Additional\ Calls}{Average\ Number\ of\ Calls\ per\ Extension}$$ **NOTE:** The Average Number of Calls per Extension depends on the traffic application and other customer-specific operating techniques. If this measurement is not known, then you may use 4.05 (a typical figure for a General Business traffic application).

Security Violations Reports

5

This chapter describes the Security Violations Reports. There are six security violation reports — a detail report, a summary report, and four status reports. These reports show system management logins, and attempts to use station security codes, authorization codes, and remote access barrier codes. They also provide information about attempts to access the system made within a given time frame.

Security Violations Summary Report

The system generates a Security Violations Summary Report that displays valid and invalid access attempts, and security violations in each of the categories measured (login, authorization code, barrier code, and station security code).

Commands

Commands are available to display or clear the Security Violations Summary report.

To display the summary report:

1. Type **list measurements security-violations summary [print/schedule]** and press RETURN.

To reset all counters of the Security Violations reports to zero:

1. Type **clear measurements security-violations** and press RETURN.

NOTE:
The Security Violations Summary Report accumulates data until it is cleared. This report *will* overflow; therefore, review and clear it at least once a month.

Options: The options **print** and **schedule** are available for these commands.

Screen

Screen 5-1 displays a typical Security Violations Summary Report. The report header lists the switch name and date and time the report is requested. Table 5-1 on page 5-3 describes the data presented in the Security Violations Summary Report.

```
     ---------------------------------------------------------------------------
     ---------------------------------------------------------------------------
    Switch Name:_______________        Date: xx:xx am  DAY MON xx, 19xx

                      SECURITY VIOLATIONS SUMMARY REPORT
                  Counted Since: xx:x am   DAY MON xx,19xx

        Barrier
        Codes       Station Security Codes            Authorization Codes
        --------    -----------------------   -----------------------------------
                      Origination                                Remote
                    Station  Trunk   Total   Station  Trunk  Access   Attd  Total
Valid         0           1      2       3         0      0       0      0      0
Invalid       0           4      6      10         0      0       0      0      0
Sec Viol      0                             3                                    0

            Successful  Invalid  Invalid Forced       Login Security  Trivial
Port Type   Logins      Attempts IDs     Disconnects  Violations      Attempts
SYSAM-LCL        0           0         0           0           0           0
SYSAM-RMT        0           0         0           0           0           0
MAINT            0           0         0           0           0           0
SYS-PORT         0           0         0           0           0           0

Total            0           0         0           0           0           0
     ---------------------------------------------------------------------------
     ---------------------------------------------------------------------------
```

Screen 5-1. Security Violations Summary Report

Table 5-1. Security Violations Summary Report

Field	Description
`Counted Since`	The time at which the counts above were last cleared and started accumulating again, or when the system is initialized.
`Barrier Codes`	The total number of times a user entered a valid or invalid remote access barrier code, and the number of resulting security violations. Barrier codes are used with remote access trunks. An inexplicable, significant increase in valid barrier code use could indicate the barrier code has been compromised. A marked increase in this number of invalid codes may indicate someone is *attempting* to break into your system. If you have just administered a new barrier code, or a barrier code expired recently, it may indicate people are making honest mistakes. **Suggested Action:** Delete or change the barrier code if you suspect it has been compromised.
`Station Security Code Origination/ Total`	The number of calls originating from either stations or trunks that generated valid or invalid station security codes, the total number of such calls, and the number of resulting security violations. A dramatic increase in the number of either valid or invalid attempts may be cause for alarm. Unless recording of TTI/PSA events is turned off, they appear in the history log. If usage does not seem legitimate, security codes and/or classes of service should be changed.

Continued on next page

Table 5-1. Security Violations Summary Report — *Continued*

Field	Description
`Authorization Codes`	The number of calls, by origination, that generated valid or invalid authorization codes, the total number of such calls, and the number of resulting security violations. Calls are monitored based on the following origination types: ■ Station ■ Trunk (other than remote access) ■ Remote Access ■ Attendant If valid authorization code usage increases dramatically, you should investigate. Someone may have obtained valid codes; on the other hand, it may turn out that a number of new, legitimate users have come onto the system. If invalid authorization code usage increases dramatically, you should investigate. Someone may be trying to break into your system. However, a legitimate explanation may be that authorization codes have recently been changed and users are making some honest mistakes. *If you suspect Authorization Codes have been compromised, change them.*

Continued on next page

Table 5-1. Security Violations Summary Report — *Continued*

Field	Description
`Port Type`	The type of port used by the measured login process. If break-ins are occurring at this level, the offender may have access to your system administration. This is an extremely dangerous situation. On the G3r, port types can be: ■ *SYSAM-LCL (SYSAM Local Port.):* This port on the SYSAM board is typically used as the local connection to the management terminal. It is located in the switch room. ■ *SYSAM-RMT (SYSAM Remote Port.):* The dial-up port on the SYSAM board is typically used by services for remote maintenance and is also used by the switch to call out with alarm information. If system break-ins are made or attempted using this port, the offender is someone who has the dial-up number. ■ *MAINT:* These ports on the Expansion Port Networks maintenance boards are typically used as local connections for on site maintenance performed by services. If system break-ins are made or attempted using this port, the offender is someone who works in the building. ■ *SYS-PORT (System Ports):* These ports are accessed by dial-up through the TDM bus.
	On the G3si, port types can be: ■ *MGR1*: The dedicated system administration terminal connection. ■ *NET*: The network controller dial-up ports. ■ *EPN*: The EPN maintenance EIA port. ■ *INADS*: The Initialization and Administration System port.
`Total`	Measurements totaled for all the above port types.
`Successful Logins`	The total number of successful logins into SM (that is, the login ID and the password submitted were valid) for the given port type.

Continued on next page

Table 5-1. Security Violations Summary Report — *Continued*

Field	Description
`Invalid Login Attempts`	The total number of login attempts where the attempting party submitted an invalid login ID or password while accessing the given port type. **NOTE:** Look for numbers significantly higher than normal. Invalid attempts do not include cases where a user makes several attempts to logon and is successful on the second or third attempt. (A user is given three tries at logging on before disconnected.)
`Invalid Login IDs`	The total number of unsuccessful login attempts where the attempting party submitted an invalid login while accessing the given port type.
`Login Forced Disconnects`	The total number of login processes disconnected automatically by the switch because the threshold for consecutive invalid login attempts was exceeded for the given port type. The threshold is three attempts.
`Login Security Violations`	The total number of login security violations for the given port type. As with barrier code attempts, the user can define the meaning of a security violation by setting two parameters administratively: 1. The number of unsuccessful logins 2. The time interval A login security violation notification is sent to the attendant console or a station with a display when the number of unsuccessful logins is exceeded within the administered interval of time.
`Login Trivial Attempts`	The total number of times a user connected to the system and gave no input to the login sequence. A large number of trivial attempts could mean that the dial-up numbers were accidentally distributed to the wrong personnel.

Security Violations Detail Report

The Security Violations Detail Report provides system management login data per login identification. It relates only to system administration.

NOTE:
If you recently added login IDs, these do not appear in the detail report (either as successful or not) until the next hourly update or until you enter the clear measurements security violations command. Similarly, logins that you remove and are subsequently used in login attempts, are included in the Security Violations Detail Report until the next hourly update or until you enter the clear measurements security violations command.

Commands

Commands are available to display or clear the Security Violations Detail and Summary reports.

To display the detail report:

1. Type **list measurements security-violations detail [print/schedule]** and press RETURN.

To reset all counters of the Security Violations reports to zero:

1. Type **clear measurements security-violations** and press RETURN.

   NOTE:
   The Security Violations Summary Report accumulates data until it is cleared. This report *will* overflow; therefore, review and clear it at least once a month.

   Options: The options **print** and **schedule** are available for these commands.

Screen

Screen 5-2 shows typical output for the Security Violations Detail Report for G3r systems. Table 5-2 on page 5-9 describes the data fields presented in the Security Violations Detail Report.

```
list measurements security-violations detail                Page 1  SPE A
Switch Name: Definity In-House              Date: 1:21 pm MON OCT 21, 19xx
                     SECURITY VIOLATIONS DETAIL REPORT
    Counted Since: 9:42 am TUE OCT 15, 19xx
                      Successful    Invalid
Login ID  Port Type    Logins     Passwords
init      SYSAM-LCL       6           0
          SYSAM-RMT       0           0
          MAINT           0           0
          SYS-PORT      191           3
           Total        197           3
inads     SYSAM-LCL       0           0
          SYSAM-RMT      11           1
          MAINT           0           0
          SYS-PORT       22           1
           Total         33           2
       press CANCEL to quit -- press NEXT PAGE to continue
```

Screen 5-2. Security Violations Detail Report

Table 5-2. Security Violations Detail Report

Field	Description
`Login ID`	The login identification submitted by the party attempting to login. Login IDs include the valid system login IDs. **NOTE:** If you see a large number of invalid attempts where an invalid ID is used, this may indicate unauthorized use by an individual who does not have access to valid login IDs. On the other hand, if the invalid attempts involve invalid passwords being used, whoever is trying to break in does know the ID. Review the Valid ID attempts to see which ones had invalid passwords connected with them.
`Port Type`	The type of port where login attempts were made. G3r: ■ SYSAM-LCL (SYSAM Local Port): This port on the SYSAM board is typically used as the local connection to the management terminal. It is located in the switch room. ■ SYSAM-RMT (SYSAM Remote Port): The dial-up port on the SYSAM board is typically used by services for remote maintenance and is also used by the switch to call out with alarm information. ■ MAINT: These ports on the Expansion Port Networks maintenance boards are typically used as local connections for on-site maintenance performed by services. ■ SYS-PORT (System Ports): These ports are accessed by dial-up through the TDM bus. G3si: ■ *MGR1*: The dedicated system administration terminal connection. ■ *INADS*: The Initialization and Administration System port ■ *EPN*: The EPN maintenance EIA port. ■ *NET*: The network controller dial-up ports.
`Successful Logins`	Total number of times a login is used successfully to log into the system for the given port type.
`Invalid Passwords`	The total number of login attempts where the attempting party submitted an invalid password for the given port type and login ID.

Security Violations Status Reports

The security violations reports provide current status information for Login, Remote Access (barrier code), or Authorization Code or Station Security Code violation attempts. The data displayed by these reports is updated every 30 seconds. A total of 16 entries is maintained for each type of violation. The oldest information is overwritten by new entries at each 30-second update. The security violations report is divided into four distinct reports:

- Login Violations
- Remote Access Barrier Code Violations
- Authorizations Code Violations
- Station Security Code Violations

Login Violations

To determine login violations, the system monitors the following ports:

- System administration terminal connected within 50 feet of the system cabinet
- Customer Support Service Organization (CSSO)
- Dial-up ports that use the switch fabric. These are normally used by CSSO.
- Expansion Port Networks (EPN) Maintenance Ports. These ports are typically used as local connections by services for on site maintenance.

Command

To access Monitor Security Violations reports:

1. Type **monitor security-violations <login/remote-access/ authorization-code/station-security-code>** and press RETURN.

Screens

This section describe each of the above possible reports (login, remote access, authorization code, and station security code) and describes the data fields presented in each report.

Security Violations Status— Login Violations report

Screen 5-3 shows typical output for the Security Violations Status—Login Violations report. Table 5-2 describes the data fields presented in the Security Violations Status—Login Violations report.

```
-------------------------------------------------------------------------
monitor security-violations login
-------------------------------------------------------------------------
                      SECURITY VIOLATIONS STATUS
                                      Date:  NN:nn DAY MON nn 199n


                              LOGIN VIOLATIONS


                  Date     Time     Login     Port      Ext
                 01/08     07:51    root      NET-1     4030
                 01/08     07:51    admin     NET-1     4030
                 01/07     07:52    cust      rcust     MGR1
-------------------------------------------------------------------------
-------------------------------------------------------------------------
```

Screen 5-3. Security Violations Status— Login Violations report (G3si)

Table 5-3. Login Violations report

Field	Description
Date	The date the attempt occurred.
Time	The time the attempt occurred.
Login	The login string entered as part of the invalid login attempt. An invalid password may cause an invalid attempt. Entry of an invalid password results in an invalid login attempt. In this case the valid login ID associated with the attempt is displayed.
Port Type (G3r) Port (G3si)	The port on which the failed login session is attempted.
Ext	This field is present only on reports from G3si systems. The extension assigned to the network controller board on which the failed login session is attempted. It contains an entry only if the System Administrator's management terminal is administered through a network controller port. This field is not present on reports produced by the G3r.

Security Violations Status— Remote Access Barrier Code Violations report

Screen 5-4 shows typical output for the Security Violations Status—Remote Access Barrier Code Violations report. Table 5-4 describes the data fields presented in the Security Violations Status—Remote Access Barrier Code Violations report.

```
-------------------------------------------------------------------------------
monitor security-violations remote-access
-------------------------------------------------------------------------------
                      SECURITY VIOLATIONS STATUS
                                      Date:  NN:nn DAY MON nn 199n


                 REMOTE ACCESS BARRIER CODE VIOLATIONS

   Date     Time     TG No   Mbr   Ext   Bar-Cd      CLI/ANI
   01/08    10:55    31      5     4050  1030        2025551234
   01/08    10:54    31      1     4050  2345        5559876




-------------------------------------------------------------------------------
-------------------------------------------------------------------------------
```

Screen 5-4. Remote Access Barrier Code Violations report

Table 5-4. Remote Access Barrier Code Violations

Field	Description
Date	The date the attempt occurred.
Time	The time the attempt occurred.
TG No	*Trunk Group Number*. The number of the remote access trunk group over which the barrier code is sent.
Mbr	*Trunk Group Member*. The number of the remote access trunk group member over which the barrier code is sent.
Ext	*Extension*. The extension used to interface with the Remote Access feature.
Bar-Cd	*Barrier Code*. The incorrect barrier code that resulted in the invalid attempt.
CLI/ANI	*Calling Line Identifier/Automatic Number Identification*. The calling line identifier or automatic number identification, when available on the incoming message, of the party making the invalid attempt.

Security Violations Status—Authorization Code Violations report

Screen 5-5 shows typical output for the Security Violations Status—Authorization Code Violations report. Table 5-5 on page 5-13 describes the data fields presented in the Security Violations Status—Authorization Code Violations report.

```
------------------------------------------------------------------------
monitor security-violations authorization-code
------------------------------------------------------------------------
                      SECURITY VIOLATIONS STATUS
                     Date:  NN:nn DAY MON nn 199n

                     AUTHORIZATION CODE VIOLATIONS


Date   Time    Originator    Auth-Cd   TG No   Mbr Bar-Cd    Ext    CLI/ANI
01/07  08:33   STATION       1234567                         84321
01/06  07:32   TRUNK         1233555   35      14                   3035551234
01/03  14:22   REM ACCESS    2222      31      3   3295912          5556789
12/25  16:45   ATTENDANT     1212111                         84000



------------------------------------------------------------------------
------------------------------------------------------------------------
```

Screen 5-5. Authorization Code Violations report

Table 5-5. Authorization Code Violations report

Field	Description
`Date`	The date the attempt occurred.
`Time`	The time the attempt occurred.
`Originator`	The type of resource from which the invalid access attempt originated. Originator types include: ■ Station ■ Remote Access (when the invalid authorization code is associated with an attempt to invoke the Remote Access feature). ■ Attendant
`Auth-Cd`	*Authorization Code*. The invalid authorization code entered.
`TG No`	*Trunk Group Number*. The trunk group number of the trunk where the attempt originated. It appears only when the originator type is “trunk” or “remote access” and an invalid authorization code is entered.
`Mbr`	*Trunk Group Member.* The number of the trunk in the trunk group where the attempt originated.
`Bar-Cd`	*Barrier Code*. The valid barrier code entered with the invalid authorization code. It appears only when an authorization code is required to invoke Remote Access, following entry of the barrier code.
`Ext`	*Extension*. The extension associated with the station or attendant originating the call. It appears only when authorization code is entered from the station or attendant console.
`CLI/ANI`	*Calling Line Identifier/Automatic Number Identification*. The calling line identifier or automatic number identification, when available on the incoming message, of the party making the invalid attempt.

Security Violations Status—Station Security Code Violations report

Screen 5-6 shows typical output for the Security Violations Status—Station Security Code Violations report. Table 5-6 describes the data fields presented in the Security Violations Status—Station Security Code Violations report.

```
-----------------------------------------------------------------------------
monitor security-violations station-security-codes
-----------------------------------------------------------------------------
                       SECURITY VIOLATIONS STATUS
                      Date:  NN:nn DAY MON nn 199n

                      STATION SECURITY CODE VIOLATIONS


Date   Time    TG No   Mbr   Port/Ext    FAC    Dialed Digits
01/07  08:33       6     2               123    3001#12345678#
01/01  07:32                 01A0301     135    3001#87654321#
01/03  14:22       3     6               124    #5551234#
12/25  16:45                 88888       127    980765432112345



-----------------------------------------------------------------------------
-----------------------------------------------------------------------------
```

Screen 5-6. Station Security Code Violations report

Table 5-6. Station Security Code Violations report

Field	Description
Date	The date the attempt occurred.
Time	The time the attempt occurred.
TG No	*Trunk Group Number*. The trunk group number associated with the trunk where the attempt originated.
Mbr	*Trunk Group Member*. The trunk group member number associated with the trunk where the attempt originated.
Port/Ext	*Port/Extension*. The port or extension associated with the station or attendant originating the call.
FAC	*Feature Access Code*. The feature access code dialed that required a station security code.
Dialed Digits	The digits the caller dialed when making this invalid attempt. This may allow judgement as to whether the caller is actually trying to break in to the system, or is a legitimate user making typographical mistakes.

History Reports

6

History Reports

This chapter describes the History (recent changes) and Access Security Gateway Session History reports.

You can view or print a History report of the most recent administration and maintenance changes. The History report also lists each time a user logs in or off the system. This report is used for diagnostic, information, or security purposes.

The system maintains a log in a software buffer of the most recent administration and maintenance commands. This log is called the transaction log. Commands must be data affecting and successfully entered to save in the transaction log. The data-affecting commands are called data commands.

The transaction log displays or prints as the History report when you enter the **list history** or **list history print** command at the management terminal or a remote terminal. This report can be generated by any login with display administration and maintenance-data permissions.

You can also view or print an Access Security Gateway Session History report of all session establishment and rejection events associated with users accessing the system administration and maintenance interface through Access Security Gateway (ASG). This report contains the last 500 session log entries for the G3si and 1250 session log entries for the G3r.

The Access Security Gateway Session History report displays or prints when you enter the **list asg-history** or **list asg-history [print/schedule]** command. This report can only be generated by a login with the super-user permissions.

Data Commands

With the exception of login and logoff, only those administration and maintenance commands that change the data state associated with any object and qualifier are maintained in the transaction log.

For example, the **list change station 3600** command changes the state of the translation data and so is classified as a data command and entered in the log. However, the command **display station 3600** does not change the state of the translation data and is not entered in the log.

The following commands are classified as data commands and are saved in the transaction log:

- add, change, remove, duplicate
- backup
- busyout, release
- cancel
- clear
- configure
- enable, disable
- format
- login/logoff
- mark
- recycle
- refresh
- restart
- save
- set, reset
- start
- test
- upgrade
- wp (write physical)

The following commands are *not* classified as data commands and are *not* saved in the transaction log:

- copy
- download
- get
- list, display, status
- load, restore
- monitor
- rp (read physical)
- upload

History Report

The History report contains associated data saved in the transaction log for every data command. This data includes:

- Date and Time
- Port
- Login
- Action, Object, and Qualifier

NOTE:
If the Record IP Registrations in History Log field is enabled on the Feature-Related Systems Parameters screen, then a history log entry occurs each time an IP endpoint registers with the DEFINITY system.

Command

The History report displays or prints data commands in last in, first out order.

To display the History report:

1. Type **list history** and press RETURN.

To print the History report:

1. Type **list history print** and press RETURN.

Screen

Screen 6-1 shows typical output for the History report. Table 6-1 on page 6-4 describes the data fields presented in the History report.

```
list history                                                          Page 1
                                    HISTORY
                  Date of Loaded Translation: 10:08pm Wed Feb 14,2001

 Date Time   Port      Login   Actn   Object       Qualifier
 2/18  12:34 1A0301    tti-m   cha    station      4000
 2/18  12:23 1B0401    psa-a   cha    station      4003
 2/16  09:44 2B0608    tti-s   cha    station      4003
 2/16  09:22 1D0708    psa-d   cha    station      4055
 2/15  15:26 01B1203   actr-d  cha    station      2005 EMERGENCY EXT
 2/15  15:25 01B1203   actr-u  cha    station      2004
 2/15  15:20 SYSAM-LCL init    cha    system-param features
 2/15  15:17 NET       inads   dup    station       20001 start 30001 count 8
 2/15  15:16 EPN       cust    add    station      507
 2/15  15:15 EPN       ncust   logn
 2/15  15:01 NET       cust    add    station      502
 2/15  14:56 NET       cust    add    station      501
 2/15  14:23 EPN       cust    cha    dialplan
```

Screen 6-1. History report

Table 6-1. History report field descriptions

Field	Description
`Date of Loaded Translation`	The time and date the translation is saved on tape. When a translation is saved on tape, by entering the save translation command, the time and date of the save is logged on the tape. Whenever the system is cold started or rebooted, the transaction log is loaded from the tape and the time and date are included on the History Report, for example, “9:53 pm Wed Jul 13, 1994."
`Date`	The date the data command is entered (for example, ***07/18)***.
`Time`	The time the data command is entered (for example, ***12:34***).
`Port`	The port, or group of ports, to which the user is connected. Users are grouped as follows: G3csi and G3si Port Types ■ MGR1 - direct system access port connection ■ INADS - dial up port ■ EPN - Expansion Port Network connection ■ NET - Network Controller incoming/outgoing system access port ■ PHONE - local extension G3r Port Types ■ SYSAM-LCL - direct system access port connection ■ SYSAM-RMT - dial up port ■ MAINT - maintenance board RS-232 connection ■ SYS-PORT - incoming/outgoing system access port ■ PHONE - local extension G3csi, G3si, and G3r Port Types XXXXXX - actual psa/tti port (for example, 1A0301) the phone is either separating from or merging to.

Continued on next page

Table 6-1. History report field descriptions — *Continued*

Field	Description
`Login`	The system login of the user entering the **data** command (for example, ***cust***). If the port type is a psa/tti port, the corresponding login will be one of the following: ■ psa-a—psa associate ■ psa-d—psa disassociate ■ tti-m—tti merge ■ tti-s—tti separate ■ actr-a—actr associate ■ actr-d—actr denied ■ actr-u—actr unassociate Note that these logins associated with the port type will not appear on the Login report. These transactions only appear if the “CTA/PSA/TTI Transactions in History Log” field is enabled on the Feature-Related System Parameters screen. These transactions appear as two separate records; one recording the moved-from port, and the other one recording the moved-to port. IP phone registrations are also recorded.
`Action`	The first command word entered—specifies the operation to be performed.
`Object`	The second command word or words entered—specifies the object to be acted on (for example **station**, **trunk group**).
`Qualifier`	The third command word or words entered—one or more words or digits used to further identify or complete the object (for example, ***1120*** [the station number]).

Access Security Gateway Session History Report

The Access Security Gateway Session History report logs all session establishment and rejection events associated with users accessing the system administration and maintenance interface through Access Security Gateway (ASG). This report emulates the data provided in the DEFINITY ECS History report, and also contains information on whether the session was accepted or rejected by ASG, and if rejected, the reason for the rejection.

This report is accessible only if, on the System-Parameters Customer-Options screen, the Access Security Gateway (ASG) field is set to y.

Command

To display the Access Security Gateway Session History report:

1. Type **list asg-history** and press return.

To print the Access Security Gateway Session History report:

1. Type **list asg-history [print/schedule]** and press return.

   Options: The **print** and **schedule** options are available with this command.

Screen

Screen 6-2 shows typical output for the Access Security Gateway Session History report. Table 6-2 on page 6-7 describes the data fields presented in the Access Security Gateway Session History report.

```
                    ACCESS SECURITY GATEWAY SESSION HISTORY

Date    Time    Port        Login    Status
01/06   12:45   SYSAM-RMT   csand    AUTHENTICATED
01/05   01:32   SYSAM-LCL   jsmith   REJECT-BLOCK
01/05   12:33   SYSAM-RMT   ajones   REJECT-EXPIRE
01/03   15:10   SYSAM-RMT   swrigh   REJECT-PASSWORD
01/02   08:32   SYSAM-LCL   jsmith   REJECT-INVALID
01/02   07:45   SYSAM-RMT   mehrda   REJECT-RESPONSE
```

Screen 6-2. Access Security Gateway Session History report

Table 6-2. Access Security Gateway History report field descriptions

Field	Description
`Date`	Indicates the date of the session establishment or rejection. The date displays in the mm/dd format where mm = month and dd = day.
`Time`	Indicates the time of the session establishment or rejection. The time displays in the hh:mm format where hh = hour and mm = minute.
`Port`	Indicates the port mnemonic associated with the port on which the session was established or rejected. The port mnemonics for G3r systems are SYSAM-LCL, SYSAM-RMT, MAINT, and SYS-PORT. For G3si systems, they are MRG1, INADS, NET, and EPN.
`Login`	Indicates the alphanumeric login string entered by the user and associated with the session establishment or rejection.
`Status`	Indicates the code showing whether the session was established or rejected and, if rejected, the reason for the rejection. The following is a list of the possible status values: ■ AUTHENTICATED—User authentication and session establishment. ■ REJECT-BLOCK—User rejected because the Blocked field associated with the login ID is set to **y**. ■ REJECT-EXPIRE—User rejected because access restriction based on the Expiration Date criteria detected. ■ REJECT-INVALID—User rejected because the user-supplied login ID did not match any of the administered login IDs. ■ REJECT-RESPONSE—User rejected because the user-supplied response to the system challenge not valid. ■ REJECT-RESTRICT—User rejected because access restriction based on either the Day of Week or Time of Day criteria detected. ■ REJECT-SESSIONS—User rejected because access restriction based on the Number of Sessions criteria detected.

Blank Worksheets

A

Worksheets serve as the suggested means for collecting data for historical comparison purposes. To obtain information on how to use these forms, refer to ''Data Analysis Guidelines'' for the corresponding measurements report. Make as many copies of these forms as you need for your data collection and analysis.

WORKSHEET 1

ATTENDANT GROUP DATA WORKSHEET

System ID:

Location:

Group Size:

Day of Week	Report Type*	Meas Hour	Calls Ans	Calls Aband	Calls Queued	Calls H-Abd	Calls Held	Time Avail	Time Talk	Time Held	Time Abd	Speed of Answer	Week No. and Date
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													

* Report Type: LH for last hour, TP for today’s peak, or YP for yesterday’s peak.

WORKSHEET 2

ARS/AAR ROUTING PATTERN DATA WORKSHEET

System ID: **Location:** **Report Type = Yesterday ***
Route-Pattern No: **Queue Size:**

Day of Week	Total Calls Offered	Calls Carried	Calls Blocked	Calls Queued	Queue Overflow	% of Calls Carried						Week No. and Date
						Pref 1	Pref 2	Pref 3	Pref 4	Pref 5	Pref 6	
M												
T												
W												
T												
F												
S												
S												
M												
T												
W												
T												
F												
S												
S												
M												
T												
W												
T												
F												
S												
S												
M												
T												
W												
T												
F												
S												
S												

* Use ‘‘Yesterday’s report’’ for the full day route-pattern measurement.

WORKSHEET 3

HUNT GROUP DATA WORKSHEET

System ID:
Group ID:
Location:
Group Size:
Queue Size:
Group Name:
Group Type:

Day of Week	Report Type*	Meas Hour	Total Usage	Calls Answered	Calls Abandoned	Calls Queued	Speed of Answer	Week No. and Date
M								
T								
W								
T								
F								
S								
S								
M								
T								
W								
T								
F								
S								
S								
M								
T								
W								
T								
F								
S								
S								
M								
T								
W								
T								
F								
S								
S								

* Report Type: LH for last hour, TP for today’s peak, or YP for yesterday’s peak

WORKSHEET 4

TRUNK GROUP DATA WORKSHEET

System ID: **Location:** **Group Type:**
Group No: **Group Size:** **Group Dir:**
Queue Size:

Day of Week	Report Type*	Meas Hour	Total Usage	Total Seize	Inc. Seize	Grp Ovfl	Calls Qued	Que Ovfl	Que Abd	Out Serv	% ATB	% Out Blk	Week No. and Date
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													

* Report Type: LH for last hour, TP for today’s peak, or YP for yesterday’s peak

WORKSHEET 5

WIDEBAND TRUNK GROUP DATA WORKSHEET

System ID: **Location:** **Service Type:**
Group No: **Group Size:** **Group Dir:**

Day of Week	Report Type*	Meas Hour	Total Usage	Total Seize	Inc. Seize	Grp Ovfl	Out Serv	% ATB	% Out Blk	Week No. and Date
M										
T										
W										
T										
F										
S										
S										
M										
T										
W										
T										
F										
S										
S										
M										
T										
W										
T										
F										
S										
S										
M										
T										
W										
T										
F										
S										
S										

* Report Type: LH for last hour, TP for today’s peak, or YP for yesterday’s peak

WORKSHEET 6

PROCESSOR OCCUPANCY SUMMARY DATA WORKSHEET

System ID: **Location:**

Day of Week	Peak Hour	Stat Occ	CP Occ	SM Occ	Idle Occ	Total Calls	Tandem Calls	Total ATMPT	INTCOM ATMPT	INC ATMPT	OUT ATMPT	PNET ATMPT	Week No. and Date
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
M													
T													
W													
T													
F													
S													
S													
4 Week Avg	NA												

‘‘NA’’ means that the field () should not be calculated. It is not applicable.

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DEFINITY ECS Release 10 Reports, 555-233-505, Issue 3, December 2001

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	Excellent	Good	Fair	Poor
Ease of Finding Information				
Clarity				
Completeness				
Accuracy				
Organization				
Appearance				
Examples				
Illustrations				
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- ❒ Improve the overview/introduction
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- ❒ Add more figures
- ❒ Add more examples
- ❒ Add more detail
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- ❒ Add more troubleshooting information
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- ❒ Improve the index

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