Norstar-PLUS
Modular ICS 4.0
Installer Guide

Norstar, Meridian and Companion are trademarks of
Nortel (Northern Telecom)
© Northern Telecom 1998

1-800-4 NORTEL
www.nortel.com/norstar
P0881590 Issue 01
Printed in Canada

Contents

Regulations 1

Safety and installation 1
Important safety instructions 2
Canadian regulations 4
US regulations 6

How to use this document 13

What's new with Norstar 15

ISDN Primary Rate Interface (PRI) 15
New Norstar features and equipment 16
New Norstar-Companion features 16

Welcome to ISDN 17

Analog versus ISDN 17
Type of ISDN service 18
ISDN layers 19
ISDN Bearer capability 20
Services and features for ISDN PRI and BRI 20
ISDN hardware 24
Clock Source for ISDN Cards 29
Other ISDN BRI equipment 30
ISDN standards compatibility 31

Working with ISDN 33

Planning your ISDN network 33
Ordering ISDN PRI 33
Ordering ISDN BRI 34
Supported ISDN protocols 36
ISDN programming 36
Programming ISDN equipment 42

Networking with Norstar 47

The big picture 47
Norstar behind a PBX 48
Networking a Norstar system with the Meridian M1 over PRI 48
Trunks and target lines 49

Remote system access 58
Networking features 61
Customer Use 75
Public network 75
Private network 78
Norstar system 82

Data Solutions 87

Examples of ISDN Scenarios 87
IDM200 interworkings 87
CTA500dm 88
ISDN applications 89
Video conferencing and video telephony 90
Desktop conferencing 90
File transfer 90
Telecommuting 90
Group 4 fax 90
Remote LAN access 90
Leased line backup 90
LAN to LAN bridging 91
Internet and database access 91

Planning the installation 93

Planning checklist 94
Required equipment 94
Expansion equipment 95
Optional equipment 96
Equipment for installing the ICS and modules 97
Location requirements 97
Electrical requirements 99
Configuring Trunk Cartridges 99
Configuring Station Modules 100
Internal wiring requirements 101
System overview 103
Upgrading your Norstar system 104
Using the NA-MICS 4.0 Upgrade Kit to upgrade from previous versions of MICS 106
Upgrading from MICS 4.0 to XC 4.0 108
Trunk and Station Modules 110
Trunk module line numbering 114

Installation 117

Installation checklist 117
Testing the ISDN BRI network connection 119
Installing the cartridges 121
Mounting the modules 124
Installing the ROM Software Cartridge 127
Inserting a cartridge 129
Connecting expansion modules 133
Installing fiber cables 137
Fiber cable management system 138
Using the fiber spool 142
Making fiber connections 143
Routing fiber cables 144
Connecting the wiring 145
Wiring charts 148
Norstar telephones 175
The emergency telephone 175
Installing ISDN BRI terminal equipment 178
Installing optional equipment 181
Norstar Integrated Data Module 200 181
Analog Station Module 183
Auxiliary ringer (customer supplied) 183
External music source (customer supplied) 183
External paging system (customer supplied) 184
Powering up the system 186
Check that the power is on 187

Programming 189

Programming overview 189
Programming tools 193
Reviewing programmed settings 202
Startup programming 205
Performing Startup 205
Changing the default template 205
Changing the starting DN number 206
Programming 208
Entering programming for installers 209
Entering programming for system coordinators 209
Entering programming using other passwords 210

Programming sequence 210
Terminals&Sets 212
Line access 212
Capabilities 220
ATA settings 222
Name 223
User prefernces 224
Restrictions 224
Telco features 231
Lines 235
Copying Trunk and Line data 237
Name 249
Restrictions 250
Telco features 252
Services 253
Ringing service 253
Restrn service 257
Routing service 257
Setting up a route for local calling 264
Setting up a route for long distance calling 266
Adding a long distance carrier access code 268
Programming for least cost routing 268
Using dialing restrictions with routing 271
Using a dialing plan to route outgoing PRI calls 272
Common settings 274
Sys speed dial 278
Passwords 279
COS pswds 279
Call log pswds 281
Progrming pswds 281
Registration password 283
Time&Date 284
System prgrming 285
Hunt groups 285
Featr settings 292
Direct-dial 300
Remote access 307
Companion 310
Network Name Display 312
Programming Call by Call service selection 319
Incoming call routing 320

Telco features 328
VMsg ctr tel#s 328
Software keys 329
ISDN-PRI 329
Hunt Groups 329
Companion 329
Norstar Integrated Data Module 200 329
Hardware 332
Modules 338
StnMod 338
ASM 339
TrunkMod 339
BRI card 342
DataMod 353

Maintenance 357

Maintenance overview 357
Beginning a Maintenance session 358
System version 359
Port/DN status 360
Module status 366
System test log 370
System administration log 373
Network evt log 375
Alarm codes 377
Event messages 385
Provisioning 392
BRI and T1 lines 392
Tests 394
CSU stats 405
Usage metrics 410

Troubleshooting 413

Getting ready 414
Types of problems 415
General troubleshooting procedure 415
Problems with telephones 417
Norstar telephone has faulty buttons, display, handset or other hardware problems 417

Norstar telephone display unreadable 417
Norstar telephone dead 418
Problems with lines 421
Calls cannot be made (but can be received) 421
Dial tone absent on external lines 422
Hung lines at a telephone 422
Auto-answer line rings at a Norstar telephone 424
Prime telephone gets misdialed calls 425
Selected lines reads “Not in service” or “Not available” 425
Selected line pool shows “No free lines” 428
Problems with optional equipment 429
Integrated Data Module 200 429
Analog Terminal Adapter 429
Auxiliary ringer 430
External paging 431
Music on Hold/Background Music trouble 431
Problems with trunk cartridges service 433
Digital Trunk Interface trouble 434
Monitoring the T1 or PRI signal 436
Problems with BRI service 437
The BRI card is connected to the ISDN network (U loop) but the LED for one of more loops is not lit 437
“Out of service” is displayed when a BRI is selected (LED for loop is lit) 438
All the LEDs on a BRI Card are flashing 438
Caller hears one ring and then a fast busy signal when placing a call on a BRI line 439
ICS down 440
Trunk or Station Module down 441
Data Module down 442
Problems for network or remote users 443
Remote feature code gets no response 443
Dialed number gets ringback and the wrong person 443
Dialed number gets stuttered dial tone instead of ringback 444
Dialed number gets dial tone instead of ringback 444
Dialed number gets busy tone 445
Dialed number does not get through 445
Dialed DISA number gets ringback instead of stuttered dial tone 447

Dialed DISA number gets dial tone instead of stuttered dial tone 448
DISA user gets overflow tone when entering COS password 448
Dialed feature code gets overflow tone 450
Dialed feature code gets busy tone 451
Line pool access code gets overflow tone 451
Line pool access code gets ringback 452
Line pool access code gets busy tone 452
Dialed number gets no response 453

Specifications 455

Norstar system 455
Digital Trunk Interface 458

Glossary 461

Index 483

Tell us what you think... 503

Regulations

Safety and installation

The shock hazard symbol within an equilateral triangle is intended to alert personnel to electrical shock hazard or equipment damage.

The following precautions should also be observed when installing telephone equipment.

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

This symbol (if applicable) on the product is used to identify the following important information:

For equipment with internal power supplies

- Mains nominal AC voltage 110-120 V~; 60Hz
- Mains nominal AC voltage 220-240 V~; 50Hz

For equipment with external power supplies

- Must be powered from a UL listed or CSA-NRTL/C certified Class 2 power source equipped with a 5-pin circular DIN connector.

For current ratings, refer to product specific documentation and product labels.

Important safety instructions

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury of persons, including the following:

- Follow the warnings and instructions marked on the product.
- Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
- Do not use this product near water, for example, near a bathtub, wash bowl, kitchen sink, or laundry tub, in a wet basement or near a swimming pool.
- Do not place this product on an unstable cart, stand or table. The product may fall, causing serious damage to the product.
- This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
- Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by persons walking on it.
- Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.

- Never spill liquid of any kind on the product.
- To reduce the risk of electric shock, do not disassemble this product, but have it sent to a qualified service person when service or repair work is required.
- Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:

  a. When the power supply cord or plug is damaged or frayed.

  b. If the product has been exposed to rain, water or liquid has been spilled on the product, disconnect and allow the product to dry out to see if still operates; but do not open up the product.

  c. If the product housing has been damaged.

  d. If the product exhibits a distinct change in performance.
- Avoid using telephone equipment during an electrical storm. There may be a remote risk of electric shock from lightning.
- Do not use the telephone equipment to report a gas leak in the vicinity of the leak.
- To eliminate the possibility of accidental damage to cords, plugs, jacks, and the telephone equipment, do not use sharp instruments during the assembly procedures.
- Do not insert the plug at the free end of the handset cord directly into a wall or baseboard jack. Such misuse can result in unsafe sound levels or possible damage to the handset.
- Disconnect telecommunications lines before unplugging main power cord.
- Save these instructions

Canadian regulations

Industry Canada Ringer Equivalence Number

NOTICE: The Ringer Equivalence Number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that sum of the ringer equivalence numbers of all the devices does not exceed 5.

NOTICE: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Department does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected

together. This precaution may be particularly important in rural areas.

Caution

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations as specified in the Industry Canada Standard ICES-003.

Substitution of non-approved equipment will void the Nortel warranty.

Address for warranty and repairs in Canada:

Nortel
30 Norelco Drive
Weston, Ontario
M9L 2X6

For more information call 1-800-4NORTEL.

Use of a music source

In accordance with US, Canadian and international copyright laws, a license may be required from the American Society of Composers, Authors and Publishers, or other composers' or performing rights organization if Radio, TV or other broadcasts to the public are transmitted through the Music On Hold or Background Music features of this telecommunication system.

Programming emergency numbers

When programming emergency numbers and/or making test calls to emergency numbers:

1. Remain on the line and briefly explain to the dispatcher the reason for calling before hanging up.
2. Perform such activities in the off-peak hours, such as early mornings or late evenings.

US regulations

State and local requirements for support of Emergency 911 Dialing service by Customer Premises Equipment vary. Consult your local telecommunications service provider regarding compliance with applicable laws and regulations.

Federal Communication Commission (FCC) Notice Radio / TV interference

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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Devices intended to be connected to the Public Switched Telephone Network

FCC Registration Number

This telephone equipment complies with Part 68, FCC Rules for direct connection to the Public Switched Telephone Network (The FCC registration number appears on a label affixed to the ICS).

Your connection to the telephone line must comply with these FCC Rules:

- Use only an FCC Standard network interface jacks and FCC compliant line cord and plug to connect this equipment to the telephone line.
- If a network interface jack is not already installed in your location, you can order one from your telephone company. Order the following network jacks along with the corresponding Facility Interface Code (FIC):

Trunk Cartridge	REN	USOC	SOC	FIC
Loop Start/Disconnect Supervision (LS/DS)- NT7B75GA-93	AC 1.5B DC 0.3	RJ21X	9.0F	02LS2
Call Information (CI)- NT5B41GA-93	AC 1.5B DC 0.3	RJ21X	9.0F	02LS2
DTI (T1 or PRI) - NT7B74GA-93	—	RJ48C	6.0Y	04DU9-1SN
E&M - NT5B38GA-93	—	RJ2HX	9.0F	TL32M

Trunk Cartridge	REN	USOC	SOC	FIC
BRI-U2 and BRI-U4 Cards NT7B86GB-93 and NT7B87GB-93	—	RJ49C	6.0Y	02IS5
BRI-ST - NT7B76GY-93 (when connected to an NT1 which has a U interface to the telephone network)	—	RJ49C	6.0Y	021S5
DID - NT5B37GA-93	0.0B	RJ21X	AS.2	02RV2-T
Off-premise extensions (OPX) - Analog Terminal Adapter	—	RJ11C	9.0F	0L13B

Notify service provider if DTI is disconnected.

You must notify your T1 service provider any time the 1.544 Mbps DTI interface is disconnected from the network.

In some states, customers are permitted to install their own jacks.

- The equipment cannot be used with or connected to a party line or a public coin phone service provided by the telephone company. Connection to Party Line Service is subject to state tariffs. Contact the Public State Utility Commission, Public Service Commission or Corporation Commission for information.
- It is no longer necessary to notify the Telephone Company of your system’s Registration and REN numbers. However, you must provide this information to the telephone company if they request it.

- If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. 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 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.
- Do not attempt to repair this equipment yourself. If trouble is experienced with this equipment, please refer to the repair and warranty information, noted below. 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.
- Allowing Direct Inward Dial (DID) Equipment to be operated in such a manner as to not provide for proper answer supervision is a violation of Part 68 of the FCC Rules. Proper answer supervision is when:

  a. This equipment returns answer supervision to the PSTN when DID calls are:

  — Answered by the called station

  — Answered by the attendant

  — Routed to a recorded announcement that can be administered by the CPE user.

  — Routed to a dial prompt

b. This equipment returns answer supervision on all DID calls forwarded to the PSTN. Permissible exceptions are:

— A call is unanswered.

— A busy tone is received.

— A reorder tone is received.

Signaling method

The equipment allows signaling in DTMF tones. It can complete calls to local and long distance lines and can also complete long distance calls via computer phone systems such as MCI or SPRINT. This equipment is capable of providing 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.

Ringer Equivalence Number

The FCC Registration information on the product label, includes a Ringer Equivalence Number (REN) which is used to determine the number of devices you may connect to your phone line. A high total REN may prevent ICSs from detecting ringing in response to an incoming call and may make placing calls difficult. In most, but not all areas, the sum of the RENs should not exceed five (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.

Note: RENs are associated with loop start and ground start ports. Do not use for E&M or digital ports.

Hearing aid compatibility

The telephone station sets are compatible with hearing aids equipped with an appropriate telecoil and is compliant with the requirements of the Americans with Disabilities Act (ADA).

Use of a music source

In accordance with US, Canadian and international copyright laws, a license may be required from the American Society of Composers, Authors and Publishers, or other composers' or performing rights organization if Radio, TV or other broadcasts to the public are transmitted through the Music On Hold or Background Music features of this telecommunication system.

Programming emergency numbers

When programming emergency numbers and/or making test calls to emergency numbers:

1. Remain on the line and briefly explain to the dispatcher the reason for calling before hanging up.
2. Perform such activities in the off-peak hours, such as early mornings or late evenings.

Substitution of non-approved equipment will void the NORTEL warranty.

Address for warranty and repairs in the US:

Nortel
640 Massman Drive
Nashville TN 37210

For more information call 1-800-4NORTEL

How to use this document

This guide provides core installation and programming information for MICS 4.0 and MICS-XC 4.0 systems. If you are installing an XC system, you must also refer to the *MICS-XC Norstar-Companion Installer Guide* for instructions on installing and programming Companion equipment on the Modular ICS system.

The XC system can be a mini (no expansion cartridge installed), a midi (installed with a 2-port expansion cartridge), a maxi (installed with a 6-port expansion cartridge), or a mega (Combination Fiber 6-port Services Cartridges and Services cartridges). The mega system supports Companion. For more on the mega configurations, see Expansion equipment on page 95. The MICS system can be a mini, a midi, or a maxi system. It does not support Companion.

Both the MICS-XC 4.0 and NA-MICS 4.0 systems can support ISDN PRI and BRI, and T1 functionality. These functionalities as well as other Norstar functionalities are documented in this guide. All Companion programming and installation instructions are documented in the *MICS-XC Norstar-Companion Installer Guide* and the *MICS-XC Norstar-Companion System Coordinator Guide.*

Both the XC and MICS systems have the capability of functioning with the Norstar Integrated Data Module 200. If you install an IDM 200, refer to Installing optional equipment on page 181 and the *Norstar Integrated Data Module 200 Installer Guide* for instructions on installing and programming the IDM 200 with the Modular ICS system.

Information that is specific to XC systems or MICS systems is clearly marked within this guide.

What’s new with Norstar

The Norstar 0X32 system has new equipment and software with improved performance to meet your growing telecommunication needs.

ISDN Primary Rate Interface (PRI)

The existing ICS DTI card is reused by configuring it with a software key to give it ISDN-PRI functionality. Refer to Software keys on page 328.

- PRI using existing Digital Trunk Interface DTI (T1) card
- You can accomplish PRI interoperability with AT&T 5ESS and GTD5 using the NI-2 interface on the Norstar
- You can have interoperability with DMS-100 custom using DMS-100 custom protocol. You can also have interoperability using DMS-250 custom protocol (MCI, Sprint, Generic) and interoperability with AT&T 4ESS using 4ESS custom protocol
- Two way DID, using a service type on call-by-call
- Call by Call Service Selection allowing access with a single PRI connection to Foreign Exchange (FX), Tie Trunk, OUTWATS, INWATS, and Private as provided by COs
- PRI call-by-call limits which sets the minimum and maximum calls per service type
- Private access protocol MCDN (SL-1) for Meridian 1 inter-working
- Network Name Display. The name of the incoming and outgoing calling party will be displayed if supplied by the network
- Name and Number blocking. A feature code blocks the outgoing name and number information.

- Dialing Plan for handling all outgoing PRI calls. Processes enbloc dialing, call by call services.
- Capable of transmitting the telephone number and internal extension number of a calling station dialing 911 to the Public Switched Telephone Network.
- Same ISDN bearer capabilities as Basic Rate Interface

New Norstar features and equipment

- New software upgrade kit allowing upgrades from earlier versions of MICS to NA-MICS 4.0. See Upgrading your Norstar system on page 104
- Direct Inward Dialing (DID) enhancements (multiple target line appearances). Multiple target line appearances of the sane target line on the same set.
- Answer Key enhancements supporting simultaneous DID calls, and an increase to eight answer keys
- Hunt groups providing Broadcast, Sequential, Rotary modes and Call queuing. They replace Incoming Line Groups (ILG)
- Selected line redirection (SLR) enhancements to allow line redirection on simultaneous DID call appearances
- Network name display for BRI
- Direct Inward System Access (DISA) enhancement
- Time and date synchronization through the use of CLASS trunks
- Modular ICS NVRAM cartridge for additional data
- New modular ICS ROM software cartridge

New Norstar-Companion features

- Wireless twinning improved with Answer Key enhancements

Welcome to ISDN

This chapter provides you with some background information about ISDN and also includes information about:

- Analog vs. ISDN
- Type of ISDN service
- ISDN layers
- ISDN Bearer capability
- Services and features for ISDN PRI and BRI
- ISDN hardware
- ISDN standards compatibility

Integrated Services Digital Network (ISDN) technology provides a fast, accurate and reliable means of sending and receiving voice, data, images, text, and other information through the telecom network.

ISDN uses existing analog telephone wires and divides it into separate digital channels which dramatically increases the bandwidth.

ISDN uses a single transport to carry multiple information types. What once required separate networks for voice, data, images, or video conferencing is now combined onto one common high-speed transport.

Analog versus ISDN

ISDN offers significantly higher bandwidth and speed than analog transmission because of its end-to-end digital connectivity on all transmission circuits. Being digital allows ISDN lines to provide better quality signaling than analog

POTS lines and ISDN out-of band data channel signaling offers faster call set up and tear down.

While an analog line carries only a single transmission at a time, an ISDN line can carry one or more voice, data, fax and video transmissions simultaneously.

An analog modem operating at 14.4 K takes about 4.5 minutes to transfer a 1MB data file and a 28.8K modem takes about half that time. Using one channel of an ISDN line, the transfer time is reduced to only 1 minute and if 2 ISDN channels are used, transfer time is just 30 seconds.

When transmitting data, the connect time for an average ISDN call is about 3 seconds per call, compared to about 21 seconds for the average analog modem call.

Type of ISDN service

Two types of ISDN services (lines) are available: Basic Rate Interface (BRI) and Primary Rate Interface (PRI). Each line is made up of separate channels known as B and D channels which transmit information simultaneously.

- BRI is known as “2B+D” because it consists of 2 B-channels and 1 D-channel.
- PRI is known as “23B+D” because it consists of 23 B-channels and 1 D-channel.

B channels

B channels are the bearer channel and are used to carry voice or data information and have speeds of 64 kbps. Since each ISDN line (BRI or PRI) has more than one B-channel, a user can perform more than one transmission at the same time using a single ISDN line.

D channels

The standard signaling protocol is transmitted over a dedicated data channel called the D-channel. The D-channel carries call setup and feature activation information to the destination and have speeds of 16 kbps (BRI) and 64 kbps (PRI). Data information consists of control and signal information and packet-switched data such as credit card verification.

ISDN layers

ISDN layers refer to the standards established to guide the manufacturers of ISDN equipment. The layers include both physical connections, such as wiring and logical connections, which are programmed in computer software.

When equipment is designed to the ISDN standard for one of the layers, it works with equipment for the layers above and below it.

There are three layers at work in ISDN for Norstar. To support ISDN service, all three layers must be working properly.

- Layer 1: A physical connection that supports fundamental signaling passed between the ISDN network (your service provider) and the Norstar ICS. When the LED for a loop on a BRI or PRI card that is used for a network connection is lit, your layer 1 is functioning.
- Layer 2: A logical connection between the ISDN network (your service provider) and the Norstar ICS. Norstar has two of these connections for each BRI line, one for each of the logical lines. Without Layer 2, call processing is not possible and there is no dial tone.

- Layer 3: Also a logical connection between the ISDN network (your service provider) and the Norstar ICS. For BRI lines, layer 3 is where call processing and service profile identifier (SPID) information is exchanged. This controls which central office services are available to the connection. For example, a network connection can be programmed to carry data calls.

The system of layers is important when you are installing, maintaining, and troubleshooting an ISDN system. See Problems with BRI service on page 437 for more information about working with the layers.

ISDN Bearer capability

Bearer capability describes the transmission standard used by the BRI or PRI line so that it can work within a larger ISDN hardware and software network.

The bearer capability for BRI and PRI is voice/speech, 3.1 kHz audio, and data (unrestricted 64 kbps, restricted 64 kbps, 56 kbps).

Services and features for ISDN PRI and BRI

As part of an ISDN digital network, your Modular ICS supports enhanced capabilities and features, including:

- faster call set up and tear down
- high quality voice transmission
- dial-up Internet and local area network (LAN) access
- video transmission
- network name display
- name and number blocking (PRI, BRI and analog)
- access to public protocols (only NI-1 for BRI)

PRI services and features

- call by call service selection
- dialing plan
- Emergency 911 dialing, internal extension number transmission
- access to Meridian 1 private networking SL-1 protocol

BRI services and features

- data transmission at speeds up to 128 kbps per loop (depending on the bandwidth supported by your service provider)
- shared digital lines for voice and data ISDN terminal equipment

Norstar Basic Rate Interface (BRI) cards also support D-channel packet service between a network and terminal connection. This allows you to add applications such as point-of-sale terminals without additional network connections.

Any analog or digital network connections can be shared by all Norstar telephones, peripherals and applications, and ISDN terminal equipment (TE).

Modular ICS supports the following ISDN services and features offered by ISDN service providers:

- D-channel packet service (BRI only) to support devices such as transaction terminals. Transaction terminals are used to “swipe” credit or debit cards and transmit the information to a financial institution in data packets.
- calling number identification (appears on both Norstar sets and ISDN terminal equipment with the capability to show the information)

- Multi-Line Hunt or DN Hunting which switches a call to another ISDN line if the line usually used by the Network DN is busy. (*BRI only*)
- subaddressing of terminal equipment (TE) on the same BRI loop. However, terminal equipment which supports sub-addressing is not commonly available in North America.(*BRI only*)

Transmission of B-channel packet data is not supported by Modular ICS.

Contact your ISDN service provider for more information about these services and features. Packages for ISDN service in North America are described on page 35.

The terminal equipment (TE) connected to the Norstar system can use some feature codes supported by the ISDN service provider. See “ISDN services and features” in the *Modular ICS 4.0 System Coordinator Guide* for more information.

Network name display

This feature allows ISDN to deliver the Name information of the users to those who are involved in a call that is on a public or private network. For information on system programming of this feature see, Network Name Display on page 312.

Name and number blocking

This feature suppresses the outgoing name and/or number on a call by call basis. For information on system programming of this feature see, Outgoing Name and Number Blocking on page 315.

Call by Call service selection for PRI

Call by Call service selection allows a user to access services or private facilities over a PRI line without the use of dedicated facilities. Various types of services such as FX, Tie, and

OUTWATS are available, depending on the Protocol that is selected. Outgoing calls are routed through a dedicated PRI Pool and the calls can be routed based on various schedules.

For information on system programming of this feature, see Call by Call service selection for PRI on page 316.

For services information on dialing plans and PRI, see Using a dialing plan to route outgoing PRI calls on page 272.

Refer to the hardware section for Programming Call by Call Limits on page 326.

Emergency 911 dialing

Modular ICS 4.0 with the ISDN PRI feature is capable of transmitting the telephone number and internal extension number of a calling station dialing 911 to the Public Switched Telephone Network. State and local requirements for support of Emergency 911 dialing service by Customer Premises Equipment vary. Consult your local telecommunications service provider regarding compliance with applicable laws and regulations. For most installations the following configuration rules should be followed, unless local regulations require a modification.

- All PSTN connections must be over PRI
- In order for all sets to be reachable from the PSAP, the system must be configured for DID access to all sets. In order to reduce confusion, the dial digits for each set should be configured to correspond to the set’s extension number
- The OLI digits for each set should be identical to the DID dialed digits for the set

- The System Coordinator is responsible for maintaining a site map or location directory that allows emergency personnel to rapidly locate a set given its DID number. This list should be kept up to date and readily available, and can be included in the Programming Record
- The routing table should route “911” to a public line or line pool
- If attendant notification is required, the routing table must be set up for all 911 calls to use a dedicated line which has an appearance on the attendant’s console
- The actual digit string “911” is not hard-coded into the system. More than one emergency number can be supported

Protocols supported (PRI only)

Various public and private protocols are now supported with the Norstar ICS. For more information on these protocols see Call by Call service selection for PRI on page 316.

DTI card configured as a PRI card

Two cards can now be used as PRI type cards on the Norstar ICS. A dedicated PRI card can be used or once an existing DTI card has been correctly configured, it can also be used as a PRI card. For information on configuring a DTI card as a PRI type card, see Provisioning the PRI card on page 320.

ISDN hardware

To support connections to an ISDN network and ISDN terminal equipment, your Modular ICS must be equipped with one or more BRI Cards (BRI-U or BRI-ST) a DTI card configured for PRI and a Combination Fiber 6-port Services Cartridge or a Services Cartridge.

PRI Card

DTI card configured as PRI provides one T loop. See T reference points on page 28 for more information.

In most PRI network configurations, you need one PRI card in your ICS to act as the primary clock reference. The only time when you may not have a PRI designated as the primary clock reference is in a network where your Norstar system is connected back-to-back with another switch using a PRI link. If the other switch is loop-timed to your Norstar system, your PRI card can be designated as a timing master.

If your Norstar has two PRI cards, you cannot assign both PRI cards as the primary reference or both PRI cards as the secondary reference.

You can only have one primary reference and one secondary reference per system. See Clock Src on page 345 for more information.

BRI Card

The loops on BRI-U and BRI-ST Cards can be programmed to support either network or terminal connections. This allows you to customize your arrangement of lines, voice terminals, data terminals and other ISDN equipment. This section describes some basic hardware configurations for network and terminal connections for each loop type.

Detailed wiring information for BRI and PRI network and terminal connections is included in the Installation on page 117.

BRI-U2 and BRI-U4

A BRI-U2 Card supports two loops and the BRI-U4 supports four loops. Each loop can be individually programmed to provide:

- a U-LT reference point connection for terminal equipment (TE) with built-in NT1 functionality (U interface), or
- a U-NT reference point connection for direct connection to an ISDN network

BRI-ST Card

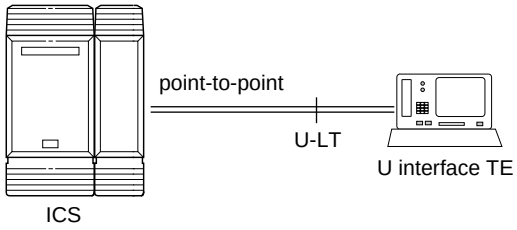
A BRI-ST Card provides four loops. Each loop can be individually programmed as:

- an S reference point connection (S loop) to ISDN terminal equipment (TE), or
- a T or S reference point connection (T loop or S loop) to an ISDN network using an external NT1

U-LT reference point

The U-LT reference point connection provides a point-to-point digital connection between Norstar and TE equipped with a U interface.

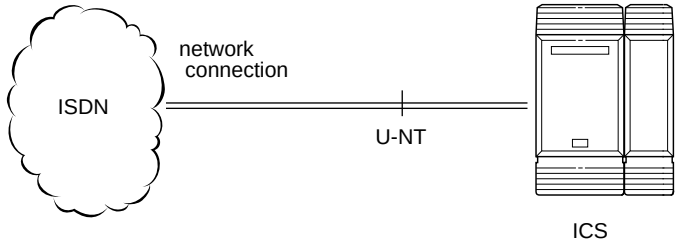
A U-LT loop supports up to eight ISDN DNs, which identify TE to the ICS.



U-NT reference points

The U-NT reference point connection provides a point-to-point digital connection between the ISDN network and the ICS.

A U-NT loop provides lines that can be used by all Norstar telephones, peripherals and applications, and ISDN TE.



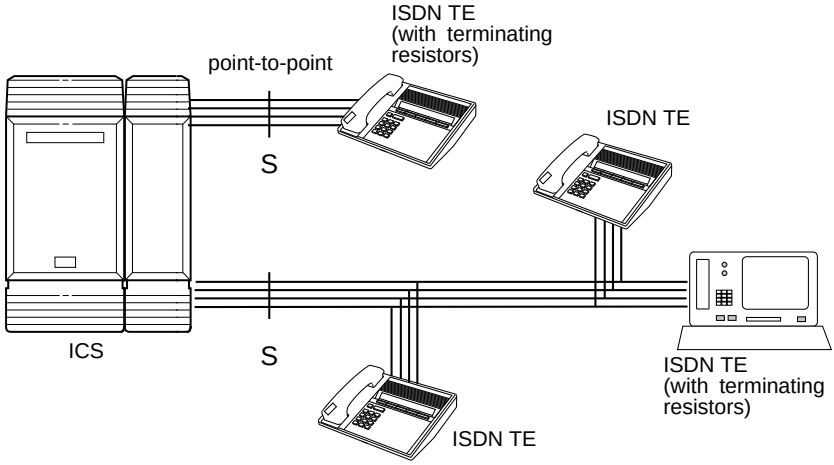
U-NT and U-LT loops can be used in combination to provide D-packet service for a point-of-sale terminal adapter (POSTA) or other D-packet device. D-packet service is a 16 kbps data transmission service that uses the D-channel of an ISDN line.

To deliver D-packet service, a network connection (U-NT) is programmed to work with a terminal connection (U-LT). The loops must be on the same physical card. For example, if the network connection is a loop found on the BRI Card in Slot 1, the terminal connection must be a loop found on the same card.

S reference point

The S reference point connection provides either a point-to-point or point-to-multipoint digital connection between Norstar and ISDN terminal equipment (TE) that uses an S interface.

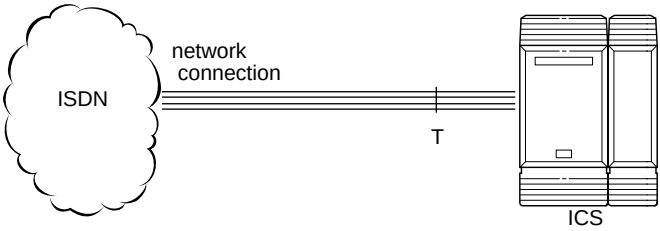
S loops support up to seven ISDN DNs, which identify TE to the ICS.



T reference points

The T reference point connections provide a point-to-point digital connection between the ISDN network and Norstar.

A T loop provides lines that can be shared by all Norstar telephones, peripherals and applications, and ISDN TE.



An T loop can be used in combination with an S loop to provide D-packet service for a point-of-sale terminal adapter

(POSTA) or other D-packet device. D-packet service is a 16 kbps data transmission service that uses the D-channel of an ISDN line.

To deliver D-packet service, a network connection (T loop) is programmed to work with a terminal connection (S loop). The loops must be on the same physical card. For example, if the network connection is a loop found on the BRI Card in Slot 1, the terminal connection must be a loop found on the same card

Clock Source for ISDN Cards

Systems with ISDN interfaces need to synchronize clocking with the ISDN network and any connected ISDN terminal equipment. Clocking synchronization is supported by either a Combination Fiber 6-port Services Cartridge or a Services Cartridge.

The Modular ICS derives timing from the network using U-NT and T reference points (loops). Terminal equipment on U-LT and S reference points (loops) derive timing from the ICS.

Systems synchronize clocking to the first available, functional, network connection. If there are excessive errors on the reference network connection, or the loop fails, the next available, functional, network connection is used for clock synchronization.

The clock synchronization process generates alarm codes and event messages. See the Alarm codes on page 377 and Event messages on page 385 for more information.

When you configure the network connections to the Modular ICS, you should take into account the system preferences for selecting loops for synchronization:

- lower numbered loops have preference over higher numbered loops
- the loop preference order is: 201, 202, 203, 204, 225, 226, 227, 228
- the system skips U-LT, S, and analog loops when selecting a network connection for synchronization

Systems with only U-LT and S loops act as timing masters for the attached terminal equipment (TE), and are not synchronized to the network. ISDN TE without access to a network connection (BRI lines) has limited or no functionality.

If your system has both a BRI and a PRI card installed it is recommended that you use PRI as the primary clock source, see PRI Card on page 25.

Other ISDN BRI equipment

NT1

The NT1 (network termination type 1) connects an S interface (four-wire) to a U interface (two-wire). In most cases, it connects loops from a BRI-ST card to the network connection, which uses the U interface. It can also connect S interface terminal equipment (TE) to the U loop from a BRI-U2 or BRI-U4 Card.

An NT1 is not required to connect from the network to BRI-U Cards or to connect U interface TE to an ICS equipped with BRI-U Cards.

The NT1 converts and reformats data so it can be transmitted to and from the S or T connection. In addition, it manages the maintenance messages travelling between the network and the NT1, and between the NT1 and the ICS.

The NT1 from Northern Telecom is packaged two ways:

- a stand alone package which contains one NT1 card (NTBX80XX) and a power supply (NTBX81XX)
- a modular package which contains up to 12 NT1 cards (NTBX83XX) and a power supply (NTBX86AA)

ISDN standards compatibility

Norstar ISDN equipment supports National ISDN standards for basic call and calling line identification services.

Norstar BRI is compliant with National-1 and PRI is compliant with National-2.

Modular ICS does not support EKTS (Electronic Key Telephone System), CACH (Call Appearance Call Handling), or Calling Name Display.

Working with ISDN

Planning your ISDN network

Consult ISDN hardware on page 24 and ISDN programming on page 36 to determine a configuration of ISDN trunks and terminal equipment (TE) for the Modular ICS, then order the appropriate ISDN capability package from your ISDN service provider.

For ISDN BRI service your service provider supplies service profile identifiers (SPIDs), network directory numbers (Network DNs), terminal endpoint identifiers (TEIs), and other information as required to program your Modular ICS, TE and other ISDN equipment.

Modular ICS does not support any package with EKTS (Electronic Key Telephone System), CACH (Call Appearance Call Handling), or Calling Name Display. EKTS is a package of features provided by the service provider and may include features such as Call Forwarding, Link, Three-Way Calling, and Calling Party Identification.

Ordering ISDN PRI

Ordering ISDN PRI service in Canada

In Canada, order Megalink™ service, the trade name for standard PRI service and set the Norstar equipment to the supported protocol that is identified by your service provider, either DMS-100 or NI-2.

Ordering ISDN PRI service in United States

In the United States order PRI service from your service provider. Set the Norstar equipment to the PRI protocol provided by your service provider.

Ordering ISDN BRI

Ordering service in Canada

In Canada, order Microlink™ service, the trade name for standard BRI service. You can order either regular Microlink™ service, which includes the CLID (Calling Line Identification) feature, or Centrex Microlink™, which includes access to additional ISDN network features (including Call Forwarding).

When ordering Microlink™ service, it must be ordered with EKTS (Electronic Key Telephone System) turned off. If you will be using a point-of-sale terminal adapter (POSTA), ask for D-packet service to be enabled.

Ordering ISDN service in the U.S.

In the U.S., regardless of the CO (Central Office) type, order National ISDN BRI-NI-1 with EKTS (Electronic Key Telephone System) turned off. Use the following packages as a guideline for ordering your National ISDN BRI-NI-1. However we recommend using packages M or P with the Modular ICS. Contact your service provider for more information about the capability packages it offers. Bellcore/

National ISDN Users Forum (NIUF ISDN packages supported by Modular ICS (for ordering in U.S.)

	Capability	Feature set	Optional features	Point-of-sale	Voice	Data
M	Alternate voice/circuit-switched data on both B-channels	--	calling line identification	--	✓	✓
P	Alternate voice/circuit-switched data on both B-channels D-channel packet	flexible calling for voice (not supported by Modular ICS) Basic D-Channel Packet	additional call offering (not supported by Modular ICS) calling line identification	✓	✓	✓

If you want to transmit both voice and data, and support D-channel packet service, order package P. However, Modular ICS does not support the flexible calling for voice and additional call offering features that are included in package P.

Multi-Line Hunt may be ordered with your package. When a telephone number (the Network DN) in the group of numbers assigned by your service providers is busy, the Multi-Line Hunt feature connects the call to another telephone number in the group. Norstar supports the feature only on point-to-point, network connections (T loop or U-NT loop). Check with your service provider for more information about Multi-Line Hunt.

Any of the ISDN packages will allow you to use sub-addressing, but your ISDN TE must be equipped to use sub-addressing for the feature to work.

Supported ISDN protocols

The switch used by your service provider must be running the appropriate protocol software and the correct version of that software to support ISDN PRI and ISDN BRI. Each protocol is different and supports different services. Contact your service provider to make sure that your ISDN connection has the protocol you require.

For more information on the supported protocols and services, refer to Call by Call service selection for PRI on page 316.

ISDN programming

Most of the configuration programming for PRI and BRI lines and ISDN terminals and devices is done under Hardware. This section gives you an overview of programming for PRI and BRI lines, ISDN terminals and devices, and D-packet service.

PRI or BRI programming activity	Programming heading
View or change the card configuration for each slot in the ICS	Hardware
Provision or pre-provision loops and lines	Provisioning
Enable or disable BRI or PRI card	Module status
View status of line, loop or port	Port/DN status

Programming ISDN PRI resources

Some steps will not be necessary depending on the service you are providing.

More detailed information is included under the individual headings and settings in the Programming and Maintenance sections.

For complete card and cartridge installation instructions and safety precautions, see Installation on page 117.

1. Collect the information supplied by your service provider to support your ISDN package.
2. Make sure a Combination Fiber 6-port Services Cartridge, or a Services Cartridge is installed in the ICS.
3. Install the DTI cards in the ICS, Trunk Module (see Installing the cartridges on page 121 for information about PRI card placement), or determine which type of card you will preprogram the ICS to use in each slot.
4. Disable each card under Maintenance.
5. Select a card type (PRI) in Hardware. See page 312 for information on protocol and other settings you must configure.
6. Re-enable the card in Maintenance. If required, the card goes through a firmware download process, which takes five to six minutes. During a firmware download, the bottom LED on the DTI card flashes.

Programming ISDN BRI resources

Some steps will not be necessary depending on the service you are providing.

More detailed information is included under the individual headings and settings in the Programming and Maintenance sections.

For complete card and cartridge installation instructions and safety precautions, see Installation on page 117.

1. Collect the information supplied by your service provider to support your ISDN package. This includes network service profile identifiers (SPIDs) and Network DNs. If

you are supporting a point-of-sale terminal adapter, you also need one or more terminal endpoint identifiers (TEIs).

2. Make sure a Combination Fiber 6-port Services Cartridge, or a Services Cartridge is installed in the ICS.
3. Install the BRI card in the ICS, Trunk Module (see Installing the cartridges on page 121 for information about BRI card placement), or determine which type of card you will preprogram the ICS to use in each slot.
4. Disable each card under Maintenance.
5. Select a card type (BRI-ST, BRI-U2, BRI-U4) in Hardware.
6. Select the type for each loop in Hardware:

   For a BRI card select T or S if the card type is BRI-ST. Select LT or NT if the card type is BRI-U2 or BRI-U4.

7. If the card uses an S, T or NT loop, enter the following configuration information as supplied by your service provider: the SPID assigned to the loop, the number of B-channels associated with each SPID, the Network DNs used with the network SPID, and the call type of the Network DN. Repeat the programming for the second network SPID, if any.

   If the S, T or NT loop is used for D-packet service: turn on the service, assign the appropriate S-loop mapping (for BRI-ST cards) or LT-loop mapping (for BRI-U2 or U4 cards), and assign the TEIs (provided by the telco to support a point-of-sale terminal adapter or other D-packet service device) to the loop.

   If the loop type is S, select the sampling used on the loop.

If the loop type is S or LT, assign ISDN DNs to the loop and designate one of the assigned ISDN DNs to be the DN for the loop (Loop DN).

Note: You can have a maximum of thirty ISDN DNs on your system. The default ISDN DN range is 667–696. To change ISDN DN type, see See “Change DNs” on page 292.

8. Re-enable the card in Maintenance. If required, the card goes through a firmware download process, which takes five to six minutes. During a firmware download, the bottom LED on the BRI Card flashes.
9. Provision the loops and lines as appropriate in Maintenance programming. See “Provisioning” on page 392.
10. If you are configuring auto-answer BRI trunks to map to target lines, program the received number for the target line (a setting found under Lines) to be the same as the Network DN supplied by your service provider.

Assign the ISDN lines and target lines to the appropriate ISDN DNs (the set of DNs reserved for use by ISDN devices) under Line access, a subheading of Terminals&Sets. ISDN lines can also be assigned to the DNs used by Norstar telephones or any other devices connected to the Modular ICS.

Program the ISDN terminals and devices with the appropriate ISDN DNs and terminal SPIDs by following the instructions that come with the devices. For more information see Programming ISDN equipment on page 42. If you are setting up a D-packet service, program the point-of-sale terminal adapter or other D-packet service device with the appropriate TEI (provided by your service

provider), terminal SPID, and DN by following the instructions that come with the device.

Programming ISDN PRI lines

When the configuration programming under Hardware is complete, your PRI lines are ready to be programmed. For information on programming your PRI lines, see Call by Call service selection for PRI on page 316.

Programming ISDN BRI lines

When the configuration programming under Hardware is complete, your BRI lines are ready to be programmed in the same way as analog lines. You can, for example, place them in pools and assign them to Norstar sets and ISDN terminal equipment. However, there are some differences in the way BRI lines work that will influence how you configure them to handle incoming and outgoing calls.

For BRI lines, in most cases, your service provider supplies two SPIDs – one for each B channel. Each SPID and one or more Network DNs are associated with a single line. Calls to a Network DN come in on a specific line, and pressing a line button selects the same line every time.

If your service provider supplies you with a single SPID for both B channels, incoming and outgoing calls are handled according to the loop. The two lines provided by the BRI loop are “pooled” for both incoming and outgoing calls.

For example, if Loop 201is programmed with a single SPID, which supports lines 001 and 002, incoming calls made to a Network DN associated with the SPID appear on either line 001 or line 002. If you press the line button for line 001, either line 001 or line 002 is selected. For loops which use a single SPID, assign both lines on a loop to a set to guarantee that all calls appear at the set.

Programming Direct Inward System Access (DISA) on PRI trunks

When a trunk cartridge is set to PRI, all lines on that trunk are set to Auto Answer without Direct Inward System Access (DISA). DISA can however be accessed by one of two methods.

1) Define the DISA DN to match the trailing digits of the Called Party Number (CDN).

With Public, Private, and Tie service types, the CDN is simply truncated to the Target Line Receive Digit Length and is parsed to match the Target Line Receive Digits. DISA can be accessed by having the DISA DN match the trailing digits of the CDN. For example, with a Receive Digit Length = 4, and DISA DN = 1234, a call made to Public DN 763-1234 will be handled as follows:

- the ISDN setup message will contain a CDN of 763-1234
- the CDN will be truncated to the 4 digits, 1234
- 1234 matches the DISA DN
- the call will be answered with DISA

2) Use incoming Call by Call (CbC) Service routing to map the call type to the DISA DN. Refer to Programming Call by Call service selection on page 319 for more information.

With FX, INWATS, 900, and SDS service types, either a Service Id (SID) or a CDN is mapped to Target Line Receive Digits.

This is programmed under Call-by-Call Routing. DISA may be accessed by having the SID or CDN map to the DISA DN. This example has a Receive Digit Length = 4,

DISA DN = 1234, and CbC Routing with (Service Type = FX, Map from SID = 2, Map to digits = 1234).

A call presented to the Norstar system with service type FX and SID 2 will be handled as follows:

- The ISDN setup message will specify FX with SID = 2
- The FX SID = 2 will be mapped to DISA DN digits 1234

  The call will be answered with DISA

Programming ISDN equipment

PRI cards support various applications that are enabled by PRI. For a list of the type of applications that are support, see ISDN applications on page 89.

Terminal equipment for BRI cards

Unlike Norstar sets, ISDN devices and terminals connected to the ICS must be configured under the Hardware heading in system programming. You choose directory numbers for ISDN equipment from a pre-determined range of DNs (667-696). Any of the ISDN DNs can be assigned to any U-LT or S loop, but each can only be assigned to one loop and a single device.

Devices on an S or LT loop (BRI cards only)

Terminal equipment using a U-LT loop or S loop must be assigned an ISDN directory number (ISDN DN). This allows the TE to be assigned lines and to communicate with other devices connected to the ICS. Each DN can be assigned to only one TE and one loop.

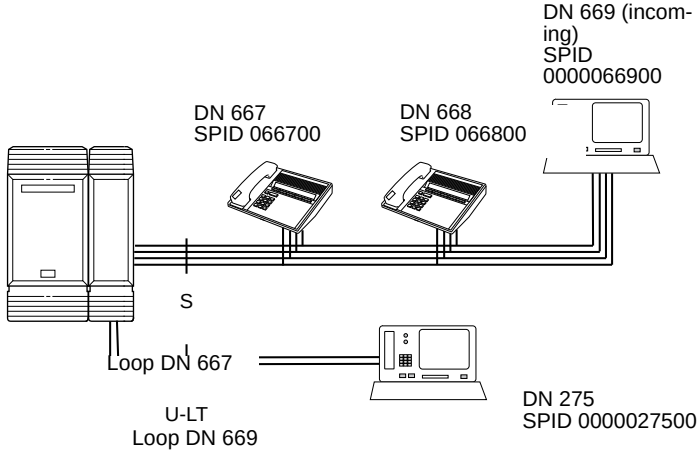
You assign ISDN DNs to S loops and LT loops under Assign DNs in Hardware programming. Each S or LT loop can be programmed with eight ISDN DNs, but you cannot exceed a total of thirty ISDN DNs for the Modular ICS.

Once you have assigned ISDN DNs to a loop, designate one of the DNs as a Loop DN. The Loop DN acts as a main ISDN DN and completes the configuration of the loop.

The ISDN terminal equipment (TE) on the loop is also programmed with its ISDN DN. See the instructions that come with the ISDN device for information on how to program it to recognize its assigned DN. Most devices will require both a terminal service profile identifier (terminal SPID) and a DN, and some will require two terminal SPIDs and two ISDN DNs. The SPID used with the device should not be confused with a SPID used for network connections using an T or NT loop.

To create a terminal SPID for a device, add at least two zeros to the end of the of the ISDN DN. Add more zeros to the beginning or end of the ISDN DN until you have the length of SPID required by the TE. For example, if an ISDN telephone requires a six-digit SPID and has a DN of 667, its SPID is 066700. If the same TE requires a minimum of ten digits, the SPID is 0000066700.

Most ISDN terminals require a five-digit SPID. An ISDN PC card usually requires a ten-digit SPID. Follow the directions that come with the ISDN device to program it with a SPID and ISDN DN.

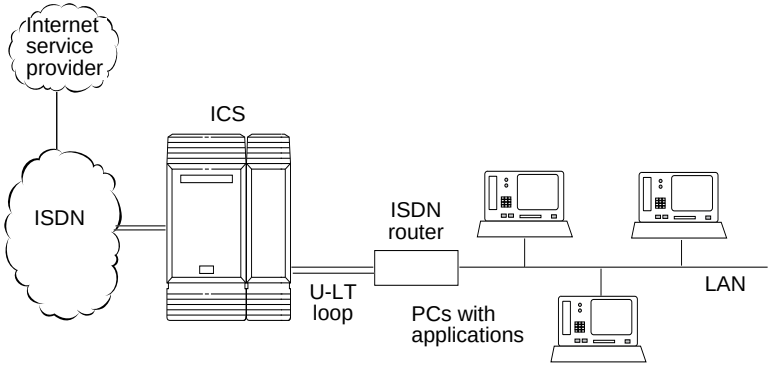


The following table uses the example in the illustration to show the programming for the S loop.

Setting	Option
Loop	201
Type	S
Sampling	Fixed
DNs on Loop 201: Assign DNs	667: Assigned 668: Assigned 669: Assigned 670: Assigned
Loop DN	667

ISDN router

By connecting an ISDN router to your Modular ICS, a group of PCs can share Internet access. This arrangement is best for a workplace where each PC occasionally uses an Internet connection.



To support Internet access, you must order BRI lines from your service provider, and subscribe to Internet service from an Internet service provider (ISP). Your PCs must have an Internet browser and any applications supplied by your ISP.

D-packet service (BRI cards only)

The D-packet service supplied by the Modular ICS supports a point-of-sale terminal adapter (POSTA). Connecting a POSTA allows transaction terminals (devices where you “swipe” credit or debit cards) to transmit information using the D channel of the BRI line, while the B channels of the BRI line remain available for voice and data calls. A special adapter links transaction equipment (such as cash registers, credit card verification rigs, and point-of-sale terminals) to the X.25 network, a data communications network designed to transmit information in the form of small data packets.

To support the D-packet service, your ISDN network and financial institution must be equipped with a D-packet handler. To convert the protocol used by the transaction equipment to the X.25 protocol, your ISDN network must also be equipped with an integrated X.25 PAD which works with the following versions of X.25: Datapac 32011, CCITT, T3POS, ITT and API. The ISDN service package you order must include D-packet service (for example, Package P in the U.S.; Microlink™ with D-channel in Canada).

Your service provider supplies a Terminal Endpoint Identifier (TEI) and DN to support D-packet service. The TEI is a number between 00 and 63 (in Canada, the default range is 21-63). Your service provider may also supply you with a DN to program your D-packet device. The DN for D-packet service becomes part of the dialing string used by the D-packet to call the packet handler.

POSTA for ISDN BRI

When you configure D-channel packet service, you are specifying the transmission path between an ISDN loop on the network side of the ICS and the ISDN loop on the set side (the loop used by the point-of-sale terminal adapter). The service is turned on and configured using the network loop

programming found under Hardware (NT loop for BRI-U2 and BRI-U4 Cards; S or T loop for BRI-ST Cards).

To set up D-packet service:

- go to the programming settings for the network loop (S, T, or NT loop) under Hardware
- select the S loop or LT loop used by the POSTA
- enter the terminal endpoint identifiers (TEIs) supplied by your service provider

Point-of-sale terminal adapter

The point-of-sale terminal adapter is an analog device that connects to point-of-sale devices using an RS-232 interface and a U-LT loop. It handles the routing of packet information from the devices to the ICS and into the ISDN network.

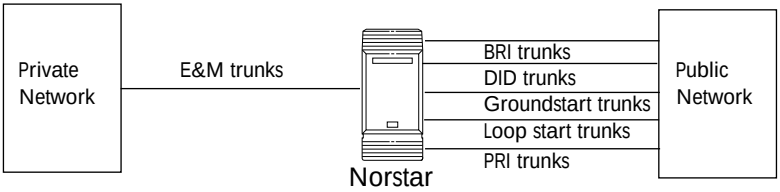
Your service provider (usually a financial institution) supplies you with information about the compatible controller, which handles the routing of packet information from the devices to the ICS and into the ISDN network.

Networking with Norstar

In addition to public network connections, Norstar Modular ICS can be integrated into an existing private network or to other Norstar systems to form a corporate telecommunications network.

The big picture

Norstar uses enhanced trunking to join other Norstar or customer equipment in a private network. Authorized users can also access tie lines, central office lines, and Norstar features from outside the Norstar system.



Callers using the Norstar Modular ICS system can:

- call directly to a specific Norstar telephone
- select an outgoing tie line to access a private network
- select an outgoing tie line to access features that are available on the private network
- select an outgoing central office line to access the public network
- use all of the Norstar features.

Callers in the public network can:

- call directly to one or more Norstar telephones

- call into the Norstar system and select an outgoing tie line to access a private network
- call into the Norstar system and select an outgoing central office line to access the public network
- call into the Norstar system and use remote features.

Callers in the private network can:

- call directly to one or more Norstar telephones
- call into the Norstar system and select an outgoing tie line to access other nodes in a private network
- call into the Norstar system and select an outgoing central office line to access the public network
- call into the Norstar system and use remote features.

Norstar behind a PBX

Norstar Modular ICS can be used behind a PBX. In order to support this application, the trunk lines must be set up not to exceed 8 dB total loop loss from the serving central office to the connection point at the Norstar ICS.

Networking a Norstar system with the Meridian M1 over PRI

Benefits

Some of the benefits of networking Norstar and Meridian M1 over PRI include

- common dialing plan
- centralized PSTN trunking (Norstar users can share the M1's PSTN trunks with M1 users)
- PRI networks can be used for voice, data, and video calls
- no usage costs when placing calls over private networks

Trunks and target lines

Trunks are external lines that provide the physical connection between a Norstar system and other systems in a private or public network. Trunks are numbered 001 to 144 (in a fully expanded system). Norstar Modular ICS supports 6 different types of trunks:

- PRI trunks are used for incoming and outgoing calls (two-way DID). Incoming calls are routed directly to a Norstar telephone. Outgoing calls are made using the intercom key.
- TI trunks are digital trunks that can be configured to act as loop start, ground start, E&M, DID, or leased lines depending on your requirements.
- DID trunks route incoming calls from the public network directly to telephones within Norstar, without an attendant.
- Loop start trunks handle incoming and outgoing calls between Norstar and the public network.
- E&M trunks handle incoming and outgoing traffic between the Norstar system and the private network.
- BRI trunks handle incoming and outgoing calls between Norstar and an ISDN network.

Target lines are virtual communication paths between trunks and telephones on the Norstar system. They are incoming lines only, and cannot be selected for outgoing calls. With 192 target lines in a fully expanded system, you can concentrate incoming calls on fewer trunks. This type of concentration is an advantage of DID lines, and Norstar target lines allow you to direct each DID number to one or more telephones. Target lines are numbered 145 to 336 in a fully expanded system and 145 to 272 in all others.

Telephones can be configured to have an appearance of any type of trunk and line (including target lines, excluding PRI trunks). If assigned, they are used for monitoring call usage.

PRI trunks

Primary Rate Interface (PRI) trunks give you incoming and outgoing access to an ISDN network and are auto-answer trunks.

Note: PRI trunks are set to auto-answer by default and can not be changed.

PRI trunks provide a fast, accurate and reliable means of sending and receiving data, images, text and voice information. Using PRI lines allows for faster transmission speeds and the addition of a variety of powerful business applications, including remote LAN access, video conferencing, file transfer and Internet access.

For more information see Welcome to ISDN on page 17, Call by Call service selection for PRI on page 22,and Call by Call service selection for PRI on page 316.

Ground start trunks (T1 only)

Ground start trunks offer the same features as loop start trunks, but are used when the local service provider does not support disconnect supervision for the digital loop start trunks. Ground start trunks work with T1 only. There are 4 operating modes:

- ground start (T1 only)
- loopstart (analog and T1)
- E&M (analog and T1)
- DID (analog and T1)

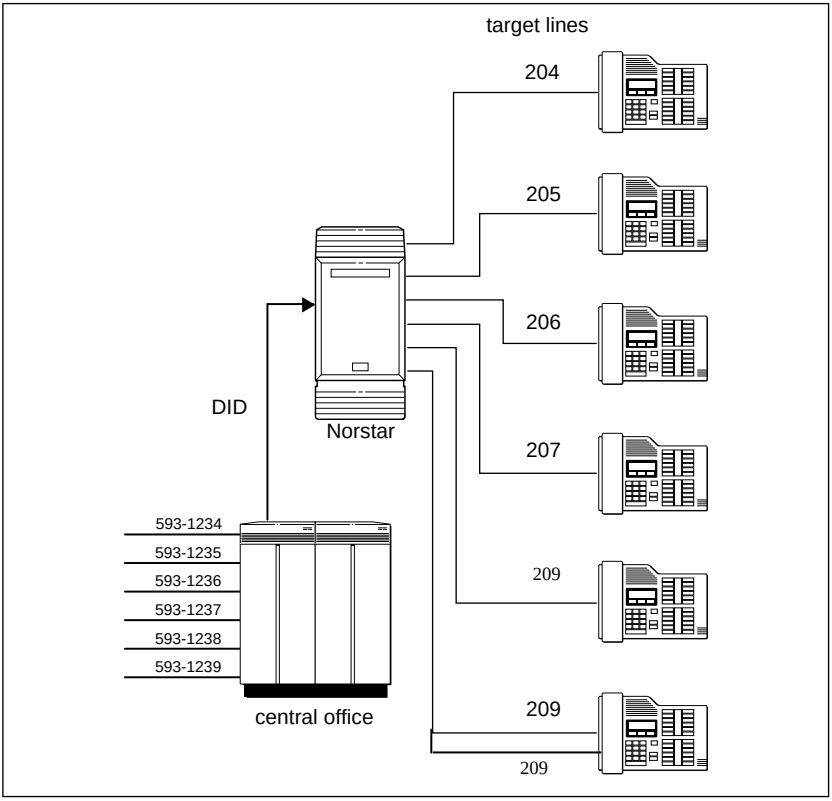
By configuring lines as ground start, the system will be able to recognize when a call is released at the far end.

Tips - *You cannot change the trunk mode for a ground start trunk on a DTI. It always has disconnect supervision.*

A DTI can provide a maximum of 24 ground start trunks. Analog ground start trunks are not supported.

DID trunks

DID trunks give you direct inward dialing (DID) from the public network. A typical application of these trunks is to map incoming digits onto target line appearances within the Norstar system. DID trunks can operate only as auto-answer trunks.



When a call comes in on a DID trunk, the Norstar system interprets the incoming digits in one of the following ways.

- If the digits map onto a target line, the call is routed to all telephones with an appearance of that target line.
- If the digits map onto the DISA DN, the caller hears stuttered dial tone. They must enter a 6-digit Class of Service password from a DTMF telephone to hear system dial tone. They can then enter a target line number, a line pool access code, or a remote feature code.
- If the digits map onto the Auto DN, the caller hears system dial tone. They can then enter a target line number, the DISA DN (the number that will call for a Class of Service password), a line pool access code, or a remote feature code from a DTMF telephone.

Tips - *Each DID Trunk Cartridge can provide four DID trunks. Each DID Trunk Cartridge also has four DTMF receivers dedicated to those trunks. A DTI can provide up to 24 DID trunks.*

You cannot configure a DID trunk as the prime line for a Norstar telephone.

The capabilities available to a remote caller are determined by the remote filters and remote package assigned to a line, or by the set restrictions, line restrictions and remote package assigned to the Class of Service password.

Analog loop start trunks

Loop start trunks give you incoming and outgoing access to the public network. Loop start trunks can be configured as manual-answer or auto-answer. The answer mode determines how the system handles incoming calls.

When a call comes in on a manual-answer loop start trunk, it alerts at all telephones with that line appearance.

When a call comes in on an auto-answer loop start trunk that is configured to answer with direct inward system access (DISA), the caller hears a stuttered dial tone. They must enter a six-digit Class of Service (COS) password from a dual tone multifrequency (DTMF) telephone to access system dial tone. Once the caller has system dial tone, they can then enter a target line number, a line pool access code, or a remote feature code.

By default, auto answer loop start trunks are configured to answer with DISA, and are used to provide controlled access to Norstar system resources.

When a call comes in on an auto-answer loop start trunk that is not configured to answer with DISA, the caller hears system dial tone. They can then enter a target line number, the DISA DN (the number that will call for a Class of Service password), a line pool access code, or a remote feature code from a DTMF telephone.

To place an outgoing call, a loop start line can be selected by pressing a line button on the telephone, dialing a line pool access code, or pressing a memory button that has been programmed with a line pool access code.

Tips - *Loop start signaling is supported by Loop Start Trunk Cartridges, Call Information (CI) Trunk Cartridges and Digital Trunk Interfaces (DTI). Each Loop Start Trunk Cartridge or CI Trunk Cartridge can provide four loop start trunks. A DTI can provide up to 24 loop start trunks. If you wish to configure your loop start trunks as auto-answer, the trunks must have disconnect supervision.*

For Loop Start or CI Trunk Cartridges installed in a Trunk Module, you will also need one E&M/DISA Trunk Cartridge for every two loop start trunks that you configure as auto-answer. The E&M/DISA Trunk Cartridge provides two DTMF receivers to receive the incoming digits from the central office. An auto-answer loop start trunk can give you the same kind of direct inward dialing function as a DID trunk.

If your system includes both loop start trunks and DID trunks, you would typically use loop start trunks for outgoing calls and DID trunks for incoming calls.

You may configure a loop start trunk as the prime line for a Norstar telephone.

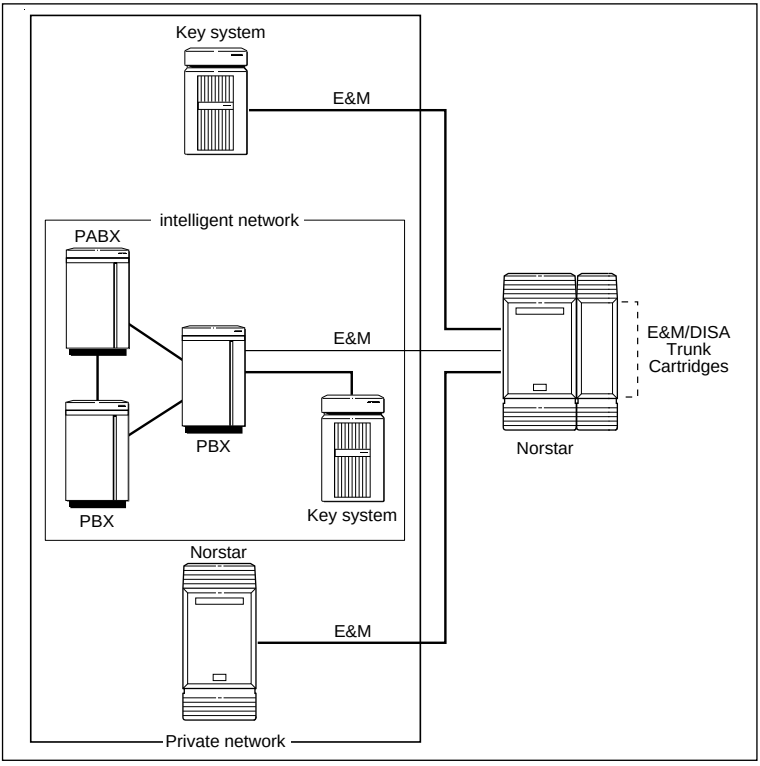
The capabilities available to a remote caller are determined by the remote filters and remote package assigned to a line, or by the set restrictions, line restrictions and remote package assigned to the Class of Service password.

Two loopstart trunk cartridges are compatible with MICS-XC 4.0. The NT5B40GA-93 can be installed in trunk module (TM) slots only. The NT7B75GA-93 can be installed in either core slots three or four, or TM slots one, two or three.

Analog E&M trunks

An Analog E&M trunk gives you incoming and outgoing access to other systems in a private network. E&M trunks can be configured as manual-answer or auto-answer. The answer mode determines how the system handles incoming calls.

By default, auto-answer E&M trunks are answered by the system with direct inward system access (DISA), and are used to provide controlled access to Norstar system resources.



When a call comes in on a manual-answer E&M trunk, it alerts at all telephones with that line appearance.

When a call comes in on an auto-answer E&M trunk that is configured to answer with DISA, the caller hears stuttered dial tone. They must enter a 6-digit Class of Service password from a DTMF telephone to hear system dial tone. They can then enter a target line number, a line pool access code, or a remote feature code.

When a call comes in on an auto-answer E&M trunk that is not configured to answer with DISA, the caller hears system dial tone. They can then enter a target line number, the DISA DN (the number that will call for a Class of Service password), a line pool access code, or a remote feature code from a DTMF telephone.

To place an outgoing call, an E&M trunk can be selected by pressing a line button on the telephone, dialing a line pool access code, or pressing a memory button that has been programmed with a line pool access code.

Tips - *Each E&M/DISA Trunk Cartridge can provide two E&M trunks. A DTI can provide up to 24 E&M trunks.*

For Loop Start or CI Trunk Cartridges installed in a Trunk Module, you need one E&M/DISA Trunk Cartridge for every two loop start trunks that you configure as auto-answer. The E&M/DISA Trunk Cartridge provides two DTMF receivers to receive the incoming digits from the central office.

You can configure an E&M trunk as the prime line for a Norstar telephone.

The capabilities available to a remote caller are determined by the remote filters and remote package assigned to a line, or by the set restrictions, line restrictions and remote package assigned to the Class of Service password.

BRI trunks

BRI trunks give you incoming and outgoing access to an ISDN network. Like loop start trunks, they can be configured as manual-answer or auto-answer. See Ans mode on page 243.

BRI trunks provide a fast, accurate and reliable means of sending and receiving data, images, text and voice information. Using BRI lines allows for faster transmission speeds and the addition of a variety of powerful business applications, including remote LAN access, video conferencing, file transfer and Internet access.

For more information see Welcome to ISDN on page 17.

Target lines

A target line is a specific communication path that is reached by means of digits received from an incoming trunk. Target lines are used to answer incoming calls but cannot be used to make outgoing calls.

You can program auto-answer loop start and E&M trunks, and DID trunks to map to target lines to provide for attendant bypass (calling directly to a department or individual) and line concentration (one trunk can map onto several target lines).

With all templates except the DID template, by default no target lines are assigned to sets.

Target lines are referred to by line numbers (145-336 or 145-272) in the same way as physical lines.

Remote system access

The remote access feature allows callers elsewhere on the private or the public network to access a Norstar system by dialing directly without going through an attendant. Once in the system, the remote user can use some of the system's resources. The remote access must be enabled in programming before callers can use it.

Norstar systems support remote system access on the following trunk types which may require the remote caller to enter a password for direct inward system access (DISA):

- auto-answer loop start trunks
- auto-answer E&M trunks
- DID trunks (by means of the DISA DN)
- PRI trunks (by means of the DISA DN)

The system resources (dialing capabilities, line pool access and feature access) that a remote user may access depends on the Class of Service (COS) assigned to them. See Class of Service on page 61, COS pswds on page 279 and the *Modular ICS 4.0 System Coordinator Guide* for more details.

To use features on a Norstar system remotely, press [*] followed by the feature code. Even if you are calling from another Norstar system, press [*] instead of [Feature].

Remote access on loop start and E&M trunks

Loop start trunks provide remote access to Norstar from the public network; E&M trunks provide remote access from a private network. Each must be configured to be auto-answer to provide remote system access.

A loop start trunk **must** have disconnect supervision if it is to operate in auto-answer mode. E&M trunks always operate in disconnect supervised mode.

When a caller dials into the system on a line that has auto-answer, the system answers with system dial tone and no (COS) password is required. In this case, control over the system capabilities available to the caller is provided only by the restriction filters assigned to the line.

When a caller dials in on a line that has auto-answer with DISA, the system answers with stuttered dial tone. This is the prompt to enter a COS password which determines which system capabilities are available to the caller.

Remote access on a private network

Nodes on the private network deliver the last dialed digits to the destination Norstar node, for interpretation by the destination Norstar node. The destination Norstar node either matches the digits to a target line or interprets the digits as a remote feature request. The call is either routed to the specified target line, or the remote feature is activated.

By default, E&M trunks are set to answer with DISA. For auto-answer E&M trunks connected to a private network, change the default so that the trunks are **not** answered with DISA.

If an auto-answer E&M trunk is configured to answer with DISA, the system tries to interpret any received digits as a COS password.

The DISA DN and the Auto DN allow auto-answer private network and DID calls, in the same way that calls on auto-answer loop start and auto-answer E&M trunks can be

answered, with or without DISA. These DNs are described in System prgming under Access codes.

Remote access on Direct Inward Dial (DID) trunks

Remote system access on DID trunks is similar to that of E&M trunks connected to a private network. The main differences are:

- a remote caller is on the public network dialing standard local or long-distance telephone numbers
- the digits received are delivered by the central office
- DISA cannot be administered to a DID trunk

As with a private network, the dialed digits may be programmed to match those of a specific target line DN, the DISA DN or the Auto DN.

Remote access on PRI trunks

Remote system access on PRI trunks is similar to that of E&M trunks connected to a private network. The main differences are:

- a remote caller is on the public network dialing standard local or long-distance telephone numbers
- the digits received are delivered by the central office
- answer with DISA cannot be administered to a PRI trunk

As with a private network, the dialed digits may be programmed to match those of a specific target line DN, the DISA DN or the Auto DN.

Networking features

Security

Programming provides several ways of protecting your Norstar system from unauthorized access or use.

Class of Service

Class of Service (COS) refers to the capabilities that Norstar provides to users who access the system from the public or private network. The COS includes:

- filters that restrict dialing on the line
- an access package, which defines the set of line pools that may be accessed and whether or not the user has access to the paging feature.

The COS that is applied to an incoming remote access call is determined by:

- the filters that you apply to the incoming trunk
- the Class of Service password that the caller used to gain access to the Norstar system.

In cases where DISA is not automatically applied to incoming calls, the remote caller can change the COS by dialing the DISA DN and entering a COS password.

To program COS passwords, see Passwords on page 279 and the *Modular ICS 4.0 System Coordinator Guide*.

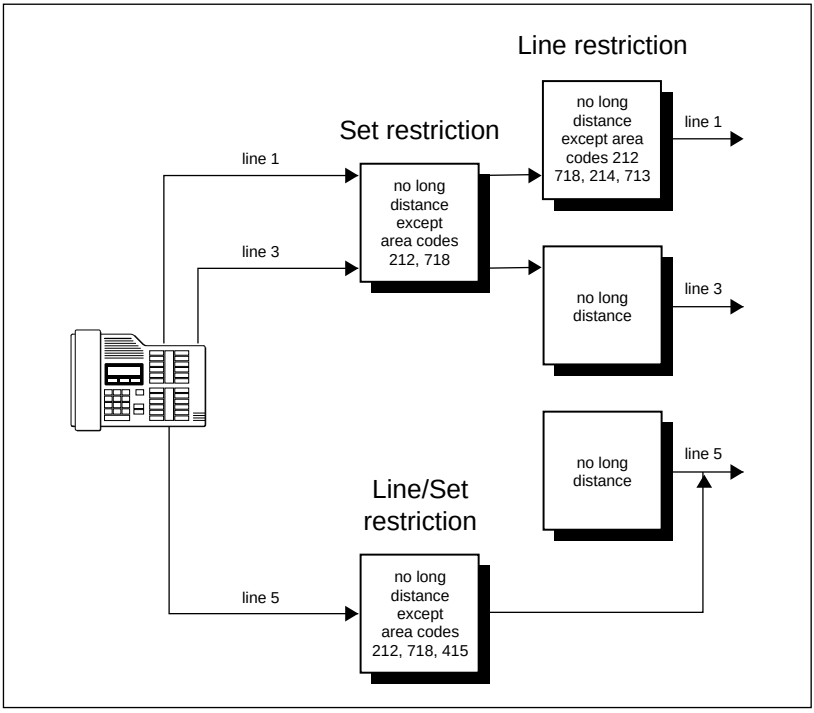
Restriction filters

Restriction filters can be used to restrict the numbers that may be dialed on any external line within your Norstar system. Up to 100 restriction filters can be created for the system.

A restriction filter consists of up to 48 restrictions and their associated overrides.

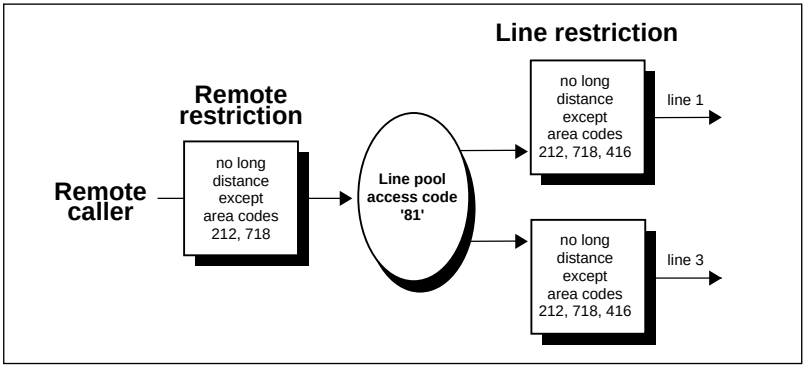
To restrict dialing within the system, you can apply restriction filters to outgoing external lines (as line restrictions), to telephones (as set restrictions), and to external lines on specific telephones (as line/set restrictions).

Restriction filters can also be specified in Restriction Service, for times when the system is operating according to a Schedule. See Services on page 253 for more details.



Dialed digits must pass both the line restrictions and the set restrictions. The line/set restriction overrides the line restriction and set restriction.

In the previous diagram, a caller using line 1 could only dial long-distance numbers to area codes 212 and 718. A caller using line 3 could not dial any long-distance numbers. A caller using line 5 could dial long-distance numbers to area codes 212, 718, and 415.



Tips - *Set restrictions have no effect on numbers dialed on an E&M trunk.*

To restrict dialing outside the system (once a caller gains remote access), you can apply restriction filters to incoming external lines (as remote restrictions).

In this case, dialed digits must pass both the remote restriction and the line restriction. A remote caller can override these filters by dialing the DISA DN and entering a COS password.

For restriction filter programming instructions, see Restrictions on page 224 and the *Modular ICS 4.0 System Coordinator Guide*.

Direct inward system access (DISA)

To control access from the public or private network, you can configure auto-answer trunks to answer with DISA. Remote callers hear a stuttered dial tone and must then enter a COS

password that determines what they are allowed to do in the system.

Auto-answer loop start and E&M trunks are configured to answer with DISA by default. For DISA programming instructions, see Ans with DISA on page 244.

Tips - *You must have one E&M/DISA Trunk Cartridge to provide DTMF receivers for every two auto-answer loop start trunks on Loop Start or CI Trunk Cartridges.*

DID trunks cannot be configured to answer with DISA. If you want incoming DID calls to be answered with DISA, configure the system with a DISA DN. Incoming DID calls that map onto the DISA DN are then routed to a line that has DISA.

For DISA programming instructions, see Ans with DISA on page 244.

Transparent dialing plan

The Norstar system has a routing feature that allows you to set up a transparent or coordinated dialing plan with other systems in a public or private network. The goal is to have a network-wide dialing plan where all DN numbers are unique and of a uniform length.

- all set numbers in the network are the same length
- a set can be reached using a set number regardless of where the call originates in the network

Dialing plans are typically used with a network of systems with three to seven digit dialing access between them.

Any programming for routing should be carefully planned using the tables supplied with the *Programming Record*. The settings for routing and destination codes are fully explained

in Services on page 253. This section deals with applying the programming in network situations.

Dialing plan using public lines

For example if you have a system in a network of three offices such as New York, Toronto and Santa Clara and they do not have routing, you would need to do one of the following:

- A Norstar user in New York would have to select a line pool and dial a number such as 1-416-555-3227 to reach set 3227 in Toronto (416).

If you do have routing:

- you could create a destination code of 3 and create a route that uses the proper line pool and DialOut, and the user simply dials 3227 (string dialed by the caller is the same as the called party's intercom DN).

In the DialOut, P stands for pause, a host system signalling option. Press [Feature] [7] [8] to insert a 1.5 second pause in the dialing string. See the *Modular ICS 4.0 System Coordinator Guide* for information about other signals.

Destination code numbering in a network

Because the system checks the initial digits of a call against the routing tables, each type of internal or external call must begin with a unique pattern of digits. The following table gives a sample plan for how initial digits are assigned in a network of systems with three-digit intercom numbers. For PRI there are no pool codes or separate external access codes.

Leading Digits	Use
0	Network Direct Dial
221-253	Intercom calls
4	Coordinated Dialing Plan

Leading Digits	Use
5	Unused
6	Unused
8	Call Park Prefix
9	All PSTN Calls

In the table, 4 is used as the initial digit for the Coordinated Dialing Plan, but 5, or 6 could also be used for this purpose.

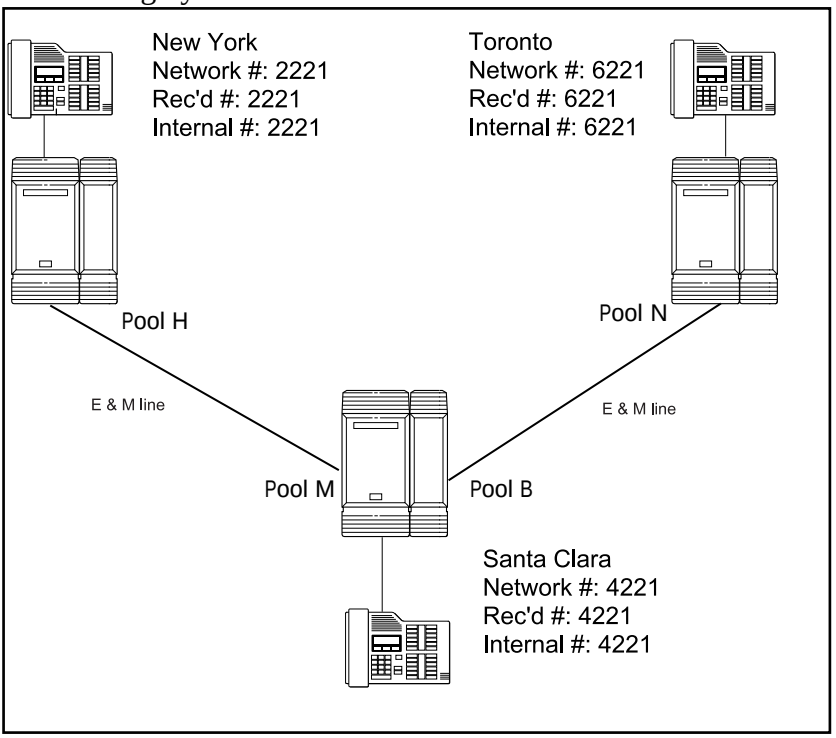
Dialing plan using E&M lines

By properly planning and programming routing tables and destination codes, an installer can create a dialing plan where:

- E&M lines between Norstar systems are available to other systems in the network

The following figure and programming chart shows how a transparent dialing plan for a network of three Norstars. Each system must be running Norstar NA-MICS 4.0 or MICS-XC 4.0 software. Each system must be equipped with target lines and a Trunk Module with an E&M/DISA Trunk cartridge or an ICS with a DTI with at least one E&M line.

Routing by destination codes



Heading	Parameter	Setting
New York:		
Trk/Line Data	Line 049	E&M
	Ans Mode	Auto
	Line type	Pool H
	Line 245	Target line
	Rec'd #	2221
Line Access	Set 2221	L245: Ring only
	Line pool access	Line pool H
To Santa Clara:		
Routing service	Route	001
	Use	Pool H
	DialOut	None
	DestCode	4
	Normal rte	001
	Absorb	None
To Toronto:		
Routing service	DestCode	6
	Absorb	None
	Normal rte	001
Santa Clara:		
Trk/Line Data	Line 050	E&M
	Ans Mode	Auto
	Line type	Pool M
Trk/Line Data	Line 049	E&M
	Ans Mode	Auto
	Line type	Pool B
	Line 250	Target line
	Rec'd #	4221

Heading	Parameter	Setting
Line Access	Set 4221	L250: Ring only
	Line pool access	Line pool B Line pool M
To New York:		
Routing service	Route	001
	Use	Pool M
	DialOut	None
	DestCode	2
	Absorb	None
	Normal rte	001
To Toronto:		
Routing service	Route	002
	Use	Pool B
	DialOut	None
	DestCode	6
	Absorb	None
	Normal rte	002
Remote access	Rem access pkgs	01
	Line pool access	Pool M: ON
	Rem access pkgs	02
	Line pool access	Pool B: ON
	Line abilities	049
	Remote pkg	01
	Line abilities	050
	Remote pkg	02

Heading	Parameter	Setting
Toronto:		
Trk/Line Data	Line 053	E&M
	Ans Mode	Auto
	Line type	Pool N
	Line 260	Target line
	Rec'd #	6221
Line Access	Set 6221	L260: Ring only
	Line pool access	Line pool N
To New York:		
Routing service	Route	001
	Use	Pool N
	DialOut	None
	DestCode	4
	Absorb	None
	Normal rte	001
To Santa Clara:		
Routing service	DestCode	2
	Absorb	None
	Normal rte	001

If a user in New York wishes to call Toronto within the network, they dial 6221. The local Norstar checks the number against the routing tables and routes the call according to the destination code 6, which places the call using Route 001.

When the DialOut is added to the number by the New York system, the call appears on the auto answer line on the Norstar in Santa Clara as 6-221.

Because 6 is also a destination code on the Santa Clara system, another call is placed using route 002 from Santa Clara. This call arrives at the Toronto system, where the digits 6-221 are interpreted as a target line received number. The call will now alert at telephone 6221 in Toronto.

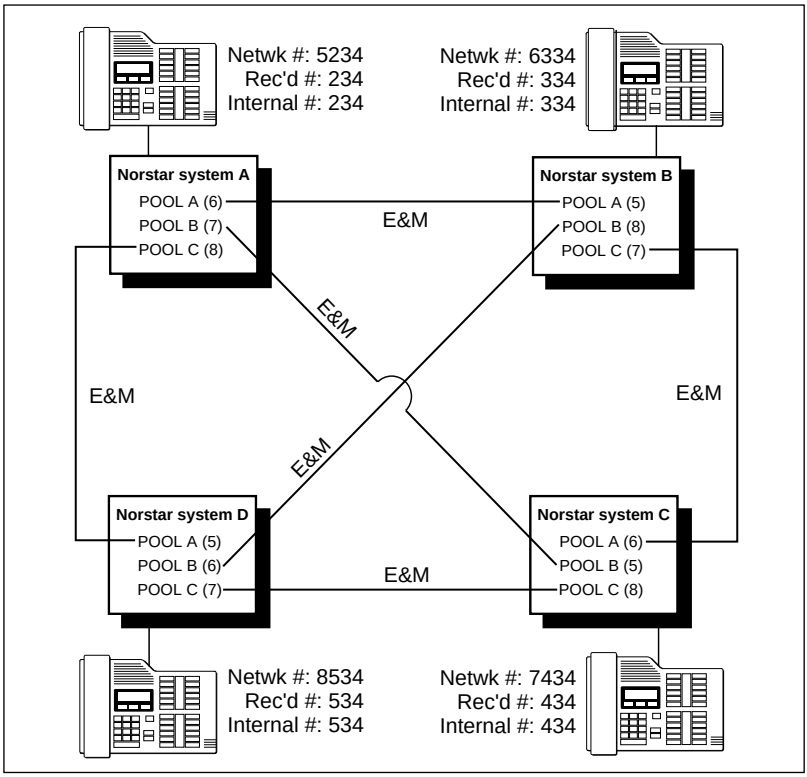
Dialing plans with shared line pools

Using routes and destination codes is a powerful and efficient way to create a transparent dialing plan. Line pools offer an alternate method of creating a dialing plan or supplementing the routing and destination codes.

If the Norstar systems are close to each other geographically, you can conserve resources by not duplicating access. For example, system A, B, and C are all within the same area code. System A has a line pool to Santa Clara, System B has a line pool to Montreal, and system C has a line pool to Miami. A Norstar user in system A can reach Miami by calling system C and using their line pool to Miami.

To simplify access between Norstar systems, all line pools that go to the same destination should have the same line pool access code. For example, system A and system B both have a line pool to Ottawa. You can configure both systems with the same line pool access code for the Ottawa line pool.

A dialing plan similar to the one in the following figure will let you create a company directory that uses line pool access codes and unique DNs of a uniform length.



For instance, the person on system A at telephone 234 can press an Intercom button and dial 7434.

This means that telephone 234 has dialed the line pool access code of the trunk to system C, and will receive the dial tone of system C. The digits 434 then map to the Received number 434, and ring telephone 434 with an appearance of the associated target line.

Tips - *Network calls that use routes are subject to any restriction filters that are in effect.*

If the telephone used to make a network call has an appearance of a line used by the route, the call will move from the intercom button to the line button.

The telephone used to make a network call must have access to the line pool used by the route.

Network calls are external calls, even though they are dialed as if they were internal calls. Only the features and capabilities available to external calls can be used.

When programming a button to dial a Network number automatically (autodial), network calls must be treated as external numbers, even though they resemble internal set numbers.

Routes generally define the path between your Norstar switch and another switch in your network, not other individual telephones on that switch.

For dialing plan information with PRI, see Using a dialing plan to route outgoing PRI calls on page 272.

Norstar system with the Meridian M1 over PRI

1. Provision the PRI card if it is not already on the system.
2. Select the SL-1 protocol.
3. Set the Norstar system to be the slave and set the M1 as the master. A clock controller is not required on the M1.
4. Select Bchansea as Ascend with M1 configured as Descend. This ensures that there will be no B-channel collision.
5. Set the internal CSU to off.
6. Setup the routing tables to include a PRI dialing plan for outgoing calls to the M1 as described in the following example.

Use a dialing plan with four digits. All numbers on the Norstar system are of the form 2xxx and all M1 numbers are of the form 8xxx.

For each set on the Norstar system, program the received digits 2xxx on target line YYY. Create a route, select the PRI line pool and set the DN type to Private.

Create a Dest code of 8 with Digit absorb set to 0. Set the Priv Dn length to 4 and make sure that each set has access to the PRI line pool. You will also need to program the Business Name (see Programming Network Name Display on page 314) and CLID set (see CLID set on page 242).

7. Program the M1 to recognize 2xxx. The M1 will then send 2xxx calls to the Norstar system.

Customer Use

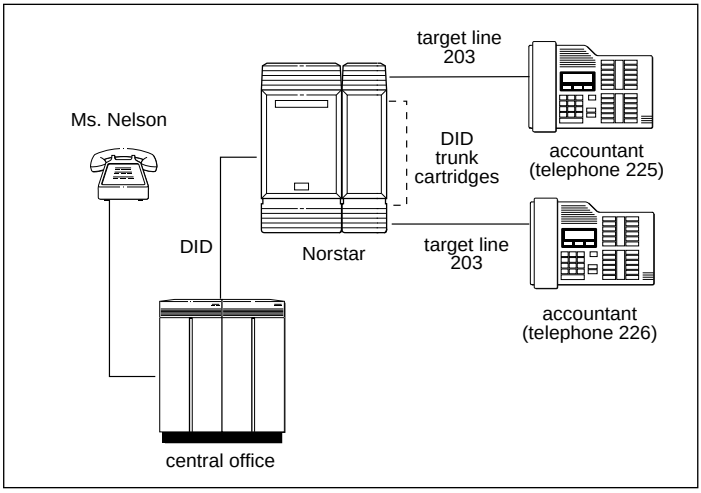
This section shows sample configurations for different types of network access. Each example has four parts:

- A scenario explains the caller's goal and what is required to achieve it.
- A diagram shows the network configuration that supports the application.
- A list shows the Norstar hardware required to support the configuration.
- Tables show the programming required. Only those settings that are important to network access are described here.

Public network

Call one or more Norstar telephones

Ms. Nelson is a bank customer who has a question for an accountant. She dials the telephone number that maps onto target line 203. All of the accountant’s telephones ring.

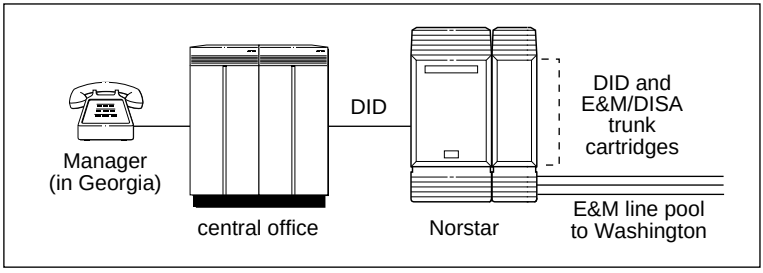


Hardware: ICS, a Trunk Module with a DID Trunk Cartridge, or a DTI with lines programmed as DID.

Heading	Parameter	Setting
Trk/Line Data	Rec'd # Line 051	4321 (for Line 203) DID
Rec'd # length	Rec'd # length	4 digits (can be from 2 to 7 digits, but must match number of digits sent by central office)

Call Norstar and select tie lines to a private network

A manager in Georgia wants to use the tie lines at headquarters to call Washington. He dials a telephone number that maps onto the DISA DN, enters a Class of Service (COS) password, then dials a line pool access code to select a tie line to Washington.



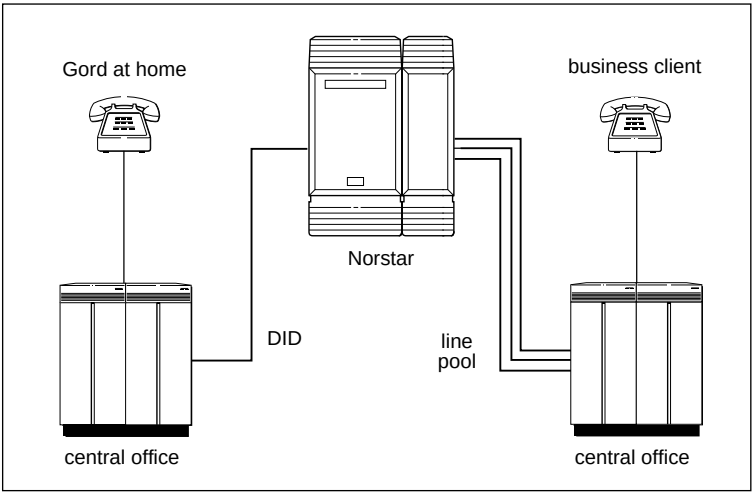
Hardware: ICS, a Trunk Module with a DID Trunk Cartridge, two E&M/DISA Trunk Cartridges (for the three trunks in the line pool to Washington) or a DTI with one DID line and three E&M lines.

Heading	Parameter	Setting
Incoming trunk:		
Trk/Line Data	Line 049	DID
Access codes	DISA DN	5321

Heading	Parameter	Setting
Rec'd # length	Rec'd # length	4 digits (can be from 2 to 7 digits, but must match number of digits sent by central office)
Outgoing trunk:		
Trk/Line Data	Line 053 Line type	E&M Pool F
Access codes	Line pool F	6 (up to 4 digits)
COS pswds		Define restrictions. Define remote access pkgs. Assign a restriction filter to the line. Assign COS passwords and filters for each Class of Service.

Call Norstar and select lines to the public network

Gord wants to make a long-distance business call from home. To avoid being charged, he dials the telephone number that maps onto the Auto DN at work. After hearing the dial tone, Gord dials a line pool access code to select a line to the public network. He then dials the long-distance number.



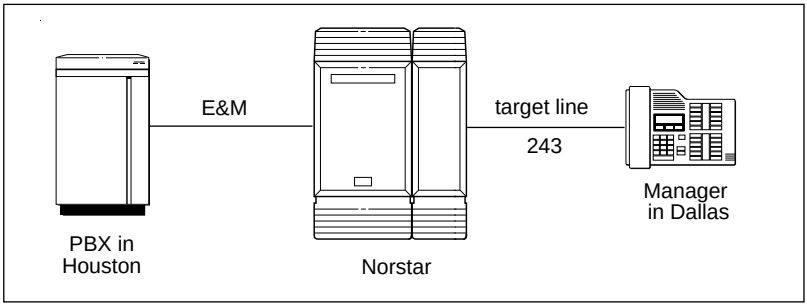
Hardware: ICS, a Trunk Module with a DID Trunk Cartridge or DTI with several DID lines.

Heading	Parameter	Setting
Incoming trunk:		
Trk/Line Data	Line 049	DID
Access codes	Auto DN	4321
Rec'd # length	Rec'd # length	4 digits (can be from 2 to 7 digits, but must match number of digits sent by central office)
Lines /Restrictions and Remote access		Define restriction filters. Define remote access packages. Assign a remote restriction and remote package to the line.
Outgoing trunk:		
Trk/Line Data	Line 001 Line type	Loop Pool A
Access codes	Line pool A	1234
Lines /Restrictions		Assign a restriction filter to the line.

Private network

Call one or more Norstar telephones

The production supervisor in Houston selects the less expensive company tie line to call the manager at the Administration office in Dallas. Once the line is selected, the production supervisor dials the digits that will map onto the target line of the manager in Dallas.



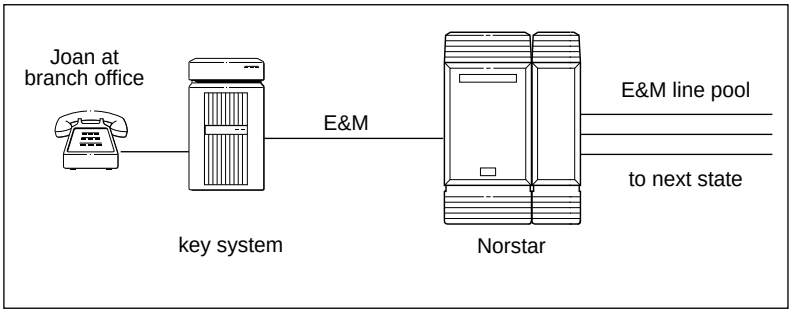
Hardware: ICS, a Trunk Module with an E&M/DISA Trunk Cartridge or a DTI with an E&M line.

Heading	Parameter	Setting
Incoming trunk:		
Trk/Line Data	Rec'd # Line 049 Ans Mode	4321(for target line 243) E&M Auto
Rec'd # length	Rec'd # length	4 digits (can be from 2 to 7 digits, but must match number of digits sent by central office)

Call Norstar and select tie lines to other nodes in the private network

At a branch office, Joan selects a tie line to the main office downtown. After hearing the dial tone, she dials a line pool access code to select another tie line to a branch office in the

next state.



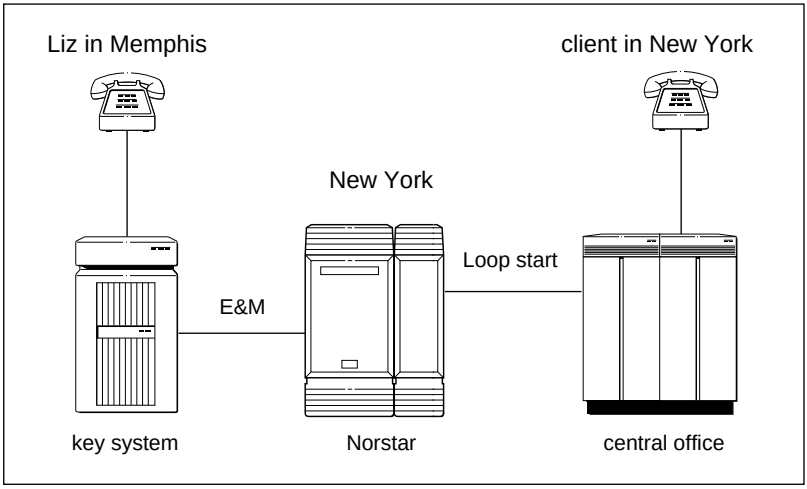
Hardware: ICS, a Trunk Module with two E&M/DISA Trunk Cartridges (for the three lines in the line pool and the one incoming line) or a DTI with four E&M lines.

Heading	Parameter	Setting
Incoming trunk:		
Trk/Line Data	Line 049 Ans mode	E&M Auto
Under Lines / Restrictions and Remote access		Define restriction filters. Define remote access packages. Assign a remote restriction and remote package to the trunk.
Outgoing trunk:		
Trk/Line Data	Line 050 Line type	E&M Pool D
Access codes	Line pool D	71 (can be from 1 to 4 digits)
Lines /Restrictions		Assign a restriction filter to the trunk.

Call Norstar and select lines to the public network

Liz in Memphis, needs to call long-distance to a client in New York. She selects a tie-line to the branch office in New York. After hearing the dial tone, she dials a line pool access code to

select a line to the public network. Then, she dials the client's number as a local call.



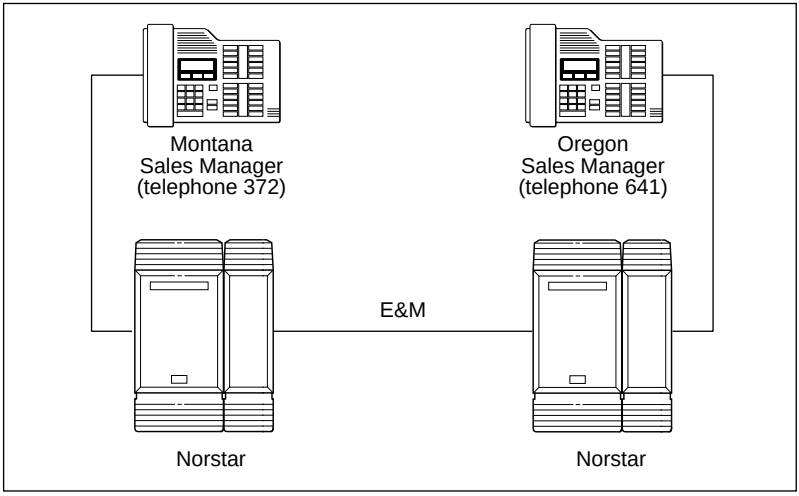
Hardware: ICS, a Trunk Module with an E&M/DISA Trunk Cartridge or DTI with an E&M line.

Heading	Parameter	Setting
Incoming trunk:		
Trk/Line Data	Line 049 Ans mode	E&M Auto
Under Lines / Restrictions and Remote access		Define restriction filters and remote access packages. Assign a remote restriction and remote package to the trunk.
Outgoing trunk:		
Trk/Line Data	Line 001 Line type	Loop Pool B
Access codes	Line pool B	73 (can be 1 to 4 digits)
Lines /Restrictions		Assign a restriction filter to the line.

Norstar system

Select E&M trunks to the private network

For a confidential call, the Montana sales manager presses the line button for a private E&M trunk to the Oregon office. This automatically alerts at the line appearance on the telephone of the Oregon sales manager.



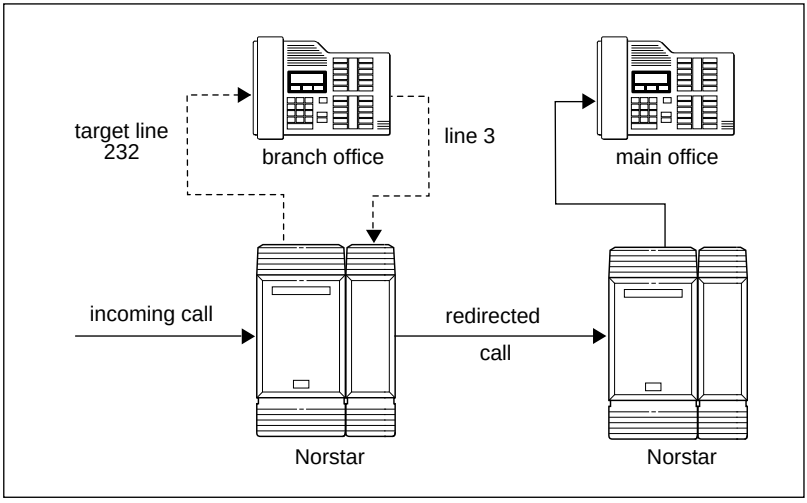
Hardware: (for both systems) ICS, a Trunk Module with an E&M/DISA Trunk Cartridge or a DTI with an E&M line.

Heading	Parameter	Setting
Montana:		
Outgoing trunk:		
Trunk Data (Line 049)	Line	E&M
Line Data (Line 049)	Line type	Private to 372

Heading	Parameter	Setting
Oregon:		
Incoming trunk:		
Trunk Data (Line 057)	Line	E&M
	Ans mode	Manual
	Line type	Private to 641

Norstar Line Redirection feature

The branch office is receiving more calls than it can handle, so it redirects one of its lines to the main office. All calls that come in on target line 232 will be routed out on line 003 to the main office. Whenever a call is redirected, the target line and outgoing line will be busy for the duration of the call.



Hardware: ICS, an E&M/DISA Trunk Cartridge if the incoming trunk is E&M or a DID Trunk Cartridge if the incoming trunk is DID, or a DTI with one E&M line or one DID line.

Tips - *Any line appearance on a telephone can be selected as the incoming line to be redirected. Restriction filter restrictions on the line are checked against the filter in effect at the time a call is redirected not when redirection is programmed.*

A target line can not be selected as the outgoing line for redirection.

The incoming trunk must have disconnect supervision.

Heading	Parameter	Setting
Incoming trunk:		Incoming trunk:
Trk/Line Data	Line 001: Loop Trunk mode: Super Ans mode: Auto OR Line 049: DID OR Line 053: E&M Ans mode: Auto Rec'd #: 4321 (for target line 232)	Trk/Line Data
Rec'd # length	Rec'd # length: 4 digits (can be from 2 to 7 digits, but must match number of digits sent by central office)	Rec'd # length
Outgoing trunk:		Outgoing trunk:
Trk/Line Data	Line 003: Loop OR Line 054: E&M	Trk/Line Data
Capabilities	Allow redirect: Y	Capabilities

PRI dialing plan example for 2-way DID

The following list shows the steps involved in configuring a dialing plan for two-way DID which uses the Public service type under the NI-2 protocol. In this example the user will be dialing the prefix 8 to place a call over a PRI line.

- in Hardware programming, configure the PRI card to use the NI-2 protocol
- select PRI-A as the line pool
- for incoming calls you need to program target lines to match the DID digit that is being received on the PRI interface
- set Dial Out to None
- set SrvcType to Public
- in Services programming access Routing Service to enter a Destination Code (8 in this example)
- set the Absorb Length to All
- the set that you are dialing out from must have access to the PRI Pool (programmed in Terminals/Sets)
- define rec'd digits for target lines
- define limits for incoming and outgoing public calls, see Programming Call by Call Limits on page 326

Data Solutions

Examples of ISDN Scenarios

For information on various ISDN scenarios that may help you to decide on the data solution that is best for you, refer to the following web site: **http://www.nortel.com/norstar-itas** and go to the **TIPS** link on this web site. You will need your user name and access code.

If you do not already have access to this site, go to the web site: **http://www.nortel.com/norstar-itas** for information on how to get access to this site.

IDM200 interworkings

Norstar Integrated Data Module 200

The ICS allows the IDM 200 to share T1 connections between voice calls and data traffic from 12 ethernet Local Area Network (LAN) attached data devices such as personal computers, workstations and servers. The T1 lines that are used for data connections are administered through the Norstar ICS programming.

The IDM 200 is an access device that provides Ethernet LAN connectivity via twelve ports and offers high-speed Wide Area Network (WAN) access to a remote site, such as the Internet or the enterprise network. The IDM 200 supports IEEE 802.1d transparent bridging, and IP and IPX routing between Ethernet LANs across a WAN resource.

The IDM 200 provides:

- 10-Base-T connections over unshielded twisted pair (UTP) wiring for 12 ethernet devices via an on board Ethernet Repeater which allows all attached devices to access the ethernet LAN to the ICS.

- WAN bridging and routing function
- DS-30 fiber connection to interface
- a connection to the Norstar ICS over a fiber interface.
- Data packets which are addressed to an allowable destination outside of the Local Area Network are either Bridged or Routed onto the fiber interface to be joined into the T1 Trunk data stream by the ICS
- a built-in power supply.

For more information on the IDM 200, refer to Installing optional equipment on page 181 and the *Norstar Integrated Data Module 200 Installer Guide* for instructions on installing and programming the IDM 200 with the Modular ICS system.

CTA500dm

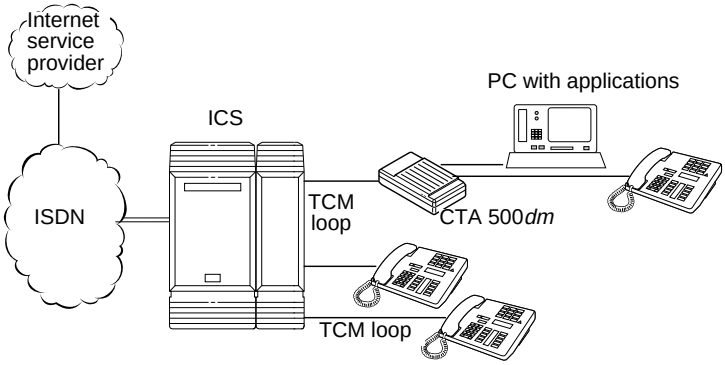
Supporting Internet access

The CTA 500 digital modem (CTA 500*dm*) is an optional device for use with the Modular ICS. The CTA 500*dm* provides an integrated desktop or set solution for digital networking applications.

With the CTA 500*dm* you can access remote computers on networks including the Internet. You can also telecommute over a digital telephone network and access a CTA 500*dm* in your office using PPP from the attached computer.

By combining your ISDN service with the CTA 500*dm* or a router, you can access the Internet at significantly faster speeds (up to 115.2 or 120 Kbps).

Like a Norstar telephone, the CTA 500*dm* connects with the ICS using a TCM port, has a DN, and is assigned ISDN or digital lines.



This configuration supports a number of applications, including:

- remote access to personal computers (PCs)
- computer telephony integration (CTI) applications, such as call accounting, call answer, and remote data base applications

To support Internet access, you must order BRI or PRI service from your service provider, and subscribe to Internet service from an Internet service provider (ISP). Your PC must have an Internet browser and the applications supplied by your ISP.

Users also have full access to Norstar features using the Norstar telephone connected at the CTA 500*dm*. For more information, see the information that comes with the CTA 500*dm*.

ISDN applications

ISDN terminal equipment delivers a wide range of powerful business applications:

Video conferencing and video telephony

Video conferencing offers instant visual and audio contact between distant parties using either studio-based or desktop ISDN terminals.

Desktop conferencing

ISDN allows computer users in distant locations to share and edit any image, data or text file on their own computer screens while they discuss the information.

File transfer

The ISDN network allows you to transfer files containing data, text, images, data, or audio clips, faster and cheaper than with a conventional modem.

Telecommuting

Convenient retrieval, processing and storage of files is possible for the employee working at home by using ISDN lines to give high-speed access to information resources at the office.

Group 4 fax

ISDN fax applications save money by increasing both transmission speed and the quality of resolution.

Remote LAN access

ISDN provides an affordable and fast means for employees at remote sites (at home or branch offices) to access local area networks (LANs).

Leased line backup

Essential backup for leased lines can be provided using ISDN as required, rather than duplicating costly permanent leased lines.

LAN to LAN bridging

Local area network (LAN) bridge/routers allow flexible interconnection between LANs using ISDN, with charges only incurred when information is actually transmitted.

Internet and database access

The fast call set up and high bandwidth of ISDN are ideal for accessing information services such as the Internet and databases.

Planning the installation

Only qualified persons should service the system.

The installation and service of this unit is to be performed only by service personnel having appropriate training and experience necessary to be aware of hazards to which they are exposed in performing a task and of measures to minimize the danger to themselves or other persons.

Electrical shock hazards from the telecommunication network and AC mains are possible with this equipment. To minimize risk to service personnel and users, the ICS must be connected to an outlet with a third-wire ground. In addition, all unused slots should have filler faceplates installed and the doors should be in place at the completion of any servicing.

Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power line fault events near network lines. A risk point on the ICS is the power cord earth ground pin. These leakage currents normally safely flow to Protective Earth ground via the power cord. Therefore, it is mandatory that connection to a grounded outlet is performed first and removed last when cabling to the unit. Specifically, operations requiring the unit to be powered down must have the network connections (central office lines) removed first.

Planning checklist

- ☐ Verify that you have all the equipment and supplies you need to install the system. See Required equipment on page 94.
- ☐ Determine the location for the Integrated Communication System (ICS) and expansion modules, telephones and other equipment.
- ☐ Select the default template to be used in System Startup programming. See the *Programming Record*.
- ☐ Plan and record system programming details in the *Programming Record*.

If you are installing a system with Norstar Companion components, refer to the checklist supplied in the *MICS-XC Norstar-Companion Installer Guide*.

Required equipment

- ☐ Integrated Communication System (ICS)
- ☐ Modular ICS ROM software cartridge
- ☐ Modular ICS NVRAM cartridge
- ☐ Trunk Cartridge(s) for the ICS
- ☐ Services Cartridge (one required for T1 or BRI; two required for busy sites), or a Combination Fiber 6-port Services Cartridge (provides same Services Cartridge functionality)
- ☐ The Digital Trunk Interface configured for PRI
- ☐ BRI Card(s) for the ICS (as required)
- ☐ emergency telephones (2 for ICS, 1 for each TM), as required
- ☐ Norstar telephones

- ☐ ISDN devices (for example, ISDN equipment, data devices), as required
- ☐ distribution panel(s)

Expansion equipment

- ☐ Expansion Cartridge (two-port or six-port)
- ☐ Combination Fiber 6-port Services Cartridge
- ☐ Trunk Module(s) (TM)
- ☐ Station Module(s) (SM)
- ☐ Trunk Cartridge(s) for the TM
- ☐ power bar

Your Norstar system requires connection to a grounded outlet.

To prevent possible injury from voltage on the telephone network, disconnect all central office and station lines before removing plug from the electrical outlet.

The Integrated Communication System (ICS) supports up to 32 telephones (no expansion). With the addition of Trunk Cartridges, you can connect up to 48 digital lines to the ICS.

With the addition of an Expansion Cartridge or a Combination Fiber 6-port Services Cartridge in the ICS, you can add Trunk Modules, Station Modules, Integrated Data Modules, or a combination to increase your system capacity.

Installed in ICS	Additional modules allowed		
	Trunk	Station	Maximum
NA-MICS 4.0 system No Expansion cartridge (mini)	0	0	0
2-port Expansion cartridge (midi)	2	2	2

Installed in ICS	Additional modules allowed		
	Trunk	**Station**	**Maximum**
6-port Expansion cartridge (maxi)	6	6	6
XC system Combination Fiber 6-port Services Cartridge (maxi)	6	6	6
Combination Fiber 6-port Services Cartridge and 6-port cartridges (mega)	6	12*	12
Two Combination Fiber 6-port Services Cartridge (mega)	6	12*	12
Two 6-port cartridges (mega)	6	12*	12

*The last two ports are reserved for Companion use and Integrated Data Module only. See the *Norstar-Companion Modular ICS 2.0 Installer Guide* or the *Integrated Data Module 200 Installer Guide* for more details.

Optional equipment

- ☐ station auxiliary power supply (SAPS)
- ☐ Busy Lamp Field (BLF) (for the M7310 telephone only)
- ☐ central answering position (CAP) module (for the M7324 telephone only)
- ☐ Analog Terminal Adapter (ATA)
- ☐ Norstar Integrated Data Module 200 (IDM200)
- ☐ external music source
- ☐ auxiliary ringer
- ☐ headset
- ☐ telephone loud ring amplifier
- ☐ Base Stations, handsets, antennas and remote power interconnect units
- ☐ uninterruptible power supply

- ☐ other

If the system is equipped with digital lines, it is recommended you use an uninterruptible power supply so that the DTI - keep alive signal will continue to be sent to the network in the event of a power failure.

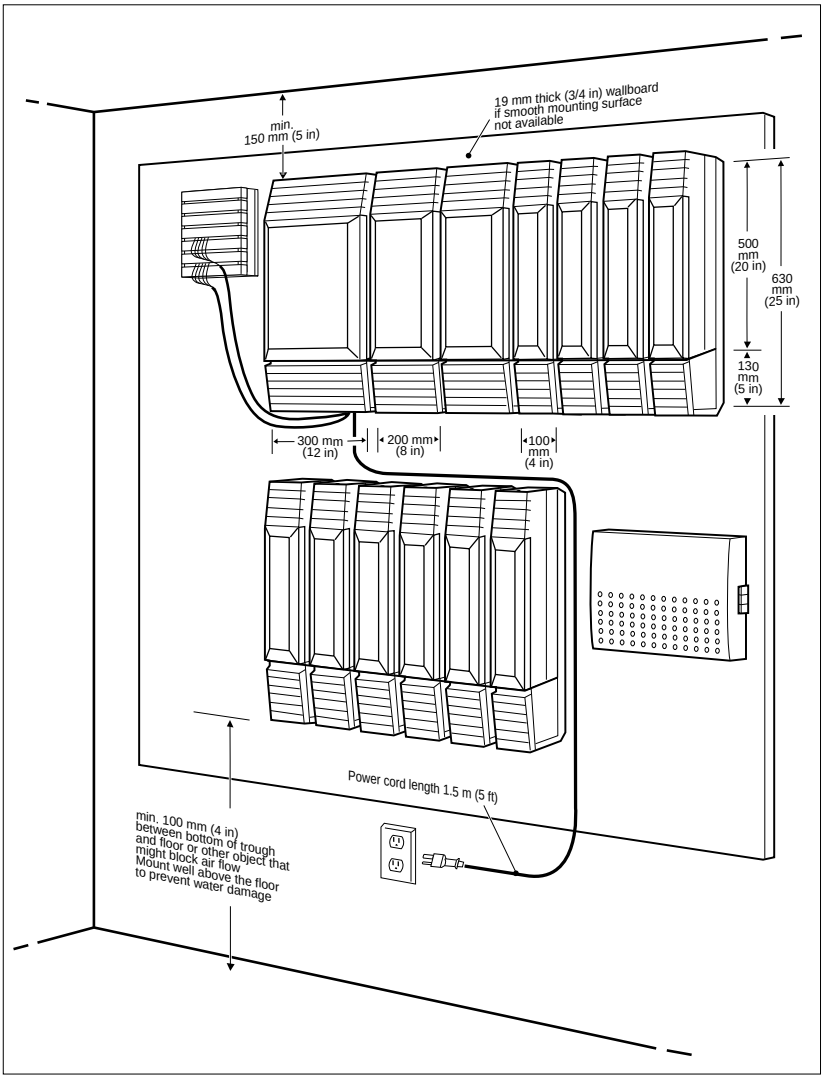
Equipment for installing the ICS and modules

- ☐ screwdriver
- ☐ pliers
- ☐ connecting tool (punch-down tool)
- ☐ four 19 mm (3/4 in.) wood screws for each of the mounting brackets
- ☐ 38 mm (1 1/2 in.) screws for the cable troughs (2 screws for the ICS and SM, 4 screws for the TM)
- ☐ 19 mm (3/4 in.) thick wooden backboard

Location requirements

- ☐ minimum distance of 4 m (13 ft.) from equipment such as photocopiers, electrical motors and other equipment that can produce electromagnetic, radio-frequency, and electrostatic interference
- ☐ clean, dry, and well-ventilated
- ☐ minimum clearance of 150 mm (5 in.) above and 100 mm (4 in.) below the ICS
- ☐ the gap between the ICS and the wall should be left completely clear to allow proper heat dissipation
- ☐ temperature between 0°C and 50°C (32°F and 122°F)
- ☐ humidity between 5% and 95%, non-condensing

Spacing requirements for a typical MICS-XC 4.0 system



Electrical requirements

- ☐ non-switched outlet within 1.5 m (5 ft.) of the ICS
- ☐ The ICS and module power cords are 1.5 m (5 ft.) long. You may connect the ICS and modules to a power bar. The power bar must be CSA certified and UL listed with a third-wire ground.
  Do not use an extension cord between the ICS and the power bar, or between the power bar and the electrical outlet.
- ☐ AC outlet equipped with a third wire safety ground to provide shock protection and avoid electromagnetic interference
- ☐ dedicated 110 V AC nominal, 50/60 Hz, 15 A minimum service with a third wire safety ground

Risk of electric shock.

The safety of this product requires connection to an outlet with a third-wire ground. Use only with three-prong power cord and outlet.

Check ground connections.

Ensure that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. If they are not connected together, contact the appropriate electrical inspection authority. Do not attempt to make the connections yourself.

Configuring Trunk Cartridges

If you plan to configure lines on a Loop Start Trunk Cartridge as auto-answer, you will need an E&M Trunk Cartridge for every two auto-answer loop start lines. The E&M Trunk Cartridge provides DTMF receivers for auto-answer loop start

lines. You can install three additional Trunk Cartridges in each Trunk Module. The following table shows you the line capacity of each Trunk Cartridge.

Trunk Cartridge	Line capacity
DTI configured for T1 (ICS only)	24
DTI configured for PRI (ICS only)	23
BRI-ST & BRI-U4	8
BRI-U2	4
Loop Start with disconnect supervision	4
CI	4
DID (TM only)	4
E&M (TM only)	2

You can install different types of Trunk Cartridges together in the same Trunk Module. When mixing Trunk Cartridges, use a separate block on the distribution panel for each type of Trunk Cartridge.

Configuring Station Modules

Each Station Module allows you to connect up to 16 additional Norstar telephones to the system.

Mini	Midi		Maxi				Mega				Mega / Companion	
ICS	**SM3**	**SM4**	**SM5**	**SM6**	**SM7**	**SM8**	**SM9**	**SM10**	**SM11**	**SM12**	**SM13**	**SM14**
32	48	64	80	96	112	128	144	160	176	192	208	224

Tips - *The following combinations are not supported with the NA-MICS 4.0 and MICS-XC 4.0 systems:*

- *two 2-port expansion cartridge system (4 fiber ports total)*
- *a 6-port and a 2-port expansion combination (8 fiber ports total)*
- *two 6-port expansion cartridge system (12 fiber ports total)*

In a fully expanded system using 48 digital channels, consider installing 2 service cartridge functionality to prevent blocking of incoming calls due to lack of DTMF resources.

Internal wiring requirements

(Norstar loop)

- ☐ one, two or three twisted pair cables per telephone
- ☐ dc loop resistance of less than 64 Ω
- ☐ cable length (0.5 mm or 24 AWG) less than 300 m (1000 ft.)
- ☐ use of a station auxiliary power supply (SAPS) for loops 300 m (1000 ft.) to 790 m (2600 ft.).The SAPS must be a Class 2 power source that is UL listed and CSA certified.
- ☐ no bridge taps

ISDN S reference point (S Loop)

- ☐ no longer than 1000 m (3,200 ft.) for point to point
- ☐ no longer than 450 m (1,475 ft.) on a point-to-multipoint extended passive bus
- ☐ no longer than 100 m (300 ft.) for 75 ohm cable or 200 m (600 ft) for 150 ohm cable on a point-to-multipoint short passive bus

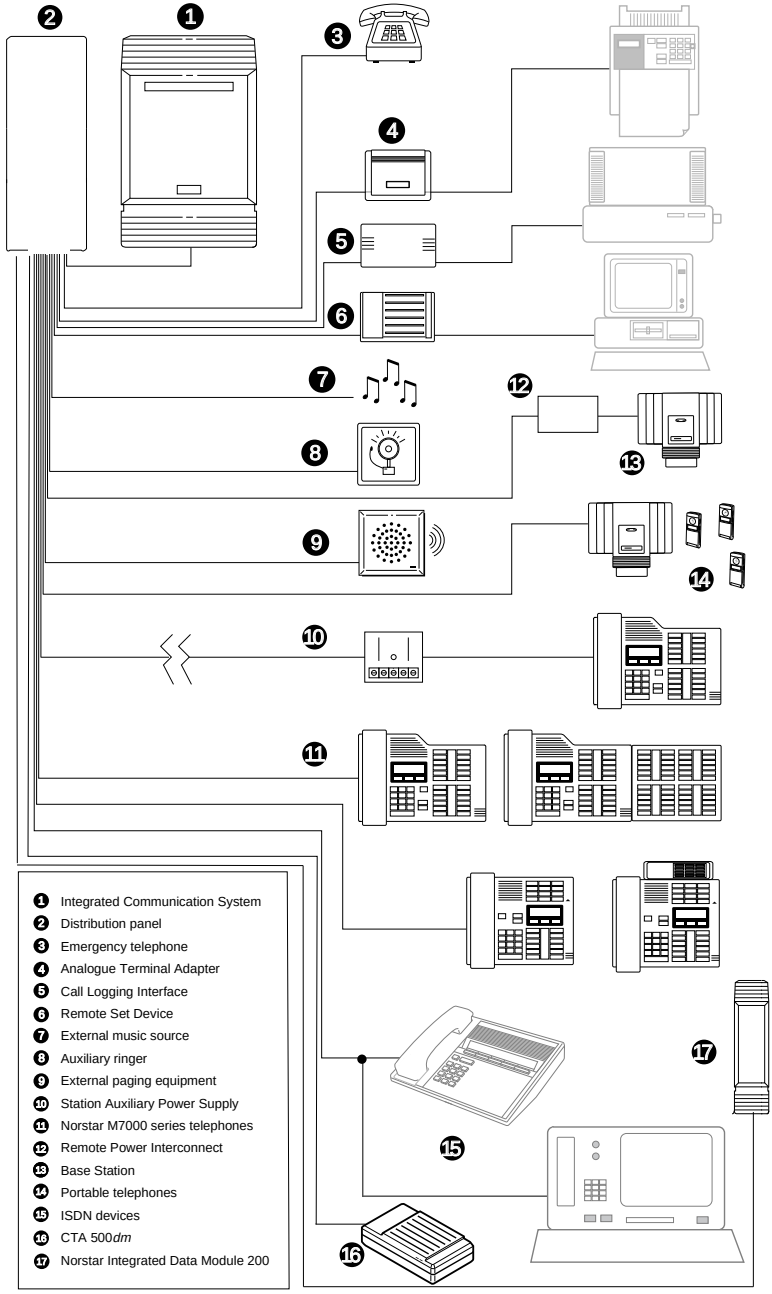
Wiring for the S reference point (S loop) should conform to ANSI T1.605. Wiring for the ISDN U reference point (U loop) should conform to ANSI T1.601.

Verify lightning protectors.

Check the lightning protectors at the cable entry point to the building with special attention to the grounding. Report any problems to the telephone company in writing.

Equipment that is designed to be connected using internal wiring is typically not lightning protected. Norstar telephone equipment and ISDN S loops and T loops should not leave the building where the ICS is installed.

System overview



Upgrading your Norstar system

If you have any previous version of MICS software, you must use the upgrade kit to upgrade to MICS 4.0. If this is a new installation, the upgrade kit is not required.

When making simultaneous hardware and software upgrades, upgrade your software release before making your hardware upgrades. Make sure to power up after the new software has been installed. Upgrading in this order maintains your 0X32 programming data for use with NA-MICS 4.0 and MICS-XC 4.0.

MICS NVRAM cartridge

Do not install a MICS NVRAM cartridge from other NA-MICS 4.0 systems. This will cause the system to cold start.

Do not use an incorrect upgrade kit when upgrading. For example, do not use the NA-MICS 4.0 upgrade kit when upgrading to MICS-XC 4.0.

Do not attempt to use the MICS NVRAM cartridge as stored data transfer. This will cause the system to cold start.

A new MICS NVRAM cartridge is available for additional Non Volatile Read-only Memory (NVRAM). This new cartridge includes a cartridge assembly that inserts into the Modular ICS.

The assembly cartridge has a slot for a credit-card size PC-card (also called Flash cards) that contains the system software. These flash cards accommodate future system memory requirements and software downloading. The Modular ICS NVRAM cartridge with the new Modular ICS ROM software cartridge is used to upgrade from earlier versions of MICS to MICS 4.0.

Supported upgrades in MICS 4.0

Upgrading from...	Target Upgrade		
	NA-MICS 4.0	**USA-MICS-XC 4.0**	**CDA-MICS-XC 4.0**
NA-MICS 1.0	Use NA-MICS Upgrade Kit	Use NA-MICS Upgrade Kit	Use NA-MICS Upgrade Kit
USA-MICS-XC1.0		Use USA-XC Upgrade Kit	
CDA-MICS-XC 1.0			Use CDA-XC Upgrade Kit
NA-MICS 1.1	Use NA-MICS Upgrade Kit	Use NA-MICS Upgrade Kit	Use NA-MICS Upgrade Kit
USA-MICS-XC 1.1		Use USA-XC Upgrade Kit	
CDA-MICS-XC 1.1			Use CDA-XC Upgrade Kit
NA-MICS 2.0	Use NA-MICS Upgrade Kit	Use NA-MICS Upgrade Kit	Use NA-MICS Upgrade Kit
USA-MICS-XC 2.0		Use USA-XC Upgrade Kit	
CDA-MICS-XC 2.0			Use CDA-XC Upgrade Kit
NA-MICS 3.0	Use NA-MICS Upgrade Kit	Use NA-MICS Upgrade Kit	Use NA-MICS Upgrade Kit
USA-MICS-XC 3.0		Use USA-XC Upgrade Kit	
CDA-MICS-XC 3.0			Use CDA-XC Upgrade Kit

Using the Upgrade Kit to upgrade from previous versions of MICS

1. Power down.
2. Disconnect all amphenol cables.
3. Remove the power to the ICS and all associated modules. Disconnecting the power ensures protection for electronic components and that the data stored in the feature cartridge will not be corrupted.
4. Remove your old Norstar MICS software cartridge.
5. This step determines the type of MICS 4.0 system you will ultimately upgrade to.

   Insert the MICS 4.0 NVRAM cartridge. See illustration on page 127.

   Insert the MICS ROM software cartridge that came with your upgrade kit. See illustration on page 127.

> Make sure to use the appropriate MICS 4.0 upgrade kit (NA-MICS 4.0, CDA-MICS-XC or USA-MICS-XC) when upgrading. Refer to Supported upgrades in MICS 4.0 on page 105.
>
> Your Norstar system will cold start (data will be lost) if the MICS ROM software cartridge that came in your upgrade kit does not match your MICS 4.0 system.

6. Power up. Wait until display flashing stops. Insert new cartridge is displayed.
7. Power down. Insert the Modular ICS ROM software cartridge to perform the final stage of the upgrade to NA-MICS 4.0. See Installing the ROM Software Cartridge

on page 127 to verify that you are using the proper software cartridge.

8. Power up. If no alarm-event messages are observed, see alarm-event message section, the upgrade to MICS 4.0 has been performed. If alarm codes are displayed, refer to Alarm codes on page 377 for definitions. If event messages are displayed refer to Event messages on page 385 for definitions.

Notes

All old programming is maintained when upgrading from the 0X32 Release 1 - T1 software, with the following exceptions:

- all system passwords are reverted to the system defaults
- ATA ans timer setting is reverted to the system default setting

It is recommended to have an accurate record of your existing system programming so that you can plan your new system programming appropriately.

When upgrading from MICS 1.1, note that the Call log space has increased from 300 to 600.

Reallocate log space after upgrading.

If you have a Norstar system with a Modular 8X24 Key Service Unit (KSU), you cannot upgrade your software with the Upgrade Kit. If you want to upgrade to MICS 4.0, you must replace your older ICS with the current 0X32 ICS and program the system.

Note: The Key Service Unit (KSU) has been renamed the Integrated Communication System (ICS).

If you have a Norstar system with a Modular 0X32 ICS, you can use your ICS with the new NA-MICS 4.0 and MICS-XC 4.0 software.

When upgrading, Call Log information may be lost.

During a system restart, Call Log information is not saved. Make sure to notify users if a system restart is planned so any log information can be recorded first.

A loss of UTAM information occurs when upgrading US MICS-XC systems.

UTAM Recovery Codes are required. If you are upgrading the system to include Companion components, see the upgrade instructions included in the *MICS-XC Norstar-Companion Installer Guide*.

Upgrading from NA-MICS 4.0 to XC 4.0

NA-MICS 4.0 mini to XC 4.0 mini

1. Install XC 4.0 ROM software cartridge.
2. Use module 1 (ports 101 to 132) for sets only and module 2 for Trunk Cartridges only

NA-MICS 4.0 mini to XC 4.0 midi

1. Install XC 4.0 ROM software cartridge.
2. Install 2-port Expansion Cartridge in slot 2.
3. Connect trunk modules beginning at port 4 and station modules beginning at port 3.

NA-MICS 4.0 mini to XC 4.0 maxi

1. Install XC 4.0 ROM software cartridge.
2. Install a Combination Fiber 6-port Services Cartridge in slot 2.
3. Connect trunk modules beginning at port 8 and work down and station modules beginning at port 3 and work up.

NA-MICS 4.0 midi to XC 4.0 midi

Install XC 4.0 ROM software cartridge.

NA-MICS 4.0 midi to XC 4.0 maxi

1. Install XC 4.0 ROM software cartridge.
2. Replace 2-port Expansion Cartridge with a Combination Fiber 6-port Services Cartridge in ICS slot 2.
3. Connect trunk modules beginning at port 8 and work down and station modules beginning at port 3 and work up.

NA-MICS 4.0 maxi to XC 4.0 maxi

Install XC 4.0 ROM software cartridge.

NA-MICS 4.0 maxi to XC 4.0 mega

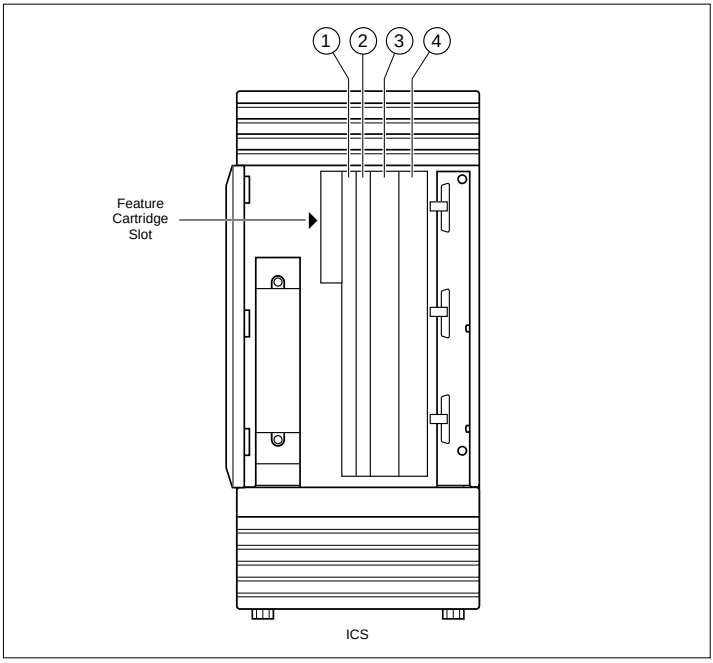
1. Install XC 4.0 ROM software cartridge.
2. Replace 2-port Expansion Cartridge with two Combination Fiber 6-port Services Cartridges or one 6-port expansion module and one Combination Fiber 6-port Services Cartridge in ICS slots 1 and 2, skipping any trunk modules, to port 12.
3. Connect trunk modules beginning at port 8 and work down and station modules beginning at port 3 and work up.

4. Trunk modules cannot be connected to the Combination Fiber 6-port Services Cartridge in slot 1. (fiber interface ports 9 through 14).

Tips - *Trunk modules cannot be connected to the Combination Fiber 6-port Services Cartridge in slot 1.*

To add Trunk and /or Station Modules to ports 13 and 14 in a mega system refer to Norstar-Companion Installer Guide.

Slots on ICS



Trunk and Station Modules

If you are not adding digital T1 trunks to your system or expanding to a mega configuration, you may reuse your existing copper Trunk and/or Station Modules with the Modular 0X32 ICS in NA-MICS 4.0/XC 4.0. One 6-port

copper expansion cartridge can be supported on the maxi configuration.

If you are adding digital T1 trunks to your system or expanding to a mega configuration, you must replace any copper Trunk and/or Station Modules with the new modules that have fiber connectors, and use a new fiber Expansion Cartridge in the ICS. You can reuse your old Trunk Cartridges in the new Trunk Module with fiber connectors.

Trunk modules cannot be installed on the second expansion (6-port) cartridge. You must relocate station modules to the second expansion cartridge to free up ports on the first 6-port expansion cartridge.

If you are upgrading your ICS and adding digital T1 trunks to your system:

1. Verify your system programming, and update your *MICS 4.0 Programming Record*.
2. Follow the procedures outlined in the "Installation" chapter on page 117 for installing a new system.

If you are upgrading your ICS, but not adding digital T1 trunks:

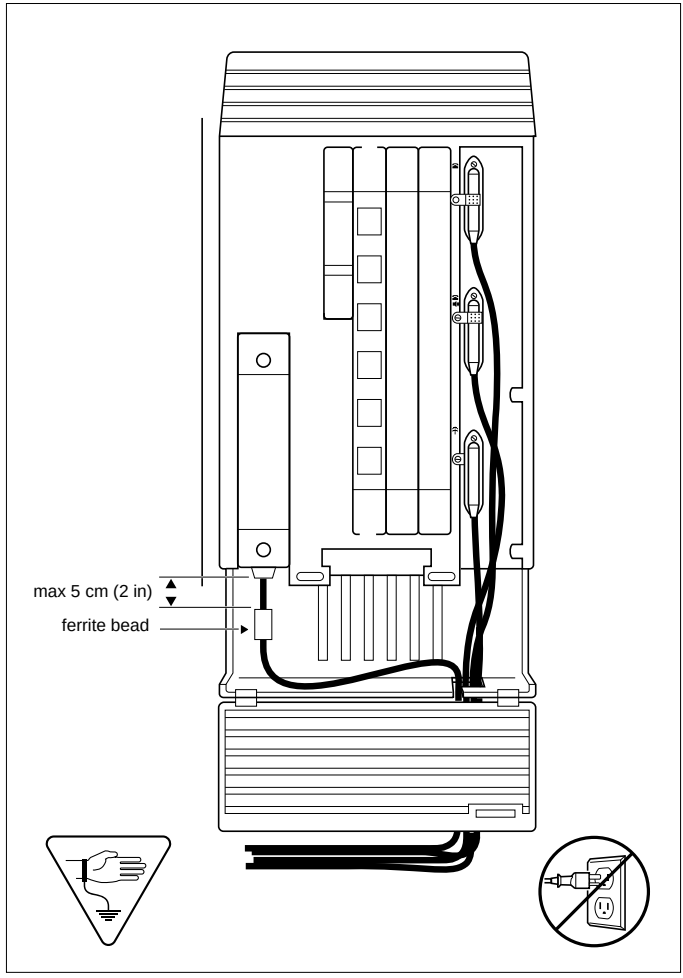
1. Verify your system programming, and update your *MICS 4.0 Programming Record*.
2. Disconnect the 50-pin connector for telephones from the ICS.
3. Disconnect the 50-pin connector for external lines and auxiliary equipment from the ICS.
4. Remove power from your system.

5. If your system includes Trunk Modules and Station Modules with DS-30 copper connectors, disconnect the DS-30 copper connectors from the Expansion Cartridge.
6. Remove any cables from the ICS cable trough.
7. Remove the ICS and wall-mount bracket from the wall.
8. Install the new ICS following the procedures in the "Installation" chapter on page 117.
9. If your system includes Trunk Modules and or Station Modules with DS-30 copper connectors, install a compatible Expansion Cartridge with copper connectors in slot 1 of the ICS. The faceplate will cover slots 1 and 2.

Do not reuse 8X24 Expansion Cartridge

You cannot reuse an 8X24 Expansion Cartridge in the 0X32 ICS. You must install a supported Expansion Cartridge. See Installing the cartridges on page 121.

10. If you have installed a copper Expansion Cartridge in the 0X32 ICS, clip the ferrite bead that was shipped with the Expansion Cartridge onto the ICS power supply power cord.



Ferrite bead required to meet EMI requirements

When using a copper Expansion Cartridge, you must install the ferrite bead on the ICS power cord to ensure that the product continues to meets FCC Part 15 Class A EMI requirements.

11. If your system includes Trunk Modules and or Station Modules with DS-30 copper connectors, reconnect the fiber interface cables to the Expansion Cartridge.
12. Power up the system.
13. Reconnect your 50-pin connector for internal telephones to the internal telephone connector on the ICS.
14. Reconnect your external line and auxiliary equipment wiring according to the procedures and wiring charts in the "Installation" chapter on page 117. You cannot reuse your original 50-pin connector for external lines and auxiliary equipment because the pin-outs have changed.

DNs on Station Modules will change

If you simply reconnect the 50-pin connector for telephones on the ICS, and leave your Station Modules telephone connectors as is, your directory numbers will change. The new 0X32 ICS can accommodate 32 telephones; the old 8X24 ICS connected only 24. Port numbering has been changed accordingly.

To preserve existing directory numbers consult the wiring charts in Installing the hardware and change the DNs using `Change DNs` in `System prgrming`.

Trunk module line numbering

When upgrading to a NA-MICS 4.0 or XC 4.0 system from systems earlier than MICS 2.0 or XC 2.0, the trunk module line numbering is reconfigured. This could affect applications such as Norstar Voice Mail and FLASH talk.

Line numbering for MICS 1.0 and 1.1 upgrades to MICS 2.0, 3.0 and 4.0

Module	Cartridge	MICS 1.0 and 1.1 lines	MICS 2.0, 3.0 and 4.0 lines
Mod 08	Cd1-Mod8	49-52	49-56
	Cd2-Mod8	53-56	57-64
	Cd3-Mod8	57-60	65-72
Mod 07	Cd1-Mod7	61-64	73-80
	Cd2-Mod7	65-68	81-88
	Cd3-Mod7	69-72	89-96
Mod 06	Cd1-Mod6	73-76	97-100
	Cd2-Mod6	77-80	101-104
	Cd3-Mod6	81-84	105-108
Mod 05	Cd1-Mod5	85-88	109-112
	Cd2-Mod5	89-92	113-116
	Cd3-Mod5	93-96	117-120
Mod 04	Cd1-Mod4	97-100	121-124
	Cd2-Mod4	101-104	125-128
	Cd3-Mod4	105-108	129-132
Mod 03	Cd1-Mod3	109-112	133-136
	Cd2-Mod3	113-116	137-140
	Cd3-Mod3	117-120	141-144

Upgrading ILG functionality with hunt groups

Incoming Line Group functionality has been replaced and extended in NA-MICS 4.0 with the new Hunt Group feature. ILG capabilities are not lost when replaced with hunt groups. The hunt group broadcast mode contains the equivalent of ILG functionality. With hunt groups

- calls can be queued when all the members in a hunt group are busy
- calls can be distributed to other members in the hunt group in a way that does not depend on the busy situation of its members (call forwards are overridden by the hunt group routing)
- the ring / call distribution pattern (e.g. who receives what call and in what order) can be programmed
- an overflow position can be another hunt group
- sequential and rotary modes are available (software key required) with more hunt group features

For more information on hunt groups, see Hunt groups on page 285.

Installation

Only qualified persons should service the system.

The installation and service of this unit is to be performed only by service personnel having appropriate training and experience necessary to be aware of hazards to which they are exposed in performing a task and of measures to minimize the danger to themselves or other persons.

Electrical shock hazards from the telecommunication network and AC mains are possible with this equipment. To minimize risk to service personnel and users, the ICS must be connected to an outlet with a third-wire ground. In addition, all unused slots should have filler faceplates installed and the doors should be in place at the completion of any servicing.

Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power line fault events near network lines. A risk point on the ICS is the power cord earth ground pin. These leakage currents normally safely flow to Protective Earth ground via the power cord. Therefore, it is mandatory that connection to a grounded outlet is performed first and removed last when cabling to the unit. Specifically, operations requiring the unit to be powered down must have the network connections (central office lines) removed first.

Installation checklist

- ☐ test all ISDN network connections, if any
- ☐ mount the Integrated Communications System (ICS)
- ☐ mount the expansion modules (as required)
- ☐ install the Modular ICS NVRAM cartridge

- ☐ install the Expansion Cartridge, Trunk Cartridges (for DTI or PRI) or BRI cards (as required)
- ☐ install the optional equipment
- ☐ install power bars, as required
- ☐ mount the distribution panel
- ☐ complete the wiring
- ☐ install the fiber cables
- ☐ install the emergency telephone(s)
- ☐ install the Norstar telephones
- ☐ power up the system
- ☐ connect the cables between the distribution block and the expansion modules
- ☐ install the door
- ☐ select the default template using System Startup programming
- ☐ program to customer requirements
- ☐ record programming details in the *MICS 4.0 Programming Record*
- ☐ ensure that all telephone keys are properly labelled
- ☐ ensure that all sets are working
- ☐ check that the system is working properly
- ☐ ensure that all relevant documentation is left with the person in charge of the system
- ☐ train the Administrator using “Getting Started” in the *Modular ICS 4.0 System Coordinator Guide*

- ☐ for information on upgrading your ICS without adding digital T1, see Trunk and Station Modules on page 110.

To avoid electrical shock hazard to personnel or equipment damage, observe the following precautions when installing telephone equipment.

- Always disconnect telecommunication network connectors before disconnecting the AC power plug.
- Never connect the central office connectors until you have connected the power plug.
- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when modifying or installing telephone lines.

Companion

If you are installing a system with Norstar Companion components, refer to the Installation chapter of the *MICS-XC Norstar Companion Installer Guide*.

Norstar Integrated Data Module 200

If you are installing the ICS system with the Norstar Integrated Data Module 200, refer to Installing optional equipment on page 181 and the *Norstar Integrated Data Module 200 Installer Guide*.

Testing the ISDN BRI network connection

Before you install a Norstar system which uses BRI Cards you should test your connection to the ISDN network.

If you are installing a system which connects to the network using BRI-ST Cards, the network connection must be equipped with an NT1. See the ISDN chapter and the wiring information in this chapter for more information about installing an NT1.

To test the ISDN BRI connection:

1. Connect ISDN terminal equipment (TE) that conforms to Bellcore standard to your central office ISDN jack or NT1. U interface TE can connect directly to the central office jack; S interface TE connect to the central office through an NT1.
2. Program the TE with the appropriate switch type, service profile identifier (SPID), and Network directory number (DN) using the instructions that come with the TE.
3. Check for dial tone, then place a call and verify the quality and clarity of the connection. If there is a problem, contact your service provider.
4. Repeat steps one through three for each network connection.

Installing the cartridges

The following table shows you which cartridges can be installed in which ICS and TM slots.

Cartridge type	Part number	ICS Slot	TM Slot
Modular ICS NVRAM cartridge	A0733975 NTBB08GA-93	Feature Cartridge Slot	
Modular ICS ROM software cartridges: USA-MICS-XC 4.0 CDA-MICS-XC 4.0 NA-MICS 4.0	 A0734006 NT7B64AV A0734004 NT7B64AT A0734007 NT7B64AU	NVRAM Cartridge Slot	
Services Cartridge	A0404139 NTBB24GA-93	1	
Fiber Expansion Cartridge (2-port)	A0404244 NTBB02GA-93	2	
Fiber Expansion Cartridge (6-port)	A0404245 NTBB06GA-93	1 or 2 (see note below)	
Combination Fiber 6-port Services Cartridge	A0632426 NTBB25GA-93	1 or 2 (see note below)	
Digital Trunk Interface (DTI) card configured for TI card or PRI	A0404135 NT7B74GA-93	3 or 4	
Loop Start Disconnect Supervision (LS/DS) Trunk Cartridge	A0405799 NT7B75GA-93	3 or 4	1, 2 or 3
Caller Identification (CI) Trunk Cartridge	A0393277 NT5B41GA-93	3 or 4	1, 2 or 3
E&M Trunk Cartridge	A0359618 NT5B38GA-93		1, 2 or 3
DID Trunk Cartridge	A0359617 NT5B37GA-93		1, 2 or 3

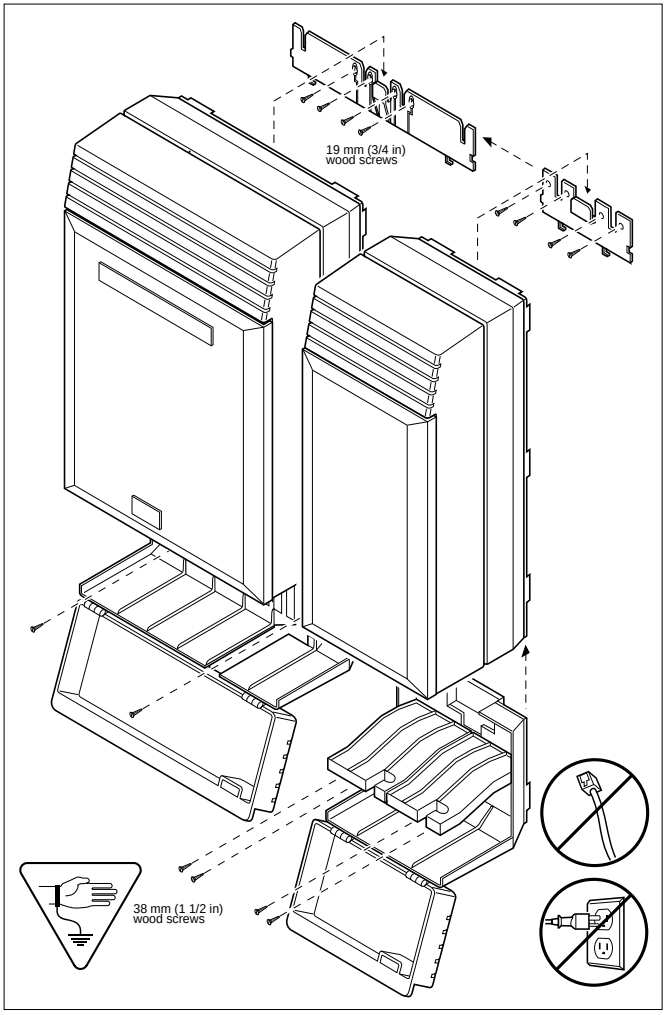
Cartridge type	Part number	ICS Slot	TM Slot
Copper Expansion (2-port)	A0405796 NTB03GA-93 or NT5B26GA-93	1	
Copper Expansion (6-port)	A0405797 NTBB07GA-93or NT5B27GA-93	1	
BRI-ST card	A0649029 NT7B76GY-93	3 or 4	1, 2 or 3
BRI-U2 card	A0655688 NT7B86GB-93	3 or 4	1, 2 or 3
BRI-U4 card	A0655690 NT7B87GB-93	3 or 4	1, 2 or 3

Note: Use Slot 1 only when installing cartridges for 12-port, fully expanded systems. In this case, both slots 1 and 2 are installed with 6-port Expansion or a Combination Fiber 6-port Services Cartridge. If you use both slot 1 and 2, the software must be XC.

- LS/DS Analog Trunk Cartridges and Caller Identification (CI) Trunk Cartridges both support loop start external lines.
- The Digital trunk Interface (DTI) supports both digital T1 and PRI lines. The DTI card can be configured to support ISDN PRI
- The Loop Start Trunk Cartridge supports loop start external lines.
- The CI Trunk Cartridge supports Call Display features on loop start external lines.
- The E&M Trunk Cartridge supports E&M lines and provides direct inward system access (DISA).
- The DID Trunk Cartridge supports direct inward dialing lines.

- The BRI-ST card supports ISDN BRI S or T reference point loops.
- The BRI-U2 and BRI-U4 cards support 2 or 4 ISDN BRI U reference point loops, respectively.

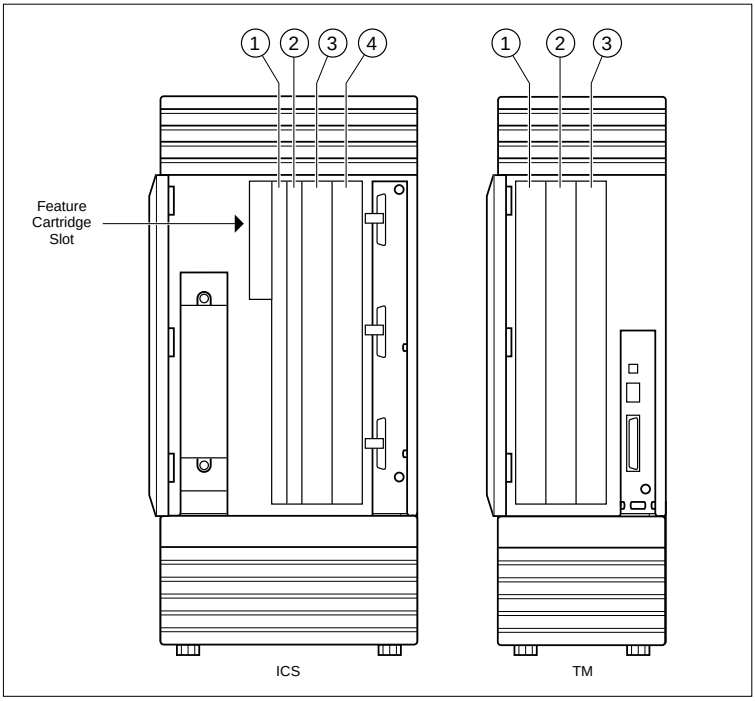
Mounting the modules



Attach bracket to secure surface.

Screw the ICS mounting bracket and ICS to a 19 mm wood backboard secured to a wall and capable of supporting a 20 kg mass. Do not screw bracket directly to drywall. Use the two inner screw holes on the bracket.

See T1 or ISDN-PRI configurations on page 351 for configurations of Trunk Cartridges on the ICS slots.



Avoid risk of electrical shock.

Voltages of up to 130 V may be present on the 1.544 Mbps circuit and on portions of the DTI circuitry.

Tips - *For a 2-port (midi) system, a 2-port fiber Expansion Cartridge is installed only in ICS slot 2.*

For a 6-port (maxi) system, a 6-port fiber Expansion Cartridge or a Combination Fiber 6-port Services Cartridge is installed only in ICS slot 2.

When a 6-port fiber Expansion Cartridge is installed in ICS slot 2, either an additional 6-port fiber Expansion Cartridge

(for a fully analog trunk system) or a Combination Fiber 6-port Services Cartridge can be installed in ICS slot 1 for a 12-port (mega) system with digital or BRI lines.

Two Combination Fiber 6-port Services Cartridge are supported on a mega configuration using both ICS slots 1 and 2. When expanding beyond 6 ports, it is recommended two Combination Fiber 6-port Services Cartridge be used if two DTI cards are installed.

For a 12-port (mega) system, any combination of the 6-port fiber Expansion and the Combination Fiber 6-port Services Cartridge is supported using both ICS slots 1 and 2.

A copper Expansion Cartridge is a full-width cartridge and covers both ICS slots 1 and 2.

One 6-port copper Expansion Cartridge is supported for a maxi configuration and can only be installed in slot 1.

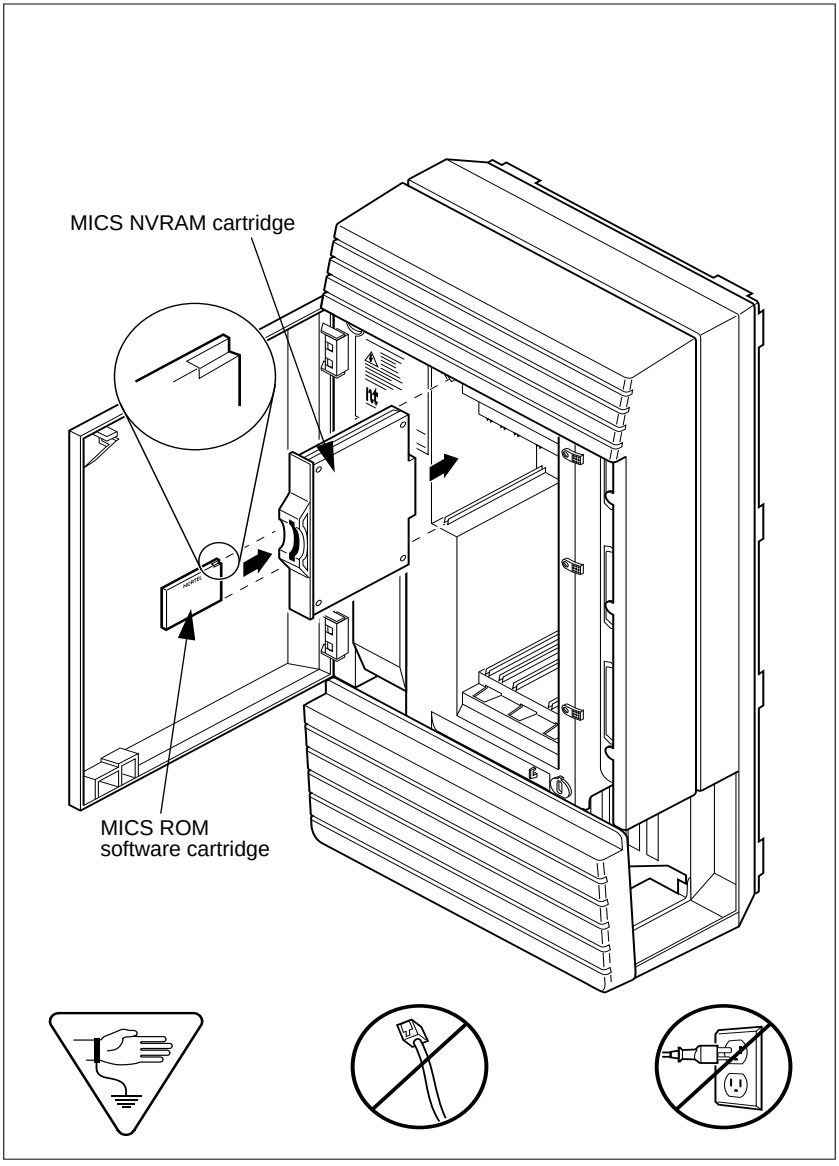
One 2-port copper Expansion Cartridge is supported for a midi configuration and can only be installed in slot 1.

Depending on your system configuration, BRI-ST, BRI-U2, and BRI-U4 cards can only reside in certain trunk modules. In a midi system, the cards must be in trunk modules 3 or 4, for a maxi or mega system, the cards must be in trunk modules 7 or 8. The cards can reside in the ICS regardless of system size.

Alarm Telephone will indicate a warm or cold reset.

An alarm and a prompt indicating warm or cold reset will occur on the alarm telephone if an expansion cartridge is installed in the wrong ICS slot or when the system size has been decreased.

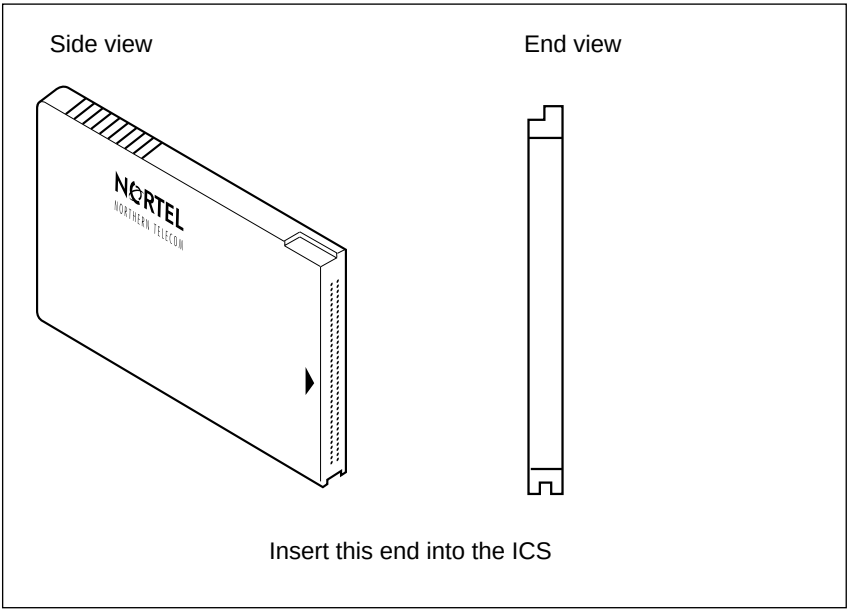
Installing the ROM Software Cartridge



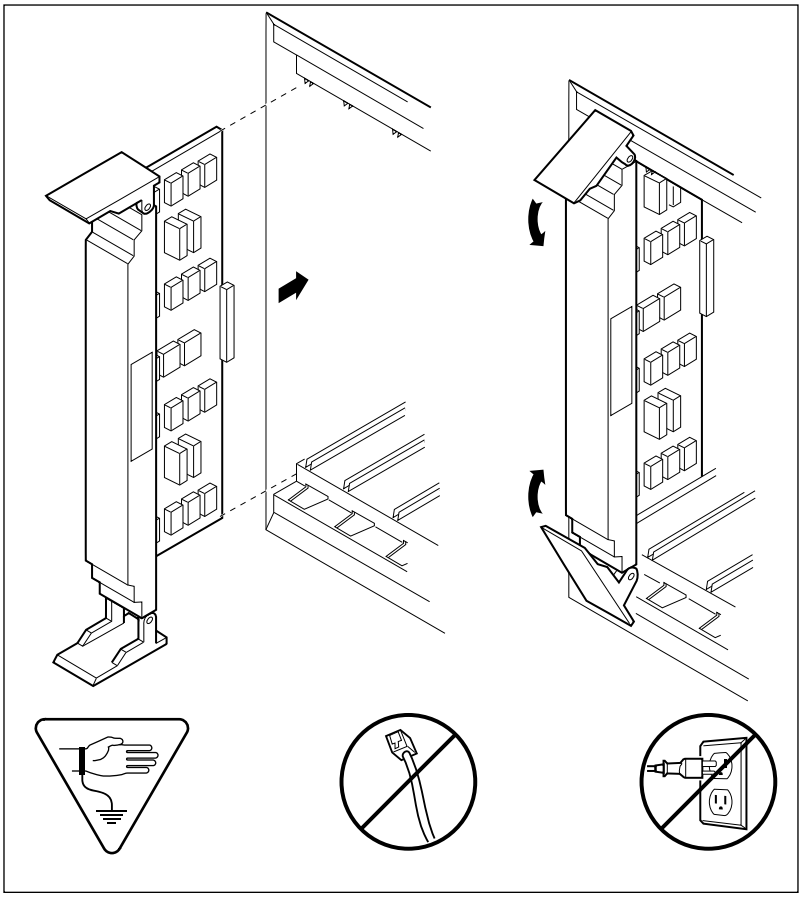
Insert MICS ROM software cartridge one way.

To ensure the MICS ROM software cartridge is properly installed, insert it as shown in the illustration.

MICS ROM software cartridge



Inserting a cartridge



Close clips simultaneously.

It is important to center and close the two clips on the cartridge simultaneously. The cartridge may become misaligned in its slot or with its connector. If improperly inserted, the connector will be damaged.

PCB is electrostatic-sensitive.

Do not touch the printed circuit board on a cartridge. This is an electrostatic-sensitive device.

1. Install trunk cartridges in the ICS beginning with Slot 4 then Slot 3.
2. Install trunk cartridges in the trunk modules beginning with Slot 1 then Slot 2 and then Slot 3.

For easier wiring, install similar type Trunk Cartridges together in the same Trunk Module.

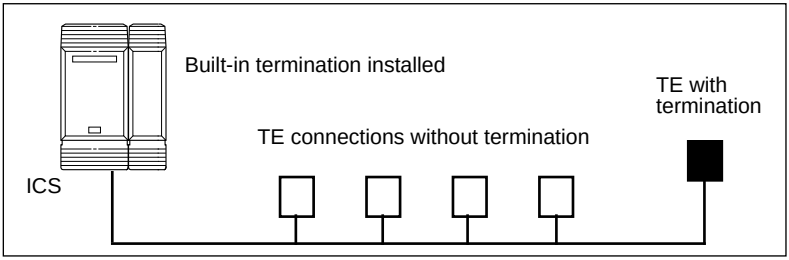
If you install an E&M or a DID or BRI Trunk Cartridge in the left-most slot (slot 1) of a TM, emergency telephones cannot be supported for that Trunk Module.

Terminating resistors on BRI-ST Cards

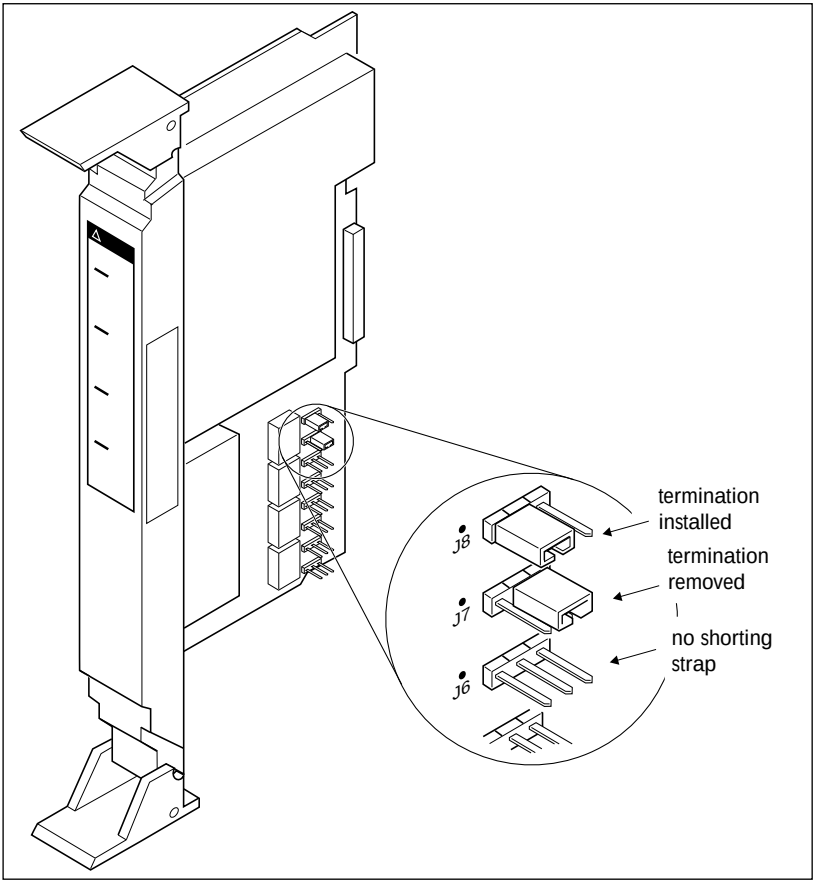
The standard ISDN user-network interface wiring requires terminating resistors at each end of the loop for point-to-point operation. This ensures correct timing of the signaling circuits.

Loop termination can be provided at either the point where the ISDN terminal is attached, or by the device attached to the loop (with built-in termination). Because the Modular ICS is usually at one end of the loop, the BRI-ST card is shipped with termination built-in for each ISDN loop. It is ready to be used

where the ICS is located at one end of the loop, as in the following illustration:



Shorting straps on a BRI-ST card



Make sure the shorting straps are installed on both the receive and transmit jumpers for the loop (see illustration). The jumpers are numbered top to bottom, but the loops associated with each pair of jumpers does not follow the same top-to-bottom sequence (see table).

Loop	RX and TX shorting straps
1	J3 and J4

Loop	RX and TX shorting straps
2	J7 and J8
3	J1 and J2
4	J5 and J6

Connecting expansion modules

If your system includes fiber Trunk Modules, fiber Station Modules, Data Modules or Analog Station Modules, you need to connect the modules to the Expansion Cartridge by means of fiber cables.

Order of connection

In order to keep the default port and set numbering, connect Trunk Modules to the Expansion Cartridge beginning at the top and working down; connect Station Modules to the Expansion Cartridge beginning at the bottom and working up.

Norstar Integrated Data Module 200

If you are installing the ICS system with the Norstar Integrated Data Module 200, refer to Installing optional equipment on page 181 and the *Norstar Integrated Data Module 200 Installer Guide*.

Companion

If you are expanding your system to include Companion components, see the upgrade instructions included in the *MICS-XC Norstar-Companion Installer Guide*.

Analog Station Module

If you are installing the ICS system with an ASM, refer to the *Analog Station Module Installation Guide*.

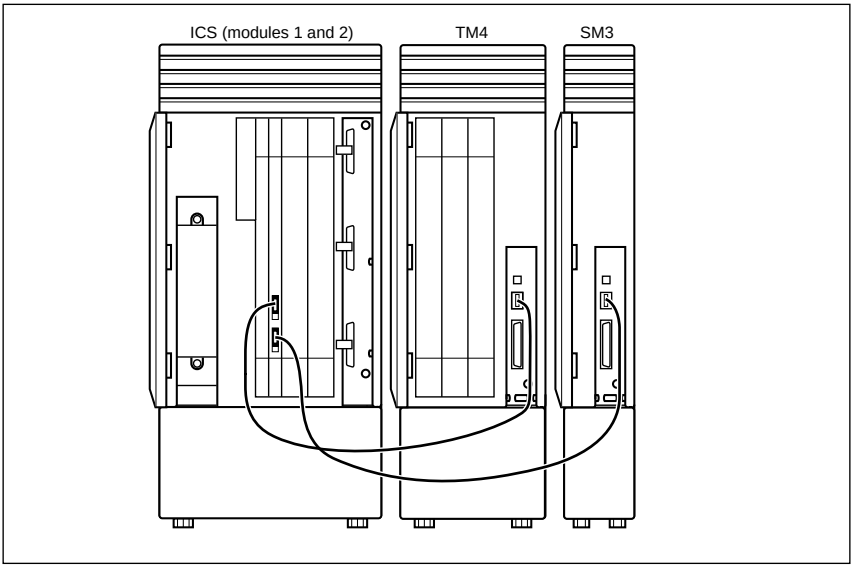
Tips - *On a midi system, ports 3 and 4 can be used for Trunk Modules or Station Modules. In this case, connect Trunk Modules beginning at the top (port 4); connect Station Modules beginning at the bottom (port 3).*

On a maxi system, ports 3 through 8 can be used for Trunk Modules or Station Modules. In this case, Trunk Modules should be connected beginning at the top (port 8) and working down; Station Modules should be connected beginning at the bottom (port 3) and working up.

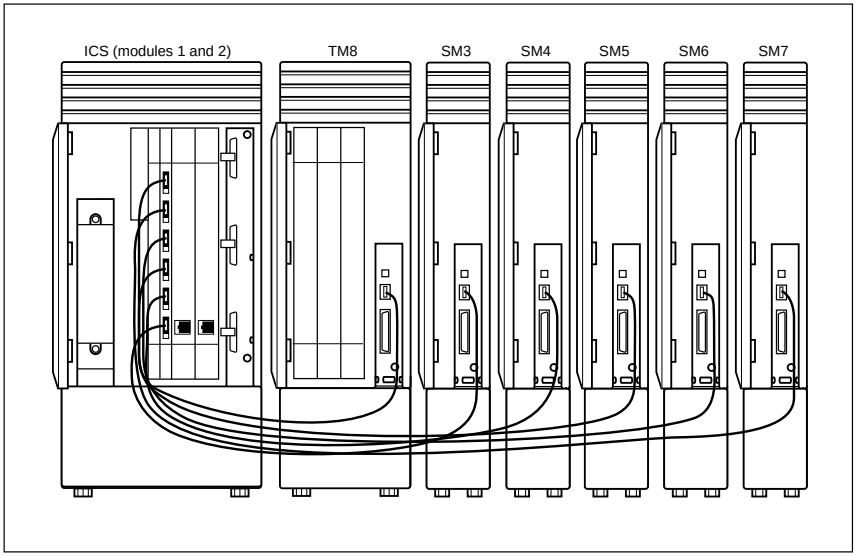
On a fully expanded 12-port (mega) system, connect Trunk Modules beginning at the top (port 8) and working down; Station Modules would be connected beginning at the bottom (port 3) and working up. Trunk Modules cannot be connected to the Expansion Cartridge in slot 1.

When no more Station Modules can be added to the Expansion Cartridge in slot 2, connect additional Station Modules to the Expansion Cartridge in slot 1, beginning at the bottom (port 9) and working up.

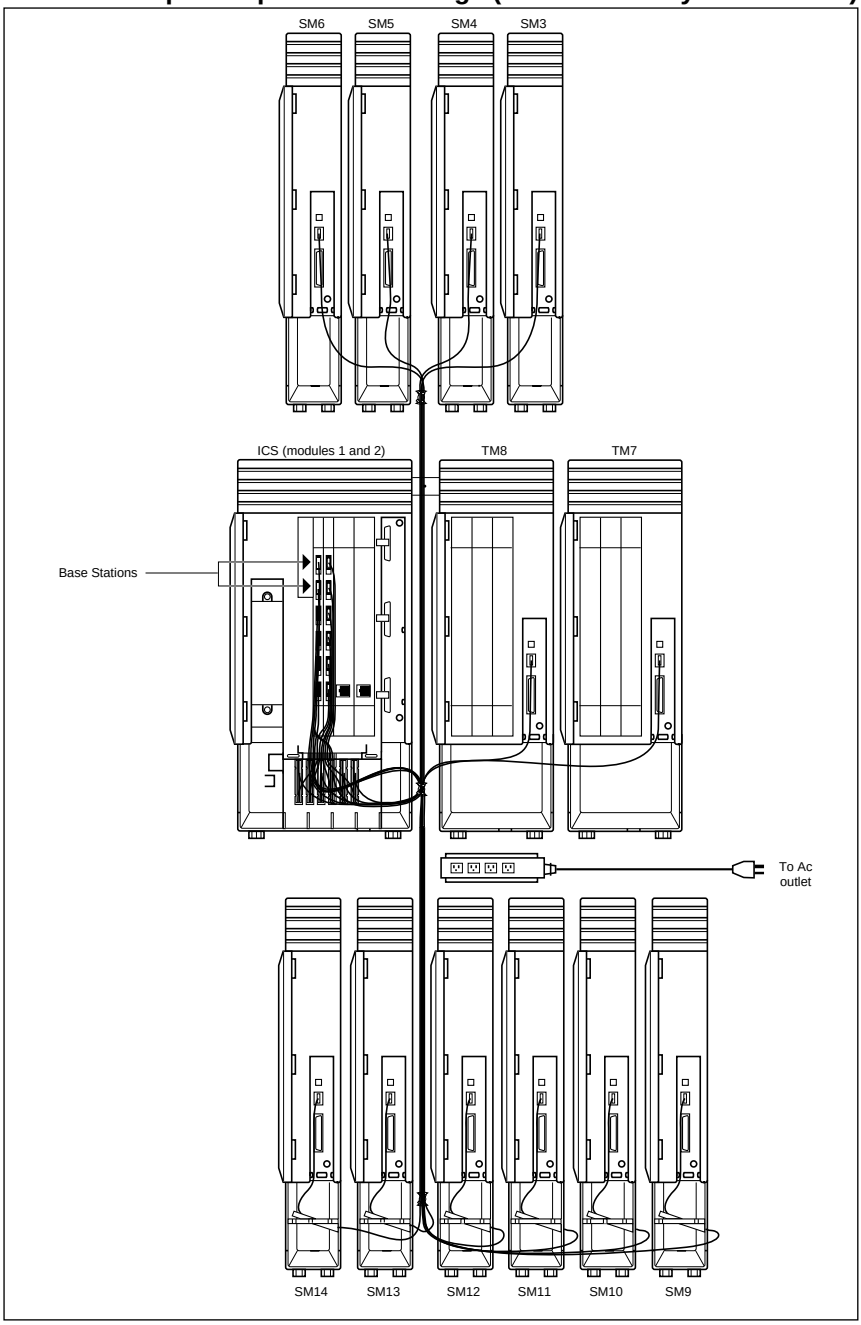
Two-port Expansion Cartridge



Six-port Expansion Cartridge



Twelve-port Expansion Cartridge (MICS-XC 4.0 system shown)



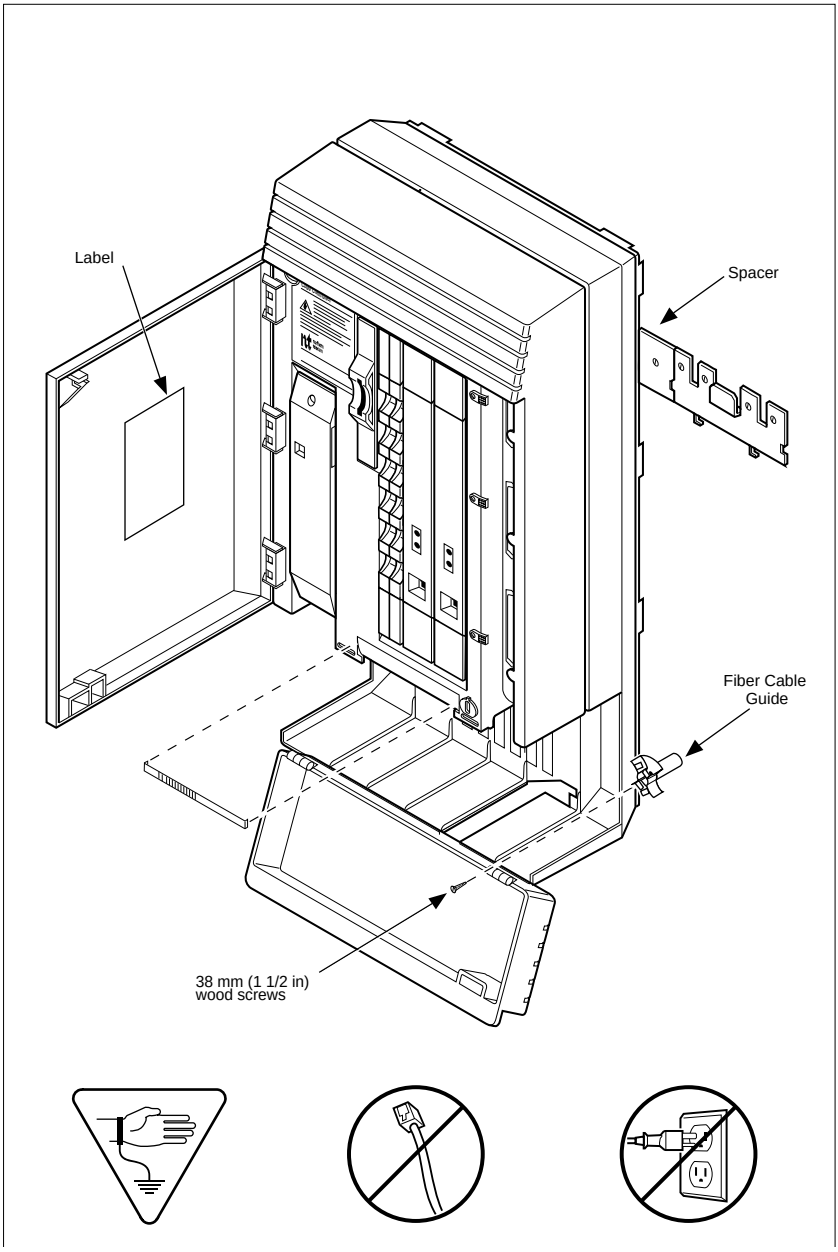
Installing fiber cables

Installing fiber cables.

Fiber cables are durable, but can be damaged. To avoid damage that can affect the signals transmitted, observe the following guidelines:

- Coil excess fiber cable on the spool provided for the installation.
- Secure the fiber cable spool in the ICS cable trough.
- Ensure that bends in the cable are no tighter than 100 mm. (4 in.) in diameter.
- When using cable ties, bundle fiber cables loosely.
- Avoid excessive pulling, compression or impact.
- Do not grasp the fiber cable, or the clasp where the cable joins the plug, when connecting or disconnecting a fiber cable plug into a port.
- Do not leave fiber cables in an environment with excessively high temperatures (for example, on top of radiators).

Fiber cable management system

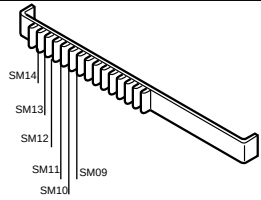


Using the fiber cable management system

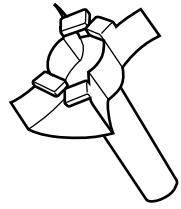
To facilitate the installation of an NA-MICS 4.0 or MICS-XC 4.0 configuration, the Fiber Cable Management System ensures that power cords are located outside of the cable tray and that a 2.6 cm (1 in.) space exists between the ICS module and other modules.

The following hardware components are used in the Fiber Cable Management System:

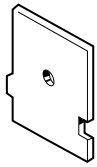
- **Fiber Comb (one per system):** The Fiber Comb, is installed, using an adhesive back, on the ICS, below the fiber expansion cartridges. The Fiber Comb keeps the fiber cable in place and prevents the cables from being pinched between doors. Use the comb to keep fiber cables organized as they are routed to each Station Module, as shown in the 12-port example below.



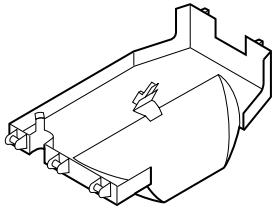
- **Fiber Cable Guide (three per system):** to be installed in the entrance and exit of the cable trough. The Fiber Cable Guide allows routing fibers to maintain a minimum bend radius when going through the cable trough.



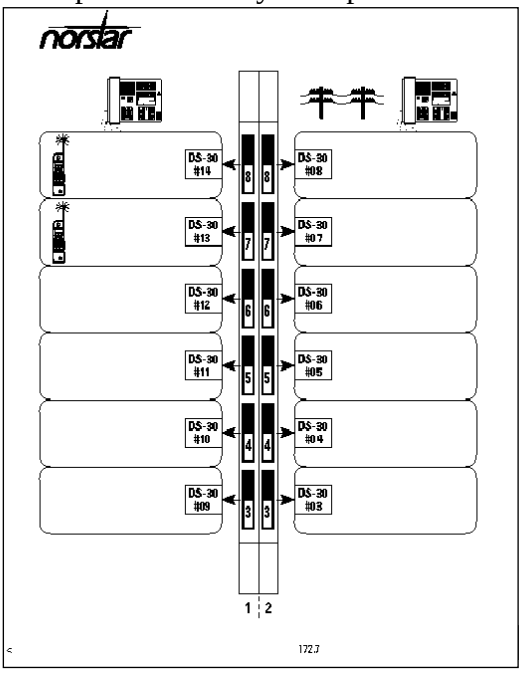
- **Spacer (three per system):** to be installed between mounting brackets of the ICS and an adjacent module. The Spacer provides a 2.6 cm (1 in.) space between modules and the ICS.



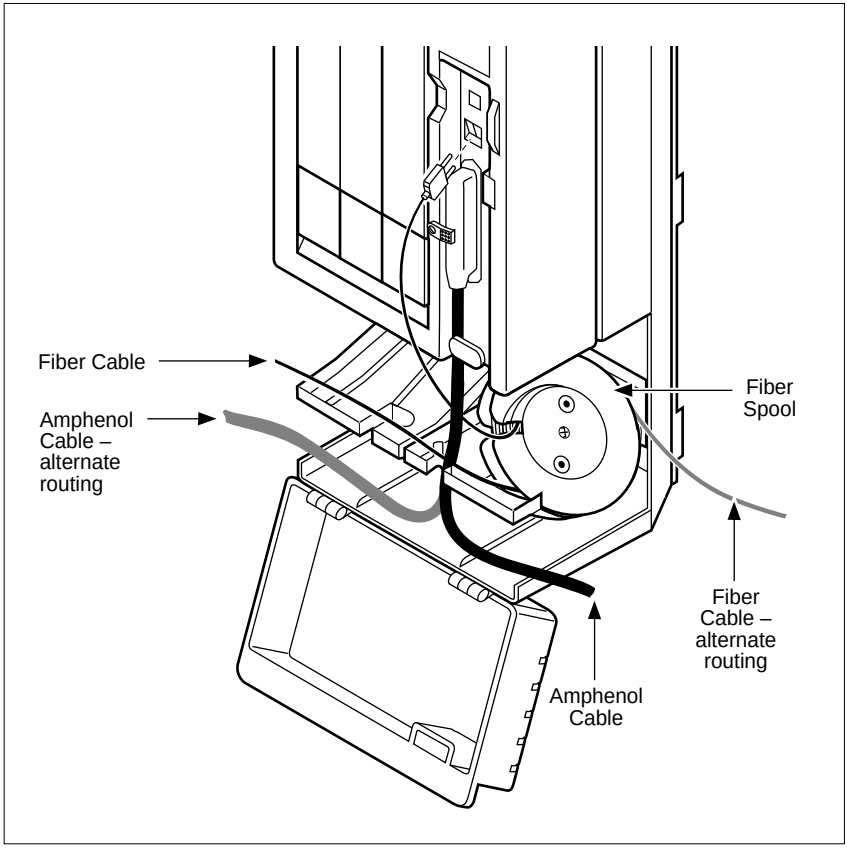
- **Fiber Spool Holder (six per system):** Replaces the trough shelf in modules requiring additional fiber spools. The spool holder should be installed in the right side of a Trunk Module.



- **ICS Door Label:** Located on the inside of the ICS door, it provides space to identify fiber port allocation on the ICS.

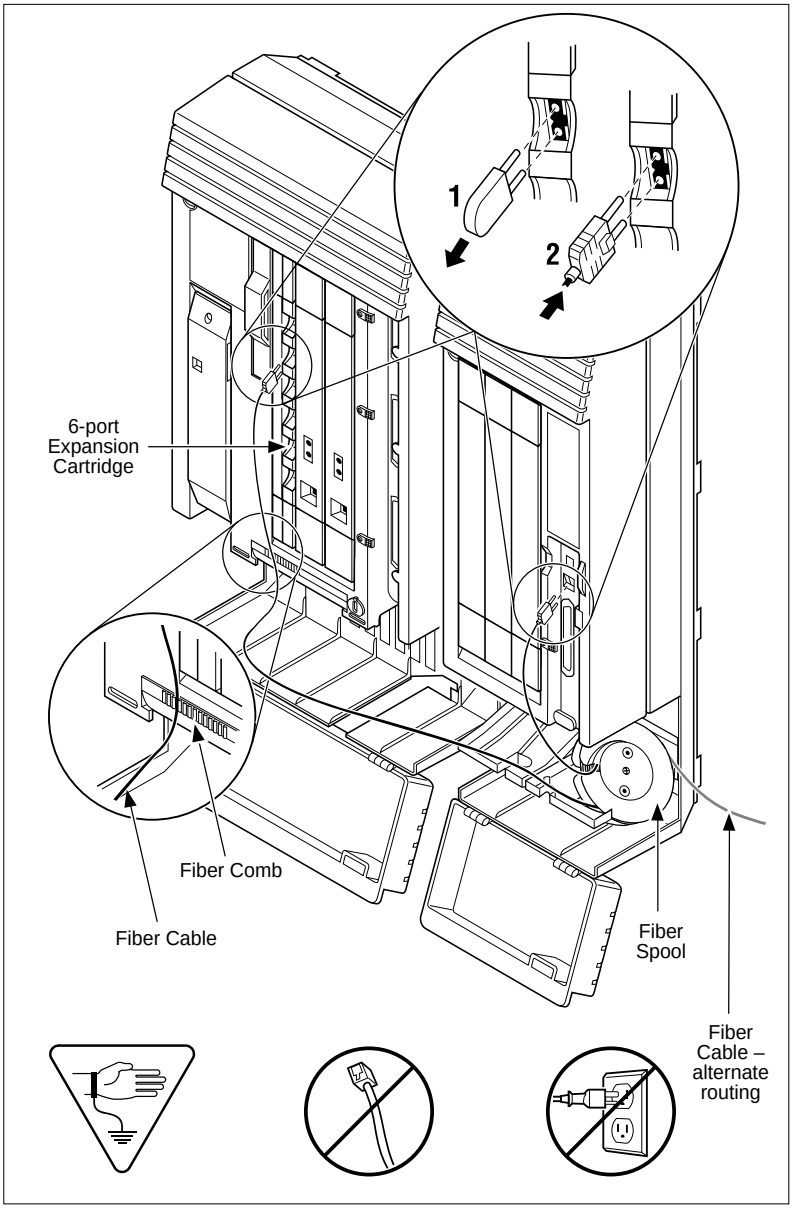


Using the fiber spool

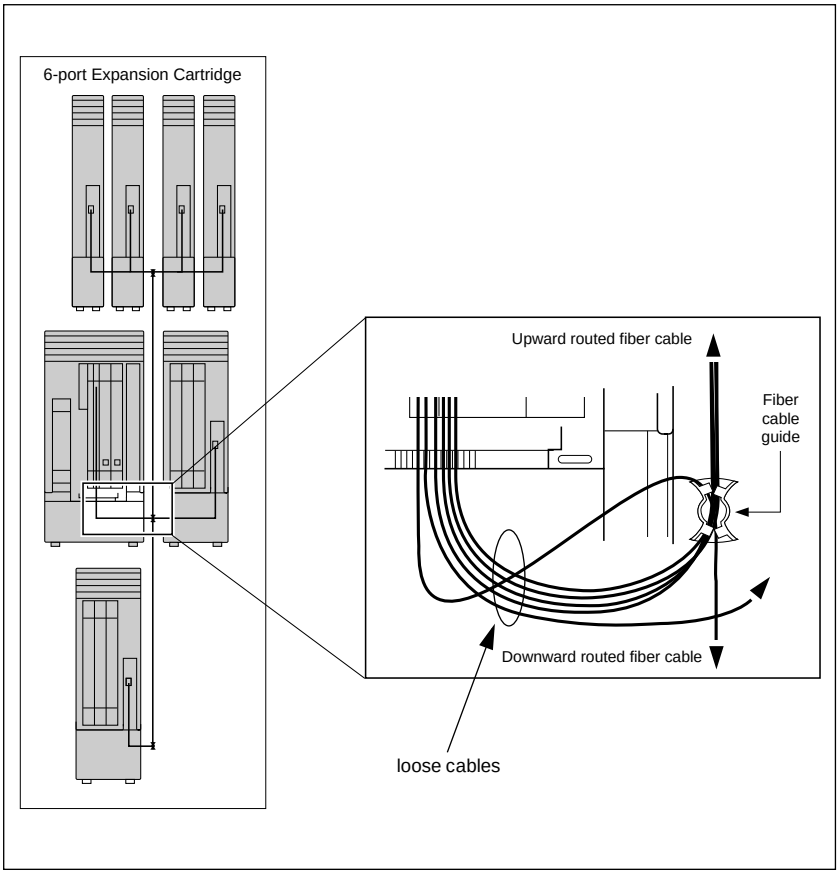


Making fiber connections

(MICS-XC 4.0 system is shown)



Routing fiber cables



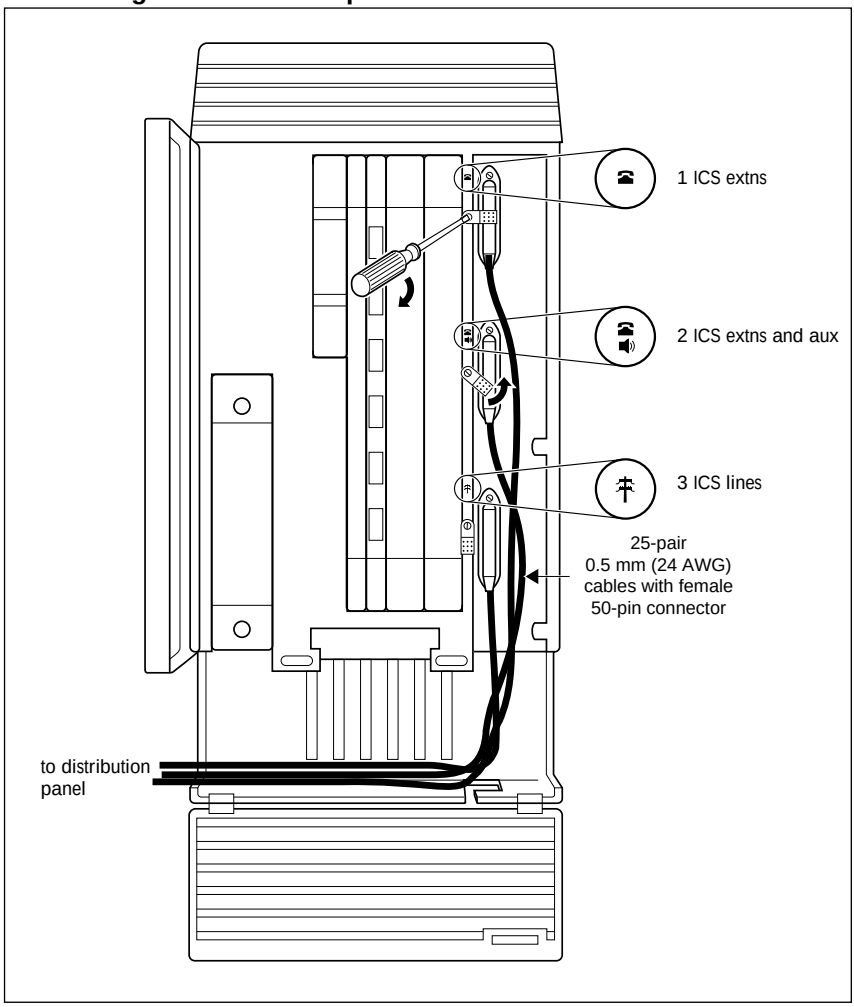
Connecting the wiring

Connecting the wiring to the distribution panel

1. Route the cables through the hole in the ICS cable through to the distribution panel.
2. Bundle the cables with cable ties and secure them to the wall to support their weight.
3. Connect the telephone and auxiliary equipment wires to the appropriate pins on the distribution block (refer to the wiring charts).
4. Cross-connect the ICS telephone and auxiliary equipment wiring.
5. Connect the Station Module telephone wiring to the corresponding station pins.
6. Connect the Norstar Integrated Data Module 200 to the distribution block. Use Category 5 wire and accessories for the Integrated Data Module 200.
7. Using a single pair of wires for each telephone, connect each of the telephones according to the wiring charts.
8. Cross-connect the external lines (loop start, E&M, DID, BRI) to the distribution block (refer to the wiring charts).
9. The DTI is equipped with an internal channel service unit (CSU). You can connect the DTI directly to the termination point provided by your T1 or PRI service provider. If you disable the internal CSU, you can connect the DTI to an external CSU or multiplexer.

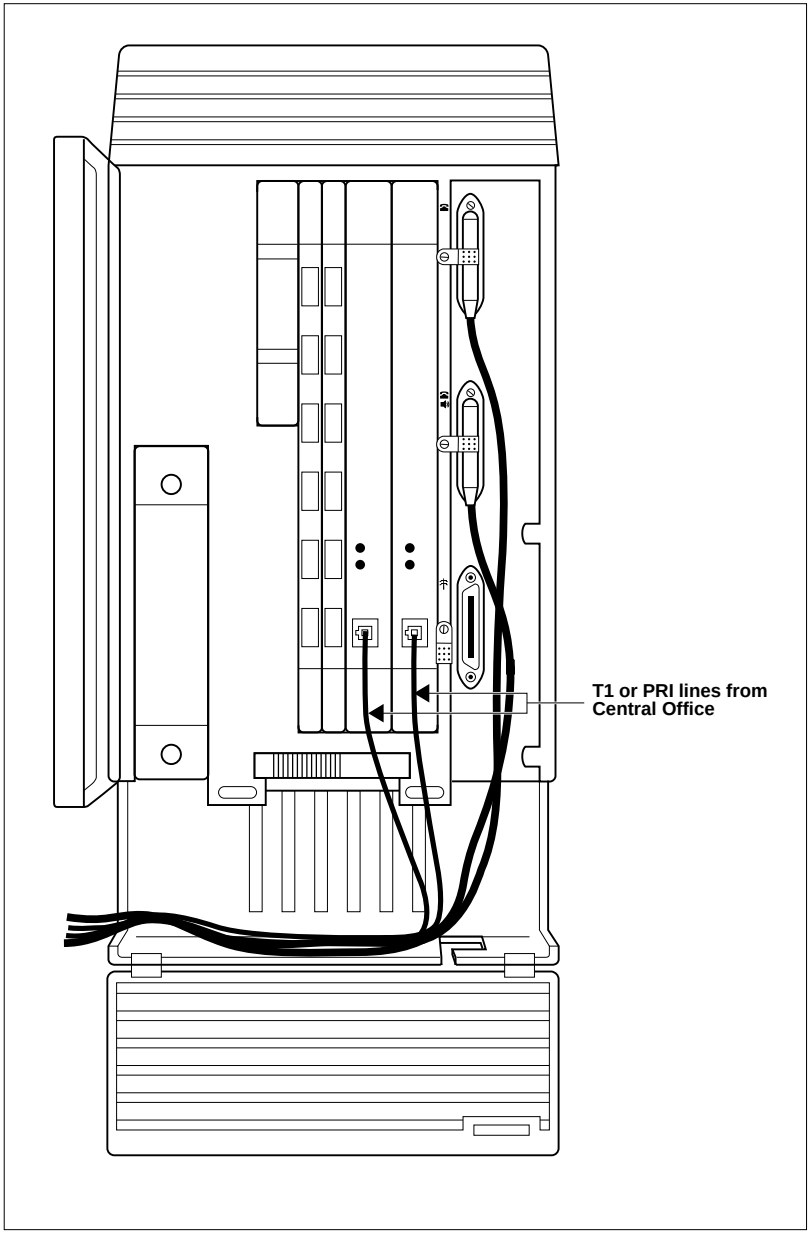
   The DTI does not provide the DC connection required for through-fed repeaters. If through-fed repeaters are used on the T1 or PRI span, disable the internal CSU and connect the DTI to an external CSU.

Connecting an ICS with loop start lines

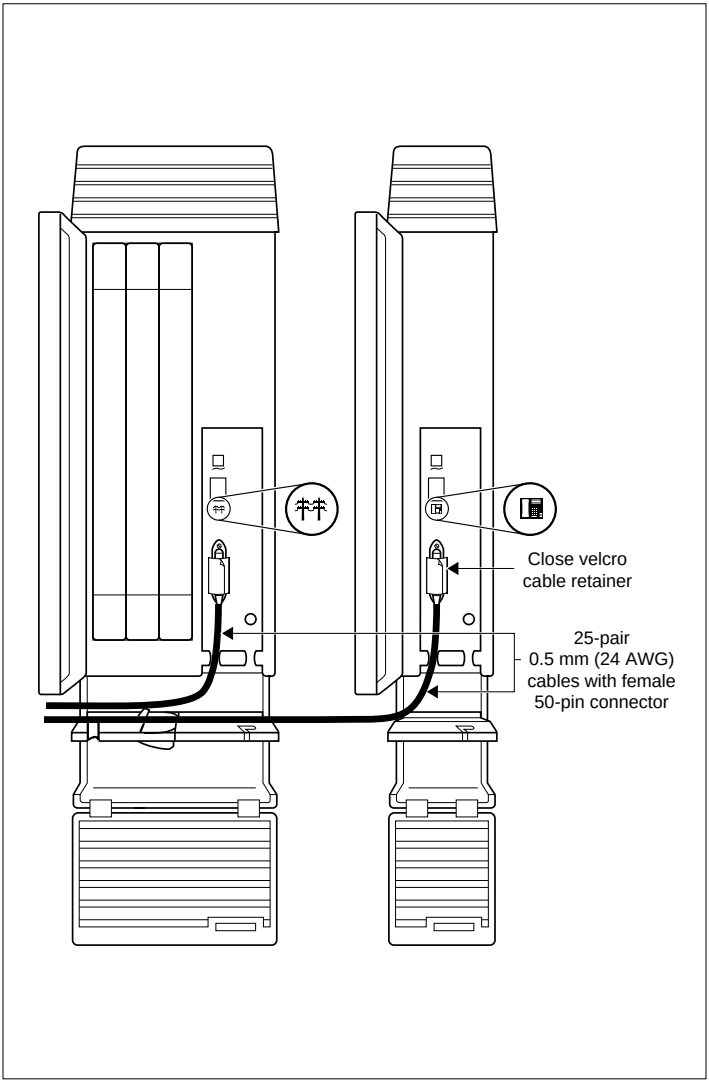


Do not attach central office connections to the ICS or Modules until power is connected to the units.

Connecting the wiring for an ICS with T1 or PRI lines (MICS-XC 4.0 system is shown)



Connecting a Module



Wiring charts

Port numbering on the wiring charts

The port number listed on the wiring charts is useful in tracking down faults during a Maintenance session where error codes appear on a Norstar telephone display (see Alarm

codes on page 377). The port numbers (for example: “XX12”) on the Trunk Cartridge and Station Module wiring charts have two components:

- “XX” corresponds to the number that appears on the face of the Expansion Cartridge port that the Trunk Module or Station Module is connected to.
- digits (for example “01” or “12”) identify an individual port number associated with that module.

For example:
The code “812” appearing as part of an error message for a Trunk Module indicates that the problem is with Expansion Cartridge port #8 and internal port “12”. The corresponding Trunk Module pins on the distribution block are pin 47 (violet-orange) and pin 22 (orange-violet).

Integrated Communications System (ICS)

In the charts on the following pages, notice that the ICS has two internal modules, ICS #1 and ICS #2. ICS #1 handles telephones and auxiliary equipment. ICS #2 handles lines.

B1 and B2 directory numbers

The terms B1 and B2 correspond to channels on Norstar for transmitting voice and data. Each DN port number has a B1 DN and a B2 DN. Devices such as the Norstar M7100, M7208, M7310, and M7324 telephones use only the B1 DN. Other devices may need both B1 and B2 channels, therefore requiring B1 and B2 DNs.

CTA 500*dm*

If you are attaching a Computer Telephony Adapter (CTA) 500*dm* to the ICS, use one of the last ten on-core DN ports (123-132). You can connect a maximum of 10 CTAs to the system. See the instructions that come with the adapter for more information.

Norstar Integrated Data Module 200

If you are attaching an Norstar Integrated Data Module 200 to the ICS, see the *Norstar Integrated Data Module 200 Installer Guide* for wiring charts and instructions.

Non-expanded system (ICS alone) numbering

Module	Lines	Line ports	B1 DN	B2 DN	DN ports
ICS (#2)	001-048	201-248	— —	— —	— —
ICS (#1)	— —	— —	21-52	53-84	101-132

Two-port Expansion Cartridge and ICS numbering

Module	Lines	Line ports	B1 DN	B2 DN	DN ports
Mod 04	049-072	401-412	269-284	333-348	401-416
Mod 03	073-096	301-312	253-268	317-332	301-316
ICS (#2)	001-048	201-248	— —	— —	— —
ICS (#1)	— —	— —	221-252	285-316	101-132

Six-port Expansion Cartridge and ICS numbering

Module	Lines	Line ports	B1 DN	B2 DN	DNports
Mod 08	049-072	801-812	333-348	461-476	801-816
Mod 07	073-096	701-712	317-332	445-460	701-716
Mod 06	097-108	601-612	301-316	429-444	601-616
Mod 05	109-120	501-512	285-300	413-428	501-516
Mod 04	121-132	401-412	269-284	397-412	401-416
Mod 03	133-144	301-312	253-268	381-396	301-316
ICS (#2)	001 -048	201-248	— —	— —	— —
ICS (#1)	— —	— —	221-252	349-380	101-132

Twelve-port expanded system and ICS numbering

Module	Lines	Line ports	B1 DN	B2 DN	DN ports
Mod 14	— —	— —	— —	— —	— —
Mod 13	— —	— —	— —	— —	— —
Mod 12	— —	— —	397-412	589-604	1201-1216
Mod 11	— —	— —	381-396	573-588	1101-1116
Mod 10	— —	— —	365-380	557-572	1001-1016
Mod 09	— —	— —	349-364	541-556	901-916
Mod 08	049-072	801-812	333-348	525-540	801-816
Mod 07	073-096	701-712	317-332	509-524	701-716
Mod 06	097-108	601-612	301-316	493-508	601-616
Mod 05	109-120	501-512	285-300	447-492	501-516
Mod 04	121-132	401-412	269-284	461-476	401-416
Mod 03	133-144	301-312	253-268	455-460	301-316
ICS (#2)	001-048	201-248	— —	— —	— —
ICS (#1)	— —	— —	221-252	413-444	101-132

Tips - *A 12-port expanded system is available on an MICS-XC 4.0 system.*

Depending on your system configuration, BRI-ST, BRI-U2, and BRI-U4 cards can only reside in certain trunk modules. In a Midi system, the cards must be in trunk modules 03 or 04, for a Maxi or Mega system, the cards must be in trunk modules 07 or 08. The cards can reside in the ICS regardless of system size.

Expansion module #13 and #14 are reserved for Companion Wireless capability. Refer to your MICS-XC Norstar-Companion Installer Guide for information on using expansion module #13 and #14.

Port 3 is the bottom fiber cable port on both the two-port and the six-port Expansion Cartridge in slot 2. Port 9 is the bottom fiber cable port located on the left most expansion card in slot 1.

B1 and B2 directory numbers reflect the default numbering scheme.

If you expand your system after initial installation and programming, there may appear to be gaps in your B1 DN numbering.

This is because the system has already assigned DN numbers to B2 channels. You can correct these gaps by performing Startup programming and resetting the system memory, or by changing the individual DNs. See in Change DNs *under* System prgrming*.*

Startup programming erases the system memory.

ICS telephone wiring chart

Pin	Wire color	Port	Service	Telephones (ICS)	Default DN
26	White-Blue	101	T	1	
1	Blue-White	101	R	1	21/221/2221
27	White-Orange	102	T	2	
2	Orange-White	102	R	2	22/222/2222
28	White-Green	103	T	3	
3	Green-White	103	R	3	23/223/2223
29	White-Brown	104	T	4	
4	Brown-White	104	R	4	24/224/2224
30	White-Slate	105	T	5	
5	Slate-White	105	R	5	25/225/2225
31	Red-Blue	106	T	6	
6	Blue-Red	106	R	6	26/226/2226
32	Red-Orange	107	T	7	
7	Orange-Red	107	R	7	27/227/2227
33	Red-Green	108	T	8	
8	Green-Red	108	R	8	28/228/2228
34	Red-Brown	109	T	9	
9	Brown-Red	109	R	9	29/229/2229
35	Red-Slate	110	T	10	
10	Slate-Red	110	R	10	30/230/2230
36	Black-Blue	111	T	11	
11	Blue-Black	111	R	11	31/231/2231
37	Black-Orange	112	T	12	
12	Orange-Black	112	R	12	32/232/2232
38	Black-Green	113	T	13	
13	Green-Black	113	R	13	33/233/2233
39	Black-Brown	114	T	14	
14	Brown-Black	114	R	14	34/234/2234
40	Black-Slate	115	T	15	
15	Slate-Black	115	R	15	35/235/2235
41	Yellow-Blue	116	T	16	
16	Blue-Yellow	116	R	16	36/236/2236
42	Yellow-Orange	117	T	17	
17	Orange-Yellow	117	R	17	37/237/2237
43	Yellow-Green	118	T	18	
18	Green-Yellow	118	R	18	38/238/2238
44	Yellow-Brown	119	T	19	
19	Brown-Yellow	119	R	19	39/239/2239
45	Yellow-Slate	120	T	20	
20	Slate-Yellow	120	R	20	40/240/2240
46	Violet-Blue	121	T	21	
21	Blue-Violet	121	R	21	41/241/2241

Pin	Wire color	Port	Service	Telephones (ICS)	Default DN
47	Violet-Orange	122	T	22	
22	Orange-Violet	122	R	22	42/242/2242
48	Violet-Green	123	T	23	
23	Green-Violet	123	R	23	43/243/2243
49	Violet-Brown	124	T	24	
24	Brown-Violet	124	R	24	44/244/2244
50	Violet-Slate	----	----	no connection	----
25	Slate-Violet	----	----	no connection	----

T and R represent station connections and should not be confused with Tip and Ring on external lines. Station connections are non-polarized.

ICS telephone and auxiliary equipment wiring chart

Pin	Wire color	Port	Service	Telephones (ICS)	Default DN
26	White-Blue	125	T	25	
1	Blue-White	125	R	25	45/245/2245
27	White-Orange	126	T	26	
2	Orange-White	126	R	26	46/246/2246
28	White-Green	127	T	27	
3	Green-White	127	R	27	47/247/2247
29	White-Brown	128	T	28	
4	Brown-White	128	R	28	48/248/2248
30	White-Slate	129	T	29	
5	Slate-White	129	R	29	49/249/2249
31	Red-Blue	130	T	30	
6	Blue-Red	130	R	30	50/250/2250
32	Red-Orange	131	T	31	
7	Orange-Red	131	R	31	51/251/2251
33	Red-Green	132	T	32	
8	Green-Red	132	R	32	52/252/2252
34	Red-Brown	----	----	no connection	
9	Brown-Red	----	----	no connection	
35	Red-Slate	----	----	no connection	
10	Slate-Red	----	----	no connection	
36	Black-Blue	----	----	no connection	
11	Blue-Black	----	----	no connection	
37	Black-Orange	----	----	no connection	
12	Orange-Black	----	----	no connection	
38	Black-Green	----	----	no connection	
13	Green-Black	----	----	no connection	
39	Black-Brown	----	----	no connection	
14	Brown-Black	----	----	no connection	
40	Black-Slate	----	T	Page	

Pin	Wire color	Port	Service	Telephones (ICS)	Default DN
15	Slate-Black	----	R	Page	
41	Yellow-Blue	----	Make	External page	
16	Blue-Yellow	----	Common	External page	
42	Yellow-Orange	----	T	Music	
17	Orange-Yellow	----	R	Music	
43	Yellow-Green	----	----	reserved	
18	Green-Yellow	----	----	reserved	
44	Yellow-Brown	----	Make	Auxiliary ringer - 1	
19	Brown-Yellow	----	Common	Auxiliary ringer - 1	
45	Yellow-Slate	----	----	reserved	
20	Slate-Yellow	----	----	reserved	
46	Violet-Blue	----	----	no connection	
21	Blue-Violet	----	----	no connection	
47	Violet-Orange	----	----	reserved	
22	Orange-Violet	----	----	reserved	
48	Violet-Green	----	----	reserved	
23	Green-Violet	----	----	reserved	
49	Violet-Brown	----	----	reserved	
24	Brown-Violet	----	----	reserved	
50	Violet-Slate	----	----	reserved	
25	Slate-Violet	----	----	reserved	

T and R represent station connections and should not be confused with Tip and Ring on external lines. Station connections are non-polarized.

ICS external loop start lines wiring

Pin	Wire color	Port	Service	Line
26	White-Blue	201	T	1
1	Blue-White	201	R	1
27	White-Orange	202	T	2
2	Orange-White	202	R	2
28	White-Green	----	----	----
3	Green-White	----	----	----
29	White-Brown	----	----	----
4	Brown-White	----	----	----
30	White-Slate	203	T	3
5	Slate-White	203	R	3
31	Red-Blue	204	T	4
6	Blue-Red	204	R	4
32	Red-Orange	----	----	----
7	Orange-Red	----	----	----
33	Red-Green	----	----	----
8	Green-Red	----	----	----

Pin	Wire color	Port	Service	Line
34	Red-Brown	225	T	25
9	Brown-Red	225	R	25
35	Red-Slate	226	T	26
10	Slate-Red	226	R	26
36	Black-Blue	----	----	----
11	Blue-Black	----	----	----
37	Black-Orange	----	----	----
12	Orange-Black	----	----	----
38	Black-Green	227	T	27
13	Green-Black	227	R	27
39	Black-Brown	228	T	28
14	Brown-Black	228	R	28
40	Black-Slate	----	----	----
15	Slate-Black	----	----	----
41	Yellow-Blue	----	----	----
16	Blue-Yellow	----	----	----
42	Yellow-Orange	----	----	----
17	Orange-Yellow	----	----	----
43	Yellow-Green	----	T	ET1
18	Green-Yellow	----	R	ET1
44	Yellow-Brown	----	T	ET2
19	Brown-Yellow	----	R	ET2
45	Yellow-Slate	----	----	----
20	Slate-Yellow	----	----	----
46	Violet-Blue	----	----	----
21	Blue-Violet	----	----	----
47	Violet-Orange	----	----	----
22	Orange-Violet	----	----	----
48	Violet-Green	----	----	----
23	Green-Violet	----	----	----
49	Violet-Brown	----	----	----
24	Brown-Violet	----	----	----
50	Violet-Slate	----	----	----
25	Slate-Violet	----	----	----

For an explanation of port numbering, see Port numbering on the wiring charts on page 148.

BRI Wiring charts

A BRI Card in Slot 4 uses loops 201 through 204. A BRI card in Slot 3 uses loops 225 through 228. Because a BRI-U2 Card has only two loops, it only uses the first two loop numbers (201-202 and 225-226) when it occupies an ICS slot.

The loops appearing on a BRI card may be automatically assigned lines, or assigned one or more ISDN DNs in Hardware programming. If the loop is configured as S or T, or NT, lines are automatically assigned. If the loop is configured as S or LT, you can assign one or more ISDN DNs to the loop.

The emergency telephone connections (ET2 and ET1) cannot be used if a BRI card is installed in Slot 3 or Slot 4, respectively.

Detailed information about configuring BRI cards is included in the ISDN chapter and in the Hardware section of the Programming chapter.

ICS ST Interface Cards wiring

Pin	Wire color	Port (loop)	Service	Lines (S or T-loop)	Terminal equipment (S loop)
26	White-Blue	201	+Tx	001-002	Assigned DN
1	Blue-White	201	-Tx	001-002	Assigned DN
27	White-Orange	201	+Rx	001-002	Assigned DN
2	Orange-White	201	-Rx	001-002	Assigned DN
28	White-Green	202	+Tx	003-004	Assigned DN
3	Green-White	202	-Tx	003-004	Assigned DN
29	White-Brown	202	+Rx	003-004	Assigned DN
4	Brown-White	202	-Rx	003-004	Assigned DN
30	White-Slate	203	+Tx	005-006	Assigned DN
5	Slate-White	203	-Tx	005-006	Assigned DN
31	Red-Blue	203	+Rx	005-006	Assigned DN
6	Blue-Red	203	-Rx	005-006	Assigned DN
32	Red-Orange	204	+Tx	007-008	Assigned DN
7	Orange-Red	204	-Tx	007-008	Assigned DN
33	Red-Green	204	+Rx	007-008	Assigned DN
8	Green-Red	204	-Rx	007-008	Assigned DN
34	Red-Brown	225	+Tx	025-026	Assigned DN
9	Brown-Red	225	-Tx	025-026	Assigned DN
35	Red-Slate	225	+Rx	025-026	Assigned DN
10	Slate-Red	225	-Rx	025-026	Assigned DN
36	Black-Blue	226	+Tx	027-028	Assigned DN
11	Blue-Black	226	-Tx	027-028	Assigned DN

Pin	Wire color	Port (loop)	Service	Lines (S or T-loop)	Terminal equipment (S loop)
37	Black-Orange	226	+Rx	027-028	Assigned DN
12	Orange-Black	226	-Rx	027-028	Assigned DN
38	Black-Green	227	+Tx	029-030	Assigned DN
13	Green-Black	227	-Tx	029-030	Assigned DN
39	Black-Brown	227	+Rx	029-030	Assigned DN
14	Brown-Black	227	-Rx	029-030	Assigned DN
40	Black-Slate	228	+Tx	031-032	Assigned DN
15	Slate-Black	228	-Tx	031-032	Assigned DN
41	Yellow-Blue	228	+Rx	031-032	Assigned DN
16	Blue-Yellow	228	-Rx	031-032	Assigned DN
42	Yellow-Orange	----	----	----	---
17	Orange-Yellow	----	----	----	---
43	Yellow-Green	----	T	ET1	---
18	Green-Yellow	----	R	ET1	---
44	Yellow-Brown	----	T	ET2	---
19	Brown-Yellow	----	R	ET2	---
45	Yellow-Slate	----	----	----	---
20	Slate-Yellow	----	----	----	---
46	Violet-Blue	----	----	----	---
21	Blue-Violet	----	----	----	---
47	Violet-Orange	----	----	----	---
22	Orange-Violet	----	----	----	---
48	Violet-Green	----	----	----	---
23	Green-Violet	----	----	----	---
49	Violet-Brown	----	----	----	---
24	Brown-Violet	----	----	----	---
50	Violet-Slate	----	----	----	---
25	Slate-Violet	----	----	----	---

BRI S or T wiring is polarity sensitive.
Tx and Rx are Transmit and Receive for Norstar.

ICS U Interface Cards wiring

Pin	Wire color	Port (loop)	Service	Lines (U-NT)	Terminal equipment (U-LT)
26	White-Blue	201	T	001-002	Assigned DN
1	Blue-White	201	R	001-002	Assigned DN
27	White-Orange	202	T	003-004	Assigned DN
2	Orange-White	202	R	003-004	Assigned DN
28	White-Green	----	----	----	----
3	Green-White	----	----	----	----
29	White-Brown	----	----	----	----
4	Brown-White	----	----	----	----
30	White-Slate	203	T	005-006	Assigned DN
5	Slate-White	203	R	005-006	Assigned DN
31	Red-Blue	204	T	007-008	Assigned DN
6	Blue-Red	204	R	007-008	Assigned DN
32	Red-Orange	----	----	----	----
7	Orange-Red	----	----	----	----
33	Red-Green	----	----	----	----
8	Green-Red	----	----	----	----
34	Red-Brown	225	T	025-026	Assigned DN
9	Brown-Red	225	R	025-026	Assigned DN
35	Red-Slate	226	T	027-028	Assigned DN
10	Slate-Red	226	R	027-028	Assigned DN
36	Black-Blue	----	----	----	----
11	Blue-Black	----	----	----	----
37	Black-Orange	----	----	----	----
12	Orange-Black	----	----	----	----
38	Black-Green	227	T	029-030	Assigned DN
13	Green-Black	227	R	029-030	Assigned DN
39	Black-Brown	228	T	031-032	Assigned DN
14	Brown-Black	228	R	031-032	Assigned DN
40	Black-Slate	----	----	----	----
15	Slate-Black	----	----	----	----
41	Yellow-Blue	----	----	----	----
16	Blue-Yellow	----	----	----	----
42	Yellow-Orange	----	----	----	---
17	Orange-Yellow	----	----	----	---
43	Yellow-Green	----	T	ET1	---
18	Green-Yellow	----	R	ET1	---
44	Yellow-Brown	----	T	ET2	---
19	Brown-Yellow	----	R	ET2	---

Pin	Wire color	Port (loop)	Service	Lines (U-NT)	Terminal equipment (U-LT)
45	Yellow-Slate	----	----	----	---
20	Slate-Yellow	----	----	----	---
46	Violet-Blue	----	----	----	---
21	Blue-Violet	----	----	----	---
47	Violet-Orange	----	----	----	---
22	Orange-Violet	----	----	----	---
48	Violet-Green	----	----	----	---
23	Green-Violet	----	----	----	---
49	Violet-Brown	----	----	----	---
24	Brown-Violet	----	----	----	---
50	Violet-Slate	----	----	----	---
25	Slate-Violet	----	----	----	---

BRI U wiring is not polarity sensitive.

Wiring the BRI network interface

A network interface provides the connection between the ISDN network and the Modular ICS.

If the card in the ICS is configured as a T-loop, the ICS is wired to the network connection using an NT1. For an S loop, the ICS and terminal equipment share the loop wired to the NT1, which is in turn wired to the network. See the “ISDN” chapter page 17 for more information about the NT1.

Wiring for T or S network connection

Pin (jack or plug)	NT1 connection (for jack)	ICS and optional TE connection (plug)
1	not used	optional power source 3 (+)
2	not used	optional power source 3 (-)
3	+Rx	+Tx
4	+Tx	+Rx
5	-Tx	-Rx
6	-Rx	-Tx
7	not used	optional power sink 2 (-)
8	not used	optional power sink 2 (+)

The Modular ICS supplies the NT1 functionality to a U-NT loop, allowing a direct connection to the network. The connection may use a plug and jack, or may be directly wired.

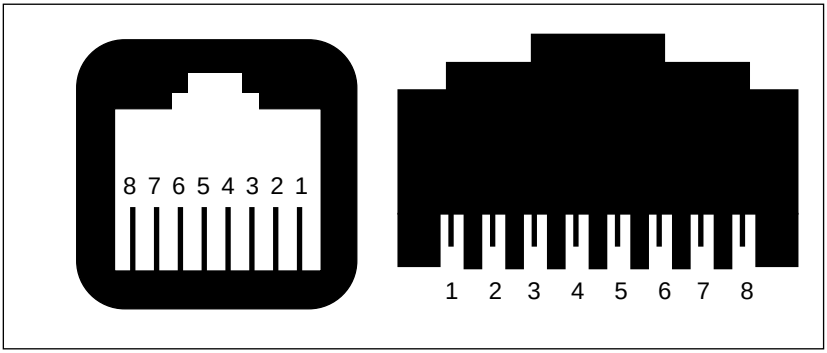
Wiring for U-NT network interface

Pin (jack or plug)	Norstar connection (for plug to network interface jack)	Network interface connection (jack)
1	not used	optional battery status indicator (+)
2	not used	optional battery status indicator (-)
3	not used	no connection
4	R	R
5	T	T
6	not used	no connection
7	not used	optional power supply (-)
8	not used	optional power supply (+)

The BRI-U Card does not use or provide optional power.
Some installations may not use a plug and jack for connections between the ICS (NT) and the network.

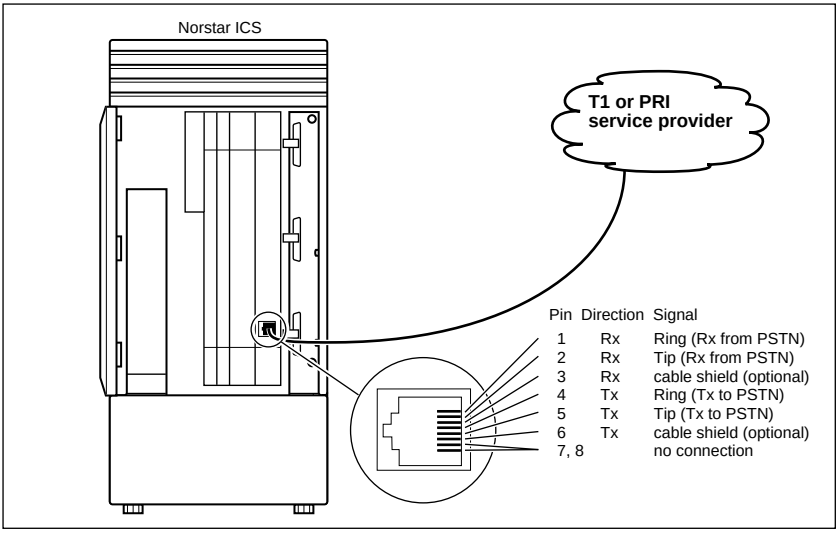
The following illustration shows the pin arrangement for a Bellcore standard ISDN plug and jack. Other pin arrangements are possible.

Jack and plug pin numbering

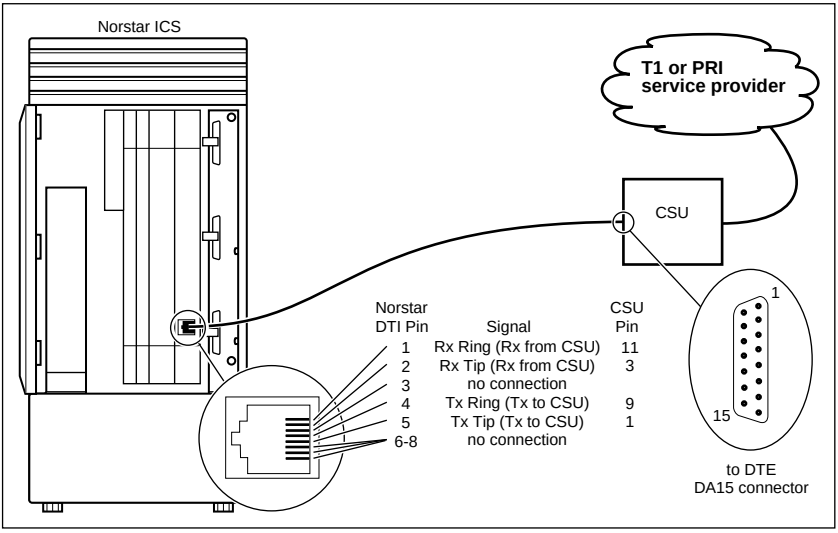


DTI wiring

Connecting the DTI to the T1 or PRI service provider



Connecting the DTI to an external CSU



Station Module wiring chart

Pin	Wire color	Port	Service	Telephones SM
26	White-Blue	X01	T	1
1	Blue-White	X01	R	1
27	White-Orange	X02	T	2
2	Orange-White	X02	R	2
28	White-Green	X03	T	3
3	Green-White	X03	R	3
29	White-Brown	X04	T	4
4	Brown-White	X04	R	4
30	White-Slate	X05	T	5
5	Slate-White	X05	R	5
31	Red-Blue	X06	T	6
6	Blue-Red	X06	R	6
32	Red-Orange	X07	T	7
7	Orange-Red	X07	R	7
33	Red-Green	X08	T	8
8	Green-Red	X08	R	8
34	Red-Brown	X09	T	9
9	Brown-Red	X09	R	9
35	Red-Slate	X10	T	10
10	Slate-Red	X10	R	10
36	Black-Blue	X11	T	11
11	Blue-Black	X11	R	11
37	Black-Orange	X12	T	12
12	Orange-Black	X12	R	12
38	Black-Green	X13	T	13
13	Green-Black	X13	R	13
39	Black-Brown	X14	T	14
14	Brown-Black	X14	R	14
40	Black-Slate	X15	T	15
15	Slate-Black	X15	R	15
41	Yellow-Blue	X16	T	16
16	Blue-Yellow	X16	R	16
42	Yellow-Orange	----	----	no connection
17	Orange-Yellow	----	----	no connection
43	Yellow-Green	----	----	no connection
18	Green-Yellow	----	----	no connection
44	Yellow-Brown	----	----	no connection
19	Brown-Yellow	----	----	no connection
45	Yellow-Slate	----	----	no connection
20	Slate-Yellow	----	----	no connection
46	Violet-Blue	----	----	no connection
21	Blue-Violet	----	----	no connection
47	Violet-Orange	----	----	no connection

Pin	Wire color	Port	Service	Telephones SM
22	Orange-Violet	----	----	no connection
48	Violet-Green	----	----	no connection
23	Green-Violet	----	----	no connection
49	Violet-Brown	----	----	no connection
24	Brown-Violet	----	----	no connection
50	Violet-Slate	----	----	no connection
25	Slate-Violet	----	----	no connection

T and R represent station connections and should not be confused with Tip and Ring on external lines. Station connections are non-polarized.
For an explanation of port numbering, see Port numbering on the wiring charts on page 148.

Loop Start or CI Trunk Cartridge wiring chart

TC Slot	Pin	Wire color	Port	Service	Line
Slot 1	26	White-Blue	X01	T	1
	1	Blue-White	X01	R	1
	27	White-Orange	X02	T	2
	2	Orange-White	X02	R	2
	28	White-Green	----	No connection	----
	3	Green-White	----	No connection	----
	29	White-Brown	----	No connection	----
	4	Brown-White	----	No connection	----
	30	White-Slate	X03	T	3
	5	Slate-White	X03	R	3
	31	Red-Blue	X04	T	4
	6	Blue-Red	X04	R	4
	32	Red-Orange	----	No connection	----
	7	Orange-Red	----	No connection	----
	33	Red-Green	----	No connection	----
	8	Green-Red	----	No connection	----
Slot 2	34	Red-Brown	X05	T	5
	9	Brown-Red	X05	R	5
	35	Red-Slate	X06	T	6
	10	Slate-Red	X06	R	6
	36	Black-Blue	----	No connection	----
	11	Blue-Black	----	No connection	----
	37	Black-Orange	----	No connection	----
	12	Orange-Black	----	No connection	----
	38	Black-Green	X07	T	7
	13	Green-Black	X07	R	7
	39	Black-Brown	X08	T	8
	14	Brown-Black	X08	R	8
	40	Black-Slate	----	No connection	----
	15	Slate-Black	----	No connection	----
	41	Yellow-Blue	----	No connection	----

TC Slot	Pin	Wire color	Port	Service	Line
Slot 3	42	Yellow-Orange	X09	T	9
	17	Orange-Yellow	X09	R	9
	43	Yellow-Green	X10	T	10
	18	Green-Yellow	X10	R	10
	44	Yellow-Brown	----	No connection	----
	19	Brown-Yellow	----	No connection	----
	45	Yellow-Slate	----	No connection	----
	20	Slate-Yellow	----	No connection	----
	46	Violet-Blue	X11	T	11
	21	Blue-Violet	X11	R	11
	47	Violet-Orange	X12	T	12
	22	Orange-Violet	X12	R	12
	48	Violet-Green	----	No connection	----
	23	Green-Violet	----	No connection	----
	49	Violet-Brown	----	No connection	----
	24	Brown-Violet	----	No connection	----
	50	Violet-Slate	----	ET	----
	25	Slate-Violet	----	ET	----

For an explanation of port numbering, see Port numbering on the wiring charts on page 148.

E&M/DISA Trunk Cartridge wiring chart

Use the Table , “Trunk Module with E&M/DISA Trunk Cartridges,” on page 167 when a Trunk Module has only E&M/DISA Trunk Cartridges.

If the Norstar system is being connected to another Norstar system or private branch exchange by connecting two RJ2HX/CA2HA distribution blocks together, use the following table to determine the required cross-connections.

Back-to-back cross-connections

1st distribution block	T	R	T1	R1	E	SG	M	SB
Next distribution block	T1	R1	T	R	SB	M	SG	E

Tips - *When installing a mixture of E&M/DISA, DID, BRI, or Loop Start Trunk Cartridges, it is important to cross-connect the wiring for each type of TC to a separate distribution block.*

To verify the operation of the Norstar E&M cards and the target lines, wire the two E&M lines on the Norstar E&M back to back.

The cross-connections to each distribution block must always begin at pins 26 and 1. To retain emergency telephone function, install a Loop Start Trunk Cartridge in the left-most slot (slot 1) of the TM.

Trunk Module with E&M/DISA Trunk Cartridges

TC Slot	Pin	Wire color	Port	Service	Line
Slot 1	26	White-Blue	X01	T	1
	1	Blue-White	X01	R	1
	27	White-Orange	X01	T1	1
	2	Orange-White	X01	R1	1
	28	White-Green	X01	E	1
	3	Green-White	X01	SG	1
	29	White-Brown	X01	M	1
	4	Brown-White	X01	SB	1
	30	White-Slate	X02	T	2
	5	Slate-White	X02	R	2
	31	Red-Blue	X02	T1	2
	6	Blue-Red	X02	R1	2
	32	Red-Orange	X02	E	2
	7	Orange-Red	X02	SG	2
	33	Red-Green	X02	M	2
	8	Green-Red	X02	SB	2
Slot 2	34	Red-Brown	X05	T	5
	9	Brown-Red	X05	R	5
	35	Red-Slate	X05	T1	5
	10	Slate-Red	X05	R1	5
	36	Black-Blue	X05	E	5
	11	Blue-Black	X05	SG	5
	37	Black-Orange	X05	M	5
	12	Orange-Black	X05	SB	5
	38	Black-Green	X06	T	6
	13	Green-Black	X06	R	6
	39	Black-Brown	X06	T1	6
	14	Brown-Black	X06	R1	6
	40	Black-Slate	X06	E	6
	15	Slate-Black	X06	SG	6
	41	Yellow-Blue	X06	M	6
	16	Blue-Yellow	X06	SB	6

TC Slot	Pin	Wire color	Port	Service	Line
Slot 3	42	Yellow-Orange	X09	T	9
	17	Orange-Yellow	X09	R	9
	43	Yellow-Green	X09	T1	9
	18	Green-Yellow	X09	R1	9
	44	Yellow-Brown	X09	E	9
	19	Brown-Yellow	X09	SG	9
	45	Yellow-Slate	X09	M	9
	20	Slate-Yellow	X09	SB	9
	46	Violet-Blue	X10	T	10
	21	Blue-Violet	X10	R	10
	47	Violet-Orange	X10	T1	10
	22	Orange-Violet	X10	R1	10
	48	Violet-Green	X10	E	10
	23	Green-Violet	X10	SG	10
	49	Violet-Brown	X10	M	10
	24	Brown-Violet	X10	SB	10
	50	Violet-Slate	----	reserved	----
	25	Slate-Violet	----	reserved	----

For an explanation of port numbering, see Port numbering on the wiring charts on page 148.

Trunk Module with DID Trunk Cartridges

TC Slot	Pin	Wire color	Port	Service	Line
Slot 1	26	White-Blue	X01	T	1
	1	Blue-White	X01	R	1
	27	White-Orange	X02	T	2
	2	Orange-White	X02	R	2
	28	White-Green	----	No connection	----
	3	Green-White	----	No connection	----
	29	White-Brown	----	CCI NC1	----
	4	Brown-White	----	CCI Com1	----
	30	White-Slate	X03	T	3
	5	Slate-White	X03	R	3
	31	Red-Blue	X04	T	4
	6	Blue-Red	X04	R	4
	32	Red-Orange	----	No connection	----
	7	Orange-Red	----	No connection	----
	33	Red-Green	----	No connection	----
	8	Green-Red	----	No connection	----
Slot 2	34	Red-Brown	X05	T	5
	9	Brown-Red	X05	R	5
	35	Red-Slate	X06	T	6
	10	Slate-Red	X06	R	6
	36	Black-Blue	----	No connection	----
	11	Blue-Black	----	No connection	----

TC Slot	Pin	Wire color	Port	Service	Line
	37	Black-Orange	----	CCI NC1	----
	12	Orange-Black	----	CCI Com1	----
	38	Black-Green	X07	T	7
	13	Green-Black	X07	R	7
	39	Black-Brown	X08	T	8
	14	Brown-Black	X08	R	8
	40	Black-Slate	----	No connection	----
	15	Slate-Black	----	No connection	----
	41	Yellow-Blue	----	No connection	----
	16	Blue-Yellow	----	No connection	----
Slot 3	42	Yellow-Orange	X09	T	9
	17	Orange-Yellow	X09	R	9
	43	Yellow-Green	X10	T	10
	18	Green-Yellow	X10	R	10
	44	Yellow-Brown	----	No connection	----
	19	Brown-Yellow	----	No connection	----
	45	Yellow-Slate	----	CCI NC1	----
	20	Slate-Yellow	----	CCI Com1	----
	46	Violet-Blue	X11	T	11
	21	Blue-Violet	X11	R	11
	47	Violet-Orange	X12	T	12
	22	Orange-Violet	X12	R	12
	48	Violet-Green	----	No connection	----
	23	Green-Violet	----	No connection	----
	49	Violet-Brown	----	No connection	----
	24	Brown-Violet	----	No connection	----
	50	Violet-Slate	----	ET	----
	25	Slate-Violet	----	ET	----

For an explanation of port numbering, see Port numbering on the wiring charts on page 148.

For CCI connections in Service column: NC1 stands for the normally closed relay and Com1 the common relay. CCI signaling is not supported by all carriers. For carriers or installations that do not use CCI signaling, the CCI and ET connections should be treated as “no connection”. CCI wiring is a non-standard wiring arrangement which has been submitted to the DOC.

DID supervisory signaling

This equipment is designed to return supervisory signals to the public switched telephone network (PSTN) when the DID calls are:

- answered by the called telephone
- answered by the attendant
- routed to a customer controlled recorded announcement

- routed to a dial prompt

This equipment is designed to return supervisory signals on all DID calls forwarded through the system back to the PSTN within 20 seconds of the call forwarding sequence being initiated.

Emergency transfer conditions

Every DID Trunk Cartridge has a Control Circuit Interface (CCI) which should be connected directly to the central office for monitoring purposes.

If the Norstar system loses power or the microcontroller on the DID Trunk Cartridge malfunctions, the CCI signals the central office that it can no longer handle DID calls. The central office, by prearrangement, can then forward the DID lines to other numbers.

Connect the CCI com1 connection to a ground connection. Connect the CCI NC1 connection to the central office demarcation.

Tips - *The CCI signaling to report power loss or malfunction of the DID Trunk Cartridge is not supported by all carriers. For carriers or installations which do not use CCI signaling, the CCI and ET connections should be treated as “no connection”.*

Wire each CCI independently to the central office. If the connections are wired in parallel, any CCI trouble disables all DID Trunk Cartridges. If the connections are wired in series, all DID Trunk Cartridges must fail before the central office recognizes the trouble condition.

Trunk Module with BRI-ST cartridge

TC slot	Pin	Wire color	Port (loop)	Service	Lines (T or S loop)	Terminal equipment S loop)
Slot 1	26	White-Blue	X01	+Tx	001-002	Assigned DN
	1	Blue-White	X01	-Tx	001-002	Assigned DN
	27	White-Orange	X01	+Rx	001-002	Assigned DN
	2	Orange-White	X01	-Rx	001-002	Assigned DN
	28	White-Green	X02	+Tx	003-004	Assigned DN
	3	Green-White	X02	-Tx	003-004	Assigned DN
	29	White-Brown	X02	+Rx	003-004	Assigned DN
	4	Brown-White	X02	-Rx	003-004	Assigned DN
	30	White-Slate	X03	+Tx	005-006	Assigned DN
	5	Slate-White	X03	-Tx	005-006	Assigned DN
	31	Red-Blue	X03	+Rx	005-006	Assigned DN
	6	Blue-Red	X03	-Rx	005-006	Assigned DN
	32	Red-Orange	X04	+Tx	007-008	Assigned DN
	7	Orange-Red	X04	-Tx	007-008	Assigned DN
	33	Red-Green	X04	+Rx	007-008	Assigned DN
	8	Green-Red	X04	-Rx	007-008	Assigned DN
Slot 2	34	Red-Brown	X05	+Tx	009-010	Assigned DN
	9	Brown-Red	X05	-Tx	009-010	Assigned DN
	35	Red-Slate	X05	+Rx	009-010	Assigned DN
	10	Slate-Red	X05	-Rx	009-010	Assigned DN
	36	Black-Blue	X06	+Tx	011-012	Assigned DN
	11	Blue-Black	X06	-Tx	011-012	Assigned DN
	37	Black-Orange	X06	+Rx	011-012	Assigned DN
	12	Orange-Black	X06	-Rx	011-012	Assigned DN
	38	Black-Green	X07	+Tx	013-014	Assigned DN
	13	Green-Black	X07	-Tx	013-014	Assigned DN
	39	Black-Brown	X07	+Rx	013-014	Assigned DN
	14	Brown-Black	X07	-Rx	013-014	Assigned DN
	40	Black-Slate	X08	+Tx	015-016	Assigned DN
	15	Slate-Black	X08	-Tx	015-016	Assigned DN
	41	Yellow-Blue	X08	+Rx	015-016	Assigned DN
	16	Blue-Yellow	X08	-Rx	015-016	Assigned DN

TC slot	Pin	Wire color	Port (loop)	Service	Lines (T or S loop)	Terminal equipment S loop)
Slot 3	42	Yellow-Orange	X09	+Tx	017-018	Assigned DN
	17	Orange-Yellow	X09	-Tx	017-018	Assigned DN
	43	Yellow-Green	X09	+Rx	017-018	Assigned DN
	18	Green-Yellow	X09	-Rx	017-018	Assigned DN
	44	Yellow-Brown	X10	+Tx	019-020	Assigned DN
	19	Brown-Yellow	X10	-Tx	019-020	Assigned DN
	45	Yellow-Slate	X10	+Rx	019-020	Assigned DN
	20	Slate-Yellow	X10	-Rx	019-020	Assigned DN
	46	Violet-Blue	X11	+Tx	021-022	Assigned DN
	21	Blue-Violet	X11	-Tx	021-022	Assigned DN
	47	Violet-Orange	X11	+Rx	021-022	Assigned DN
	22	Orange-Violet	X11	-Rx	021-022	Assigned DN
	48	Violet-Green	X12	+Tx	023-024	Assigned DN
	23	Green-Violet	X12	-Tx	023-024	Assigned DN
	49	Violet-Brown	X12	+Rx	023-024	Assigned DN
	24	Brown-Violet	X12	-Rx	023-024	Assigned DN
	50	Violet-Slate	----	reserved	----	----
	25	Slate-Violet	----	reserved	----	----

To determine the assigned lines for a BRI card, refer to “BRI card” on page 341.
For an explanation of port numbering, see Port numbering on the wiring charts on page 148.

Trunk Module with BRI-U cartridge

TC slot	Pin	Wire color	Port (loop)	Service	Lines (U-NT)	Terminal equipment (U-LT)
Slot 1	26	White-Blue	X01	T	001-002	Assigned DN
	1	Blue-White	X01	R	001-002	Assigned DN
	27	White-Orange	X02	T	003-004	Assigned DN
	2	Orange-White	X02	R	003-004	Assigned DN
	28	White-Green	----	----	----	----
	3	Green-White	----	----	----	----
	29	White-Brown	----	----	----	----
	4	Brown-White	----	----	----	----
	30	White-Slate	X03	T	005-006	Assigned DN
	5	Slate-White	X03	R	005-006	Assigned DN
	31	Red-Blue	X04	T	007-008	Assigned DN
	6	Blue-Red	X04	R	007-008	Assigned DN
	32	Red-Orange	----	----	----	----
	7	Orange-Red	----	----	----	----
	33	Red-Green	----	----	----	----
	8	Green-Red	----	----	----	----
Slot 2	34	Red-Brown	X05	T	009-010	Assigned DN
	9	Brown-Red	X05	R	009-010	Assigned DN
	35	Red-Slate	X06	T	011-012	Assigned DN
	10	Slate-Red	X06	R	011-012	Assigned DN
	36	Black-Blue	----	----	----	----
	11	Blue-Black	----	----	----	----
	37	Black-Orange	----	----	----	----
	12	Orange-Black	----	----	----	----
	38	Black-Green	X07	T	013-014	Assigned DN
	13	Green-Black	X07	R	013-014	Assigned DN
	39	Black-Brown	X08	T	015-016	Assigned DN
	14	Brown-Black	X08	R	015-016	Assigned DN
	40	Black-Slate	----	----	----	----
	15	Slate-Black	----	----	----	----
	41	Yellow-Blue	----	----	----	----
	16	Blue-Yellow	----	----	----	----
Slot 3	42	Yellow-Orange	X09	T	017-018	Assigned DN
	17	Orange-Yellow	X09	R	017-018	Assigned DN
	43	Yellow-Green	X10	T	019-020	Assigned DN
	18	Green-Yellow	X10	R	019-020	Assigned DN
	44	Yellow-Brown	----	----	----	----
	19	Brown-Yellow	----	----	----	----

TC slot	Pin	Wire color	Port (loop)	Service	Lines (U-NT)	Terminal equipment (U-LT)
Slot 3	45	Yellow-Slate	----	----	----	----
	20	Slate-Yellow	----	----	----	----
	46	Violet-Blue	X11	T	021-022	Assigned DN
	21	Blue-Violet	X11	R	021-022	Assigned DN
	47	Violet-Orange	X12	T	023-024	Assigned DN
	22	Orange-Violet	X12	R	023-024	Assigned DN
	48	Violet-Green	----	----	----	---
	23	Green-Violet	----	----	----	---
	49	Violet-Brown	----	----	----	---
	24	Brown-Violet	----	----	----	---
	50	Violet-Slate	----	reserved	----	---
	25	Slate-Violet	----	reserved	----	---

BRI U wiring is not polarity sensitive.
A BRI-U2 Card only uses the first two loop numbers (X01-X02, X05-X06, or X09-X10) when it occupies a trunk module slot.

Norstar telephones

If you are installing Companion portable telephones, see the information included in the *MICS-XC Norstar-Companion Installer Guide*.

The emergency telephone

You can connect an emergency telephone to an ICS or Trunk Module with a Loop Start Trunk Cartridge to provide emergency service when there is no power to the ICS. The ICS has emergency telephone connections for lines 002 and 026. Each Trunk Module has one emergency telephone connection.

1. Wire a modular jack or equivalent to each set of emergency telephone pins on the 50-pin distribution block for the ICS or Trunk Module external lines. (See the Wiring charts on page 148 for the pin numbers.)
2. Connect a single-line telephone (500/2500) to the modular jack.
3. Prepare to test the emergency telephone by removing the Trunk Cartridge from the slot (slot 3 or 4 on the ICS, and slot 1 on the TM).
4. Connect the power, then connect the central office lines to the ICS.
5. Pick up the emergency telephone receiver and listen for dial tone.
6. Disconnect the central office lines, then remove power from the system.
7. Replace the Trunk Cartridge in the left slot.
8. Continue with procedures for powering up the system.

Tips - *The emergency telephone connections on the Trunk Module will not work if there is an E&M/DISA, a BRI-ST or BRI-U card or a DID Trunk Cartridge in the first slot of the Trunk Module. The emergency telephone connections on the ICS will not work if DTIs or PRIs are used.*

Tips - *Norstar telephones cannot be used as off-premise sets (OPX). For OPX applications, use the Norstar Analog Terminal Adapter (ATA) and a single-line telephone. See the Norstar ATA Installation Card for details.*

Moving Norstar telephones

You can move a Norstar telephone to a new location within the Norstar system without losing its programmed settings. When Set relocation (automatic telephone relocation) is enabled in system programming, the internal numbers, autodial settings, and personal speed dial codes remain with the telephone when it is unplugged. To move a telephone, simply unplug it and plug it in again at another location. It may take up to 45

seconds for the ICS to recognize the telephone. Automatic telephone relocation is disabled by default.

Tips - *All Norstar telephones being moved should be relocated before new telephones are plugged into their place. This allows the moved telephones to retain their programmed settings. If a new telephone is plugged into the Norstar system before the old telephone is reconnected at a new location, Norstar will give the old telephone's information to the new telephone, and the old telephone will no longer be recognized by the system.*

When changing a telephone's internal number (in programming), wait one minute after Automatic Telephone Relocation.

When you relocate a Norstar telephone, the telephone must remain installed and connected in the new location for at least 3 minutes for the programming relocation to be complete. Moving the telephone again before the 3 minute period may result in losing the telephone's programming.

Installing ISDN BRI terminal equipment

For each S or T or U-LT reference point, an 8-position miniature unkeyed plug from the terminal equipment (TE) is plugged into a jack connected to Norstar wiring. The pin connections for the jack and plug are shown in the following charts.

S or T wiring for terminal equipment

Pin (jack or plug)	Norstar connection (for jack)	Equipment connection (plug)
1	not used	optional power source 3 (+)
2	not used	optional power source 3 (-)
3	+Rx	+Rx
4	+Tx	+Tx
5	-Tx	-Tx
6	-Rx	-Rx
7	not used	optional power sink 2 (-)
8	not used	optional power sink 2 (+)

S or T extension wiring configurations

The last connection on any ISDN S or T extension wiring must have terminating resistors to ensure correct timing of the signaling circuits. Failure to install terminating resistors will degrade performance. Terminating resistors should not be connected on a TE which is not the last connection on the loop.

Terminating resistors are provided on terminal equipment. See the instructions that come with your TE for information on how to enable or disable the termination, as required.

The maximum length of spur and ISDN connection cord (the extension from the main line or bus) is 10 m (30 ft).

See the ISDN chapter for information about wiring arrangements for ISDN terminal equipment (TE) on an S or T loop.

Additional power

A Norstar S or T-loop does not provide power on Power Source 1 (PS1), Power Source (PS2), or Power Source or Sink 3 (PS3). If you are installing ISDN terminal equipment at the S-reference point, and the equipment requires additional power on PS1, PS2, or PS3, then you can install a suitably approved power supply unit. See ANSI T1.605 or the documentation that comes with your TE for details.

The Modular ICS does not require power on PS3.

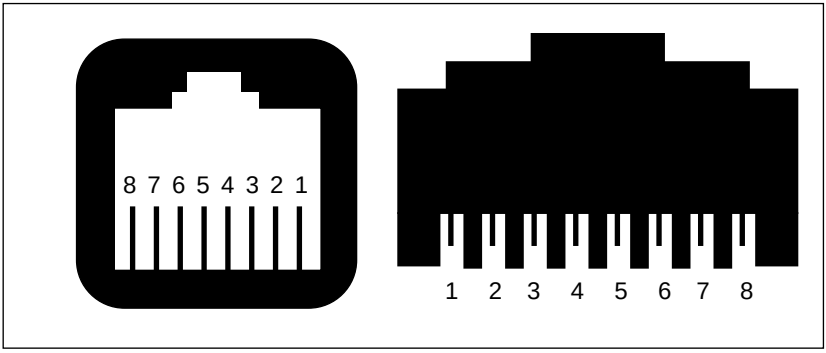
If a phantom circuit (a wiring arrangement using side circuits) is used to provide power to the TE (PS1), it may affect loop performance. You must account for any effects. For example, you may need to reduce the number of TEs on a passive bus.

U-LT wiring for terminal equipment

Pin (jack or plug)	Norstar connection (for jack)	Equipment connection (plug)
1	not used	optional battery status indication (+)
2	not used	optional battery status indication (-)
3	not used	no connection
4	R	R
5	T	T
6	not used	no connection
7	not used	optional power (-)
8	not used	optional power (+)

No power supply is provided for the U-LT wiring. If equipment attached to the U-LT loop requires optional power, install an approved power supply unit. See ANSI T1.601-1992 Annex H or the documentation that comes with your TE for more information.

Jack and plug pin numbering



Installing optional equipment

Norstar Integrated Data Module 200

This procedure outlines how to assign T1 lines to WAN interfaces (an interface is a collection of channels which share a common destination).

Configure the ICS

1. Obtain the authorization code (Bandwidth Allocation License) to activate the Line type option for T1 lines to Fixed. Refer to Software keys on page 328 for information on enabling Fixed lines. Only Fixed lines can be used by the IDM 200.
2. Go to `Maintenance` and disable the modules associated with the T1 cards to be configured.
3. Go to `Hardware` and set a card on the ICS to be **T1**. For more information on T1 configuration options, see Hardware on page 331.
4. Identify the lines to be allocated for WAN Fixed Access.
5. Go to `Trunk/Line data` under `Lines` and set the lines to be used on the WAN interface to **Fixed**. For more information, see Lines on page 235.
6. Identify the number of WAN interfaces required and identify the lines required for each interface.
7. To assign lines to the interfaces:
   - At `Hardware` press [Show] and enter the module number that corresponds to the IDM 200.
   - Press `CHANGE` to select the setting. Set the module to **DataMod**.

— Go to `Fixed Access`. At `Show Intrface:`, enter the number of the interface to which you wish to assign lines.

Note: Interface 01 is reserved for the IDMs LAN interface. The first available WAN interface is 02.

— At `Show line:`, assign the line numbers corresponding to the T1 Fixed lines for that interface.

— At `Linexxx:Assigned`, press [Show]. The display shows `Linexxx: Channel yy`.

— Record each Channel number associated with the interface in the *Norstar-PLUS MICS Programming Record*.

— Repeat these steps for each interface.

Note: For information on channel mapping and restrictions, refer to the *Norstar Integrated Data Module 200 Installer Guide*.

8. Go to `Terminals&Sets` and assign **Appr Only** appearances for the Fixed lines to a Norstar set (optional step for monitoring purposes only).

9. Go into `Maintenance`, provision the selected lines (if not already provisioned) and re-enable the modules. For more information, see Maintenance on page 357.

10. If you have assigned appearances of Fixed lines to a Norstar set for monitoring purposes, the lamps will have a solid appearance for a few seconds after exiting programming if the IDM 200 is already powered up and functioning properly. To verify the state of the Data Module, see Module status on page 366.

Analog Station Module

If you are installing the ICS system with an Analog Station Module, refer to the *Analog Station Module Installation Guide*.

Auxiliary ringer (customer supplied)

The Norstar ICS provides a control contact to operate an auxiliary ringer.

1. Follow the manufacturer's installation instructions.
2. Connect the auxiliary ring generator to the 50-pin distribution block as shown in the wiring charts.

   The pins in this chart provide a control contact. They do not provide ring current or DC voltage. The ringer must not draw more than 50 mA from a 40 V DC source.

Auxiliary ringer programming

The auxiliary ringer can be activated by setting auxiliary ring for specific external lines, and auxiliary ring for specific telephones. Refer to the *Modular ICS 4.0 System Coordinator Guide* for programming details.

Heading
Trk/Line Data
Capabilities
Services

External music source (customer supplied)

The music source can be any approved low-power device such as a radio with a high-impedance earphone jack. The recommended ICS input level is 0.25 V rms across an input impedance of 3300 Ω.

1. Connect the music source output to the 50-pin distribution block, as shown in the wiring charts.

2. Adjust the volume of the music source to a comfortable level by activating Background Music (Feature 8 6) and adjusting the volume at the music source.

Tips - *Background Music volume can also be adjusted at each telephone.*

External music source programming

Music for callers on Hold and for Background Music must be enabled through programming. Refer to Backgrnd music on page 292 for more details. Confirm that the following settings are implemented:

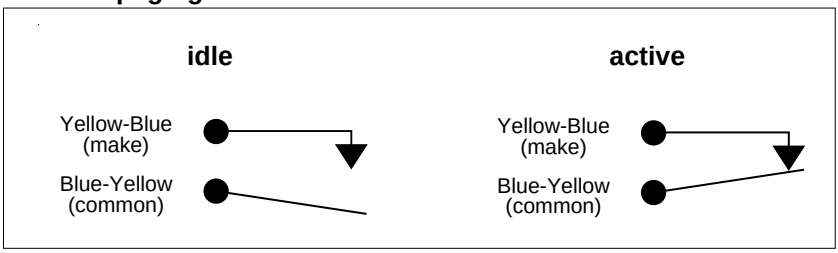
Heading	Setting
Featr settings	On hold: **Music**
Featr settings	Backgrnd music: **Y**

External paging system (customer supplied)

You can connect an external paging system to provide paging over external loudspeakers. The paging output from the Norstar ICS is 100 mV rms across an input impedance of 600 Ω.

1. Follow the manufacturer's installation instructions.
2. Connect the paging system audio input to the 50-pin distribution block as shown in the wiring charts.
3. Connect the paging system relay to the 50-pin distribution block as shown in the wiring charts.

External paging contacts



Tips - *Norstar external paging does not support talk-back paging equipment unless an external line port is used.*

The Norstar system provides paging over the Norstar telephone speakers, even when no external paging equipment is connected.

Powering up the system

1. Double-check all wiring before turning the system power on. Do not connect central office line cables to the ICS, TMs, SMs or IDMs until after turning the system power on.
2. Route the TM, SM and IDM power cords through the lower shelf of the cable trough and out through the bottom of the ICS cable trough.
3. Route the ICS power cord through the bottom of the ICS cable trough.
4. Connect each power cord (ICS, TM, SM and IDM) to an electrical outlet (non-switchable, third-wire ground AC outlet).

   If you are using a power bar, plug the power cords into the power bar and connect the power bar to the AC outlet.

Do not fasten power supply cords.

Do not fasten the ICS power supply cord or module power supply cords to any building surface, including the backboard.

Close and lock the ICS door.

Close and lock the ICS door after installation is complete to avoid accidental shock and to provide containment in the event of fire.

Install Base Stations before powering up the MICS-XC 4.0 system.

For information on installing Companion Wireless components, refer to your *MICS-XC Norstar-Companion Installer Guide*.

Check that the power is on

After the power is supplied, the ICS PSU will light up green. If a BRI cartridge is installed, the LEDs on the faceplate of the cartridge will flash for up to 5 minutes. Telephones and lines may take up to 5 minutes to initialize.

1. Check that the power LEDs of the PSU, the TMs, the SMs and the IDMs are on. The power LED on the IDM will be flashing.
2. If none of the LEDs are on, verify that power is present at the outlet. If there is power at the outlet, see “Problems for network or remote users” on page 443.

Tips - *During system initialization, the system performs a self-diagnostic test on the hardware configuration size and expansion cartridge installation.*

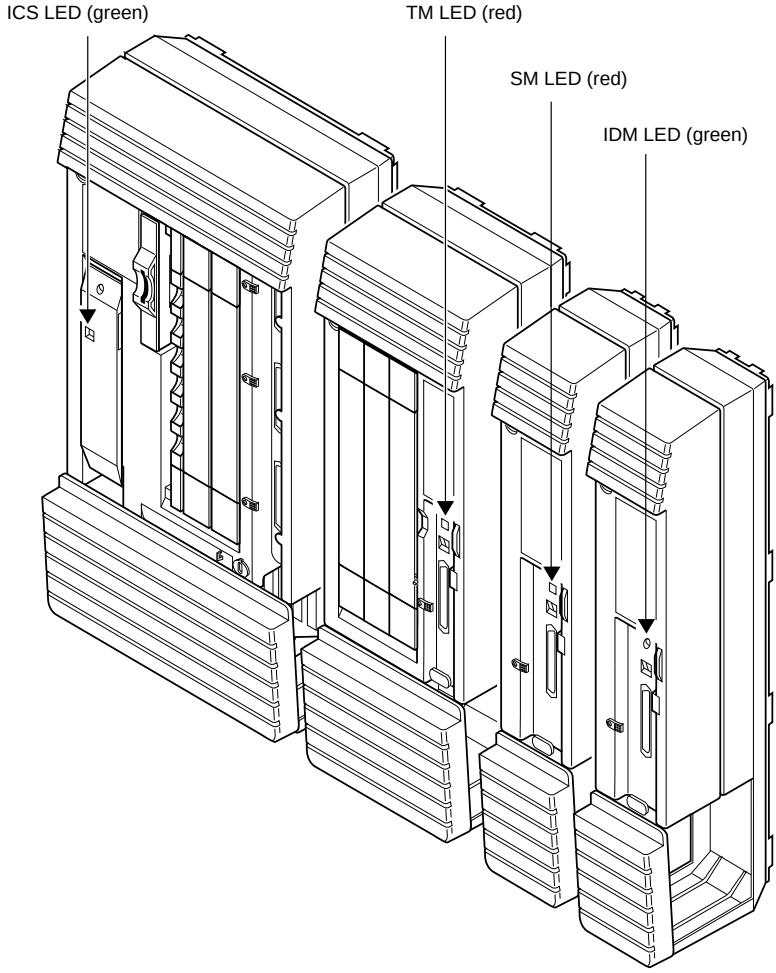
Once the system is initialized and the telephone displays read `Jan 1 1:00 am`, you have fifteen minutes in which to perform Startup programming. After 15 minutes, access to Startup programming is denied. You can turn the system power off and back on if you need to access Startup programming after this point.

Tips - *After system startup, you can turn the power off and on and retain any system data that has been entered. This is considered a “warm” start. A warm start takes approximately 5-10 minutes.*

Call Log information may be lost.

If the Norstar system suffers a power failure or the system is manually restarted, Call Log information is not saved. Notify users if a system restart is planned so any log information can be written down first.

System power indicators



Programming

The installer or the customer service representative programs settings for the entire Norstar system, plus settings for individual telephones and external lines. Most of the settings can also be programmed by a system coordinator who has a “plus” (SysCoord+) password. The SysCoord+ password should only be used by individuals who are capable of programming the Norstar ICS. However, this level of access should only be distributed to System Coordinators who are more experienced in programming the Norstar ICS.

Programming affects system operation.

Only a qualified installer or customer service representative should perform startup, installation and maintenance programming. Some of the settings affect the correct operation of the system.

Programming overview

Programming access is controlled by four passwords.

- Installer password – allows you to see and change any item in programming.
- System Coordinator Plus password – provides knowledgeable users with access to all but a few sensitive areas of programming. You should only distribute this password to experienced System Coordinators.
- System Coordinator password – used to view and change the settings that are part of day-to-day administration of the Norstar system. This level of access is documented in the Modular ICS System Coordinator Guide.
- Basic password – used with a limited number of feature codes to change programming and control system services.

The tables give an overview of what programming is seen by each type of user. For information on programming the passwords, see “Passwords” on page 279. This level of access is documented in the Modular ICS System Coordinator Guide.

For information about programming using the System Coordinator and Basic passwords, see the *Modular ICS 4.0 System Coordinator Guide*.

Programming overview of NA-MICS 4.0 using the Installer and System Coordinator Plus password

- **Startup**
  - Template
  - Start DN
- **Terminals&Sets**
  - Line access
  - Capabilities
  - Name
  - User prefernces
  - Restrictions
  - Telco features
- **Lines**
  - Trunk/Line data
  - Name
  - Restrictions
  - Telco features
- **Services**
  - Ringing service
  - Restrn service
  - Routing service
  - Common settings
- **Sys speed dial**
- **Passwords**
  - COS pswds
  - Call log pswds
  - Progrming pswds
- **Time&Date**
- **System prgrming**
  - Hunt groups
  - Change DNs
  - Featr settings
  - Direct-dial
  - CAP assignment
  - Access codes
  - Remote access
  - Change DN type
  - Companion
  - Rec'd # length
  - DN length
  - BusName
  - CbC limits
- **Telco features**
  - VMsg ctr tel#s
- **ONN blocking**
- **Software keys**
  - SysID
  - Password keys
- **Hardware**
  - Cards on ICS
  - Mod 03
  - Mod 04
  - Mod 05
  - Mod 06
  - Mod 07
  - Mod 08
- **Maintenance**
  - System version
  - Port/DN status
  - Module status
  - Sys test log
  - Sys admin log
  - Network evt log
  - Provisioning
  - Tests
  - CSU stats
- **Usage metrics**
  - Hunt groups

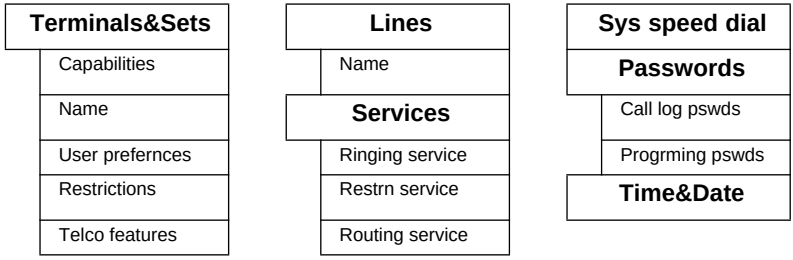
Shaded items are seen only if you are using the Installer password. Settings that require an Installer password are identified with a special icon in each section of this guide detailing the programming instructions.

Programming overview of MICS-XC 4.0 using the Installer and System Coordinator Plus password

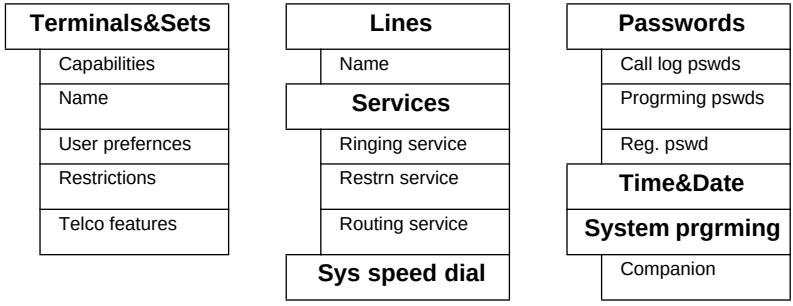
- **Startup**
  - Template
  - Start DN
- **Terminals&Sets**
  - Line access
  - Capabilities
  - Name
  - User prefernces
  - Restrictions
  - Telco features
- **Lines**
  - Trunk/Line data
  - Name
  - Restrictions
  - Telco features
- **Services**
  - Ringing service
  - Restrn service
  - Routing service
  - Common settings
- **Sys speed dial**
- **Passwords**
  - COS pswds
  - Call log pswds
  - Progrming pswds
  - Reg. pswd
- **Time&Date**
- **System prgrming**
  - Hunt groups
  - Change DNs
  - Featr settings
  - Direct-dial
  - CAP assignment
  - Access codes
  - Remote access
  - Change DN type
  - Companion
  - Rec'd # length
  - DN length
  - BusName
  - CbC limits
- **Telco features**
  - VMsg ctr tel#s
- **Software keys**
  - SysID
  - Password keys
- **Hardware**
  - Cards on KSU
  - Mod 03
  - Mod 04
  - Mod 05
  - Mod 06
  - Mod 07
  - Mod 08
  - Mod 09
  - Mod 10
  - Mod 11
  - Mod 12
  - Mod 13
  - Mod 14
- **Maintenance**
  - System version
  - Port/DN status
  - Module status
  - Sys test log
  - Sys admin log
  - Network evt log
  - Provisioning
  - Tests
  - CSU stats
- **Usage metrics**
  - Hunt groups

Shaded items are seen only if you are using the Installer password.

Programming overview of NA-MICS 4.0 using the System Coordinator password



Programming overview of MICS-XC 4.0 using the System Coordinator password



If you are new to programming, you may want to practice using the step-by-step programming instructions in the “Getting Started” section of the *Modular ICS 4.0 System Coordinator Guide* before attempting other programming.

Programming tools

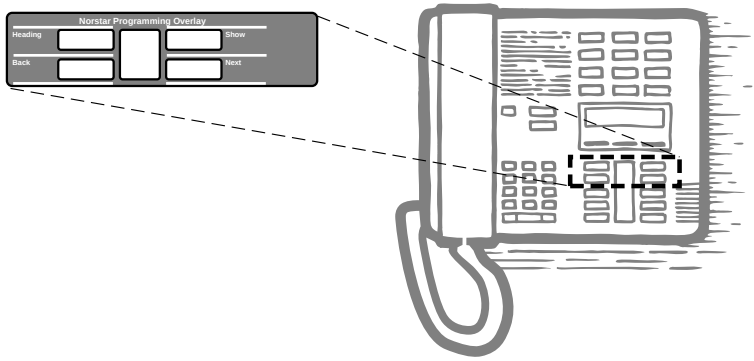
A Norstar telephone

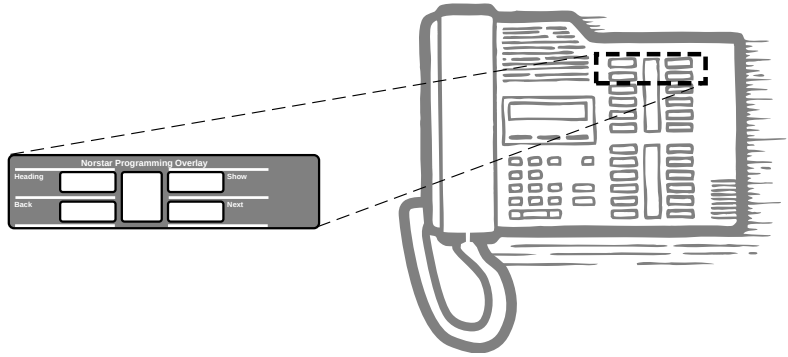
Programming is done at an M7310 or M7324 telephone. Use the buttons on the telephone to program a setting or to request a specific programming action. Norstar guides you step-by-step with instructions on the telephone display while you are programming.

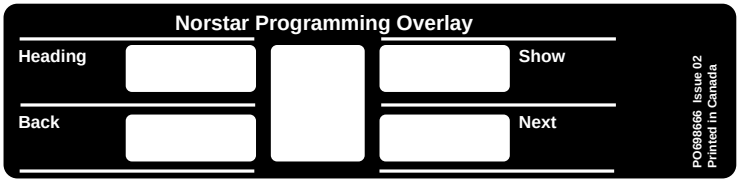
The programming overlay

The programming overlay is a paper cutout that labels four telephone buttons used during programming. The programming overlay is provided at the front of this book.

Placing the programming overlay







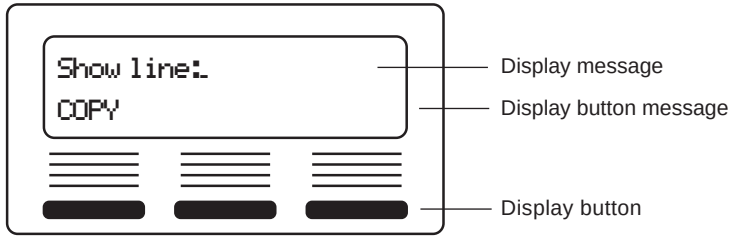
The indicators (▶) on the M7310 or M7324 telephone show which buttons can be used at that programming step.

The functions on these buttons allow you to move through the headings and subheadings of Norstar programming.

Heading	moves to a higher level in the hierarchy of headings and subheadings.
Show	moves to a lower level in the hierarchy of headings and subheadings, or begins programming for a heading or subheading.
Next	moves forward at the same level in the hierarchy of headings and subheadings.
Back	moves backward at the same level in the hierarchy of headings and subheadings.

The Norstar display buttons

Display buttons on the M7310 and M7324 telephones perform many functions. Depending on where you are in programming, one, two, or three display buttons may be available at any one time. You press one of the display buttons to select the desired function.



The most common display button labels are:

CHANGE	changes a programmable setting
BKSP	moves the cursor one space to the left (backspace) and deletes a character, allowing you to re-enter a number or letter
COPY	copies the settings of items like lines, telephones and filters to an item of the same type
LIST	displays the lowest value in a list of DNs, lines or other items
VIEW→	views the last part of a displayed message longer than 16 characters
←VIEW	views the first part of a displayed message longer than 16 characters
-->	moves the cursor one position to the right when programming a name
<--	moves the cursor one position to the left when programming a name

Special characters on the display

When a triangle (▶) is at the end of a programming heading or subheading, it means you can press [Show] to see settings.

When an ellipsis (...) is at the end of a heading or subheading, it means you can press [Show] to see the setting for that heading.

The Norstar Programming Record

The *Programming Record* provides a convenient way to record what you have programmed. It also helps you to plan your programming.

Pages from the record may be photocopied as necessary for programming many telephones or lines.

Exiting programming

Norstar stores your changes automatically as soon as you alter any settings; you do not need to “save” your changes.

Press [Rls]. The display briefly reads End of session.

Viewing your programming updates

If any changes you have made to programming have not taken effect yet, you will see an UPDATE display button when you leave programming. The display will show you how many telephones have not been updated yet because the system is busy with other programming or the telephone is in use.

Press DNs to see the specific sets where programming changes have not been updated. Items will disappear from the list as they are updated, and UPDATE will disappear once all changes are complete.

Entering numbers

Numbers are entered from the Norstar telephone dial pad. The backspace display button may be used to edit the number.

A line number must always be entered as a three-digit number. Line numbers from 10 to 99 must be entered with a leading zero (line 020, for example). Similarly, line numbers less than 10 must be entered with two leading zeros (line 002, for example).

Internal telephone numbers, also referred to as directory numbers (DNs), can be two to seven digits long on a non-expanded system, and three to seven digits long on an expanded system. The default DN length is three for both a non-expanded and expanded system. The DN length can be changed in programming.

Viewing long telephone numbers

External telephone numbers can be up to 24 digits, but the telephone display is only 16 character spaces long. If you wish to see a previously programmed number that is longer than 16 digits, you must do the following:

Begin, for example, with `123456789012345`…. The display shows only the first 15 digits. The three dots (…) at the end of the display indicate that more digits remain to the external number.

1. To see the remaining digits, press `VIEW→`.
2. To see the first 15 digits again, press `←VIEW`.

Using User Preferences programming

The User Preferences feature allows you to program memory buttons, speed dial codes and other settings for any Norstar telephone on the system.

For example, an employee may want to have the Do Not Disturb feature programmed onto a memory button or create a speed dial code. Instead of programming from the employee's telephone, you can program these features from any telephone.

Subheadings in User Preferences

User prefernces
Model
Button prgrming
User speed dial
Call log opt'ns
Dialing opt'ns
Language
Display cntrst
Ring type

To access User Preferences programming see instructions in the *Modular ICS 4.0 System Coordinator Guide*.

Copying telephone programming

Copying is done by using COPY under Terminals&Sets. You can copy programming from one telephone to another telephone, a range of telephones or all telephones.

1. At Terminals&Sets ▶, press [Show] and enter the internal number of the telephone from which you wish to copy programming. Select what programming will be copied:

   •SYSTEM – the system administration programming (system data) of a set

   OR

   •SYSTEM+USER – the system administration programming PLUS the programming for a particular set (user data)

   See the tables starting on page 201 to see which settings will and will not be copied with system and user data.

2. Press [Next], then CHANGE to select the telephone or telephones which will be programmed with the copied data: SINGLE, RANGE, ALL.

   You can copy programming to telephones which are not yet hooked up to the system (unequipped).

3. Press [Next], then CHANGE to select which telephones will be programmed: Only equipped DNs, All set DNs. This is not necessary when copying to a single telephone.

4. Press [Next] and enter the internal number of the telephone that will be programmed or the internal numbers of the first and last telephone in a range.

5. Press OK to proceed with the copy. This step is not necessary when you are copying to a single telephone.

You can also use COPY to duplicate the settings found in the individual subheadings. The button is available in Line access, Capabilities, User prefernces, Restrictions and Telco features and will copy only the settings included in the subheading.

If you press COPY in one of these subheadings, you will not be asked to decide if user data will be copied. Otherwise, the procedure is the same.

Tips - *To copy to a group of telephones which are not part of a range, follow the steps for making a single copy and keep entering new numbers at the* Copy to: *display.*

Depending on the activities going on in the system, a copy may not take effect for a while. The brief display you see once you have finished a copying session does not indicate the process is complete.

You can leave the programming session even if the copy has not been completed. If you exit programming, copying will continue uninterrupted until it is complete.

Event messages capture both the start and completion of the copying process. For more information, see Event messages on page 385.

Some programming settings allow you to choose a delay according to the number of rings. The ring counts used are based on a North American standard of six seconds per ring cycle. The actual delay time may be different for a device other than a Norstar telephone.

System Data which will be copied	System data which will NOT be copied
Line access • Line assignment • Line pool access • Prime line designation • Number of intercom keys • Answer DNs (unless Answer button DN is same as set being copied to)	Line access • Private line appearances
Capabilities • Call Forward No Answer (DN + delay + setting) • Call Forward Busy (DN + setting) • DND on busy • Handsfree setting • Handsfree answerback • Pickup group • Paging zone • Paging • Direct-dial (which set is reached by the D-Dial digit) • Priority calling • Hotline • Auxiliary ringer • Allow redirect • Redirect ring • ATA settings (except Use ringback setting)	Capabilities • Set name • Use ringback setting under ATA settings
Telco Features • Call Log set *(Logging set)* • 1stDisplay	Telco features • Log password • Log space
Restrictions • Set restrictions • Set lock • Allow Last Number Redial • Allow Saved Number Redial • Allow Link • Line/set restrictions	Direct-dial set designation (which set is the D-Dial set) CAP assignment ExtraDial set designation Service mode ringing set designation Prime set designation for a line Hunt group appearance

User data which will be copied	User data which will be copied if destination set type is the same as the source set type
Language choice Ring type Calls log options *(Auto logging)* Display contrast Dialing options (automatic, pre-dial, standard)	External autodial button assignments Internal autodial button assignments Programmable button assignments

Ring volume, User speed dial and CAP module memory button programming are not copied with user data.

System ID

The System ID (or System Security number) can be accessed on any M7324 or M7310 telephone display by pressing [Feature] [*] [*] [S] [Y] [S] [I] [D], or [Feature] [*] [*] [7] [9] [7] [4] [3].

Reviewing programmed settings

The Set Profile and Line Profile features help you to check your programming by allowing you to review the settings.

Programming that can be reviewed

Set Profile	Line Profile
Terminals&Sets settings	Lines settings
Set name	Line name
Line Access	Trunk data
Capabilities	Line data
Restrictions	Restrictions
Telco features	Telco features

Viewing the programming for a telephone

From an M7310 or M7324 telephone:

1. Press [Feature] [*] [*] [S] [E] [T]. The display reads `Show set:`.
2. Enter the internal number of the telephone you wish to review.
3. Use BACK, NEXT, and SHOW to navigate through the settings.
4. Press [Rls] to exit.

Viewing the programming for a line

From an M7310 or M7324 telephone:

1. Press [Feature] [*] [*] [L] [I] [N] [E]. The display reads `Show line:`.
2. Enter the number of the line you wish to review.
3. Use BACK, NEXT, and SHOW to navigate through the settings.
4. Press [Rls] to exit.

Startup programming

After the hardware has been installed and powered up, use Startup to initialize the system, and select one of the two system templates that best suits your system.

Startup erases programming.

Startup erases any existing programmed data, and resets the system to factory defaults.

Performing Startup

1. Enter the Startup access code from a Norstar M7310 or M7324 telephone dial pad, by pressing
   [Feature] [*] [*] [S] [T] [A] [R] [T] [U] [P] which is the same as
   [Feature] [*] [*] [7] [8] [2] [7] [8] [8] [7].

   To be accepted, the Startup code must be entered no later than 15 minutes after the Norstar system has been powered up. (If 15 minutes have elapsed since you powered up the system, turn system power off and on, to prepare for the Startup process.)
2. Enter the Installer password. The default is
   [C] [O] [N] [F] [I] [G] which is the same as [2] [6] [6] [3] [4] [4].

Tips - *The Installer password shown is the default normally used for Startup. For a system which has already been programmed, the Installer password might have been changed in programming and recorded in the Programming Record.*

Changing the default template

After entering the Startup access code and Installer password the display shows `Reset memory?`.

1. Press YES to select a default template. The display shows the current template.

2. Press CHANGE to choose the appropriate template.

Changing template resets programming.

If you change your system template, your programming will be reset.

Changing the starting DN number

You can change the starting number for your telephone directory numbers (DNs). This is helpful when your system is part of a network and you want to use a uniform series of directory numbers for all telephones in your network.

With the display showing the current template.

1. Press Next. The display shows the current start DN.
2. Press CHANGE.
3. Enter the new directory number you want as the starting DN and press OK. The display shows the new range of DN numbers.
4. Press Next to store the programming. The display shows Applyng template. The indicators begin to flash after a few moments, then the display shows Jan 1 1:00 am.

Tips - *All programming is retained for three days if the power fails or if the Norstar system is powered off. After three days without power, it may be necessary to perform Startup.*

The length of the new DN can be from three to seven digits on all systems.

The length of the directory number that you enter sets the length for all directory numbers and target line received numbers in the system.

A DN length change, if required, should be the first programming change on a newly installed Norstar system.

If you reduce the length of the directory numbers in DN length *in* System prgrming*, the starting DN number is reset to the default value (**221**).*

If you increase the length of directory numbers in DN length *in* System prgrming*, each increase in length places the digit 2 in front of any existing DN. For example, if DN 3444 was increased to a length of 6, the new DN would be 223444.*

If the new DNs clash with the direct-dial digit, park prefix, or line pool codes or destination codes, those numbers are overridden and set to None.

Do not disable or enable ports in Maintenance programming during the first two minutes after Startup programming.

Programming

After performing Startup, use programming to change default settings as required. Default settings for the PBX template are shown in bold. Headings and subheadings in Programming help you to keep track of where you are.

Programming for both NA-MICS 4.0 and MICS-XC 4.0 has the following headings:

Terminals&Sets	Lets you assign settings to each telephone.
Lines	Lets you assign settings to each trunk, external and target line.
Services	Lets you create services such as night ringing, routing and restrictions for making external calls.
Sys speed dial	Lets you create speed dial codes that can be used by any telephone in the system.
Passwords	Lets you view and change passwords for programming and features.
Time&Date	Lets you set the time and date on the system clock.
System prgming	Lets you change system-wide settings.
Telco features	Lets you assign settings for external voice message services.
Software keys*	Lets you access system identification and password keys. For USA-MICS-XC 4.0. Lets you configure DTI card as ISDN-PRI card. Companion system only or to activate the Norstar Integrated Data Module 200.
Hardware	Lets you configure the Trunk Cartridges and BRI cards used by the system.
Maintenance	Lets you see diagnostic information about the system and provision BRI cartridges.
Usage metrics	Gives you statistical information on Hunt groups.

*For information about programming for a system which uses Companion components, see the *MICS-XC Norstar-Companion Installer Guide*.

Entering programming for installers

1. Press [Feature] [*] [*] [C] [O] [N] [F] [I] [G] which is the same as [Feature] [*] [*] [2] [6] [6] [3] [4] [4]. The display shows `Password:`.

2. Enter the Installer password. The default password is **CONFIG** (266344).
   The display shows `Terminals:Sets`. Three triangular indicators ▶ appear on the vertical display between the rows of buttons.

3. Place the programming overlay over the buttons pointed to by the indicators ▶.

Entering programming for system coordinators

The person on staff who is in charge of making changes on the Norstar system is called the system coordinator. The everyday programming done by system coordinators is described in *Modular ICS 4.0 System Coordinator Guide*.

Some system coordinators need to be able to program more advanced settings and functions in order to carry out the day-to-day requests and upkeep of the Norstar. These coordinators are usually dedicated communications specialists who work with large Norstar systems or other telephone systems like PBX or Centrex.

By using a special password, a system coordinator can see and change many, but not all, of the programming settings used by an installer. In this guide, programming that can only be changed by an installer is marked in the heading. If you are programming using the System Coordinator Plus password, you will not see these items when you move through

programming. This level of access is documented in the Modular ICS System Coordinator Guide.

1. Press [Feature] [*] [*] [C] [O] [N] [F] [I] [G] which is the same as [Feature] [*] [*] [2] [6] [6] [3] [4] [4].
   The display shows `Password:`.

2. Enter the System Coordinator Plus password. The default password is **SCPLUS** (727587). The display shows `Terminals:Sets ▶`. Three triangular indicators ▶ appear on the vertical display between the rows of buttons.

3. Place the programming overlay over the buttons pointed to by the indicators ▶.

Entering programming using other passwords

A set of the most often used headings and subheadings is available by using a System Coordinator password (see page 193). This level of access is designed for the average user who takes care of the day-to-day changes to the Norstar system, but who is not interested in more advanced programming. The default password is **ADMIN** (23646).

There is also a Basic password that can be used to perform a few programming tasks. The default password is **BASIC** (22742). By using this password, a system coordinator can delegate some responsibilities while keeping more sensitive programming secure. For more information, refer to *Modular ICS 4.0 System Coordinator Guide*.

Programming sequence

The programming information in this guide is presented in the order that is useful for everyday changes and upkeep of the system. The following order is more suitable for an installation.

Suggested order for programming a new installation

- Startup
- Hardware
- Lines
- Terminals&Sets
- System prgrming
- Services
- Sys speed dial
- Telco features
- Passwords
- Time&Date
- Software keys
  (USA-MICS-XC 4.0 Companion system only)
  (to activate the IDM 200)
  (enable PRI capability on DTI card)

Terminals&Sets

Terminals&Sets lets you assign settings to each telephone.

1. Press Show and enter the set number of the telephone you would like to program.
2. Press COPY to duplicate the programming for the telephone and apply it to another telephone, a range of telephones or all the telephones on the system.

For more information about copying set programming, see Copying telephone programming on page 199.

Line access

Line access allows you to assign lines to individual telephones. When you are finished programming Line access settings for one telephone, you can copy those settings to other telephones.

In some cases, Line access programming for Norstar Companion portables works differently than it does for desk sets. See the *MICS-XC Norstar-Companion Installer Guide* for information.

PRI lines can only be configured as direct inward dialing (DID) lines. Therefore, PRI lines are always Auto Answer and cannot be Manual Answer.

Tip - *When you assign line access for BRI loops which have only one SPID, make sure that the programming for the two lines on a BRI loop is identical. For example, if line 001 on BRI loop 201 appears at a DN, line 002 on the same loop should appear at the DN as well. See the ISDN chapter for more information about programming BRI lines.*

In general, auto-answer loop start trunks and auto-answer BRI trunks are not assigned to telephones. If assigned, they are used for monitoring incoming call usage, or for making outgoing calls.

Line assignment

This setting allows you to assign physical trunks and target lines to each telephone. Target lines are assigned and removed in the same manner as other lines. Press [Show] and enter the line number. Press CHANGE to change the setting for each line: **Unassigned**, Ring only, Appr&Ring, and Appr only.

Broadcast ring group ability is possible with multiple target line assignment across a group of sets.

Appearances

This setting only applies for direct inward dial (DID) lines (145 to 272 for MICS, and 145-336 for XC). These lines are also referred to as target lines.

The Norstar system can handle simultaneous calls to the same DID line on the same set (multiple target line appearances). The number of DID appearances depends on the line assignment setting (Appr&Ring, Ring only, Appr only).

If Appr&Ring or Appr only is chosen, you can have as many simultaneous DID calls as there are target line key

appearances. If Ring only is chosen, you can have as many simultaneous DID calls as you have intercom keys.

> Users cannot access PRI lines directly through line appearances or line pools. All outgoing PRI calls are dialed via intercom using routing codes.

When a trunk card is changed to PRI, all existing line appearances for that card are automatically removed.

The Basic Set, ATA, portable and BRI ISDN S-terminals cannot process more than 2 simultaneous calls.

There is a suggested limit of 4 keys per set. You can program more than 4 keys on an set by programming less than 4 on other sets. For instance, you might program 20 keys on a receptionist set equipped with a CAP.

The Norstar system will not support a mixture of Appear only and Ring only appearances.

1. Enter the line number. The display shows the line number and its assignment.
2. Press [Show] until the display shows Appearances:1.
3. Press CHANGE and enter the number of target line appearances.
4. Press [Rls] to exit or [Next] to continue programming.

Tips - *Press* SCAN *to view the lines assigned to this telephone.*

In general, auto-answer loop start trunks, auto-answer E&M trunks and DID trunks are not assigned to telephones. If assigned, they are used for monitoring incoming call usage, or for making outgoing calls (auto-answer loop start and E&M trunks).

In general, fixed data channel trunks are not assigned to telephones. If assigned, they are used for monitoring call usage.

You cannot assign a line that is private to another telephone.

Each line assigned to appear at a telephone must appear at a button with an indicator on that telephone. The maximum number of line buttons are 8 for the M7208 telephone, 10 for the M7310 telephone, and 24 for the M7324 telephone.

If you set a line to Ring only, incoming calls appear on an intercom button.

A central answering position (CAP), with one or two CAP modules, can provide extra line buttons if more than 24 lines are assigned to the CAP. The remaining lines appear at buttons on the CAP module.

The M7100 telephone is an exception; it has no line buttons and can be assigned any number of lines.

Make sure that lines assigned to an M7100 telephone are assigned to ring; otherwise, you cannot detect incoming calls on the lines.

Line pool access

This setting allows a telephone to access one or more of the fifteen line pools available (A to O). When you assign “yes” for a given line pool, the telephone being programmed can access any lines in that line pool.

Press [Show] then press [Next] to scroll through the settings and display the line pool you want to program access to. Press CHANGE to select the setting: N (No) and **Y** (Yes).

Two exclusive line pools are available for PRI lines. There can be a maximum two PRI cards on a Norstar system, therefore the two possible line pools are PRI-A and PRI-B.

Only PRI lines can belong to a PRI pool. PRI lines cannot belong to Line Pools A through O, and all lines on a single PRI card belong to the same pool. Lines from multiple PRI cards can belong to the same pool if they are configured with the same protocol. PRI lines are assigned to pools with the Line type setting.

Prime line

This setting assigns a prime line to the telephone. A prime line is the first line that is automatically selected when a call is made from a Norstar telephone. Press CHANGE to select the setting: None, Pool (A to O), and **I/C** (intercom). Only assigned lines and line pools appear. PRI pools are not valid selections for a Prime line.

Tips - *An assigned prime line is not associated with the assignment of a prime telephone.*

An external line must be assigned to the telephone in Line assignment before it can be assigned as the prime line to the telephone.

A line pool must be assigned to the telephone in line pool access before a line pool can be assigned as the prime line to the telephone.

A target line cannot be a prime line for a telephone because it is incoming-only.

A DID line should not be assigned as the prime line for a telephone. If assigned, it is treated as if no prime line has been assigned. The message `Select a line` *appears when the receiver is lifted.*

Remember that if you set prime line to I/C (intercom), you may wish to assign loop start lines to the first line pools. When the system searches for an outgoing line, it begins at line pool A and chooses the first available line.

By assigning a line pool as a prime line, a telephone can be made to search automatically for an idle line in a pool. This is described in the section on programming Line type (`Trk/Line Data`*).*

Intercom keys

This setting assigns the number of intercom buttons to a telephone. Intercom buttons provide a telephone with access to internal lines and line pools. Press CHANGE to select the setting: 0, 1, **2**, 3, 4, 5, 6, 7, or 8.

Tips - *Each intercom button assigned during programming automatically appears on the telephone. The buttons start with the lower right-hand button, or one button above if the Handsfree/Mute feature is assigned to the telephone.*

A telephone needs two intercom buttons to be able to establish a conference call with two other Norstar telephones.

Only one intercom button may be required if the button will only be used to make and receive internal calls, and to access line pools.

Two intercom buttons are required if a telephone has several lines assigned to ring only.

The M7100 telephone default assignment of two Intercom buttons cannot be changed. These buttons do not appear on the telephone.

Answer DNs

Calls for other Norstar telephones can appear and be answered at the telephone being programmed. The DNs of the other telephones are referred to as Answer DNs.

Press [Show] and enter the Answer DN. Press CHANGE to change the setting for the Answer DN: **Unassigned**, Appr&Ring or Appr only.

To assign additional Answer DNs, press [Next], then enter the next Answer DN.

Tips - *Press* SCAN *to view the Answer DNs assigned to this telephone.*

Every Answer DN assigned to the telephone automatically assigns an Answer button with an indicator to the telephone. These buttons should be labeled accordingly, identifying the telephone with its name or DN.

The maximum number of Answer DNs that can be assigned to a particular Norstar set is eight.

More than one telephone can have an Answer button for the same DN. In this way, more than one telephone can provide call alerting and call answering for any calls directed to that DN.

When a call to a Norstar set is received via Call Forwarding, the Answer DN for that set will not alert.

OLI

When you make an outgoing call on a BRI line, the Call Display information which appears on the telephone you are calling is usually based on the first Network DN associated with the service profile identifier (SPID) and line.

If the SPID and line have more than one Network DN, you can program a DN to use a Network DN other than the first one for the outgoing Call Display information. When you program the alternate Network DN as the ten-digit outgoing line identification (OLI) number, and you make a call using the line associated with the Network DN, the OLI number appears on the telephone you are calling.

If an outgoing call is made using a SPID and line that are not associated with the Network DN number used as the OLI number, the network ignores the number and the default Call

Display information (the first or only Network DN associated with the SPID and line) is displayed.

1. Press CHANGE and enter the 10 digits used for the OLI.
2. Press CLR to choose **None**.

Note: If your system is equipped with a mixture of digital line cards, it is recommended that sets be programmed to use line pools when making calls. If line pools are not properly configured, a set may use a line with a network range that does not include the set's CLI, causing the network to present an incorrect CLID to the called party.

Capabilities

Settings that control how the system interacts with individual telephones and the calls they receive are found in Capabilities. The default settings are shown in bold.

Setting	Description	Options
Fwd no answer		
Fwd to	Redirect all incoming calls when this telephone does not answer.	Enter DN **None**
Forward delay	Select the number of rings before an unanswered call is forwarded.	2, 3, **4**, 6, 10
Fwd on busy	Redirect all incoming calls when this telephone is busy with another call.	Enter DN **None**
DND on Busy	Select whether an incoming call rings if the user is already on another call.	Y, **N**
Handsfree	Select whether Handsfree will be available to a telephone.	Auto, Std (Standard), **None**
HF answerback	Select whether a user can automatically answer a voice call without lifting the receiver or pressing the Handsfree/Mute button.	**Y**, N

Setting	Description	Options
Pickup grp	Assign this telephone to a pickup group.	**None**, 1 to 9
Page zone	Assign this telephone to page zone.	None, **1** to 6
Paging	Select whether paging announcements can be made from this telephone.	**Y**, N
D-Dial	Select whether you can call the Direct-dial telephone from this telephone using the Direct-dial digit.	**Set1** to Set5, None
Priority call	Select whether to allow this telephone to interrupt calls or to override Do Not Disturb at another telephone.	Y, **N**
Hotline	Select whether a telephone number will be dialed automatically when a user lifts the receiver or presses [Handsfree Mute].	Intrnl, Extrnl (enter DN), **None**
Intrnl #	Appears if Hotline is Intrnl	Enter DN, **None**
Extrnl #	Appears if Extrnl	**None**, <up to 24 digits>
<Extrnl> facility choice	Appears if D-Dial is Extrnl and number is specified. Use routing tabl option routes numbers through the Routing Table. Target lines cannot be used as the facility.	Use Prime line Use line: Pool code: Use Routing tabl
Aux. ringer	Select whether an auxiliary ringer (if installed) will ring for incoming calls at this telephone.	Y, **N**
Allow redirect	Select whether to allow this telephone to redirect its lines.	Y, **N**
Redirect ring	Select whether a telephone rings briefly when a call on one of its lines is redirected by the Line Redirection feature ([Feature] [8] [4]).	**Y**, N

Setting	Description	Options
ATA settings		
ATA ans timer	Select the length of delay between the last digit you dial and when the ATA device is ready to receive DTMF tone.	3, 5, **7**, 10
ATA use	Select where the ATA can be used.	On site, **Off site**
MsgIndicate	Select the type of message indicator. Tone sends a Message Tone through the set's receiver and Lamp turns on the set's Message Lamp when a message is received.	**None**, Tone, Lamp

For more information, refer to the *Modular ICS 4.0 System Coordinator Guide*.

ATA settings

ATA ans timer

A timer can be used to administer a delay between the last digit you dial on a device connected to an analog terminal adapter (ATA) and when the system begins to send out tones (DTMF or modem) on the outgoing line without capturing and interpreting them. To change the delay time, press CHANGE to select the setting (in seconds): ATA ans timer: 3, 5, **7**, or 10.

Tip - *To accommodate the device attached to the ATA, you may want to lengthen or shorten the delay. If a modem or fax machine is attached to the ATA you will want to keep the delay short. If a call to a fax machine or modem cannot be connected, try shortening the delay. If an individual is dialing the number for a fax machine or modem, you may want to make the delay a little longer.*

ATA use

An analog terminal adapter (ATA) can connect to devices that are either on your premises or at some other location. Press CHANGE to select On site or **Off site**.

Note: This setting is only programmable for ATA2. Global ATAs are off site and Analog Station Modules (ASMs) are on site.

MsgIndicate

Select the type of message indicator to be activated when a set on an ASM has a message. Press CHANGE to select **None**, Tone, or Lamp.

Name

The default name for a telephone is its DN, but it can be changed to any combination of letters and numbers to a maximum length of 7 characters.

For more information, refer to the *Modular ICS 4.0 System Coordinator Guide*.

User prefernces

Any programming that can be done by a users at their telephones can also be done in programming. The default settings are given in bold.

Setting	Description
Model	Allows you to pre-program the model of Norstar set which will use this DN (**M7208**).
Button prgrming	Lets you program the buttons with internal and external autodialers and/or programmed feature keys.
User speed dial	Programs user speed dialers (No defaults).
Call log opt'ns	Select whether the set will: Log all calls, No autologging, **No one answered**, or Unanswered by me.
Dialing opt'ns	Select **Standard dial**, Pre-dial or Automatic dial.
Language	Choose the display language: **English**, French or Spanish.
Display cntrst	Adjust the contrast of the display 1, 2, 3,**4**,5.....9
Ring type	Select a ring type **1**, 2, 3, 4

For more information, refer to the *Modular ICS 4.0 System Coordinator Guide*.

Restrictions

Restrictions prevent a user from making certain kinds of calls from a telephone or from lines that are available at the telephone. It also restricts some features.

When you are finished programming restriction settings for one telephone, you can copy those settings to other telephones by using COPY at the Restrictions ▶ display.

For ISDN PRI, all line restriction changes are applicable to all 23 lines.

For more information about copying set programming, see Copying telephone programming on page 199.

Filters

A restriction filter is a set or group of restrictions and overrides that specify the external numbers or feature codes that cannot be dialed from a telephone or on a line. Rather than define individual restrictions and apply them repeatedly to telephones and to lines, restriction filters let you assign them in one step as a single package of dialing sequences that are not permitted.

In addition to restricting telephone numbers, you can prevent people from entering dialing sequences used by the central office (the public network) to deliver special services and features. Because some of these features provide the caller with dial tone after they have entered the special code (which often uses [#] or [*]), users may have an opportunity to bypass restrictions. To prevent this from happening, you should create filters that block these special codes.

You create a filter by defining the dialing sequences that are denied. There will also be variations of each sequence that you will want users to be able to dial. Sequences that can be dialed are called overrides.

Once you create the filters, you can assign the restrictions to a telephone (under `Terminals&Sets`), to a line (under `Lines`), to a particular line on a telephone (under `Terminals&Sets`), and to remote callers (under `Remote access`).

1. Press [Show] and enter the number of the restriction filter you want to program or press [Next] to move through all the available filters.
2. Press [Show] to see the first restriction in the filter. The first four digits of the number that will be denied are

included in the display. The full number can be seen by pressing [Show] again.

3. Use ADD, the dial pad, and OK to program a restriction for each filter.
4. Press [Next] when the full restricted number is on the display (it shows Deny: and the number) to see any overrides to the restriction.
5. Use ADD, the dial pad, and OK to program overrides for each restriction filter.
6. Press ANY to enter a • wild card character that represents any digit in a sequence of numbers when denying numbers or creating overrides.
7. You can press REMOVE to delete a restriction.The overrides will be deleted as well and the restrictions will renumber to fill the gap.

Default filters

Filter 00 permits unrestricted dialing and cannot be changed.

Filter 01 is preprogrammed with five restrictions and some associated overrides.

In Filter 01, restriction 02 and override 005 allow long distance directory assistance calls. Filter 01 reflects the fact that area codes can now have any digit as a second digit. This is designed to be used with the North American dialing plan.

The dialing string 911 (the number for emergency assistance in North America) is included as both a restriction and an override in filter 01. This arrangement prevents anyone from blocking calls for emergency assistance on lines or sets using the default filter.

Restriction filter defaults

Filter	Restrictions (denied)	Overrides
00	Unrestricted dialing	
01	01: 0	
	02: 1	001: 1800 002: 1877 003: 1888
	03: 911	001: 911
	04: 411	
	05: 976	
	06: 1976	
	07: 1•••976	
	08: 1900	
	09: 1•••900	
	10: 5551212	
02 - 99	No restrictions or exceptions programmed	

Note: Default filters are only loaded at a cold start.

Filters 02, 03, and 04, although not preset with restrictions and overrides, are used as default filters in these programming headings:

Filter	Heading	Sub-heading
02	Terminals&Sets	Set restrns:
03	Lines	Line restrn:
04	Lines	Remote restrn:

Tips - *Filter 00 cannot be changed.*

Norstar can have up to 100 restriction filters (00 to 99).

Each programmable filter can have up to 48 restrictions. There is no limit on the number of overrides that can be allocated to a restriction.

There is a maximum of 400 restrictions and overrides allocated to the 100 programmable filters.

The maximum length of a restriction is 15 digits. The maximum length of an override is 16 digits.

A single dot (•) in a dialing sequence is a wild card (stands for any digit). It is inserted by pressing ANY*.*

You can use * *and* # *in a sequence of numbers in either a restriction or an override. These characters are often used as part of feature codes for other systems or for features provided by the central office (the public network).*

*When restricting the dialing of a central office feature code, don't forget to create separate restrictions for the codes used for DTMF and pulse lines. Examples of dialing strings that may be restricted for this reason are *67 and 1167. Do not string together a central office feature code and a dialing sequence that you want to restrict. Create a separate restriction for each.*

You can use COPY *and the dial pad to copy restrictions and overrides from one filter to another.*

Any restriction or override can be used in any number of filters. Each time it is used, it counts as one entry. For example, if restriction 411 exists in filters 01, 02 and 03, it uses up three entries of the 400 entries available.

Removing a restriction from a filter has no effect on the contents of other filters even if the restriction was copied to them.

You cannot delete a filter. Removing the restrictions programmed on a filter makes it an unrestricted filter but the filter itself is not removed.

Removing a restriction changes the identifying number of the restriction.

Removing a restriction also removes the overrides associated with it, and changes the identifying number of the restriction. For example, if you remove restriction 01, restrictions 01 to 08 are renumbered as 01 to 07.

Set restrns

Set restrictions lets you assign a restriction filter to a telephone to prevent certain numbers from being dialed from that telephone, and prevent certain features from being used by a telephone.

Filters

You can assign a different restriction filter for normal service and for each of six schedules. See the section on Services for more information about the schedules.

Use [Show], CHANGE and the dial pad to enter the number of the restriction filter to be assigned to the set for each schedule.

Default filters for sets

Schedule	Restriction filter
Normal	02
Sched 1 (Night)	11
Sched 2 (Evening)	12
Sched 3 (Lunch)	13

Schedule	Restriction filter
Sched 4	00
Sched 5	00
Sched 6	00

This means, for example, that if you enter a set of restrictions for filter 11, they will be automatically applied when the Night schedule is in use.

Set lock

You can adjust the amount of personal programming and customizing that can be done at a telephone. Press CHANGE to select the setting: **None**, Partial, or Full.

Allow last no

A telephone can be prevented from using Last Number Redial (Feature 5). Press CHANGE to select the setting: **Y** (Yes) or N (No).

Allow saved no

A telephone can be prevented from using Saved Number Redial (Feature 6 7). Press CHANGE to select the setting: **Y** (Yes) or N (No).

Allow link

A telephone can be prevented from using Link (Feature 7 1), a host signaling option. Press CHANGE to select the setting: **Y** (Yes) or N (No).

Tip - *For more information about host system signaling, refer to the Modular ICS 4.0 System Coordinator Guide.*

Line/set restrns

Line/set restrns lets you assign a restriction filter to a specific line that can be used for outgoing calls at a specific telephone. This type of filter replaces any line or set restriction filters which might otherwise apply. It restricts the numbers you can dial on a line, but only from that telephone. The same line on another telephone can have different restrictions.

As with set restrictions, you can apply a different line/set restriction for normal service and for each of six schedules.

Use [Show], CHANGE and the dial pad to enter the number of the filter to be assigned as the line/set restriction for each schedule. There are no default line/set restrictions.

Tips - *A maximum of 255 line/set restrictions may be applied to lines at telephones.*

If a line/set restriction is assigned to a line at a particular telephone, it overrides any line restrictions or set restrictions which might otherwise apply.

If no line/set restrictions have been defined, the numbers are checked against the set restrictions and the line restrictions, if either of these have been defined. The numbers may be rejected by either restriction.

Telco features

Telco features can program the way the Norstar works with features and services that are based in the public network or other outside source. Norstar is designed to work with two of these kinds of services: Call Display and an external voice message service.

When you are finished programming Telco features settings for one telephone, you can copy those settings to other telephones by using COPY at the Telco features... display.

For more information about copying set programming, see Copying telephone programming on page 199.

CLASS assignment (CMS)

If you subscribe to Call Display services (often called Caller ID), external calls are identified on the display. You may also have a message indicator from an external voice mail service show on the display. CLASS assignment programming allows you to customize how this information is used.

Press [Show] and enter the number of the line you want to program with CLASS settings for the telephone.

Call log set

Call log set allows you to specify whether the telephone automatically logs Call Display information for calls on an external line. The line must appear on that telephone, but it does not have to be a ringing line. Press CHANGE to select the setting: **N** (No) or Y (Yes).

Extl VMsg set

If you subscribe to a voice message service, you can access that service through your Norstar system. The external voice message setting controls where the indicator shows up when there is a voice message waiting on a particular line. The line must appear on that telephone. Press CHANGE to select the setting: **N** (No) or Y (Yes).

To find out if your voice message service will work with Norstar, or if you have any problems with your service, contact your voice message service provider.

1stDisplay

Depending on the services you subscribe to, Call Display information may contain the number of the caller, the name of the line in your Norstar system that the call is on, or both. For

each telephone, you can determine which information is displayed first. Press CHANGE to select the setting: **Name**, Numbr or Line.

Tips - *The Call Information feature is used to display and toggle between the name and line number used for Call Display information. Refer to Modular ICS 4.0 System Coordinator Guide for more information.*

You may see Unknown number *on the display if the information is not available from your telephone company. You may see* Private number *on the display if the caller blocks that information.*

Log space

Log space determines the number of items that can be stored in the Call log for each telephone. Use [Show], ADD and REMOVE to redistribute the log space. There is no log space assigned by default.

Tips - *There must be space available in the log pool in order for you to add space to a Call log. The maximum number of spaces available is 600.*

System-wide log space allocation is performed in Call log space under System prgrming*. If you want to allocate the same log space to all telephones, use the Call log space setting instead.*

Lines

Trunk/Line data

Installer password required

Trunk data lets you program settings for lines that affect how Norstar communicates with other switches, and lets you determine how lines (including target lines) will be used in the Norstar system.

Some Trunk data settings may not appear on the display during programming depending on the type of trunk. Those that appear for a given Trunk type are indicated in the following table.

Tips - *Fixed lines can only be used by the IDM 200. Entering the software keys allows you to change the Trunk type option for T1 lines to Fixed.*

To enable the IDM 200 to interact with the ICS, you must enter Software keys. See Software keys on page 328 or the Bandwidth Allocation License sheet.

Trunk/Line data settings that appear for a given trunk type

Setting	Loop start Analog	Loop start Digital	E&M Analog	DID Analog	DID Digital	Target lines	PRI lines	BRI -ST, BRI-U2, and BRI-U4	Groundstart	E&M Digital	Fixed
Trunk type	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Line type	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
Dial mode	✓	✓	✓	✓	✓	–	–	–	✓	✓	–
Rec'd #	–	–	–	–	–	✓	–	–	–	–	–

Setting	Loop start Analog	Loop start Digital	E&M Analog	DID Analog	DID Digital	Target lines	PRI lines	BRI -ST, BRI-U2, and BRI-U4	Groundstart	E&M Digital	Fixed
PrimeSet	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	–
CLID set	✓	✓	–	–	–	✓	–	✓	–	✓	–
Auto privacy	✓	✓	✓	✓	✓	✓	–	✓	✓	✓	–
Trunk mode	✓	✓	–	–	–	–	–	–	–	–	–
Ans mode	✓	✓	✓	✓	–	–	–	✓	✓	✓	–
Ans with DISA	✓	✓	✓	✓	–	–	–	✓	✓	✓	–
Link time	✓	✓	–	✓	–	–	–	–	–	–	–
Link at CO	✓	–	–	✓	–	–	–	–	–	–	–
Aux. ringer	✓	✓	✓	✓	✓	✓	–	✓	✓	✓	–
Full AutoHold	✓	✓	–	–	–	–	–	✓	–	–	–
LossPkg	✓	–	–	–	–	–	–	–	–	–	–
Signal	–	–	✓	✓	✓	–	–	–	–	✓	–
ANI Number	–	–	✓	✓	✓	–	–	–	–	✓	–
DNIS Number	–	–	✓	✓	✓	–	–	–	–	✓	–
Gain	–	–	✓	✓	–	–	–	–	–	–	–

Copying Trunk and Line data

At the `Trk/Line data` display `COPY` appears. This allows you to copy programming from one line to other lines.

Tips - *In copying data from a physical trunk to a target line (or the other way around), only the data in common is copied. For example, copying a target line to an E&M trunk copies only the Line data settings because there are no Trunk data settings for a target line.*

If you try to copy line programming between lines on different types of Trunk Cartridges, the display shows `Incompatible Cd`*, then returns to* `Show line:_`*. You cannot copy programming between lines on different types of Trunk Cartridges.*

The Received number of a target line is a unique number and cannot be copied.

Trunk type

Installer password required

The Line setting shows **Loop**, DID, PRI, BRI-ST, BRI-U4, BRI-U2, E&M, Ground or Fixed.

Tips - *You can only change this setting for lines connected to a DTI. For all other lines (analog lines and BRI lines), the trunk type is determined by the Trunk Cartridge type. The system simply displays the trunk type; you cannot change it. To change the Trunk Cartridge or BRI Card, see Hardware on page 331.*

Fixed lines can only be used by the IDM 200. Entering the software keys allows you to change the Trunk type option for T1 lines to Fixed. To enable the IDM 200 to interact with the ICS, you must enter Software keys. See Software keys on page 328 or the Bandwidth Allocation License sheet.

Enable Trunk Cartridges

If you disable any Trunk Cartridges to perform programming, enable them now using `Module status` in Maintenance or your system will not function properly. See *Module status on page 366* for information on enabling Trunk Cartridges in Module status.

Line type

Installer password required

This setting specifies how the line is to be used in relation to other lines in the system. Press `CHANGE` to select the setting: **Public**, Private to:, or Pool (A to O, representing 15 line pools) or PRI-A and PRI-B.

- A **Public** line can be accessed by more than one telephone.
- A **Private** line can be assigned only to one telephone and the prime telephone for that line. Use `CHANGE` and the dial pad to enter the internal number of the telephone.
- **Pool** assigns the line to one of the fifteen line pools. If a line is assigned to a line pool, but is not assigned to any telephone, that line is available only for outgoing calls.

Tips - *Line pools must never contain a mixture of loop start lines and E&M lines. All E&M lines in a given line pool should go to the same location.*

Try to avoid putting unsupervised loopstart lines in a line pool. These lines can become hung, especially when a remote user uses the line pool to make an external call.

There are two more programming settings that must be assigned before a line pool can be used:

- You must assign line pool access to telephones in `Line access` programming.

- You must assign system-wide line pool access codes in System prgrming.

Tips - *A telephone can be administered to search automatically for an idle line from several lines appearing on the telephone. Assign a line pool as the prime line (in* Line access*) and all the lines in the line pool must appear on that telephone. When the user lifts the receiver or presses* [Handsfree Mute]*, any one of the lines, if idle, can be selected by Automatic Outgoing Line selection.*

Line connected to a DTI

Installer password required

The Line setting shows the trunk type for a line. For lines connected to a DTI, press CHANGE to select the setting: **Loop**, E&M, DID, Ground, Fixed.

- For DTI, loop is the setting used for loop start trunks.
- For DTI, E&M is for the first two line numbers on E&M trunks.
- For DTI, DID is for direct inward dialing (DID) trunks.
- For DTI, ground is for ground start trunks.
- For ISDN-PRI, ISDN primary rate interface (PRI) lines.

Tips - *You can only change this setting for lines connected to a DTI. For all other lines, the trunk type is determined by the Trunk Cartridge type. The system simply displays the trunk type; you cannot change it. To change the Trunk Cartridge or BRI Card, see Hardware on page 331.*

E&M Trunk Cartridges have two E&M lines and two DTMF receivers (instead of four lines as in a Loop Start Trunk Cartridge). For example, if an E&M Trunk Cartridge has the range of line numbers 049 to 052, numbers 049 and 050 are E&M lines, and numbers 051 and 052 are the DTMF receivers. The display for line 050 appears as `Line050:E&M` *and for line 051 appears as* `Line051:DTMF`*.*

Tips - *Changing the settings for trunk type (that is, Loop Start, E&M or DID) on a system that is in use, may cause calls to be dropped.*

When assigning lines to line pools, consider your network configuration. You may be able to create a unified dialing plan by assigning lines to the same location to the same line pool on each of your systems. For example, if system A and system B each have tie lines to system C, assign the tie lines to pool D on each of the systems.

If you plan to program the prime line as I/C (intercom) for some telephones, you may wish to assign loop start lines to the first line pool. Remember that when the system searches for an outgoing line, it begins at line pool A and chooses the first available line.

Assigning a single E&M trunk to a line pool allows features like Ring Again to help manage access to a shared resource.

You cannot assign target lines (145-272) to a line pool.

Dial mode

Installer password required

Dial mode lets you specify whether dual tone multifrequency (DTMF) or pulse signalling is used on the trunk. Press CHANGE to select the setting: Pulse or **Tone.**

Tips - *For DID and E&M lines connected to a DTI, the Tone setting does not appear if Signal is Immediate.*

Rec'd

Installer password required

The Received number setting applies only to target lines (line numbers 145 to 275 for a NA-MICS 4.0 system and 145 to 336 for an XC 4.0 system). It allows you to specify the digits which make a specific target line ring. The default value is **None**.

Use CHANGE, and the dial pad to program the digit string for each target line.

Tips - *A Received number can be two to seven digits long (programmed in System Prgming). The default length for a non-expanded system is 2. The default length for an expanded system is 3.*

A received number cannot be the same as, or be the start digits of a line pool access code, a destination code, the DISA DN or the Auto DN.

If you are configuring auto-answer BRI trunks to map to target lines, the received number should be the same as the Network DN supplied by your service provider. The call will be directed to the prime telephone for the incoming line if the Network DN is not used.

Prime set

Installer password required

This feature allows you to assign a telephone to provide backup answering for calls on the line. Unanswered calls are

redirected to the prime telephone. Use CHANGE and the dial pad to enter the internal number of the prime telephone.

The default prime set for each line is 221.

Tips - *For auto-answer trunks, calls ring only at the prime telephone for a trunk, and only when overflow call routing is active.*

Each line can be assigned only one prime telephone.

CLID set

Installer password required

A Norstar set displays the telephone number of the calling party. The Call Line Identifier (CLID) set prompt lets you specify which sets are capable of using the feature.

The default setting is **None**.

Auto privacy

Installer password required

This feature controls whether one Norstar user can select a line in use at another telephone to join an existing call. The default setting is Privacy on, so that nobody with a Norstar telephone can press a line appearance on their telephone to join a call in progress at another telephone. Press CHANGE to select the setting: **Y** (on) and N (off).

Tips - *Users can change a line's privacy setting for an individual call using the Privacy feature (Feature 8 3).*

Trunk mode

Installer password required

Trunk mode lets you specify one of two modes of operation for each line: disconnect supervision or unsupervised. Disconnect supervision, also referred to as loop supervision, releases an external line when an open switch interval (OSI) is detected

during a call on that line. This prevents the line from remaining unavailable for other Norstar users.

Press CHANGE to select the setting: **Unspr** or Super.

- Unspr (the default) turns disconnect supervision off for the line.
- Super assigns supervised mode, if supported by the line; otherwise, the line functions as unsupervised.

Tips - *The duration of an open switch interval (OSI) before Norstar disconnects a call is programmed by the Discon timer setting under* Hardware*.*

Disconnect supervision is required for loop start trunks to operate in auto-answer mode or with DISA. It is also required to conference with two external callers. The line must be equipped with disconnect supervision from the central office for the Super option to work.

Ans mode

Installer password required

The Answer mode setting appears on the display during programming for loop start and BRI lines if the Trunk mode setting is Super, for ground start lines, and for E&M lines. Press CHANGE to select the setting: **Manual** or Auto.

Tips - *If loop start lines are set to Auto, you will require an E&M card for the DTMF receivers to function properly.*

Remember that disconnect supervision is required if loop start trunks are to operate in auto-answer mode.

You should change the Answer with DISA setting to N, for E&M trunks in a private network operating in auto-answer mode. The default, Y (Yes), causes the system to expect a Class of Service password after it automatically answers a trunk.

Ans with DISA

Installer password required

When activated, the Answer with DISA setting specifies that a trunk is answered with stutter dial tone. Press CHANGE to select the setting: **Y** (Yes) or N (No).

Tips - *For loop start and E&M lines this setting only appears if Answer mode is Auto.*

Set Ans with DISA to No for E&M lines on an enhanced switched network (ESN) to operate properly in auto-answer mode.

To program DISA on PRI trunk, see Programming Direct Inward System Access (DISA) on PRI trunks on page 41.

Link time

Installer password required

Link time allows you to specify the duration of a signal required to access a feature through a remote system. Press CHANGE to select the setting: 100, 200, 300, 400, 500, **600**, 700, 800, 900, or 1000 milliseconds.

For example, to program external dialing through a Centrex system, which requires a Link time of 400 ms, specify a Link time of 400.

Tips - *The Link time required depends on the requirements of the host switching system that must be accessed.*

Link is another name for recall or flash.

Link at CO (exchange)

Installer password required

Some exchanges respond to a Link signal (Feature 7 1) by providing an alternative line for making outgoing calls. When Link at CO is set to Y (Yes), the system applies the restrictions on outgoing calls to the digits dialed after the Link signal, and the call on the alternative line will be subject to all restrictions.

Setting Link at exch to N (No) prevents a Link signal from resetting the Norstar restrictions in cases where the host exchange does not provide an alternative line.

Press CHANGE to select the setting: Y (Yes) or **N** (No).

For more information about host signalling options, refer to *Norstar-PLUS Modular ICS 4.0 System Coordinator Guide*.

Aux. ringer

Installer password required

This setting allows you to turn the auxiliary ringer on or off. An auxiliary ringer can be programmed on a line or a set. When programmed on a set, the auxiliary ringer will ring every time a call is received. When programmed on a line, the auxiliary ringer will not ring when a transferred call is received.

Press CHANGE to select the setting: Y (Yes) or **N** (No).

Tips - *The auxiliary ringer is an optional device that should be connected by the installer.*

If you have an auxiliary ringer programmed to ring for calls on an external line, and you transfer a call on that line without announcing the transfer, the auxiliary ringer will ring for the call transfer.

An auxiliary ringer can also be programmed in Services to ring for a line placed into a scheduled Ringing service. See the Norstar-PLUS Modular ICS 4.0 System Coordinator Guide for more information.

Full AutoHold

Installer password required

Full AutoHold on idle line is a variation of the Automatic Hold feature. If you select an idle line, but do not dial any digits, that line is automatically placed on hold if you then select another line. Press CHANGE to select the setting: **N** (No) or Y (Yes).

The line you first selected is held until you press its button. The line is not available for use by anyone else.

Tips - *The Full AutoHold setting appears only during loop start trunk programming. Full AutoHold is always in place for E&M trunks; it has no meaning for incoming-only DID trunks.*

The default setting should be changed only if Full AutoHold is required for a specific application.

LossPkg

Installer password required

Loss Package lets you select the appropriate loss/gain and impedance settings for each line. The setting is based on the distance between the ICS and the terminating switch, and the terminating switch type. When measuring the distance from ICS to CO and from ICS to PBX, use 600 ohms as the termination resistance setting.

Loss Pkg	Receive Loss	Transmit Loss	Impedance	Distance to switch/cable loss/ terminating switch
ShortCO	0 dB	3 dB	Short	Short/<2 dB/ICS to CO
MediumCO	0 dB	0 dB	TIA/EIA 464	Medium/>2 dB and <6 dB/ICS to CO
LongCO	-3 dB	0 dB	TIA/EIA 464	Long/>6 dB/ICS to CO
ShortPBX	0 dB	0 dB	Short	Short/<2 dB/ICS to PBX
LongPBX	-3 dB	0 dB	TIA/EIA 464	Long/>2 dB/ICS to PBX

A loss of 4 dB corresponds to a cable length of approximately 2700 m (9000 ft.).

Press CHANGE to select the setting: ShortCO, **MediumCO**, LongCO, ShortPBX or LongPBX.

Tips - *This setting applies only to lines connected to an NT7B75GA-93 Loop Start Trunk Cartridge.*

When measuring the distance from ICS to CO and ICS to PBX use 600 ohms as the termination resistance setting.

Signal

Installer password required

Select the signal type for the line. Press CHANGE to select the setting: **WinkStart**, Immediate and DelayDial.

Tips - *The Signal setting appears on the display only for E&M or DID lines.*

Make sure that this matches the signal type programmed for the trunk at the other switch.

For E&M and DID lines connected to a DTI, the Immediate setting does not appear if dial mode for the line is tone.

ANI Number

Installer password required

Select whether the telephone number of the caller will be collected for this line. The digits can then be displayed on Norstar telephones as part of Call Display services. Press CHANGE to select the setting: **N** (No) or Y (Yes).

Tips - *The central office must deliver ANI/DNIS in DTMF mode.The delivery of ANI/DNIS depends on the network provider and the services they offer. This setting applies only to E&M and DID lines.*

For E&M or DID lines connected to a DTI, the setting only appears if Signal is WinkStart. For lines connected to an E&M or DID Trunk Cartridge, the setting only appears if Signal is WinkStart or Immediate.

If the conditions for signalling mode and start arrangement are not met, prompts are not presented to the user. No additional equipment is required.

DNIS Number

Installer password required

Select whether the digits dialed by an external caller on this line will be collected. Press CHANGE to select the setting: **N** (No) or Y (Yes).

Tips - *This setting applies to E&M lines only.*

For E&M lines connected to a DTI, this setting only appears if Signal is WinkStart and Ans mode is Manual. For E&M lines connected to an E&M Trunk Cartridge, this setting only appears if Signal is WinkStart or Immediate and Ans mode is Manual.

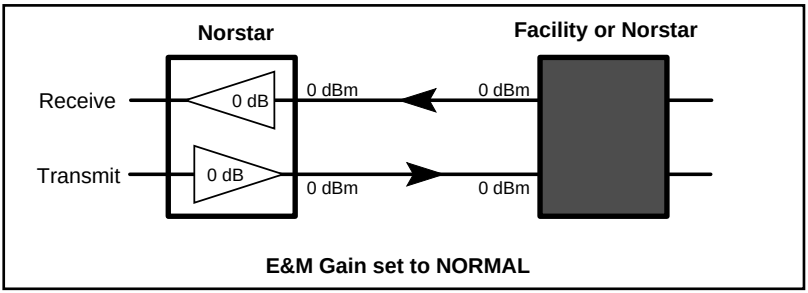
These digits are required for some third party software applications.

Gain

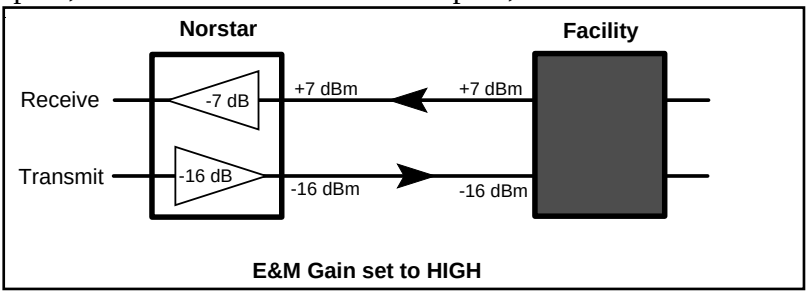
Installer password required

Select the appropriate gain level for the line. Press CHANGE to select the setting: **Normal** or High.

The default value **Normal** induces zero loss. Use it when the E&M trunks are connected to facilities that present 0 dBm at the interface, for both the transmit and receive paths.



The value **High** induces 7 dB of loss in the receive path and 16 dB of loss in the transmit path. Use it when the E&M trunks are connected to facilities that present +7 dBm in the receive path, and -16 dBm in the transmit path, at the interface.



Tip - *Control over the gain (transmission levels) can only be set for lines on E&M Trunk Cartridges.*

Name

The default name for a line is “Line” and its three-digit number (for example, Line 001), but it can be changed to any combination of letters and numbers to a maximum length of 7 characters.

For more information, refer to *Norstar-PLUS Modular ICS 4.0 System Coordinator Guide*.

Restrictions

Preventing a user from using a line for making certain kinds of calls is done in Restrictions. For example, users should not be able to make long-distance calls on lines used exclusively for local calling.

Restrn filters

A restriction filter is a set or group of restrictions and overrides that specify the external numbers or feature codes that cannot be dialed from a telephone or on a line. Rather than define individual restrictions and apply them repeatedly to telephones and to lines, restriction filters let you assign them in one step as a single package of dialing sequences that are not permitted.

You can make changes to restriction filters under both Terminals&Sets, and Lines. Any changes will take effect for any telephone, line or line on a telephone regardless of where the programming was changed.

See the description and procedures in Restrictions on page 224.

Line restrns

Specify the filter to be applied to this line to restrict the numbers that can be dialed on it. You can assign a different restriction filter for normal service and for each of six schedules. See the section on Services for more information about the schedules.

Use [Show], CHANGE and the dial pad to enter the number of the restriction filter to be assigned as the line restriction for each schedule. The default restrictions are as follows:

Default filters for lines

Schedule	Restriction filter
Normal	03
Sched 1 (Night)	21
Sched 2 (Evening)	22
Sched 3 (Lunch)	23
Sched 4	00
Sched 5	00
Sched 6	00

Tips - *When a remote user places an external call on a line, any filters used with the line still apply.*

Remote restrns

Specify the restriction filter to be applied to remote callers calling in to the Norstar system on this line. A restriction filter is a set or group of restrictions and overrides.

As with line restrictions, you can apply a different remote restriction for normal service and for each of six schedules.

Use CHANGE and the dial pad to program the remote restrictions for each schedule. The default restrictions are as follows:

Default filters for remote access

Schedule	Restriction filter
Normal	04
Sched 1 (Night)	31
Sched 2 (Evening)	32
Sched 3 (Lunch)	33
Sched 4	00
Sched 5	00
Sched 6	00

Tip - *The remote restriction restricts the numbers that can be dialed on an incoming auto-answer line. If a remote user then selects a line to place an external call, any filter used with the line still applies.*

Telco features

VMsg center 1

If you subscribe to a voice message service, you can specify which voice message center is used for each external line that can receive message waiting indication. For each line, press `CHANGE` to select the setting: **1**, 2, 3, 4, 5, or N.

You enter the telephone numbers for each of the five voice message centers under the general `Telco features` heading.

Services

Using Services, you can control three types of service by the time of day and day of week:

- alternate call ringing for certain times and days
- alternate dialing restrictions for certain times and days
- alternate call routing for certain times and days.

Each of the three services has six schedules that you can customize.

For example, you may want to combine alternate call ringing with alternate dialing restrictions for lunchtime, evenings, and weekends (Schedules 1, 2, and 3). Then you may want to run alternate call routing using three separate schedules.

Tips - *Once you have programmed the different services and schedules, you can turn each of the services on separately. For example, the Night schedule might control both Ringing service and Restriction service. But you can turn on just the Ringing service part of the Night schedule if you wish.*

You can activate the services from the designated control telephone for each Norstar telephone and line in your system. You can have one control telephone for the whole system, or different control telephones for different Norstar telephones and lines.

If you want to have several services active at the same time, simply program them on for the same schedule.

Ringing service

At certain times or in certain situations, you may want additional telephones to begin ringing for incoming lines. The most common use of this feature is when a security desk

telephone begins to ring for incoming lines after 5:00 p.m., a practice often called “night service”.

These features are programmed under Ringing service.

Ringing groups

Ringing groups allows you to define groups of extended ringing sets. A group can be assigned to any line for any of the schedules. You can create up to 20 ringing groups composed of up to 30 sets for each ringing group.

To define a ringing group use [Show] and enter the number of the group you want to program (01-20).

Once you define a ringing group, the display will prompt you to enter the number of the set you want to assign to this ringing group. You can use SCAN to display the sets that are assigned to the ringing group.

Tips - *You can assign any set on the Norstar system to a ringing group. The assigned control set for each schedule is added to each ringing group.*

A set can belong to more than one ringing group.

Sched:Night

Indicate how Ringing service should be activated for each of the schedules.

Service

Use [Show] and CHANGE to change the setting for each schedule: **Off**, Auto, or Manual.

Manual allows you to turn the service on and off at any time from a control telephone using the Ringing service feature code.

Automatic allows you to program a stop and start time for a service. You are still able to start and stop the service by entering the appropriate Services feature code at a control telephone. If you select this setting, you will have to set start and stop times. See the section on schedule times for information on programming times.

Off prevents the service from being activated.

Trunk answer

Trunk answer allows you to answer, from any telephone, an external call that is ringing at another telephone in your office. This is useful if the other telephones have not been assigned the same lines as the telephone you are using to answer the call.

Press CHANGE to select the setting: **Y** (Yes) or N (No).

Tip - *You can change the Trunk Answer setting only if Ringing service is set to Manual or Automatic.*

ExtraDial telephone

ExtraDial telephone allows you to assign an additional direct-dial telephone in the Norstar system for each schedule you use.

Use CHANGE and the dial pad to enter the internal number of the extra-dial telephone.

Tip - *The extra-dial telephone is activated during a schedule by entering the Ringing service feature code from a direct-dial telephone. This does not activate the Ringing service unless the direct-dial telephone is also a control telephone.*

Line settings

The ring groups and auxiliary ringer use for Ringing service is programmed for each line individually.

Ringing group

You can assign a predefined ringing group to a line for each schedule. See Ringing groups on page 254 to create groups of extra ringing telephones.

Using the dial pad, enter the line number to see which ringing group is assigned to the line. Press CHANGE and the ringing group number (01-20) to choose a different ringing group assignment.

Tip - *Only one ringing group can be assigned to a line for each schedule. To combine groups of ringing sets, you must create a new ringing group which contains all the sets you want to ring and assign it to the line.*

Aux. ringer

Indicate whether the auxiliary ringer (if installed) also rings when Ringing service is on. Press CHANGE to select the setting: Y (Yes) or N (No).

Tips - *The default ringing telephone is 221. This means that all lines ring at telephone 221 when Ringing service is on.*

You can use COPY *and the dial pad to copy Ringing set and Auxiliary ringer programming from one line to another.*

If you have an auxiliary ringer programmed to ring for calls on an external line, and you transfer a call on that line without announcing the transfer, the auxiliary ringer will ring for the call transfer.

Restrn service

Indicate how the alternate dialing restrictions should be activated for each of the schedules.

Use [Show] and CHANGE to change the setting for each schedule: **Off**, Automatic, or Manual.

See Ringing service in this section for descriptions of the three settings.

See Restrictions under both Terminals&Sets and Lines to assign dialing restrictions for telephones, lines and remote users to the schedules.

Routing service

The programming for routing decides what path an outgoing call takes using the digits that are dialed. It is sometimes called Automatic Route Selection (ARS).

When you select an internal line and dial, the numbers you enter are checked against the routing tables. If the number you dialed starts with a destination code, the system uses the line pool and dials out digits specified by the route assigned to that

destination code, and then dials the rest of the number that you dialed.

Routing service replaces a number of tasks that otherwise have to be done manually, including:

- entering a line pool code
- dialing an access code for a long distance carrier
- deciding which line pool to use according to the time and day

The installer can set up routing to take advantage of any leased or discounted routes using information supplied by the customer. The system itself cannot tell which lines are cheaper to use.

For Call by Call service selection (PRI only), the installer defines destination codes for various call types over PRI lines (e.g. Foreign Exchange, Tie Trunk, and OUTWATS). This information is then recorded in the routing and dialing plan section of the Programming Record for the PRI Pool-A (and PRI Pool-B if there are two PRI cards).

The user simply dials a number via the intercom button without having to enter any special information. For more information see, Call by Call service selection for PRI on page 316.

Using routing to create a transparent dialing plan or coordinated dialing plan is explained in Transparent dialing plan on page 64.

Plan your routing service before doing any programming.

Routing affects every call placed in the system and must be carefully planned to avoid conflicts and gaps in the programming. Use the tables in the *Programming Record* to design routes and destination codes, then check for potential problems before you start programming. It will also save you time to have all the settings written out in front of you.

Routes and destination codes

Installer password required

Programming for a route makes use of:

- destination codes (max. of 500 available, up to 7 digits)
- a 3-digit route number (000-999)
- a line pool
- DialOut digits (up to 24)
- a schedule (programmed in Services)

Routing table modifications

Changes to the routing tables can only be made during least busy call times or on an idle system. Plan to program the routing tables when user activity is at a minimum.

Alternatively, Norstar Remote Utilities (NRU) can be used to back up, modify and restore these tables.

Tips - *To dial a telephone number which does not match any of the programmed destination codes, the user will have to choose a line and dial the number. For long distance dialing, area codes in the North American numbering plan can be programmed as destination codes.*

Routes

Installer password required

Press [Show] and enter a 3 digit route number (000-999).

DialOut

DialOut is the number you want the route to use. Press [Show] and enter the DialOut digits (up to 24), or press CLR to choose No numbr.

You can press [Feature] [7] [8] to insert a 1.5 second pause in the dialing string, if necessary.

Route 000 has no DialOut by default and cannot be changed.

Use Pool

Press [Next] and CHANGE to select a line pool to be used with the route: **Pool A**, Pool B...Pool O.

Route 000 uses Pool A by default and cannot be changed.

Dest codes

Installer password required

The numbers used for destination codes must not conflict with:

- Call Park Prefix
- External Access Code
- Direct Dial Numbers
- Line Pool Code
- Internal set numbers (intercom)
- DISA set numbers

- Auto DNs

For example, the system will confuse an internal number of 221 and a destination code of 22 because even if the caller dialed the complete internal number, the call would be routed using the first two digits. But an internal number of 221 and a destination code of 23 would work.

The following are the *default* numbers automatically assigned in MICS-XC 4.0 with Companion Wireless capability:

System type	Expansion used	Initial digits pre-assigned
mini	no expansion	0, 1, 2, 6 & 9
midi	one 2-port cartridge	0, 1, 2, 3, 6 & 9
maxi	one 6-port cartridge	0, 1, 2, 3, 4, 6 & 9
mega	two 6-port cartridges or two combo cartridges	0, 1, 2, 3, 4, 5, 6 & 9

The following are the *default* numbers automatically assigned in a NA-MICS 4.0 system:

System type	Expansion used	Initial digits pre-assigned
mini	no expansion	0, 1, 2, 3, 4, 5, 6, 7, 8 & 9
midi	one 2-port cartridge	0, 1, 2, 3 & 9
maxi	one 6-port cartridge	0, 1, 2, 3, 4 & 9

In order to make digits available for use with destination codes, you must change the DN length of B1 and B2 DNs depending on your system size. This can be done either at system startup or in `System prgrming` of programming. The

examples shown above use a 3 digit DN length unless stated otherwise.

Wild card character

When programming destination codes, the installer can use wild cards in the destination code string. As a result of wild card characters, the number of destination codes programmed in the system is reduced thus maximizing the use of destination codes in the system.

1. At DestCodes, press [Show] and enter the destination code you want to modify or use the ADD display key to enter a new destination code.
2. When you enter a destination code, press the ANY display key to enter a wild card character (•) in the destination code.

The wild card character can be used only for the last digit of a destination code and represents any digit from 0 to 9 except for digits already programmed or used by other numbering plans. Should there be a conflict with other digits already programmed or used by other destination codes, the digit will not be displayed.

The wild card character can only be used to group destination codes that use the same Route and Digit Absorb length.

Destination codes without the use of a wild card character

Route	DialOut	Line Pool
555	763-4018	Line Pool C
565	763-3492	Line Pool A

Destination codes	Route	Digit Absorb	DialOut
9201	555	3	763-4018 *-1*

Destination codes	Route	Digit Absorb	DialOut
9202	565	3	763-3492 *-2*
9203	555	3	763-4018 *-3*
9204	555	All	763-4018
9205	565	2	763-3492 *-05*
9206	555	3	763-4018 *-6*
9207	555	3	763-4018 *-7*
9208	555	3	763-4018 *-8*
9209	555	3	763-4018 *-9*

Note: The numbers in italics in the DialOut sequence are not visible to the user.

Destination codes with the use of a wild card character

Destination codes	Route	Digit Absorb	DialOut
920 •	555	3	763-4018 - •
9204	555	All	763-4018
9205	565	2	763-3492 - *05*

Note: The numbers in italics in the DialOut sequence are not visible to the user.

Normal rte

Select which route a call using the destination code takes during normal service and for each of the schedules. The automatic schedule times are programmed under `Services`. The default Normal route is **000**, which has no DialOut digits and uses Pool A.

Digit Absorption

Select the portion of the destination code that is always absorbed by the system and not used in the dialing sequence.

Press CHANGE to select the number of digits to be deleted: 0, 1, 2, 3, 4, 5, 6, or **All**.

Tips - *The digit absorption setting (Digit absorb) only applies to a maximum of two schedules.*

Setting digit absorption to 0 minimizes the effort involved in preparing destination codes. With a 0 setting, the actual digits dialed by a caller are preserved in the dialout sequence. Programming a DialOut sequence as part of the route may or may not be necessary depending on the required dialout.

Setting up a route for local calling

An office may have different suppliers for local and long distance telephone service. By programming a destination code, any call that begins with 9 (the most common dial out digit) will automatically use lines dedicated to local service.

The first step is to build a route (under Services in Routing Service).

- enter 001 (or any other available route number) at Show route:

Press SCAN to view defined routes and CLEAR to erase a defined route.

- assuming that the lines for local calling have been placed in Line pool A, choose it as the line pool
- enter the DialOut digits (if any) which are needed to direct the call once it is connected to an external line

The second step of programming is setting up how the route will work with a destination code. Because users will dial 9 to make an external call, 9 should be the destination code.

For local calls only, there are no DialOut numbers (compare with Setting up a route for long distance calling on page 266).

- Press ADD and enter 9 at Show DstCode:

  If entering a code other then 9, a valid destination code must be used. See Dest codes on page 260.

To view existing destination codes press Next before entering a new code. Press ROUTE and enter a route number to find an existing code that uses a particular route.

The destination code can use a different route depending on a Schedule (see Services in the *Modular ICS 4.0 System Coordinator Guide*). In the current example, Route 001 is used when someone dials 9 during normal mode (the mode used when the other Schedules are turned off).

- Press Show. The route for the first schedule appears after Normal:. Press CHANGE and enter the defined route number 002.

The following illustrations show the tables used for planning and recording routing service found in the *Programming Record*. They are filled out to match the examples of routes for local and long distance calling.

Page 24

Routing Service (Services: Routing Service)

Route # (000-999)	**DialOut** (if required) (max. 24 digits or characters)	**Use Pool**
000	*none*	A B C D E F G H I J K L M N O
002	*none*	A B C D E F G H I J K L M N O
		A B C D E F G H I J K L M N O
		A B C D E F G H I J K L M N O
		A B C D E F G H I J K L M N O

Destination codes (Services; Routing service; Destination codes)

Service Schedule name (max. 7 char)	**Normal Rte**		**Night Rte**		**Evening Rte**		**Lunch Rte**	
DestCode (max. 7 digits)	**Use route** (000-999)	**Absorb Length**	**Use route** (000-999)	**Absorb Length**	**Use route** (000-999)	**Absorb Length**	**Use route** (000-999)	**Absorb Length**
9	~~000~~ *000*	All		All		All		All
1	~~000~~ *002*	~~All~~ *0*		All		All		All
	000	All		All		All		All
	000	All		All		All		All

Setting up a route for long distance calling

An office may have leased lines or E&M trunks which make it cheaper to call long distance. The routing should take place automatically when the number of the outgoing call begins with 1.

Again, the first step is to define a route (under `Services` in `Routing service`).

- enter 002 (or any other available route number) at `Route:`
- assuming that the discounted lines for calling long distance have been placed in Line pool B, choose it as the line pool

Because the system “absorbs” the 1 as a destination code, the routing programming has to add it back on as the DialOut. The DialOut information makes the number you dialed complete again and ready to be directed by the long distance carrier.

- enter 1 for the DialOut
- enter 1 at `DstCode:`

A valid destination code must be used. See Dest codes on page 260.

To view existing destination codes press [Next] before entering a new code. Press ROUTE and enter a route number to find an existing code that uses a particular route.

The destination code can use a different route depending on the Schedule (see Services in the *Modular ICS 4.0 System Coordinator Guide*). In this example, the system uses Route 002 (which uses Line pool B) to take advantage of the lower cost when the system is in normal mode.

- Press [Show]. The route for the first schedule appears: Normal:. Press CHANGE and enter the defined route number 002.

In the current example, the destination code 1 should be duplicated in the dial-out sequence in order to direct the call to the public carrier network. The number of digits to be absorbed should be one.

- Press [Show]. At AbsorbLength: press CHANGE until 1 appears.

Tips - *The digit absorption setting (AbsorbLength) only applies to a maximum of two schedules.*

Setting AbsorbLength to 0 minimizes the effort involved in preparing destination codes.With a 0 setting, the actual digits dialed by a caller are preserved in the dialout sequence. Programming a DialOut sequence as part of the route is not necessary.

If rates change depending on the time of the day or week, a different route can be used for the same destination code 1 when a particular schedule is in use. See Programming for least cost routing on page 268.

Adding a long distance carrier access code

In many cases, long distance service uses the same lines as local service but is switched to a specific carrier using an access number (sometimes called an equal access code). Programming for routing can include the access number so users don't have to dial it every time they make a long distance call.

1. Create a route that uses a line pool containing local lines only.
2. Program the route to use a line pool containing the lines used to access the long distance carriers.
3. Enter the DialOut digits, which are the same as the access digits. For example, if the access code was 10222, the DialOut digits would be10222.
4. Create a destination code 91: 9 (for outside access) and 1 (for long distance). A valid destination code must be used. See Dest codes on page 260.
5. Set `AbsorbLength` to 1. The 9 is only used internally and should be dropped; the 1 is needed to direct the call to the public carrier network.

Tips - *The destination codes 9 and 91 used in the examples cannot be used together. If the destination code 91 is needed to direct long distance calls, you must create a separate set of codes that use local calling routes. These codes would be, for example, 90, 92, 93, 94, 95, 96, 97, 98 and 99. See Wild card character on page 262 for information on programming destination codes.*

Programming for least cost routing

It may be cheaper to use another long distance carrier at another time of day. Continuing with the example used in the previous flowchart, the lines that supply local service in normal mode will also be used for long distance service after

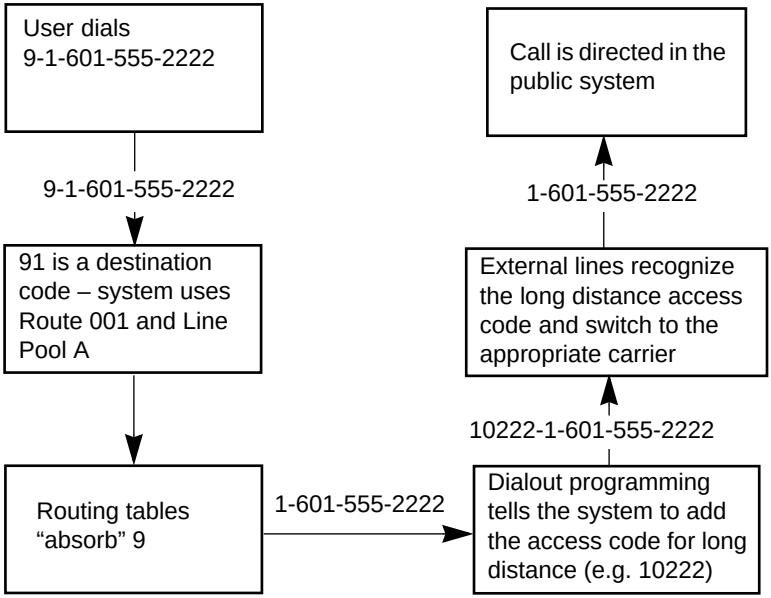
6 p.m. because that is when rates become competitive. For the system to do this automatically, another route has to be built.

1. Choose Route 007 (or any other available route) at `Route:`.
2. Press `CLR` to choose `No numbr` for the DialOut.
3. Choose Line pool A (local service carrier lines).

In this case, the change in route uses the start and stop times for Night Sched (the schedule for different modes are set up under `Services`).

1. Enter 91 at `Show DstCode:`
2. Make sure `AbsorbLength` is set at 1.
3. The route programmed with the access code as its DialOut (Route 001) remains as the route used by `Normal:`
4. Under `Night rte:` select Route 007.

Calls that begin with the digits 91 will now travel out without using the access code when the Night schedule comes into use automatically or when it is turned on at a control telephone.



Sched:Night

Indicate how the alternate routing should be activated for each of the schedules.

Service

Use [Show], CHANGE, and [Next] to change the setting for each schedule: **Off**, Automatic, or Manual.

See Ringing service on page 253 for descriptions of the three settings.

Overflow routing

If all the lines used by a route are busy when a call is made, the mode may be programmed to overflow to the route used for normal mode. If this happens, the set will sound a warning tone and display the message Expensive route. The caller can then release the call to avoid using the normal route, or continue with the call.

Overflow routing is turned on or off for each Schedule in programming. Press CHANGE to select the setting: Y (Yes) or **N** (No). See the *Modular ICS 4.0 System Coordinator Guide*.

Tips - *A schedule must be active for overflow routing to be in effect. Overflow routing is not available in normal mode.*

You must create an overflow route to be used with each destination code. In this way, every route used with a scheduled mode that has overflow service must have an alternate route in normal service.

Using dialing restrictions with routing

Routing service can be further customized by adding dialing filters to lines in line pools. Filters restrict the use of the line to specific area codes. See Networking features on page 61 and the Programming chapter of the *Modular ICS 4.0 System Coordinator Guide* for more information.

Tips - *Host system signaling codes can be part of the DialOut. See the Modular ICS 4.0 System Coordinator Guide for details on host system signaling codes.*

You can also use routing as an alternate method for a direct-dial number. For example, create a destination code 0 and program the number of the internal or external destination as the DialOut. Digit absorption should be set to 1.

Because overflow routing directs calls using alternate line pools, a call may be affected by different line filters when it is handled by overflow routing.

Feature 7 1	Link – if your Norstar system is connected to a private branch exchange (PBX), you can use a Link signal to access special features.
Feature 7 8	Pause – Enters a 1.5 second delay in a dialing sequence on an external line.
Feature * 8 9	Programmed Release – performs same function as Rls in a programmed dialing sequence. When the system encounters Programmed Release in a dialing sequence, it stops dialing and hangs up the call.
Feature * 9	Run/Stop – inserts a break point into a sequence of dialed numbers or characters used for automatic dialing.
Feature 8 0 4	Wait for Dial Tone – causes a sequence of numbers to pause until dial tone is present on the line before continuing to dial.

See the *Modular ICS 4.0 System Coordinator Guide* for more information.

Using a dialing plan to route outgoing PRI calls

The Dialing Plan supports PRI connectivity to public and private networks. The dialing plan is a collection of features responsible for processing and routing outgoing calls. All PRI calls must go through a dialing plan.

The Dialing Plan

- allows Enbloc dialing by buffering user-dialed digits until a complete DN has been dialed (Enbloc dialing is a requirement for PRI)
- provides the ability to map user-dialed digits to a service type on a Call by Call basis
- allows long distance carrier selection via user-dialed Carrier Access Codes
- allows incoming calls to be routed according to the service type and the digits received

Enbloc dialing

The Private DN Length must be set to the number of digits users dial to reach other nodes in the private network. The Private DN Length parameter is used by the PRI trunk to determine when a complete number has been dialed. The PSTN DN Length Table is used by the PRI trunk to determine when a complete PSTN DN has been dialed. Entries in the table consist of two fields, Prefix and DN Length.

Carrier Access Codes

A multi-digit Carrier Access Code contains an Equal Access Identifier Code followed by a Carrier Identification Code. The CIC identifies the carrier to be used to handle the call. The Carrier Access Code table stores the CAC digit pattern that you define for your region. In most cases it is not necessary to change the default values. The capability is there to modify overall patterns if required.

- you can define at most five entries
- two entries will be pre-defined in North America, but you are free to remove these defaults
- each entry consists of an equal access identifier code prefix (one to six digits) and a carrier identification code length (one digit, 1 - 9)
- each entry is identified by the prefix digits themselves

With the display showing `Routing service`

1. Press [Show] then press [Next] until the display shows `Carrier codes`.
2. Press [Show].The display shows `Prfx:10`.
3. Press ADD to enter a prefix (1 - 6 digits).

4. Press [Show].The display shows ID length:3. Press CHANGE to enter a carrier ID length value (one digit, 1 - 9).

Common settings

Services share the settings for control telephones, schedule names and schedule times.

Control sets

A control telephone turns Services on and off for the lines and/ or telephones assigned to it. You can assign several control telephones for your system. A control telephone for lines controls Ringing service, Restriction service and Routing service for its assigned lines; a control telephone for telephones controls Restriction service and Routing service for its assigned telephones. Assign a control telephone for each external line and telephone.

Use [Show], [Next], CHANGE and the dial pad to program the internal number of the control telephone for each line and each telephone.

Tips - *External lines and telephones must be programmed with a control telephone to use the three kinds of Services. You can assign a control telephone to more than one external line or telephone, but a line or telephone cannot be assigned to more than one control telephone.*

One recommendation is to have one control telephone for all lines and a different control telephone for all telephones.

A service can be turned on manually or automatically for all external lines and telephones controlled by a given control telephone, but you cannot combine schedules. In other words, a service can only be active as normal service or one of the six schedules at any one time. You can have several schedules active, as long as they are using different services.

*The default control telephone for all lines and telephones is **221**.*

Schedules names

The schedule name is shown on the display of the control telephone when the schedule is turned on. It identifies the active schedule.

Use [Show], [Next], and CHANGE and the dial pad to program the name.

Tips - *The default names of the six possible schedules are only suggestions and may be changed to any other name. A schedule name can be one to seven characters long. It is recommended that you reserve certain schedules (4, 5, and 6) exclusively for alternate call routing (Routing service).*

Schedule times

Schedule start and stop times are set at times you are most likely to want each service to be active.

Use [Show], [Next], and CHANGE and the dial pad to program the start and stop times for each schedule, on each day.

Default schedule times

Schedule	Start time	Stop time
Schedule 1: Night	23:00	07:00
Schedule 2: Evening	17:00	23:00
Schedule 3: Lunch	12:00	13:00
Schedule 4: Sched 4	00:00	00:00
Schedule 5: Sched 5	00:00	00:00
Schedule 6: Sched 6	00:00	00:00

Tips - *It is only necessary to program start and stop times for schedules that are activated automatically. See the instructions with Ringing service for information on activating schedules.*

The time may be entered in either 12 or 24-hour format. If the display is in English, and the hour entered is less than thirteen, the display prompts you to specify AM *or* PM*.*

If you assign identical start and stop times for a schedule, for example, 04:00 start and 04:00 stop, the schedule is in effect all day. The only exception to this is a start and stop time of 00:00; in this case the schedule is off for the day.

You may assign overlapping times. For example, if schedule 1 is assigned from 9:00 am to 4:00 pm and schedule 2 is assigned from 1:00 pm to 5:00 pm, then the start time of the second schedule is treated as a stop time for the first schedule.

This is also true if two schedules have the same start time but different stop times; the stop time of the shorter schedule is treated as the start time of the longer schedule.

If one schedule starts and stops within the times of another schedule, the first service temporarily ends when the second service starts. The first service then resumes when the second service has ended.

Some schedules start and stop at the same times each day: use COPY *to copy the start and stop times from one day to the next.*

Start and stop times don't span days.

When you program a schedule to start in the evening and stop in the morning, it does not carry over into the next day. For example, if you program Night service for Friday (22:00 to 6:00), the system turns on Night service from midnight to 6 am on Friday, and then again from 10 pm to midnight on Friday.

Sys speed dial

System speed dial lets you create speed dial codes that can be used by any telephone system.

For more information on using and programming System speed dial, refer to the *Modular ICS 4.0 System Coordinator Guide*.

Passwords

COS pswds

Class of Service (COS) passwords permit controlled access to a system's resources by both internal and remote users. When you enter a Class of Service password at a telephone, the restriction filters associated with your Class of Service password apply instead of the normal restriction filters. Similarly, when a remote user enters a Class of Service password on an incoming auto-answer line, the restriction filters and remote package associated with their Class of Service password apply instead of the normal restriction filters and remote package.

COS passwords lets you define individual passwords and determine the restriction filters and remote package associated with each.

Tips - *The Class of Service passwords for a system should be determined randomly and should be changed on a regular basis.*

Users should memorize their COS passwords instead of writing them down.

Employees' COS passwords should be deleted when they leave the company.

Typically, each user has a separate password. Alternately, several users can share a password or one user can have several passwords.

A system can have a maximum of 100 six-digit COS passwords (00 to 99).

You can use COPY *and the dial pad to copy the restriction filters and remote package from one COS password to another. COS passwords must be unique.*

Pswd

Pswd defines the six-digit Class of Service password. There is no default password.

Use [Show], CHANGE and the dial pad to program the six-digit password. Use BKSP to edit numbers you have entered.

User flt

User filter lets you assign a restriction filter to a Class of Service password. The user filter associated with the Class of Service password replaces any normally applicable set restriction, line/set restriction, and remote restriction.

Use CHANGE and the dial to program the two-digit user filter. The default setting (**None**), means that any normally applicable filters (set restriction, line/set restriction, or remote restriction) still apply.

Line flt

Line filter lets you assign a specific line restriction to a Class of Service password. The line filter associated with the Class of Service password replaces any normally applicable line restriction.

Use CHANGE and the dial pad to program the two-digit line filter. The default setting (**None**), means that any normally applicable line filter still applies.

Remote pkg

Remote pkg lets you assign a specific remote access package to a Class of Service password. The remote access package associated with the Class of Service password replaces any normally applicable remote access package.

Use CHANGE and the dial pad to program the two-digit remote package. The default setting (**None**), means that any normally applicable remote access package still applies.

Call log pswds

This setting allows you to override any Call log password programmed with the Call log feature, and resets it to **None**. It is used when someone forgets a password.

1. Press [Show] and enter the DN of the telephone.
2. Press [Show] to clear the programmed password.

Tips - *You program a Call log password using the Call log Password feature. See the Telephone Feature Card or the Modular ICS 4.0 System Coordinator Guide for more information.*

Progrming pswds

You can choose any combination of six digits for Passwords. It is easier to remember the password if the digits spell a word.

Provide passwords only to selected personnel to prevent unauthorized access to programming. Some passwords allow line assignments to be rearranged, which could disrupt your telephone service.

Installer

The default Installer password is **266344 (CONFIG)**.

1. Use CHANGE, the dial pad, and OK to program the Installer password.
2. Record the password in the *Programming Record*.

Tips - *You can choose any combination of one to six digits. It is easier to remember the password if the digits spell a word. Provide this password only to selected personnel to prevent unauthorized access to programming. The implications of such access may include the rearrangement of line assignments, which could affect the operation of the Norstar system.*

SysCoord+

The default System Coordinator Plus password is **727587 (SCPLUS)**.

Use CHANGE, the dial pad, and OK to program the System Coordinator Plus password.

Tips - *You should only distribute this password to experienced System Coordinators. This level of access is documented in the Modular ICS System Coordinator Guide.*

Tips - *An overview of what programming is available by using the System Coordinator Plus password is on page 191 and page 192.*

SysCoord

The default System Coordinator password is **23646 (ADMIN)**.

Basic

The default Basic password is **22742 (BASIC)**.

Tips - *For more information about the System Coordinator and Basic passwords, see the Modular ICS 4.0 System Coordinator Guide.*

Registration password

For more information about the Registration password, see the *MICS-XC Norstar-Companion Installer Guide*.

Time&Date

The time and date shown on the telephone display is used by the system for scheduled features. It can be changed in programming or by using a feature code (Feature * * T I M E or Feature * * 8 4 6 3).

For more information refer to the *Modular ICS 4.0 System Coordinator Guide*.

System prgrming

System prgming allows you to set up features and settings which are not associated with any specific line or telephone.

Hunt groups

The hunt groups feature allows a group of sets to be called by a single directory number ensuring that calls are easily routed to the appropriate group.

The default setting for hunt groups is broadcast. If you want to use sequential or rotary mode a software key is required. If you get these additional modes, Hunt group statistics also becomes available with the Usage metrics feature. For information on Usage metrics, see Usage metrics on page 410.

For information on getting a software key, see Hunt Groups on page 328.

Hunt groups can be used to route calls to a support service such as a Help Line for a software company. Specialists dealing with Product A can be in one group, and specialists dealing with Product B can be in another group. Incoming calls will hunt for the next available set in the group. If no set is available, the call can be placed in a queue or routed to an overflow set.

The Hunt groups subheading in system programming is the area that programming changes are made to the following:

- members of a group
- member position in a group
- what lines are assigned to a group
- how incoming calls are distributed

- how long the system looks for available agents
- where a call goes if all agents are busy

The hunt group setting impacts other features:

- Call forwards set on telephones that are members of a hunt group are overridden by the hunt group routing.
- Sets that are members of a hunt group can temporarily leave a group by activating the DND feature.
- Wireless twinning can be enabled if a hunt group appears on the portable as well as the set.
- Priority calls to a hunt group will be rejected
- Hunt group set numbers cannot be in a ringing group.
- Hunt group set numbers cannot be in a page zone.

Note: Videophones should not be programmed as members of a hunt group. Hunt groups allow one B channel connection at a time and videophones use two B channels.

Adding or removing members from a group

Norstar can be programmed with up to 40 members per group with a maximum of 600 members system-wide. Members of the group can be any Norstar set, CTA 500dm, ISDN set, or portables. A set can be in more than one hunt group but is considered a member in each hunt group, increasing the total number of members in the system.

There can be only one appearance of the same hunt group on a set.

The set number range for hunt groups is 707 to 736. The set numbers in this range cannot be members of a hunt group.

Hunt groups can be programmed under System prgrming.

1. Press [Show]. The display shows Hunt groups.
2. Press [Show]. The display shows Show group:.
3. Enter the hunt group number you want to program (1-30).
4. Press [Show]. The display shows Member extns:.
5. Press [Show]. The display shows the members for that group.

Press ADD to add a member or press REMOVE to remove a member from the group.

Moving members of a group

Member order within a hunt group is important. The member order determines how a call is routed through a hunt group.

1. Press MOVE to move an existing member to another place within the hunt group.The display shows the member number followed by an arrow.
2. Enter the new position number for the set.

Assigning or unassigning lines to a group

It's a good idea to set a hunt group's line prime set to None. This avoids delayed ring transfer of external hunt group calls to the prime set before the hunt group can receive the call.

A line can only be assigned to one group.

1. When the display shows Member sets:.
2. Press [Next]. The display shows Line assignment.
3. Press [Show]. The display shows Show line:.

4. Enter the line number you want to program, press SCAN to go the first line assigned to this group or press LIST to go to the first line in the system.

5. Press CHANGE to program the line as **Unassigned** or Assigned.

   HGnn means the line is assigned to another hunt group.

Setting the distribution mode

There are three modes of call distribution:

- Broadcast—rings each set in the group simultaneously. Calls are handled one at a time, other calls are queued. As soon as a call is picked up, the call next in the queue is presented to the hunt group without having to wait for queue timeout.

  In Broadcast mode, a single incoming call will ring simultaneously at all the sets in a group. This way, all receptionists in the group can share the load of answering large volumes of calls. A familiar example is a fund-raising campaign where a group of operators would be waiting to take each call as it comes in.

- Sequential—starts the call at the first set in the hunt group and distribution is complete when the first free set has been found. Simultaneous calls can be presented. Distribution is order based.

  In Sequential mode, you can program your top salesperson to be the first member of the group to receive incoming calls.

- Rotary—the call starts at the set after the one which was last presented and distribution is complete when the next free set has been found. Simultaneous calls can be presented. Distribution is order based.

  In Rotary mode, you can ensure that all your help-line people are receiving calls, rather than one person receiving the majority of calls.

If a hunt group has available agents but nobody answers the call, the call is routed through the hunt group list until either someone answers the call or the queue time-out occurs. In the latter case, the call is diverted to the overflow position.

1. When the display shows `Member extns:`.
2. Press [Next] until the display shows `Mode:`.
3. Press CHANGE to set the mode: **Broadcast**, Sequential, Rotary.

Setting the hunt delay

This setting allows you to program the number of rings the system permits at a hunt group set before moving on to the next set in the hunt group.

1. When the display shows `Member extns:`.
2. Press [Next] until the display shows `Hunt delay:`.
3. Press CHANGE to select the setting: 1, 2, 3, **4**, 5, 6, 7, 8, 9,10.

Programming busy line setting

There are three routing options if all agents are busy:

- BusyTone—the caller gets a busy tone
- Overflow—the call is routed to an overflow position

- Queue—the call stays in the system for a period of time. Within this period of time, the call will be presented to an agent if one becomes available. When the time-out occurs, the call will be presented to an overflow position.

1. When the display shows `Member extns:`.
2. Press [Next] until the display shows `If busy:`.
3. Press CHANGE to set the mode: **BusyTone**, Overflow, Queue.

Programming the queue timeout

This setting allows you to program the number of seconds a call will remain in the hunt group queue before it is also routed to the overflow position.

1. When the display shows `Member extns:`.
2. Press [Next] until the display shows `Q Timeout:`.
3. Press CHANGE to set the queue timeout: 15, 30, 45, **60**, 120 or 180.

Programming the overflow set

This setting allows you to program the over flow set the hunt group calls will be routed to. Unless the overflow position is a hunt group set, the call ceases to be a hunt group call. If the overflow set is a hunt group set, the call is treated as a new call and goes to the bottom of the queue.

The overflow set can be a set number associated with a voice mailbox.

1. When the display shows `Member extns:`.
2. Press [Next] until the display shows `Overflow:`.
3. Press [Show]. The display shows `Overflow:HGn.`
4. Press CHANGE to change the overflow position.

5. Enter the new overflow position.

Setting the function name

This setting allows you to program the hunt group function name, such as SERVICE or SALES. The name can be up to 7 characters in length.

1. When the display shows Member sets:.
2. Press [Next] until the display shows Name:.
3. Press CHANGE.
4. Using the dialpad, enter the name of the hunt group.
5. Press [Next] to store the name.

Changing from Incoming Line Groups (ILG) to Hunt groups

The Incoming Line Group feature has been replaced in NA-MICS 4.0 with hunt groups. The installer or system coordinator can set up defined company user groups such as a sales group, finance group or service group. The broadcast, sequential and rotary modes of hunt groups allows the improved flexibility of call distribution. Hunt groups also allow for improved call completion with call queue when a call is busy.

Change DNs

Installer password required

Change DNs allows you to change the directory number (DN) or internal number of a telephone.

Changing DN locks programming session.

Changing an individual DN locks the programming session into the Change DNs programming mode. After you have finished and have pressed [Rls], re-enter the programming access code and the Installer password to continue with other programming. Do not perform Startup again or all previous programming will be erased.

Use [Show] and the dial pad to identify the DN you want to change (“old DN”). Then, use the dial pad to enter the new DN.

Featr settings

Backgrnd music

Background Music allows you to listen to music through your telephone speaker. A music source must be connected to the Integrated Communication System.
Press CHANGE to select the setting: **N** (No) or Y (Yes).

On hold

On hold allows you to choose what a caller hears on an external line when the line has been put on hold. Press CHANGE to select the setting: **Tones**, Music, or Silence.

- Tones provides a periodic tone.
- Music provides any signal from a source such as a radio connected to the ICS.
- Silence provides no audio feedback.

Receiver volume

Receiver volume allows you to specify whether the volume level of a receiver or headset will return to the system default level when a call is ended or put on hold, or whether it will remain at the level set at the individual telephone.

Use [Show] and CHANGE to select the setting: **Use sys volume** or Use set volume.

Tips - *This feature is not available on some older telephones.*

Camp timeout

Camp timeout delay allows you to assign the number of seconds before an unanswered camped call is returned to the telephone which camped the call.

Press CHANGE to select the setting: 30, **45**, 60, 90, 120, 150, or 180 seconds.

Park timeout

Park timeout allows you to assign the number of seconds before a parked call on an external line returns to the originating telephone. Press CHANGE to select the setting: 30, 45, **60**, 90, 120, 150, 180, 300, or 600 seconds.

Park mode

The Call Park feature lets you suspend a call and lets someone retrieve the call by entering a retrieval code at any Norstar set in the system. Park Mode is the setting which determines how a retrieval code is assigned to parked calls.

Press CHANGE to select the way that the system will choose a Call Park code: **Lowest** or Cycle.

When set to Lowest, the system will choose the lowest code that is available when the call is parked. When set to Cycle, the system will choose the codes in a sequence, from lowest to highest, until all the codes have been used.

Trnsfr callbk

Transfer callback delay allows you to specify the number of rings before a callback occurs on a transferred call. Press CHANGE to select the setting: **3**, 4, 5, 6, or 12 rings.

Tips - *You can estimate the delay in seconds if you multiply the number of rings by six.*

DRT to prime

Delayed Ring Transfer automatically forwards unanswered external calls to a prime telephone, after a certain period of time. This helps ensure that no external call goes unanswered. Press CHANGE to select the setting: **Y** (Yes) or N (No).

Tips - *An operational prime telephone must be assigned before this feature can operate. A prime telephone is assigned to one or more external lines in the Line Data of programming.*

DRT delay

Delayed Ring Transfer delay allows you to specify the number of rings before Delayed Ring Transfer transfers a call to a

prime telephone. Press CHANGE to select the setting: 1, 2, 3, **4**, 6, or 10 rings.

Tips - *The DRT delay can be programmed only if DRT is activated.*

You can estimate the delay in seconds if you multiply the number of rings by six.

Held reminder

When active, Held Line Reminder reminds you that a call at your telephone is still on hold. You periodically hear two tones from your telephone until you return to the call on hold. Press CHANGE to select the setting: **N** (No) or Y (Yes).

Remind delay

Held Line Reminder delay allows you to choose the number of seconds before the Held Line Reminder feature begins at a telephone that has an external call on hold. Press CHANGE to select the setting: 30, **60**, 90, 120, 150, or 180 seconds.

Tips - *The Held Line Reminder delay can be programmed only if Held Line Reminder is activated.*

Directd pickup

Directd pickup allows you to answer any calls by specifying the ringing telephone's internal number. Press CHANGE to select the setting: **Y** (Yes) or N (No).

Tips - *Directed pickup is not to be confused with the Call Pickup Group feature in programming, which allows you to answer a call at any telephone within a specific group without specifying the internal number of the ringing telephone.*

Like Call Pickup Group, Directed pickup is useful when not all the telephones have been assigned the same lines, but you still want to allow your co-workers to answer a call on any external line from their telephones.

Page tone

You can choose whether a tone sounds before a page begins. Press CHANGE to select the setting: **Y** (Yes) or N (No).

Page Timeout

The paging feature is automatically disconnected after a set length of time. Press CHANGE to select the maximum number of seconds needed for a page: 15, 30, 60, 120, 180, 300, 600, **2700**.

Daylight time

When this feature is turned on, your system will automatically switch between standard time and daylight savings time. Press CHANGE, to select the setting: **Y** (Yes) or N (No).

Tips - *The hour falls back one hour on the last Sunday of October at 2:00 am., and it advances one hour on the first Sunday of April at 2:00 am. This function should only be programmed by your installer.*

In regions where daylight savings time does not apply, (for example, Saskatchewan), make sure this setting is changed to N (No).

AutoTime&Date

The incoming CLASS trunk call provides time and date information to the Norstar system. The Automatic Time&Date feature enables the Norstar system to use this information to automatically update the time and date on the Norstar system. Press CHANGE to choose **Y** or N.

Call log space

Call log space programming customizes how log space is allocated to telephones in the system.

Reset all logs?

Reset all logs allows you to reallocate the Call log space equally to all telephones in your system.

1. Press YES and use the dial pad to enter the space allocation for the Call log at each telephone. You must use a three-digit number (for example, 020 to give each set 20 spaces).
2. Press YES to accept the settings and end programming. The system automatically reallocates Log space. Press NO to reset the number of spaces allocated to each log.

Tips - *Use this heading only if you want to allocate an equal amount of log space to all the telephones in your system. If you want to assign specific amounts of log space to individual telephones, see the information under Terminals&Sets in the Modular ICS 4.0 System Coordinator Guide.*

Reallocating Call log space may destroy Call log data at telephones that lose space.

There are 600 Call log spaces available in the system. There are no spaces allocated by default. Changing the space allocation using Log Defaults defines the log space available to all telephones in the system. Any remaining unassigned log space is available in a log pool, and can be reallocated under Terminals&Sets *in* Telco features.

Host delay

Installer password required

Host delay lets you assign the delay between the moment an outgoing line is selected to make an external call (for example, by lifting the receiver off the telephone) and the moment that Norstar sends dialed digits or codes on the line.

Press CHANGE to select the setting: 200, 400, 600, 800, **1000**, 1200, 1400, 1600, 1800, or 2000 milliseconds.

Tips - *Host delay is provided to ensure that a dial tone is present before the dialing sequence is sent. Minimizing this delay provides faster access to the requested features.*

AlarmSet

Alarm set allows you to assign a telephone on which alarm messages appear when a problem has been detected in the system. Use CHANGE and the dial pad to enter the internal number of the Alarm telephone. Press Next to set the Alarm telephone to None. The default setting is **221**.

Set relocation

Set relocation allows you to move any telephone to a new location within the Norstar system without losing the directory number, autodial settings, personal speed dial codes,

and any programming for that telephone. Press CHANGE to select the setting: **N** (No) and Y (Yes).

Tips - *It is advisable to activate Set relocation after the telephone installation and programming has been done. This provides you with more flexibility in testing equipment.*

If this feature is deactivated while a telephone is moved, that telephone's internal number and programming data remain with the physical port on the ICS, and the telephone does not receive the original programming when it is reconnected elsewhere.

Msg reply enh

The Message reply enhancement feature allows for the message waiting indicator on analog telephones connected to an Analog Station Module (ASM) to be deactivated automatically if the reply call from the analog telephone to the designated direct-dial telephone is answered, no matter where the call is answered from by the user.

This feature also functions if the user invokes the Call Pickup feature to answer the reply call from the analog set. It does not however, work with the Retrieve Parked Call feature.

Press CHANGE to select the setting: **N** (No) and Y (Yes).

Tips - *Direct-dial telephones are the only telephones that can send messages (using Feature 1) to analog telephones connected to an Analog Station Module (ASM). The direct-dial telephone must be the designated direct-dial set for the analog telephone receiving a message.*

Answer key

There are up to eight answer keys that can be assigned per set. The Answer key setting in Feature settings programming lets you determine what types of calls will alert at the telephone. Answer key changes do not apply to portables.

Your choices are: Basic, Enhanced and Extended.

With the default Basic setting, answer keys do not ring for:

- Prime set call capture
- call forwarded calls
- other answer key calls
- priority calls
- voice calls
- ringing service
- callbacks

The Enhanced setting is the same as the Basic setting except that answer keys will ring for overflow call routed calls (special case of Prime set call capture). Answer keys will not ring for line transferred calls (although Basic will ring).

Extended will ring for all call types except priority calls, voice calls and other answer key calls to alert at the telephone.

Press CHANGE to select the settings: **Basic**, Enhanced, and Extended.

Direct-dial

Direct-dial lets you dial a single system-wide digit that can be used to call a specific telephone, called a Direct-dial telephone. The most common example of a Direct-dial

telephone would be telephone for an operator, a receptionist or an attendant.

D-Dial1

For the direct-dial telephone, indicate whether it is an internal or external number. A total of five Direct-dial telephone can be programmed on the system.

Use [Show] and CHANGE to select the setting: **Intrnl**, Extrnl, or None.

Intrnl / Extrnl#

Enter the internal or external number that the system will automatically dial when someone enters the direct-dial digit.

Use [Show], CHANGE, and the dial pad to enter the telephone number. The default number for the direct-dial telephone is **221**.

Line selection

If you assign an external number as a direct-dial telephone, you must indicate which line to use for the call. Use [Next], CHANGE, and the dial pad to select the line for the external number.

Tips - *There is just one direct-dial digit for the entire system.*

The Norstar system cannot verify that the number you assign as an external direct-dial telephone is valid. Check the number before assigning it as a direct-dial telephone, and call the direct-dial telephone after you've assigned it in order to test it.

You cannot forward calls to any direct-dial telephone that is outside your Norstar system. For more information, refer to the Modular ICS 4.0 System Coordinator Guide.

CAP assignment

Installer password required

This setting designates a telephone as a central answering position (CAP). The CAP must be an M7324 telephone, and may have one or two CAP modules attached. A maximum of five CAPs can be installed in a Norstar system.

The CAP may be used to:

- monitor the busy/not busy and Do Not Disturb status of Norstar telephones
- answer external calls on up to 120 lines, and extend calls to other Norstar telephones
- send up to 30 messages to other Norstar telephones
- provide up to 96 extra memory buttons for the M7324 telephone

Use [Show], CHANGE and the dial pad to enter the internal number of the M7324 telephone to be designated a CAP.

Tips - *If CAP modules are attached to an M7324 telephone that has not been programmed as a CAP, then no CAP settings are assigned. If a CAP module (or modules) is relocated with the M7324 telephone, the settings are retained.*

Access codes

Installer password required

Access codes are used by the system to direct calls to the correct lines and destinations. If the codes conflict, some of the features on the system will not work.

The table of default settings can help you plan your access codes so there are no conflicts.

Digits assigned by default to settings

Digit	Use	Heading
0	direct-dial digit	Access Codes
1	Park prefix	Access Codes
2	the first digit of B1 DNs	Startup
9	line pool A access code (Takes precedence over the External Line access code if there is a conflict.)	Access Codes
— —	external line access code	Access Codes
— —	destination code	Services

Line pool codes

Installer password required

This setting allows you to assign a line pool access code for each of the fifteen line pools (A to O). These codes are used to specify the line pool you want to use for making an outgoing external call.

If your system is installed without expansion cards, the DN default is 2 digits. Therefore, B1 DNs will be from 21 to 52 and the B2 DNs are assigned from 53 to 84. The B2 DN range is 80 to 84; therefore, the single digit 8 is not available for a line pool access code.

Use [Show], CHANGE, the dial pad, and OK to program the access code. The default access code is **9** for Line Pool A, None for Line Pool B-O.

For ISDN-PRI, see Line Pools on page 319.

Tips - *The code can be one to four digits in length.*

A line pool access code can be the same as an external line access code. In this case, the line pool access code takes priority over the external line access code, and a line from the line pool is selected.

A line pool access code cannot conflict with: the Park prefix, the Direct-dial digit; the first digit of any Received number; the first digit of any DN (including the Auto DN or the DISA DN).

To avoid a conflict, refer to the table of default settings in the description of External code.

Park prefix

Installer password required

The Park prefix is the first digit of the call park retrieval code that must be entered to retrieve a parked call. If the Park prefix is set to None, calls cannot be parked.
Press CHANGE to select the setting: **1** to 9, N (None), or 0.

Tips - *The Park prefix cannot be the same as: the Direct-dial digit, the External Line access code, the first digit of a DN, the first digit of a line pool access code, or the first digit of a destination code.*

Other programmable settings may affect which numbers appear on the display during programming. Although the numbers 0 to 9 are valid Park prefix settings, some may have been already assigned elsewhere by default or by

programming changes. (To avoid a conflict, refer to the table of default settings in the description of External code.)

If DN length is changed, and the changed DNs conflict with the Park prefix, the setting changes to None.

External code

Installer password required

External code allows you to assign the external line access code. This code is used to allow M7100 telephones and Analog Terminal Adapters (ATA) to access external lines.

Press CHANGE to select the setting: 0 to 9, or **None**.

Tips - *The external line access code cannot conflict with: the Park prefix, the direct-dial digit, the first digit of a line pool access code, the first digit of a DN, or the first digit of a destination code.*

If DN range, and the changed DNs conflict with the external line access code, the setting changes to None.

Direct-dial

Installer password required

Direct-dial digit allows you to dial a single system-wide digit that can be used to call a specific telephone, called a direct-dial telephone.

Press CHANGE to select the setting: 1 to 9, None, or **0**.

Tips - *Another direct-dial telephone, an extra-dial telephone, can be assigned for each schedule in Services programming.*

The direct-dial digit cannot be the same as the first digit of a DN, of a line pool access code, the external line access code or the Call Park prefix. It cannot be the first digit of a destination code.

If DN length is changed, and the changed DNs conflict with the direct-dial digit, the setting changes to None.

Auto DN

Installer password required

For calls answered without DISA, no password is required to access the Norstar system. The Class of Service (COS) that applies to the call is determined by the COS for the trunk on which the user is calling.

1. Use CHANGE and the dial pad to enter the digits to be received from the auto-answer trunk.
2. Press CLR to set the Auto DN back to **None**.

Tips - *The length of the Auto DN is the same as the Rec'd # length specified in System prgming. The Auto DN is cleared if the Received number length is changed.*

The Auto DN cannot be the same as a line pool access code or a destination code.

DISA DN

Installer password required

For calls answered with DISA, the system presents a stuttered dial tone to prompt a caller to enter a valid password. The Class of Service (COS) that applies to the call is determined by this COS password.

Once a remote user is on the Norstar system, the DISA DN can be used to change the existing Class of Service. This gives you greater flexibility when you create access privileges. For example, you may want to have a shared DN for remote access and separate COS passwords with different dialing out privileges for individuals.

Use CHANGE and the dial pad to enter the digits to be received from the auto-answer trunk. Press Next to set the DISA DN to None.

Tips - *The length of the DISA DN is the same as the Rec'd # length specified in System prgming. The DISA DN is cleared if the Received number length is changed.*

The DISA DN cannot be the same as a line pool access code or a destination code.

Remote access

Remote access packages allow you to control the remote use of Norstar line pools. Create a remote access package by defining which of your system's line pools it will be able to access. You then assign the package to individual lines (using Rem line access), and to a particular Class of Service password (Remote pkg in COS passwords).

Rem access pkgs

Use Show and the dial pad to select the remote access package you want to program.

LinePool access

Press CHANGE to select the line pool access setting for each pool: **N** (No) or Y (Yes).

Rem line access

Enter the number of the line which will be accessible by remote users.

L001 Rem pkg

Press CHANGE and enter the number of the remote access package that will apply to remote use of the line.

Remote access packages defaults

Parameter	Square	PBX	Hybrid	Centrex	DID
Package 00	Prohibits remote access to line pools, Page, remote monitoring and administration. Cannot be changed.				
Package 01 Line pool access	Y for Pool A N for Pools B and C				
Packages 02 - 15 Line pool access	N for Pools A to C				

Tips - *You can use* `COPY` *and the dial pad to copy settings from one remote package to another.*

The line pool access display shows an alphabetic line pool identifier, followed by a numeric line pool access code in brackets, for example, `PoolA (9):N`*. If no access code has been identified, there is nothing between the brackets, for example* `PoolA ( ):N`*. The line pool access code can be programmed under* `Terminals:Sets`*.*

Remote package 00 is the default setting for the Remote package setting. It permits no access to line pools. Unlike packages 01 to 15, package 00 cannot be changed.

You can define up to 15 remote access packages (01 to 15).

Change DN type

Installer password required

This setting is applicable for MICS-XC 4.0 systems only.

On startup, the DN default ranges are:

- Norstar telephones: 221-605
- Portable telephones: 637-666
- ISDN devices: 667-696 (A BRI S-loop may have more than one DN associated with it.)
- CTA500 DNs: 697-705

Note that the DN range 637 to 696 can be used by either portable telephones or ISDN S-loops. You can assign all 60 of the DNs to portable telephones and none to S-loops. You can assign up to 30 DNs to S-loops leaving 30 for portable telephones. Within these two limits you can choose a combination of ISDN and portable telephone DNs. If you try to assign more than 30 ISDN DNs, `Max 30 ISDN DNs` will appear.

Before you change a registered portable telephone DN to an ISDN DN, you must first deregister the number. Refer to *MICS-XC Norstar-Companion Installer Guide*.

Tips - *When you change an S-loop DN to a portable telephone DN, service could be disrupted on one of the S-loops. If you want to change the DN type while people are using the Norstar system, use the Page feature (Feature 6 0), to announce that calls may be disconnected.*

1. Press CHANGE to select the DN type setting: ISDN or Portable.
2. Press STATE to show whether the number is Assigned, Registered, Available, Pending, or In use by system (currently being used by an ISDN device).

If an ISDN DN is being changed, the display may show `Disrupt service?` Press No to leave the value as ISDN, or Yes to remove the ISDN DN from use by the system.

Note that changing an ISDN DN may cause an ISDN device to go down. The device may have to be unplugged then plugged back in to re-establish connection with the Norstar system. For this reason, changing DNs should only be done when the system is not busy.

Companion

Companion is used for programming Norstar systems which use Companion components. See the *MICS-XC Norstar-Companion Installer Guide* for information.

Rec'd # length

Installer password required

The Received number length setting allows you to change the number of digits received on auto-answer trunks. These digits are used to identify target lines, Auto DNs, and DISA DNs. Press CHANGE to select the setting: 1, 2, **3**, 4, 5, 6, or 7. Then, press Next to make the change.

Tips - *The target line number (for example, line 052) and the Received number for the target line (for example,* Rec'd #: 123 *for line 052) are two different numbers.*

The Received number length may be the same as the system DN length, or may, because of network or central office constraints, be set to some other value.

Changing the Received number length causes all programmed received digits to be cleared.

DN length

Installer password required

This feature allows you to change the number of digits for all DNs. The maximum length is seven. The default and minimum length is **3**.

1. Press CHANGE to select the setting: **3**, 4, 5, 6, or 7. Press Next to save the new DN length. The display shows Drop data calls?.

2. Press YES to save the new DN length. NO restores the original value.

Do not change DN length immediately after a system startup.

You must wait for at least two minutes after a system startup before you change the DN length.

Norstar data devices (not ISDN terminal equipment) drop calls when the DN length is changed. (These data devices use the B2 channel. The M7100, M7208, M7310, and M7324 telephones use the B1 channel. Calls are **not** dropped for these telephones.) Norstar data devices which use the B2 channel include the CTA devices used for PC applications and Norstar voice mail.

The DN length change is completed within two minutes, depending on the size of the installed Norstar system. System response may briefly slow down during this time. You cannot re-enter programming during this time. If you enter the programming access code, the message In use: SYSTEM appears on the display.

Tips - *A DN length change, if required, should be the first programming change on a newly installed Norstar system.*

Each increase in length places the digit 2 in front of any existing DN. For example, if DN 234 was increased to a length of 4, the new DN would be 2234.

If the DN length is changed so that a conflict is created with the Park prefix, external line access code, direct-dial digit, or any line pool access code, the setting for the prefix or code is changed to None, and the corresponding feature is disabled.

Network Name Display

Norstar will display the name of the calling party when it is provided by both Private and Public ISDN PRI and BRI interfaces. The displayed name may includes information such as the Receiving Calling Name, Receiving Redirected Name, and/or Receiving Connected Name. The outgoing name is the business name concatenated with the set name. The outgoing name is not supported on BRI. For information on programming your CLASS assignment, see CLASS assignment (CMS) on page 232.

Note: Network Name Display is an optional feature that is available based on the interface to which you are subscribed.

Network name display supported by protocol

Feature	Interface			
	NI PRI	DMS Custom PRI	NI BRI	SL-1
Receiving Calling Name	Supported	Supported	Supported	Supported
Receiving Redirected Name	Supported		Supported	
Receiving Connected Name		Supported		Supported
Sending Calling Party Name	Supported	Supported		Supported
Sending Connected Name		Supported		Supported

Receiving and Sending Calling Party Name

Network name display allows the name of an incoming PRI/BRI call to be displayed on the Norstar set receiving the call.

Calling Party Name with status of ‘PRIVATE’ may be displayed on the Called Party set as ‘Private name’. If the incoming Calling Name is defined by the CO as a private name, then ‘Private name’ appears on the answering set. If the

Calling Party Name is unavailable it may be displayed on the Called Party set as ‘Unknown name’.

The system supports sending the calling party name (Business Name and Set Name concatenated together) on calls originated by the Norstar system.

For information on programming your CLASS assignment, see CLASS assignment (CMS) on page 232.

Receiving Redirected Name

Network name display allows the receiving of the Originally Called Name (Redirecting Name) on incoming calls. The Originally Called Name will be stored, but not displayed.

Receiving and Sending Connected Name

Network name display supports the reception of Connected Name on outgoing calls. The Connected Name is stored and displayed on the Norstar set.

The system also supports sending the Connected Name (Business and Set Name concatenated together) on incoming calls.

If the call is answered by a hunt group, the hunt group name is used instead of the set name in forming the connected name.

Network Name Display interactions

Calling and Connected Name information (if available) is passed between trunks with Selective Line Redirection (SLR). Only Calling Name information is passed between trunks in cases where Direct System Inward Access (DISA) has resulted in tandeming of trunks.

Programming Network Name Display

Installer password required

The Business Name and the Set Name make up the information that is used for the outgoing Calling name or connected name.

Calling/connected name is only sent once the Business Name is programmed. To program the Business Name start with the display showing System prgming.

1. Press [Show].The display shows Hunt groups.
2. Press [Next] until the display shows BusName:.
3. Press CHANGE and use the keypad to enter a Business Name. You can enter a maximum of eight letters. It is recommended that you use a blank space for the last character to act as a separator between the Business name and Set name.

To program the Set Name start with the display showing Terminals & Sets.

1. Press [Show] and enter the set number of the telephone you would like to program.
2. Press [Show]. The display shows Line access.
3. Press [Next] until the display shows Name:.
4. Press CHANGE and use the keypad to enter a Set Name. You can enter a maximum of seven letters.
5. Other areas that must also be programmed include:
   - the OLI number,
   - under Telco the Call ID must be set to yes,
   - under lines you need to enter the set number where you want the CLID to appear.

Outgoing Name and Number Blocking

When activated, [Feature] [8] [1] [9] blocks the outgoing name and number on a per call basis. When this feature is used, the call is flagged to the CO so that the name and number will not be presented to the person being called.

On feature supported trunks, a call blocking digit sequence is sent to the CO before sending the dialout digits. You can change this digit in ADMIN and set it to the digit sequence recognized by the local CO for name and number blocking.

To program the Name and Number blocking digit, start with the display showing `Telco features`.

1. Press [Show]. The display shows `XXX`.
2. Press [Next] until the display shows `ONN Blocking:`.
3. Press [Show]. The display shows `Tone:None .`
4. Press `CHANGE` to enter a new tone dialing Name and Number blocking digit sequence.
5. Press [Next]. The display shows `Pulse:None.`
6. Press `CHANGE` to enter a new pulse dialing Name and Number blocking digit sequence.

Call by Call service selection for PRI

Installer password required

Call by Call service selection allows a user to access services or private facilities over a PRI line without the need for dedicated facilities. The different services represent different types of access to the network. Various services (see list below) are available depending on the chosen protocol.

Call by Call service selection is supported for the following protocols:

- National ISDN 2 (NI-2)
- DMS-100 custom
- DMS-250 (MCI, Sprint, Generic)
- AT&T 4ESS custom

The following Call by Call Services are supported:

- Public

  Public calls connect Norstar and a Central Office (CO). Both incoming (DID) and outgoing (DOD) calls are supported. Dialed digits conform to the standard North American dialing plan (E.164 standard).

- Foreign Exchange (FX)

  Foreign exchange service connects a Norstar site to a remote central office (CO). This provides the equivalent of local service at the remote location.

- Tie

  Tie lines are private incoming and outgoing lines that connect Private Branch Exchanges (PBXs) such as Norstar.

- Outward Wide Area Telecommunications (OUTWATS)

  This outgoing call service allows a Norstar user to call telephones in a specific geographical area referred to as a zone or band. Typically a flat monthly fee is charged for this service.

- Inward Wide Area Telecommunications (INWATS)

  This long distance service allows a Norstar user to receive calls originating from specified areas without charge to the caller. A toll-free number is assigned to permit reverse billing.

- International INWATS

  An international long distance service that allows a Norstar user to receive international calls originating from specified areas without charge to the caller. A toll-free number is assigned to permit reverse billing.

- Switched Digital

  This service provides premises to premises voice and data transport with call management and monitoring features.

- Nine Hundred

  This service is commonly referred to as fixed charge dialing.

- Private

  Private incoming and outgoing calls connect Norstar to a virtual private network. Dialed digits may conform to the standard North American dialing plan (E.164 standard) or the dialed digits may use a private dialing plan.

Norstar supported Call by Call Services by protocol

Norstar Service[a]	NI-2 (5ESS	DMS-100 (custom)	DMS-250 (MCI, Sprint, Generic)	AT&T 4ESS
FX	FX	FX[b]	FX	
Tie[c]	Tie	Tie	Tie	
INWATS	INWATS	INWATS	Eight Hundred	Toll Free MEGACOM
International INWATS	Same as INWATS	Same as INWATS	Same as INWATS	International Toll Free Service
OUTWATS	IntraLATA OUTWATS OUTWATS with bands InterLATA OUTWATS	OUTWATS	PRISM	MEGACOM
Private		DMS Private[e]	VNET (virtual network)	SDN (software defined network)
Switched Digital				ACCUNET[d]
Nine Hundred			Nine Hundred	MultiQuest
Public	Public	Public	Public	

a. A shaded box indicates that the protocol does not support the service.
b. DMS-250 Sprint and UCS support incoming FX only (i.e. Network-to-Norstar). DMS-250 MCI does not support FX.
c. NI-2 allows two Tie operating modes: senderized and cut-through. Norstar will only support senderized mode.
d. Rates greater than 64 kbps will not be supported.
e. Bell Canada VNET.

Programming Call by Call on PRI requires you to program various areas of the Norstar system such as

- ☐ under Line access, assign the line pool
- ☐ under Services, in routing services section, assign which pool to use for routing and which service type, service id if required
- ☐ under System programming, specify the minimum and maximum values for the pools
- ☐ under Hardware choose PRI card and select the protocol

Line Pools

All lines in a PRI interface are in the same PRI line pool. This pool cannot contain any non-PRI lines. There is one PRI pool available for each PRI interface on the CCU. Depending on the order that the cards are configured as PRI, Pool PRI-A represents lines 1 to 23, and Pool PRI-B represents lines 25 to 47. If both PRIs are connected to the same service provider and use the same protocol, lines 1 to 23 and 25 to 47 can be put in the same pool, A or B.

Programming Call by Call service selection

Programming the Norstar system for Call by Call Service Selection with a PRI interface requires

- provisioning a PRI card if a PRI card is not already a part of the system
- selecting a protocol
- programming incoming call routing
- programming routes that use the PRI pools (under Services)

Provisioning the PRI card

The Cards on ICS setting allows you to specify the type of Trunk Cards in the ICS.

Start with the display showing Hardware.

1. Press [Show]. The display shows Cards on ICS:Loop.
2. Press CHANGE to view the different cards: **T1**, PRI, BRI-U4, BRI-U2, BRI-ST or Loop.
3. Select PRI.

   For more information on provisioning cards see Hardware on page 331.

Selecting the protocol

Now that the PRI card has been provisioned (or is already part of the system) you can select a protocol.

With the display showing PRI

1. Press [Show].
2. Press [Next] until the display shows Protocol:.
3. Press CHANGE to select a different protocol. The choices are NI-2, DMS-100, DMS-250, AT&T4ESS, SL-1.

Incoming call routing

By default, incoming calls are routed based on the Called Party Number. The last ‘N’ digits of the called party number are used as Received Digits to find a target line (where ‘N’ is the Received Number Length)

For example, the incoming calling party number is 800-555-1234. The received digit number length is 4, and the result is 1234. These last 4 digits are used to route the call.

Depending on the protocol and the service, alternate routing maps may be defined.

To change the incoming call routing for a service, with the display showing Protocol:, do the following:

1. Press [Next] until the display shows CbC Routing.
2. Press [Show].The display shows FX:.
   Press NEXT to display a different service.

Note: The display shows the first applicable service for the given protocol, in this example the service is FX.

3. Press CHANGE to change the mapping that is applied to incoming calls of this service type to obtain the received digits. In all cases, the received digits are used to find a target line or to activate Remote Access.

   None: No mapping is applied. The last ‘N’ digits of the Called Party Number are used as received digits. Note that if there is no called party number (may occur with some FX calls) the call will ring at the incoming trunk’s Prime set.

   All: Allows you to define the received digits used for all calls with this service type, regardless of the called party number or service identifier (SID). For this option, all calls with this service type on this PRI will ring the same target line.

   Map table: Allows you to associate different received digits with different calls of this service type depending on the call party number and/or the service identifier. Incoming calls that do not match any entry defined in the map table will ring at the prime set. Depending on the service type and the protocol, you may be able to map the

called party number and the service identifier. The following table shows the different options.

	Service				
Protocol	**FX**	**800**	**I-800**	**SDS**	**900**
NI-2	SID	CDN	n/a	n/a	n/a
DMS-100	SID	SID or CDN	n/a	n/a	n/a
DMS-250	SID	SID or CDN	n/a	n/a	SID or CDN
4ESS	n/a	CDN	CDN	CDN	CDN

Routing table

Call by Call Service information for outgoing calls is recorded in the Routing Service section of the Programing Record. The following is an example of a Routing Table containing CbC programming.

Route # (000-999)	Dial Out (24 digits)	Use Pool	Service Type	Service Identifier
003		PRI-A	Public	
004		PRI-A	FX	xxxxx
005		PRI-A	Tie	xxxxx
006		PRI-B	OUTWATS	xxx
007		PRI-B	Private	
008		PRI-B	Switched Digital	

The service identifier (SID) depends on the selected service type. (For example with NI-2 protocol)

Service Type	Service Identifier description
Public	None
FX	Facility Number 1-5 digits
Tie	Facility Number 1-5 digits
OUTWATS	Optional Band Number 1-3 digits
Private	None
Switched Digital	None

When a PRI protocol is selected or changed, the Service Type and Service ID fields are automatically cleared for each entry in the routing table for that PRI.

Programming the PRI routing table

The dialing plan must be thoroughly planned out in advance before programming the information into the Norstar system.

Programming the routing table takes place in Services under Routing Service: Routes

1. Press [Show]. The display shows `Rte000`. Press [Next]. The display shows `Rte001`.
2. Press [Show]. The display shows `Dial-Out:None`. Press CHANGE to enter a number (up to 24 digits).
3. Press [Next]. The display shows `UsePool:`.
   The PRI pool(s) displayed depend on how the PRI lines are put into pools in the Trunk/Line data section of programming. It is possible to have only pool PRI-A or only pool PRI-B, even if there are two PRI cards in the system.

4. Press [Next]. The display shows SrvcType:Public. Press CHANGE if you want to select a different Service Type.

5. Press [Next]. The display shows Service ID:None. Press CHANGE to enter the Service ID number. This is shown only if the service requires an ID.

6. Press [Next]. The display shows DN type:Public. Press CHANGE to enter Public or Private. This is shown only for service type Tie.

Public DN lengths

In most cases it is not necessary to change the default values. The public DN lengths table is used for all PRI calls except those whose routes specify DN Type: Private. The public DN lengths table allows the ICS to determine the length of a DN based on the initial digits dialed by the user. In the public DN length table

- you can define at most 30 entries
- each entry consists of a DN prefix string (1 to 10 digits) and a length value (two digits, 1 - 25)
- several entries will be pre-defined in North America (can be removed or modified). These defaults will handle most regions in North America without the need for additional programming.
- the table always contains one ‘default’ entry; this cannot be removed. You can only modify the length parameter associated with this entry. The default entry specifies the length of any dialing string that does not match one of the other table entries.

With the display showing Routing service

1. Press [Show] then press [Next] until the display shows Public DNs.

2. Press [Show].The display shows Show prefix:.

3. Press ADD to enter a prefix (1 - 10 digits). The display shows Prfx:Deflt...
4. Press [Show].The display shows DN length:7. Press CHANGE to enter a DN length number (2 digits, 1 - 25).

Private DN length

The Private DN length parameter specifies the length of DNs in the private dialing plan. This is used by all PRI calls where the route specifies DN Type:Private.

With the display showing Routing service

1. Press [Show] then press [Next] until the display shows Private DN len:x.
2. Press CHANGE to select a different DN length (3..10).

Interdigit Timeout

Interdigit Timeout specifies how long the ICS will wait between user-dialed digits. This value allows the ICS to determine when you has stopped dialing. The value is programmed from the Routing service feature.

You can select one of the following values (in seconds): 3, **4**, 5, 6, 8, 10, 15. Too small a value may not give you enough time to enter a string of numbers, and too large a value may cause you to enter too many numbers before the system is ready for them.

For more information on non-PRI routing tables and destination codes, see Routing service on page 257.

PRI Call by Call Limits

PRI pool limits for Call by Call services allows you to configure limits for service types without interacting with the CO. This feature sets the minimum and maximum number of incoming and outgoing calls per service type for the PRI pool.

The number of active calls will be tracked and whenever a call is being setup, a check will be made to determine if it will be allowed. Calls will not be allowed if they exceed the maximum value for that service type or if they will use lines needed to maintain the minimum value of other service types.

The summation of the minimum values for incoming or outgoing PRI services cannot exceed the total number of lines in the PRI pool.

The maximum value for an incoming or outgoing PRI service cannot exceed the total number of lines in the PRI pool.

Programming Call by Call Limits

With the display showing System prgming.

1. Press [Show].The display shows Hunt groups.
2. Press [Next] until the display shows CbC limits.
3. Press [Show].The display shows the first pool (PRI-A or PRI-B) that contains lines. Press NEXT to show the other pool if it is available.
4. Press [Show].The display shows Service:.
   The service that is displayed depends upon the protocol. Press NEXT to select a different service.
5. Press [Show].The display shows Min incoming:2.
   Press CHANGE to enter a different number.
6. Press [Next]. The display shows Max incoming:23.
   Press CHANGE to enter a different number.
7. Press [Next]. The display shows Min outgoing:4.
   Press CHANGE to enter a different number.
8. Press [Next]. The display shows Max outgoing:23.
   Press CHANGE to enter a different number.

Telco features

VMsg ctr tel#s

If you subscribe to a voice message service outside your office, you can access it through your Norstar system. This setting specifies the external telephone numbers that are dialed by the Message feature to retrieve voice messages. Use [Show], CHANGE, and the dial pad to enter the external number.

The default for each voice message center is **No number**.

Tips - *A telephone does not show that external voice messages are waiting unless Extl VMsg set is set to Y (Yes). The setting is in CLASS assignment under* Terminals&Sets.

You can program up to five voice message center numbers, but most systems require only one.

Software keys

ISDN-PRI

A software key is required so that you can configure a DTI card as a PRI card.To obtain the required Software key, call the Nortel Customer Response Center at: **1-800-684-5825.**

Hunt Groups

The default setting for hunt groups is broadcast. If you want to use sequential or rotary mode and statistics, a software key is required. To obtain the required Software key, call the Nortel Customer Response Center at: **1-800-684-5825.**

Companion

Software keys are used to activate Companion components on systems running the USA-MICS-XC 4.0 software. See the *MICS-XC Norstar-Companion Installer Guide* for more information. To obtain the required Software keys for Companion, call the Nortel Customer Response Center at: **1-800-321-2649.**

Norstar Integrated Data Module 200

Software keys is also used to activate the connection between the Norstar ICS and the IDM 200. Entering the software keys allows you to change the Line type option of T1 lines to Fixed. Only Fixed lines can be assigned to the IDM 200.

Software keys are available by calling the Nortel Customer Response Center. You will need to provide the following information:

- the System ID of the Norstar ICS
- the authorization number printed on the Bandwidth Allocation License Instruction Sheet

- the number of Directory numbers (DNs) configured in the system
- the number of lines configured in the system

Re-entering software keys.

Should the system be powered down for 72 hours or more, you will be required to obtain and enter new software keys.

Obtain the System Identification Number

Obtain the System ID (SysID) by pressing [Feature] [*] [*] [S] [Y] [S] [I] [D], or [Feature] [*] [*] [7] [9] [7] [4] [3] on any M7324 or M7310 telephone.

This information is also available by accessing `Software keys` in an Installer programming session:

1. Press [Show] The display reads `SysID:` followed by the unique System Identification Number.
2. Press [Next] to continue in `Software keys` or [Rls] to exit.
3. Record the SysID in the *Programming Record*.

Call the Nortel Customer Response Center

1. To obtain the required Software keys to activate the IDM 200, call the Nortel Customer Response Center at: **1-800-684-5825.**
2. Follow the voice prompts for Norstar products and the Bandwidth Allocation License. When you are asked for the information concerning your request, provide the following:
   - the System ID of the Norstar ICS

- the authorization number printed on the Bandwidth Allocation License Instruction Sheet
- the number of Directory numbers (DNs) configured in the system
- the number of lines configured in the system

3. You will be given three separate numeric strings that contain eight digits each.
4. Record the Password keys in the *Programming Record*.

Enter the keys

Keys are entered by first accessing `Software keys` in a programming session.

1. Press [Show]. The display reads `SysID:`.
2. Press [Next]. The display reads `Password keys`.
3. Press [Show]. The display reads `Key 1:_`.
4. Enter the 8 digit password number for Key 1. Use BKSP to make corrections. The display reads `Key 2:_`.
5. Enter the 8 digit password number for Key 2. Proceed as above until you have finished entering Key 3. The display reads `Entry successful`.
6. Press [Heading] until the display reads `Software keys` or [Rls] to exit.

Note: If the entry is unsuccessful, the display shows `Invalid password`. If this happens, reenter the code or call Nortel Customer Response Center at **1-800-684-5825** for assistance.

Hardware

Hardware is where you view and change settings for cartridges installed in the ICS, Trunk Modules and the Station Modules. Hardware is also where you view and change settings for the Analog Station Modules and Data Modules.

Show module

Installer password required

The Show module setting automatically displays the modules connected to the system. Press [Next] to select the setting: **KSU**, Mod 03, Mod 04, Mod 05, Mod 06, Mod 07, Mod 08, Mod 09, Mod 10, Mod 11, Mod 12, Mod 13 and Mod 14.

Cards on ICS

Installer password required

The Cards on ICS setting allows you to specify the type of Trunk Cartridges in the ICS. Press [Next] to select the setting: **T1**, PRI, BRI-U4, BRI-U2, BRI-ST or Loop.

Loop is the default setting used for Loop Start and Call Information (CI) Trunk Cartridges.

Select the T1 or PRI setting for DTIs cards.

> The IDM 200 will not function with a DTI card that is configured for PRI. The IDM 200 only works with T1 trunks. Only fixed lines can be used by the IDM 200. See Norstar Integrated Data Module 200 on page 181 for information on configuring the IDM 200.

Tips - *You cannot change this setting unless you first disable the Trunk Cartridge using* `Module status` *in Maintenance. Remember to enable the Trunk Cartridge once you have completed programming. See Module status on page 366 for details.*

The Trunk Cartridge slots in the ICS are numbered from right to left.

Once you specify the type of Trunk Cartridge in the ICS slot, press [Show] to display the line numbered range for the lines on the Trunk Cartridge.

Discon timer

Disconnect timer allows you to specify the duration of an Open Switch Interval (OSI) before a call on a supervised external line is considered disconnected. Press CHANGE to select the setting: 60, 100, 260, **460**, or 600 milliseconds.

Tips - *Disconnect Supervision is assigned to each line with the Trunk mode setting. See Trunk/Line data on page 235.*

This setting must match the setting for the line at the central office (CO).

This setting only appears for DTI and Loop Trunk Cartridges.

Answer timer

Installer password required

Answer timer allows you to set the minimum duration of an answer signal before a call is considered to be answered. Press CHANGE to select the setting: 1, **2**, 3, 4 or 5 seconds.

Tips - *This setting only appears for DTI and E&M Trunk Cartridges.*

CO fail

Installer password required

Select the carrier failure standard used by your T1 service provider. Press CHANGE to select the setting: **TIA-547A** or TR62411.

Tips - *This setting only appears for DTIs. Consult your T1 service provider for the proper setting.*

I/F levels

Installer password required

Interface levels defaults to the ISDN loss plan setting. Press CHANGE to select setting: **ISDN**, PSTN or ISD/TT interface levels.

Tips - *Find out if your Norstar system is connected to a central office (CO) with digital network loss treatment (ISDN I/F levels) or analog network loss treatment (PSTN I/F levels) by checking with your telecommunications service provider.*

The ISDN setting requires digital access lines (DAL) that have digital network loss treatment. On a DAL network, it is the PBX that administers the dB loss. DALs may have ISDN signalling or digital (such as T1 and so on) signalling. To have DAL network loss treatment on a line with digital signalling, you must contact your service provider.

The PSTN setting requires analog access lines (AAL) that have analog network loss treatment and digital signalling. On an AAL network, the CO administers the dB loss.

The ISD/TT setting is only for DTI and PRI cards.

Each loss plans uses a transmit objective loudness rating of -46 dB. The ISDN loss plan uses a receive objective loudness rating (ROLR) of 51dB and the PSTN loss plan uses a ROLR of 48 dB. The ISD/TT loss plan uses

Choosing the wrong setting may affect voice quality, either too loud or too soft.

Framing

Installer password required

Framing lets you select the framing format used by your T1 service provider. Press CHANGE to select the setting: **ESF** (Extended Superframe) or SF (Superframe).

Tips - *This setting only appears for DTIs. Consult your T1 service provider for the proper setting.*

You must disable the Trunk Cartridge using Module status *in Maintenance before you can change this setting. See Module status on page 366 for details.*

SF or Superframe is sometimes known as D4.

Internal CSU

Installer password required

Internal CSU allows you to turn the internal T1 channel service unit on or off. The channel service unit gathers performance statistics for your T1 lines or PRI with public interface. Press CHANGE to select the setting: **On** or Off.

Tips - *This setting only appears for DTIs. Consult your service provider for the proper settings.*

You must disable the Trunk Cartridge using Module status *in Maintenance before you can change this setting. See Module status on page 366 for details.*

You can view the performance statistics for your T1 lines in Maintenance under the CSU stats *heading.*

If you set the internal CSU off, there must be an external CSU connected to your T1 lines.

The internal CSU must be set to off if a Norstar Integrated Data Module is active.

CSU line bld

Installer password required

CSU line build allows you to set the gain level of the transmitted signal. Press CHANGE to select the setting: **0**, 7.5 or 15 dB.

Tips - *This setting only appears for DTIs that have their internal CSU turned on.*

You must disable the Trunk Cartridge using Module status *in Maintenance before you can change this setting. See Module status on page 366 for details.*

DSX1 bld

Installer password required

DSX1 build out allows you to set the distance between the ICS and an external channel service unit. Press CHANGE to select the setting: **000-100**, 100-200, 200-300, 300-400, 400-500, 500-600, 600-700 feet.

Tips - *This setting only appears for DTIs that have their internal CSU set to Off. Consult your service provider for proper settings.*

You must disable the Trunk Cartridge using Module status *in Maintenance before you can change this setting. See Module status on page 366 for details.*

Line coding

Installer password required

Select the standard used by your T1 service provider for encoding signals on the T1 lines. Press CHANGE to select the setting: **B8ZS** or AMI.

Tips - *This setting only appears for DTIs. Consult your T1 service provider for the proper setting.*

You must disable the Trunk Cartridge using Module status *in Maintenance before you can change this setting. See Module status on page 366 for details.*

Enable Trunk Cartridges

If you disable any Trunk Cartridges to perform programming, enable them now using Module status in Maintenance or your system will not function properly. See *Module status on page 366* for information on enabling Trunk Cartridges in Module status.

ClockSrc

Installer password required

Clock Source lets you designate which of the systems' Digital Trunk Interfaces (DTIs) obtains the timing reference from the network, which the system synchronizes to. For more on Clock Source settings, see page 345.

Modules

Installer password required

The Mod setting (Modules 03 to 14) allows you to specify the type of module you wish to configure. Press CHANGE to select the setting: **StnMod**, ASM, TrunkMod or DataMod.

StnMod

Installer password required

If Station Module is selected and connected to the Modular ICS, no extra programming is required. Each Station Module represents 16 new DNs. For more information on lines and

DNs used by the Station Module, see Wiring charts on page 148.

ASM

Installer password required

For Analog Station Module programming, see the *Analog Station Module Installation Guide* for more information.

TrunkMod

Installer password required

TrunkMod setting allows you to configure the Trunk Cartridges in the Trunk Module. Press CHANGE to select the setting: **Loop**, E&M, DID, BRI-ST, BRI-U2, or BRI-U4.

Loop is the default setting used for Loop start and Call Information (CI) Trunk Cartridges.

Tips - *You cannot change this setting unless you first disable the Trunk Cartridge using* Module status *in Maintenance. Remember to enable the Trunk Cartridge once you have completed programming. See Module status on page 366 for details.*

The Trunk Cartridge slots in the Module are numbered from left to right. Trunk Modules are numbered 3 to 4 for a midi, 3 to 8 for a maxi and a mega system.

Depending on your system configuration, BRI-ST, BRI-U2, and BRI-U4 cards can only reside in certain trunk modules. In a midi system, the cards must be in trunk modules 3 or 4, for a maxi or mega system, the cards must be in trunk modules 7 or 8. The cards can reside in the ICS regardless of system size.

Once you specify the type of Trunk Cartridge in the ICS slot, press SHOW to display the line numbered range for the lines on the Trunk Cartridge.

	Line numbers						
Midi	**Loop**	**ST**	**U-2**	**U-4**	**DTI (T1)**	**E&M**	**DID**
Cd1 ICS	1-4	1-8	1-4	1-8	1-24	NA	NA
Cd2 ICS	25-28	25-32	25-28	25-32	25-48	NA	NA
Cd1 Mod 04	49-52	49-56	49-52	49-56	NA	49-50	49-52
Cd2 Mod 04	57-60	57-64	57-60	57-64	NA	57-58	57-60
Cd3 Mod 04	65-68	65-72	65-68	65-72	NA	65-66	65-68
Cd1 Mod 03	73-76	73-80	73-76	73-80	NA	73-74	73-76
Cd2 Mod 03	81-84	81-88	81-84	81-88	NA	81-82	81-84
Cd3 Mod 03	89-92	89-96	89-92	89-96	NA	89-90	89-92

	Line numbers						
Maxi/ Mega	**Loop**	**ST**	**U-2**	**U-4**	**DTI (T1)**	**E&M**	**DID**
Cd1 ICS	1-4	1-8	1-4	1-8	1-24	NA	NA
Cd2 ICS	25-28	25-32	25-28	25-32	25-48	NA	NA
Cd1 Mod 08	49-52	49-56	49-52	49-56	NA	49-50	49-52

Cd2 Mod 08	57-60	57-64	57-60	57-64	NA	57-58	57-60
Cd3 Mod 08	65-68	65-72	65-68	65-72	NA	65-66	65-68
Cd1 Mod 07	73-76	73-80	73-76	73-80	NA	73-74	73-76
Cd2 Mod 07	81-84	81-88	81-84	81-88	NA	81-82	81-84
Cd3 Mod 07	89-92	89-96	89-92	89-96	NA	89-90	89-92
Cd1 Mod 06	97-100	NA	NA	NA	NA	97-98	97-100
Cd2 Mod 06	101-104	NA	NA	NA	NA	101-102	101-104
Cd3 Mod 06	105-108	NA	NA	NA	NA	105-106	105-108
Cd1 Mod 05	109-112	NA	NA	NA	NA	109-110	109-112
Cd2 Mod 05	113-116	NA	NA	NA	NA	113-114	113-116
Cd3 Mod 05	117-120	NA	NA	NA	NA	117-118	117-120
Cd1 Mod 04	121-124	NA	NA	NA	NA	121-122	121-124
Cd2 Mod 04	125-128	NA	NA	NA	NA	125-126	125-128
Cd3 Mod 04	129-132	NA	NA	NA	NA	129-130	129-132
Cd1 Mod 03	133-136	NA	NA	NA	NA	133-134	133-136
Cd2 Mod 03	137-140	NA	NA	NA	NA	137-138	137-140
Cd3 Mod 03	141-144	NA	NA	NA	NA	141-142	141-144

BRI card

Loops

Installer password required

The display shows the loops found on the BRI card.

Loop

Press [Next] to display the settings for individual loops on a BRI card.

Type

Installer password required

Press CHANGE to select the loop type. If the card type is BRI-ST, the loop type can be S, or **T**. If the card type is BRI-U2 or BRI-U4, the loop type can be LT or **NT**.

The BRI card must be disabled in Module status before this setting can be changed. You can change the setting if the card has not yet been installed in the ICS slot.

Lines

There are two lines for each T, S, or NT loop.

Loop	Default lines
201	001-002
202	003-004
203	005-006
204	007-008
225	025-026
226	027-028
227	029-030
228	031-032

No SPIDs assignd

Installer password required

T, S, and NT loops can be assigned a system profile identifier (SPID) as supplied by your service provider. No SPIDs are assigned by default.

When the loop type is T, calls on the loop are handled for a network connection only. If any other ISDN equipment is connected to the loop, it must be configured as an S loop to ensure proper call handling.

1. Press ADD and enter the first or second SPID assigned to the loop.
   If there are two SPIDs already assigned to the loop, ADD will not appear until one is removed.
2. Press REMOVE to clear a SPID.

# of B-channels
Press CHANGE to select the number of B-channels that are associated with the SPID: **1** or 2.

Tips - *When you order an ISDN capability package that supplies two B-channels, you may receive one or two SPIDs from your service provider. If you receive one, it usually means you will configure the SPID to use two B-channels. If you receive two, it usually means you will configure each SPID with one B-channel. Check with your service provider if you are not sure about the proper configuration.*

Network DNs

Installer password required

1. Press Show to display the DNs which are used with the SPID.
2. Press ADD and enter the appropriate number to assign additional Network DNs to the SPID.

The Modular ICS can have a maximum of 128 Network DNs for the system. There is no limit to the number of Network DNs for each SPID, but you cannot exceed the limit of 128 Network DNs for the system.

If the Network DN you try to enter is already assigned to a SPID and its call type is Both, you will not be able to assign the DN again.

If the Network DN you enter is already assigned to a SPID and its call type is Voice or Data, it will be automatically programmed with the unused call type. For example, if the DN has Call type set to Voice in the previous SPID assignment, it will be automatically set to handle Data calls when the same DN is added to the other SPID.

Call type

Installer password required

Press CHANGE to select the call type of the Network DN: Voice, Data, or **Both**.

CHANGE will not appear if the Network DN is already in use by the system and the call type will be automatically programmed with the unused call type. For example, if the DN has Call type set to Voice in a previous SPID assignment, it will be automatically set to handle Data calls when the DN is entered the second time.

Tips - *If our service provider does not specify the call type for each Network DN, it is probably available for both voice and data. Check with your service provider if you are not certain about the proper configuration.*

D-packet servce

Installer password required

1. Press Show to view and program D-packet service for S, T or NT loops. You can have two D-packet service configurations for each BRI card.
2. Press CHANGE to turn D-packet service for this loop on (Y) or off (**N**).

Tips - *An LT loop must already be assigned.*

Lp

Installer password required

1. Select the S loop (for BRI-S/T cards) or LT loop (for BRI-U2 or BRI-U4 cards) that supports the D-packet service.
2. Press CHANGE to move through a list of the loops which are available on this card. If only one loop is available, you will not see CHANGE.

TEIs

Installer password required

Press Show to view and program the Terminal Endpoint Identifiers (TEIs). Each TEI is supplied by your service provider and is associated with an ISDN D-channel packet device.

No TEIs on loop

Installer password required

Press ADD to program up to eight TEIs to this loop.

Sampling

Installer password required

Press CHANGE to select the sampling used by an S loop:

- **Fixed**: if two or more S-interface devices use the loop and the length of the loop is less than 200 m (650 ft.), select Fixed.
- Adaptve: if two or more S-interface devices use the loop and the length of the loop is greater than 200 m (650 ft.), select Adaptve.

If one S-interface device is using the loop, the length of the loop can be up to 1000 m (3,250 ft.) and the rate should be set to Adaptve.

The BRI card must be disabled under Module status in Maintenance programming, before you can change this setting. You can change the setting if the card has not yet been installed in the ICS slot.

DNs on Loop

Installer password required

Press Show to view and program the ISDN DNs assigned to the loop.

Assign DNs

Installer password required

1. Press Show and enter the ISDN DN you wish to assign to this loop, or press SCAN to move through a list of DNs already assigned to the loop.

   The display shows Availabl, Assigned (assigned to this loop), *Lpnnn* (assigned as the default DN of another loop) or Lpnnn (assigned to another loop).

2. Press LIST to view the DNs assigned as ISDN DNs. The default ISDN DN range is 667-696. For information about changing ISDN DN type, see Change DN type on page 308.

3. Press CHANGE to assign the DN to the loop or to remove it.

Loop DN

Press CHANGE to move through the ISDN DNs you have assigned to the loop. This will assign the main ISDN DN to the loop. You can also set Loop DN to **None**.

Clock Src

Installer password required

Systems with digital interfaces need to synchronize to the network in order to function. Synchronization is done in a hierarchical way, where each device/switch obtains the

network clock from the device/or switch above it in the synchronization hierarchy and passes the network clock to the device/switch below it in the synchronization hierarchy. The synchronization levels are referred to as strata.

Norstar systems are stratum 4E equipment and are usually used as termination points in a network.

For each DTI, choose one of the following settings:

Primary reference

The DTI obtains the timing reference from the network, which the system synchronizes to. This is the default value for the DTI in slot 1 in the ICS. If the system is configured with a PRI card, the setting should be set to Primary.

Secondary reference (Secndry)

The DTI acts as a standby reference. If there are excessive errors on the primary reference T1 link, or the DTI designated as primary reference fails, this DTI will obtain the timing reference from the network, which the system synchronizes to. This is the default value for the DTI in slot 2 in the ICS.

Timing master (TimeMst)

The DTI does not obtain timing from the network, but transmits the systems timing to equipment connected to it.

Tips - *If a BRI card becomes clock source, it will have up to four clock sources available (T, S, U-NT, NT loops only). Only when all four clock sources have an alarm will the card cause a switch to the secondary or hold-over state.*

BRI -T, S, and U-NT interface loops may be autonomously powered down by the network. This will be treated as a loss of clock source on that loop.

The installer should ensure that clock source loops are either not powered down or are among the last to be powered down.

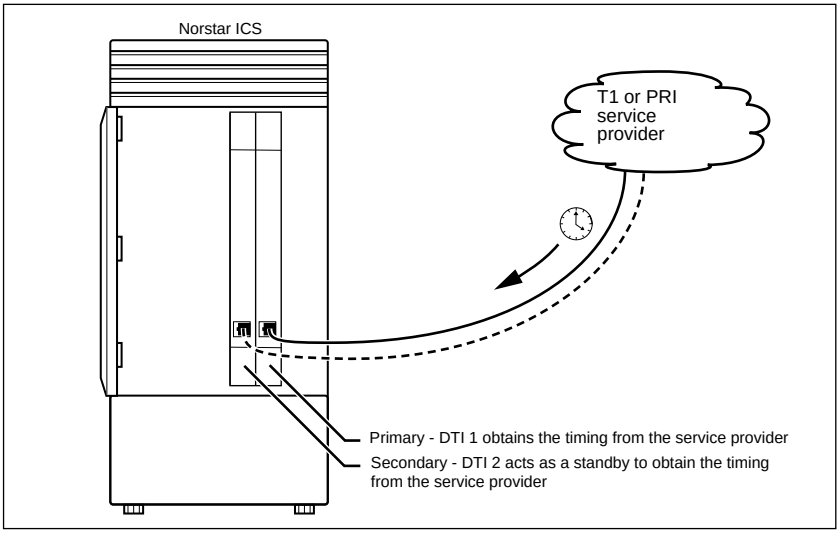
If BRI cards are used only for S-loops, a Service Card is required only if the DTI is T1. However, a Services Card is recommended when a T1 is not used, since the card improves clock accuracy and performance.

If BRI cards are used off-core, they still require a connection to the network, which requires the SC, and an on-core digital clock source.

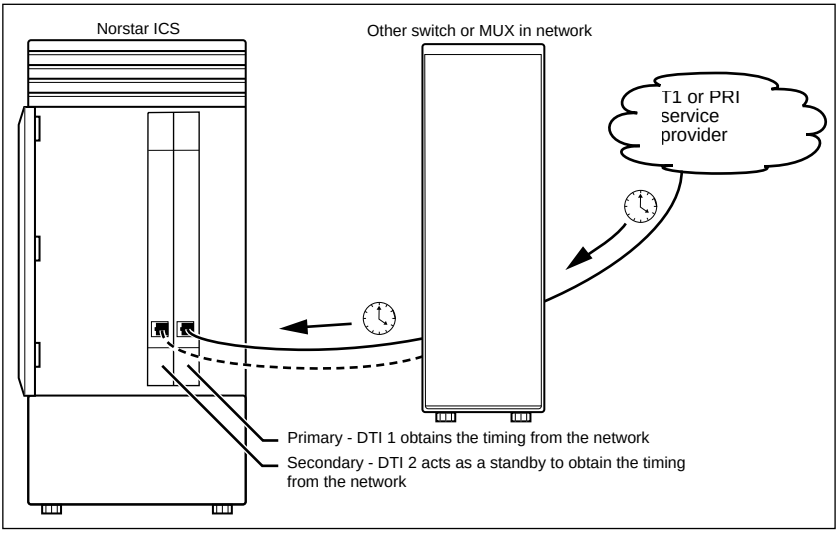
For more information on network synchronization, consult the appropriate private digital network synchronization standards.

The following illustrations show some typical network configuration and the appropriate clock source settings for your DTIs.

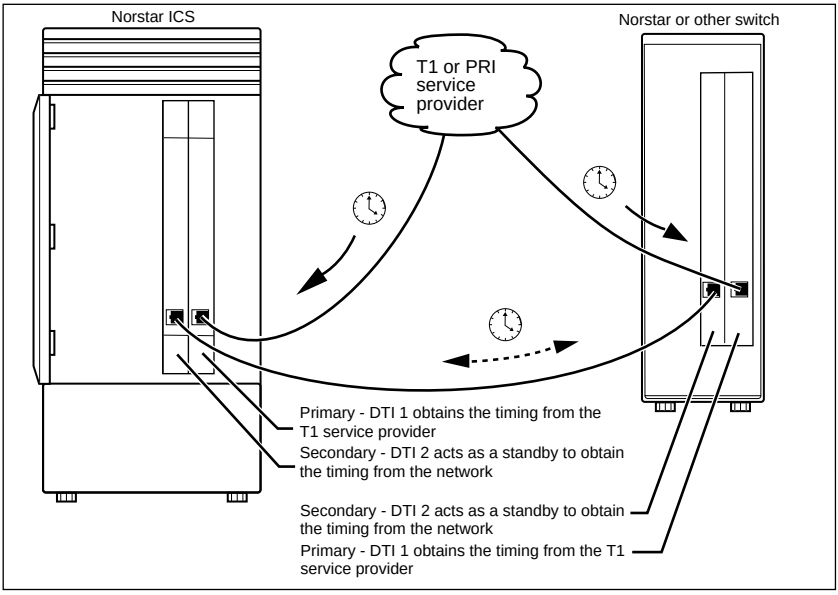
Norstar connected directly to the T1 or PRI service provider in a T1 network



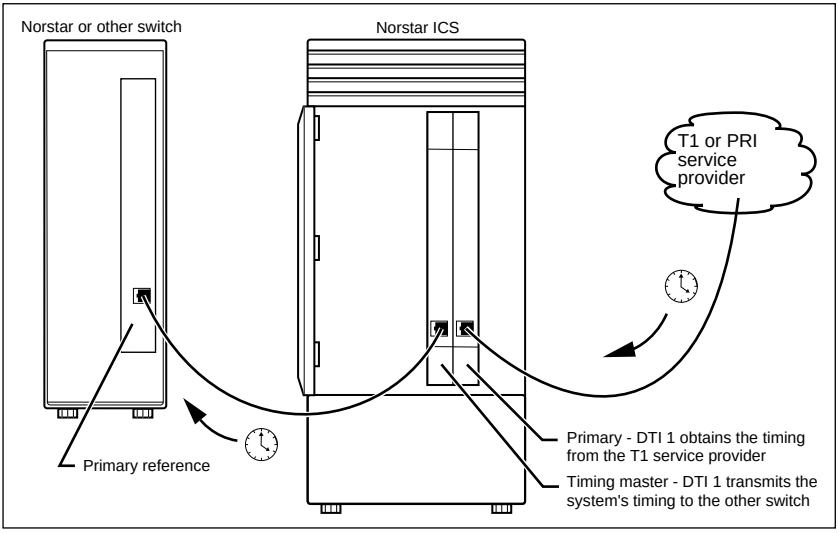
Norstar connected to another switch or MUX in a T1 or PRI network



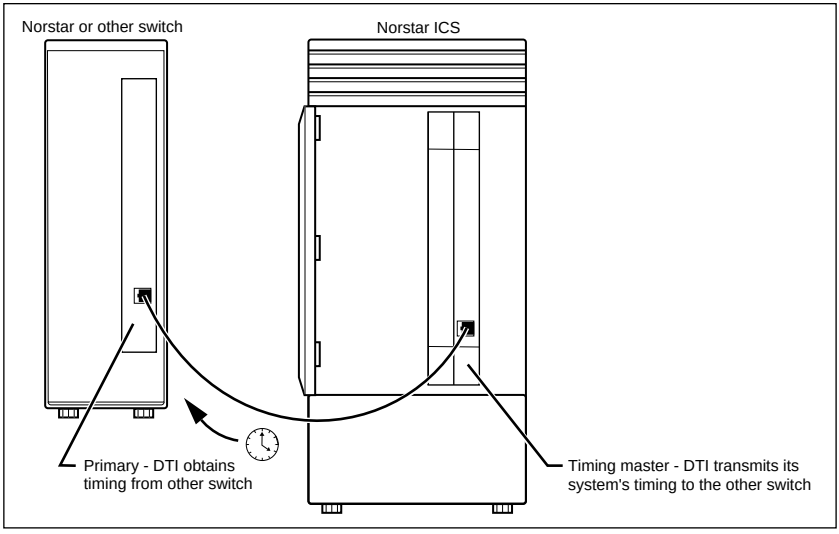
Norstar connected to another switch in a closed T1 or PRI network



Norstar connected in a series of switches in a T1 or PRI network



Norstar connected by a T1 link to another switch in an analog network



Setting the clock source for DTIs and PRI

Installer password required

Changing clock source may disconnect calls.

Changing the clock source for your system may cause your system to restart itself, resulting in dropped calls. Choose a suitable time to change the clock source and use the Page feature to inform people of possible service disruptions.

Start with the display showing `Hardware`.

1. Press [Show].
2. Press [Next]. The display shows `Cards on KSU`.
3. Press [Show].
4. Press [Next] until the display shows the card you wish to view.
5. Press [Show].
6. Press [Next] until the display shows `ClockSrc`.
7. Press `CHANGE` to toggle the setting.

8. Press [Rls] to exit or [Next] to continue in Hardware.

Tips - *In most T1 network configurations, you need one DTI or ISDN-PRI card in your ICS to act as a primary reference. The only application where you might not have a DTI or an ISDN-PRI card designated as primary reference is in a network where your Norstar system is connected back-to-back with another switch using a T1 link. If the other switch is loop-timed to your Norstar system, your DTI or ISDN-PRI card can be designated as a timing master.*

If your Norstar system has two DTIs, you cannot assign both DTIs as primary reference or both DTIs as secondary reference.

You can only have one primary reference and one secondary reference per system. See "T1 or ISDN-PRI configurations" for more information.

T1 or ISDN-PRI configurations

The following tables indicate proper and improper T1 or ISDN-PRI configurations:

Valid digital trunk configurations

	Option 1	Option 2	Option 3
Primary Slot 1	TI or PRI	T1 or PRI	BRI-ST, BRI-U2, BRI-U4
Secondary Slot 2	T1 or PRI	BRI-ST, BRI-U2, BRI-U4	BRI-ST, BRI-U2, BRI-U4

Invalid digital trunk configuration

	Option 1
Primary Slot 1	BRI-ST, BRI-U2, BRI-U4

	Option 1
Secondary Slot 2	T1 or PRI

Valid mixed trunking configuration

	Option 1	Option 2
Primary Slot 1	T1 or PRI	BRI-ST, BRI-U2, BRI-U4
Secondary Slot 2	Analog	Analog

Invalid mixed trunking configuration

	Option 1	Option 2
Primary Slot 1	Analog	Analog
Secondary Slot 2	T1 or PRI	BRI-ST, BRI-U2, BRI-U4

Invalid configurations will raise an alarm. In these invalid configurations, digital links are likely to suffer errors, slips, etc.

DataMod

DataMod allows you to configure the settings used by the Norstar Integrated Data Module 200 with the ICS.

Type

Installer password required

The display shows the type of data module selected: **IDM200**.

Fixed Access

Installer password required

Assign the line or lines to be used by each interface of the IDM 200. To assign lines to the interfaces:

1. At `Show Intrface:`, enter the number of the interface to which you wish to assign lines.
2. At the `Show line:` assign the line numbers corresponding to the T1 Fixed lines for that interface.
3. At `Linexxx:Assigned`, press [Show]. The display shows `Linexxx: Channel yy`.
4. Record each Channel number associated with the interface in the *Programming Record*. Each line corresponds to a channel which appears on the IDM 200.
5. Repeat these steps for each interface.

Tip - *Only Fixed lines can be assigned to the IDM 200. Entering the software keys allows you to change the Trunk type option for T1 lines to Fixed.*

To enable the IDM 200 to interact with the ICS, you must enter Software keys. See Software keys on page 328.

Enable Trunk Cartridges

If you have disabled any Trunk Cartridges to perform programming, enable them now using `Module status` in Maintenance or your system will not function properly. See *Module status on page 366* for information on enabling Trunk Cartridges in Module status.

For more information on the IDM 200 programming, channel mapping and restrictions, see the *Norstar Integrated Data Module 200 Installer Guide*, and the *Programming Record*.

DataMod NVRAM

Installer password required

The Norstar Modular ICS allows for you to reset the NVRAM for the IDM 200 within the ICS programming.

Reset NVRAM now?

The default setting is **No**. If you select Yes, the NVRAM will reset to the factory default setting.

Maintenance

Maintenance overview

A Norstar Maintenance session helps you diagnose problems that may occasionally arise within the Norstar system. Maintenance also includes settings to determine how the system will deal with T1 digital lines, and provides a means for provisioning and testing digital lines.

The Maintenance section of programming has nine headings.

System version	displays the version number of the system processor.
Port/DN status	allows you to check and change the status of ports in your system.
Module status	allows you to check and change the status of modules in your system.
Sys test log	displays a list of test results, event messages, and alarm codes.
Sys admin log	displays a list of system initialization sessions, invalid password attempts and password changes.
Network evt log	displays a list of events and alarms.
Provisioning	allows you to add or remove individual T1 lines, PRI lines, and BRI loops in and out of service.
Tests	allow you to test incoming T1 signals to evaluate transmission quality, the connection between the ICS and telephones, and the connection between a PRI or BRI Card and the network.
CSU stats	displays T1 performance information supplied by the Channel Service Unit.

You can run a Maintenance session from any working Norstar M7310 or M7324 telephone. Only one person at a time can

access a Maintenance session. Photocopy the Maintenance records found in the *Programming Record*, and keep a pencil handy to record important information.

Beginning a Maintenance session

1. Release all calls on your telephone.
2. Press [Feature] [*] [*] [C] [O] [N] [F] [I] [G] which is the same as [Feature] [*] [*] [2] [6] [6] [3] [4] [4]. The display shows `Password:`.
3. Enter the Installer password. The display shows `Terminals:Sets`. Three triangular indicators ▶ appear on the vertical display between the rows of buttons.
4. Place the programming overlay over the buttons pointed to by the indicators ▶.
5. Press [Next] until the display shows `Maintenance`.

System version

System version allows you to note the version number of the System Processor (SP) software, which resides in the Feature Cartridge.

The SP version number can be used to determine whether you have the latest software release, and to trace a software fault if one occurs. For instance:

- SP version number can indicate a Feature Cartridge incompatibility.
- SP and telephone version numbers can indicate a telephone version incompatibility.
- SP and functional terminal version numbers can indicate a functional terminal incompatibility.

Checking the version of the system

To check the version number, start with the display showing `Maintenance`.

1. Press [Show]. The display shows `System version`.
2. Press [Show]. The display shows the version number of the SP.
3. Write the SP version number on the appropriate Maintenance record.
4. Press [Heading]. The display shows `System version`.

Port/DN status

Port/DN status allows you to:

- identify any device or line connected to the system
- check the version number of a device (an analog terminal adapter, for example) for compatibility with the system
- check the state of a device or line (for example, idle or busy)
- disable or enable a device
- determine which port number corresponds to each DN
- determine the port number of a malfunctioning device
- determine if a malfunctioning device is incompatible with the Norstar system
- disable a device before replacing it

Tips - *You cannot disable the Norstar telephone from which you are accessing the Maintenance session. If you try to do this, a message appears on the display and you hear an error tone. If you want to disable that particular telephone, conduct the Maintenance session from another Norstar telephone.*

Pick a suitable time to disable devices

Do not disable devices when many people are using the Norstar system. Wait until after regular office hours.

Do **not** enable or disable ports at the following times:

- during the first two minutes after Startup programming
- before fiber cables are connected

If you do so, incorrect ports may be enabled or disabled. To recover from this, disable then enable the affected modules using Module status.

Port/DN status allows you to check lines and devices on the system. Although the following procedures describe how to check devices, you can use the same procedures to check lines.

Lines can only be disabled in Module status.

Identifying a device connected to the system

Installer password required

Start with the display showing System version.

1. Press [Next]. The display shows Port/DN status.
2. Press [Show]. The display shows Show port:.
3. Enter the port number of the device, or press DN, then enter the directory number of the device. The display shows device information, as illustrated in the following sample device identification display. This identifies the device connected to the B1 channel.
4. If there is an add-on device attached to a Norstar telephone such as a central answering position module or a Busy Lamp Field, press [Show] to display the add-on device.
5. Press >B2 to display the device connected to the B2 channel.
6. Press [Heading] until the display shows Port/DN status.

Displays

Sample device identification display

P104 7324 224 DEVICE >B2 STATE	This sample display indicates that port 104 has an M7324 telephone whose DN is 224. Press DEVICE to see the device attached to the port.

The following table lists some of the device types that may appear on the Norstar device identification display.

Explanation of device type

Display	Explanation
7100	M7100 telephone
7208	M7208 telephone
7310	M7310 telephone
7324	M7324 telephone
1: MODULE1	First CAP module attached to an M7324 telephone
2: MODULE2	Second CAP module attached to an M7324 telephone
ATA	Analog Terminal Adapter or Analog Station Module
BLF	Busy Lamp Field

Checking the version number of the device

Installer password required

From the Norstar device identification display:

1. Press VERSN (if it is available). The display shows the version number of the device.
2. Write this number on the appropriate Maintenance record.

   To return to the Norstar device identification display from the display showing the version number:

Press OK to retain the same port number.
OR
Press Next to see information about the next port number (or DN if that is how you entered).
OR
Press Back to see information about the previous port number (or DN if that is how you entered).

Checking the state of the device

Installer password required

From the Norstar device identification display.

1. Press STATE. The display shows one of the states listed in the table on the following page.
   If you want, you can disable or enable the device (see Disabling a device on page 364 or Examples of display messages on page 364).
2. Press OK to return to the device identification display.

How the device state is shown on the display

Display	State of device
Busy DISABLE OK	The device is in use.
Disabling... OK	The device is being disabled.
Enabling... OK	The device is being enabled.
Idle DISABLE OK	The device is not in use.
Unequipped DISABLE OK	There is no device connected to that port.
Disabled by user ENABLE OK	The device has been disabled by someone running a Maintenance session.
Disabled by sys. ENABLE OK	The device has been disabled by the system because it is faulty or because a test is running.

Display	State of device
Not available DISABLE OK	There is no state available.

Disabling a device

Installer password required

Give notice that you are disabling equipment.

Make sure you inform people that you are going to disable their devices.

To disable immediately when the display indicates the device is busy:

1. Press DISABLE. The display shows Disable at once?.
2. Press YES. The system prompts the device user and disables the device in one minute (or immediately, if the device is idle). Press EXIT to leave this display without disabling the device.

Displays

The following table show examples of the sequence of messages that might appear on a telephone when you disable a device.

Examples of display messages

Please hang up Maintenance test	Occurs on a busy telephone before disabling
48 seconds until disconnect	
Please hang up	
In Maintenance	Occurs after disabling

Enabling the device

Installer password required

When the display shows you that the device is disabled:

Press ENABLE. The display briefly shows Enabling... The device is immediately enabled and the display shows Idle.

Tips - *The display may briefly show* Enabling... *, then either* Disabled by sys. *or* Disabled by user. *In this case, the system is waiting to enable the module. This may occur after someone has run a Maintenance session and used Module status. You cannot enable the device until its module has been enabled.*

Individual lines cannot be disabled in Port/DN status. *To disable a Trunk Cartridge, see Module status on page 366.*

Returning to the beginning

Installer password required

From the display showing the state of the device:

1. Press OK.
2. Press Heading until the display shows Port/DN status.

Module status

Module status allows you to:

- look at the inventory of Station Modules, Trunk Modules, Norstar Integrated Data Module 200 and modules inside the Integrated Communication System
- check the number of Trunk Cartridges in a module
- check the state of the module or its cartridges
- disable or enable the module or its cartridges
- isolate any malfunctioning modules
- disable a module before replacing it
- clear a hung line by disabling and enabling the affected Trunk Cartridge

Tips - *Modules 1 and 2 are located inside the ICS. Module 1 connects Norstar telephones. Module 2 connects Trunk Cartridges.*

Looking at the module inventory

Installer password required

Start with the display showing `Port/DN status`.

1. Press [Next]. The display shows `Module status`.
2. Press [Show]. The display shows `Show module:`.
3. Enter the module number.

Tips - *Norstar devices may occupy both the B1 and B2 channels. This may increase the number of devices indicated on the module inventory display. The display is different for Analog Station Modules (ASM) and will show either* `8 sets on ASM` *or* `16 sets on ASM`.

Checking the number of Cartridges

Installer password required

Start from the module inventory display, which shows the number of Trunk Cartridges connected to the module you chose (for example, `Mod 04: 3 cards`).

1. Press CARD. If there is a Trunk Cartridge in a slot, the display shows that four lines are connected (for example, `Card 1: 4 lines`).
2. Press Next or Back to check for Trunk Cartridges in the other slots.
3. Press MODULE to return to the module inventory display.

Checking the state of a module

Installer password required

Start from the module inventory display, which shows the number of Trunk Cartridges connected to the module you chose (for example, `Mod 04: 3 cards`).

1. Press STATE. The state of the module is shown on the display.
2. Press OK to return to the module inventory display.

Module or cartridge state is shown on the display

Example display	State of module or cartridge
`3 sets busy` `DISABLE OK`	There are three devices in use that are connected to the module or cartridge.
`2 ports busy` `DISABLE OK`	There are two ports in use that are connected to the module or cartridge.
`4 lines busy` `DISABLE OK`	There are four lines in use that are connected to the module or cartridge.
`Disabling...` `OK`	The module or cartridge is being disabled.
`Enabling...` `OK`	The module or cartridge is being enabled.

Example display	State of module or cartridge
Unequipped DISABLE OK	There is no module or cartridge connected to that DS-30 port.
Disabled by user ENABLE OK	The module or cartridge has been disabled from a Maintenance session.
Disabled by sys. ENABLE OK	The module or cartridge has been disabled by the system because it is faulty or because there is a test running.
Updating state...	The system is verifying the state of the module or cartridge.

Checking the state of a cartridge

Installer password required

Start from the display that shows the number of lines connected to the Trunk Cartridge you chose (for example, Card 1: 4 lines).

1. Press STATE. The display shows the state of the cartridge. Some examples of this display are shown on the previous page.
2. Press Next or Back to check the Trunk Cartridges connected to the other Trunk Modules.
3. If required, you can disable or enable the cartridge. (See Disabling a module or its cartridges on page 369 or Enabling a module or its cartridge on page 369.)
4. Press OK to return to the display showing how many lines are connected to the Trunk Cartridge.

Disabling a module or its cartridges

Installer password required

Use Page feature prior to disabling.

Use the Page feature to inform people that you are about to disable a module. Mention that they may experience delays in the performance of their devices.

From the display showing the state of the module or cartridge:

1. Press DISABLE. The display shows Disable at once?.
2. Press YES. The system disables the module or cartridge in one minute (or immediately, if the status is idle). Press EXIT to leave this display without disabling the module or cartridge.

Enabling a module or its cartridge

Installer password required

From the display showing the state of the module or cartridge:

Press ENABLE. The display briefly shows Enabling... The module or cartridge is immediately enabled. The display then shows the state of the module or cartridge.

Returning to the beginning

Installer password required

From any display showing the state of the module or cartridge:

1. Press OK.
2. Press Heading until the display shows Module status.

System test log

The System test log shows you a list of diagnostic test results, audits, event messages, and alarm codes. By using this feature you can:

- check the items in the log
- check the current alarm (if there is one)
- check when each item in the log occurred
- check the number of consecutive occurrences of an event or an alarm
- erase the log

The System test log holds a maximum of 20 items. You should check and record these items at regular intervals. Erase the log after dealing with all the items.

Checking the items in the log

Installer password required

Start with the display showing `Module status`:

1. Press [Next]. The display shows `Sys test log`.
2. Press [Show]. The display shows `Items in log:`. (If there is no log entry, the display shows `Items in log:0` and returns to `Sys test log`.)
3. Press [Next] or [Back]. The display shows a log item.
4. Write down the item on the System test log record.
5. If the log item is an event message or an alarm code, refer to Alarm codes on page 377 or Event messages on page 385.

6. Repeat steps 3, 4, and 5 until you have recorded all the items.

Checking the current alarm

Installer password required

If you want to quickly check the highest severity alarm before viewing all the log items, start with the display showing `Items in log:`.

1. Press ALARM. The display shows an alarm code if there is a current alarm.

   If there is no current alarm, ALARM does not appear on the display.

2. Press OK to return to the display `Items in log:`.

   All alarms are recorded as items in the System test log.

Checking when each item in the log occurred

Installer password required

Start with any display showing a log item:

1. Press TIME. The display briefly shows the date and time.
2. Write the date and time on the System test log record.

Checking the number of consecutive repetitions of an event or alarm

Installer password required

If REPEAT appears under a display showing a log item:

1. Press REPEAT. The display shows the number of consecutive times the event or alarm occurred.

Erasing the log

Installer password required

Start with the display showing `Items in log:`.

1. Press ERASE. The display shows `Erase log?`.
2. Press YES.

   If no new items have been added since the list was entered, the log is erased and the display shows `Log erased`.

OR

If new items have been added since the list was entered, the display briefly reads `Cancld-new items` and returns to the display `Items in log:`.

3. Press [Heading] to return to `Sys test log`.

System administration log

The System administration log keeps a record of administrative events such as sessions in which a change was made, invalid password attempts, and password changes. By using this feature you can:

- check the items in the log
- erase the log
- check when each item in the log occurred

The System administration log holds a maximum of ten items. Erase the log after dealing with all the items.

Checking the items in the log

Start with the display showing `Sys test log`:

1. Press [Next]. The display shows `Sys admin log`.
2. Press [Show]. The display reads `Items in log:`. (If there is no log entry, the display reads `Items in log:0`.)
3. Press [Next] or [Back]. The display shows a log item.
4. Write down the item on the System administration log record.
5. Repeat steps 3 and 4 until you have recorded all the items.

Checking the current alarm

Start with the display showing `Items in log:`.

1. Press `ALARM`. The display shows an alarm code. If there is no current alarm, `ALARM` does not appear on the display.
2. Press `OK` to return to the display showing `Items in log:`.

Checking when each item in the log occurred

Start with any display showing a log item:

1. Press TIME. The display shows the date and time.
2. Write the date and time on the System administration log record.

Erasing the log

Start with the display showing Items in log:.

1. Press ERASE. The display shows Erase log?.
2. Press YES. If no new items have been added since the list was entered, the display shows Log erased.

   OR

   If new items have been added since the list was entered, the display briefly reads Cancld-new items and returns to the display Items in log:.

3. If the display shows Log has changed, press SHOW to show the new log.

   OR

   Press EXIT to return to Sys admin log.

Network evt log

The Network evt log keeps a record of events and alarms that are specific to the T1 network interface. You can:

- check the items in the log
- erase the log
- check when each item in the log occurred

The Network evt log holds a maximum of twenty items. Erase the log after dealing with all the items.

Checking the items in the log

Start with the display showing `Sys admin log`:

1. Press [Next]. The display shows `Network evt log`.
2. Press [Show]. The display shows `Items in log:`. (If there is no log entry, the display reads `Items in log:0`.)
3. Press [Next] or [Back]. The display shows a log item.
4. Write down the item on the Network event log record.
5. Repeat steps 3 and 4 until you have recorded all the items.

Checking the current alarm

Start with the display showing `Items in log:`.

1. Press `ALARM`. The display shows an alarm code if there is a current alarm.

   If there is no current alarm, `ALARM` does not appear on the display.

2. Press `OK` to return to the display `Items in log:`.

Erasing the log

Start with the display showing `Items in log:`.

1. Press ERASE. The display shows `Erase log?`.
2. Press YES. If no new items have been added since the list was entered, The display shows `Log erased`.

   OR

   If new items have been added since the list was entered, the display briefly reads `Cancld-new items` and returns to the display `Items in log:`.

3. Press [Heading] to return to `Network evt log`.

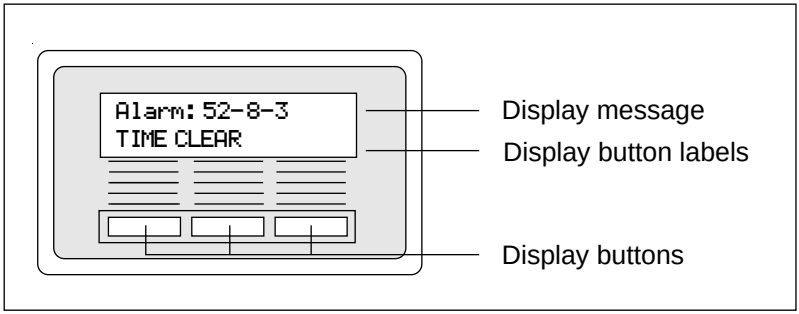
Checking when each item in the log occurred

Start with any display showing a log item:

1. Press TIME. The display shows the date and time.
2. Write down the date and time on the Network event log record.

Alarm codes

The Norstar ICS system generates alarm codes after system disconnections or after certain anomalies in system operation. All alarm codes appear at the Alarm telephone and in the System test log of a Maintenance session. For a complete description of alarm and event codes, you may order an *Alarm and Event Code Manual* from your service provider. The following figure shows an alarm code appearing on a Norstar Alarm telephone display.



Tips - *The Alarm telephone is assigned in* `Featr settings` *of system programming.*

Alarms have a higher severity than events. Attend to alarm codes before event messages.

Alarm code information that is specific to Companion components is included in the MICS-XC Norstar-Companion Installer Guide.

If you see an alarm code

1. Write the alarm code on the Sys test log record.
2. Determine the cause of the alarm from the following table.
3. Follow Alarm troubleshooting on page 380.
4. Press `TIME` to see when the alarm occurred.

5. Press CLEAR to clear the alarm.

An alarm code may not be displayed until two minutes after it has been triggered. If the ICS is powered off when the alarm is triggered, the alarm code is not displayed until two minutes after the ICS is powered on.

For a complete list of Norstar alarms, consult the *Norstar Alarm & Event Code Manual*.

Displays

Example display	Meaning	Possible causes
Alarm: 10	All ICS devices disconnected.	The last device on Norstar bus 1 (port numbers 101-124) has been removed. A 25-pair cable was disconnected from the ICS. There is an internal ICS fault.
Alarm: 37-ABBCDD	An error has occurred in the download of a protocol to a BRI Card. A: the maintenance index of the BRI BB: a code describing the nature of the error C: the current download state DD (appears when the error is limited to one protocol): the two-character product identifier of the protocol	The BRI Card is not properly installed.

Example display	Meaning	Possible causes
Alarm: 40 Alarm: 41 Alarm: 42 Alarm: 43 Alarm: 44 Alarm: 45 Alarm: 46 Alarm: 47	There is a problem with the T1 signal	The cable connecting the DTI to the network termination point or external CSU has been disconnected. There is a problem with the T1 signal from the network.
Alarm: 50-X	All devices on SM disconnected.	The last device on Norstar bus X (port numbers X01-X16) has been removed. The 25-pair cable was disconnected from the SM. The fiber cable from the SM to the ICS has been disconnected. The SM was powered down.
Alarm: 51-X	Trunk Module disconnected.	All Trunk Cartridges have been disconnected from the TM on DS-30 port X. The TM was powered down. The fiber cable from the TM to the ICS has been disconnected.
Alarm: 52-X-Y	TC disconnected from TM	Trunk Cartridge Y on DS-30 port X has been disconnected from the TM.
Alarm: 61-X-Y	Incompatible Trunk Cartridge	Trunk Cartridge Y on DS-30 port X cannot operate with the Trunk type assigned to it in Configuration.
Alarm: 62-X-Y	Unsupported Auto-answer setting (Loop Start TCs)	Trunk Cartridge X on DS-30 port Y does not support the auto-answer setting.

Example display	Meaning	Possible causes
Alarm: 63-Z	No available DTMF receivers	DTMF receivers are busy, not working properly, or have not been installed.
Alarm: 68-Z	A device has been connected to a port which is not available for the device type.	Power down the system and disconnect the device from the port identified. Reconnect it to a valid port.
Alarm: 76-X	Data Module disconnected.	The Data Module has been disconnected from the DM on DS-30 port X. The DM was powered down. The fiber cable from the DM to the ICS has been disconnected.

"X" = DS-30 port numbers, "Y" = Trunk Cartridge number (numbered from left to right) and "Z" = Trunk port number

Alarm troubleshooting

Refer to the previous table before following these procedures.

Alarm: 10

1. Check to see if there is a device connected to the ICS (that has a port number beginning with the number "1").
2. If there are no devices connected to the ICS, connect one and then press CLEAR.
3. If there are any devices connected to the ICS, check all the wiring associated with the devices.
4. Refer to Problems with BRI service on page 437.

Alarm: 37

1. Check that the BRI Card is properly installed.
2. Remove and re-install the BRI Card.

3. If the alarm persists, replace the BRI Card with another BRI Card of the same type.

Alarm: 40 to Alarm: 47

1. Check the System Network evt log for events in the range 315-336 to verify the frequency of the alarms.
2. Refer to Digital Trunk Interface trouble on page 434.

Alarm: 50-X

1. Check that there is a device connected to the Station Module (that has a port number beginning with a number from three to eight).
2. If there are no devices connected to the Station Module, connect one and then press CLEAR.
3. If there are any devices connected to the Station Module, check all the wiring associated with the devices.
4. Refer to Data Module down on page 442.

Alarm: 51-X

1. Check the wiring from the ICS to the TM.
2. Refer to Problems with trunk cartridges service on page 433.

Alarm: 52-X-Y

1. Follow the procedure in Problems with trunk cartridges service on page 433.
2. If the problem persists, replace Trunk Cartridge Y on DS-30 port X. (Refer to the previous table for the definition of “X” and “Y”).

Alarm: 61-X-Y

1. Check that the proper Trunk Cartridges are inserted in the proper slots of the ICS or Trunk Module.
2. Enter programming and look under the Trk/Line data heading. Check that the Trunk Cartridge type is correctly

configured. Check that the Trunk mode and Answer mode settings do not conflict for every line connected to Trunk Cartridge Y. If Trunk mode is set to unsupervised, Answer mode must be set to manual.

OR

Install a Trunk Cartridge in slot Y that matches the type of trunk you have configured.

Alarm: 62-X-Y

1. Check that the proper Trunk Cartridges are inserted in the proper slots of the Trunk Module.
2. Enter programming and look under the `Trk/Line data` heading. Check that the Trunk mode and Answer mode settings do not conflict for every line connected to Trunk Cartridge Y. If Trunk mode is set to unsupervised, Answer mode must be set to manual.

Alarm: 63-Z

1. Check that you have the required E&M Trunk Cartridges (maximum of one for every two auto-answer loop start lines installed in a Trunk Module).
2. Enter programming and look under the `Trk/Line data` heading. Check that the Answer mode is correct for all the loop start lines.
3. Make sure that all of your E&M trunks installed in a Trunk Module are configured as E&M or DTMF (whichever applies) so that the system knows the receivers are there.
4. If the problem persists, an E&M Trunk Cartridge may be malfunctioning. Replace one E&M Trunk Cartridge at a time until the problem is resolved.

Alarm 68-Z

1. Locate the device(s) that has/have been connected to port(s) not available for that device type.

2. Power down the system.
3. Disconnect the device from the port identified.
4. Reconnect it to a valid port.

Alarm 75

1. Check the connection to your ISDN service provider.

Alarm: 76-X

1. Check the wiring from the ICS to the DM.
2. Refer to Problems with trunk cartridges service on page 433.
3. Refer to Data Module down on page 442.

Event messages

Event messages appear as items in the System administration log or the System test log of the Maintenance session. Most of these event messages can only be caused by an unusual combination of events, and should rarely occur.

Each event is assigned a severity number. An “S” preceding this number, “S4” for example, may appear in the event message. “S8” is the most severe. If the log is full, new event messages with a higher severity number replace existing event messages of a lower severity. For this reason, you should check event messages at regular intervals. You can then deal with all messages before they are replaced.

Event message information that is specific to Companion components is included in the *MICS-XC Norstar-Companion Installer Guide*.

Dealing with event messages

For every event message that you see:

1. Record the event on the appropriate Maintenance record.
2. Refer to Significant event messages.
3. To see if the event caused the Norstar system to automatically restart, consult the table on Event Message on page 390.

Significant event messages

The following table lists event messages that are relevant to Maintenance activities. The time that the message is recorded is also provided.

Displays

Event message		The event message is recorded when…
Evt:210-YYYZ	S4	Loopback test YYY on Trunk Cartridge Z has been started
Evt:211-YYYZ	S4	Loopback test YYY on Trunk Cartridge Z has been stopped
Evt:220-3546	S4	the Sys admin log has been cleared by the DN (3546 in this case)
Evt:221-3546	S4	the Sys test log has been cleared by the DN (3546 in this case)
Evt:222-3546	S5	the DN (3546 in this case) enters the debugging facility that is password protected
Evt:255	S9	administered mode is not supported by the cartridge plugged into the slot
Evt:260-0302	S8	the ICS takes the access line on port 0302 out of service because no current was detected
Evt:261-0302	S1	the access line on port 0302 is returned to service after current was detected (see Evt:260)
Evt:263-302	S8	the ICS takes the E&M line on port 302 out of service because the far end did not respond to a disconnect signal
Evt:264-302	S1	the E&M line on port 302 is returned to service after the far end finally responded to a disconnect signal (see Evt:263)
Evt:265-302	S7	the E&M line on port 302 did not receive an expected wink signal or delay dial signal from the far end
Evt:267	S9	a data module has been disconnected
Evt:268-07	S8	Dialing filter 07 has lost data due to a fault in the system memory
Evt:269-3546	S8	the Line/set filter for the DN (3546 in this case) has lost data due to a fault in the system memory
Evt:299	S1	the system powers up after a power failure
Evt:373	S5	the ICS restart diagnostic tool has been activated

Event message		The event message is recorded when…
Evt:400	S9	Startup programming is performed using Feature * * S T A R T U P
Evt:407	S2	there are no more codes for Speed Dial numbers
Evt:408	S2	there is no more memory for Speed Dial codes
Evt:412-3546	S5	the Installer password has been changed by the DN (3546 in this case)
Evt:413-3546	S3	the System Coordinator password has been changed by the DN (3546 in this case)
Evt:414-3546	S5	an invalid Installer password has been entered by the DN (3546 in this case)
Evt:415-3546	S3	an invalid customer password has been entered by the DN (3546 in this case)
Evt:416-3546	S4	programming is performed using Feature * * C O N F I G
Evt:417-3546	S2	programming is performed using Feature * * A D M I N
Evt:418	S7	a DN change is successful
Evt:419	S2	the time setting has been changed
Evt:421	S8	a DN change failed
Evt:422-3546	S6	a length change by the DN (3546 in this case) has been requested
Evt:423-3546	S6	an individual DN change has been requested by the DN (3546 in this case)
Evt:441	S2	a timeout occurred while waiting for ANI or DNIS digits to be received
Evt:442	S5	a timeout occurred while waiting for ANI or DNIS digits to be received
Evt:458	S4	Call-by-Call NVRAM data is corrupt

Event message	The event message is recorded when…
Evt:459 S9	DN length has been changed to less than 3 digits
Evt:687 S4	the data driver has received a bad call reference
Evt:688 S4	the data driver has received a bad data event
Evt:689 S4	the data driver could not allocate a new index
Evt:690 S4	no response to the ICS within 10 seconds of being sent an initialization message
Evt:691 S4	no response to the ICS within 3 seconds
Evt:692 S4	a bad parameter value has been received in a stimulus message from the data device
Evt:693 S3	old data to be discarded has been detected
Evt:694 S4	RADAR flow control has received a bad stimulus message from an off-core application
Evt:695 S4	attached set denied request for a B-channel
Evt:696 S2	corrupt CLID length
Evt:697 S2	an asynchronous data report generated by ethernet module
Evt:698 S8	incorrect software key entered
EVT799-00040BS7	a call processing error on the fourth BRI loop; see Event message 799 on page 388.
Evt:822 S8	Alarm code 63 is sent because there are no DTMF receivers for an incoming call
Evt:883 S4	an invalid dial pulse signal was received by the DTI
Evt:992 S6	auto attendant error

Event message 799

Event message 799 indicates a call processing error has occurred on an ISDN line. The event number is followed by a

number representing the line or loop number, and a code for the type of error.

`EVT799-XXXX YY57` In this example, the error has occurred on line XXX and the error code is YY.

Error code	Meaning
01	Internal software error. Cannot acquire the B-channel from the B-channel arbitrator.
02	Internal software error. There is no free line available for the call.
03	A call that is not on the B-channel has been attempted. These kind of calls are part of EKTS service, which is not supported by this version of the software. Check with your service provider to make sure your package does not include EKTS service.
04	Internal software error. Failed to instantiate on the chain.
05	Internal software error. Activation procedure failed.
06	Internal software error. Index conversion failed.
07	Unexpected digits on a Manual answer mode line. Configuration of the ICS and the network connection may not match.
08	Internal software error. Cannot seize central office (CO) line on a BRI connection.
09	Cannot get vterm (virtual terminal) from the Vterm Server.
0A	Central office did not respond to the SPID initialization request.
0B	Central office has rejected the SPID. Verify your SPID information programmed under Hardware and with your ISDN service provider.
0C	Internal software error. Already instantiated on the chain.

Displays

You should rarely see any event messages that are not described in the Significant event messages on page 385. If you do see one of these event messages, the Norstar system has followed its normal recovery from an unusual combination of system events. Although the problem is not a serious one, repeated occurrences of the event number should be reported as soon as possible.

As a result of some events, the Norstar system automatically restarts itself. The table on the next two pages lists all the event numbers and tells you which of these events are associated with Norstar system restarts.

Most of these events are recorded in the Sys test log. The few exceptions to this are recorded in the Sys admin log, as indicated.

Event Message	System Restart	Event Message	System Restart
101-106	Yes	400 (Admin log)	Yes
107	No	401-403	No
108-112	Yes	405-411	No
113	No	412-419 (Admin log)	No
114-116	Yes	421-423 (Admin log)	No
117	No	424-425	No
118-120	Yes	426-430	Yes
121-123	No	431	No
124-125	Yes	432	Yes
126-129	No	433	No
130	Yes	441-442	No
131-132	No	458-459	No

Event Message	System Restart	Event Message	System Restart
133-134	Yes	600-602	Yes
135-136	No	603-613	No
137	Yes	614	Yes
138-150	No	615-629	No
151	Yes	630	Yes
152	No	631-646	No
160-164	No	689-698	No
170-173	No	800-802	No
200-211	No	803	Yes
220 (Admin log)	No	804-807	No
221-222	No	808	Yes
223 (Admin log)	Yes	809	No
224	Yes	810	Yes
225-228	No	811-820	No
229 (Admin log)	Yes	823	Yes
230-235	No	824-825	No
245-248	No	883	No
250-256	No	900	No
260-271	No	940-943	No
280-283	No	950-989	No
285-298	Yes		
299	No		
373	Yes		

Provisioning

BRI and T1 lines

Provisioning applies to BRI and T1 loops and lines. It allows you to place loops and lines in or out of service, either before or after the BRI Cards have been installed in the ICS.

When you provision a loop, ISDN terminals on the loop can be used to make outgoing calls or receive incoming calls (S or U-LT loop), or lines are available for use by the devices attached to the system (T, S, or U-NT loop). When you are configuring a T, S, or NT loop, you must also provision each line on the loop to place the lines in service.

Cd1-ICS

Installer password required

The card type will appear with the setting. If no card has been installed, you can change the card type under Hardware.

1. Press [Show] to display the loops found on the card.
2. Press REMOVE to take the loop out of service.
3. If lines on the loop are busy, the display will ask if you still want to remove the loop from service. Press YES to go ahead.

L001

Installer password required

If the loop is configured as a U-NT, T or S loop, press [Show] and [Next] to display the individual lines. There are no lines associated with an S or U-LT loop.

1. Press REMOVE to take the line out of service.
2. If line is busy, the display will ask if you still want to remove it from service. Press YES to go ahead.

Provisioning a T1 line

Installer password required

Start with the display showing Network evt log.

1. Press [Next]. The display shows Provisioning.

2. Press [Show]. The display shows `Show line:`.
3. Enter the number of the line to be provisioned. The display shows the line and its current status.
4. Press `PORT` to identify the logical port number for the line. Lines cannot be provisioned from the `PORT` display. Press `LINE` to return to the line number display.
5. Press [Next] to view settings for the next line number.
6. Press [Heading] until you return to `Provisioning`.

Provisioning a PRI line

ISDN lines are provisioned by default. For information on adding a PRI card see Cards on ICS on page 331.

Deprovisioning a line

Deprovisioning all of the lines on a DTI does not disable the cartridge.

Tests

Norstar allows you to run tests which verify the integrity of the installation wiring for Norstar sets. In addition, you can evaluate the transmission quality of a BRI loop through your service provider using a loopback test and evaluate different aspects and segments of the T1 digital transmission path. You can only run one loopback test at a time on any one DTI.

Choose an appropriate time to run tests.

Do not run the loopback tests while ports are being disabled or during the first two minutes after Startup programming. If you do, the tests may stop running with ports still disabled. To recover from this, unplug the ICS from the power outlet, then plug it in again.

The loopback tests disrupt service. Do not run tests when many people are using the Norstar system.

BERT set test

Installer password required

The bit error rate test (BERT) for Norstar sets may help to detect problems caused by wiring faults such as opens, shorts, bridge taps, split twist, crosstalk, ohmic connections, and imbalance.

You can run the BERT set test to check the quality of the path for voice or data. You can also run a test continuously until an error occurs or you stop the test, if you need more information about errors or the problem is sporadic.

The test can only be run on one telephone at a time. You cannot run a BERT on the telephone that you are using for the Maintenance session. Make sure there is a Norstar telephone connected for the DN you wish to test.

Do not run a BERT on ISDN terminal equipment, or on any other peripheral device.

Starting a BERT set test

Installer password required

Start with the display showing Tests.

1. Press [Show]. The display shows BERT-set tests▶.
2. Press [Show] again. The display shows Show set:.
3. Enter the DN for the telephone you wish to test. The display briefly shows Checking state... and then shows Disable at once?
4. Press YES. The display briefly shows Disabled by user and then shows Test:Voice path.
5. Press [Next] if you want to run the test on the Data path.
6. Press START to begin the test. The display shows the test name followed by running. When the test is finished, the display shows the test name followed by PASS or FAIL.
7. Press TEST, then repeat step 7 if you wish to test the telephone again.

   OR

   Press DONE to return to Show set:. The telephone just tested is automatically re-enabled.

Cancelling a BERT set test

Press CANCL. The display shows Test cancelled and returns to
Show set:. The telephone just tested is automatically re-enabled.

Starting and stopping a continuous bit error rate test

Start with the display showing Tests.

1. Press [Show]. The display shows BERT-set tests▶.
2. Press [Show] again. The display shows Show set:.
3. Enter the DN for the telephone you wish to test. The display briefly shows Checking state... and then shows Disable at once?
4. Press YES. The display briefly shows Disabled by user and then shows Test:Voice path.
5. Press [Next] twice. The display shows Test:Continuous.
6. Press START to begin the test. The display shows the bit error rate, updating every two seconds.
7. Press STOP to end the test. The display shows the last bit error rate.
8. Press TEST, then repeat steps 7 and 8 if you wish to continue testing.

   OR

   Press DONE to return to Show set:. The telephone just tested is automatically re-enabled.

How the bit error rate test status is shown on the display

Event message	The event message is recorded when…
BERT denied	You have entered the DN for the telephone you are using to run the Maintenance session, or the ATA.
BERT:Out of sync TEST DONE	The data, voice, or continuous test has stopped due to being out of sync. Either the error rate is very high, or the telephone at that DN has been removed.

Event message	The event message is recorded when…
BERT-running:223 STOP	A bit error rate test is already running on the telephone at DN 223.
BERT: Try later	The resource in the ICS is busy with another feature.
Connect device	There is no telephone connected for that DN.
Continuous:FAIL TEST DONE	The continuous test has stopped because the bit error rate is more than 1 in 10^3 for a 2-second interval during the test.
Data path:FAIL TEST DONE	The data path test is complete and there is more than 1 error in 10^7 transmitted bits.
Data path:PASS TEST DONE	The data path test is complete and there is no more than 1 error in 10^7 transmitted bits.
Voice path:FAIL TEST DONE	The voice path test is complete and there is more than 1 error in 10^5 transmitted bits.
Voice path:PASS TEST DONE	The voice path test is complete and there is no more than 1 error in 10^5 transmitted bits.
23:<1E-10 STOP	The bit error rate for the telephone at DN 23 is less than 1 in 10^{10}.
23:10E-05 STOP	The bit error rate for the telephone at DN 23 is 1 in 10^5.

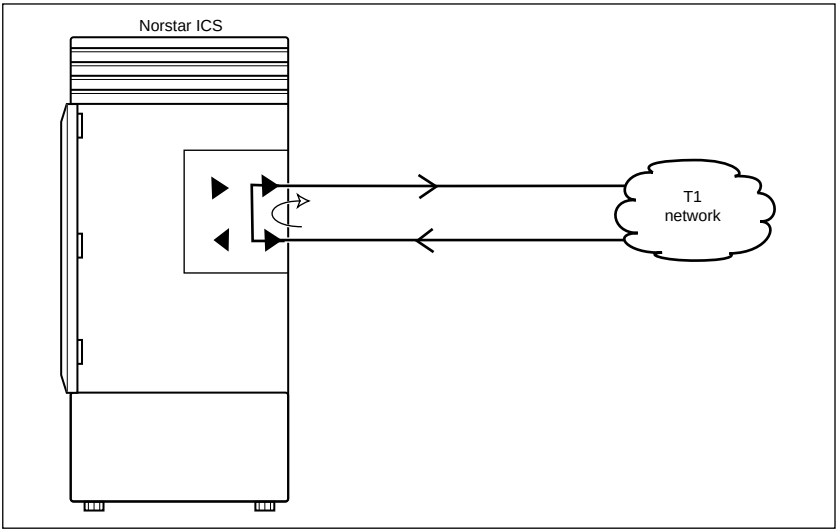
Loopback tests for T1 or ISDN-PRI lines

Installer password required

The following messages may appear on the Alarm Telephone during Loopback tests.

Message	Explanation
EVT: 210-YYYZ	Loopback test YYY on Trunk Cartridge Z has started
EVT: 211-YYYZ	Loopback test YYY on Trunk Cartridge Z has ended

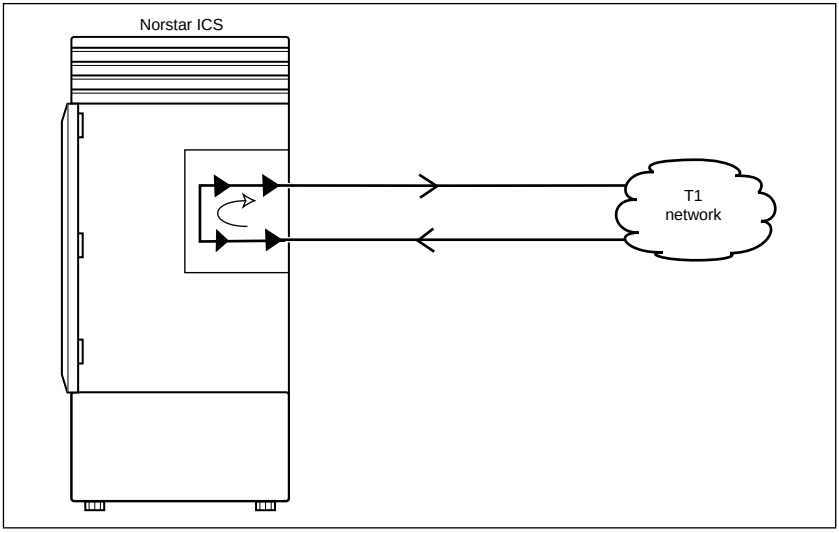
Line loopback



The line loopback test loops the full 1.544 Mbps signal received from the network back to the network. The looped signal is regenerated without any change in the framing format and without the removal of any bipolar violations. The line loopback test can also be invoked and stopped remotely using the in-band signal or via the facility data link (FDL) in extended super frame (ESF) format.

The line loopback test must be run in coordination with the T1 or PRI service provider. Some test patterns can cause the DTI to reset. To avoid this, start the line loopback test from your system before the T1 or PRI service provider begins their test, and stop the line loopback test from your system after the T1 or PRI service provider ends their test.

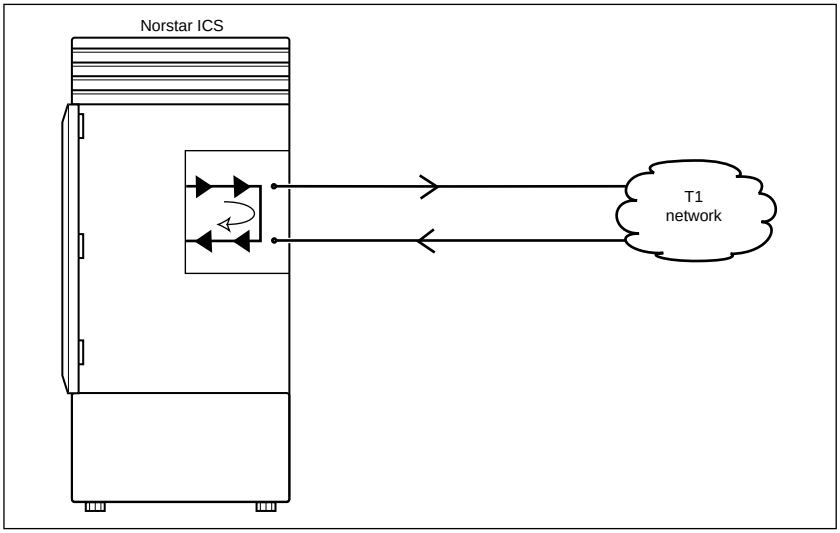
Payload loopback



The payload loopback test loops the received information bits (192 per frame) back to the network. The payload loopback test can also be invoked and stopped remotely via the facility data link (FDL) in extended super frame (ESF) format.

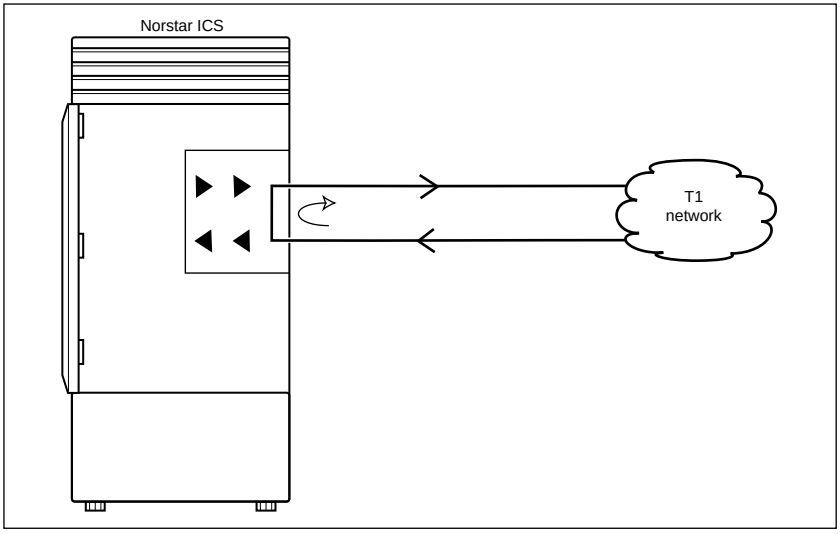
The payload loopback test must be run in coordination with the T1 service provider. Some test patterns can cause the DTI to reset. To avoid this, start the payload loopback test from your system before the T1 service provider begins their test, and stop the payload loopback test from your system after the T1 service provider ends their test.

Card edge loopback



The card edge loopback test loops the outgoing signal on the DTI back to its internal received signal path. Signal paths to the external network are disconnected.

Continuity loopback



The continuity loopback test shorts the tip and ring pair of the receive signal path with the transmit signal path. This test allows you to check the metallic continuity of the external wiring.

Tests initiated from Norstar

Loopback tests, except for the continuity test, are started and stopped in Maintenance programming under the heading `Loopback tests`. The continuity test is started and stopped using a button on the DTI faceplate.

Only one test at a time can be run on a trunk cartridge. You can exit Maintenance, or move on to another programming task while the loopback test is running. While the loopback test is running, the green “in Service” LED on the DTI flashes.

Tests initiated by the central office

If the internal CSU is administered on line loopback and payload loopback tests can also be invoked and stopped by the central office. In order to be able to run a payload loopback test, the DTI must be configured for extended superframe format.

Starting a line, payload or card edge loopback test

Installer password required

Give notice that you are running a loopback test.

Calls on all T1 or PRI lines on the DTI will be automatically dropped when a loopback test is invoked. Use the Page feature to notify people using the system that a test is about to begin and that calls will be disconnected.

Start with the display showing `BERT-set tests`.

1. Press [Show]. The display shows `Loopback tests:`.

2. Press [Show]. The display shows `Show Module:`.
3. Enter a module number.
4. Press [Show]. The display shows `Cards on KSU`.
   If you want to test cartridges on another module, press [Next] until the display shows the module you want to test.
5. Press [Show]. The display shows `Cd1-KSU`.
   If you want to test the second cartridge on the KSU, press [Next]. The display shows `Cd2-KSU`.
6. Press [Show]. If there is an analog cartridge in the slot or the slot is empty, the display shows `Need digital crd`.
7. Press [Next] until the display shows the test you want to run. Options are line loopback, payload loopback or card edge loopback.
8. Press [Show] to select the test.
9. Press `START` to begin the test. The display shows the test name followed by `running`.
10. Press `STOP` to end the test.

Starting or stopping a continuity loopback test

Installer password required

You start the continuity loopback test by pressing the button on the front of the DTI. Calls on all lines on the cartridge are automatically dropped when a loopback test is invoked.

Give notice that you are running a loopback test.

Calls on all T1 or PRI lines on the DTI will be automatically dropped when a loopback test is invoked. Use the Page feature to notify people using the system that a test is about to begin and that calls will be disconnected.

- The red LED light above the button remains on until the test is canceled.
- Invoking a Continuity loopback test automatically cancels any other test in progress.
- To stop the continuity loopback test, press the button on the DTI. The red LED light above the button turns off when the test is canceled.

Loopback test for BRI lines

Installer password required

The loopback test for BRI lines loops the incoming BRI payload back to the local exchange (service provider) for evaluation of the transmission quality. Loopback tests should be conducted only under the guidance of the service provider, and the results from these tests are returned to the service provider.

You can run loopback payload tests simultaneously on multiple loops or multiple cards. The loop must be provisioned to perform the test. All calls on the card you are testing will be dropped at the start of a loop payload test.

Starting and stopping a payload loopback test

Installer password required

All calls on a BRI loop are dropped when you start loopback test.

While the loopback test is in progress, the BRI lines go out of service. There is no warning from the system. Pick an appropriate time to do a test and warn users that they will lose any calls in progress.

Start with the display showing `BERT-set tests`.

1. Press [Next]. The display shows `Loopback tests:`.

2. Press [Show]. The display shows `Show Module:`.
3. Enter a module number or press LIST to scroll through modules.
4. The display shows `Cards on KSU` or `Card on Mod X`.
   If you want to test cartridges on another module, press [Next] until the display shows the module you want to test.
5. Press [Show]. The display shows `Cd1-KSU` or `Cd1-ModX`.

   If you want to test the second cartridge on the KSU, press [Next]. The display shows `Cd2-KSU` or `Cd1-ModX`.
6. Press [Show]. If there is an analog cartridge in the slot or the slot is empty, the display shows `Need digital crd`. If there is a BRI cartridge with U-NT or S/T loops, the display shows `Loop nnn`.
7. Press [Show]. The display shows `Payload loopback`.
8. Press START to begin the test. The display shows `Payload running`.

   You can exit programming or move on to other programming tasks while the test is running, or begin a test on another loop.
9. Press STOP to end the test.

CSU stats

Each DTI is equipped with an internal channel service unit (CSU). When enabled, the internal CSU monitors the quality of the received T1 signal and provides performance statistics and diagnostic information.

DTIs must be individually programmed to establish parameters for collecting and measuring transmission performance statistics by the CSU.

Statistics

Installer password required

The CSU provides both performance and alarm statistics. Three performance parameters are accumulated:

- errored seconds (ES-P)
- severely errored seconds (SES-P)
- unavailable seconds (UAS-P)

These parameters are defined as per TIA-547A. Errored seconds are enhanced to include control slip (CS) events.

The parameters are stored for the previous 15 minute interval, the 15 minute intervals in the last 24 hours, and the previous 24 hour interval. Only near-end performance data is recorded.

The internal CSU continuously monitors the received signal and detects four types of transmission defects:

- any active carrier failure alarms (CFA) (loss of signal LOS, out of frame OOF, alarm indication signal AIS, remote alarm indication RAI)
- the number of bipolar violations that occurred in the last minute

- any defects (loss of signal LOS, out of frame OOF, alarm indication signal AIS) that occurred in the last minute
- the number of milliseconds of short term alarms (loss of signal LOS, out of frame OOF, alarm indication signal AIS, remote alarm indication RAI) in the last minute. A short term alarm is declared when the detected defects persist for tens of milliseconds.

A carrier failure alarm (CFA) is a duration of carrier system outage. CFA types reported can be mapped to CFAs defined in TIA-547A and TR62411 as follows:

Norstar	TIA-547A	TR62411
LOS CFA	Red CFA	Red CFA
OOF CFA	Red CFA	Red CFA
AIS CFA	Red CFA	AIS CFA
RAI CFA	Yellow CFA	Yellow CFA

The criteria for declaring and clearing the alarms is selectable to meet those in TIA-547A or TR64211.

Checking the performance statistics

Installer password required

To check the performance statistics, start with the display showing `CSU stats`:

1. Press [Show]. The display shows `Show card:`. (If the ICS in not equipped with DTIs, or if both cartridges have their internal CSU setting programmed to off, the display shows `Unequipped`.)
2. Press [1] or [2] depending on which Trunk Cartridge you are checking. The display shows `Error free:` followed by the percentage of error free seconds in the current 15 minute interval.

3. Press [Next]. The display shows the date and time that the system began collecting statistics.
4. Press [Next]. The display shows `Performnce stats`.
5. Press [Show] to view the performance stats. The display shows `Current interval`.
6. Press [Show] to display the duration of the current interval.

   OR

   Press [Next] until the display shows the type of interval statistics you want to check. Options are:

   - `15 min intervals` for intervals in the last 24 hours, numbered from the most recent (01) to the oldest (96). Press [Show], then enter an interval number, or press [Next] to view the most recent interval. The display shows the start time of the interval.
   - `24 hour summary` for an overall summary of the previous 24 hours. Press [Show] to display the number of intervals in the summary.
7. Press [Next]. The display shows `ES:` followed by the number of errored seconds.
8. Press [Next]. The display shows `SES:` followed by the number of severely errored seconds.
9. Press [Next]. The display shows `UAS:` followed by the number of unavailable time seconds.
10. Press [Heading] until the display shows `Performnce stats`.

Checking the CSU alarms

Installer password required

To check the CSU alarms, start with the display showing `Performnce stats`.

1. Press [Next]. The display shows `Alarm stats`.

2. Press [Show]. The display shows either `No active alarms` if there are no alarms, or `Active alarms` if alarms are present.

Checking active alarms

Installer password required

Start with the display showing `Active alarms`.

1. Press [Show]. The display shows the first active alarm.
2. Press [Next] or [Back] to cycle through the complete list of active alarms.
3. Press [Heading] to return to `Active alarms`.

Checking carrier failure alarms

Installer password required

Start with the display showing `No active alarms` or `Active alarms`.

1. Press [Next]. The display shows `CFA alarms`.
2. Press [Show]. The display shows `LOS CFA history`, `OOF CFA history`, `RAI CFA history` or `AIS CFA history`.
3. Press [Next] until the display shows the type of alarms you wish to view.
4. Press [Show]. The display shows the first history item and the time that the alarm started.
5. Press [Next] and [Back] to move through the history items.

Checking bipolar violations

Installer password required

Start with the display showing `No active alarms` or `Active alarms`.

1. Press [Next] until the display shows `Bipolar violat'n`.
2. Press [Show]. The display shows the number of bipolar violations that occurred in the last minute.

Checking short term alarms

Installer password required

Start with the display showing `No active alarms` or `Active alarms`.

1. Press [Next] until the display shows `ShortTerm alarms`.
2. Press [Show]. The display shows the first type of short term alarm and the number of milliseconds (not necessarily contiguous) it was active in the last minute.
3. Press [Next] and [Back] to move through the short term alarms.

Checking Defects

Installer password required

Start with the display showing `No active alarms` or `Active alarms`.

1. Press [Show] until the display shows `Defects`.
2. Press [Show]. The display shows the first type of defect and the number of milliseconds (not necessarily contiguous) the hardware reported it active in the last minute.
3. Press [Next] and [Back] to move through the defects.

Resetting all statistics

Installer password required

Start with the display showing `Alarm stats`:

1. Press [Next]. The display shows `Reset all stats?`.
2. Press `YES` to erase all the current statistics and begin collecting statistics again.

Usage metrics

Hunt groups

Installer password required

This feature gives you statistical information on hunt group calls. When you get a software key for sequential and rotary modes, this feature is enabled.

From Usage Metrics, start with the display showing Hunt groups.

1. Press [Show] the display shows Show group:
2. Enter the group number. The display shows Hg1 metrics.
3. Press [Show] the display shows the date the information was last cleared.
4. Press [Next] the display shows TotalCalls:

   The displayed value is the total number of calls received by the hunt group, up to a maximum value of 99999.

5. Press [Next] the display shows Ans:

   The displayed values are the number of calls that were answered up to a maximum value of 99999 and the percentage of answer calls versus total calls up to a maximum value of 999.

6. Press [Next] the display shows Avg ans: . sec.

   The displayed value is the average time in seconds that it took to answer a call, up to a maximum value of 999.

7. Press [Next] the display shows Abndn:

   The displayed values are the number of calls that were abandoned up to a maximum value of 99999 and the percentage of abandoned calls versus total calls up to a maximum value of 999.

8. Press Next the display shows Busy:

   The displayed values show the number of times the hunt group was busy up to a maximum value of 99999 and the percentage of busy call versus total calls up to a maximum value of 999.

9. Press Next the display shows Ovrfl:

   The displayed values show the number of calls that were sent to the overflow position up to a maximum value of 99999 and the percentage of overflow calls versus total calls up to a maximum value of 999.

10. Press Next the display shows Avg Q:_ sec

    The displayed value is the average time in seconds the call waited in the queue, up to a maximum value of 999.

Troubleshooting

These troubleshooting procedures allow you to solve many problems in the Norstar system. Follow these procedures before replacing any components.

Only qualified persons should service the system.

The installation and service of this unit is to be performed only by service personnel having appropriate training and experience necessary to be aware of hazards to which they are exposed in performing a task and of measures to minimize the danger to themselves or other persons.

Electrical shock hazards from the telecommunication network and AC mains are possible with this equipment. To minimize risk to service personnel and users, the ICS must be connected to an outlet with a third-wire ground. In addition, all unused slots should have filler faceplates installed and the doors should be in place at the completion of any servicing.

Service personnel must be alert to the possibility of high leakage currents becoming available on metal system surfaces during power line fault events near network lines. A risk point on the ICS is the power cord earth ground pin. These leakage currents normally safely flow to Protective Earth ground via the power cord. Therefore, it is mandatory that connection to an grounded outlet is performed first and removed last when cabling to the unit. Specifically, operations requiring the unit to be powered down must have the network connections (central office lines) removed first.

Where more than one procedure is given, the procedures represent different options from which you should select just one.

Troubleshooting procedures for Companion components are included in the *MICS-XC Norstar-Companion Installer Guide*.

Getting ready

Before you begin troubleshooting, gather all the information that is relevant to your network configuration:

- the *MICS Programming Record*
- records from people who use the network
- information about other hardware and non-Norstar features within the public or private network

Notify service provider of T1 or PRI signaling disruption.

Notify your T1 or PRI service provider before disconnecting your T1 or PRI lines, removing power to your system, or performing any other action that disrupts your T1 or PRI signaling. Failure to notify your T1 or PRI service provider may result in a loss of T1or PRI service.

Tips - *Remember that you can check many of the system parameters without having to go into a programming session.*

*Use Line Profile (Feature * * L I N E) from an M7310 or M7324 telephone, to check programming for any line.*

*Use Set Profile (Feature * * S E T) from an M7310 or M7324 telephone, to check programming for any telephone.*

*Use Button Inquiry (Feature * 0) to check the buttons on a particular telephone.*

Types of problems

The problems you encounter will likely fall into one of the following categories:

Misunderstanding of a feature

A problem may be reported because a Norstar user is unfamiliar with the operation of a given feature. You may be able to solve the problem simply by demonstrating how to use the feature correctly.

Programming errors

You may encounter problems caused by errors in programming. A feature may have been programmed incorrectly or may not have been programmed at all.

Wiring connections

Wiring problems are caused by loose, unconnected, or incorrect wiring. Use the procedures in the section on Checking the hardware as a guide.

Equipment defects

You may encounter problems caused by Norstar equipment defects. See the appropriate section for problems related to the system hardware.

General troubleshooting procedure

1. Diagnose the trouble by determining:
   - the types of problems users have experienced
   - the frequency of the problems
   - how many telephones are affected
2. Check how a feature is being used. A problem may have been reported because of a misunderstanding about how a feature works. Confirm that the person who reported a

problem understands the intended use and operation of any feature in question.

3. Check for programming errors. Check that the programming recorded in the *Norstar-PLUS MICS Programming Record* is correct for the intended operation of the system, and verify that the programming has been correctly entered.

4. Run a Station set test ([Feature] [8] [0] [5]). Instructions are included in the *System Coordinator Guide*.

5. Check the wiring and hardware connections.

6. If the problem persists, run a Maintenance session as described in Beginning a Maintenance session on page 358.

7. If hardware is defective, replace it. If the trouble requires expert advice, follow your company's procedure for obtaining assistance.

Problems with telephones

Norstar telephone has faulty buttons, display, handset or other hardware problems

Run a Station Set Test (Feature 8 0 5). Instructions are included in the *Modular ICS 4.0 System Coordinator Guide*.

Norstar telephone display unreadable

If the trouble is with an M7310 or an M7324 telephone

1. Press Feature * 7.
2. Press UP or DOWN to adjust the display to the desired level.
3. Press OK.

Tip - *The number of contrast settings varies with the model of telephone.*

If the trouble is with an M7100 or M7208 telephone

1. Press Feature * 7.
2. Press a number on the dial pad to adjust the display to the desired level.
3. Press Hold.

If the display is still unreadable

1. Go into Maintenance in programming and disable the problem telephone.
2. Replace the problem telephone with a known working one.
3. Enable the working telephone.

Norstar telephone dead

1. Run a Station Set Test (Feature 8 0 5). Instructions are included in the *Modular ICS 4.0 System Coordinator Guide*.
2. If more than one telephone is affected, refer to Data Module down on page 442.
3. Check for dial tone.
4. Check the display.
5. If the problem persists, replace the telephone with a known working Norstar telephone of the same type (so that the programming is retained).
6. Check the internal wiring at both the modular jack and the distribution cross-connect. A TCM port should have between 15 and 26 V DC across the Tip and Ring when the telephone is disconnected.
7. Run a bit error rate test (BERT). Instructions begin on page 396.
8. Check the line cord.

Running a Maintenance session to test a dead telephone

1. Run a Maintenance session to ensure that the telephone is not disabled. See Port/DN status on page 360.
2. Disable the port that the telephone is connected to using the heading `Port/DN status`.
3. Enable the port that the telephone is connected to using the heading `Port/DN status`.

Replacing a telephone

In a powered-up system, an existing Norstar telephone can be replaced by a new Norstar telephone. A new Norstar telephone is one that was not previously in service within the system.

Replacing Norstar telephones of the same type

If an existing Norstar telephone is unplugged, and a new Norstar telephone of the same type is then plugged into the same jack (for example, replacing an M7208 telephone with another M7208 telephone), the new telephone acquires the programming and the internal number of the old telephone. This is normally done to replace a defective telephone.

Replacing Norstar telephones of different types

If an existing Norstar telephone is unplugged, and a new Norstar telephone of a different type is plugged into the same jack (for example, replacing an M7208 telephone with an M7310 telephone), the new telephone keeps the old internal number. The new telephone receives a default profile for a telephone of its type. Refer to the *System Coordinator Guide*.

If the telephone being replaced has more lines than the new telephone, automatic outgoing line selection may not work with the Handsfree/Mute feature. A line must be selected manually.

Status of a telephone that was replaced

The old Norstar telephone that was unplugged and replaced by a new Norstar telephone loses its programming and internal number. The old telephone's internal number has been given to the new telephone and the programming has either been removed or given to the new telephone when it was plugged into the old jack. The replaced telephone (if still functional) is now treated by the system as a telephone not previously in service.

Emergency telephone dead

1. Verify that the power at the ICS or Trunk Module is not lit.
2. Verify that there is no dial tone at the emergency telephone.
3. Check that the external line and emergency telephone connections have been made correctly.
4. Ensure that the emergency telephone is not faulty by connecting it directly to the external line and listening for dial tone.
5. Verify that the ICS has a Loop Start Trunk Cartridge installed in slot 4. Verify that the Trunk Module has a Loop Start Trunk Cartridge installed in the left-most slot.
6. Verify that there is dial tone on lines 002 (ET1 on CD1) and 026 (ET2 on CD2) of the ICS and on the first line of each Trunk Module.
7. Replace the ICS if the emergency telephone is connected to the ICS or replace the Trunk Module if the emergency telephone is connected to the Trunk Module.

Problems with lines

The troubleshooting problems listed here focus on trouble with making calls or using lines. For problems which are specific to BRI lines, see See “Problems with BRI service” on page 437.

Calls cannot be made (but can be received)

1. Press [Feature] [*] [0].
2. Press a line button.
3. If an incorrect line number or name appears (or if neither appears) on the Norstar telephone display, check the programming settings.

   OR

   If the correct line number or name appears on the Norstar telephone display, make sure the external lines are properly cross-connected.

4. Check external lines by attaching a test telephone directly on the distribution block.
5. Ensure that the 25-pair cable is properly connected to the modules or the ICS.
6. Run a Maintenance session and verify that the module that the Trunk Cartridge is installed in is not disabled or unequipped using the heading `Module status`.
7. Run a Maintenance session and disable the appropriate ports using the heading `Port/DN status`. For charts showing external line port number defaults, refer to Wiring charts on page 148.
8. Enable the appropriate ports using the heading `Port/DN status`.

9. If you still cannot make external calls, power down, then power up the system. This should be done after business hours to avoid losing calls.

10. To check the line, contact the telephone company.

Notify service provider of T1 signaling disruption.

Notify your T1 service provider before disconnecting your T1 lines, removing power to your system, or performing any other action that disrupts your T1 signaling. Failure to notify your T1 service provider may result in a loss of T1 service.

Dial tone absent on external lines

1. Use Button Inquiry (Feature * 0) to display the number of the external line you are testing.

2. Check for dial tone using a test telephone at the connections for the external line on the distribution block.

3. Make sure that a Trunk Cartridge for the line is properly installed in the ICS or Trunk Module.

4. Make sure that the Trunk Module fiber cable is properly connected to the Expansion Cartridge on the ICS.

5. Refer to Problems with trunk cartridges service on page 433 and Trunk or Station Module down on page 441.

6. Run a Maintenance session to ensure that the line is not disabled. See Port/DN status on page 360.

Hung lines at a telephone

Line indicators that have been solid for a long time are the only visible indication that lines are hung.

Possible problem

A line that has been redirected using Line Redirection may, under some circumstances, remain busy after a call is over. If this happens, the outgoing line for the redirection also remains busy. You can clear this kind of hung line only at the telephone that was used to redirect the line.

Solution

1. Enter the Button Inquiry feature code (Feature * 0) at the telephone that was used to redirect the line.
2. Press the button of the redirected line.
3. Press SHOW or # .
4. Press DROP or * .

Both the redirected line and the outgoing line for the redirection should now be cleared.

Possible problem

The supervision and/or Discon timer programming for the line do not match the settings for the line at the central office.

Solution

Verify that your programming for the line matches the central office settings.

Possible problem

Lines are still hung after all the above solutions have been investigated or tried out.

Solution

For lines that are hung for any other reason, you will have to run a Maintenance session.

1. Run a Maintenance session and go to the heading `Module status`.

2. Disable and enable the affected Trunk Cartridge.

Follow the procedures in the General troubleshooting procedure on page 415 before proceeding.

Auto-answer line rings at a Norstar telephone

Possible problem

You configured a loop start trunk as auto-answer but the installed hardware does not support disconnect supervision. (In this case, the symptom would be accompanied by the Alarm 62 code symptom.)

Solution

Reconfigure the trunk as manual-answer.
OR
Replace the Trunk Cartridge with one that provides disconnect supervision.

Possible problem

The line is configured as auto-answer and unsupervised.

Solution

Reconfigure the line as manual-answer.
OR
Reconfigure the line as supervised.

Possible problem

The line is not equipped for disconnect supervision at the central office.

Solution

Reconfigure the trunk as manual-answer.

Possible problem

The Discon timer setting for the Trunk Cartridge in `Trk/ Line data` does not match the setting for the line at the central office.

Solution

Reconfigure the Discon timer to match the setting at the central office.

Prime telephone gets misdialed calls

Possible problem

The digits sent by a switch at a central office or in the private network did not match any Received number, the Auto DN, or the DISA DN. The call has been routed to the prime telephone for the incoming trunk.

Solution

1. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
2. Verify all the digit strings that the switch should be sending.
3. Check that you have defined the corresponding Received number for every target line in your system.
4. Make sure that the published telephone numbers for your network are correct.

Selected lines reads “Not in service” or “Not available”

Possible problem

You have configured a line number associated with an E&M Trunk Cartridge DTMF receiver to appear at the telephone.

Solution

Reconfigure the line so that it does not appear at any telephone and configure another line to replace it at the telephone.

OR

Reconfigure the line as a different type and install trunk hardware to support the new type of line.

Possible problem

The Norstar system has taken an E&M line out of service because the far end did not respond to a disconnect signal from the Norstar system. The symptom would be accompanied by event code 263 in the System test log.

Solution

1. Check with the operators of the system at the far end and find out if their system is operating.
2. Check that your system hardware is receiving signals properly.
3. Check the trunk between your system and the far end system for a break.
4. Check that your trunk is properly configured.
5. Run a Maintenance session and go to the heading `Module status`.
6. Disable and enable the affected Trunk Cartridge.

Possible problem

The Norstar system has detected no response on an E&M line from the system at the far end. The symptom will be accompanied by Event code 265 in the System test log.

Solution

Check with the operators of the system at the far end and get them to troubleshoot their system.

Possible problem

The line is connected to a DTI which is currently not in service.

Solution

1. Check if the green LED on the DTI is flashing to indicate that service is suspended.
2. Check if any yellow LEDs are on to indicate an alarm or error condition.
3. Check if the red test LED is on to indicate that a continuity loopback test is running.
4. Check that the cable connecting the DTI to the termination point from the central office or network is properly connected.
5. Check that the DTI is properly inserted in the ICS.
6. Run a Maintenance session to verify the status of the DTI.

Possible problem

The line has been disabled for maintenance purposes.

Solution

Enable the line.

OR

If the line will be out of service for some time, configure another line to replace it on the telephone.

Possible problem

The loop or line has not been provisioned.

Solution

Provision the loop or line.

Selected line pool shows “No free lines”

Possible problem

If this happens often, there are not enough lines in the line pool to serve the number of line pool users.

Solution

If the line pool contains loop start trunks, enter programming and move under-used loop start trunks from other line pools into the deficient line pool.

OR

If the line pool contains E&M trunks, order more trunks from the telephone company or private network vendor. Install additional Trunk Cartridges of the appropriate type. In programming, add the new trunks to the deficient line pool.

Problems with optional equipment

Integrated Data Module 200

For information on troubleshooting the IDM 200, see Data Module down on page 442 and the *Norstar Integrated Data Module 200 Installer Guide*.

Analog Terminal Adapter

1. Check the connections to the jack.
2. Check the connections to the ATA.
3. Disconnect the ATA and replace it with a working Norstar telephone. If the telephone still works properly, the ICS and/or the SM are operating properly.
4. Verify that the programming has been done as described in the *MICS Programming Record* and the *Norstar Analog Terminal Adapter Installation Card.*
5. If the trouble seems to be in the ICS or SM, double-check all wiring and programming options. If this does not help, refer to Problems with BRI service on page 437 or Data Module down on page 442

   OR

   If the trouble seems to be with the ATA, disable the ATA and replace it with a known working one.

Running a Maintenance session to test an ATA

1. Run a Maintenance session to ensure that the ATA is not disabled. See Port/DN status on page 360.
2. Disable the port connected to the ATA using the heading `Port/DN status`.
3. Enable the port connected to the ATA using the heading `Port/DN status`.

Auxiliary ringer

1. If the auxiliary ringer is used for Schedules (Night, Evening, or Lunch service), ensure that Schedules is activated from the control telephone.
2. Check the wiring between the auxiliary ringer generator and the ringing device. Refer to the auxiliary ringer wiring chart.
3. Check the wiring between the auxiliary ringer generator and the distribution block:

Auxiliary ringer wiring

Feature	Pin
Auxiliary ring (Make)	44 (Yellow-Brown)
Auxiliary ring (Common)	19 (Brown-Yellow)

4. Ensure that the auxiliary ringer contacts are operating properly by checking with an ohmmeter across the auxiliary ringer pin contacts listed above.
5. Check that the auxiliary ringer pin contacts are programmed to operate in conjunction with any or all of the features in the auxiliary ringer programming chart.

Auxiliary ringer programming

Feature	Programmed in
Auxiliary ringer	Terminals&Sets
Auxiliary ringer	Lines
Schedules	Services

The current capacity of the Norstar relay contacts is 50 mA DC. They are designed to operate with the auxiliary ringer generator, or equivalent.

External paging

1. Use the Button Inquiry feature (Feature * 0) to verify the feature of a programmable memory button.
2. Check the wiring between the 50-pin connector and the paging amplifier or between the connections shown in the external paging wiring chart.

External paging wiring

Feature	Pin
Page out (Tip)	40 (Black-Slate)
Page out (Ring)	15 (Slate-Black)
Page (Make)	41 (Yellow-Blue)
Page (Common)	16 (Blue-Yellow)

3. Test external paging Feature 6 2 to ensure that it is working. The nominal output signal from the Norstar ICS is 100 mV across 600 Ω.

Music on Hold / Background Music trouble

Although Music on Hold and Background Music are separate features, they share the same wiring and customer-supplied music source.

1. Ensure that the proper feature access code (Feature 8 6) is turned on. Adjust the volume using the volume control bar.
2. Use the Button Inquiry feature (Feature * 0) to verify the feature on a programmable memory button.
3. If there is trouble with Music on Hold or Background Music, check `Featr settings` in System prgming.
4. Check the wiring between the music source and the 50-pin connector. See Wiring charts on page 148.

5. Ensure that the music source is turned on, is operational, and the volume control is set properly.
6. Any music source with a low-output impedance (for example, less than 3,300 ohms) can be connected. The output level must be less than one volt.

Problems with trunk cartridges service

Check first for user problems, then wiring and programming errors before replacing Norstar equipment.

Notify service provider of T1 or PRI signaling disruption.

Notify your T1 or PRI service provider before disconnecting your T1 or PRI lines, removing power to your system, or performing any other action that disrupts your T1 or PRI signaling. Failure to notify your T1 or PRI service provider may result in a loss of T1 or PRI service.

1. Check that the cartridge is properly inserted in the ICS or Trunk Module.
2. Run a Maintenance session to ensure that the cartridge is not disabled.

If the problem persists

If the Trunk Cartridge is installed in the ICS and the AC power is present and the LED indicator on the ICS is off, replace the ICS.

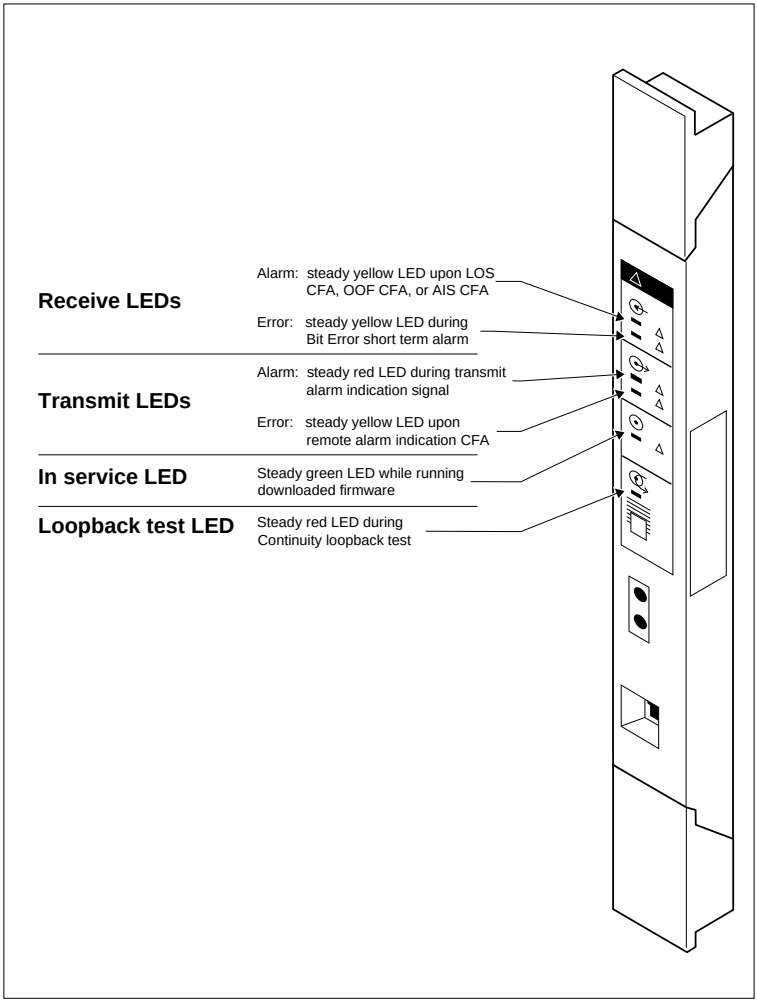
If the Trunk Cartridge is installed in a Trunk Module:

1. If AC power is present and the LED indicator on the Trunk Module is off, replace the Trunk Module.
2. Replace the fiber cable.
3. Replace the Trunk Cartridge.
4. Replace the Expansion Cartridge.
5. Replace the ICS.

Refer to Installation on page 117 for information on replacing components.

Digital Trunk Interface trouble

1. Run a Maintenance session to verify that the Trunk Cartridge is enabled and that it's lines are provisioned.
2. Check the LEDs on the front of the DTI:



- **Receive Alarm**: yellow LED on indicates a problem with the digital transmission being received. This half-duplex link is unusable.
- **Receive Error**: yellow LED indicates a minor error as a result of degraded digital transmission. Possible causes are an ohmic connection, water ingress, or too long a loop.
- **Transmit Alarm**: red LED on indicates an inability to transmit. Alarm indication signal (AIS) is being transmitted to the terminating switch. This half-duplex link in unusable.
- **Transmit Error**: yellow LED on indicates a remote alarm indication (RAI) carrier failure alarm (CFA) is being sent to the terminating switch. If the Transmit Alarm is not on, this indicates a far-end or cable problem.
- **In service**: flashing green indicates that the T1 or PRI trunks are out of service because of a running loopback test, or because the DTI is being initialized.
- **Loopback test**: red LED on while a continuity loopback test is running.
- **All LEDs flashing continuously**: the DTI is being initialized.

3. Run a Maintenance session and any loopback tests as appropriate.
4. Check the pinout of the cable that connects the DTI to the termination point from the T1 or PRI service provider or the external channel service unit, and check that the cable is properly connected.
5. Check with your T1 or PRI service provider to see if through-fed repeaters are used on the T1 or PRI span. The DTI does not provide the DC connection required for through-fed repeaters. If through-fed repeaters are used on

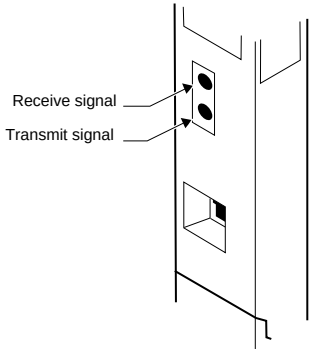
the T1 span, disable the internal CSU and connect the DTI to an external CSU.

6. If the problem persists, replace the DTI.

> ***Notify service provider of T1 or PRI signaling disruption.***
>
> Notify your T1 or PRI service provider before disconnecting your T1 or PRI lines, removing power to your system, or performing any other action that disrupts your T1 or PRI signaling. Failure to notify your T1 or PRI service provider may result in a loss of T1 or PRI service.

Monitoring the T1 or PRI signal

If you are finding minimal faults with the T1 or PRI signal, you can monitor the signal to try and isolate the problem. The monitor jack on the DTI faceplate provides non-intrusive, bridged in-service monitoring of the T1 or PRI signal. Connect a protocol analyzer or other test equipment into the monitor jack to monitor the signal received from the network, and the signal transmitted by Norstar.



Problems with BRI service

Each LED on front of a BRI-ST or BRI-U Card corresponds with a loop, or indicates an overall state of the BRI connections.

BRI Card indicators

LED status	S, T or U-NT loop	S or U-LT loop
on	normal operation	
off	no synchronization with ISDN network	no synchronization with TE
all flashing	Card is not recognized by ICS (not configured in Hardware as a valid BRI loop). See “All the LEDs on a BRI Card are flashing” on page 438.	
bottom LED only flashing	ICS is downloading firmware to the card; card is new or has changed location, or Feature Cartridge has been upgraded	

The BRI card is connected to the ISDN network (U loop) but the LED for one of more loops is not lit

Possible problem

The physical connection or configuration for the network connection is not correct (no Layer 1).

Solution

1. Verify the wiring from the network to the distribution block.
2. Verify the wiring from the distribution block to the ICS.
3. Use a Meridian 2500 set to test for data on the BRI trunk.
4. Test the network connection by connecting Bellcore standard terminal equipment (TE) directly to the network.
5. Verify that the loop is provisioned.

6. Verify that the loop is properly configured, including the proper loop type, SPIDs, and Network DNs.
7. Disable and re-enable the BRI Card.
8. Disable and enable the module for the Card.

"Out of service" is displayed when a BRI is selected (LED for loop is lit)

Possible problem

The loop is configured incorrectly. Layer 1 is present but Layers 2 and 3 are not working.

Solution

1. Verify that the SPIDs and Network DNs are programmed correctly in Hardware.
2. Verify that the loop and lines are provisioned.

All the LEDs on a BRI Card are flashing

Possible problem

The card is not configured properly.

Solution

Verify that the loop is properly configured, including the proper loop type, SPIDs, and Network DNs.

Possible problem

The card is not recognized by the ICS.

Solution

1. Verify that an Expansion Cartridge with Clocking, or Clocking Cartridge is installed in the ICS.
2. Replace the card with another card of the same type.

Caller hears one ring and then a fast busy signal when placing a call on a BRI line

Possible problem

CACH or EKTS, which are not supported by Modular ICS, is included in the ISDN services package.

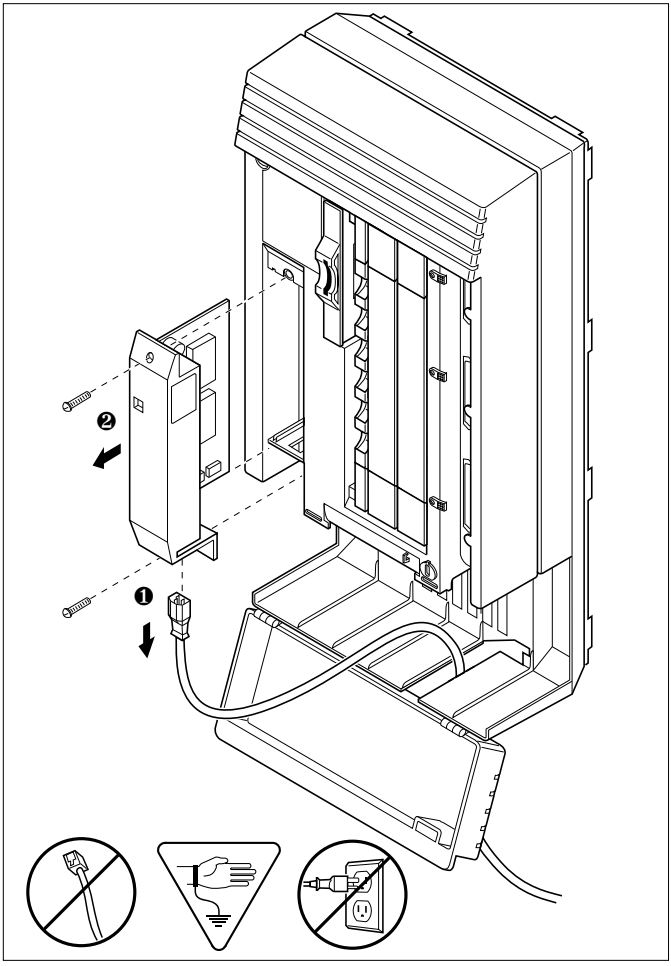
Solution

1. Contact your service provider and ensure that CACH or EKTS are not part of the ISDN services package. These services must be turned off at the switch.
2. Verify that the Network DNs have been programmed correctly, and verify the numbers with your service provider.

ICS down

1. If AC power is present and the LED indicator on the ICS is off, replace the ICS power supply.
2. Disconnect all central office and station lines from the ICS. Power down the ICS by unplugging it.

Replacing the ICS power supply



Trunk or Station Module down

1. Run a Maintenance session to ensure that the Trunk Module is not disabled. See Module status on page 366.
2. Disable the module using the Maintenance heading `Module status`.
3. Enable the module using the Maintenance heading `Module status`.
4. For Trunk Module

   Check the external line by terminating a single-line telephone directly on the distribution block, or equivalent, which connects to the Trunk Module.

5. For Station Module

   If the Station Module is still down, power down, then power up the ICS.

If the problem persists

1. If AC power is present and the LED indicator on the Trunk Module is off, replace the Trunk Module.
2. Replace the fiber cable.
3. Replace the Trunk Cartridge.
4. Replace the Expansion Cartridge.
5. Replace the ICS.

Refer to Installation on page 117 for information on replacing components.

Data Module down

1. Run a Maintenance session to ensure that the module is not disabled. See Module status on page 366.
2. Disable the Data Module using the heading `Module status`.
3. Enable the Data Module using the heading `Module status`.
4. If the Data Module is still down, power down, then power up the ICS and the Data Module.

If the problem persists

1. If AC power is present and the LED indicator on the Data Module is off, replace the Data Module.
2. Replace the Fiber cable.

For more information on troubleshooting the IDM 200, see the *Norstar Integrated Data Module 200 Installer Guide*.

Problems for network or remote users

Remote feature code gets no response

Possible problem

A Norstar user has called into another Norstar system and is trying to activate a remote feature but gets no response after dialing the feature code.

Solution

1. Make sure that the remote caller is dialing the feature code correctly. Use the asterisk (*) character, followed by the feature code, to activate a remote feature. (Do not use [Feature] for accessing features on a remote Norstar system.)
2. Make sure that the remote user is dialing tones, not pulses once the call is answered.

Dialed number gets ringback and the wrong person

Possible problem

The digits sent by a switch at a central office or in the private network did not match any Received number, the Auto DN, or the DISA DN. The call has been routed to the prime telephone for the incoming trunk.

Solution

1. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
2. Verify all the digit strings that the switch should be sending.
3. Check that you have defined the corresponding Received number for every target line in your system.

4. Make sure that the published telephone numbers for your network are correct.

Dialed number gets stuttered dial tone instead of ringback

Possible problem

The remote caller has tried to reach a Norstar target line, but has reached a trunk with DISA instead. Alternatively, the Norstar system has mapped incoming digits onto the DISA DN.

Solution

1. Verify all the digit strings that the switch should be sending.
2. Check that you have defined a corresponding Received number for every target line in your system.
3. Check that you have defined the correct DISA DN for your system.
4. Make sure that the published telephone numbers for your network are correct.

Dialed number gets dial tone instead of ringback

Possible problem

The remote caller has tried to reach a Norstar target line, but has reached the Norstar system instead. Norstar has mapped the incoming digits onto the Auto DN.

Solution

1. Verify all the digit strings that the switch should be sending.
2. Check that you have defined the corresponding Received number for every target line in your system.
3. Check that you have defined the correct Auto DN for your system.

4. Make sure that the published telephone numbers for your network are correct.

Dialed number gets busy tone

Possible problem

The target line that the incoming digits map onto is busy, and there is no prime telephone for the incoming trunk.

Solution

For maximum call coverage, make sure that you configure a prime telephone for every incoming trunk.

Dialed number does not get through

Possible problem

The digits sent by a switch at a central office or in the private network did not match any Received number, the Auto DN, or the DISA DN. There is also no prime telephone assigned for the incoming trunk. In this case, the caller may hear overflow tone from the Norstar system or a recorded message from the originating switch.

Solution

1. Configure a prime telephone for every incoming trunk.
2. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
3. Verify all the digit strings that the switch should be sending.
4. Check that you have defined a Received number for every target line in your system.
5. Make sure that the published telephone numbers for your network are correct.

Possible problem

The Norstar system did not receive some or all of the incoming digits.

Solution

1. Check that the system hardware is receiving signals properly.
2. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
3. If the switch at the far end is sending pulse signals, make sure they are being sent at the proper rate. (Pulse digits must be 300 ms or more apart for Norstar to receive them.)

Possible problem

If remote callers are having difficulty getting through from the public network, there may be a problem with your DID Trunk Cartridge.

Solution

1. Connect a single-line DTMF telephone to a DID trunk input on the DID Trunk Cartridge.
2. Use the single-line telephone to enter a Received number that has been programmed for a target line in your system. Listen for ringback.
3. If you do not hear ringback, check that the target line is assigned to a telephone and that there is a prime telephone assigned for the DID trunk.
4. If you now hear ringback, but you also hear the noise of your unanswered call ringing, check the cross-connections. If all the cross-connections are correct replace the Trunk Cartridge.

Possible problem

If remote callers are having difficulty getting through from the private network, there may be a problem with your E&M/ DISA Trunk Cartridge.

Solution

1. Check the cross-connections for the E&M/DISA Trunk Cartridge.
2. If the E&M trunks are connected to another Norstar system, make sure that connections have been made as indicated in Installation on page 117.
3. Use the following table to check for correct voltage on the E&M/DISA leads:

Voltages on E&M leads

Leads	Voltage: active	Voltage: inactive
$V_{T\text{-}R}$	125 mV AC on steady dial tone	0 V AC
$V_{T1\text{-}R1}$	125 mV AC on steady dial tone	0 V AC
$V_{E\text{-}SG}$	0 V DC to -5 V DC	-48 V DC
$V_{M\text{-}SB}$	0 V DC to + 2 V DC	-48 V DC

Dialed DISA number gets ringback instead of stuttered dial tone

Possible problem

The remote caller has dialed a DISA number, but has instead reached a target line, or has been routed to the prime telephone for the auto-answer trunk. The Norstar system has mapped the incoming digits from a switch onto a target line, or has been unable to map the digits anywhere.

Solution

1. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.

2. Verify all the digit strings that the switch should be sending.
3. Check that you have defined the correct DISA DN for your system.
4. Make sure that the published telephone numbers for your network are correct.

Dialed DISA number gets dial tone instead of stuttered dial tone

Possible problem

The remote caller has dialed a DISA number, but has reached the Norstar system instead. The Norstar system has mapped the incoming digits from a switch onto the Auto DN.

Solution

1. Verify that the switch is sending the correct number of digits for the Received number length defined in your system.
2. Verify all the digit strings that the switch should be sending.
3. Check that you have defined the correct DISA DN for your system.
4. Make sure that the DISA DN and Auto DN are different enough to prevent misdialing.
5. Make sure that the published telephone numbers for your network are correct.

DISA user gets overflow tone when entering COS password

Possible problem

The remote caller may have entered an invalid password.

Solution

Check programming under COS passwords and verify that the caller has a valid password.

Possible problem

The remote caller may have entered an asterisk (*) as one of the 6 digits.

Solution

Instruct remote callers to enter their COS password correctly: enter 6 digits.

Possible problem

The remote caller may have entered a number sign (#) as one of the 6 digits.

Solution

Instruct remote callers to enter their COS password correctly: enter 6 digits. The number sign (#) may be entered after the 6th digit, but is not required.

Possible problem

The remote caller may have waited more than 15 seconds between entering digits.

Solution

Instruct remote callers to enter their COS password correctly: enter 6 digits, and do not pause too long between digits.

Possible problem

The caller may be dialing from a rotary-dial telephone or from a push-button telephone that uses pulse signaling.

Solution

Inform remote callers that they must dial from a push-button telephone that uses DTMF “tone” signaling.

Dialed feature code gets overflow tone

Possible problem

The remote caller does not have access to that feature.

Solution

1. If the call came in on a trunk with DISA, check the Class of Service that is associated with the remote caller's COS password. If it is too restrictive, modify the remote package assigned to the COS password, or assign another COS password that is more suitable.
2. If the call came in on a trunk without DISA, check the remote package that you assigned to the incoming trunk. Make sure that it gives the appropriate access to the remote caller.

Possible problem

The feature code is not valid.

Solution

1. Make sure that remote callers have a correct listing of the features that are programmed for remote access.
2. Ensure that remote callers are dialing the feature code correctly. Press * followed by the feature code to activate a remote feature.

Possible problem

The caller may be dialing on a rotary-dial telephone or on a push-button telephone that uses pulse signaling.

Solution

Inform remote callers that they must dial from a push-button telephone that uses DTMF “tone” signaling.

Dialed feature code gets busy tone

Possible problem

A resource that the remote feature uses may currently be in use. For example, a remote caller trying to use the paging feature would get a busy tone if the auxiliary speaker were being used at the time.

Solution

If repeated attempts to use the remote feature get busy tone, there may be a malfunction in a resource that the feature uses. Check that the remote feature hardware is functioning normally.

Line pool access code gets overflow tone

Possible problem

If the published line pool access code is valid, the remote caller does not have access to that line pool.

Solution

If the incoming trunk answers with DISA, give the remote caller a COS password that permits access to that line pool.
OR
Change the remote package for the incoming trunk so that it permits access to that line pool.
OR
Give the remote caller a line pool access code that is permitted within the Class of Service on the incoming trunk.

Possible problem

If the published line pool access code is invalid, the system has attempted, without success, to match the invalid code to a Norstar target line internal number, and there is no prime telephone for the auto-answer trunk.

Solution

1. Make sure that the published line pool access codes are correct.
2. Check that the line pool access codes have been entered correctly under `Access codes` in `System prgming`.

Possible problem

The caller may be dialing from the network on a rotary-dial telephone or on a push-button telephone that uses pulse signaling.

Solution

Inform remote callers that they must dial from a push-button telephone that uses DTMF “tone” signaling.

Line pool access code gets ringback

Possible problem

The published line pool access code is invalid, and the system has routed the call to the prime telephone for the incoming trunk.

Solution

1. Make sure that the published line pool access codes are correct.
2. Check that the line pool codes have been entered correctly under `Access codes` in System prgming.

Line pool access code gets busy tone

Possible problem

There are not enough lines in the line pool to serve the number of users.

Solution

If the line pool contains loop start trunks, enter programming and move under-used loop start trunks from other line pools into the deficient line pool.

OR

If the line pool contains E&M trunks, order more trunks from the telephone company or private network vendor. Install additional E&M Trunk Cartridges. In programming, add the new trunks to the deficient line pool.

OR

Create a separate line pool for remote users only.

Possible problem

There are DID lines in the line pool.

Solution

In programming, make sure that there are no DID lines in any of the line pools.

Dialed number gets no response

Possible problem

The remote caller, after accessing a line in a line pool, may have started dialing before the far end was ready to receive digits.

Solution

Instruct remote callers to wait until they hear feedback before entering any digits.

Possible problem

There may be a malfunction in the line that the remote caller accessed.

Solution

If the problem is persistent, check that all lines in the affected line pool are functioning normally.

Possible problem

There may be a malfunction in the system that the caller is trying to reach.

Solution

Inform the operators of the system at the far end that the dialed number is not getting through.

Specifications

Norstar system

Service tone cadences

Tone	Cadence (seconds)
Busy	0.5 on / 0.5 off
Expensive Route	0.3 on / 0.3 off (3 bursts)
Overflow	0.25 on / 0.25 off
Ringback	2.0 on / 4.0 off
Confirmation	1.0 on / 1.0 off (3 bursts followed by no tone)
Recall	1.0 on / 1.0 off (3 bursts followed by steady tone)
Ring splash	0.2 on (1 burst)

Power specifications

Characteristic	ICS	TM	SM
Voltage V ac	110-120	110-120	110-120
Current A rms (max)	2.6	1.75	1.0
Frequency Hz	47-63	45-70	45-70
Crest factor	4.0	4.0	4.0

Telephone loop specifications

Characteristic	Value
Loop resistance	64 Ω (300 m of 0.5 mm wire or 1000 ft. of 24 AWG wire)
Loop length	300 m (1000 ft.) without station auxiliary power supply 790 m (2500 ft.) with station auxiliary power supply
Minimum voltage at telephone	10 V dc
Current at telephone (idle)	45 mA nominal
Current at telephone (active)	80 mA maximum

Electrical requirements

Characteristic	Spec/Value
Electrostatic discharge	
ICS and telephones	IEC 801-2 severity level 3 maximum of 15 kV with a 300 Ω/150 pF probe
Connectors	IEC 801-2 severity level 2
Radiated immunity	maximum of 5 V/m from 100 kHz to 1 GHz
Conducted immunity	maximum of 3 V rms from 0.1 MHz to 30 MHz

Environmental requirements

Characteristic	Spec/Value
Operating temperature range	0°C to 50°C (32°F to 122°F) IEC. 68-2-1 Tests Ad and IEC 68-2-2, Method A
Storage temperature range	-50°C to 70°C (-31°F to 158°F) IEC. 68-2-2 Test Bd
Humidity above 34°C (93°F)	5% to 95% (non-condensing) <52 mbar of water vapor pressure

ISDN network synchronization*

Characteristic	Spec/Value
Free run clock accuracy	±32 ppm
Network synchronized clock accuracy	±5 ppm

* These specifications only apply when the system clock is not derived from a Digital Trunk Interface connection to the network.

Digital Trunk Interface

Network interface

Characteristic	Spec/Value
Physical	RJ48C 8-pin modular jack
Line rate	1.544 +/- 32 Mbps
Framing	Superframe/extended superframe*
Line code	AMI/B8ZS*
Impedance	100 Ω

* These values are set in Hardware programming. See the Hardware on page 331 for details.

DSX1 operation

Characteristic	Value
Pre-equalization	0-210 m (0-700 ft.)*

* This value is set in Hardware programming. See the Hardware on page 331 for details.

CSU operation

Characteristic	Spec/Value
Line build out	0, 7.5 or 15 dB*
Input dynamic range	0 to -26 dB (typical)
Performance reporting	Simultaneous support of TR 54016 or TIA-547A
Line loopback support	Remote activation/deactivation via in-band code or FDL as per TR 54016 or TIA-547A
Payload loopback support	Remote activation/deactivation via FDL as per TR 54016 or TIA-547A
Carrier failure alarms (CFA)	Alarm indication signal (AIS), Red Yellow

* This value is set in Hardware programming. See the Hardware on page 331 for details.

Synchronization performance

Characteristic	Spec/Value
Stratum	4E

Digital trunk signaling support

Types	Options
Loop Start with answer and disconnect supervision	OSI interval* Pulse/DTMF dialing*
E&M	Immediate start (Pulse dialing only), Wink start, Delay start or ring-down tie line* Pulse/DTMF dialing*
DID	Immediate start (Pulse dialing only), Wink start or Delay start* Pulse/DTMF dialing* Ground start

* These values are set in Hardware programming. See the Hardware on page 331 for details.

Local test support

Characteristic	Value
Monitor jack	Bridging via Bantam jack
Line loopback	activate/deactivate via maintenance*
Payload loopback	activate/deactivate via maintenance*
Card edge loopback	activate/deactivate via maintenance*
Continuity loopback	activate/deactivate via push button on faceplate*

* See Tests on page 394 for details on running these tests.

Glossary

A

AbsorbLength: A setting that determines how many of the digits in a destination code will not be dialed by the system. AbsorbLength is assigned under Destination codes in Services.

access code: Different sequences of characters used to gain access to these Norstar features: Line pools, Call park, external lines, Direct-Dial telephone, Auto DN, and DISA DN.

alarm code: A number that appears on the alarm telephone's display, informing you that the ICS has detected a fault in the system.

alarm telephone: A telephone that is designated to receive reports of Norstar system problems. This function is usually assigned to a prime telephone, but this can be changed under Feature settings in System programming.

Analog Terminal Adapter (ATA): A device that permits the connection of analog telecommunication devices such as fax machines, answering machines, and single line telephones to the Norstar system. Programmed defaults for the ATA are automatically assigned by the Norstar system.

ANSI: American National Standards Institute.

Answer button: A telephone button with an indicator that is used to monitor another telephone. The answer button indicates incoming calls destined for the other telephone. Someone working at a telephone with answer buttons (an attendant, for example) can receive all ringing and visual indication of incoming calls for other telephones, and answer those calls when necessary.

One telephone can have up to four Answer buttons. An Answer button is automatically assigned to a telephone when that telephone is assigned an Answer DN.

Answer DN: The internal or directory number (DN) of a telephone that is monitored by an Answer button. You can assign up to four Answer DNs to a telephone under Line Access in Terminals and Sets programming.

Autobumping:
Feature 8 1 5
A feature that determines what the system does with new Call Log items when your Call Log is full. When Autobumping is on, a new log entry causes the oldest entry to be deleted. If Autobumping is off, your Norstar system does not log calls when your log is full.

autodial button: A memory button that, if programmed, provides one-touch dialing of external or internal numbers.

autolog options:
Feature * 8 4
A feature that allows you to select the type of calls that are stored in your Call Log. You can choose to log calls that were not answered by anyone within the system, to log

calls that were unanswered at this telephone but answered elsewhere in the system, to log all calls answered and not answered at this telephone, or to not have calls automatically logged.

Automatic Dial: A feature that allows you to dial without having to pick up the receiver or select a line. You must have a prime line to use Automatic Dial. Automatic Dial is assigned under Dialing options in Terminals and Sets programming.

Automatic Handsfree: A feature which automatically activates Handsfree operation when you make or answer a call. Automatic Handsfree is assigned under Handsfree in Terminals and Sets programming.

Automatic Hold: A feature that automatically places an active call on hold when you select another line.Automatic Hold (Full AutoHold) is assigned in Lines programming.

Automatic Privacy: See Privacy.

Automatic Daylight Savings Time: A feature that switches the system to standard or daylight savings time at pre-programmed times. It is turned on or off under Daylight time in System programming.

Automatic Telephone Relocation: A feature that lets a telephone retain its personal and system programming when it is plugged into a different Norstar modular jack. Automatic Telephone Relocation is enabled under Set relocation in System programming.

auxiliary ringer: A separate external telephone ringer or bell which can be programmed to ring when a line or a telephone rings. An auxiliary ringer may be programmed to ring only when the system is in a particular schedule. Programming of an auxiliary ringer is done in Services programming after the feature has been enabled under Capabilities in Terminals and Sets programming.

AWG: American wire gauge.

B

B channel (Bearer channel) An ISDN standard transmission channel used for voice or data transmission.

Base Station (XC 3.0 only): A Companion component that is mounted on walls and ceilings to provide a radio link to an office or other area where Companion portable telephones are used. Each Base Station houses two radios that allow portables to send and receive calls through the ICS. (See also Companion Wireless)

Background Music: A feature that lets you hear music from the speaker of your Norstar telephone. It is available only if a music source has been attached to the ICS and the feature has been enabled under Feature settings in System programming.

Basic password: A one- to six-digit password that prevents unauthorized access to the most commonly-used telephone settings. The Basic password can be assigned and changed in Passwords programming.

Basic Rate Interface (BRI): A An ISDN interface which uses two B channels and a D channel (2B+D).

Bearer channel: See B channel.

BERT: See bit error rate test.

bit error rate test: A test that checks the transmission of data across the voice and data channels between the ICS and any Norstar telephone.

busy lamp field (BLF): A device with a liquid crystal display (LCD) panel of indicators that shows the status of up to 24 telephones in the Norstar system. The BLF attaches to the M7310 telephone.

button caps: Interchangeable plastic caps that fit over the buttons of Norstar telephones. They are used to indicate the features programmed onto each programmable memory button. Button caps are either pre-printed or have clear windows that allow you to insert labels.

Button Inquiry: [Feature] [*] [0]
With this feature you can check the function of each programmable button on your Norstar telephone.

C

Call Duration timer:
[Feature] [7] [7]
A feature that lets you see how long you spent on your last call or how long you have been on your present call.

Call Forward: [Feature] [4]
A feature that forwards all the calls arriving at your telephone to another telephone in your Norstar system. To have calls forwarded outside the system, use Line Redirection.

Call Forward No Answer: A feature that forwards all calls arriving at your telephone to another designated telephone in your Norstar system after a specific number of rings. Call Forward No Answer is assigned under Capabilities in Terminals and Sets programming.

Call Forward On Busy: A feature that forwards all calls at your telephone to another designated telephone if your telephone is busy. This feature is assigned under Capabilities in Terminals and Sets programming.

Call Forward Override: An automatic system feature that lets you call someone and ask them to stop forwarding their calls to you.

Call Information:
[Feature] [8] [1] [1]
Call Information allows you to display information about incoming calls. For external calls, you can display the caller's name, telephone number and the line name. For an internal call, you can display the name of the caller and their internal number. You can obtain information about ringing, answered, or held calls.

Call Information Trunk Cartridge: The Trunk Cartridge that allows you to connect loop start trunks with Call Information capability to the Norstar system.

Call Line Identifier (CLID): A Norstar set that displays the telephone number of the calling party.

Call Log: Feature 8 1 2
Enter your Call Log to view a record of incoming calls. The log could contain the following information for each call: sequence number in the Call Log, name and number of caller, long distance indication, indication if the call was answered, time and date of the call, number of repeated calls from the same source, and name of the line that the call came in on. See Autobumping, Autolog options, and Call Log for further information.

Call Park: Feature 7 4
With this feature you can place a call on hold so that someone can retrieve it from any other telephone in the Norstar system by selecting an internal line and entering a retrieval code.

The retrieval code appears on the display of your telephone when you park the call. You can park up to twenty-five calls on the system at one time.

Call Park Callback: See Callback.

Call Park prefix: The first digit of the retrieval code of a parked call. This digit cannot conflict with the first digit of any existing DNs, Line Pool access codes, the Direct-dial digit, or the external line access code. The default Call Park prefix digit is “1”. It may be set to none, in which case Call Park is disabled. Call Park prefix is assigned under Access codes in System programming.

Call Pickup Directed:
Feature 7 6
A feature that lets you answer a call ringing at any Norstar telephone by entering the internal number of that telephone before taking the call. Call Pickup Directed is enabled under Feature settings in System programming.

Call Pickup Group: See Pickup Group.

Call Queuing:
Feature 8 0 1
If you have several calls waiting at your telephone, you can invoke the Call Queuing feature to answer them in order of priority. Priority is given to incoming calls, followed by callback and camped calls.

Callback: If you park, camp, or transfer a call to another telephone and it is not answered there, it will ring again at your telephone. How long the system will wait before Callback occurs is set under Feature settings in System programming.

Camp-on: Feature 8 2
A feature that lets you reroute a call to a telephone even if all the lines on that telephone are busy. To answer a camped call, use Call Queuing or select a line if the camped call appears on your telephone. Priority is given to queued calls over camped calls.

Camp timeout: The length of a delay before a camped call is returned to the telephone that camped the call. The length of delay is set under Feature settings in System programming.

Central answering position (CAP): An M7324 telephone that has been designated as a CAP under CAP assignment in System programming. The CAP provides backup answering and can be used to monitor the telephones within a Norstar system.

Central answering position (CAP) module: A module connected to an M7324 telephone and provides 48 additional buttons that can be used as autodial buttons or feature buttons. A maximum of two CAP modules can be connected to a single M7324 telephone.

Channel Service Unit (CSU): A device on the Digital Trunk Interface that is the termination point of the T1 lines from the T1 provider. The CSU collects statistics on the quality of the T1 signal. The CSU ensures network compliance with FCC rules and protects the network from harmful signals or voltages.

Class of Service (COS): The set of Norstar features and lines available to the user for a call. The Class of Service for a call is determined by the restriction filters and remote access packages assigned to the telephone in Lines programming. The Class of Service for a call can be changed by entering a six-digit Class of Service password. (Internal users cannot change their access to features with a COS password, only their restriction filters.) Class of Service and Class of Service passwords are assigned in Passwords programming. See Remote Access.

Class of Service password: [Feature] [6] [8]
A six digit code that lets you switch from your current Class of Service to one that lets you dial numbers prohibited by your current Class of Service.

CLID set: See Call Line Identifier (CLID).

cold start: When all system programming is lost. This can happen because you have entered the Startup feature code ([*] [*] [S] [T] [A] [R] [T] [U] [P]), or after a major event (such as an extended power failure).

Combo Cartridge: A cartridge that allows you to connect Trunk Modules and Station Modules to the ICS to expand the system's capacity for trunks and telephones. Combo Cartridges provide six-port or 12-port expansion and Services functionality with each cartridge. (See also Expansion Cartridge.)

Companion Wireless: The name for Northern Telecom communication systems which use radio technology to transmit and receive signals between its components and the Norstar system. Companion Wireless provides mobility in the workplace. Calls that used to ring just at your Norstar set can also appear and ring at your portable.

Companion portable telephone: Hand-held wireless sets which allow complete mobility within the reach of Companion Base Stations or an external antenna. Portables offer many but not all Norstar features and share much of the same programming as "wired" desk sets.

Conference: [Feature] [3]
A feature allows you to establish a three-person call at your Norstar telephone.

contrast adjustment: [Feature] [*] [7]
Allows you to set the contrast level of your telephone display.

control telephone: A control telephone can place the lines for

which it has responsibility in or out of a Service Mode.

The direct-dial telephone is a control telephone for directing calls to the extra direct-dial telephone. A telephone is made a control telephone and has lines assigned to it in Services programming.

COS: See Class of Service.

CTA 500*dm*: A digital modem for Norstar that allows an ICS using BRI cards to support an end-to-end digital connection. The addition of a CTA 500dm gives you faster access to dial-up computer services such as an Internet Service Provider.

cursor: A short horizontal line that appears on the Norstar telephone display to indicate that characters can be entered using the dial pad.

D

D channel (Data channel): An ISDN standard transmission channel which is packet-switched, and is used for call setup, signalling and data transmission.

Data channel: See D channel.

Data Communications Interface (DCI): A Norstar device that lets you attach an RS-232 data device to the Norstar system.

Data Module: See Integrated Data Module 200.

data terminal: A device such as a modem that can be used to transfer data instead of sound over a telephone network. You cannot use Norstar programming to set up such devices. See the documentation that accompanies the device.

date: See Show Time or Time and Date.

defaults: The settings for all Norstar features when the system is first installed. Settings are changed from their defaults in programming. In this manual, default settings are shown in **bold** text.

Delayed Ring Transfer (DRT) to prime: After a specified number of rings, this feature transfers an unanswered call on an external line, to the prime telephone associated with that line. This feature is activated under Feature settings in System programming.

destination code: A two- to seven-digit number that the system interprets and then translates into the digits that you want dialed out. Both the code and its associated dialed digits are assigned under Routing service in Services programming.

DID trunk: See Direct Inward Dial trunks**.**

DID Trunk Cartridge: The Trunk Cartridge that allows you to connect DID trunks to the Norstar system.

dialing restriction: See Restriction filter.

dialing modes:

[Feature] [*] [8] [2]

This feature allows you to set the dialing mode of your telephone. Norstar supports three dialing modes: Automatic Dial, Pre-Dial, and Standard Dial. All three modes support on-hook dialing (meaning you can dial a call without picking up

the receiver). The special features of the Automatic and Pre-Dial modes are available only when you dial on-hook.

Digital Trunk Interface: The Trunk Cartridge connects digital T1 AND ISDN trunks to the Norstar system.

Direct-dial: A feature that lets you dial a designated telephone in your Norstar system with a single digit. As many as five direct dial sets can be established. Each telephone in the system is assigned to one direct-dial telephone. There is a single, system wide digit for calling the assigned direct-dial telephone of any telephone. Direct-dial telephones are established in System programming. Telephones are assigned to a direct-dial telephone under Capabilities in Terminals and Sets programming.

Direct-dial #: A digit used system-wide to call the Direct-dial telephone. The digit is assigned under Access codes in System programming.

Direct-dial number: The digit used to call the direct-dial telephone.

Direct Inward Dial trunk: Trunks that allow direct inward dialing from the public network to the Norstar system.

Direct inward system access (DISA): The feature that lets remote users dial directly into the Norstar system and use Norstar features. Callers will hear stuttered dial tone and will be required to enter a Class of Service password to gain access to the system. See Remote Access.

directed pickup: See Call Pickup Directed.

Directory number (DN): A unique number that is automatically assigned to each telephone or data terminal. The DN, also referred to as an internal number, is often used to identify a telephone when settings are assigned during programming.

Default DN assignments start at 221.

DISA DN: The received number assigned to the Norstar direct inward system access facility. If a caller dials a number that is assigned to the DISA DN, the caller hears stuttered dial tone and must enter a Class of Service password. Once the password is accepted, the caller hears system dial tone and can use Remote Access features. See Remote Access.

Disconnect Supervision: A setting that enables the Norstar system to detect if an external caller hangs up. Once an external caller hangs up, the Norstar system can disconnect its line. Disconnect Supervision is enabled under Trunk/Line data in Lines programming.

display: A liquid crystal display (LCD) on the Norstar telephone that guides you through feature operation and programming.

display button: The Norstar M7310 telephone and M7324 telephone are each equipped with three buttons located directly beneath the display. During feature operation or programming, some or all of these buttons may be used to provide further options. If an option is available, it is shown in the bottom row of the two row display, directly above the corresponding display button. Display buttons are

represented in this manual as underlined capital, such as OK.

DM: See Integrated Data Module 200.

DN: See Directory number.

Do Not Disturb: Feature 8 5
A feature that stops calls from ringing at your telephone. Only Priority Calls will ring at your telephone. A line button will flash when you receive a call, but the call will not ring.

DTMF: See Dual tone multifrequency.

dual tone multifrequency: Two distinct telephone signaling tones used for dialing.

DTI: See Digital Trunk Interface.

E

E&M/DISA Trunk Cartridge: The Trunk Cartridge that allows you to connect E&M trunks to the Norstar system. The E&M Trunk Cartridge also allows DISA access to the system by providing DTMF receivers for auto-answer trunks.

Emergency 911 dialing: The capability to access a public emergency response system by dialing the digits 9-1-1. State and local requirements for support of Emergency 911 DIaling service by Customer Premises Equipment vary. Consult your local telecommunications service provider regarding compliance with applicable laws and regulations.

emergency telephone: A single-line telephone (also referred to as a 500/2500 telephone) that becomes active when there is no power to the ICS.

evening schedule: See Schedules, and Services.

event message: Event messages are stored in the system log and displayed during a Maintenance session. They record a variety of events and activities in the Norstar system.

exceptions: See Overrides.

Expansion Cartridge: A cartridge that allows you to connect Trunk Modules and Station Modules to the ICS to expand the system's capacity for trunks and telephones.

There are two Expansion Cartridge: a two-port Expansion Cartridge and a six-port Expansion Cartridge. (See also Combo Cartridge.)

external call: A call to a destination outside the Norstar system.

External Call Forward: See Line Redirection.

external code: The number you dial to get an external line. By default it is 9, but this can be changed under Access codes in System programming. You do not always need an external code. It is primarily to support the M7100 telephone and single line telephones using an Analog Terminal Adapter.

external line: A line on your Norstar telephone used for making calls to destinations outside the Norstar system.

external music source: See Music source.

external paging: A feature you can use to make voice announcements over an externally-mounted loudspeaker connected to the Integrated Communication System. The external speaker is not a Norstar component and must be supplied by the customer.

F

feature button: Many Norstar features are invoked by pressing the Feature button followed by a feature code. The feature button is also used to exit a feature.

Feature Cartridge: A replaceable cartridge containing the Norstar features. The Feature Cartridge is inserted into the ICS.

feature code: A number that is used to activate a particular feature.

Feature programming:
[Feature] [*] [3]
Allows you to program a feature code onto a memory button.

Forward: See Call Forward.

Full Autohold (on idle line): When this feature is on, if you select an available line, and then do something that selects another line, the first line is put on hold. Full Autohold is enabled under Trunk/ Line data in Lines programming.

Full Handsfree: See Handsfree.

G

Ground Start trunk: Ground start trunks offer the same features as loop start trunks, but are used when the local service provider does not support disconnect supervision for the digital loop start trunks. By configuring lines as ground start, the system will be able to recognize when a call is released at the far end. Ground start trunks are provided only by a DTI.

Group Listening:
[Feature] [8] [0] [2]
A feature that allows you to have others in your office hear a caller through your phone's speaker. The caller hears you only when you speak into the receiver and cannot hear other people in the office.

You can cancel Group Listen for the current call. Group Listen is cancelled automatically when you hang up the Group Listen call.

H

Handsfree: [Handsfree Mute]
A feature you can use to make calls without using the telephone receiver. Full Handsfree is activated under Capabilities in Terminals and Sets programming. When it is activated, a Handsfree/Mute button is automatically assigned to the telephone.

Handsfree (HF) Answerback: When activated, this feature automatically turns on the microphone at a telephone receiving a Voice Call so that the person receiving the call can respond without lifting the receiver. It is activated under Capabilities in Terminals and Sets programming.

Handsfree/Mute button: See Handsfree.

Hardware: A section in programming that shows what equipment has been installed in the ICS. This section is accessed by the installer.

headset: A head-mounted or ear-mounted telephone receiver that is used instead of the hand-held receiver. Headsets are not Norstar components and must be supplied by the customer.

Held (Line) Reminder: A Norstar telephone rings and displays the message `On hold: LINENAM` when an external call has been placed on hold for a certain period of time. The Held Line Reminder feature and Remind delay are set under Ftr settings in System programming.

HF Answerback: See Handsfree Answerback.

Hold button: Hold
This button is used to suspend calls so that the person using the telephone can perform another task without disconnecting the caller.

Hook Switch Flash: See Link time.

Host system signaling: (Also referred to as end-to-end signaling.) Norstar telephones can access a remote system or dial a number on an alternate carrier by means of host feature activation, such as Link, Pause and Run/Stop.

Hotline: This feature automatically calls a pre-assigned number when the telephone's receiver is lifted or the Handsfree/Mute button is pressed. A Hotline number can be an internal or external number. Hotline is assigned under Capabilities in Terminals and Sets programming.

I

I/C: An abbreviation of intercom.

ICS (integrated communication system): The central hardware component in the Norstar system. The ICS has its own processor and memory, and provides a physical point of connection for the various types of devices, telephones, and expansion modules used in Norstar.

The ICS can function on its own as a basic system (with 32 Norstar telephones and up to 48 external lines), or with the addition of Trunk Modules (TM) that supports more external lines, or Station Modules (SM) that support more Norstar telephones.

IDM: See Integrated Data Module 200.

Installer password: A one-to six-digit password that prevents unauthorized access to programming. The Installer password can be assigned and changed in Passwords programming.

Integrated Data Module 200: a Norstar module that allows Ethernet LAN capability and high-speed WAN access.

Integrated Services Digital Network (ISDN): A digital telephone service that allows for a combination voice and data connection over a single, high-speed connection. ISDN service can operate over the same copper twisted-pair telephone line as analog telephone service.

intercom button: A button that provides access to internal lines used for calls within a Norstar system and access to external lines through a line pool or external code. A telephone may be assigned zero to eight Intercom buttons. This is done under Line access in Terminals and Sets programming.

intercom keys: See Intercom button.

internal line: A line on your telephone dedicated to making calls to destinations inside your Norstar system. An internal line may still connect you with an external caller if you use it to access a line pool or to pick up a call using Norstar call handling features such as Call Park or Call Pickup Directed.

internal number: A number (also referred to as a Directory Number or DN) that identifies a Norstar telephone or device.

internal user: Someone using a Norstar telephone within a Norstar system.

ISDN: See integrated services digital network.

ISDN DN: A directory number (DN) used by ISDN terminal equipment connected to the ICS. The system uses a maximum of thirty ISDN DNs.

K

Key service unit (KSU): See ICS.

L

Last Number Redial:
Feature 5
A feature that allows you to redial the last external number you dialed.

Fixed line:
A telecommunications line between two service points leased from a communications carrier for private use, usually incurring a monthly service rate. Fixed lines setting is used solely by the IDM 200.

Least cost routing: See Routing service.

line: The complete path of a voice or data connection between one telephone (or other device) and another.

Lines: A programming section that lets you assign settings to each trunk and external line. Lines programming can be done by an installer or a system coordinator plus. A system coordinator can program the name of a line.

Line number: A number that identifies an external line. The total number of lines depends on how many Trunk Modules are installed.

Line Pool: Feature 6 4
A group of lines used for making external calls. Line pools provide an efficient way of giving a telephone access to external lines without taking up many line buttons. A line is assigned to be part of a line pool under Trunk/Line data in Lines programming.

Line Redirection:
Feature 8 4
A feature that allows you to redirect

all calls on an incoming line to a destination outside the Norstar system. Once a line is redirected it cannot be answered within the Norstar system. The system may be set up to give a brief ring when a call comes in on a redirected line, under Capabilities in Terminals and Sets programming.

This feature differs from Call Forward in two ways. It redirects only external calls (not internal calls) and it redirects calls to destinations outside the system. Call forward redirects calls only to destinations inside the Norstar system. See Call Forward.

Link: [Feature] [7] [1]
If your Norstar system is connected to a Private Branch Exchange (PBX), you can use a Link signal to access special features. The Link signal can also be included as part of a longer stored sequence on an External Autodial button or in a Speed Dial code. The Link symbol (⧉) uses two of the 24 spaces in a dialing sequence.

Long Tones: [Feature] [8] [0] [8]
A feature that lets you control the length of a tone so that you can signal devices such as fax or answering machines which require tones longer than the standard 120 milliseconds.

Loop Start Trunk Cartridge: The Trunk Cartridge that allows you to connect loop start trunks to the Norstar system.

Lunch schedule: See Schedules, and Services.

M

M7100 telephone: A telephone with a single line display and one programmable memory button without an indicator.

M7208 telephone: A telephone with a single-line display and eight programmable memory buttons with indicators.

M7310 telephone: A telephone that has a two-line display, three display buttons, 10 programmable memory buttons with indicators, and 12 dual memory programmable buttons without indicators. An M7310 can be equipped with a Busy Lamp Field.

M7324 telephone: A telephone with a two-line display, three display buttons, and 24 programmable memory buttons with indicators. An M7324 telephone can be equipped with a CAP module.

Maintenance: A type of programming that is used to diagnose and repair problems in the Norstar system. Maintenance requires no programmable settings.

memory buttons: Buttons that can be programmed to dial frequently used features or numbers automatically. See M7100, M7208, M7310, and M7324 telephone entries for their exact memory button configurations.

message: A feature that allows you to send a message to another Norstar user. The Message feature also lets you know if you have any messages waiting and maintains a Message Waiting List to keep a record of your internal messages

and your (external) voice mail messages.

Modular ICS NVRAM cartridge: A replaceable cartridge containing the Norstar features, commonly known as the Feature cartridge. The ICS NVRAM cartridge is inserted into the ICS.

Modular ICS ROM software cartridge: A PCMCIA cartridge containing the Norstar NA-MICS 4.0 features. The ICS ROM software cartridge is inserted into the Modular ICS NVRAM cartridge.

Module: A component of the Norstar 0X32 key system. Includes the Integrated Communication System, Trunk Module and Station Module.

Module status: A heading in Maintenance programming that shows what types of Trunk Cartridges are connected and whether they're busy, disabled, or malfunctioning.

Move Line buttons:
Feature * 8 1
A feature that allows you to move external lines to different buttons on your telephone.

Music source: A radio or other source of music can be connected to the Integrated Communication System to provide music for the Music on Hold and Background Music features. A music source is not part of the Norstar system and must be supplied by the customer.

N

Names: Names can be assigned to System Speed Dial numbers, external lines, telephones, and service schedules. This is done in programming. You can use up to sixteen characters to name a System Speed Dial number, and seven characters to name a telephone, line, or schedule. If a Name has not been assigned, the line number or DN will appear on the display instead of a name.

Network DN: A number supplied by the ISDN network service provider for ISDN terminal equipment.

Night schedule: See Schedules, and Services.

NT1 (Network termination type 1): A device used to connect the U interface of a service provider and the S or T interface (the customer's equipment). The Modular ICS can act as an NT1 when equipped with a BRI-U2 or BRI-U4 Card.

Norstar Integrated Data Module 200: See Integrated Data Module 200.

O

On hold: A setting, programmed under Feature settings in System programming, that controls whether external callers hear music, periodic tones, or silence when they are placed on hold.

OPS: Off premise station.

OPX: Off premise extension.

overlay: See Programming overlay.

overflow: A setting in Routing Service that allows users to decide what path an outgoing call will take if

all the lines used in a particular route are in use when the call is made.

Overrides: One component of a restriction filter. Overrides are numbers you can dial even if they are forbidden by a more general restriction. See Restrictions.

P

Page: [Feature] [6] [0]
A feature you can use to make announcements over the Norstar system. You can make page announcements over the telephone speakers and/or external speakers.

Page Time out: A setting that controls how long a Page Announcement can last. It can be assigned under Feature settings in System programming.

Page zone: An area in the office that receives internal page announcements independently of the rest of the office.

Each page zone is identified by a number. Telephones are assigned to page zones under Capabilities in Terminals and Sets programming.

Park prefix: See Call park prefix.

Park timeout: The time before an unanswered parked call is routed back to the telephone that parked it. Park timeout is under Feature settings in System programming.

Password: A password is a specific sequence of digits that you enter to gain access to Norstar programming, to override dialing restrictions, or to use remote access with DISA.

Passwords: A programming section that lets you assign or change COS passwords, Call log passwords, or any of the programming passwords. Once you access the Passwords section, you can only modify the passwords for your level of programming.

Pause: [Feature] [7] [8]
A feature that enters a 1.5 second delay in a dialing sequence on an external line. This is often required for signaling remote devices, such as answering machines, or when reaching through to PBX features or host systems. The Pause symbol (✱) uses one of the 24 spaces in a dialing sequence. For pulse dialing, [*] inserts a 1.5 second pause into the dialing sequence.

PBX: private branch exchange.

Personal Speed Dial:
[Feature] [*] [4]
Two-digit codes (71-94) can be programmed to dial external telephone numbers. Personal Speed Dial numbers are programmed for each telephone, and can be used only at the telephone on which they are programmed.

Pickup Group: [Feature] [7] [5]
A telephone can be placed into one of nine call pickup groups. A call ringing at a telephone within a pickup group can be picked up at any other telephone within the same pickup group. A telephone is assigned to a pickup group under Capabilities in Terminals and Sets programming.

Pool: See Line pool.

portable telephone: See Companion portable telephone

Pre-dial: A feature that allows you to enter a number and check it on your telephone display before it is actually dialed. If the number is incorrect, you can edit it. The number is dialed only when you pick up the receiver or select a line.

Primary Rate Interface (PRI): An ISDN interface which uses twenty three B channels and a D channel (23B+D).

Prime line: The line on your telephone that is automatically selected when you lift the receiver, press the Handsfree/Mute button or use an external dialing feature.

A Prime Line is assigned to a telephone under Line access in Terminals and Sets programming.

Prime Set (prime telephone): A telephone that provides backup answering for incoming calls on external lines. The prime telephone for a line will ring for any unanswered calls on that line. A prime telephone is assigned to a line under Trunk/Line data in Lines programming.

Priority Call: [Feature] [6] [9]
If you get a busy signal when you call someone in your office, you can interrupt them for an urgent call. This feature is enabled for a telephone under Capabilities in Terminals and Sets programming.

Privacy: This feature determines whether a Norstar user may select a line in use at another telephone and join an established call. Privacy is enabled under Trunk/Line data in Lines programming, but can be turned on and off by users during individual calls.

Private line: See Private to.

Private network: A telephone network consisting of owned or leased telephone lines used to connect different offices of an organization independently of the public network.

Private to: Lets you select the telephone that will use the line exclusively. The line cannot appear on any other telephone, except the prime telephone for that line. Private lines cannot be placed into line pools. Private lines are assigned under Trunk/Line data in Lines programming.

Programmed release:
[Feature] [*] [8] [9]
A feature that performs the function of the [Rls] button in a programmed dialing sequence.

programming: Setting the way the Norstar system will work. Programming includes system-wide settings and individual telephone and line settings.

programming overlay: A paper template that is placed over the top four memory buttons with indicators on the M7310 or M7324 telephone during programming. The overlay labels indicate the special function that each of the four buttons takes on in programming.

public line: An external line that can be assigned to any telephone and to many telephones. A line is assigned as Public under Trunk/Line data in Lines programming.

public network: The regular telephone network that connects most homes and businesses.

pulse/tone dialing: An external line setting for pulse or tone dialing. Pulse is the traditional method of dialing used by rotary-dial or push-button single-line telephones. Tone dialing allows telephones to communicate with other devices such as answering machines. Tone dialing is required to access the features that PBX systems may offer or to use another Norstar system remotely.

R

recall: See Link time.

receiver: The handset of a telephone.

receiver card: An abbreviated list of Norstar feature codes that is stored under the telephone receiver. The card is found on a perforated sheet that comes with a Norstar telephone.

Regression Code: Restores the previous system security number so that previously applied UTAM Activation Codes and Portable Credit Codes can be reentered to restore full system operation. Also required in cases of system recovery. This code cannot be reused.

Remind delay: A feature that causes a telephone to beep and display the message `On hold: LINENAM` when a call has been on hold for a programmable period of time. This period is the Remind delay.

Remote access: The ability to dial into a Norstar system from outside the system and make use of selected Norstar features. The lines, features, and dialing capabilities available to a remote user are determined by the Class of Service. If the remote access line is answered with DISA, the user must enter a Class of Service password to gain access to the Norstar system's features.

remote access dial restriction: See Remote restriction.

Remote capability: A subset of Norstar features that are available to users connected through remote access.

Remote monitoring: A feature that lets an off-site technician with a PC call in and troubleshoot your system through the built-in modem.

Remote paging: This feature allows remote users to use the Norstar paging feature. Access to this feature is governed by the Class of Service for the call. See Remote Access and Class of Service.

Remote restriction: A restriction filter applied to a line in order to control which digits can be dialed during an incoming remote access call. It is the equivalent of a set filter for a remote user.

remote user: Someone who calls into a Norstar system from a telephone outside that system and uses Norstar features or lines. See Remote Access.

Restriction filter: Through a combination of restrictions and overrides, restriction filters prevent certain telephone numbers or

feature codes from being dialed. Restriction filters can be applied to lines, sets, specific lines on a set, and to Class of Service passwords. The Norstar system can handle up to 100 restriction filters.

Restriction service: A Services section that allows you to assign alternate dialing filters to lines, telephones, lines on a particular telephone, and alternate remote filters to lines at specified times of the day and on specified days.

restrictions: One component of a Dialing filter. Restrictions are numbers you cannot dial when that dialing filter is in effect. See Exceptions.

Ring Again: Feature 2
A feature that can be used when you can't get through to someone on your Norstar system because their telephone is busy or there is no answer. Ring Again instructs the Norstar system to inform you when they hang up or next use their telephone.

ring group: A setting under Services that lets you assign a number of different telephones to ring during one of the schedules.Up to 20 ring groups can be programmed by an installer or a system coordinator plus.

ring type: Feature * 6
A feature that allows you to select one of four distinctive rings for your telephone.

ring volume: Feature * 8 0
A feature that allows you to set the volume at which your telephone rings.

ringing service: A Services section that allows you to make additional telephones ring at specified times of the day and on specified days.

Rls button: Ends a call in the same way that hanging up the receiver does. The Release button may also be used to end programming, Maintenance sessions, and feature operations.

Routing: See Routing service.

Routing service: A programming section that allows outgoing calls to be directed automatically based on the numbers a caller dials. For Norstar systems linked in a network, routing can create a transparent or coordinated dialing plan. It can also be used to direct calls to the least expensive lines according to a Services schedule (sometimes called least cost routing).

Run/Stop: Feature * 9
A feature that creates a break point in a programmed external dialing sequence. When you press a programmed key, the system dials the number up to the run/stop. When you press it again, the system dials the digits following the run/stop.

S

S loop: A type of loop provided by a BRI-ST Card. It connects the ICS to ISDN terminal equipment which uses an S interface.

SAPS: See station auxiliary power supply.

Saved Number Redial:
Feature 6 7
A feature that allows you to save the number of the external call you are

on (providing you dialed the call) so that you can call it again later.

Schedules: Any of six different sets of services that can be applied to your Norstar system. A schedule can be activated manually from a control telephone or activated automatically at specified times. See also Services.

Selective line redirection: See Line Redirection.

Service modes See Services.

Service Profile Identifier: See SPID.

Services: A programming section that lets you assign which telephones ring, which restrictions apply, and which call routing is used during any of six different schedules. There are three services: Ringing service, Restriction service and Routing service, all found in Services programming.

set: A telephone.

Set Copy: A programming section that allows you to copy programmable settings from one telephone to another of the same type. Set Copy provides two options: duplicating System Data and User Data, or duplicating System Data only. Set Copy does not provide the same copy capability as COPY, which is more selective of the settings that can be duplicated.

Set filter: See Restriction filter.

Set lock (telephone lock): This feature allows you to limit the number of features that may be used or programmed at a telephone. Full set lock allows very few changes or features, Partial set lock allows some changes and features, and No set lock allows any change to be made and any feature to be used. Set lock is assigned under Capabilities in Terminals and Sets programming.

Set relocation: See Automatic Telephone Relocation.

shift button: A small triangular button beside the dual memory buttons on the upper half of the M7310 telephone. You press the shift button to store or access features on the top half of the dual memory buttons.

Show Time: Feature 8 0 3
While on a call, accessing this feature lets you see the current date and time on the Norstar telephone display.

Software keys: A programming section used to enable the optional Remote monitoring feature. One setting provides a System ID, which an installer or system coordinator plus then uses to request three password keys from the Nortel Customer Response Center. Once these three passwords have been entered, the system will permit Remote monitoring.

SPID (Service Profile Identifier): A number that identifies devices connected to an ISDN network. A device may have more than one SPID depending on the number of channels it uses. SPIDs may be used to identify terminal equipment to the ICS, or to the service provider.

Startup programming: When a Norstar system is first installed and powered up, Startup programming must be performed before any

programming can be done. Startup initializes the system programming to defaults.

Station: An individual telephone or other Norstar device.

Station Auxiliary Power Supply (SAPS): A device which provides power to a Norstar telephone that is connected more than 300 m (975 ft.) and less than 1200 m (3900 ft.) from the ICS, or to a CAP module.

Station Module: A module that allows you to connect up to 16 additional telephone to your Norstar system.

Station set test:
Feature 8 0 5
A series of diagnostic tests for these components of a Norstar telephone: display, buttons, handset, speaker, and power.

System coordinator: The person responsible for customizing the Norstar system through programming and for helping co-workers use the Norstar system.

System coordinator password: A one- to six-digit password that prevents unauthorized access to programming. The System coordinator password can be assigned and changed in Passwords programming.

System coordinator plus: A system coordinator who also performs technical and maintenance functions for the Norstar system.

System coordinator plus password: A one- to six-digit password that prevents unauthorized access to programming. The System coordinator plus password can be assigned and changed in Passwords programming.

System coordinator plus programming: A combination of common and installer programming settings. Press Feature * * C O N F I G, then S C P L U S to access System coordinator plus programming.

System coordinator programming: The programming settings that are most commonly changed once the Norstar system is installed. Press Feature * * C O N F I G, then A D M I N to access System coordinator programming.

system data: An option in the Set Copy function. System Data refers to the programmable system settings that apply to all telephones and lines.

System programming: A programming section that lets you assign and maintain certain settings on the Norstar system. System programming is performed by an installer or system coordinator plus.

System speed dial code: A Two-digit code (01 to 70) that can be programmed to dial a telephone number up to 24 digits long. System speed dial codes are programmed for the entire Norstar system under the System Speed programming heading.

System Startup: See Startup programming.

System Startup access code: To begin System Startup, press

[Feature] [*] [*] [S] [T] [A] [R] [T] [U] [P]. An Installer password is required before Startup programming can begin.

System ID: The System ID (or System Security number) can be accessed on any M7324 or M7310 telephone display by pressing [Feature] [*] [*] [S] [Y] [S] [I] [D], or [Feature] [*] [*] [7] [9] [7] [4] [3].

T

T1: Digital carrier system or line that carries data at 1.544 Mbps.

T loop: A type of loop provided by a BRI-ST Card. It connects the ICS to an ISDN network using an NT1.

Target lines: Lines used to answer incoming calls only. A target line routes a call according to digits it receives from an incoming trunk. They are referred to by line numbers in the same way as physical lines.

TE: See Terminal equipment.

TEI (Terminal Endpoint Identifier): A digit used to identify devices which are using an ISDN connection for D-channel packet service.

Telco features: A programming section that lets you specify the external telephone numbers that are dialed by the Message feature to retrieve voice messages, or to set up CLASS (CMS) services for lines and sets. Telco features are accessed by an installer or a system coordinator plus.

Terminal Endpoint Identifier: See TEI.

Terminal equipment (TE): A generic term for devices that connect to an ISDN network. Examples of ISDN TE are ISDN telephones, computers equipped with ISDN cards and video terminals.

Terminals and Sets: A programming section that lets you assign and change settings that apply to the telephones and other devices connected to the Norstar system. Terminals and Sets programming is performed by an installer or a system coordinator.

Time and date: A programming section that lets you manually change time or date. The time and date can also be changed by pressing [*] [*] [T] [I] [M] [E] and entering the Basic password or one of the programming passwords.

Transfer: [Feature] [7] [0]
A feature that lets you redirect a call to another telephone in your Norstar system, over a network or outside your Norstar system.

Transfer Callback: If a transferred call is not answered after a specific number of rings, the call will return to the telephone that made the transfer. The number of rings is assigned under Feature settings in System programming. Transfer Callback does not apply to calls transferred externally.

Trunk: The physical connection between the Norstar system and the outside world using either the public telephone system or a private network.

Trunk Answer:
[Feature] [8] [0] [0]
A feature you can use to answer a

call on any line that has an active Ringing service Service Mode, even if that line does not appear on your telephone. Trunk Answer is enabled in Services programming.

Trunk Module: A module that allows you to install additional Trunk Cartridges in your system to provide up to 12 additional trunks.

U

U interface: A two-wire ISDN interface used for both network connections and terminal connections to the ICS.

U-LT: A type of loop provided by a BRI-U2 or BRI-U4 Card. It connects the ICS to ISDN terminal equipment which uses a U interface.

U-NT loop: A type of loop provided by a BRI-U2 or BRI-U4 Card. It connects the ICS to an ISDN network.

Unsupervised line: A line for which disconnect supervision is disabled. If an external caller hangs up, the Norstar system does not detect the disconnection and does not hang up its line. See Disconnect Supervision.

User Data: User Data is an option in the Set Copy feature. User Data refers to the personal settings that are unique to an individual telephone, and are not programmed for the system. User Data is programmed at each telephone.

These settings, for example, include Personal Speed Dial and the assignment of programmable memory buttons.

User Filter: See Restriction filter.

User Preferences: a programming section that lets you assign autodialers, user speed dial codes, display contrast, and other settings to a specific telephone or person. You do not have to program these settings at the person's telephone. User preferences are assigned in Terminals and Sets programming.

User Speed Dial:
[Feature] [*] [4]
Two-digit codes (71-94) can be programmed to dial external telephone numbers. User Speed Dial numbers are programmed for each telephone, and can be used only at the telephone on which they are programmed.

V

Voice Call: [Feature] [6] [6]
A feature you can use to make an announcement or begin a conversation through the speaker of another telephone in the Norstar system. The telephone you call will not ring. Instead, the person you call will hear a beep and then your voice. Their telephone will beep periodically to remind them that their microphone is open.

Voice Call deny: [Feature] [8] [8]
A feature that prevents your telephone from receiving Voice Calls.

Voice message center: If you have subscribed to Call Display services you can receive visual Voice Message Waiting Indication, providing your telephone has a display. If you have Voice Message Waiting Indication, you can program the telephone numbers required to access up to five different Voice Message Centers. You can also

program which of the five Centers is to be accessed by each specific line.

W

Wait for dial tone:
Feature 8 0 4
A feature that causes of sequence of numbers to pause until dial tone is present on the line before continuing to dial. The Wait for dial tone symbol (⊞) uses two of the 24 spaces in a dialing sequence. This feature requires a Services or Combo Cartridge.

wireless: See Companion.

Index

Numerics

1stDisplay 232

A

access codes 71, 303
alarm
  check active 408
  check current 371
  codes 377
  CSU 407
  messages 298
  network evt log 375
  short term 409
  system administration log 373
  telephone 298
  troubleshooting 380
Alarm 10 378, 380
Alarm 37 378
Alarm 40 379, 381
Alarm 41 379, 381
Alarm 42 379, 381
Alarm 43 379, 381
Alarm 44 379, 381
Alarm 45 379, 381
Alarm 46 379, 381
Alarm 47 379, 381
Alarm 50-X 379, 381
Alarm 51-X 379, 381
Alarm 52-X-Y 379, 381
Alarm 61-X-Y 379, 381
Alarm 62-X-Y 379, 382
Alarm 63-Z 380, 382
Alarm 68-Z 380, 382
Alarm 75 383
Alarm 76-X 380, 383
allocating log space 297
allow last number redial
  programming 230
Analog E&M
  trunks
    private network 55
Analog Terminal Adapter (see ATA)
analog trunk
  E&M 55
ANI (auto number identification) 247
answer
  DNs 218
  mode 243
  timer 334
  with DISA 244
ASM 339
assign
  answer DNs 218
  intercom buttons 217
  line pools 216
  lines 213
  prime line 216
ATA (Analog Terminal Adapter)
  accessing external lines 305
  for OPX applications 176
  programming 222
  troubleshooting 429
  use 222
auto DN, programming 306
auto number identification (see ANI)
auto privacy 242

auto-answer
E&M trunks 55
loop start trunk and DISA 53
Automatic Daylight Savings Time (see Daylight Savings Time)
automatic route selection (see routing)
automatic telephone relocation
programming 177
use 176
Automatic Time and Date 297
auxiliary ringer
installation 183
programming 245
troubleshooting 431

B

B1 and B2 directory numbers 149, 150–151
background music 292
installation 183
programming 184
troubleshooting 431
Basic Rate Interface (see BRI, see also ISDN)
BERT
Out of sync 396
Try later 397
`BERT denied` 396
BERT-Set
(BERT in use) 397
bit error rate test (BERT) 395–397
BRI (Basic Rate Interface)
card 342–346
configuration 25–30
loopback test 403
ST card 123
trunk 49, 50, 57
U2 card 123
U2 trunk modules 126
U4 card 123
U4 trunk modules 126
BRI (see also ISDN)
BRI-ST
trunk modules 151
BRI-ST, terminating resistors 130
BRI-U2
trunk modules 151
BRI-U4
trunk modules 151
`Busy` 363
busy lamp field 96

C

cadence
service tone 455
call
log
automatic 232
password 281
set 232
space 233, 297
camp timeout delay 293
Canadian regulations 4
CAP (Central Answering Position)
line assignment 215
programming 302
card edge loopback test 399
carrier failure
alarms 405
standard 334
cartridge

checking the state 368
E&M Trunk 99
enabling 369
installation 121
loop start trunk 99
CCI (Control Circuit Interface)
emergency transfer conditions 170
Cd on ICS 332
central answering position (see CAP)
Channel Service Unit (see CSU)
CI trunk cartridge
wiring chart 165
CLASS assignment 232
Class of Service (see COS)
clock source
description 346
primary reference 347
sample configurations 348–351
secondary reference 347
timing master 347
clocking cartridge 29
CO fail 334
combo cartridge
installation planning 95
common settings 274
Computer Telephony Adapter 500dm (see CTA 500dm)
configuration programming
default digits 303
`Connect set` 397
connecting
expansion modules 144
connection
expansion modules 133, 144, 147
connections
stand alone 30
continuity loopback test 400, 402
Continuous
FAIL (BERT test) 397
Control Circuit Interface (see CCI)
control telephone, programming 274
coordinated dialing plan 64
copy 212
line programming 237
system data 199
telephone programming 199
to a group of telephones 200
to a range of telephones 199
to a single telephone 199
trunk and line data 237
user data 199
COS (Class of Service)
auto DN 306
calls answered with DISA 306
dialing filters 61
password 279
auto-answer system 59
line restriction 280
programming 280
remote access package 280
remote callers 54
user filter 280
with DISA 63
security 61
cross connections
E&M/DISA trunk cartridge 167
CSU
stats 357
CSU (Channel Service Unit)

alarms 407
description 336
line build 337
performance statistics 406
stats 405
CTA 500dm
connecting to ICS
customizing
call display services 232

D

Data Module 353
Data Module 200
connecting to ICS 150
Data Path (BERT test) 397
Daylight Savings Time, automatic 296
D-channel packet service (see ISDN)
defaults
basic password 283
dialing restriction 227
directory number lengths 310
Installer password 281
line restriction 251
remote access packages 308
restrictions 226
set restrictions 229
System Coordinator password 282
System Coordinator Plus password 282
delay
by number of rings 200
camp timeout 293
dial signal type 247
DRT 294
held line reminder 295
park timeout 293
transfer callback 294
delayed ring transfer 294
to prime telephone 294
deprovisioning a line 393
desktop conferencing using ISDN 90
destination code
description 259, 260
network numbering 65
device
disabling 364
enabling 364
state 363
diagnostics
T1 signal 405
test results, system test log 370
dial
mode 241
tone
absent on external lines 422
dialed number identification 248
dialing
filter
E&M trunk 63
remote 63
plan
coordinated 64
shared line pools 71
transparent 64
using E&M lines 66
using public lines 65
restriction
for remote callers 251
line filter 280
line/set restriction 231

remote user 252
user filter 280
dialing restriction
defaults 227
exceptions 228
maximum length 228
maximum number 228
removing a filter 228
restrictions 228
set restrictions 229
wild card character 226, 262
DID (Direct Inward Dial)
emergency transfer 170
supervisory signaling 169
trunk 60
trunks 49, 52
DID trunk cartridge 52
Digit Absorb 263
Digit Absorption 263
Digital Trunk Interface trunk (see DTI)
Direct Inward Dial trunks (see DID trunks)
Direct Inward System Access (see DISA)
direct-dial digit
programming 299, 300
direct-dial digit, programming 305
directed pickup 295
directory numbers
B1 and B2 149
changing 207, 292
changing starting DN 206
entering 197
in a network 64
length 310
transparent dialing plan 64
DISA (Direct Inward System Access)
DID
trunk 60
DID trunk 52
DN 306
E&M trunks 55
loop start trunks 53
private networks 76
remote callers 63
using 53
Disabled by sys 363, 368
Disabled by user 363, 368
Disabling 363, 367
disabling
a device 364
a module 369
disconnect
supervision 242
loop start trunks 59
timer 333
disconnect timer 333
display buttons 195
display unreadable, troubleshooting 417
distribution block, connecting the wiring 145
DN hunting (see multi-line hunt)
DNIS number 248
DSX1 build out 337
DTI (Digital Trunk Interface)
clock source 346
configurations 352
continuity loopback test 402
LEDs 435
specifications 458
trunk 49
wiring 162
wiring chart 162

DTMF (dual tone multifrequency) 53
receivers 52, 99
dual tone multifrequency (see DTMF)

E

E&M
gain level 249
trunk cartridge
cross connections 167
wiring chart 166
trunks
as prime line 56
auto-answer 55
DISA 55
incoming calls 56
outgoing calls 56
remote access from private network 58
set filters 63
electrical
requirements 99
specifications 456
emergency
numbers 6, 11
telephone
installing 175
troubleshooting 420
trunk module 130
with E&M/DISA trunk cartridge 166
transfer
DID trunk cartridge 170
Enabling 363, 367
enabling
a device 364
module or its cartridges 369
environmental specifications 457
equipment
certification 4
installation checklist 94
evening schedule 276
event messages
maintenance 385
significant 385
system restarts 390
Evt 210-YYYZ 386
Evt 211-YYYZ 386
Evt 220-3546 386
Evt 221-3546 386
Evt 222-3546 386
Evt 255 386
Evt 260-0302 386
Evt 261-0302 386
Evt 263-302 386
Evt 264-302 386
Evt 265-302 386
Evt 268-07 386
Evt 269-3546 386
Evt 299 386
Evt 400 387
Evt 407 387
Evt 408 387
Evt 412-3546 387
Evt 413-3546 387
Evt 414-3546 387
Evt 415-3546 387
Evt 416-3546 387
Evt 417-3546 387
Evt 418 387
Evt 419 387
Evt 421 387
Evt 422-3546 387
Evt 423-3546 387

Evt 441 387
Evt 442 386, 387, 388
Evt 822 388
Evt 883 388
EVT799-XXXX YY 388, 389
exception (see dialing restriction)
expansion
cartridge
installation planning 95
not supported 101
six-port 135
twelve-port 136
two-port 135
equipment
installation checklist 95
not supported 101
modules 135, 136
connecting 133, 143, 144
routing fibers for 144
spacing of 139
expansion modules
connecting 143
extended superframe 336
external
code, programming 305
CSU, connecting the DTI 163
lines
access code 305
music source
connecting 183
impedance 183
programming 184
paging 184
troubleshooting 431
extra-dial telephone
programming 255

F

[Feature]
[8] [0] [5] Station Set Test 416, 417, 418
[*] [*] [C] [O] [N] [F] [I] [G] Installer programming password 210
[*] [*] [T] [I] [M] [E] Time&Date 284
[*] [*] [S] [Y] [S] [I] [D] System ID 202
[*] [*] [S] [T] [A] [R] [T] [U] [P] Startup 205
[*] [7] Contrast Adjustment 417
[7] [8] Pause 260
[Feature] [*] [*] [S] [E] [T] Set profile 203
[Feature] [*] [*] [L] [I] [N] [E] Line profile 203
Message
sending [1] 299
[Feature] [*] [*] [7] [9] [7] [4] [3] 202
feature
cartridge
installation 127
codes, troubleshooting 450
settings (see featr settings)
using remotely 58
Features (Restrictions)
[*] [9] Run/Stop 272
[*] [Link] [9] Programmed Release 272
[7] [1] Link 272
[7] [Link] Pause 272
[Link] [0] [4] Wait for Dial Tone 272

Federal Communication Commission (FCC)
radio/TV interference 6
fiber cable management system
fiber cable guide
description of 139
fiber comb
description of 139
fiber spool holder
description of 140
ICS door label
description of 141
spacer
description of 140
fiber cables
connecting 143
fiber comb 143
fiber spool holder 143
installation 137–144
file transfer using ISDN 90
filters (see also restriction service) 225–230
framing format 336
full autohold 245

G

gain for E&M line 248
ground start trunk 50
Group 4 fax using ISDN applications 90

H

hardware
cards on ICS 333
clock source 346
modules 338
trunk cartridges in ICS 332
hearing aids 10
held line reminder
remind delay 295
hold
tones, music, or silence 292
host delay 298
hung lines 422
Hunt groups 285–291
adding and removing members 286
assigning lines 287
distributing hunt group calls 288
member order 287
naming the group 291
overflow extension 290
programming hunt delay 289
routing calls if all members are busy 289
time in queue 290

I

ICS (Integrated Communication System) 94, 149
background music 292
cable connections 146
emergency telephone installation 175
external loop start lines wiring chart 155
installation checklist 97
numbering 150
telephone and auxiliary equipment wiring chart 154
telephone wiring chart 153
troubleshooting 437
trunk cartridge slots 333

identify device connected to the system 361
Idle 363
idle line
search for 239
immediate signal type 247
impedance, setting for line 246
indicators
telephone buttons 194
initializing the system, startup programming 205
installation
cartridges 121
checklist 117
electrical requirements 99
emergency telephone 175
equipment and supplies checklist 94
expansion equipment checklist 95
external paging system 184
feature cartridge 127
fiber cables 137, 139
ICS and expansion modules checklist 97
internal
wiring requirements 101
ISDN terminal equipment 178–180
location requirements 97
music 183
Norstar telephone 176
optional equipment checklist 96
planning checklist 94
safety precautions 1–3
spacing requirements 98
Installer password 191, 192, 205, 209, 281
Integrated Communication System (see ICS)
Integrated Data Module 200 87
Integrated Services Digital Network (see ISDN)
interface levels 335
internal
CSU 336
numbers
changing 292
length 310
wiring requirements 101
Internet access using ISDN applications 91
ISDN
capability packages 35
ordering service 35
ISDN (Integrated Services Digital Network) 335
applications 89–91
bearer capability 20
BRI
card 342
card, configuration 25–30
ICS wiring charts 156–160
line,loopback test 403
ST trunk modules 126
trunk module wiring charts 171–174
U2 trunk modules 126
U4 trunk modules 126
BRI-ST
card 123
trunk modules 151
BRI-U2
card 123
trunk modules 151
BRI-U4
card 123

trunk modules 151
capability packages, ordering 33
capabilties 17
clocking 29–30
data transmission speed 21
D-channel packet service 45, 344
desktop conferencing using 90
DN 346
equipment 89–91
file transfer using 90
Group 4 fax using 90
hardware configuration 24–29
installation programming 36
Internet access using 91
LAN access using 90
LAN to LAN bridging using 91
layers 19
leased line backup using 90
loop DN 346
loop termination 130
network connection 119
network DNs 343
network synchronization 29–30
planning service order 19
programming sequence 36, 37
S
interface 27
loop, programming 42
loop, wiring requirements 101
reference point 27
S or T
loop, additional power 179
loop, wiring 178
services and features 21
SPID 43, 342
standards 31
T reference point 28
TEI 345
telecommuting using 90
terminal equipment
configuration 26–27
installation 178–180
U interface 26
U-LT
loop programming 42
reference point 26
U-NT reference point 27
videoconferencing and video telephony using 90
wiring charts 156–162
IVD services card 94

J

jack pin numbering 162

L

LAN
access using ISDN applications 90
router 91
to LAN bridging ISDN applications 91
leased line backup using ISDN applications 90
least cost routing 268
LEDs
DTI 434
lightning protectors 102
line

access 212
assignment 213
BRI, about 49, 50, 57
capacity of trunk cartridges 100
coding 338
deprovisioning 393
filter, programming 280
filters 61
loopback test 398
numbers
entering 197
range 340
pool
access code 303
access codes 71
in a dialing plan 64
troubleshooting 451
profile, reviewing programming 202
programming
name 249
restrictions 250
line restrns 250
remote restrns 251
restrn filters 250
review 203
telco features 252
trunk/line data 235
ANI number 247
answer mode 243
answer with DISA 244
auto privacy 242
auxiliary ringer 245
CLID set 242
dial mode 241
DNIS Number 248
full autohold 245
gain 248
line type 238
link at exchange (CO) 244
link time 244
loss package 246
prime set 241
signal 247
trunk mode 242
trunk type 237
trunk/line data/received number 241
viewing the settings 203
provisioning 393
redirection feature 83
restriction 62
defaults 251
programming 250
search for idle 240
selection, for a direct-dial telephone 301
troubleshooting 421–428
type 238
line/set
filters 61, 62
line/set restriction 231
user filter 280
link 272
time 244
LIST 196
location requirements
installation planning 97
log
network evt 375
space
number of spaces 233
programming 233
space allocation 297
system administration 373
system test 370
long telephone numbers 198
loop DN 346

loop start trunk
as prime line 54
auto-answer 53
cartridge
wiring chart 165
incoming calls 52
manual-answer 53
remote access from public network 58
loopback test
BRI lines 403
description 394
initiated by the central office 401
initiated from Norstar 401
starting 401
loss package 246
loss/gain settings 246
lunch schedule 276

M

M7100 telephone
accessing external lines 305
M7324 telephone
CAP 302
maintenance
alarm codes 377
beginning a session 358
bipolar violations 408
carrier failure alarms 408
CSU stats 405
current alarm 371
device version number 362
disabling module/cartridges 369
enabling the module/cartridges 369
event messages 385
identify device connected to system 361
loopback tests 394
module 366
network event log 375
overview 357
port/DN status 360
programming
system administration log 373
provisioning 392
short term alarms 409
state
of a cartridge 368
of a module 367
of device 363
system
administration log 373
test log 370
version 359
tests 394
Module
ASM 339
Data Module 353
Station Module 338
Trunk Module 339
module
check number of trunk cartridges 367
checking the state 367
enabling 369
mounting 124
numbering 150–151
showing inventory 366
troubleshooting 437–454
Module status 357
modules 338
mounting Norstar telephones on wall 176

moving telephones (see automatic telephone relocation)
multi-line hunt 22
groups 35
music
installation 183
license 5, 11
source 8, 183

N

National ISDN standards 31
network
configuration samples 75–84
COS 61
DNs (see ISDN)
event log 375
features 61
log
check items 376
options with Norstar 47
private 78
private systems to Norstar system 48
public network to Norstar system 47
restriction filter 61
transparent dialing plan 64
troubleshooting 443–454
user problems 443
Network evt log 357
new equipment
IDM 200 87
night schedule 276
No free lines 428
non-expanded system (ICS alone) numbering 150
Norstar
as off-premise extension 48
sets 94
system networking 47
telephones 94
with Meridian M1 over PRI 48
Norstar Integrated Data Module 200 96
Not available 364, 425
Not in service 425
NT1 (network termination type 1) 30
stand alone connections 30
numbers, entering 197

O

on hold (see hold)
open switch interval
disconnect timer 333
optional equipment
IDM 200 87, 96
installation checklist 101
troubleshooting 429–431
overflow routing 270

P

Page Timeout 297
paging
installation 184
park
prefix 304
retrieving calls 304
timeout delay 293
password
basic 283

calls answered with DISA 306
capabilities 189
COS 52, 56, 279
Installer 191, 192, 205, 209, 281
programming 281
registration 283
System Coordinator 193, 209, 282
System Coordinator Plus 191, 192, 210, 282
using DISA 64
payload loopback test 398
plug pin numbering 162
port numbering 148
Port/DN status 357
port/DN status 360
power
and S or T loop 179
LEDs 187
specifications 455
powering up the system 188
PRI
trunk 60
prime line 216, 240
prime telephone 241, 294
private line 238
private network 47
remote access 59
sample configurations 78–84
tie lines 76
programming
access 189
alarm telephone 298
allow Last Number Redial 230
auto DN 306
auxiliary ringer 183
BRI card 342–346
CAP assignment 302
copying telephone programming 199–202
entering 210
exiting 197
features on a set 222, 232, 257
hardware 332–354
headings 208
indicators, telephone buttons 194
ISDN 36, 37
least cost routing 268
line access 212
lines 235–252
maintenance 357–409
on lines
dialing restrictions 257
ISDN (BRI) lines 40
ISDN (PRI) lines 40
trunk/line data programming 235
VMsg center 252
overlay 194
overview 191, 192, 193
passwords 279–283
programming overview 189
ring delays 200
routing 64, 257
services 253–276
software keys 329
special characters 196
startup 205–206
suggested sequence 210
system 189–202, 285–311
system features
CLASS assignment 232
control telephone 274

COS password 280
DN length 310
extra-dial telephone 255
log space 233
remote restrictions 251
restriction service 224–231, 250–252, 257
ringing 253, 256
schedule times 276
services 275
telco features 231, 252
trunk answer 254, 255
VMsg center 252
system speed dial 278
telco features 328
Terminals&Sets 212–233
Time&Date 284
tools, programming overlay 210
user preferences 198
viewing line 203
Provisioning 357
provisioning, T1 lines 392
PSTN 335
Pswd (see password)
public line 238
public network 47, 75–78

R

reallocating log space 297
received number 241, 310
receiver volume 293
registration password 283
regulatory information 4, 6
remote
access
COS password 279
defaults 308
dialing filters 61
DID trunks 60
E&M trunks 58
from public network 58
loop start trunks 58
on a private network 59
programming 280
restricting 307
filters 63, 280
system access 58–60
users, troubleshooting 443–454
repair facility 5, 11
replacing a telephone
of different types 419
of same type 418
status 419
restricting
line at telephone 231, 250
lines 250
remote access 307
remote callers 251
telephones 225, 229
restriction
default 226–230
dialing 271
filter 61, 250
service 224, 250–252
line/set 229, 231
programming 257
schedules 229
retrieving
voice messages 328
ring delay, programming 200
ringback detection 222
ringer equivalence number
Canada 4
US 10
ringing service
night schedule 254

ring group assignment 254
ringing groups 254
RJ2HX/CA2HA distribution block
cross connections 166
routing
destination codes 259
dialing restrictions 271
programming 64, 257
sample for local calling 264
sample for long distance calling 266

S

S
interface 27
loop
sampling 345
S or T reference point 27, 28
S reference point 27
safety precautions 1–3
sampling, S loop 345
SAPS (station auxillary power supply) 96
Sched 4 276
Sched 5 276
Sched 6 276
schedule
default times 276
names 275
security
COS 61
dialing filters 61
service profile identifier (see ISDN, SPID)
service tone cadences 455
services
cartridge 94
evening 276
example of alternate call ringing 253
lunch 276
night 276
programming
common settings 274
control sets 274
restrn services 257
ringing groups 254
ringing service 253
routing service 257
programming ringing sets 256
Sched 4 276
Sched 5 276
Sched 6 276
schedule names 275
schedule times 276
types 253
set
feature and number restrictions 229
filters
description 61
E&M trunks 63
profile, reviewing programming 202
restriction
default 229
user filter 280
user restrictions 62
set restrictions
Link 230
Saved Number Redial 230
shorting straps 132
show module 332
signal
method 10
type 247

significant event messages 385
six-port expansion cartridge 135
software keys 329
spacing requirements 98
specifications
    CSU 459
    DTI 458
    electrical 456
    environmental 457
    power 455
    service tone cadences 455
    telephone loop 456
speed dial 278
SPID (service profile identifier) 342
start and stop times, services 276
start DN 206
startup
    programming 205
state of device, check 363
station auxillary power supply (see SAPS)
Station Module 338
station module
    installation planning 100
    troubleshooting 442
    wiring chart 164
superframe 336
supervisory signaling
    DID 169
Sys admin log 357
Sys test log 357
system
    administration log 373
    ID 202
    overview 103
    processor software 359
    programming (see also system prgrming) 189–202
    restarts, event messages 390
    sample configurations 75–84
    speed dial 278
    test log 370, 385, 390
    version 359
System Coordinator password 193, 209
System Coordinator Plus password 191, 192, 210
system prgrming
    change DNS 292
    entering 209
    featr settings 292
        access codes 303
        alarmset 298
        background music 292
        call log space 297
        camp timeout 293
        CAP assignment 302
        daylight time 296
        directd pickup 295
        direct-dial 300
        DRT 294
        held reminder 295
        on hold 292
        page 296
        park 293, 294
        receiver volume 293
        remind delay 295
        set relocation 298
    for System Coordinators 209
    remote access 307
system programming (see system prgrming)
system settings

Answer key 300
Automatic Time and Date 297
System version 357

T

T reference point 28
T1
line coding 338
signal diagnostics 405
transmission performance 405
target lines
and received number 241
description 49
incoming calls 57
numbering 57
TE (see ISDN terminal equipment)
TEI (see ISDN)
telecommuting using ISDN applications 90
telephone
control sets 274
direct-dial 305
emergency 175
installing Norstar sets 176
log calls automatically 232
loop specifications 456
mounting on the wall 176
moving 176
programming
copying 199–202
viewing the settings 203
relocation 176, 298
troubleshooting 417–420
voice message waiting indication 232
template
changing default 205
Terminal Endpoint Identifiers (see ISDN, TEI)
Terminals&Sets 212–233
capabilities 220
allow Redirect 221
ATA settings 222
auxiliary ringer 221
d-dial 221
DND on busy 220
fwd no answer 220
fwd on busy 220
handsfree 220
HF answerback 220
hotline 221
page zone 221
paging 221
pickup grp 221
priority call 221
redirect ring 221
line access 212
answer DNs 218
intercom keys 217
line assignment 213
line pool access 216
prime line 216
name 223
restrictions 224
telco features 231
user preferences 224
terminating resistors (see termination for ISDN loop)
termination for ISDN loop
description 130
shorting straps 132
testing
bit error rate test (BERT) 395–397

ISDN network connection 119
loopback tests 394
set wiring 394
system test log 370
Tests 357
TIA-547A
carrier failure standard 334
tie lines 76
time and date
setting 284
timer
answer 334
disconnect 333
T-loop
terminating resistors 130
TR64211
carrier failure standard 334
transfer callback 294
transparent dialing plan 64
troubleshooting 413
alarms 380
ATA 429
auxiliary ringer 430
background music 431
DTI 434
emergency telephone 420
external paging 431
general procedure 415
line pools 451
lines 421–428
modules 433–436
network or remote users 443–454
optional equipment 429–431
replacing a telephone 418
T1 signal 436
telephones 418–420
trunk cartridge 433
trunk module 441
types of problems 415
voltages on E&M leads 447
trunk
answer, programming 254, 255
BRI 49, 50, 57
cartridge
checking the state 368
DID 52
installation planning 100
line capacity 100
number attached to a module 367
troubleshooting 433
data, settings 237
DID 49, 51
DTI 49
E&M 52
ground start 50
loop start 52
mode 242
module
DID trunk cartridges and RJ-21 wiring connections 168
troubleshooting 441
numbering 49
type 239
types 49
trunk cartridge
wiring chart 166
Trunk Module 339
trunk/line data 235
twelve-port Expansion Cartridge 136
two-port expansion cartridge 135

U

U interface 26
U-LT reference point 26
Unequipped 363, 368
unsupervised trunk mode 242
U-NT reference point 27
Updating state 368
upgrading system 104–115
US regulations 6
user preferences 198

V

version number
  check device 362
videoconferencing and video
  using ISDN applications 90
viewing
  long telephone numbers 198
  programming for a
    telephone 203
voice message
  accessing 232
  external center 328
  waiting indication 232
Voice path
  397
volume, system or set 293

W

warm start 187
wild card character 226, 262
WinkStart signal type 247
wiring
  auxiliary ringer 183
  BRI-ST 157
  BRI-U 159
  connecting 145
  ICS 148–162
  loopback test 394
  modules 148
  requirements 101
  S or T terminal equipment
    178
  station module 164
  U-LT terminal equipment
    180
  U-NT network 161
wiring chart
  auxiliary equipment 154
  BRI 156–160
  BRI trunk module 171–174
  CI trunk cartridge 165, 171
  DTI 162
  E&M/DISA trunk cartridge
    166
  ICS external loop start lines
    155
  ICS telephone 153, 154
  loop start trunk cartridge
    165, 171
  port numbering 148
  station module 164
  trunk module with DID trunk
    cartridge 169, 172
  trunk module with DID trunk
    cartridges and RJ-21
    wiring connections 168

X

XC4.0
  installation spacing
    requirements 98

Tell us what you think...

This is your document. Nortel wants it to work well for you.

Please take a few minutes to answer the questions on the other side of this page. Fax it back to us at the number provided, or mail it to the address below.

Your comments will be used to make improvements.

Thank you. We appreciate your time and consideration.

Enterprise Networks Training and Documentation

Return mail address:

Documentation User Comments Survey
Enterprise Networks Training and Documentation
P.O. Box 833858
M/S H300
Richardson, TX 75083-3858
USA

Fax to:

Documentation User Comments Survey
Enterprise Networks Training and Documentation
1-972-684-8699

Please circle the most appropriate number on the scale for each question.

1. Overall, are you satisfied with this document?

Yes	7	6	5	4	3	2	1	No

1. Is it easy to find information in this document?

Yes	7	6	5	4	3	2	1	No

1. Have you found the information in this document to be technically accurate?

Yes	7	6	5	4	3	2	1	No

1. Is this document clearly written?

Yes	7	6	5	4	3	2	1	No

1. Is the information in this document complete for its purpose?

Yes	7	6	5	4	3	2	1	No

1. Does this document help you do your job?

Yes	7	6	5	4	3	2	1	No

Comments:

_____

_____

_____

_____

_____

Optional: Your name _____ Fax _____

Company _____

After you have finished programming, store your Norstar Programming Overlay in the slots provided on the back cover.

Après avoir terminé la programmation, rangez la grille Norstar dans les fentes prévues à cet effet à la fin de ce guide.

Cuando haya terminado de programar, inserte en estas ranuras su Plantilla de programación Norstar que se encuentra en la contra tapa.