Nortel Meridian 1

Meridian 1 Small System Installation and Commissioning

NN43011-310

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New in this release

The following sections detail what's new in *Meridian 1 Small System Installation and Commissioning* (NN43011-310)

New features

There are no new features in this NTP.

Revision history

December 2007

Standard 02.01. This document is issued to support Communication Server 1000 Release 5.5.

June 2007

Standard 01.02. This document is up-issued to remove the Nortel Networks Confidential statement.

May 2007

Standard 01.01. This document is issued to support Nortel Communication Server 1000 Release 5.0. This document is renamed *Communication Server 1000M and Meridian 1 Small System Installation and Commissioning* (NN43011-310) and contains information previously contained in the following legacy document, now retired:*Communication Server 1000M and Meridian 1 Small System: Installation and Configuration* (553-3011-210).

A stand-alone IP Trunk (ITG Trunk) configuration is the only IP application supported on the Meridian 1 Option 11C platform in Communication Server 1000 Release 5.0. For information on software-only upgrades, refer to *Communication Server 1000M and Meridian 1 Small System Software Upgrades* (NN43011-459).

Small Systems configured with IP Phones or Signaling Servers using Communication Server 1000 Release 4.5 that require an upgrade to Communication Server 1000 Release 5.0 must be upgraded to

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Communication Server 1000E with a Common Processor Pentium Mobile (CP PM) call processor. For migrations to Communication Server Release 5.0, refer to:

- *Communication Server 1000E Upgrade - Option 11C Cabinet to CS 1000E* (NN43041-464)
- *Communication Server 1000E Upgrade - Option 11C Chassis to CS 1000E* (NN43041-465)
- *Communication Server 1000E Upgrade - CS 1000M Cabinet to CS 1000E* (NN43041-466)
- *Communication Server 1000E Upgrade - CS 1000M Chassis to CS 1000E* (NN43041-467)

August 2005

Standard 3.00. This document is up–issued to support Communication Server 1000 Release 4.5.

September 2004

Standard 2.00. This document is up-issued for Communication Server 1000 Release 4.0.

September 2003

Standard 1.00. This document is a new NTP for Succession 3.0. It was created to support a restructuring of the Documentation Library, which resulted in the merging of multiple legacy NTPs. This new document consolidates information previously contained in the following legacy documents, now retired:

- *Option 11C Planning and Installation Guide* (553-3021-210) (Content from *Option 11C Planning and Installation Guide* (553-3021-210) also appears in *Meridian 1 Small System Overview (NN43011-110)*, *Meridian 1 Small System Planning and Engineering (NN43011-220)*, and *Meridian 1 Small System Software-only Upgrade (NN43011-459)*.)
- *Option 11C Mini Planning and Installation Guide* (553-3021-209) (Content from *Option 11C Mini Planning and Installation Guide* (553-3021-209) also appears in *Meridian 1 Small System Overview (NN43011-110)*, *Meridian 1 Small System Planning and Engineering (NN43011-220)*, and *Meridian 1 Small System Software-only Upgrade (NN43011-459)*.)
- *Option 11C and 11C Mini Central Answering Position Guide* (553-3011-320)
- *Option 11C and 11C Mini Customer Configuration Backup and Restore Guide* (553-3011-330)

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(Content from *Option 11C and 11C Mini Customer Configuration Backup and Restore Guide* (553-3011-330) also appears in *Meridian 1 Small System Maintenance (NN43011-700)*.)

- *Option 11C Survivability Operation and Configuration Guide* (553-3011-331)

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Introduction

A stand-alone IP Trunk (ITG Trunk) configuration is the only IP application supported on the Meridian 1 Option 11C platform in Communication Server 1000 Release 5.5. For information on software-only upgrades, refer to *Communication Server 1000E Upgrade - CS 1000S to CS 1000E* (NN43041-470).

Small Systems configured with IP Phones or Signaling Servers using CS 1000 Release 5.0 that require an upgrade to CS 1000 Release 5.5 must be upgraded to Communication Server 1000E with a Common Processor Pentium Mobile (CP PM) call processor. For migrations to Communication Server Release 5.5, refer to:

- *Communication Server 1000E Upgrade - Option 11C Cabinet to CS 1000E* (NN43041-464)
- *Communication Server 1000E Upgrade - Option 11C Chassis to CS 1000E* (NN43041-465)
- *Communication Server 1000E Upgrade - CS 1000M Cabinet to CS 1000E* (NN43041-466)
- *Communication Server 1000E Upgrade - CS 1000M Chassis to CS 1000E* (NN43041-467)
- *Communication Server 1000E Upgrade - CS 1000S to CS 1000E* (NN43041-470)

This document is a global document. Contact your system supplier or your Nortel representative to verify that the hardware and software described are supported in your area.

Subject

This Nortel Publication (NTP) is a reference tool for first-time installation of a Small System. In addition to complete installation instructions, it includes information about Survivability and the Central Answering Position (CAP) feature.

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Note on legacy products and releases

This NTP contains information about systems, components, and features that are compatible with Nortel Communication Server 1000 Release 5.5 software. For more information on legacy products and releases, click the **Technical Documentation** link under **Support & Training** on the Nortel home page:

www.nortel.com

Applicable systems

This document applies to the following systems:

- Meridian 1 PBX 11C Chassis
- Meridian 1 PBX 11C Cabinet

System migration

When particular Meridian 1 systems are upgraded to run CS 1000 Release 5.5 and configured to include a Signaling Server, they become CS 1000E systems. Table 1 "Meridian 1 systems to CS 1000E systems" (page 16) lists each Meridian 1 system that supports an upgrade path to a CS 1000E system.

Table 1
Meridian 1 systems to CS 1000E systems

This Meridian 1 system...	Maps to this CS 1000E system
Meridian 1 PBX 11C Chassis	CS 1000E Cabinet
Meridian 1 PBX 11C Cabinet	CS 1000E Chassis

Note the following:

- When an Option 11C Mini system is upgraded to run CS 1000 Release 5.5 software, that system becomes a Meridian 1 PBX 11C Chassis.
- When an Option 11C system is upgraded to run CS 1000 Release 5.5 software, that system becomes a Meridian 1 PBX 11C Cabinet.

For more information, see *Meridian 1 Small System Software-only Upgrade (NN43011-459)*.

Intended audience

This document is intended for individuals responsible for installing new Small Systems.

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Conventions

Terminology

In this document, a Meridian 1 system is referred to generically as "system".

The following systems are referred to generically as "Small System":

- Meridian 1 PBX 11C Chassis
- Meridian 1 PBX 11C Cabinet

The Meridian 1 PBX 11C Chassis is referred to generically as "Chassis system."

The Meridian 1 PBX 11C Cabinet is referred to generically as "Cabinet system."

Related information

This section lists information sources that relate to this document.

NTPs

The following NTPs are referenced in this document:

- *ISDN Primary Rate Interface Installation and Commissioning (NN43001-301)*
- *Circuit Card Reference (NN43001-311)*
- *ISDN Basic Rate Interface Installation and Commissioning (NN43001-318)*
- *Telephony Manager 3.1 Installation and Commissioning (NN43050-300)*
- *Set-Based Administration (NN43001-603)*
- *Software Input/Output Administration (NN43001-611)*
- *Telephony Manager 3.1 System Administration (NN43050-601)*
- *Telephony Manager 3.1 Telemanagement Applications Fundamentals (NN43050-601)*
- *Telephones and Consoles Fundamentals (NN43001-567)*
- *Software Input/Output Reference - System Messages (NN43001-712)*
- *Software Input Output Reference - Maintenance (NN43001-711)*
- *ISDN Primary Rate Interface Maintenance (NN43001-717)*
- *ISDN Basic Rate Interface Maintenance (NN43001-718)*
- *Meridian 1 Small System Overview (NN43011-110)*
- *Meridian 1 Small System Planning and Engineering (NN43011-220)*

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- *Meridian 1 Small System Software-only Upgrade (NN43011-459)*
- *Meridian 1 Small System Maintenance (NN43011-700)*

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Cabinet system equipment

Contents

This section contains information on the following topics:

"Introduction" (page 19)

"Cabinets" (page 20)

"Cable connectors" (page 20)

"Cooling" (page 21)

"Power supplies" (page 21)

"Reserve power" (page 22)

"Common Equipment circuit cards and components" (page 24)

"Small System Controller card" (page 24)

"Software daughterboard" (page 25)

"IP daughterboards" (page 26)

"Fiber Expansion equipment" (page 27)

Figure 14 "Daughterboards and security device on the NTDK20 SSC card" (page 30)

"SDI/DCH card" (page 30)

The NTAK02 is an optional SDI/DCH card that provides four SDI ports for various applications.

"ISDN and DTI packs" (page 30)

"Peripheral equipment cards" (page 31)

"Telephones and attendant consoles" (page 32)

"Cables and wires" (page 32)

"Miscellaneous items" (page 35)

Introduction

This chapter identifies major components of Cabinet systems. Identification codes are given where appropriate.

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Cabinets

The NTAK11 cabinet is used for both main and expansion cabinets.

Figure 1
NTAK11 cabinet

Cable connectors

Connectors for cables to the cross-connect terminal and SDI ports are found at the bottom of each cabinet.

The AUX, SDI, and Ethernet connectors are located at the bottom left-hand side of the cabinet. The AUX port connects the cabinet to auxiliary equipment such as a Power Failure Transfer Unit (PFTU). The SDI connector in the main and IP expansion cabinets interfaces three SDI ports using a three-port SDI cable. The Ethernet connector in the main cabinet provides a 10 Mbit/s Ethernet port.

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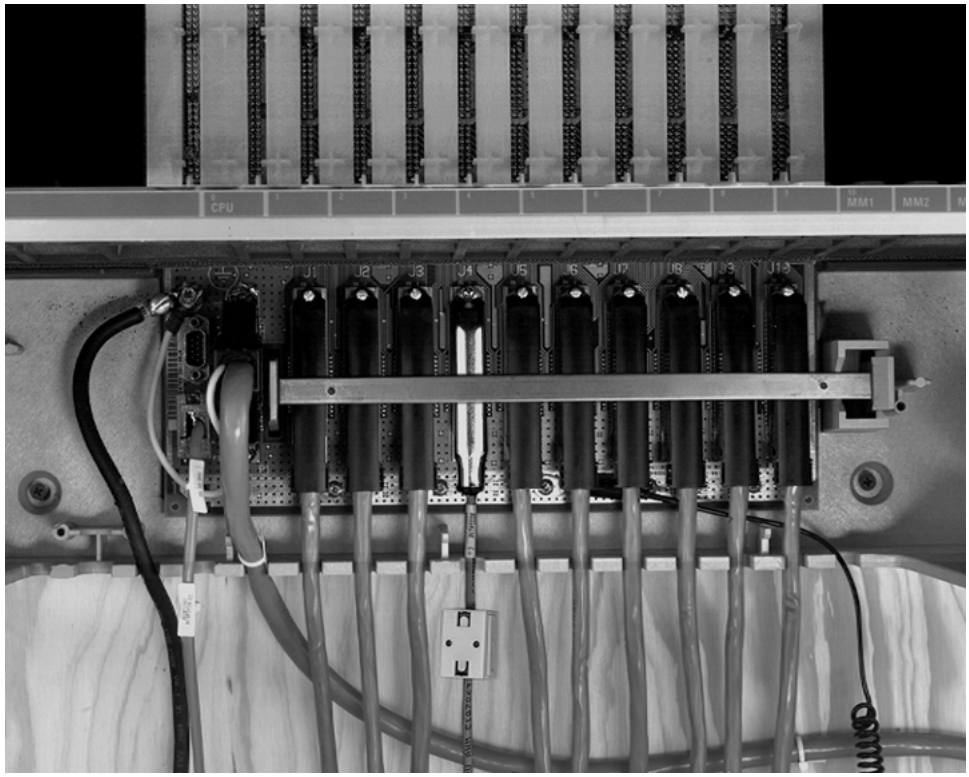
Figure 2
Cable connections



Cooling

The NTAK11 cabinet is designed to permit natural convection cooling. For more information on requirements, refer to "Installing the Cabinet system" (page 73).

WARNING
Do not block cabinet ventilation. Poor ventilation could cause the system to overheat and damage system components, which may result in service interruption.

Power supplies

Two types of power supply are available for the system:

- NTDK70 (for EMEA) AC power supply (see Figure 3 "AC/DC power supply" (page 22))
- NTDK72 DC power supply, used when the cabinet is powered by a -52 V DC source

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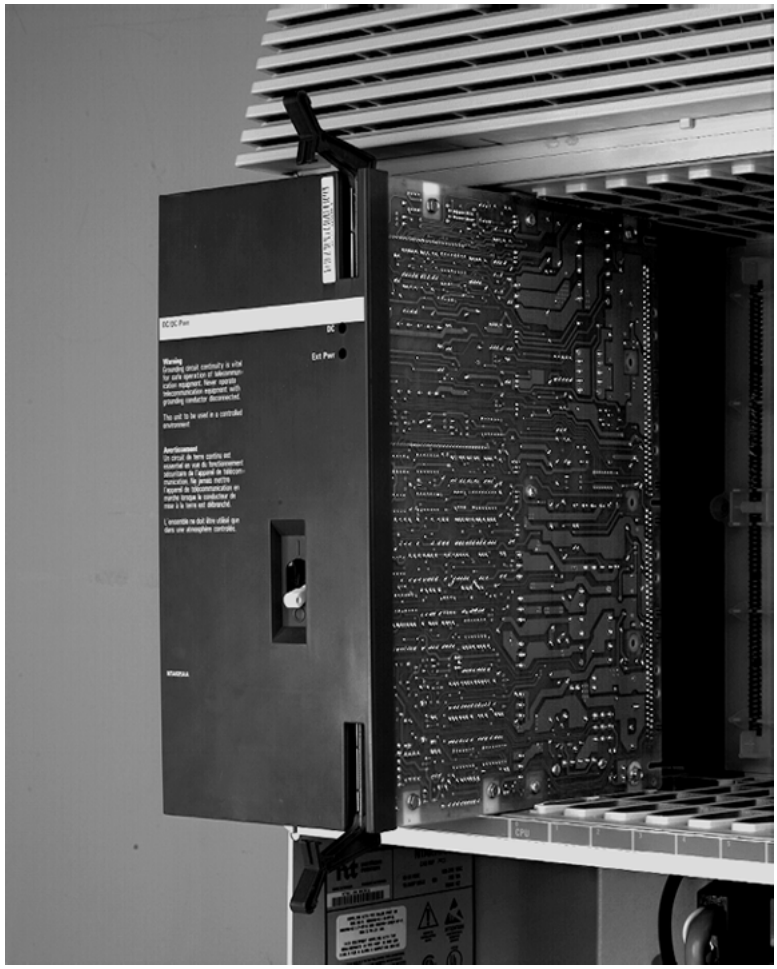
Figure 3
AC/DC power supply



Reserve power

CAUTION
Service Interruption
If the NTDK70 AC power supply is powered down while it is operating on DC reserve power from a battery backup unit, the Cabinet system cannot be powered up again until AC power is restored. Be careful not to open the circuit breaker, either on the battery backup unit, or on the NTDK70, while the system is operating on battery backup.

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Three types of reserve battery power are supported:

- The NTAK75 battery box (shown in Figure 4 "NTAK75 battery box" (page 23)) provides a minimum of two hours of reserve DC power.
- The NTAK76 battery box (shown in Figure 5 "NTAK76 battery box" (page 24)) provides a minimum of 15 minutes of reserve DC power.
- An Uninterruptible Power Supply (UPS) for continuous AC power supply.

Note: Customer-supplied battery backup units can be connected to the cabinets using an NTAK28 Junction Box.

Figure 4
NTAK75 battery box

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Figure 5
NTAK76 battery box

Common Equipment circuit cards and components

The circuit cards described in this section can be used in the main cabinet and the IP expansion cabinets, where indicated.

Small System Controller card

The NTDK20 Small System Controller (SSC) card includes:

- a Central Processing Unit (CPU) that handles call processing
- an Ethernet controller
- system memory

New systems are shipped with the NTDK20 SSC card, with 32 MByte DRAM.

PC Card interface

The NTDK20 SSC card has a 2-slot PC Card interface socket located on its faceplate (socket A is used for installations and upgrades, socket B is used for backups). You can insert a Software Delivery card (PC Card) into

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the socket. Use the PC Card for software upgrades on an existing Cabinet system. You can also use this socket for creating an external backup copy of the customer database.

Digitone receiver, tone generation, tone detection functions

The NTDK20 SSC card provides the following Digitone and other tone functions related to tone:

- 30 channels of Tone and Digit Switch (TDS) and a combination of eight Digitone receivers (DTR) or Dial Tone Detectors (XTD)
- Tone service ports, which can be configured as either four units of MFC/MFE/MFK5/MFK6/MFR or eight DTR/XTD units

Software daughterboard

The NTDK20 SSC card requires a software daughterboard in order to function. The NTTK25 Software daughterboard provides storage for system and customer data. It can be ordered preprogrammed with system software and customer data.

For CS 1000 Release 5.5 software, the minimum requirements are:

- 32 MByte DRAM
- 16 MByte primary flash
- 32 MByte program store

An NTDK20 SSC card with 32 MByte DRAM and equipped with an NTTK25 or NTTK13 Software daughterboard meets the minimum requirements.

Security device

A security device is required on the NTDK20 SSC card of the main and all IP expansion cabinets. The SSC card is equipped with a socket designed to hold the security device. The security device is shipped with each new Cabinet system. When the SSC card is shipped, the security device is normally not attached to the socket on the SSC card. You must attach the security device to the SSC card during initial installation.

There are two types of security devices:

- The NT_STD required in the main cabinet
- The NT_REM required in the IP expansion cabinets

Note: The NT_REM is programmed to match the main cabinet device.

Both devices look identical, but can easily be identified by the label.

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IP daughterboards

For IP connectivity, four IP daughterboards are available:

- The NTDK99 single-port 100BaseT
- The NTDK83 dual-port 100BaseT
- The NTTK01 single-port 100BaseF
- The NTTK02 dual-port 100BaseF

Figure 6
The NTDK99 Daughterboard

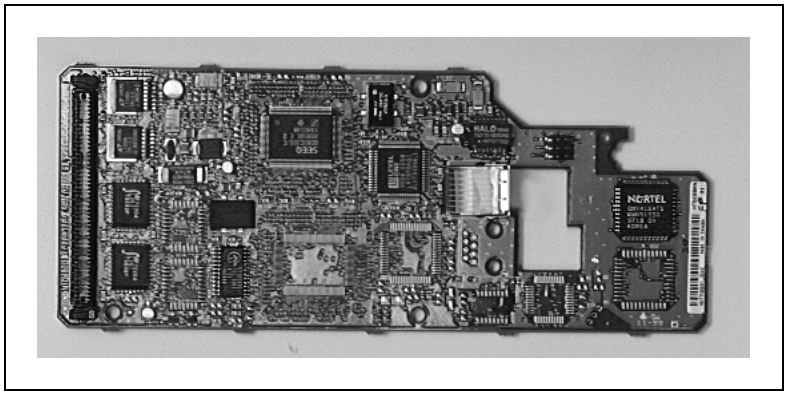

Figure 7
The NTDK83 IP Daughterboard

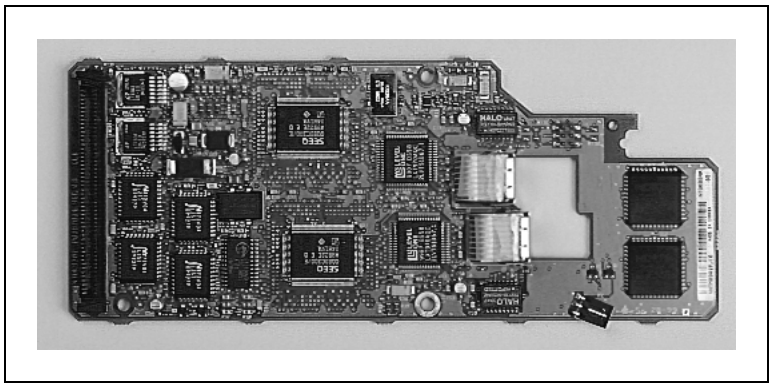

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Figure 8
The NTTK01 Daughterboard

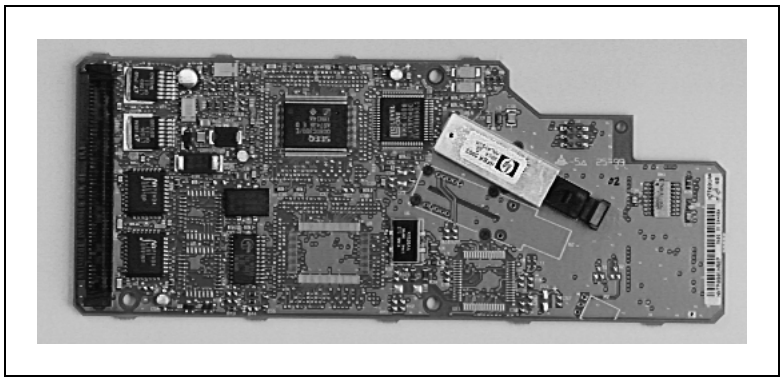
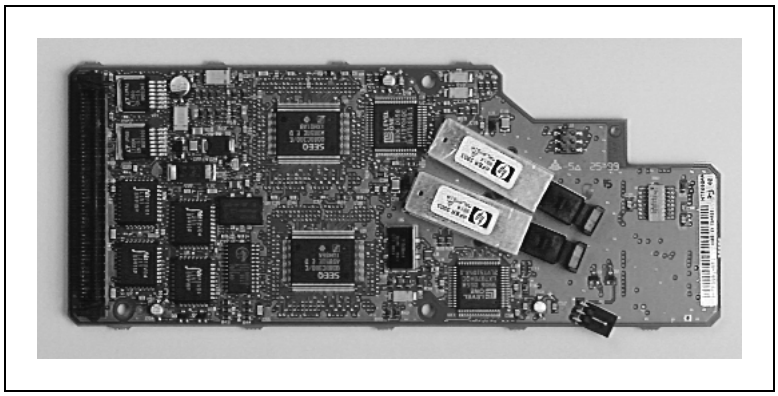


Figure 9
The NTTK02 IP Daughterboard



Fiber Expansion equipment

For non-IP expansion, fiber expansion daughterboards in the main cabinet and fiber receiver cards in expansion cabinets allow for fiber connectivity between the main cabinet and up to four fiber Expansion Cabinets or Chassis.

Fiber Receiver card

There are three versions of the Fiber Receiver card. Each has a corresponding Fiber Expansion daughterboard:

- NTDK23 (10 m / 33 ft, Plastic Multinode)
- NTDK25 (3 km / 1.8 mi, Multimode)
- NTDK80 (3 km / 1.8 mi, Single Mode)

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Fiber Expansion daughterboard

Single-port Fiber Expansion daughterboard The Single-port Fiber Expansion daughterboards and their Fiber Receiver card counterparts are:

- The NTDK22 Fiber Expansion daughterboard. Its Fiber Receiver card counterpart is the NTDK23.
- The NTDK24 daughterboard. Its Fiber Receiver card counterpart is the NTDK25.
- The NTDK79 daughterboard. Its Fiber Receiver card counterpart is the NTDK80.

Figure 10
The NTDK22 Fiber Expansion daughterboard

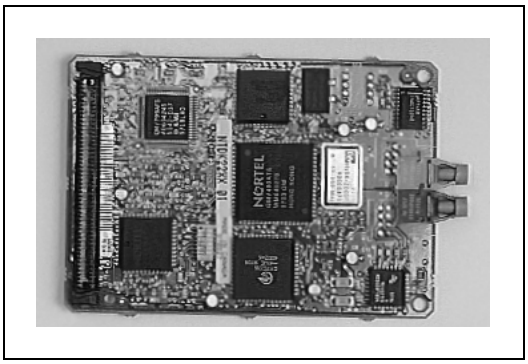
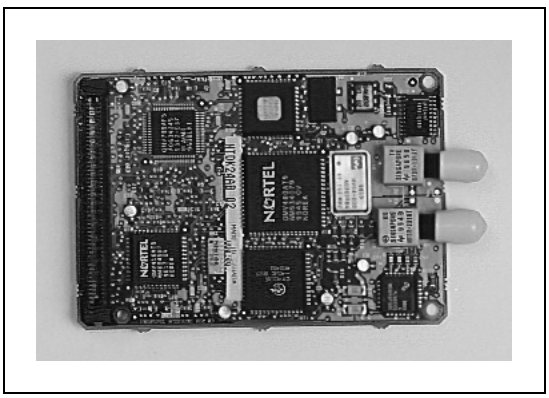


Figure 11
The NTDK24 Daughterboard



Dual-port Fiber Expansion daughterboard The Dual-port Fiber Expansion daughterboards and their Fiber Receiver counterparts are:

- The NTDK84 Dual-port Fiber Expansion daughterboard. Its Fiber Receiver card counterpart is the NTDK23.
- The NTDK85 daughterboard. Its Fiber Receiver card counterpart is the NTDK25.

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Figure 12
The NTDK84 Daughterboard

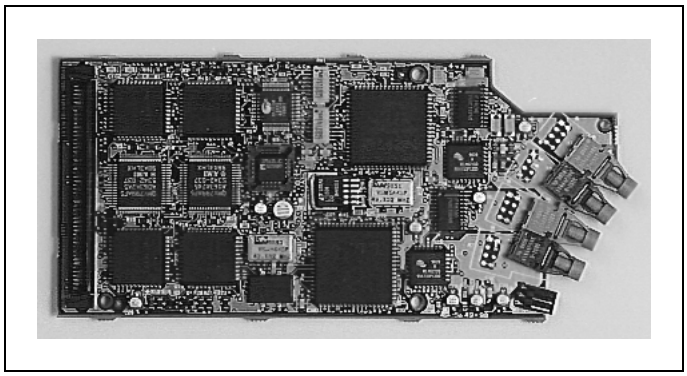

Figure 13
The NTDK85 Daughterboard

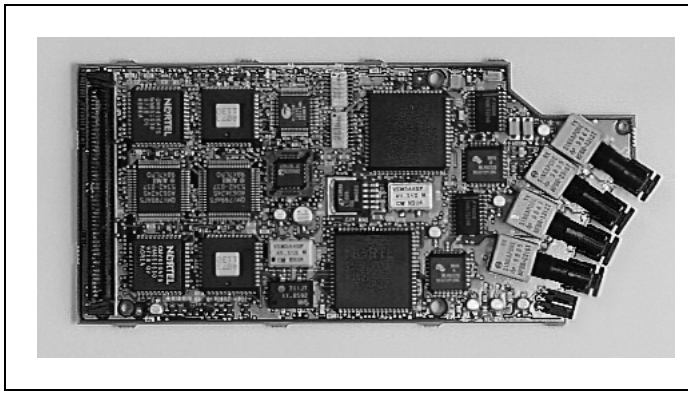

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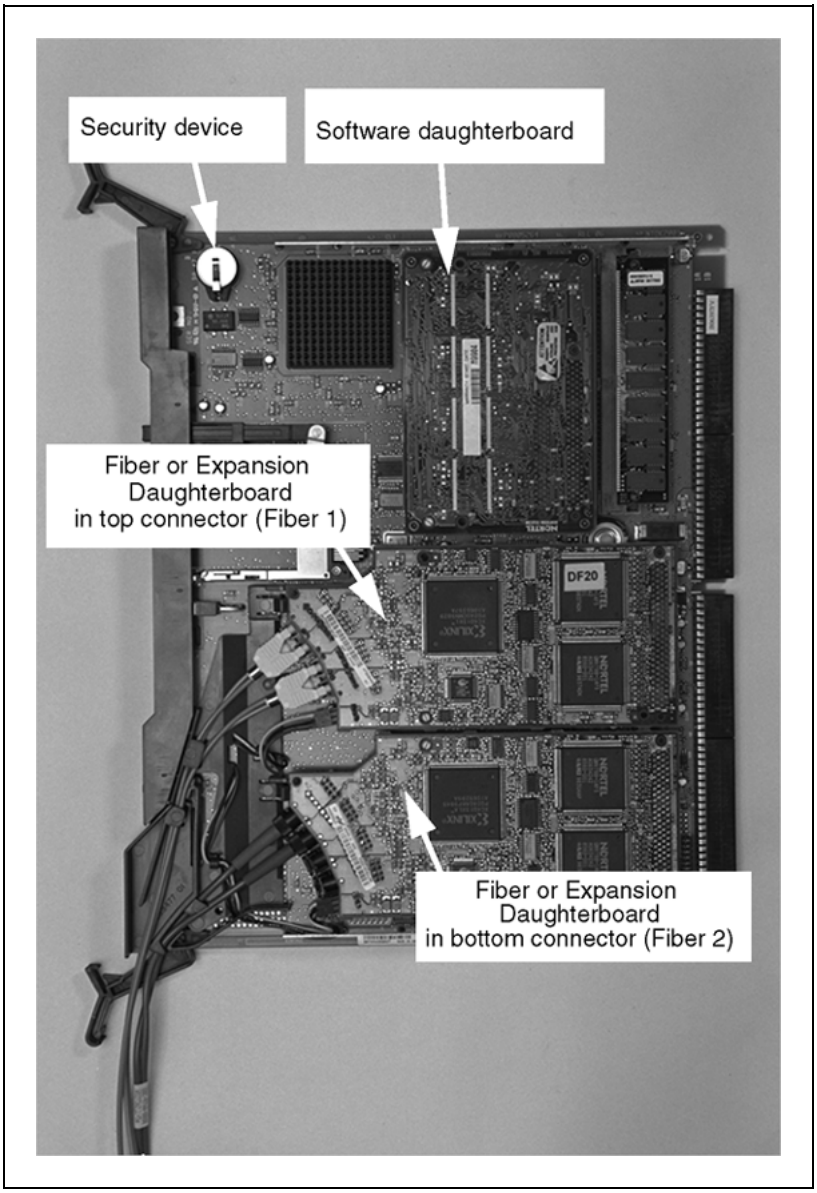
Figure 14
Daughterboards and security device on the NTDK20 SSC card



SDI/DCH card

The NTAK02 is an optional SDI/DCH card that provides four SDI ports for various applications.

ISDN and DTI packs

Table 2 "Common equipment packs supported in Cabinet system IP cabinets" (page 31) lists the packs required to support Integrated Services Digital Networks (ISDN) and Digital Trunk Interface (DTI) functionality in Cabinet systems.

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Table 2
Common equipment packs supported in Cabinet system IP cabinets

Pack	Daughterboard	Supported application
1.5 MByte TMDI (NTRB21)	CC (NTAK20)	downloadable DCH clock controller (stratum 3/4)
2.0 MByte DTI (NTAK20)	n/a	clock controller (stratum 3/4)
2.0 MByte PRI (NTAK10)	n/a	clock controller (stratum 3/4) DCH
2.0 MByte PRI (NTBK50)	DDCH (NTBK51) CC (NTAK20)	downloadable DCH clock controller (Stratum 3/4)
MISP (NTBK22)	CC (NTAK20)	MISP BRI processor clock controller (stratum 3/4)
SDI_DCH (NTAK02)	n/a	only DCH is supported; ESDI, AML, TTY are not supported
Card Option Mail is not supported	n/a	n/a

Peripheral equipment cards

The following Intelligent Peripheral Equipment (IPE) cards can be used in main and IP expansion cabinets:

- NT1R20 Off-Premise Station (OPS) analog line card
- NT8D02 digital line card
- NT8D03 analog line card
- NT8DO9 analog message waiting line card
- NT8D14 Universal Trunk card
- NT8D16 Digitone Receiver card
- NT8D15 E&M Trunk card
- NT5D14 lineside T1 card
- NT5D34 lineside E1 card
- NT5K02 (International) analog line card
- NT5K18 (International) 8 Port COT/PPM trunk card
- NT5K17 (International) 8 Port DID trunk card
- NT5K19 (International) 4 Port 2W/4W E&M, RAN, Paging AC15 trunk card
- NT5K21 (International) Multi Frequency Compelled Sender/Receiver card
- NT5K36 (International) 4 Port German DID/DOD trunk card

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- NT7D16 Data Access Card (DAC)
- NTAG26 Extended Multi-frequency Receiver (XMFR) card

Telephones and attendant consoles

Supported telephones are as follows:

- Analog (500/2500-type) telephones with or without message waiting lamps.
- Meridian Digital Telephones (M2006, M2008, M2216, M2616).
- M2616 or M2216 Central Answering Position (CAP). This telephone must be equipped with an ACD LCD display in order to function as a CAP telephone.
- Meridian 2250 (TCM) attendant consoles.

Cables and wires

Glass fiber optic cable requirements

The Option 11C fiber optic link for distances up to 3 km (1.8 mi) uses the industry standard 62.5/125 µm glass multi-mode duplex cable or 9/125 µm glass Single Mode duplex cable with ST-type connectors.

The type of cable used depends on the type of installation and any local building codes.

Table 3 "Multi and Single-mode glass optical cable requirements for distances up to 3 km (1.8 mi)" (page 32) lists the optical requirements for glass fiber optic cable used with the Option 11C.

Table 3
Multi and Single-mode glass optical cable requirements for distances up to 3 km (1.8 mi)

Parameter	Minimum	Typical	Maximum	Units
Glass Fiber Cable Length			3.0	km
Cable Attenuation @1300 nm		1.5 (multi-mode) 0.5 (Single Mode)	2.0 (multi-mode) 0.7 (Single Mode)	dB/km
Modal Bandwidth @1300 nm	200	500		MHz * km

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Parameter	Minimum	Typical	Maximum	Units
Chromatic Dispersion @1300 nm		6		ps / nm * km
Typical 3 dB Optical Bandwidth		180		MHz * km

The fiber link is limited to a maximum length of 3 km. To guarantee reliable operation, a bandwidth of 150% should be maintained. If the link is increased beyond the 3 km length the 150% margin is deteriorated possibly resulting in link malfunction under some conditions. Table 4 "Cabinet system miscellaneous cables and wires" (page 33) lists miscellaneous cables and wires used with the Chassis system.

Table 4
Cabinet system miscellaneous cables and wires

Cable and Wire	Purpose / Description
A0632902 Fiber-optic cable (multi-mode plastic)	Connects a main and expansion chassis by interfacing with a fiber expansion daughterboard and a Fiber Receiver card. Length: 10 m (33 ft)
A0632902 Fiber-optic cable (multimode plastic)	Connects a main and expansion cabinet by interfacing with a fiber expansion daughterboard and a Fiber Receiver card. Length: 10 m (33 ft)
NE-A25B 25-pair cable	Connects Intelligent Peripheral Equipment cards to the cross-connect terminal. NE-A25B connectors are on the back of each cabinet.
NTAK19 cable	SDI cable used with the NTAK02 circuit card (see Note 1).
NTAK1118/1118 9- to 25-pin RS232 converter cable	Connects SDI ports and terminals (see Note 1).
A0378652 F-F DCE to DTE converter, or A0381016 F-M DCE to DTE converter	Connects SDI ports to equipment, such as TTYs and modems.
NTBK04 1.5 Mbit DTI/PRI carrier cable (A0394216)	Connects the NTAK09 1.5 Mbit DTI/PRI card to the Channel Service Unit (CSU). The NTBK04 carries Tx and Rx pairs to a standard 5-pin connector.

Note 1: This cable is available in different versions, depending on local EMC specifications.

Note 2: These cables are not supported under EMC specifications VL43.140P.

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Cable and Wire	Purpose / Description
NTBK05AA/DA 2.0 Mbit DTI/PRI carrier cable A0394217	Carries Tx and Rx pairs to a standard 120-Ohm D-connector (see Note 1).
NT8D7205	DTI/PRI carrier cable
NTBK05CA coaxial cable NTBK05DA twisted pair cable NTAK10 2.0 Mbit DTI cable NTAK79 2.0 Mbit PRI cable NTAK50 2.0 Mbit PRI cable	These cables provide DTI/PRI connections. The cables carry Tx and Rx pairs to a standard 5-pin connector (see Note 2).
25-pair inside wiring cables equipped with amphenol-type connectors	Extend the Intelligent Peripheral Equipment connections from the system chassis to the cross-connect terminal, and connect PFTUs.
#6 AWG (#40 Metric Wire Gauge) insulated ground wire	Connects a system cabinet to a building ground source.
#6 AWG (10 mm^2) insulated ground wire (UK)	Connects a system cabinet to a building ground source.
#6 AWG (20 mm^2) insulated ground wire (Europe)	Connects a cabinet to a building ground source.
#8 AWG (10 mm^2) insulated ground wire (Germany)	Connects a cabinet to a building ground source.
Cross-connect wire	Makes cross connections at the cross-connect terminal.
Note 1: This cable is available in different versions, depending on local EMC specifications. ***Note 2:*** These cables are not supported under EMC specifications VL43.140P.	

Table 5 "AC power cord kits" (page 34) lists the AC power cord kits for various countries. These cords connect a system cabinet to a commercial AC power source.

Table 5
AC power cord kits

Country / Region	AC Power Cord	Voltage Rating	Current Rating	Plug Type
North America	A0379412	250 V	10 A	NEMA 6-15P
Argentina	A0814961	250 V	10 A	IRAM 2073
North America	NTTK14	125 V	13 A	NEMA 5-15P
Australia/New Zealand	NTTK15	250 V	10 A	AS3112
Europe	NTTK16	250 V	10 A	CEE(7)VII

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Country / Region	AC Power Cord	Voltage Rating	Current Rating	Plug Type
Switzerland	NTTK17	250 V	10 A	SEV 1011
UK/Ireland	NTTK18	250 V	10 A	BS1363
Denmark	NTTK22	250 V	10 A	AFSNIT

Miscellaneous items

The following is a list of typical miscellaneous items that can be used as part of the system installation. Quantities needed depend on the site and customer requirements:

- QUA6 Power Failure Transfer Units (PFTU) to transfer lines during a power or system failure
- NTBK80 grounding block
- modems or Data Communication Equipment (DCE) for remote access to the system
- on-site Data Terminating Equipment (DTE) or teletypewriter (TTY) terminal for accessing the system
- connecting blocks for the cross-connect terminal
- transformers and centralized power supplies for items such as digit displays on telephones
- optional equipment such as music sources, RAN machines, paging equipment, and CDR devices
- NT1R20 Off-Premise Station Analog Line Card. Each card has eight ports. Each of the units on the card can be configured to be operated as an OPS or in an On-Premise (ONS) configuration
- additional Modem Eliminator (NULL Modem without hardware handshaking) A0601397 converter may be required to interface the DTE to the system
- NTTK41 EMC grounding clip is required, for EMC compliance, on the front stiffener rail of cabinets using100BaseT connections. Refer to Figure 15 "EMC grounding clip on the cabinet" (page 36).

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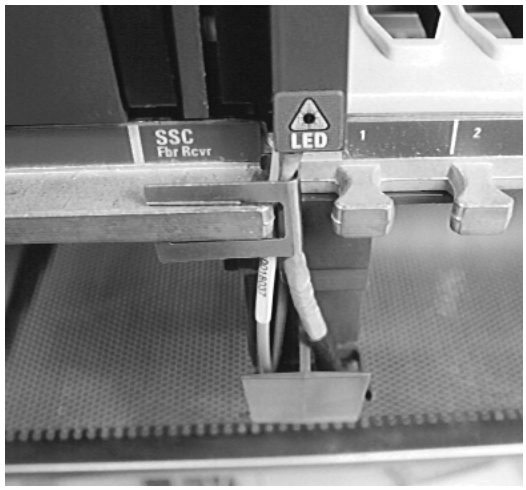
Figure 15
EMC grounding clip on the cabinet



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Chassis system equipment

Contents

This section contains information on the following topics:

"Introduction" (page 37)
"Main components of the Chassis system" (page 37)
"NTDK91 chassis and NTDK92 chassis expander" (page 37)
"Power supply" (page 41)
"Reserve power supply" (page 43)
"Circuit cards" (page 44)
"IP daughterboards" (page 26)
"Lineside E1/T1 cards" (page 46)
"Fiber expansion" (page 46)
"Telephones and attendant consoles" (page 46)
"Cables and wires" (page 47)
"Miscellaneous items for installation" (page 50)

Introduction

This chapter describes the main components used to install the Chassis system. This chapter also describes the differences between the Chassis system and the Cabinet system.

Main components of the Chassis system

NTDK91 chassis and NTDK92 chassis expander

A Chassis system comprises an NTDK91 chassis plus an optional NTDK92 chassis expander. The chassis can be connected to the chassis expander to increase line capacity.

The chassis supports the following:

- NTDK20 Small System Controller (SSC) card installed in slot 0
- any IPE or CE card in slots 1, 2, and 3

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- a dedicated 48-port Digital Line Card (NTDK16) in slot 4

The chassis expander supports the following:

- Meridian Mail in slot 10 only.
- With Meridian Mail in slot 10, you can insert any IPE card in slots 7, 8, and 9.

Chassis installation options

You can install the chassis and chassis expander in the following positions:

- in a rack/equipment cabinet
- on a wall
  - vertically on a wall
  - horizontally on a wall

The following chassis installation kits are available:

- NTTK08AA: for vertical, wall installation
- NTTK09AA: for rack/cabinet installation
- NTTK11AA: for horizontal, wall installation

Cable connectors

25-pair cables connect cards to the cross-connect terminal. Connectors for these cables are on the back of the chassis and the chassis expander. See Figure 16 "25-pair cable connectors on the back of the chassis" (page 39).

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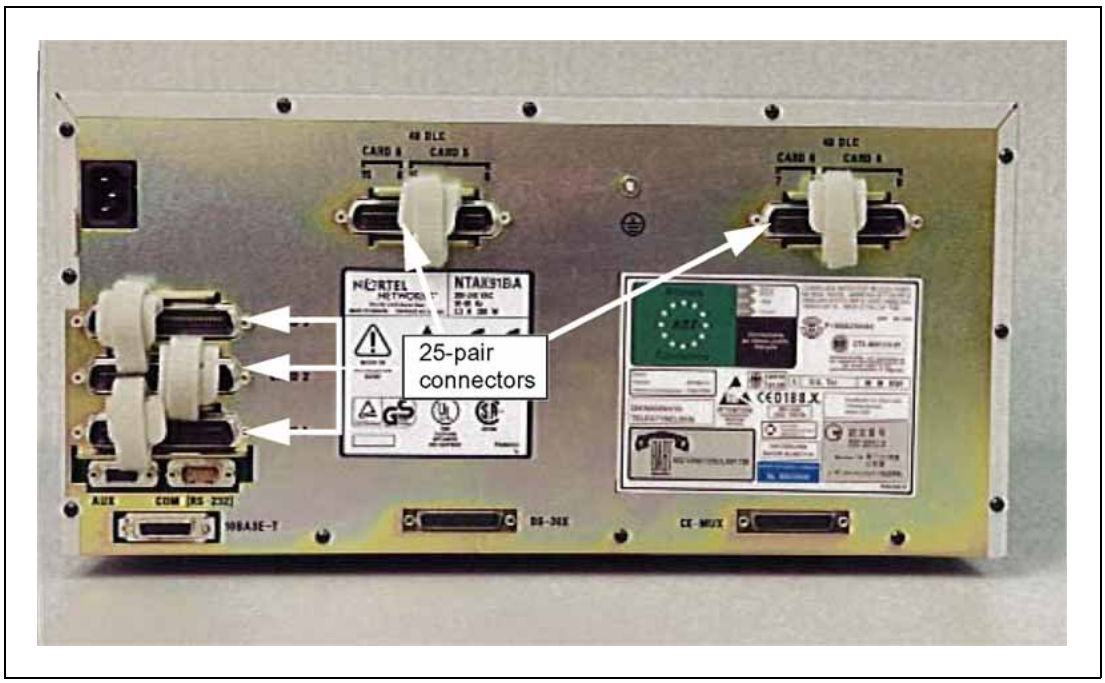
Figure 16
25-pair cable connectors on the back of the chassis



The Auxiliary (AUX), Serial Data Interface (SDI), and Ethernet connectors are on the back left-hand side of the chassis. See Figure 17 "Connectors on the back of the chassis" (page 40).

The AUX port connects auxiliary equipment, such as a Power Failure Transfer Unit (PFTU), to the Chassis system. The SDI connector in the chassis interfaces three SDI ports using a three-port SDI cable. The Ethernet connector in the chassis provides a 10 Mbit Ethernet network interface. The Ethernet network interface accepts an industry-standard Media Access Unit (MAU). Insert the Cat5 Ethernet cable into this MAU.

The back of the chassis also contains connectors for connecting the chassis and the chassis expander. These connectors are for the DS-30X and CE-MUX connections. See Figure 17 "Connectors on the back of the chassis" (page 40).

The power connector is at the back of the chassis on the upper left-hand side. See Figure 17 "Connectors on the back of the chassis" (page 40). Secure the power cord with a cable tie.

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Figure 17
Connectors on the back of the chassis

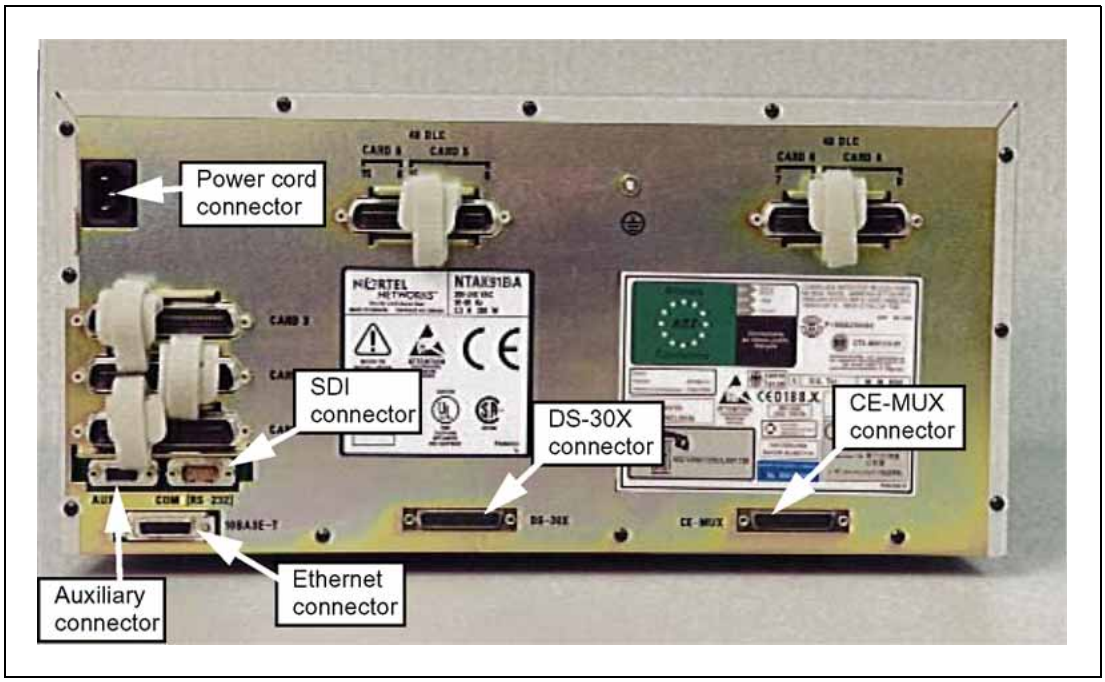
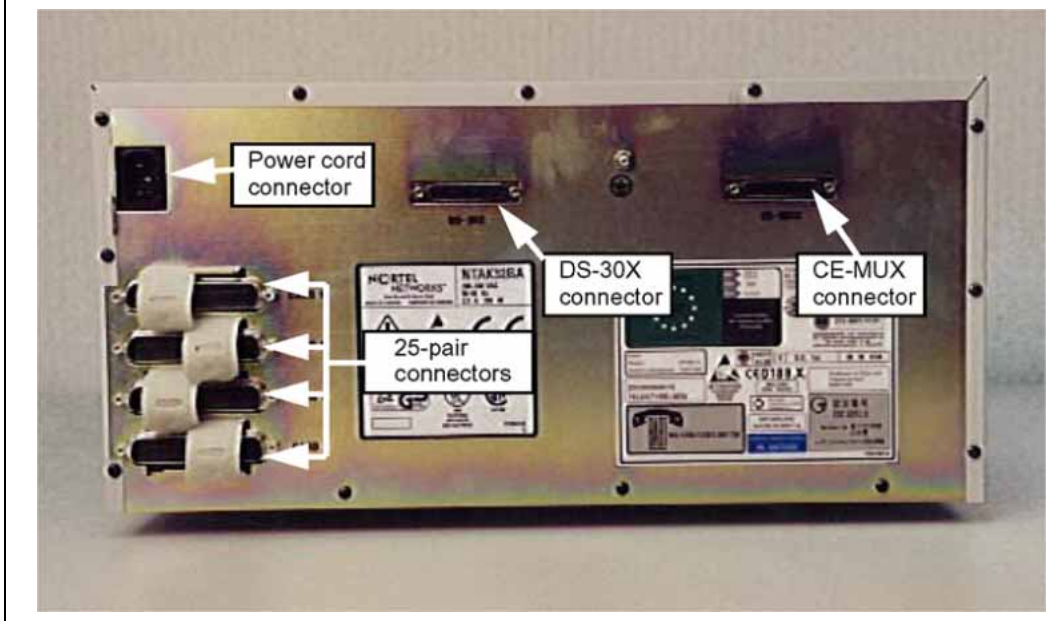


Figure 18 "Connectors on the back of the chassis expander" (page 40) shows the connectors on the back of the chassis expander.

Figure 18
Connectors on the back of the chassis expander



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Cooling

The NTDK91 chassis and the NTDK92 chassis expander have forced air cooling. As a result, you can install the chassis in a horizontal or vertical position. The fan inside the chassis is controlled by heat. It runs at a reduced speed at room temperature.

WARNING

Do not block chassis ventilation. Poor ventilation could cause the system to overheat and damage system components, which may result in service interruption.

Power supply

The universal power supply in the Chassis system uses AC input. The power supply is factory installed and not customer replaceable. The Chassis system does not support DC input.

Power switch

There is a power switch on the front of the NTDK91 chassis and the NTDK92 chassis expander. Use this switch to turn the system power on and off. See Figure 19 "Front of chassis" (page 43).

Power status indicator

There is a power status indicator (LED) on the front cover (top left-hand corner) of the chassis and the chassis expander. When the LED is green, the power is in operation. When the LED is off, there is a power failure of one of the power outputs. See Figure 19 "Front of chassis" (page 43).

Power supply DIP switch settings

Use a DIP switch to set ringing voltages, ringing frequencies, and message waiting voltages. See Table 7 "Asia Pacific/CALA power supply DIP switch settings" (page 42) and Figure 19 "Front of chassis" (page 43) for all DIP switch setting options. Typical settings are shown for the following regions:

- Table 7 "Asia Pacific/CALA power supply DIP switch settings" (page 42)
- Table 8 "Europe power supply DIP switch settings" (page 42)
- Table 9 "North American power supply DIP switch settings" (page 43)

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Table 6
Power supply DIP switch settings

Ringing Frequency (Hz)				Ringing Amplitude (Vrms)					Message Waiting Lamp (VDC)			
Switch Setting	20	25	50	**Switch Setting**	70	75	80	86	**Switch Setting**	-120	-150	Disable
1	ON	OFF	ON	3	OFF	ON	ON	ON	6	NOT USED		
2	ON	ON	OFF	4	OFF	OFF	ON	ON	7	OFF	OFF	ON
				5	OFF	OFF	OFF	ON	8	OFF	ON	X

Table 7
Asia Pacific/CALA power supply DIP switch settings

Ringing Frequency (Hz)				Ringing Amplitude (Vrms)					Message Waiting Lamp (VDC)			
Switch Setting	20	25	50	**Switch Setting**	70	75	80	86	**Switch Setting**	-120	-150	Disable
1	OFF			3	ON				6	NOT USED		
2	ON			4	OFF				7	OFF		
				5	OFF				8	ON		

Table 8
Europe power supply DIP switch settings

Ringing Frequency (Hz)				Ringing Amplitude (Vrms)					Message Waiting Lamp (VDC)			
Switch Setting	20	25	50	Switch Setting	70	75	80	86	Switch Setting	-120	-150	Disable
1	OFF			3	ON				6	NOT USED		
2	ON			4	OFF				7			ON
				5	OFF				8			ON

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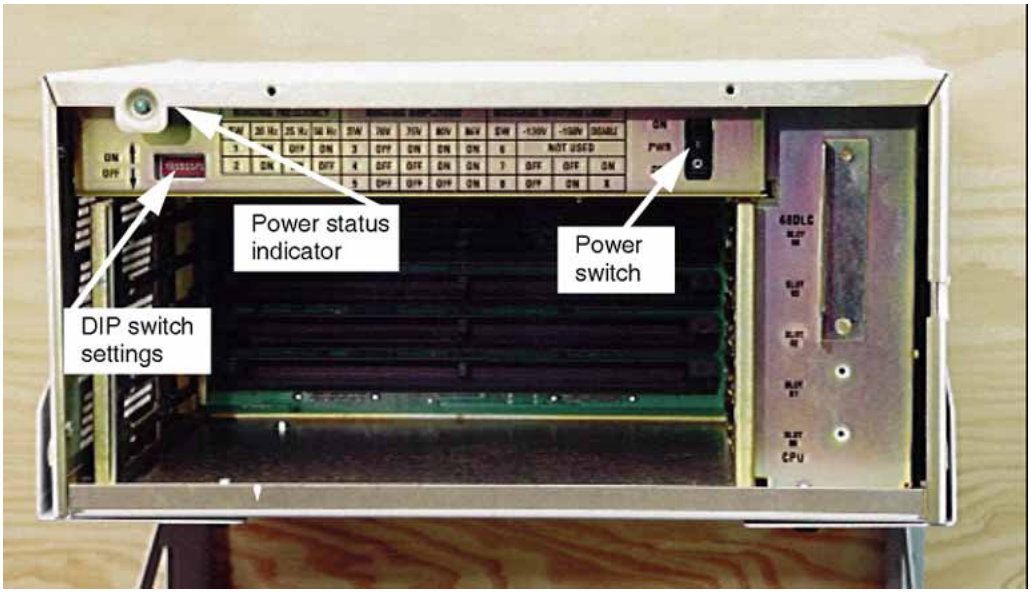
Table 9
North American power supply DIP switch settings

Ringing Frequency (Hz)				Ringing Amplitude (Vrms)					Message Waiting Lamp (VDC)			
Switch Setting	20	25	50	**Switch Setting**	70	75	80	86	**Switch Setting**	-120	-150	Disable
1	ON			3				ON	6	NOT USED		
2	ON			4				ON	7			ON
				5				ON	8			ON

Note: Set the DIP switches before the system powers up.

Figure 19 "Front of chassis" (page 43) shows the power switch, power status indicator, and DIP switch settings.

Figure 19
Front of chassis



Reserve power supply

You can use an Uninterruptible Power Supply (UPS) to provide a backup power supply for the NTDK91 and the NTDK92 chassis. A UPS provides a continuous AC power supply. Install the UPS unit according to the manufacturer's instructions. Refer to the power consumption information

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in the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)*. This section contains worksheets to help you determine the power draw for the UPS.

Circuit cards

The Chassis system supports the NTDK20 SSC card and the NTDK16 48-port Digital Line Card. This section provides a short overview of these two cards. For more information about other circuit cards supported on the Chassis system, refer to "Installing optional circuit cards" (page 189).

NTDK20 SSC card and components

The NTDK20 SSC card includes:

- a Central Processing Unit (CPU) that handles call processing
- an Ethernet controller
- system memory

New systems are shipped with the NTDK20 SSC card, with 32 MByte DRAM.

You must install the SSC card in slot 0.

Software Daughterboard

The NTDK20 SSC card requires a software daughterboard in order to function. The NTTK25 Software daughterboard provides 64 MBytes of storage for system and customer data. It can be ordered preprogrammed with system software and customer data.

For CS 1000 Release 5.5 software, the minimum requirements are:

- 32 MByte DRAM
- 16 MByte primary flash
- 32 MByte program store

An NTDK20 SSC card with 32 MByte DRAM and equipped with an NTTK13 or NTTK25 Software daughterboard meets the minimum requirements.

PC Card interface The NTDK20 SSC card has a 2-slot PC Card interface socket located on its faceplate (socket A is used for installations and upgrades, socket B is used for backups). You can insert a Software Delivery card (PC Card) into the socket. Use the PC Card for software upgrades on an existing Chassis system. You can also use this socket for creating an external backup copy of the customer database.

SDI ports The NTDK20 SSC card contains three SDI ports used to connect on-site terminals or remote terminals through a modem.

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Ethernet network interface The NTDK20 SSC card has a 10 Mbit Ethernet network interface. The 15-pin connector, located on the back of the chassis, provides external connection to the Ethernet network interface. This connector is for a standard 15-pin AUI interface for a MAU.

Digitone receiver, tone generation, tone detection functions The NTDK20 SSC card provides the following Digitone and other tone functions related to tone:

- 30 channels of Tone and Digit Switch (TDS) and a combination of eight Digitone receivers (DTR) or Dial Tone Detectors (XTD)
- Tone service ports, which can be configured as either four units of MFC/MFE/MFK5/MFK6/MFR or eight DTR/XTD units

Security device

A security device is required on the NTDK20 SSC card of the main and all IP chassis expanders. The SSC card is equipped with a socket designed to hold the security device. The security device is shipped with each new Chassis system. When the SSC card is shipped, the security device is normally not attached to the socket on the SSC card. You must attach the security device to the SSC card during initial installation.

There are two types of security devices:

- The NT_STD required in the main chassis
- The NT_REM required in the IP chassis expanders

Note: The NT_REM is programmed to match the main chassis device.

Both devices look identical, but can easily be identified by the label.

NTDK16 48-port Digital Line Card

The NTDK16 48-port Digital Line Card provides an interface to a maximum of 48 digital integrated voice and 48 data ports. The NTDK16 Digital Line Card is functionally equivalent to three NT8D02 Digital Line Cards.

Note 1: Only place the NTDK16 Digital Line Card in slot 4 of the chassis.

Note 2: The NTDK16 Digital Line Card is not required for the Chassis system to operate.

IP expansion

For IP connectivity, four IP daughterboards are available:

- The NTDK99 single-port 100BaseT
- The NTDK83 dual-port 100BaseT
- The NTTK01 single-port 100BaseF

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- The NTTK02 dual-port 100BaseF

Lineside E1/T1 cards

The Chassis system also supports the following lineside cards:

- NT5D14 lineside T1
- NT5D34 lineside E1

For further information about T1/E1 lineside cards, refer to *Circuit Card Reference (NN43001-311)*.

Fiber expansion

For non-IP expansion, fiber expansion daughterboards in the chassis and Fiber Receiver cards in the expansion chassis allow for fiber connectivity between the chassis and up to four fiber expansion chassis or cabinets.

Fiber Receiver card

Multi-chassis Small Systems require an NTDK23 Fiber Receiver card in each additional chassis. The NTDK23 supports a 10 m (33 ft) plastic fiber-optic cable. Each Fiber Receiver card provides one SDI port for remote TTY access.

Fiber Expansion daughterboard

Fiber expansion daughterboards must be installed on the NTDK20 SSC card in order to connect to additional chassis. There are two kinds of fiber expansion daughterboards that can be matched with the NTDK23 Fiber Receiver card:

- NTDK22 Single-port Fiber Expansion daughterboard
- NTDK84 Dual-port Fiber Expansion daughterboard

Both daughterboards are used with the A0632902 Fiber-optic (multimode) cable.

Routing Guides

Each chassis in a multi-chassis system requires a Routing Guide, in order to route and manage the fiber-optic cable. Only one guide is required in each chassis.

Telephones and attendant consoles

The Chassis system supports the following telephones and attendant consoles:

- Analog (500/2500-type) telephones, with or without message waiting lamps
- Meridian Digital Telephones (M2006, M2008, M2216, M2616)

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- Meridian Digital Telephones (M3110, M3310, and M3820)

  Note: The M3110, M3310, and M3820 Meridian Digital Telephones are available in Europe only.

- Meridian Digital Telephones (M3901, M3902, M3903, M3904, and M3905)

  Note: Only the M3901 and the M3905 Meridian Digital Telephones are supported in Europe.

- M2616 or M2216 Central Answering Position (CAP). These telephones must have an ACD LCD display installed to function as a CAP telephone.
- Taurus sets
- Meridian 2250 (TCM) attendant consoles
- Attendant PC

Cables and wires

Table 10 "Chassis system cable kits" (page 47) lists Chassis system cable kits and their contents.

Table 10
Chassis system cable kits

Cable or wire	Purpose/description
NTDK88 Main cable kit	
NTBK48 three-port SDI cable	Connects equipment, such as TTYs and modems, to the Chassis system. Use the NTBK48 with the NTDK20 SSC card.
NTAK1104 AUX cable	Connects a PFTU to a system chassis.
A0601396 F-M DCE to DTE converter	You can use the A0601396 when connecting SDI ports to equipment, such as TTYs and modems.
A0601397 F-F DCE to DTE converter	You can use the A0501397 when connecting SDI ports to equipment such as TTYs and modems.
NTDK89 chassis expander cable kit	
NTDK95 CE-MUX/DS-30X bus cable	Connects the chassis to the chassis expander. You need two of these cables to connect the chassis and the chassis expander. Length: 0.6 m (2 ft)
A0632902 Fiber Optic cable (multi-mode plastic)	Connects a Main and Expansion chassis by interfacing with an expansion daughterboard and a Fiber Receiver card. Length: 10 m (33 ft)
Glass Fiber Optic (multi-mode or single mode, depending on interface) cable up to 3 km (1.8 mi)	Must be supplied locally by a facilities provider. Length up to 3 km (1.8 mi)

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Table 11 "AC power cord kits" (page 48) lists the AC power cord kits for various countries. These cords connect a system chassis to a commercial AC power source.

Table 11
AC power cord kits

Country / Region	AC Power Cord	Voltage Rating	Current Rating	Plug Type
North America	A0379412	250 V	10 A	NEMA 6-15P
Argentina	A0814961	250 V	10 A	IRAM 2073
North America	NTTK14	125 V	13 A	NEMA 5-15P
Australia/New Zealand	NTTK15	250 V	10 A	AS3112
Europe	NTTK16	250 V	10 A	CEE(7)VII
Switzerland	NTTK17	250 V	10 A	SEV 1011
UK/Ireland	NTTK18	250 V	10 A	BS1363
Denmark	NTTK22	250 V	10 A	AFSNIT

Glass fiber optic cable requirements

The Option 11C fiber optic link for distances up to 3 km (1.8 mi) uses the industry standard 62.5/125 µm glass multi-mode duplex cable or 9/125 µm glass Single Mode duplex cable with ST-type connectors.

The type of cable used depends on the type of installation and any local building codes.

Table 12 "Multi and Single-mode glass optical cable requirements for distances up to 3 km (1.8 mi)" (page 48) lists the optical requirements for glass fiber optic cable used with the Option 11C.

Table 12
Multi and Single-mode glass optical cable requirements for distances up to 3 km (1.8 mi)

Parameter	Minimum	Typical	Maximum	Units
Glass Fiber Cable Length			3.0	km
Cable Attenuation @1300 nm		1.5 (multi-mode) 0.5 (Single Mode)	2.0 (multi-mode) 0.7 (Single Mode)	dB/km
Modal Bandwidth @1300 nm	200	500		MHz * km

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Parameter	Minimum	Typical	Maximum	Units
Chromatic Dispersion @1300 nm		6		ps / nm * km
Typical 3 dB Optical Bandwidth		180		MHz * km

The fiber link is limited to a maximum length of 3 km. To guarantee reliable operation, a bandwidth of 150% should be maintained. If the link is increased beyond the 3 km length the 150% margin is deteriorated possibly resulting in link malfunction under some conditions.Table 13 "Chassis system miscellaneous cables and wires" (page 49) lists miscellaneous cables and wires used with the Chassis system.

Table 13
Chassis system miscellaneous cables and wires

Cable and Wire	Purpose / Description
A0632902 Fiber-optic cable (multi-mode plastic)	Connects a main and expansion chassis by interfacing with a fiber expansion daughterboard and a Fiber Receiver card. Length: 10 m (33 ft)
A0632902 Fiber-optic cable (multimode plastic)	Connects a main and expansion chassis by interfacing with a fiber expansion daughterboard and a Fiber Receiver card. Length: 10 m (33 ft)
NE-A25B 25-pair cable	Connects Intelligent Peripheral Equipment cards to the cross-connect terminal. NE-A25B connectors are on the back of each chassis.
NTAK19 cable	SDI cable used with the NTAK02 circuit card (see Note 1).
NTAK1118/1118 9- to 25-pin RS232 converter cable	Connects SDI ports and terminals (see Note 1).
A0378652 F-F DCE to DTE converter, or A0381016 F-M DCE to DTE converter	Connects SDI ports to equipment, such as TTYs and modems.
NTBK04 1.5 Mbit DTI/PRI carrier cable (A0394216)	Connects the NTAK09 1.5 Mbit DTI/PRI card to the Channel Service Unit (CSU). The NTBK04 carries Tx and Rx pairs to a standard 5-pin connector.
NTBK05AA/DA 2.0 Mbit DTI/PRI carrier cable A0394217	Carries Tx and Rx pairs to a standard 120-Ohm D-connector (see Note 1).
NT8D7205	DTI/PRI carrier cable

Note 1: This cable is available in different versions, depending on local EMC specifications.

Note 2: These cables are not supported under EMC specifications VL43.140P.

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Cable and Wire	Purpose / Description
NTBK05CA coaxial cable NTBK05DA twisted pair cable NTAK10 2.0 Mbit DTI cable NTAK79 2.0 Mbit PRI cable NTAK50 2.0 Mbit PRI cable	These cables provide DTI/PRI connections. The cables carry Tx and Rx pairs to a standard 5-pin connector (see Note 2).
25-pair inside wiring cables equipped with amphenol-type connectors	Extend the Intelligent Peripheral Equipment connections from the system chassis to the cross-connect terminal, and connect PFTUs.
#6 AWG (#40 Metric Wire Gauge) insulated ground wire	Connects a system chassis to a building ground source.
#6 AWG (10 mm2) insulated ground wire (UK)	Connects a system chassis to a building ground source.
#6 AWG (20 mm2) insulated ground wire (Europe)	Connects a chassis to a building ground source.
#8 AWG (10 mm2) insulated ground wire (Germany)	Connects a chassis to a building ground source.
Cross-connect wire	Makes cross connections at the cross-connect terminal.

Note 1: This cable is available in different versions, depending on local EMC specifications.

Note 2: These cables are not supported under EMC specifications VL43.140P.

Miscellaneous items for installation

The following is a list of miscellaneous items that you can use as part of Chassis system installation. Quantities needed depend on the site and customer requirements:

- QUA6 Power Failure Transfer Units (PFTU) to transfer lines during a power or system failure
- NTBK80 grounding block
- modems or Data Communication Equipment (DCE) for remote access to the system
- on-site Data Terminating Equipment (DTE) or TTY terminal for accessing the system
- connecting blocks for the cross-connect terminal
- transformers and centralized power supplies for items such as digit displays on telephones
- optional equipment such as music sources, RAN machines, paging equipment, and CDR devices

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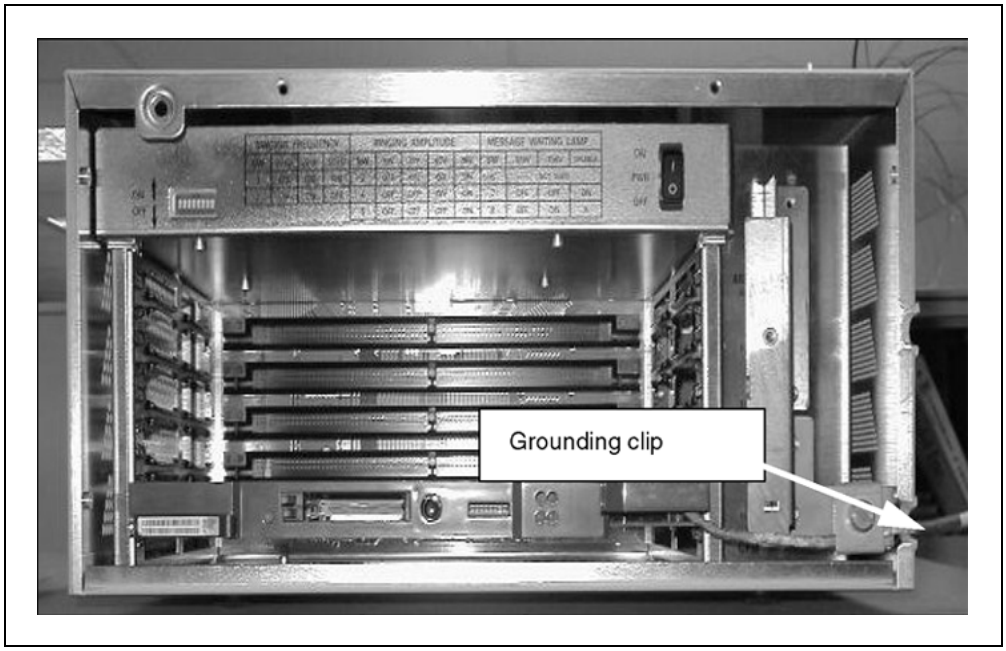
- NT1R20 Off-Premise Station Analog Line Card. Each card has eight ports. Each of the units on the card can be configured to be operated as an OPS or in an On-Premise (ONS) configuration
- additional Modem Eliminator (NULL Modem without hardware handshaking). The A0601397 converter may be required to interface the DTE to the system.
- industry-standard Ethernet Media Access Unit (MAU)
- NTTK43 EMC grounding clip is required, for EMC compliance, on the fan baffle on the lower right-hand side of chassis using100BaseT connections. Refer to Figure 20 "EMC grounding clip on the chassis" (page 51).

Figure 20
EMC grounding clip on the chassis



Differences between the Chassis system and the Cabinet system

Refer to Table 14 "Comparison of Chassis and Cabinet systems " (page 51) for a comparison of the Chassis system and the Cabinet system..

Table 14
Comparison of Chassis and Cabinet systems

Item	Chassis system	Cabinet system
Physical packaging	Chassis NTDK91 Chassis expander NTDK92	Main Cabinet NTAK11

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Item	Chassis system	Cabinet system
	Two copper cables connect the chassis to the chassis expander.	Fiber-optic cable connects the main cabinet to the expansion cabinet (upgraded systems may still have copper cable connection).
Capacity	Chassis: • 4 physical slots • logical slots (slots 1–6) Chassis expander: • 4 physical slots (slots 7–10) Add another item, "Expansion chassis" -- additional NTDK91 chassis can be connected with fiber-optic cable?	Main cabinet: • 10 physical slots (slots 1–10) Expansion cabinet: • Up to 4 additional NTAK11 cabinets can be connected with fiber-optic cable (slots 20–50)
	Supports up to 144 700 lines	Supports up to 700 lines
Chassis installation	Four Three chassis installation options: • rack/equipment cabinet • vertically on a wall • horizontally on a wall	Two cabinet installation options: • wall • floor
Cooling	Forced air, thermally controlled cooling (Fan installed inside chassis)	Convection cooling
Power	• ac power only • universal power supply factory installed in chassis • not field replaceable • power switch on chassis	• ac or dc power • NTDK70/NTDK78/ NTDK72 NTDK75/NTAK04/NTAK05 • field replaceable
Reserve power	UPS only	UPS and battery backup

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Item	Chassis system	Cabinet system
Cables	NTDK95 cable. (Two NTDK95 cables connect the chassis to the chassis expander.) Author's note: NTBK95?	
	Auxiliary cable used only for PFTU.	Auxiliary cable used for PFTU or to provide power for attendant console.
Ethernet	• Standard 15-pin AUI on chassis • NTDK27 Ethernet adapter cable not required • No jumper settings required	• NTDK27 Ethernet adapter cable required • May need to set J7 jumper
CPU	NTDK20 SSC	NTDK20 SSC
	• PC card interface • 3 SDI ports • 30 channels TDS • 8 units DTR or XTD • 4 units of MFC, MFE/MFK5/MFK6/MFR or 8 DTR/XTD units	• PC card interface • 3 SDI ports • 30 channels TDS • 8 units DTR or XTD • 4 units of MFC, MFE/MFK5/MFK6/MFR or 8 DTR/XTD units
	• Maximum 16 conference channels • 32 channels on SSC	• 32 channels on SSC • 16 channels per Fiber Optic Daughterboard
	• C: drive on NTDK97 is 16 Mbytes • Z: drive on NTDK97 is 1.5 Mbytes • NTDK97 program store is 32 Mbytes • DRAM on NTDK97 is 16 Mbytes • C: drive on NTDK21/NTDK81 is 8 Mbytes • Z: drive on NTDK20 is 1.5 Mbytes • NTDK21 program store is 24 Mbytes	• C: drive on NTDK21/NTDK81 is 8 Mbytes • Z: drive on NTDK20 is 1.5 Mbytes • NTDK21 program store is 24 Mbytes • NTDK81 program store is 32 Mbytes • DRAM — 8 or 16 Mbytes SIMM

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Item	Chassis system	Cabinet system
	• NTDK81 program store is 32 Mbytes • DRAM — 8 or 16 Mbytes SIMM	
Daughterboards	None • NTTK25 Software Daughterboard • NTDK22, NTDK84 Fiber Expansion Daughterboards	• NTDK21/NTDK81NTTK25 Software Daughterboard • NTDK22, NTDK24, NTDK79, NTDK84 , and NTDK85, Fiber Expansion Daughterboards
Software	Succession 3.0	Succession 3.0
Software installation	Software is preprogrammed on Software Daughterboard.	Software is preprogrammed on Software Daughterboard.
	Chassis system uses the same feature sets, ISM parameters, and keycode format as the Cabinet system.	
Software upgrades	Perform software upgrades using the same PC card as the Cabinet system.	Perform software upgrades using a PC card.
IPE and CE cards	TheChassis system supports the same IPE and CE cards as theCabinet system. The supported CE cards are: PRI, DTI, PRI2, DTI2, SDI/DCH, TDS/DTR, MISP	
	Only slots 1–3 in the chassis support CE cards.	Only slots 1–9 in the main cabinet support CE cards.
48-port Digital Line Card	Only theChassis system supports the NTDK16 48-port DLC. • Only install this card in slot 4 of the chassis. • Configured as slots 4, 5, and 6. ***Note:*** The NTDK16 Digital Line Card is not required for the system to operate.	NTDK16 not supported.

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Item	Chassis system	Cabinet system
Meridian Mail	Only slot 10 in the chassis expander supports Meridian Mail.	Slot 10 in the main cabinet supports Meridian Mail Card Option and Meridian Mail Enhanced Card Option.

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Important safety instructions

Contents

This section contains information on the following topics:

"Symbols you must recognize" (page 57)

"Safety instructions when installing telephone equipment" (page 57)

"Safety instructions when using telephone equipment" (page 58)

"Fiber-optic cable handling procedures" (page 59)

ATTENTION

IMPORTANT!
This chapter provides important safety information for installing and using your telephone equipment. Make sure this chapter is readily available for use as a reference tool.

Symbols you must recognize

Whenever you see the symbol shown below on Small System equipment or documentation, look for important operating and maintenance instructions.

Safety instructions when installing telephone equipment

The following are safety instructions for installing telephone equipment:

1. Never install telephone wiring during a lightning storm.

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2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch non-insulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Use caution when installing or modifying telephone lines.

Safety instructions when using telephone equipment

Always follow basic safety precautions when using telephone equipment. Following these safety precautions reduces the risk of fire, electric shock, and injury to persons, including the following:

1. Follow all warnings and instructions marked on the product.
2. Unplug the telephone from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
3. Do not use the telephone near water, for example, near a bath tub, wash bowl, kitchen sink, or laundry tub, in a wet basement or near a swimming pool.
4. Do not place the telephone on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
5. Slots and openings in the cabinet and the back or bottom of the telephone are for ventilation. These ventilation slots protect the telephone from overheating. Never block or cover these openings.
6. Never block the openings on a telephone by placing the product on a bed, sofa, rug, or other similar surface. Never place the product near or over a radiator or heat register. Do not place the product in a built-in installation, unless there is correct ventilation.
7. Only operate the product from the type of power source indicated on the marking label. If you are not sure of the type of power supply, check with your distributor.
8. Some equipment has a three-wire grounding plug. This type of plug has a third grounding pin. As a safety feature, the plug only fits into an isolated ground outlet. If you cannot insert the plug completely into the outlet, contact your electrician to replace the outlet. Do not defeat the purpose of the grounding-type plug.

   Some equipment has a polarized line plug. This type of plug has one blade wider than the other. As a safety feature, this plug fits into the power outlet one way only. If you cannot insert the plug completely into the outlet, try reversing the plug. If the plug still does not fit, contact your electrician to replace the plug. Do not defeat the purpose of the polarized plug.
9. Do not place objects on the power cord. Do not locate the product where people can walk on the plug.

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10. Do not overload wall outlets and extension cords, as fire or electrical shock can result.
11. Never push objects of any kind into the product through the cabinet slots. The objects can come in contact with dangerous voltage points. Also, parts can short out, causing the risk of fire or electrical shock. Never spill liquid of any kind onto the product.
12. To reduce the risk of electrical shock, do not disassemble a telephone product.
13. Unplug the telephone from the wall outlet and refer servicing to qualified personnel under the following conditions:
    a. if the power supply cord or plug is damaged or worn
    b. if liquid has spilled into the telephone
    c. if the telephone has been exposed to rain or water
    d. if the telephone has been dropped or the cabinet has been damaged
    e. if the product exhibits a distinct change in performance
    f. if the telephone does not function properly under normal operating conditions
14. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.
15. Do not use the telephone to report a gas leak in the vicinity of the leak.

Fiber-optic cable handling procedures

WARNING

The fiber-optic interface product used in the Small System is considered safe. However, as a precaution do not look directly at the optical port or the end of fiber-optic cable. Under certain conditions (such as during cable testing or under light magnification) the cable or port may expose the eye beyond the limits of Maximum Permissible Exposure recommended in some jurisdictions. Do not remove protective caps or plugs until ready to connect the cable.

The Cabinet system and Chassis system support fiber-optic cable interconnection between system cabinets or between system chassis using the following equipment:

- NTDK84 10 m (33 ft) Dual-port Fiber Expansion daughterboard (multimode plastic fiber-optic cable)

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- NTDK22 10 m (33 ft) Fiber Expansion daughterboard (plastic fiber-optic cable)
- NTDK23 10 m (33 ft) Fiber Receiver card (plastic fiber-optic cable)
- NTDK24 3 km (1.8 mi) Fiber Expansion daughterboard (Multimode glass fiber-optic cable)
- NTTK02 Dual-port IP Expansion daughterboard
- NTTK01 Single-port IP Expansion daughterboard
- NTDK85 3 km (1.8 mi) Dual-port Fiber Expansion daughterboard (Multimode glass fiber-optic cable)
- NTDK25 3 km (1.8 mi) Fiber Receiver card (Multimode glass fiber-optic cable)
- NTDK79 3 km (1.8 mi) Fiber Expansion daughterboard (Single Mode glass fiber-optic cable)
- NTDK80 3 km (1.8 mi) Fiber Receiver card (Single Mode glass fiber-optic cable)

Note: Fiber-optic cable is the only type of interconnection cable supported on a fully expanded Chassis system.

The following safety precautions must be followed when handling fiber equipment:

- All persons handling fiber expansion daughterboards and fiber receiver cards must be Electrostatic Discharge (ESD) protected. A wrist strap provided with the cabinet also must be worn when handling fiber-optic cables to prevent damage caused by static electricity.
- Always ensure the fiber-optic cable is routed out of the way of any traffic through the premises.
- Never staple or bend the fiber-optic cable at an extreme angle. Do not exceed the minimum 90¡ soft bend radius of 35 mm (1.5 in.).

Note: A conduit is not required for routing fiber-optic cable between cabinets or chassis. However, if you require a conduit for identification or other reasons, use a conduit measuring a minimum of 25 mm (1 in.) in diameter.

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Bracing against earthquakes

Contents

This section contains information on the following topics:

"Introduction" (page 61)

"Method for earthquake bracing" (page 61)

Introduction

This chapter provides the recommended installation method for bracing the Small System cabinets or chassis against earthquakes. This method does not guarantee that the system will continue to operate during or after an earthquake.

This chapter contains the following procedure:

- Procedure 1 "Earthquake bracing method" (page 61).

Method for earthquake bracing

To earthquake brace your Small System, fasten a 20 mm(3/4 in.) piece of plywood securely to the wall. Then, place the system components on the backboard. Do not attach the system components directly to the wall.

WARNING

To brace your Small System against earthquakes, you must install the cabinet or chassis on a wall in a vertical position.

Procedure 1
Earthquake bracing method

Step	Action
1	Determine the size of the backboard.

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You need a backboard that is large enough to hold all of the components that you will install on the wall. To determine the backboard size, refer to the wall plan that you developed using the guidelines in *Meridian 1 Small System Planning and Engineering (NN43011-220)*. If you have not developed a wall plan, please develop one now.

When you have determined the required backboard size, make sure the measurements are within the limits listed in Table 15 "Backboard size limits" (page 62).

Table 15
Backboard size limits

	Backboard size
Minimum	0.6 m by 1.8 m (2 ft by 6 ft)
Maximum	1.2 m by 2.4 m (4 ft by 8 ft)

2 Determine fastener requirements.

You need the following information to determine fastener requirements:

- What fasteners you must use.
- How deeply you must embed the fasteners into the wall.
- The vertical distance between fasteners.
- The horizontal distance between fasteners. For wood and metal stud walls, determine this spacing by the spacing between wall studs. Wall stud spacing must be within the range listed in Table 16 "Stud spacing" (page 62).
- The required wall stud sizes for wood and metal stud walls.

Table 16
Stud spacing

	Stud spacing
Minimum	0.4 m (16 in.)
Maximum	0.6 m (24 in.)

Table 17 "Hardware recommendations" (page 63) provides the hardware recommendations for earthquake bracing the Small System.

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Table 17
Hardware recommendations

Type of wall	Fastener	Vertical spacing between fasteners	Minimum embed depth of fasteners in wall	Suggested screw length
Wood stud	#10 Wood Screws	0.3 m (12 in.) on center	25 mm (1 in.)	50 mm (2 in.)
Metal stud	#14 Sheet Metal Screws	0.3 m (12 in.) on center		37.5 mm (1.5 in.)
Concrete	1/4 in. (6 mm) Hilti KB-II	0.6 m (24 in.) on center	28 mm (1 1/8 in.)	50 mm (2 in.)
Masonry	1/4 in. (6 mm) Ramset Redhead Dynabolt Sleeve Anchor	0.6 m (24 in.) on center		50 mm (2 in.)

Table 18 "Maximum wall heights for stud sizes, 0.4 m (16 in.) spacing" (page 63) lists the maximum wall heights for different sizes of wall studs with 16-inch spacing.

Table 18
Maximum wall heights for stud sizes, 0.4 m (16 in.) spacing

Wall studs	Maximum height of wall
Wood Studs	
2 X 4 (DF #2)	3.3 m (11 ft)
2 X 6 (DF #2)	5.7 m (19 ft)
Metal Studs	
2 1/2 X 20 Gauge	2.7 m (9 ft)
2 1/2 X 16 Gauge	3.0 m (10 ft)
2 1/2 X 14 Gauge	3.3 m (11 ft)
3 5/8 X 20 Gauge	3.6 m (12 ft)
3 5/8 X 18 Gauge	3.9 m (13 ft)
3 5/8 X 16 Gauge	4.2 m (14 ft)
3 5/8 X 14 Gauge	4.8 m (16 ft)
4 X 20 Gauge	4.2 m (14 ft)
4 X 18 Gauge	4.5 m (15 ft)

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Wall studs	Maximum height of wall
4 X 16 Gauge	4.8 m (16 ft)
4 X 14 Gauge	5.1 m (17 ft)
6 X 18 Gauge	6.0 m (20 ft)

Table 19 "Maximum wall heights for stud sizes: 0.6 m (24 in.) spacing" (page 64) lists the maximum wall heights for different sizes of wall studs with a 24-inch spacing

Table 19
Maximum wall heights for stud sizes: 0.6 m (24 in.) spacing

Wall studs	Maximum height of wall
Wood Studs	
2 X 4 (DF #2)	3.0 m (10 ft)
2 X 6 (DF #2)	5.1 m (17 ft)
Metal Studs	
2 1/2 X 20 Gauge	2.4 m (8 ft)
2 1/2 X 18 Gauge	2.7 m (9 ft)
2 1/2 X 14 Gauge	3.0 m (10 ft)
3 5/8 X 20 Gauge	3.3 m (11 ft)
3 5/8 X 18 Gauge	3.6 m (12 ft)
3 5/8 X 16 Gauge	3.9 m (13 ft)
3 5/8 X 14 Gauge	4.5 m (15 ft)
4 X 20 Gauge	3.6 m (12 ft)
4 X 18 Gauge	3.9 m (13 ft)
4 X 16 Gauge	4.2 m (14 ft)
4 X 14 Gauge	4.8 m (16 ft)
6 X 18 Gauge	5.4 m (18 ft)

3 Determine where to place the fasteners.

Refer to Figure 21 "Plywood fastener locations for wood and metal stud walls, 16 inch spacing" (page 66) through Figure 23 "Plywood fastener locations for concrete and masonry walls" (page 68) if you

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need help with where to place the fasteners on the backboard. In each figure, the minimum (0.6 m by 1.8 m / 2 ft by 6 ft) and maximum (1.2 m by 2.4 m / 4 ft by 8 ft) sizes of the backboard are used as examples.

- Figure 21 "Plywood fastener locations for wood and metal stud walls, 16 inch spacing" (page 66) provides the fastener locations for wood and metal stud walls with the minimum allowed stud spacing of 0.4 m (16 in.).
- Figure 22 "Plywood fastener locations for wood and metal stud walls: 0.6 m (24 in.) spacing" (page 67) provides the fastener locations for wood and metal stud walls with the maximum allowed stud spacing of 0.6 m (24 in.).
- Figure 23 "Plywood fastener locations for concrete and masonry walls" (page 68) provides the fastener locations for concrete and masonry walls.

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Figure 21
Plywood fastener locations for wood and metal stud walls, 16 inch spacing

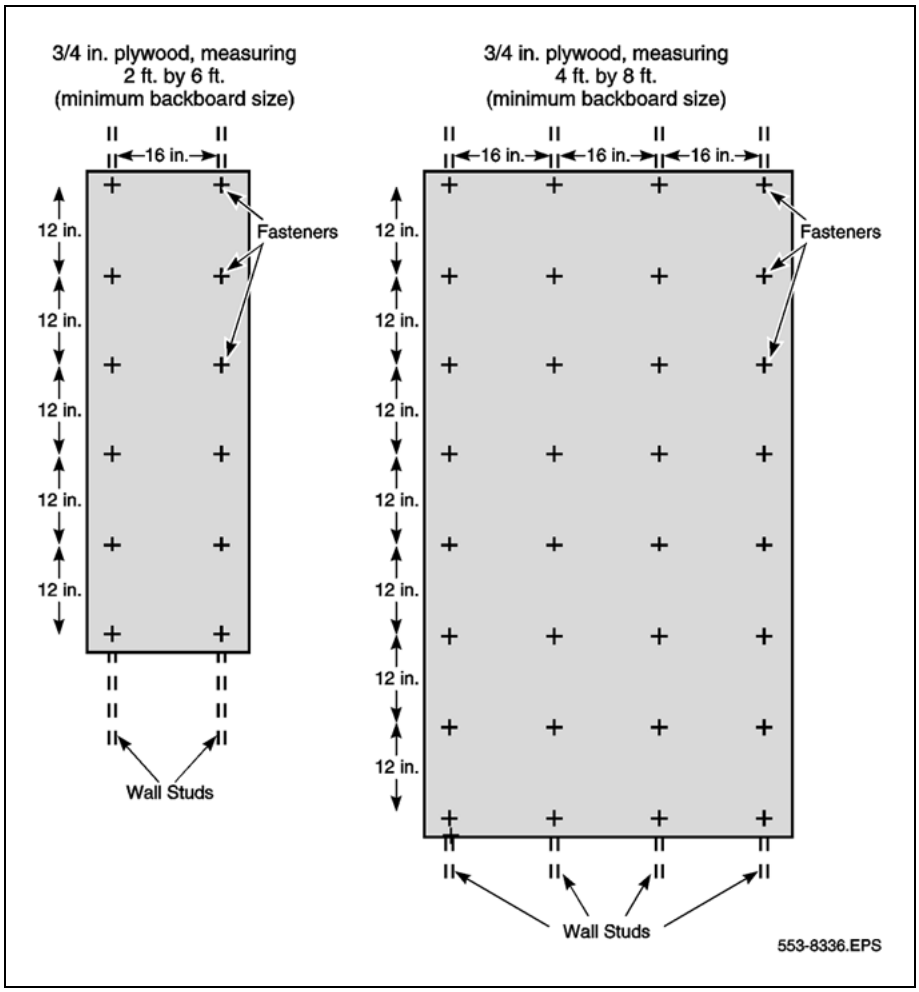

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Figure 22
Plywood fastener locations for wood and metal stud walls: 0.6 m (24 in.) spacing

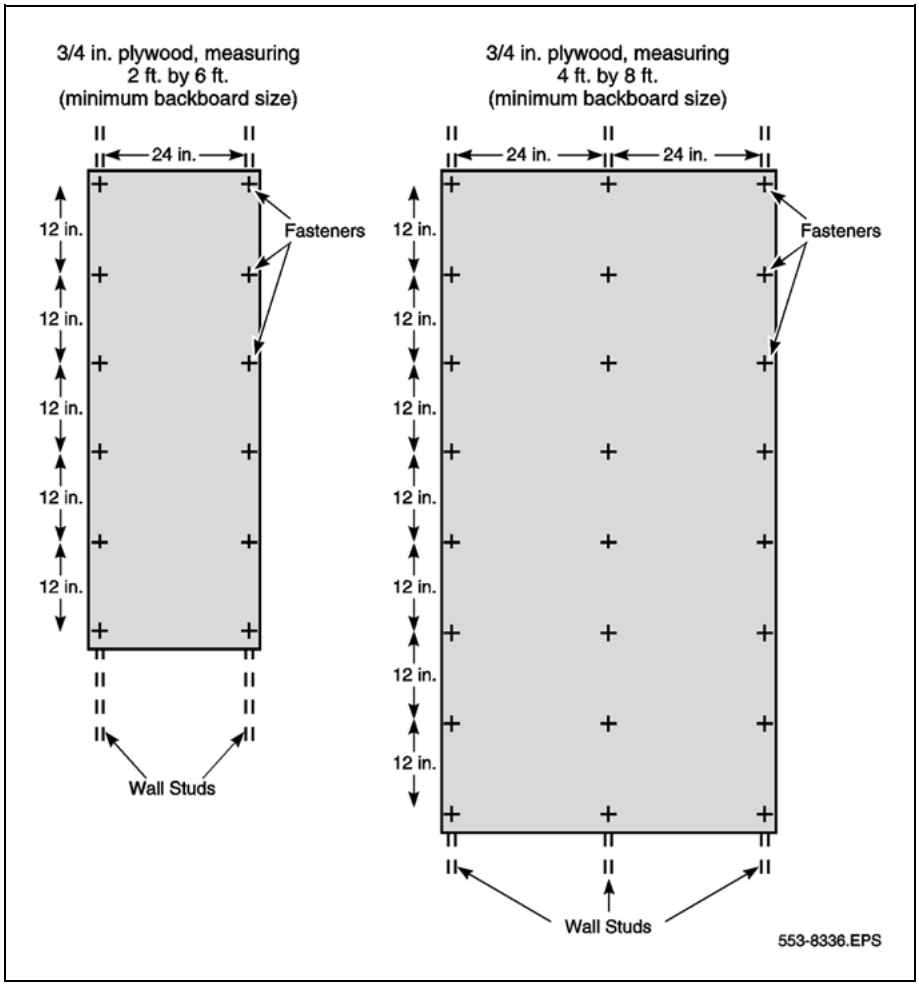

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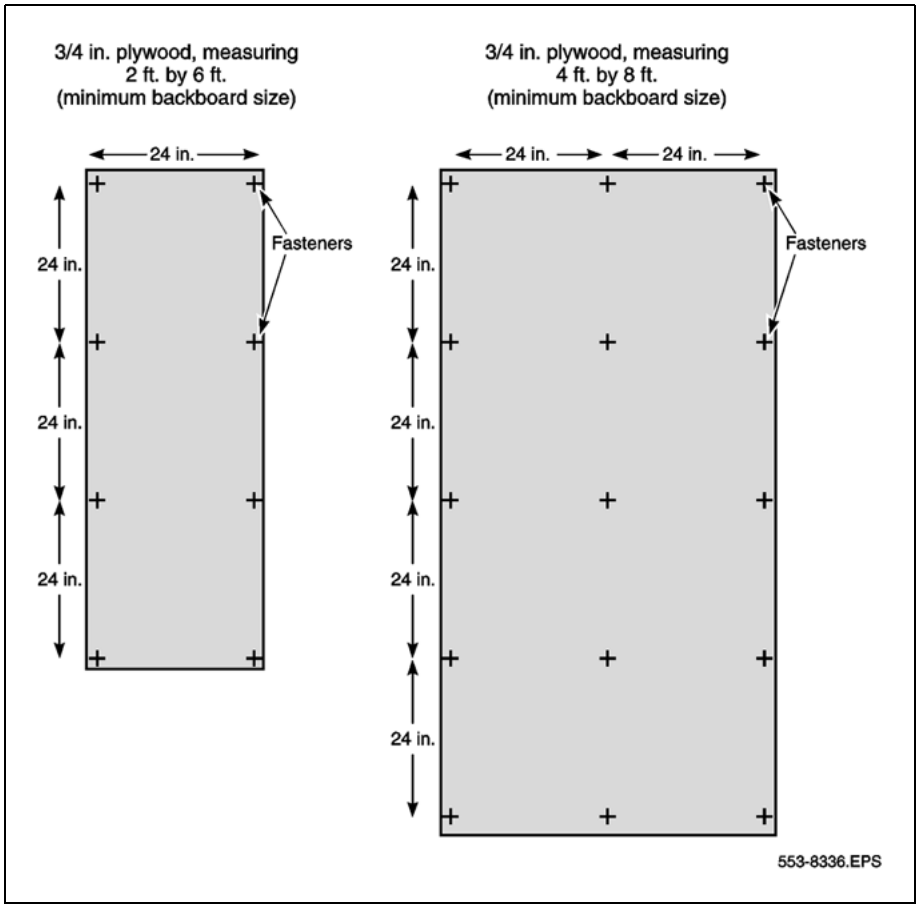
Figure 23
Plywood fastener locations for concrete and masonry walls



4 Continue with Small System installation.

Now that you have securely fastened the backboard to the wall, you can continue with the Small System installation.

—End—

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Preparing for installation

Contents

This section contains information on the following topics:

"Introduction" (page 69)

"Tools checklist" (page 69)

"Readiness checklist" (page 70)

Introduction

Before proceeding with the installation, make sure you have all the tools necessary to install the Small System. Next, make sure you have checked for all site requirements, received all equipment, and have prepared an equipment layout plan and card slot assignment plan.

Tools checklist

To install the system correctly, make sure that the following tools are available before you begin to assemble the components:

- ☐ different types of screwdrivers
- ☐ a tape measure
- ☐ a level

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- ☐ pliers such as side cutters and longnose pliers
- ☐ an ECOS 1023 POW-R-MATE or similar type of test meter
- ☐ appropriate cable terminating tools
- ☐ a drill for making lead holes for screws

Readiness checklist

Have you:

- ☐ read all ***safety instructions*** in "Important safety instructions" (page 57)?
- ☐ made sure that you received all the equipment that you ordered?
- ☐ made sure your area meets all environmental requirements?
- ☐ checked for all power requirements?
- ☐ checked for correct grounding facilities?

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- ☐ developed an equipment layout plan for the system?
- ☐ completed the card slot assignment plan?
- ☐ assembled all the tools required to continue with the installation?

If you have completed all of the above items, you are ready to proceed with the installation of the system.

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Installing the Cabinet system

Contents

This section contains information on the following topics:

"Contents" (page 73)

"Installing a new Cabinet system" (page 74)

"Expanding an existing system" (page 79)

"Reconfiguring a system" (page 80)

"Expanding an existing system" (page 79)

"Expansion cabinet as a power shelf for auxiliary processors" (page 84)

Introduction

Use this chapter when installing a new system, adding expansion cabinets to an existing system, or reconfiguring existing cabinets to accommodate an additional expansion cabinet. It also describes the procedure for adding a cabinet to be used as a stand-alone power shelf for auxiliary processor units.

Ensure you read and complete all instructions contained in the prior chapters of this guide and in the chapters on system and site planning in *Meridian 1 Small System Planning and Engineering (NN43011-220)*.

CAUTION
CAUTION WITH ESDS DEVICES
Wear the antistatic wrist strap provided in the bottom of the cabinet before handling the power supplies or other circuit cards. Static electricity can damage the components of power supplies and circuit cards.

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Installing a new Cabinet system

Follow the steps in Procedure 2 "New system installation" (page 74) to install a new Meridian 1 PBX 11C Cabinet system. Complete each step as described before proceeding with the next step. References may be made to other chapters in this guide in order to provide additional information.

Procedure 2
New system installation

Step	Action
1	Install the main cabinet.
	a. Mount the cabinets as described in "Mounting the cabinets" (page 95).
	b. Remove the drip tray from each cabinet to expose the cable routing grooves at the bottom rear of the cabinet.
	c. Install the cabinet ground wire for the main cabinet as described in "Installing the system ground" (page 123).
	d. Install the power supply as described in "Installing the power supplies for the Cabinet system" (page 133).
	e. Install the reserve power supply if required. Refer to "Installing and connecting reserve power supplies for the Cabinet system" (page 143).
	f. Install the NTDK20 Small System Controller (SSC) card and daughterboard(s). For a system without fiber or IP expansion, refer to "Installing Small System Controller cards on stand-alone systems" (page 155). For a system with fiber expansion, refer to "Installing fiber expansion" (page 159). For a system with IP expansion, refer to "Installing IP expansion" (page 175).
	g. Install the remaining circuit cards. Refer to "Installing optional circuit cards" (page 189).
	h. Install the cross-connect terminal and cables. Refer to "Installing and connecting cross-connect terminals" (page 209).
	i. Install the power fail transfer units (PFTUs) if provided. Refer to "Installing Power Failure Transfer Units" (page 225).
	j. Connect the SDI and Ethernet network interfaces. Refer to "Installing and connecting SDI and Ethernet network interfaces" (page 233).
2	Install expansion cabinets.
	a. Mount the cabinets as described in "Mounting the cabinets" (page 95).

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b. Remove the drip tray from each cabinet to expose the cable routing grooves at the bottom rear of the cabinet.

c. Install the cabinet ground wire for the cabinets as described in "Installing the system ground" (page 123).

d. Install the power supply as described in "Installing the power supplies for the Cabinet system" (page 133).

e. Install the reserve power supply if required. Refer to "Installing and connecting reserve power supplies for the Cabinet system" (page 143).

f. Install the expansion cabinet SSC or Fiber Receiver card, daughterboards, and cables. Refer to "Installing fiber expansion" (page 159) and "Installing IP expansion" (page 175).

g. Install the remaining circuit cards. Refer to "Installing optional circuit cards" (page 189).

h. Install the cross-connect terminal and cables. Refer to "Installing and connecting cross-connect terminals" (page 209).

i. Install the power fail transfer units (PFTUs) if provided. Refer to "Installing Power Failure Transfer Units" (page 225).

j. Connect the SDI and Ethernet network interfaces. Refer to "Installing and connecting SDI and Ethernet network interfaces" (page 233).

3 For fiber connectivity, go to step 4.

For IP connectivity, do one of the following:

- For point-to-point 100BaseF connectivity, go to step 5.
- For point-to-point 100BaseT connectivity, go to step 6.
- For 100BaseT or 100BaseF connectivity over a distributed data campus network, go to step 7.

4 For fiber connectivity, connect the main cabinet to the fiber expansion cabinets. Refer to "Fiber expansion daughterboards and cables" (page 162) and "Installing Fiber Receiver cards on expansion cabinets and chassis" (page 170).

5 For point-to-point 100BaseF connectivity, connect the main cabinet to the IP expansion cabinets using the A0346816 5-meter fiber cable with fiber couplers.

- Use the supplied A0346816 ST fiber couplers to connect the ST ends on the A0817052 fiber cables coming from the main and IP expansion cabinets. Use one coupler to connect Tx to Rx

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and another coupler to connect Rx to Tx. Use a push and twist motion to secure the couplers to the cable ends.

- Connect the fiber cable from the main cabinet to the fiber cable from the IP expansion cabinet.

  Note: The cable end labelled "A" is for Transmit (Tx) and the cable end labelled "B" is for Receive (Rx). Refer to Figure 24 "Cable ends and fiber coupler for 100BaseF connectivity" (page 77).

6 For point-to-point 100BaseT connectivity, connect the main cabinet to the IP expansion cabinet using the NTTK34 crossover cable.

- Use the NTTK34 2 m (6 ft 6 in.) UTP CAT 5 RJ–45 crossover cable and NTDK8305 2 m (6 ft 6 in.) STP CAT 5 extension cable to connect the main and IP expansion cabinets using the 100BaseT IP daughterboards.
- Connect the NTDK8305 extension cable ends from the main and IP expansion cabinets to the crossover cable.

7 To connect the main and IP expansion cabinets over a distributed data campus network, do the following:

- Use the A0817052 5 m (16 ft 4 in.) fiber cable with MT-RJ to ST connectors to connect the main and IP expansion cabinets using the 100BaseF IP daughterboards. The two A0817052 fiber cables are usually connected to the enterprise IP network.
- Use the NTDK8305 2 m (6 ft 6 in.) STP CAT 5 extension cable to connect the main and IP expansion cabinets using 100BaseT IP daughterboards. A customer-supplied straight-through cable is used in place of the NTTK34 2 m (6 ft 6 in.) crossover cable.

  Note: You will need to work with your local data network administrator for IP provisioning.

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Figure 24
Cable ends and fiber coupler for 100BaseF connectivity

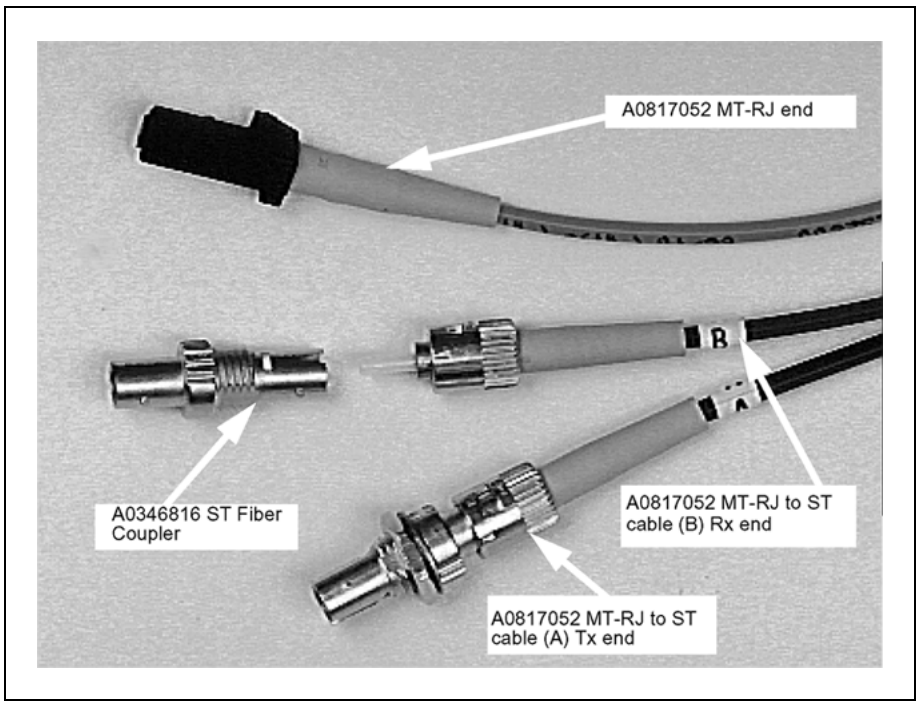
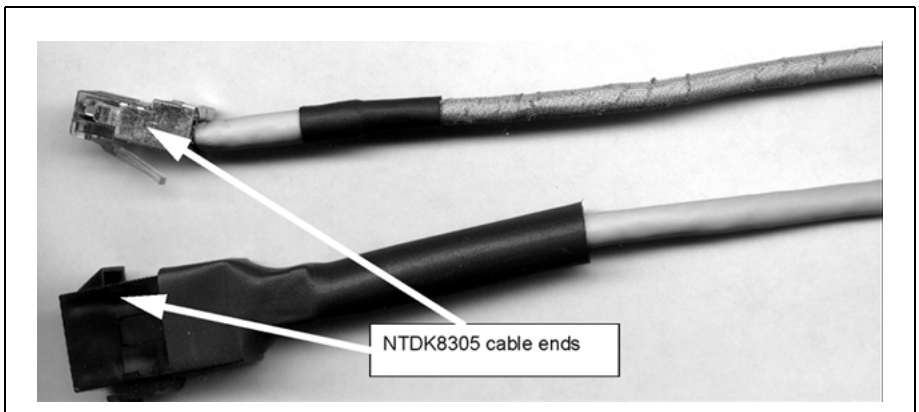


Figure 25
Cable ends for 100BaseT IP connectivity



8 Main power hookup.

a. Connect the external power supply, if not already done.

If this system uses a commercial AC power supply, the power outlet should be tested to make sure that the correct voltage is present before plugging the power cord in the outlet.

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If the system uses an external commercial AC power supply, plug the AC power cord from each cabinet into the commercial AC power supply outlet.

If the system uses a customer-provided DC power supply, plug the DC power cord from each cabinet into the DC power source.

b. For AC-powered systems, set the circuit breaker on the NTDK70 AC power supply in each cabinet to ON. For DC-powered systems, set the circuit breaker on the NTAK28 circuit breaker assembly for each cabinet to ON. Set the circuit breaker on the NTDK72 DC power supply in each cabinet to ON.

9 Set the circuit breaker on the battery backup unit to ON (if the system has reserve power).

Note: A system equipped with the NTDK70 AC power supply and a battery backup unit will continue to operate on DC reserve power if the AC supply fails. However, if the DC reserve power is interrupted, the NTDK70 cannot be powered up again until AC power is restored.

10 Install the System Software on main cabinet. Refer to "Installing software in a new system" (page 264).

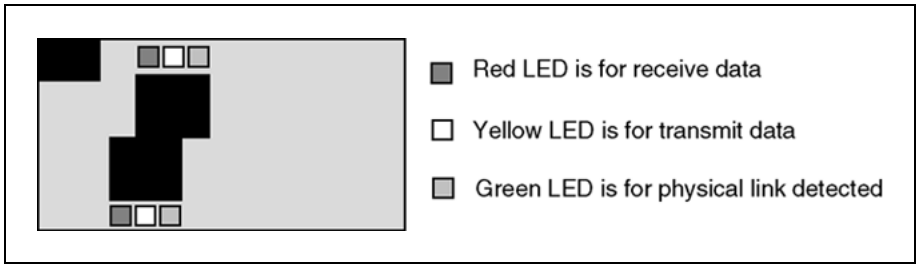
11 Install the System Software on expansion cabinet. See "Installing software on IP Expansion Cabinets or Chassis" (page 276).

12 Check the Link LED on the daughterboard. From left to right, the LEDs are:

- Receive LED
- Transmit LED
- Link LED (should be green)

If the Link LED is not lit and green, the hardware connection is not enabled. Check the cables and connections. Make sure the cables are not damaged. Refer to *Meridian 1 Small System Maintenance (NN43011-700)* for further information.

Figure 26
Daughterboard LEDs



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13 Configure the IP daughterboards with IP addresses, cabinet numbers and MAC addresses for both main and IP expansion cabinets. Use LD 117 found in *Software Input Output Reference - Maintenance (NN43001-711)*.

14 Install (if not previously installed) and activate the telephones. Refer to "Connecting the telephones" (page 307).

15 Connect the trunks to the system as described in "Terminal setup" (page 245).

16 Perform a system backup, using LD 43.

17 Install any remaining equipment, such as external alarms. Refer to "Connecting an external alarm" (page 353) and the optional Meridian Mail feature, if provided.

18 Replace all drip trays and cabinet covers.

—End—

Expanding an existing system

Follow the steps in Procedure 3 "Adding expansion cabinets to an existing system" (page 79) to add expansion cabinets to an existing system. Complete each step as described before proceeding with the next step. References may be made to other chapters in this guide in order to provide additional information.

Procedure 3
Adding expansion cabinets to an existing system

Step	Action
1	Install an expansion daughterboard and cable on the SSC card in the main cabinet as described in "Installing fiber expansion" (page 159) or "Installing IP expansion" (page 175).
2	Install expansion cabinets. Refer to step 2.
3	For fiber connectivity, refer to Procedure 2, step 4.
4	For IP connectivity, refer to Procedure 2 "New system installation" (page 74), step 5 through step 7, on step 5.
5	Power up the main and expansion cabinets. Refer to Procedure 2 "New system installation" (page 74), step 8.

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6 Install the System Software on the IP expansion cabinet (not required for fiber expansion cabinets). Refer to "Starting the Chassis system" (page 255).

7 Install (if not previously installed) and activate the telephones. Refer to "Connecting the telephones" (page 307).

8 Connect the trunks to the system as described in "Terminal setup" (page 245).

9 Perform a system backup in LD 43.

10 Install any remaining equipment, such as external alarms. Refer to "Connecting an external alarm" (page 353).

11 Replace all drip trays and cabinet covers.

—End—

Reconfiguring a system

Implement Procedure 4 if you need to reconfigure your existing system. Complete each step as described before proceeding with the next step.

Reconfiguring existing cabinets to accommodate an additional expansion cabinet

Under certain circumstances it is necessary to rearrange cabinet connections and/or configurations. Two scenarios are described.

Scenario 1: Adding a third expansion cabinet

If the existing main cabinet is equipped with two single daughterboards, and the two expansion cabinets are located within 10 m (33 ft), adding another expansion cabinet within 3 km (1.8 mi) requires the following steps:

Procedure 4

Step	Action
1	Replace the top daughterboard with a dual-port expansion daughterboard.
2	If the third cabinet is within 10 m (33 ft), add the cabinet to port 3. Configure the cards required for expansion cabinet 3.
3	If the third cabinet is further than 10 m (33 ft), connect the two short-haul cabinets to the dual-port daughterboards in ports 1 and 3.
4	Replace the lower 10 m (33 ft) expansion daughterboard in the main cabinet with a 3 km (1.8 mi) expansion daughterboard.

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5	Add the third (long-haul) cabinet to the single-port 3 km (1.8 mi) expansion daughterboard in port 2.
6	Reassign in software all services provided on cards 21 to 30, to cards 31 to 40.

—End—

Scenario 2: Adding a fourth expansion cabinet

The existing main cabinet is equipped with two 10 m (33 ft) dual-port expansion daughterboards connecting to three expansion cabinets. A remote expansion cabinet is to be added requiring a 3 km (1.8 mi) expansion daughterboard. Although one of the existing daughterboards has a port available, it can only be connected to a cabinet within 10 m (33 ft). With this scenario, do the following:

Step	Action
1	Select the dual-port expansion daughterboard that is being used for only one cabinet (a spare port is available on the daughterboard).
2	Replace it with a 3 km (1.8 mi) dual-port expansion daughterboard.
3	Replace the receiver card in the existing companion expansion cabinet with a 3 km (1.8 mi) receiver card.
4	With glass optic cable, connect the existing expansion cabinet to the same port as previously assigned on the expansion daughterboard.
5	Add the cabinet to the remaining port as described in Procedure 3 "Adding expansion cabinets to an existing system" (page 79).

—End—

Cabinet and Chassis system mix-and-match configuration

In a mix-and-match scenario, a chassis can be connected to the fiber or IP expansion cabinet(s) of a Cabinet system. In addition, the main cabinet of a Cabinet system can be connected to fiber or IP expansion chassis.

Note: There are slightly different SSC card requirements for different configurations of cabinets and chassis:

- The Main Cabinet or Chassis of an IP expansion Small System requires the SSC card vintage NTDK20HA or newer, or upgraded NTDK20EA-GA (upgraded using the NTTK19 SSC Upgrade Kit).

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- The Main Cabinet or Chassis of a fiber expansion Small System requires the SSC card vintage NTDK20HA or newer, or upgraded NTDK20CA-GA.
- IP expansion cabinets require the SSC card vintage NTDK20HA or newer, or upgraded NTDK20CA-GA.
- IP expansion chassis require the SSC card vintage NTDK20HA or newer, or upgraded NTDK20EA-GA.

Note 1: The cabinets of the Cabinet system must support the faceplate cabling that is used on all IP expansion daughterboards. If the current cabinets do not support cable routing through the faceplate, they must be upgraded to the NTDK18 cabinet kit.

Note 2: The grounding clips are situated differently on cabinets and chassis. The grounding clip for the cabinet is mounted on the front of the stiffener rail. Refer to Figure 27 "EMC grounding clip for the cabinet" (page 82). The grounding clip for the chassis is mounted on the fan baffle on the lower right-hand side of the chassis. Refer to Figure 28 "EMC grounding clip for the chassis" (page 83).

Figure 27
EMC grounding clip for the cabinet

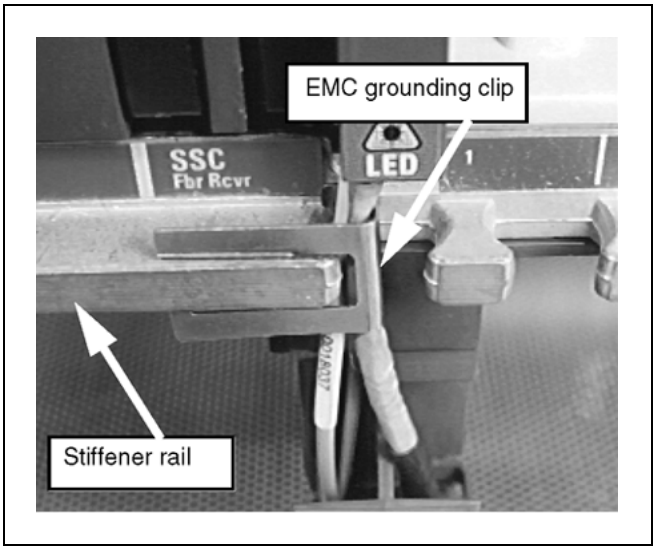

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Figure 28
EMC grounding clip for the chassis

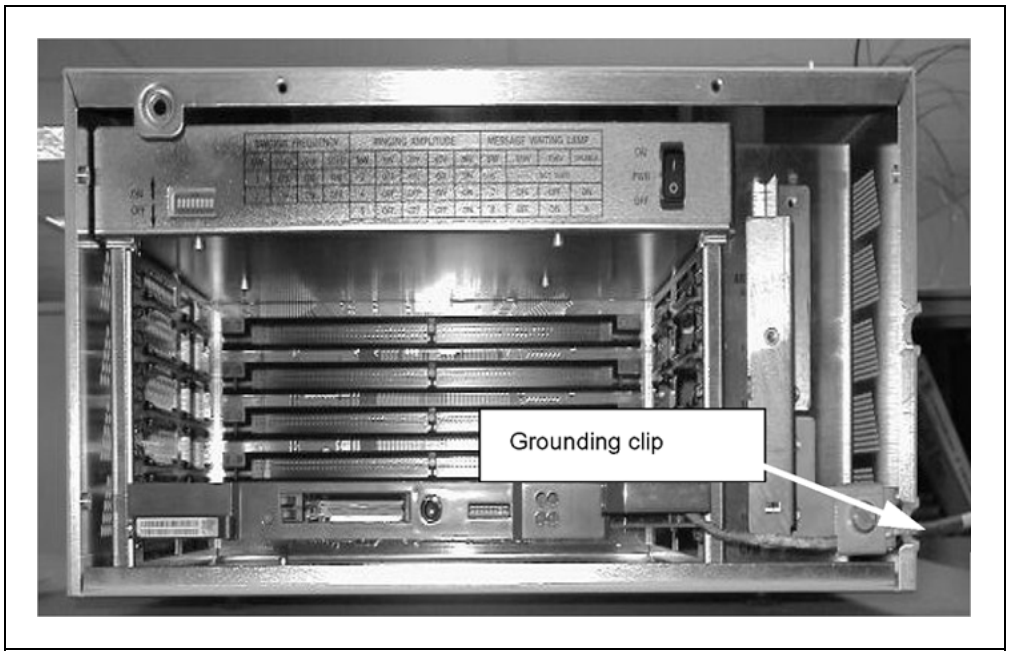

Figure 29 "Cabinet and Chassis system mix-and-match expansion configuration" (page 84) shows an example "mix-and-match" configuration in which the main cabinet of a Cabinet system uses both fiber and IP cabling to connect two expansion cabinets and one Chassis system (chassis with chassis expander).

Note: Figure 29 "Cabinet and Chassis system mix-and-match expansion configuration" (page 84) is only an example of one of many possible configurations using Cabinet systems and Chassis systems.

In this example, the SSC card in the main cabinet of a Cabinet system has one dual-port fiber expansion daughterboard installed in the top connector and one single-port IP expansion daughterboard installed in the bottom connector. The dual-port fiber expansion daughterboard in the top connector provides card slots 11–20 and 31–40. The single-port IP expansion daughterboard in the bottom connector provides card slots 21–30.

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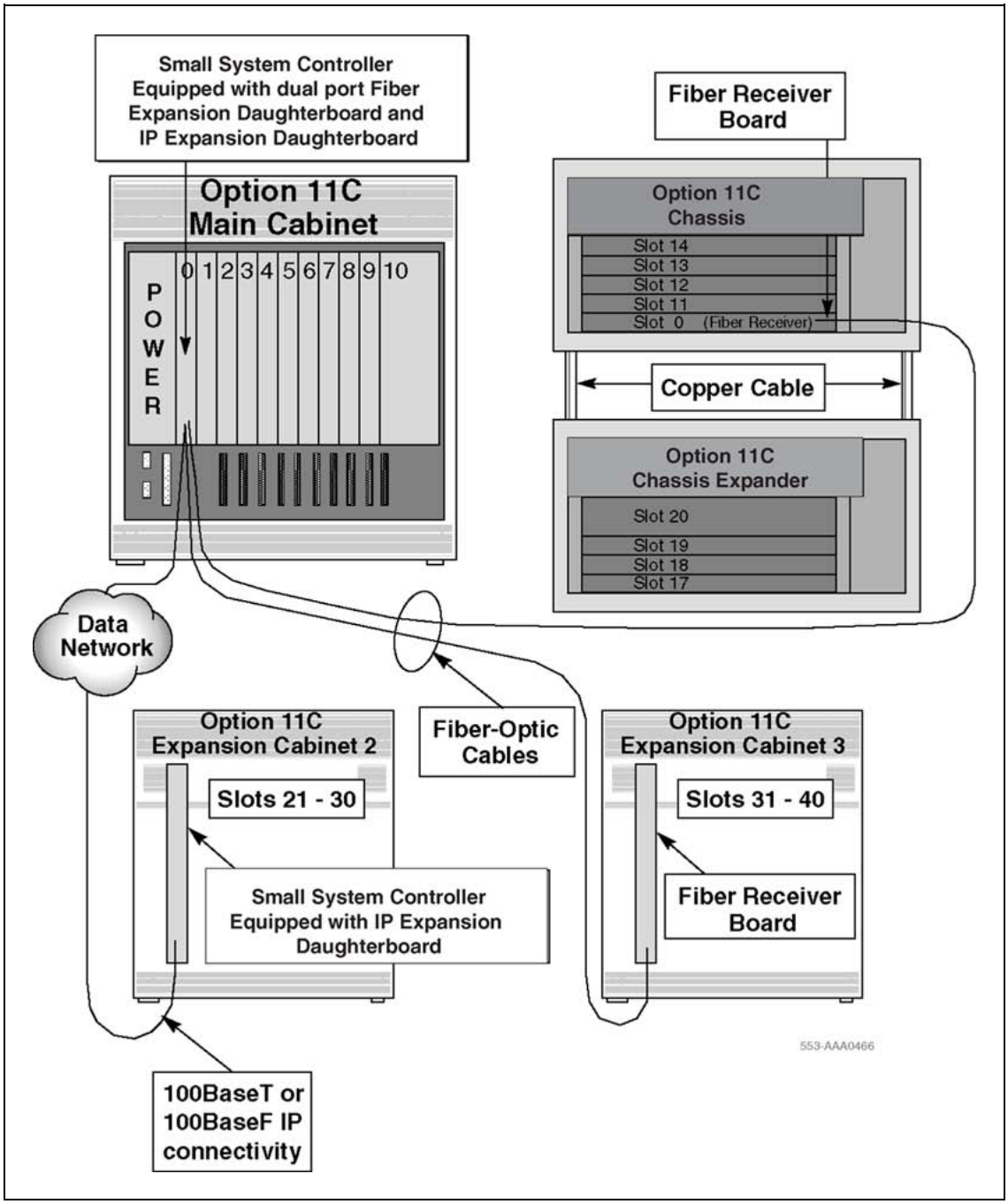
Figure 29
Cabinet and Chassis system mix-and-match expansion configuration



Expansion cabinet as a power shelf for auxiliary processors

Follow Procedure 5 "Adding an expansion cabinet as a stand-alone power shelf" (page 85) to add an expansion cabinet used as a power shelf for auxiliary processor units (such as Max IPE).

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Procedure 5
Adding an expansion cabinet as a stand-alone power shelf

Step	Action
1	Locate the carton containing the expansion cabinet. Install it as described in "Mounting the cabinets" (page 95). • Make sure that it is mounted according to the plan. • Make sure that it is securely mounted. • Make sure that the pedestal is properly installed if the cabinet is to be mounted on the floor.
2	Make sure that the AC power cord is disconnected from the power outlet.
3	Install a #6 AWG (# 40 Metric Wire Gauge) ground wire from the cabinet to a ground source (the ground bus in the AC power service panel). ***Note:*** Do not connect the ground wire to the ground connection in an existing cabinet. The ground wire must be connected to the ground source. **DANGER** **DANGER OF ELECTRIC SHOCK** The connection in the AC power service panel should be performed by a qualified technician or electrician. Connect the ground wire to the ground lug located in the bottom of the cabinet next to the cable connectors. See Figure 30 "Ground/Earth connection" (page 87). Route the ground wire through the third groove from the left in the bottom of the cabinet. Connect it to the Single Point Ground (SPG) and place a DO NOT DISCONNECT tag on it. ***Note:*** Refer to the grounding requirements in the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)*.
4	Put on the wrist strap provided in the bottom of the cabinet and install the power supply with the circuit breaker at the OFF position. If this is an AC- powered system, plug in the power supply cord in the commercial power supply receptacle and into the power supply.

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Refer to "Installing the power supplies for the Cabinet system" (page 133).

CAUTION
CAUTION WITH ESDS DEVICES
A grounded wrist strap, provided with the cabinet, must be worn when handling circuit cards to prevent damage caused by static electricity.

Make sure that the NTDK70 AC or NTDK72 DC power supplies are installed and that their circuit breakers are set to OFF.

5 Refer to the ACD Max documentation to complete the installation of the Max units and related cables.

Connectors for the cables in the expansion cabinet are located on the panel below the cabinet's shelf. Refer to "Installing and connecting cross-connect terminals" (page 209) for information about connection cables to the cabinet.

Note: The slots in the expansion cabinet are labeled 11 through 20. The corresponding connectors for cables are labeled J11 through J20 or J1 through J10, depending on the type of cabinet.

—End—

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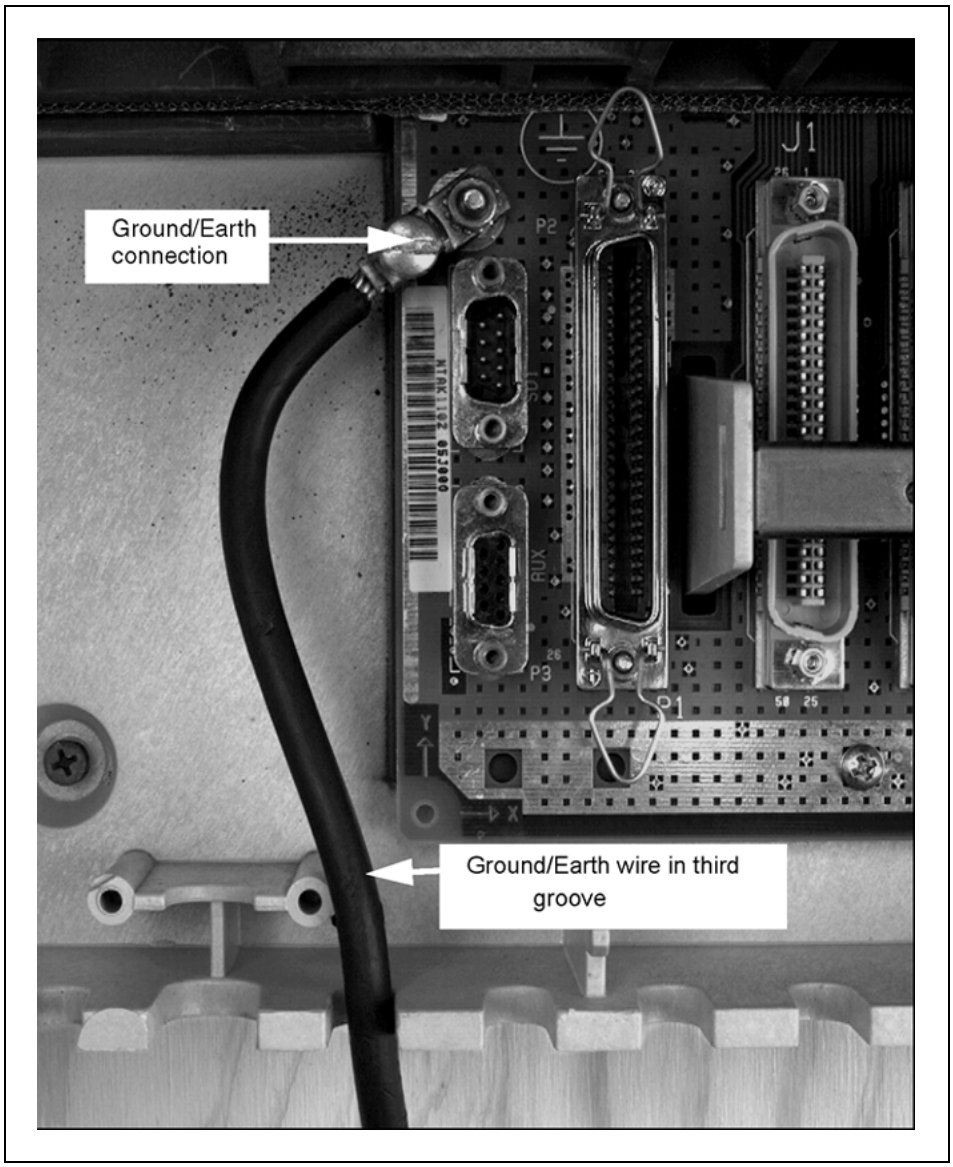
Figure 30
Ground/Earth connection



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Installing the Chassis system

Contents

This section contains information on the following topics:

"Summary of installation procedures" (page 89)

Summary of installation procedures

The following list provides a high-level summary of installation procedures for the Meridian 1 PBX 11C Chassis. Where applicable, the summary contains references to chapters that describe the procedures in more detail.

1. Read the safety instructions in "Important safety instructions" (page 57).
2. Make sure that you have read and completed the instructions contained in the planning chapters of *Meridian 1 Small System Planning and Engineering (NN43011-220)*.
3. Make sure that system and site requirements have been met. See *Meridian 1 Small System Planning and Engineering (NN43011-220)*.
4. Make sure that you have created the equipment layout plan and card slot assignment plan. See *Meridian 1 Small System Planning and Engineering (NN43011-220)*.
5. If your Small System requires earthquake bracing, refer to "Bracing against earthquakes" (page 61).

   For your system to be braced against earthquakes, you must install the chassis on a wall in a vertical position.
6. Locate the box containing the Small System equipment.
7. Install the chassis. See "Mounting the chassis" (page 103). Refer to one of the following procedures, depending on the position in which you will install the chassis:
   - Procedure 8 "Installing the chassis in a 480 mm (19 in.) rack/equipment cabinet" (page 106)
   - Procedure 9 "Installing the chassis on a wall in a vertical position" (page 110)

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- Procedure 10 "Installing the chassis on a wall in a horizontal position" (page 115)

8. Install the chassis expander. See "Connecting the chassis expander to the chassis" (page 119). You can skip this step if your system only has one chassis.

   Install the chassis expander the same way as the chassis. Refer to Procedure 11 "Adding a chassis expander" (page 119). This procedure describes how to connect the chassis to the chassis expander by using the two NTDK95 CE-MUX/DS-30X cables.

9. Install the chassis ground wire for the chassis and chassis expander at this site. See "Installing the system ground" (page 123).

   Refer to one of the following procedures:

   - Procedure 12 "Grounding the cabinets or chassis" (page 125)
   - Procedure 13 "Earthing the cabinets or chassis (UK)" (page 130)

   To ground multiple pieces of equipment in a rack/cabinet when one or more pieces of equipment does not have a grounding lug, see "Multiple pieces of equipment in an equipment rack/cabinet" (page 130).

10. If you require a UPS, install the UPS according to the manufacturer's instructions.

11. If you have not already done so, remove the faceplate of the chassis.

    a. Loosen the quick-release screws on the faceplate of the chassis. See Figure 31 "Faceplate on the Chassis system" (page 91).

    b. Lift the faceplate up.

    c. Remove the faceplate.

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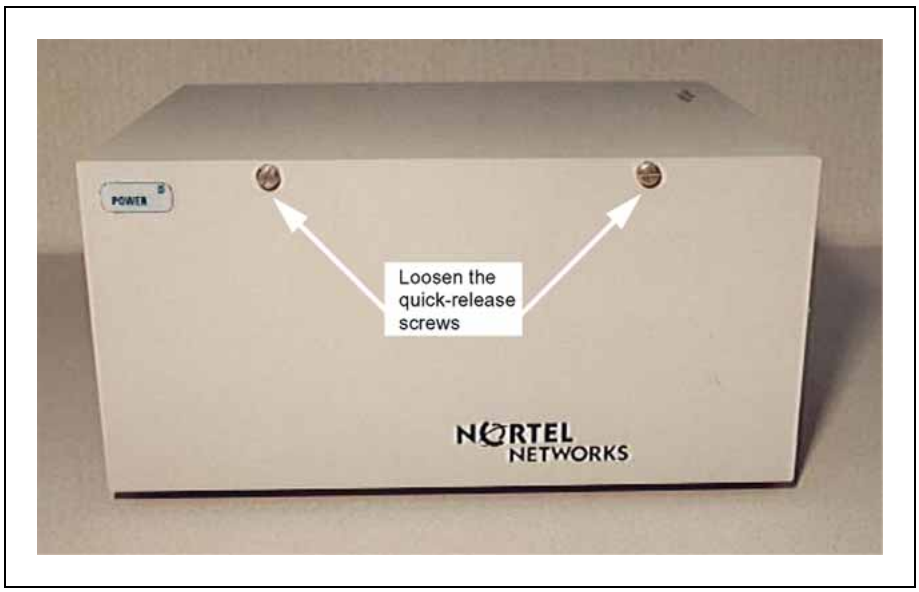
Figure 31
Faceplate on the Chassis system



12. Install the Small System Controller (SSC) card and the 48-port Digital Line Card.

    a. Install the SSC card in CPU slot 0 of the chassis. For a system without fiber or IP expansion, refer to "Installing Small System Controller cards on stand-alone systems" (page 155). For a system with fiber expansion, refer to "Installing fiber expansion" (page 159). For a system with IP expansion, refer to "Installing IP expansion" (page 175).

    b. Install the NTDK16 48-port Digital Line Card in slot 4 of the chassis. See Procedure 36 "Installing the NTDK16 48-port Digital Line Card" (page 206).
    The NTDK16 Digital Line Card is not required for the Small System to operate.

13. Install the optional circuit cards that you wish to have in your Small System. Refer to "Installing optional circuit cards" (page 189) and *ISDN Basic Rate Interface Maintenance (NN43001-718)*. Also, refer to your card slot assignment plan.

14. Install the cross-connect terminal. See "Installing and connecting cross-connect terminals" (page 209).

    Refer to the following procedures:

    - Procedure 38 "Installing the BIX cross-connect terminal" (page 211)
    - Procedure 39 "Installing the Krone Test Jack Frame (UK)" (page 215)

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15. Install the cables from the chassis to the cross-connect terminal. See "Installing and connecting cross-connect terminals" (page 209). Refer to Procedure 41 "Connecting the cables for the Chassis system" (page 221).
16. Install the PFTUs, if provided. See "Installing Power Failure Transfer Units" (page 225). Refer to Procedure 42 "Installing the PFTU" (page 226).
17. Connect the SDI port cable at the back of the chassis. See "Installing and connecting SDI and Ethernet network interfaces" (page 233). Refer to Procedure 43 "Connecting SDI ports on the SSC card" (page 238).
18. If Ethernet is required, insert an industry-standard Media Access Unit (MAU) directly into the Ethernet connector at the back of the chassis. The Chassis system does not include the MAU. Insert the Ethernet cable into this MAU. See "Installing and connecting SDI and Ethernet network interfaces" (page 233). Refer to Procedure 47 "Connecting the Ethernet cable to the Chassis system" (page 252).
19. Make sure that the DIP switch settings on the power supply are set to the correct values for ringing voltage, ringing frequency, and message waiting voltage. See Table 6 "Power supply DIP switch settings" (page 42) through Table 9 "North American power supply DIP switch settings" (page 43) for the DIP switch settings.
20. Connect the system to an AC power source. Make sure that the source matches the label on the back of the chassis. Turn the power switch to "ON".
21. Start and test system. See Software Installation Program on page 320. Refer to the following procedures:
    - Procedure 48 "Startup procedure for a new system installation, using the Small System Controller card" (page 255)
    - Procedure 49 "Startup procedure for a previously installed system" (page 257)
22. Install the system software. See "Installing software in a new system" (page 264). Refer to "E and M TIE trunk card (2280 Hz)" (page 341).
23. Connect the M2616 or the M2008 administration and maintenance telephone with display. See "Connecting the telephones" (page 307).
24. Install the telephones, if you have not already done so, and activate them. See "Connecting the telephones" (page 307).
25. Connect the trunks to the system. See "Terminal setup" (page 245).
26. Perform a system backup using LD 43.
27. Install any remaining equipment. See "Connecting an external alarm" (page 353).

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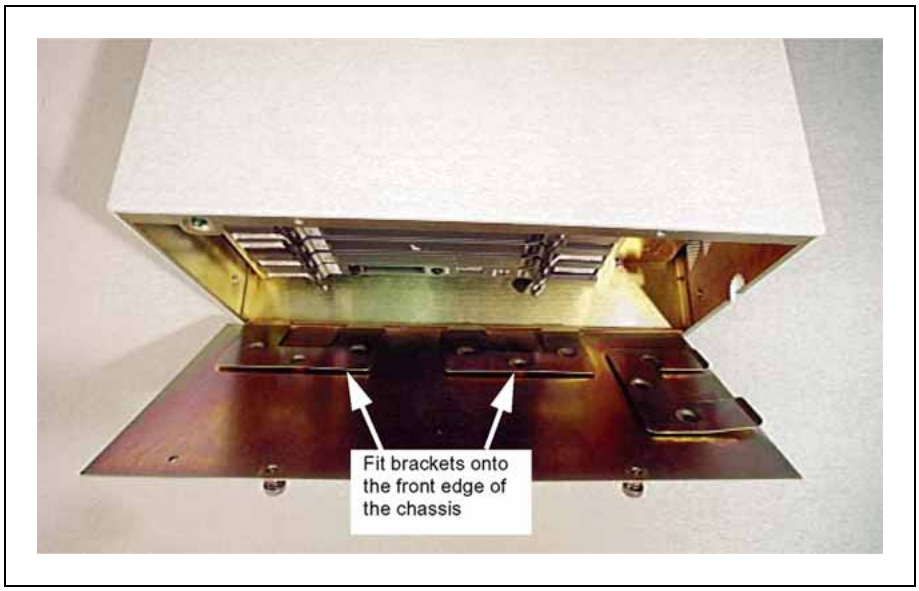
28. Replace the faceplate.

    a. Fit the brackets at the bottom of the faceplate into the raised edge at the bottom of the chassis. Move slightly to the left. See Figure 32 "Aligning the faceplate with the chassis" (page 93).

Figure 32
Aligning the faceplate with the chassis



    b. Move the faceplate down so that it fits over the raised edge at the bottom of the chassis. See Figure 33 "Fitting the front faceplate on the chassis" (page 93).

Figure 33
Fitting the front faceplate on the chassis

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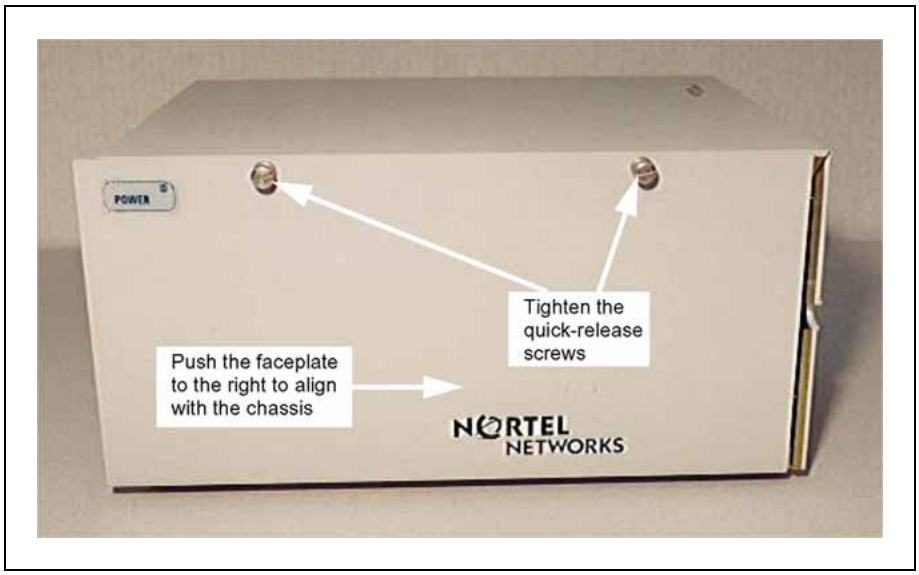
c. Slide the faceplate to the right, and tighten the quick-release screws into the two holes at the top of the chassis. See Figure 34 "Pushing the faceplate down into place to align with chassis" (page 94).

Figure 34
Pushing the faceplate down into place to align with chassis



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Mounting the cabinets

Contents

This section contains information on the following topics:

"Introduction" (page 95)
"Earthquake bracing" (page 95)
"Wall mounting" (page 95)
"Items required" (page 95)
"Floor mounting" (page 99)
"Items required" (page 99)

Introduction

This chapter explains two methods of installing cabinets. Procedure 6 "Mounting the cabinet on a wall" (page 96) describes how to mount the cabinet on a wall. Procedure 7 "Mounting the cabinet on the floor" (page 100) describes how to mount the cabinet on the floor using a pedestal.

Earthquake bracing

If the Small System cabinets require earthquake bracing, refer to the earthquake bracing requirements in the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)* before continuing.

Wall mounting

Items required

To mount cabinets on a wall you need:

- the equipment layout plan as developed in the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)*
- the mounting bracket supplied with each cabinet
- seven 25 mm (1 in.) #12 screws provided or other appropriate fasteners to secure the mounting bracket and cabinet to the wall

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- a 20 mm (3/4 in.) sheet of plywood secured to the wall
- one 25 mm (1 in.) #12 screw and an alignment bracket if installing an expansion cabinet next to the main cabinet (horizontal expansion)

DANGER

A fully loaded cabinet weighs up to 34 kg (75 lb). Make sure that the equipment is securely fastened to the wall. Use fasteners that are designed to hold securely in the type of surface chosen to support the equipment. When using 20 mm (3/4 in.) plywood or other similar material as a backboard, make sure that it is anchored directly to the wall studs in a minimum of six locations.

Procedure 6
Mounting the cabinet on a wall

Step	Action

If adding a cabinet next to an existing installed cabinet, start at Step 4.

1 Draw a level line on the plywood backboard indicating where the mounting brackets for each system cabinet will be located.

Refer to the equipment layout plan for measurements, or refer to the chapter on developing an equipment layout plan in *Meridian 1 Small System Planning and Engineering (NN43011-220)*.

2 Locate the mounting bracket and mounting screws shipped with each cabinet.

3 Rest the bottom of the bracket on the line drawn for the main cabinet and fasten the mounting bracket to the wall with five 25 mm (1 in.) #12 screws provided (or other suitable fasteners).

Make sure the mounting bracket is even with the line you have drawn and that the hook on the bracket is facing upward as shown in Figure 35 "Brackets for horizontal expansion" (page 97).

4 Perform this step only if an expansion cabinet is to be located immediately next to the main cabinet (or an existing expansion cabinet). Otherwise, go to the next step (Step 5).

Fasten an alignment bracket (shipped with the cabinet) to the wall as shown in Figure 35 "Brackets for horizontal expansion" (page 97).

The alignment bracket determines the minimum distance between the main and expansion cabinets if mounted side-by-side. It is not required if the space between cabinets is significant.

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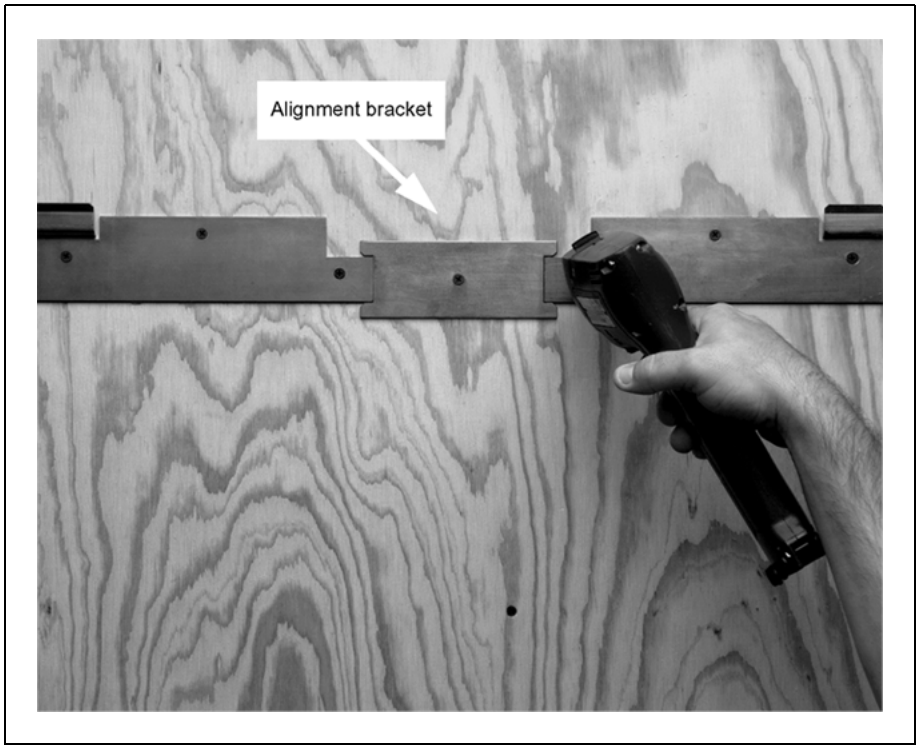
Figure 35
Brackets for horizontal expansion



5 Rest the bottom of the bracket on the line drawn for the expansion cabinet, and fasten the mounting bracket to the wall with five 25 mm (1 in.) #12 screws provided (or other suitable fasteners).

Make sure the mounting bracket is even with the line drawn, and that the hook on the bracket is facing upward as shown in Figure 35 "Brackets for horizontal expansion" (page 97).

6 Remove the main cabinet (or expansion cabinet if the main cabinet has been installed) from its carton and remove its front cover.

If the front cover lock latches are in their locked position, use a screwdriver and turn the lug on each latch 90¡ to the unlocked position (refer to Figure 36 "Unlocking the latches" (page 98)).

Simultaneously slide both latches in towards the center of the cabinet.

Grasp the sides of the cover and pull the top outwards, then lift it upward to remove it from the cabinet.

Note: The bottom of the front cover is supported but not secured to the cabinet. Be careful not to drop it.

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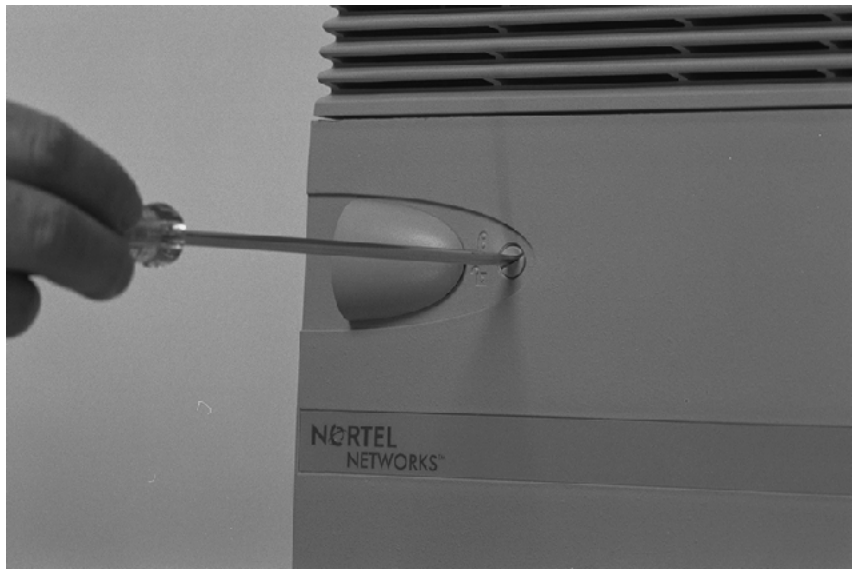
Figure 36
Unlocking the latches



7 Remove the metal drip tray.

Check the wrist strap in the bottom right of the cabinet. It may have come loose during transit. If so, attach it to the Velcro tab on the inside right wall of the cabinet.

WARNING
An empty cabinet weighs 12 kg (26 lb). Get help to lift the cabinet if necessary.

8 Lift the cabinet and hang it on the mounting bracket hook.

9 Locate the two screw holes at the bottom towards the rear of the cabinet. See Figure 37 "Securing the cabinet to the wall" (page 99).

10 Adjust the cabinet so that it is straight and level. Fasten the bottom of the cabinet to the wall with the two 25 mm (1 in.) #12 screws provided with the cabinet.

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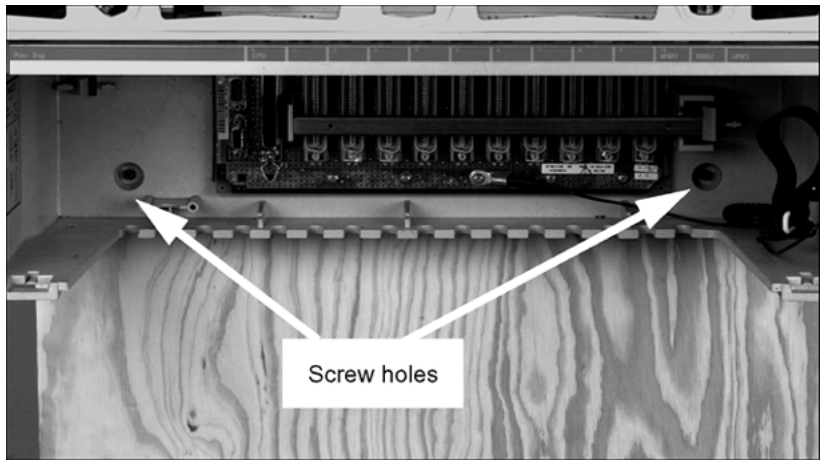
Figure 37
Securing the cabinet to the wall



11 If additional expansion cabinets are being installed at this site, repeat Step 6 through 10 to install those cabinets.

—End—

Floor mounting

Items required

To mount the cabinet on the floor you need:

- the optional pedestal for floor mounting
- four #14 screws provided to secure the cabinet to the pedestal
- the equipment layout plan as developed in the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)*

WARNING
An empty cabinet weighs 12 kg (26 lb). Get help to lift the cabinet if necessary.

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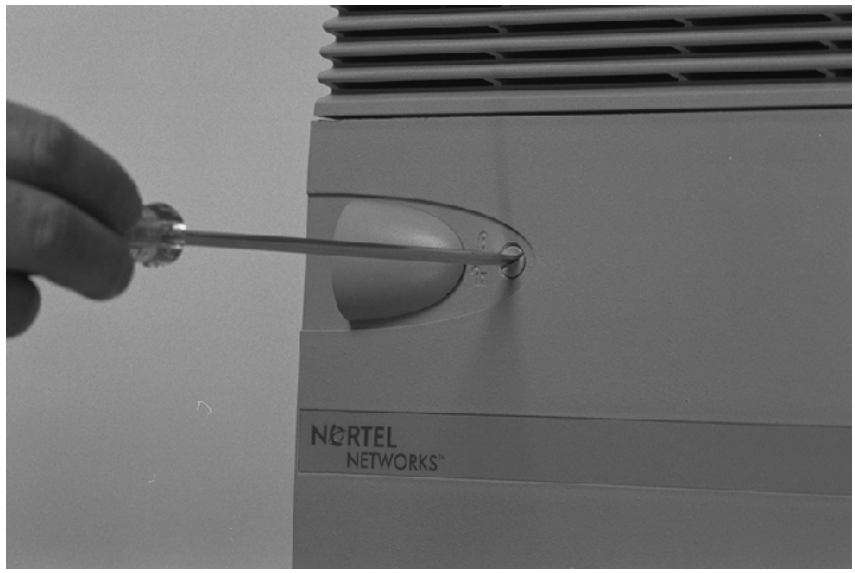
Procedure 7
Mounting the cabinet on the floor

Step	Action
1	Remove the main cabinet (or expansion cabinet if the main cabinet has been installed) from its carton and remove its front cover. If the front cover lock latches are in their locked position, use a screwdriver and turn the lug on each latch 90¡ to the unlocked position. (Refer to Figure 38 "Unlocking the latches" (page 100).) Simultaneously slide both latches in towards the center of the cabinet. Grasp the sides of the cover and pull the top outwards, then lift it upward to remove it from the cabinet.

Figure 38
Unlocking the latches



Note: The bottom of the front cover is supported but not secured to the cabinet. Be careful not to drop it.

2	Remove the metal drip tray. Check the wrist strap in the bottom right of the cabinet. It may have come loose during transit. If so, attach it to the Velcro tab on the inside right wall of the cabinet.
3	Locate the carton containing the pedestal.

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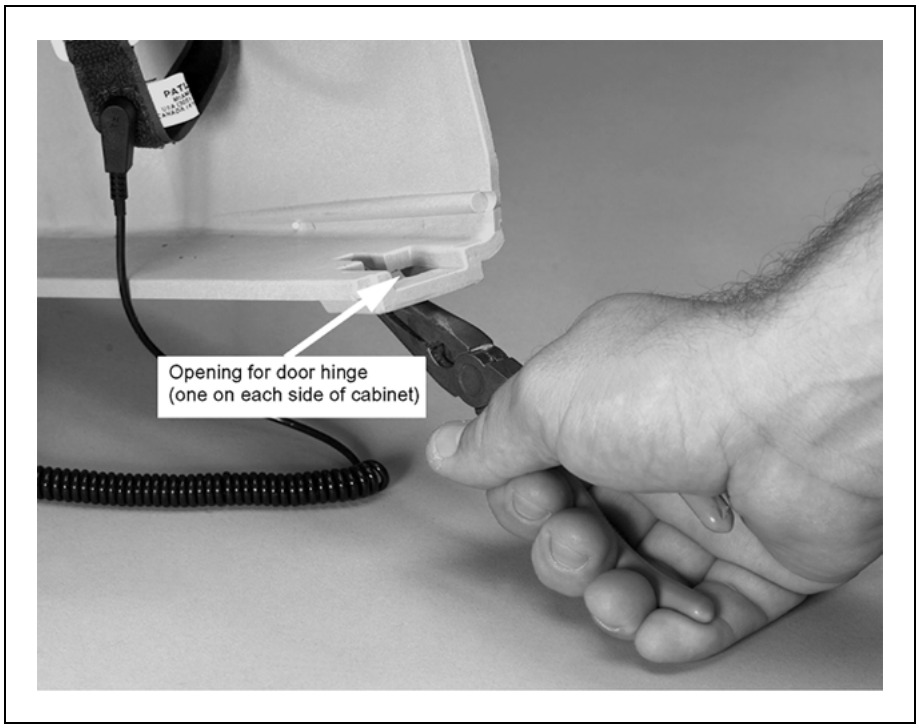
Remove the pedestal from the carton and locate the four leveling feet.

Install the feet into the base of the pedestal.

4 Install the cabinet on the pedestal.

Lean the cabinet backwards. From under the cabinet and with a pair of pliers, break off the two tabs located in the openings on the bottom of the cabinet where the door hinges join the cabinet, as shown in Figure 39 "Installing the pedestal" (page 101).

Figure 39
Installing the pedestal



Place the cabinet on the pedestal and make sure that it is properly seated. Align with the guide at the rear of the cabinet and pedestal. (Refer to Figure 40 "Mounting the cabinet on the pedestal" (page 102).)

Install the four #14 screws that are shipped with the pedestal, two at the bottom rear and two where the tabs were removed, and secure the cabinet to the pedestal.

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Figure 40
Mounting the cabinet on the pedestal

5 Position the cabinet according to the equipment layout plan.

6 If an additional expansion cabinet is being installed at this site, repeat this procedure for that cabinet.

—End—

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Mounting the chassis

Contents

This section contains information on the following topics:

"Introduction" (page 103)

"Mounting in a 480 mm (19 in.) rack/equipment cabinet" (page 104)

"Items required" (page 104)

"Wall mounting in a vertical position" (page 109)

"Items required" (page 109)

"Wall mounting in a horizontal position" (page 113)

"Lineside E1/T1 cards" (page 46)

Introduction

This chapter describes the three methods you can use to install the chassis. The following procedures describe the three installation methods:

- Procedure 8 "Installing the chassis in a 480 mm (19 in.) rack/equipment cabinet" (page 106)
- Procedure 9 "Installing the chassis on a wall in a vertical position" (page 110)
- Procedure 10 "Installing the chassis on a wall in a horizontal position" (page 115)

This chapter also provides guidelines on how to position system components. See Figure 41 "Typical layout for installing the chassis in a rack/equipment cabinet" (page 105), Figure 45 "Typical layout for installing the chassis on a wall in a vertical position" (page 110), and Figure 49 "Typical layout for installing the chassis on a wall in a horizontal position" (page 115). Also refer to the chapter on developing an equipment layout plan and a card slot assignment plan in *Meridian 1 Small System Planning and Engineering (NN43011-220)* for additional information.

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WARNING
If the Small System requires earthquake bracing, you must install the chassis on a wall in a vertical position. Refer to the earthquake bracing requirements in the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)* and "Bracing against earthquakes" (page 61).

WARNING
A chassis is 13.5 kg (30 lb) with circuit cards installed. A chassis is 12 kg (26 lb) without circuit cards installed. Get help lifting the chassis if necessary.

Mounting in a 480 mm (19 in.) rack/equipment cabinet

Items required

To install the chassis in a 480 mm (19 in.) rack/equipment cabinet, you require the following items:

- equipment layout plan
- one left chassis guide bracket
- one right chassis guide bracket
- one left ear bracket
- one right ear bracket
- eight #12-24 self-tapping screws
- four #8-32 machine screws

The NTTK09 contains all of the above items, with the exception of the equipment layout plan.

Note: The Chassis system does not include the 19-inch rack/equipment cabinet.

Refer to Figure 41 "Typical layout for installing the chassis in a rack/equipment cabinet" (page 105) for guidelines on how to position system components.

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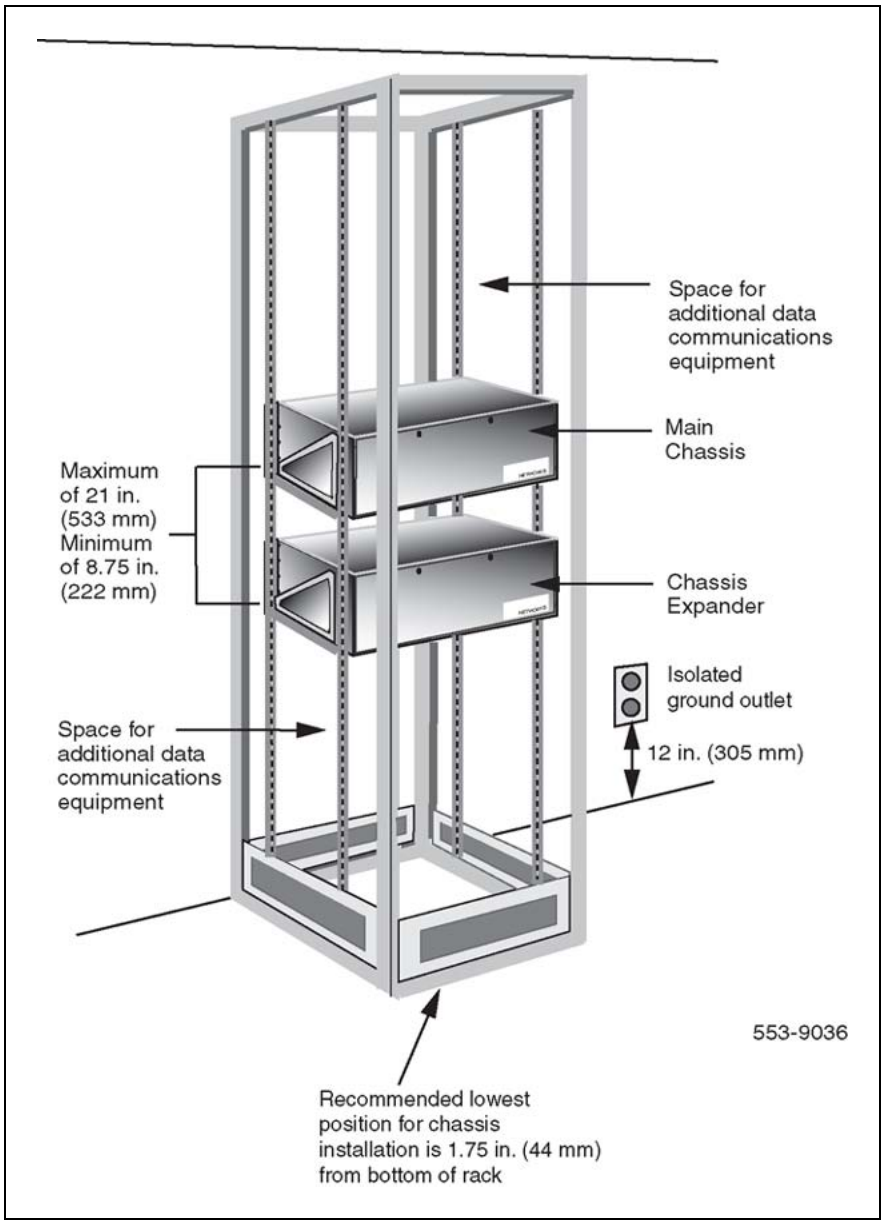
Figure 41
Typical layout for installing the chassis in a rack/equipment cabinet



Note 1: Leave wall space for the cross-connect terminal.

Note 2: The rack/equipment cabinet does not have to be right against the wall. You can position the rack/equipment cabinet so that you have access to both the front and back.

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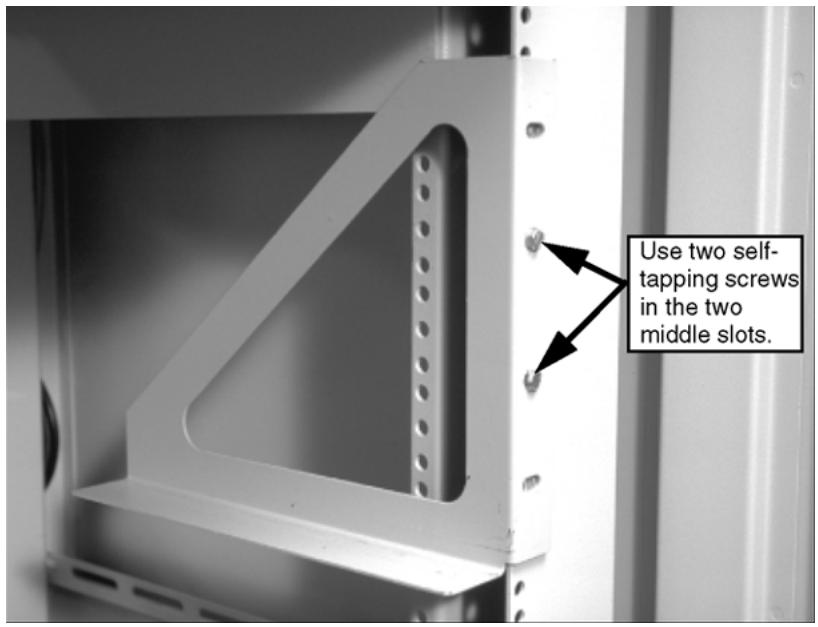
Procedure 8
Installing the chassis in a 480 mm (19 in.) rack/equipment cabinet

Step	Action
1	Fasten the left chassis guide bracket to the left rack/equipment cabinet support. Insert two #12-24 self-tapping screws into the two middle slots in the chassis guide bracket and into the respective holes in the left rack/equipment cabinet support. Fasten the screws. ***Note:*** The rack/equipment cabinet brackets help guide the chassis into place, and allow one person to install the chassis in the rack/equipment cabinet.
2	Fasten the right chassis guide bracket to the right rack/equipment cabinet support. Insert two #12-24 self-tapping screws into the two middle slots in the bracket and into the respective holes in the right rack/equipment cabinet support. Fasten the screws. See Figure 42 "Chassis guide bracket installed in a rack" (page 106).
3	Attach the left ear bracket (marked with an "L") to the holes on the left side of the chassis (near the front). Use two #8-32 machine screws. Position the ear bracket so that the four holes on the bracket flange are nearer to the back of the chassis.

Figure 42
Chassis guide bracket installed in a rack



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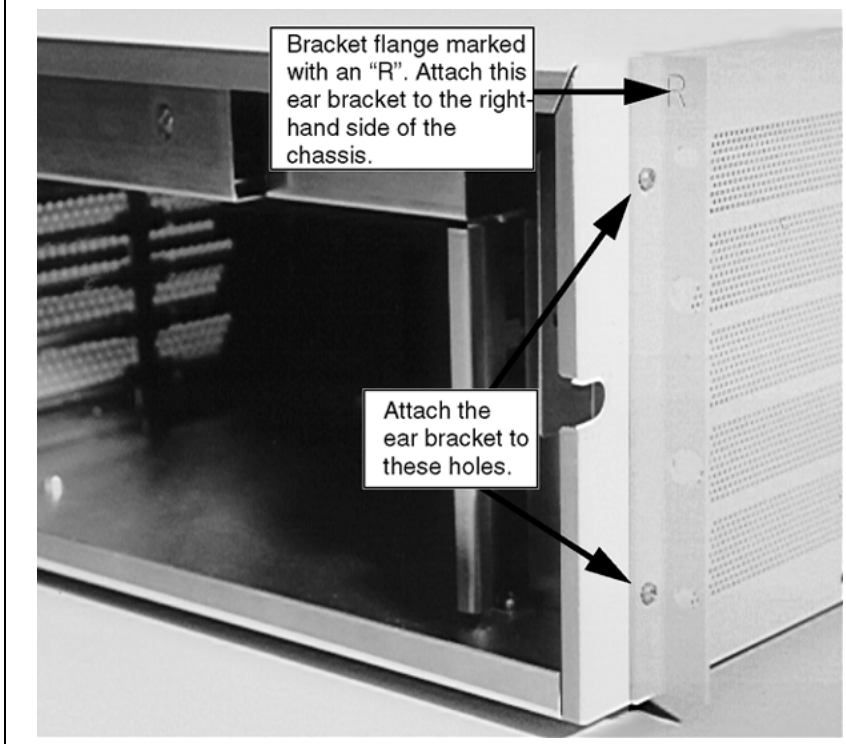
To determine the front of the bracket, locate the "L". This "L" must be at the top of the bracket and must face to the front of the chassis.

4 Attach the right ear bracket (marked with an "R") to the holes on the right side of the chassis.
Use two #8-32 machine screws. Position the ear bracket so that the four holes on the bracket flange are nearer to the back of the chassis. To determine the front of the bracket, locate the "R". This "R" must be at the top of the bracket and must face to the front of the chassis. See Figure 43 "Right ear bracket installed on the chassis" (page 107).

Figure 43
Right ear bracket installed on the chassis



5 Place the chassis on the chassis guide brackets.
Carefully slide the chassis into the rack/equipment cabinet until the ear brackets come to rest against the rack/equipment cabinet support.

6 Use the four remaining #12-24 self-tapping screws to fasten the chassis to the rack/equipment cabinet supports (two screws on each side). Make sure that the back of the chassis is on the chassis guide

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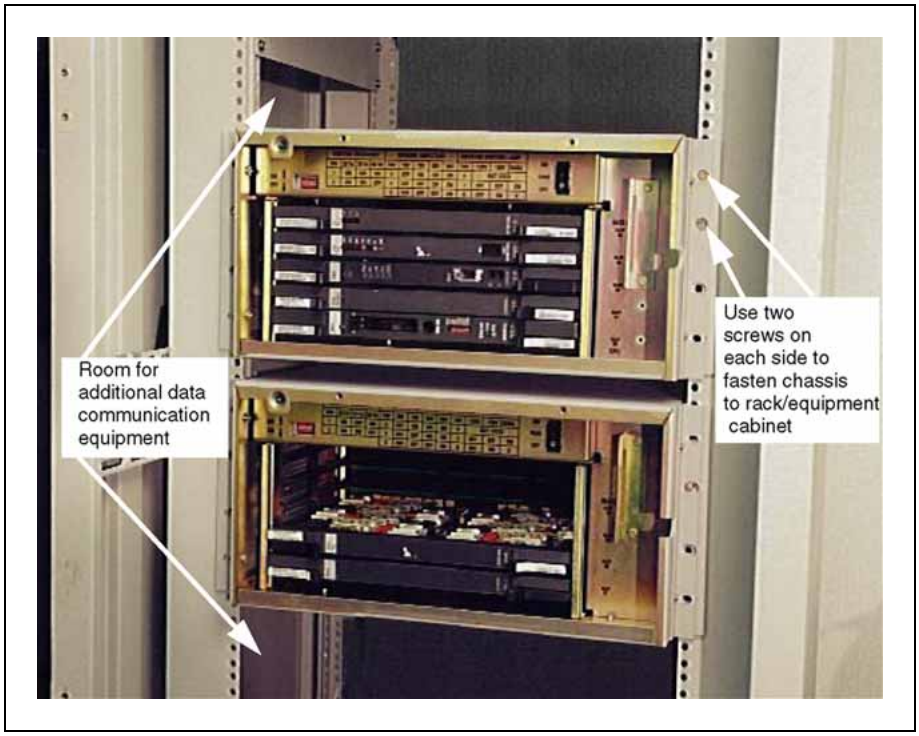
brackets. See Figure 44 "Chassis installed in a rack/equipment cabinet" (page 108).

Figure 44
Chassis installed in a rack/equipment cabinet



7 To add a chassis expander, follow the above steps.
You only need to leave a small space between the chassis and the chassis expander. The air circulates from the side of the chassis. To install the chassis expander, start at the next 5u pattern of mounting holes (see Note 1). This results in the chassis expander being approximately 6 mm (1/4 in.) from the first chassis.

Note 1: The holes in the rack occur in sets of three, spaced at 16 mm (5/8 in.) + 16 mm (5/8 in.) + 12.5 mm (1/2 in.). Each set of three holes is one "u" and spans 44.5 mm (1.75 in.). In a 5u pattern, the chassis is mounted over five sets of holes.

Note 2: In addition to more chassis, you can install other Data Communication Equipment in a rack/equipment cabinet with the Chassis system. Refer to "Multiple pieces of equipment in an equipment rack/cabinet" (page 130) for grounding instructions for multiple pieces of equipment in a rack/equipment cabinet.

—End—

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Wall mounting in a vertical position

Items required

To install the chassis on a wall in a vertical position, you require the following items:

- equipment layout plan
- chassis bracket
- wall bracket
- five 25 mm(1 in.) #12 wood screws provided in the bracket kit (or other appropriate fasteners) to hold the wall brackets and chassis on the wall
- four #8-32 machine screws, used to attach the chassis brackets to the wall
- one 20 mm (3/4 in.) piece of plywood fastened to the wall

The NTTK08 bracket kit contains all of the above items, with the exception of the equipment layout plan and the plywood.

DANGER
A chassis is 13.5 kg (30 lb) with circuit cards installed. Make sure that you fasten the equipment securely to the wall. Use fasteners designed to hold securely to the type of surface that will support the equipment. When using 20 mm (3/4 in.) plywood, or other similar material as a backboard, make sure to attach the backboard directly to the wall studs in a minimum of six locations.

Refer to Figure 45 "Typical layout for installing the chassis on a wall in a vertical position" (page 110) for guidelines on how to position the system components.

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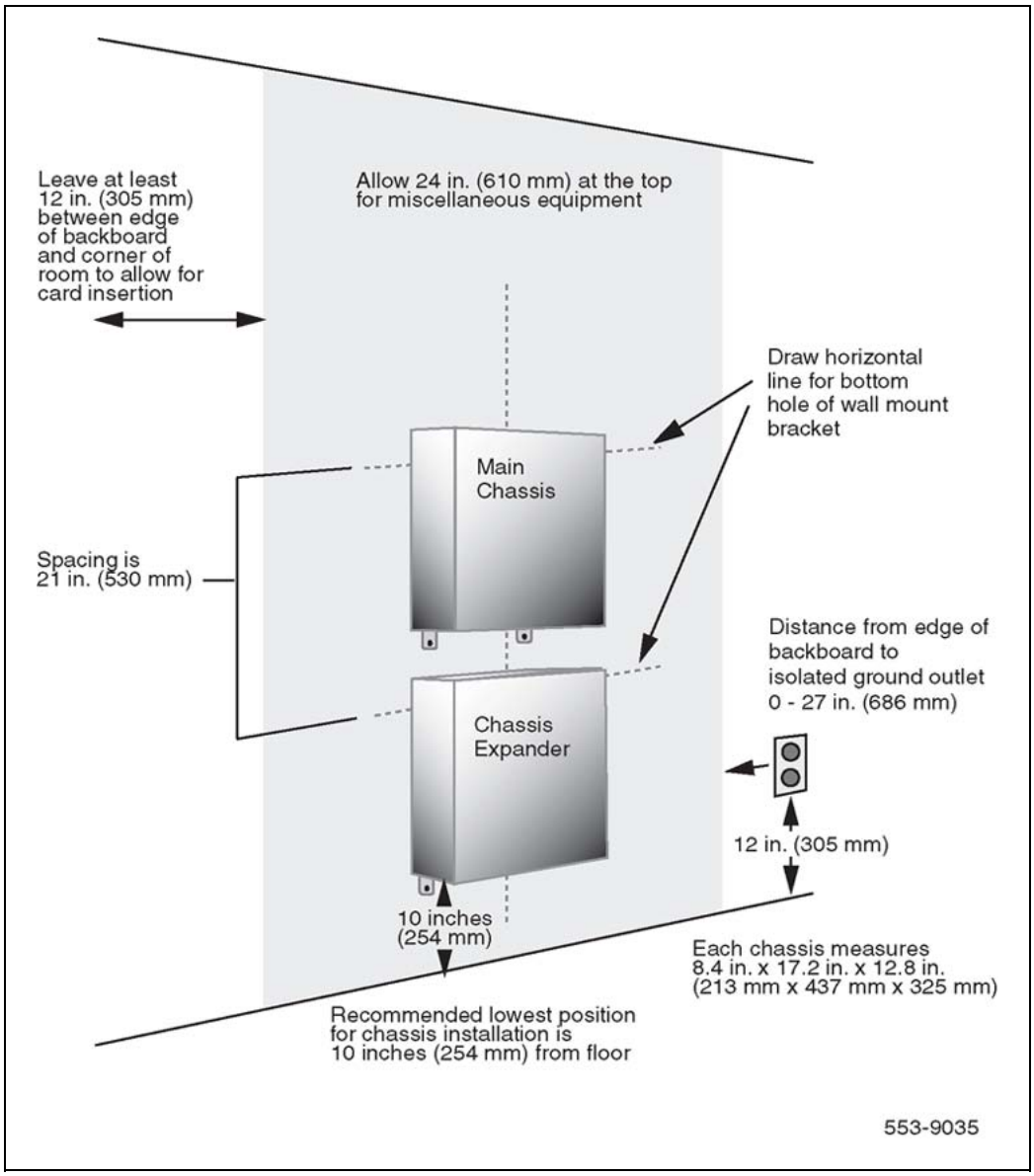
Figure 45
Typical layout for installing the chassis on a wall in a vertical position



Note: Leave space for the cross-connect terminal.

Procedure 9
Installing the chassis on a wall in a vertical position

Step	Action
1	Draw the vertical center line of the chassis on the plywood backboard. Allow for clearance on the left and right of the chassis

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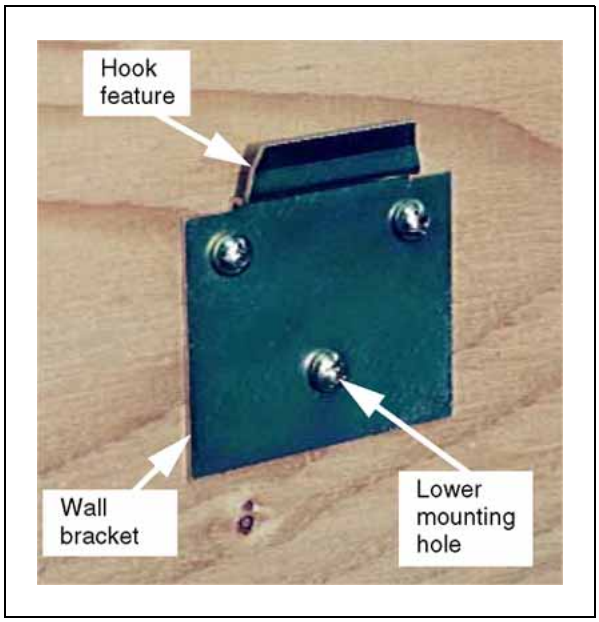
for cables and card access. Refer to Figure 45 "Typical layout for installing the chassis on a wall in a vertical position" (page 110).

2 Draw a horizontal line on the plywood backboard.
This line indicates the vertical position of the lower hole of the wall bracket.

Place the wall bracket against the plywood backboard. Place the lower mounting hole over the intersection of the vertical and horizontal lines. Fasten the wall bracket securely to the plywood backboard with three #12 wood screws provided (or other appropriate fasteners). See Figure 46 "Wall bracket fastened to backboard" (page 111).

Note: Make sure that the hook feature on the wall bracket points toward the top of the backboard.

Figure 46
Wall bracket fastened to backboard



3 Fasten the chassis bracket to the back of the chassis using the four #8-32 machine screws supplied with the bracket kit. See Figure 47 "Chassis bracket installed on the back of the chassis" (page 112), which shows the chassis lying on its side.

Note: Make sure that the slot feature on the chassis bracket is at the top of the chassis. Also, the two tabs on the chassis bracket must extend past the bottom of the chassis.

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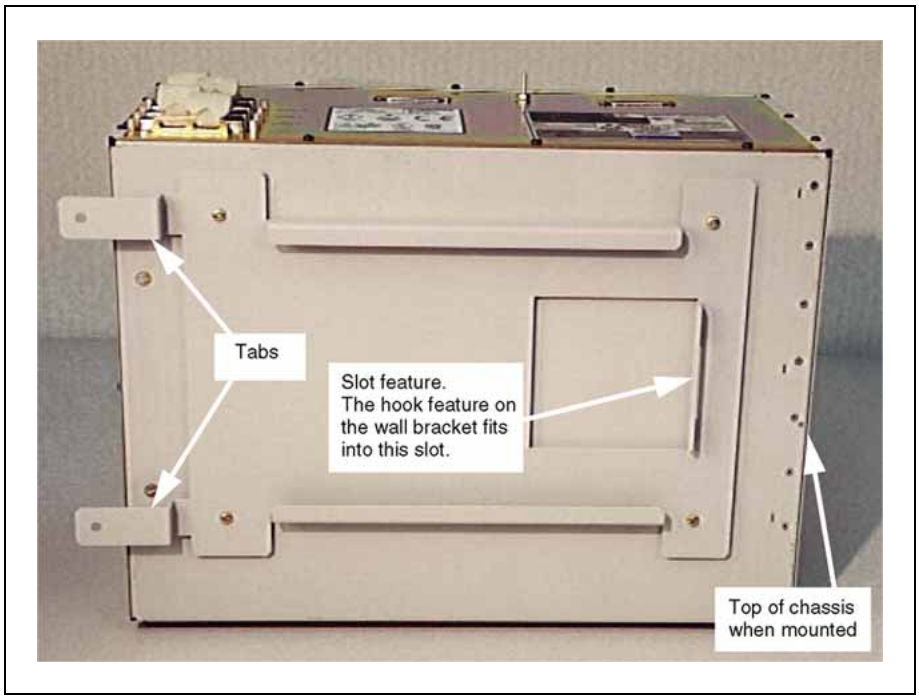
Figure 47
Chassis bracket installed on the back of the chassis



4 Lift the chassis into place so that the slot on the chassis bracket engages the hook feature on the wall bracket. Carefully lower the chassis until the hook on the wall bracket fits securely into the slot on the chassis bracket.

5 Fasten the chassis in position. Fasten the tabs, which extend past the bottom of the chassis, to the plywood backboard. Use the two remaining #12 wood screws from the bracket kit to fasten the tabs to the backboard. See Figure 48 "Chassis on a wall in a vertical position" (page 113).

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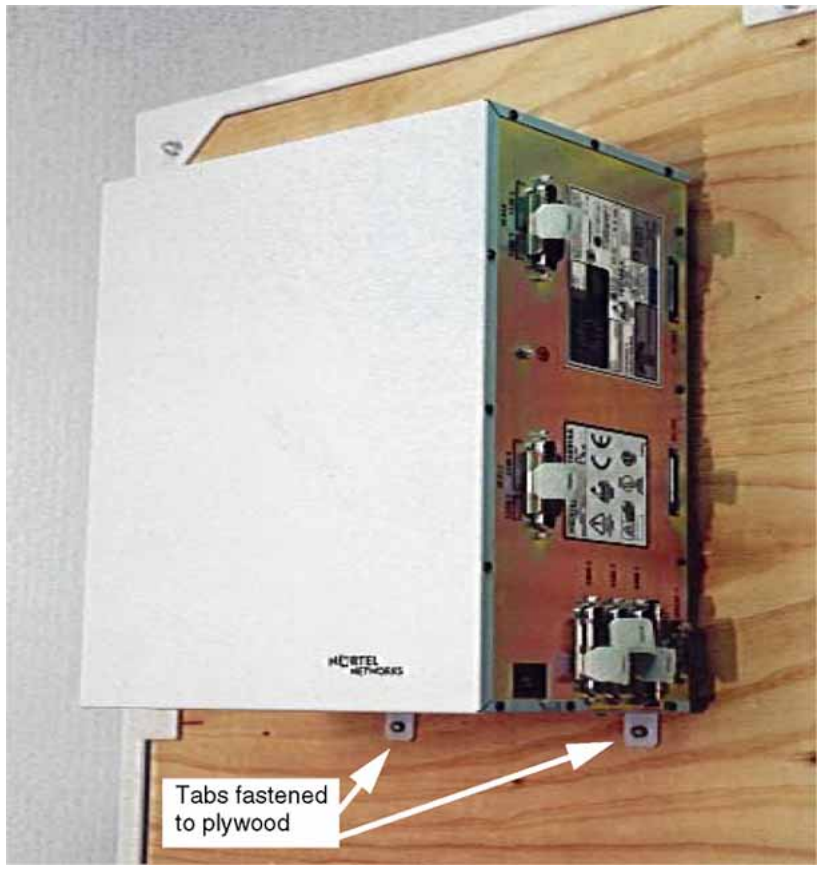
Figure 48
Chassis on a wall in a vertical position



6 If you want to install a chassis expander, repeat the above steps. Refer to the equipment layout plan for the measurements and where to place the chassis expander.

—End—

Wall mounting in a horizontal position

Items required

To install the chassis on a wall in a horizontal position, you require the following items:

- equipment layout plan
- one left shelf bracket
- one right shelf bracket

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- eight 25 mm (1 in.) #12 wood screws supplied in the bracket kit (or other appropriate fasteners) to fasten the wall shelf brackets to the wall
- one 20 mm (3/4 in.) piece of plywood fastened to the wall

The NTTK11 bracket kit contains all of the above items, with the exception of the equipment layout plan and the plywood.

DANGER

A chassis is 13.5 kg (30 lb) with circuit cards installed. Make sure that you fasten the equipment securely to the wall. Use fasteners designed to hold securely to the type of surface that will support the equipment. When using 20 mm (3/4 in.) plywood, or other similar material as a backboard, make sure you attach it directly to the wall studs in a minimum of six places.

Refer to Figure 49 "Typical layout for installing the chassis on a wall in a horizontal position" (page 115) for guidelines on how to position system components.

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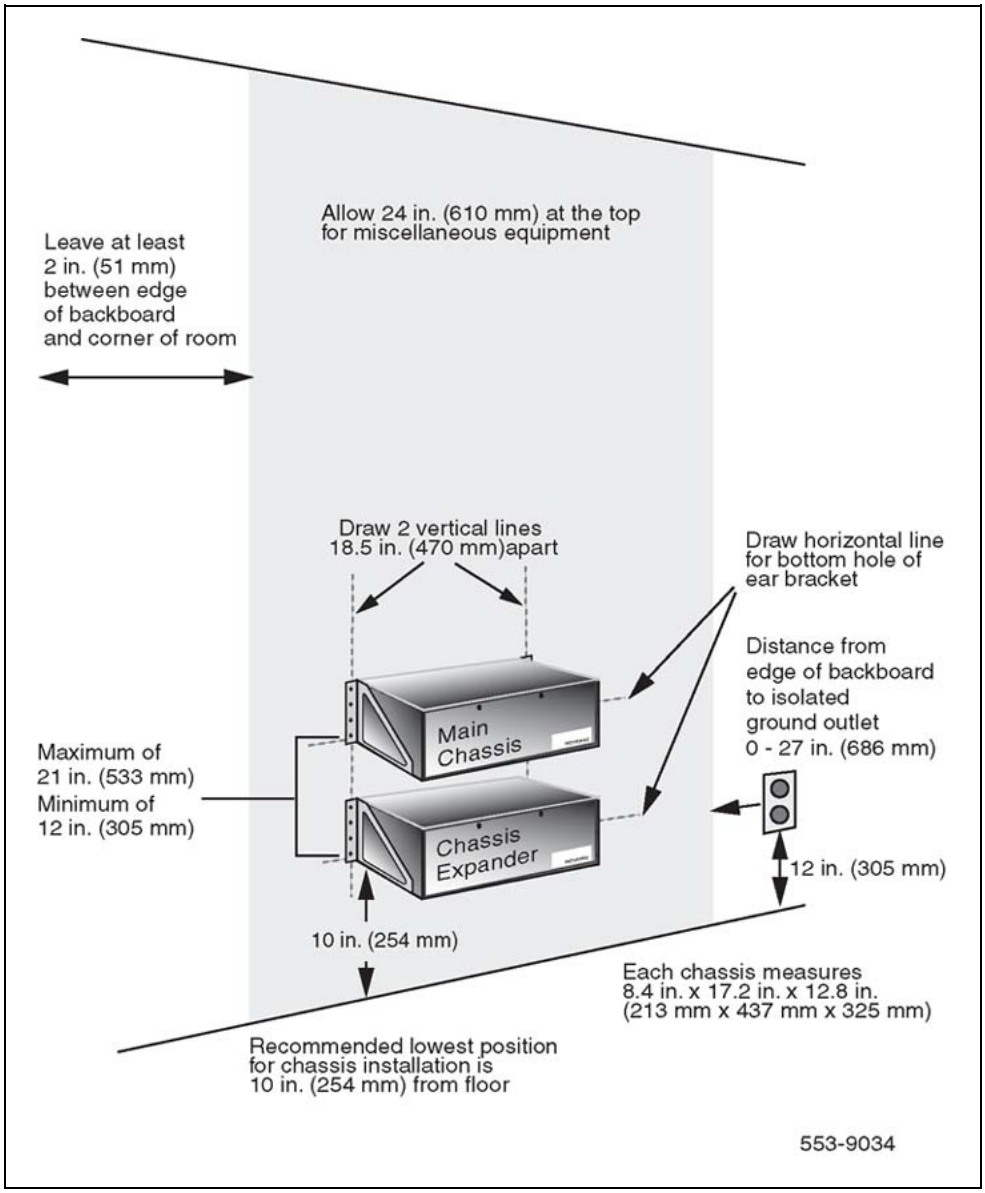
Figure 49
Typical layout for installing the chassis on a wall in a horizontal position



Note: Leave space for the cross-connect terminal.

Procedure 10
Installing the chassis on a wall in a horizontal position

Step	Action
1	Draw two vertical lines 470 mm (18.5 in.) apart on the plywood backboard.

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Allow for clearance on the left and right of the chassis for cables and air flow. Refer to the equipment layout plan for measurements.

2 Draw a horizontal line on the plywood backboard.
This line indicates the vertical position of the bottom hole on the horizontal wall shelf bracket. Refer to the equipment layout plan for measurements.

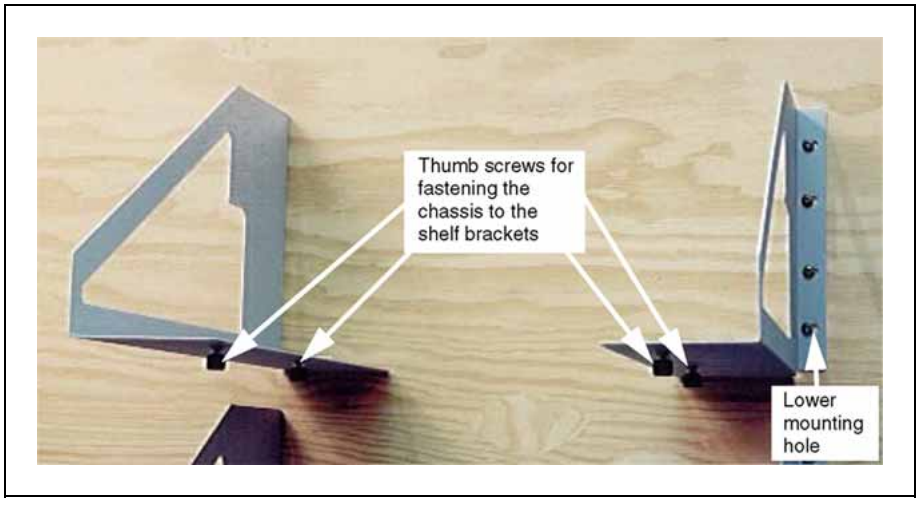
3 Place the left shelf bracket against the plywood backboard. Place the lower mounting hole over the intersection of the left vertical line and the horizontal line.
Fasten the shelf bracket securely to the plywood backboard.
Use four #12 wood screws provided in the bracket kit (or other appropriate fasteners) to fasten the shelf bracket to the backboard.

Note: Position the shelf bracket so that the two thumb screws, located on the bottom of the bracket, face downward. Leave the screws slightly loose, so you can adjust the brackets to the width of the chassis if necessary.

4 Place the right shelf bracket against the plywood backboard. Place the lower mounting hole over the intersection of the right vertical line and the horizontal line. Fasten the shelf bracket securely to the plywood backboard with the remaining four #12 wood screws provided in the bracket kit (or other appropriate fasteners). See Figure 50 "Thumb screws on the wall shelf brackets" (page 116).

Note: Make sure the shelf bracket is oriented with the two thumb screws, located on the bottom face of the bracket, facing downwards. Leave the screws slightly loose, so you can adjust the brackets to the width of the chassis if necessary.

Figure 50
Thumb screws on the wall shelf brackets



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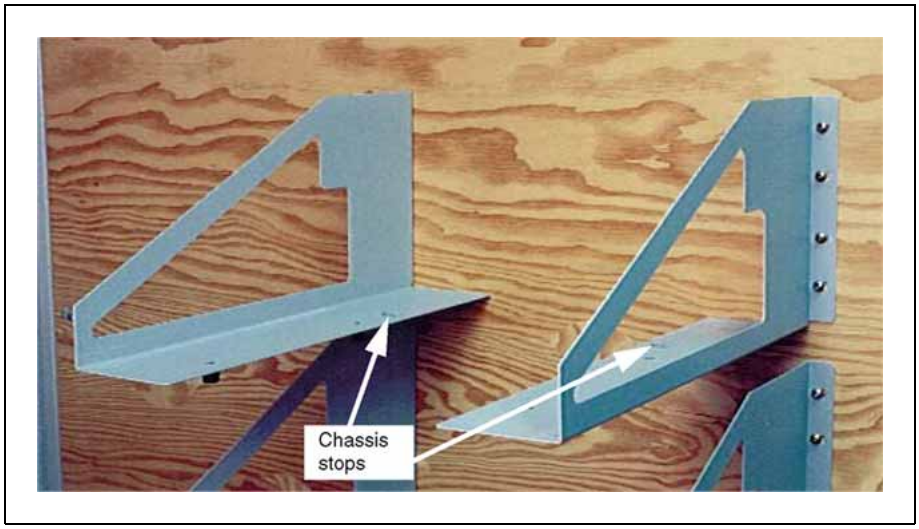
5 Place the chassis on the shelf brackets. Carefully slide the chassis on the wall shelf brackets until it touches the chassis stops on the brackets. See Figure 51 "Chassis stops on the wall shelf brackets" (page 117).

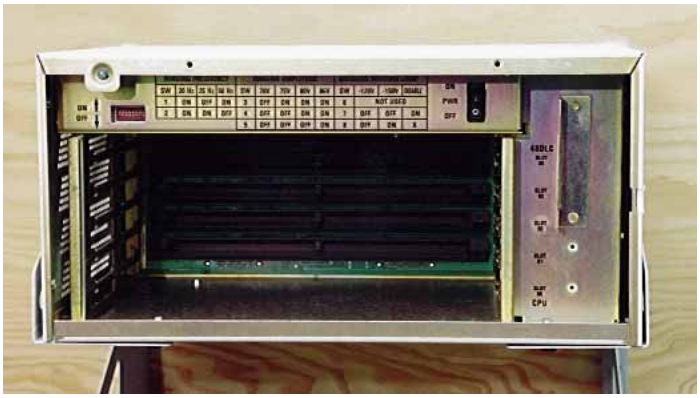
Figure 51
Chassis stops on the wall shelf brackets



6 Fasten the chassis in position using the four thumb screws, located on the bottom side of the shelf brackets.

7 Tighten the eight #12 wood screws into the plywood backboard. Make sure that the shelf brackets and chassis are fastened securely in position. See Figure 52 "Chassis installed on a wall in a horizontal position" (page 117).

Figure 52
Chassis installed on a wall in a horizontal position



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8 If you want to install a chassis expander on a wall in a horizontal position, repeat the above steps for the chassis expander. Refer to the equipment layout plan for the measurements and where to position the chassis expander.

—End—

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Connecting the chassis expander to the chassis

Contents

This section contains information on the following topics:

"Introduction" (page 119)

"Adding a chassis expander" (page 119)

Introduction

This chapter describes how to add a chassis expander to your Chassis system. Use the same methods described in "Mounting the chassis" (page 103) to install the chassis expander. Refer to the chapter on developing an equipment layout plan in *Meridian 1 Small System Planning and Engineering (NN43011-220)* for measurements and distances between the chassis and the chassis expander.

This chapter contains the following procedure:

- Procedure 11 "Adding a chassis expander" (page 119)

Adding a chassis expander

The chassis expander connects to the chassis by two copper cables: one provides DS-30X connectivity and the other provides CE-MUX connectivity to slot 10 only.

Procedure 11
Adding a chassis expander

Step	Action
1	Install the chassis expander following the procedures in "Mounting the chassis" (page 103).
2	Connect one of the NTDK95 cables from the CE-MUX connector on the back of the chassis to the CE-MUX connector on the back of the chassis expander.

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3 Tighten the screws on the connectors.

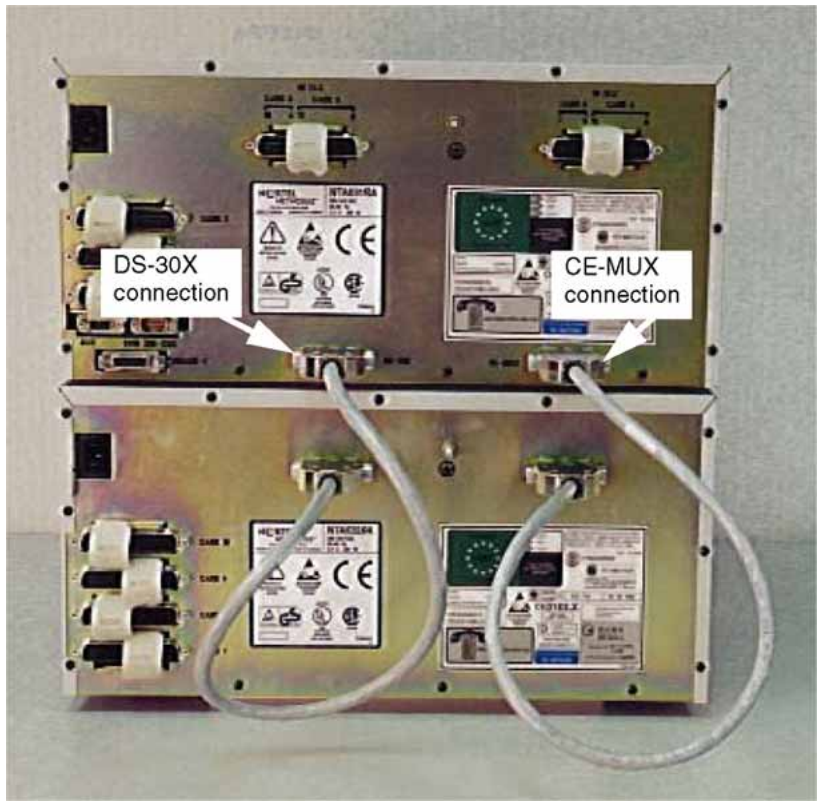
4 Connect the other NTDK95 cable from the DS-30X connector on the back of the chassis to the DS-30X connector on the back of the chassis expander.

5 Tighten the screws on the connectors.

Note: The Chassis Expander Cable Kit (NTDK89) contains two NTDK95 cables.

Figure 53 "The chassis and chassis expander connected with the two NTDK95 CE-MUX/DS-30X bus cables" (page 120) shows the chassis and chassis expander connected with the two NTDK95 cables.

Figure 53
The chassis and chassis expander connected with the two NTDK95 CE-MUX/DS-30X bus cables



6 Install the system ground as described in "Installing the system ground" (page 123).

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7 Add circuit cards as described in "Installing optional circuit cards" (page 189).

8 Follow the procedures for starting the Small System in "Starting the Chassis system" (page 255).

—End—

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Installing the system ground

Contents

This section contains information on the following topics:

"Introduction" (page 123)

"Cabinets or chassis powered by the same service panel" (page 124)

"Cabinets or chassis powered by different service panels" (page 124)

"Grounding instructions for cabinets and chassis" (page 125)

"Multiple pieces of equipment in an equipment rack/cabinet" (page 130)

Introduction

This chapter describes how to install and connect the ground source to the Small System cabinets and chassis. This chapter contains the following procedures:

- Procedure 12 "Grounding the cabinets or chassis" (page 125)
- Procedure 13 "Earthing the cabinets or chassis (UK)" (page 130)

This chapter also describes how to ground multiple pieces of Chassis system equipment in an equipment rack/cabinet when one or more pieces of equipment does not have a grounding lug. See "Multiple pieces of equipment in an equipment rack/cabinet" (page 130).

Make sure you read the grounding requirements in the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)* before proceeding further.

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DANGER
DANGER OF ELECTRIC SHOCK
Proper grounding is extremely important.
Failure to complete the following steps could result in a system that is:

- unsafe for personnel using the equipment
- not protected from lightning or power surges
- subject to service interruptions

Insulated ground wire **must** be used for system grounding.

Note: System ground is synonymous with system earth in the UK.

Cabinets or chassis powered by the same service panel

For each system cabinet in collocated multi-cabinet situations or for each chassis, connect a #6 AWG (#40 Metric Wire Gauge) ground wire from the cabinet or the chassis to an NTBK80 grounding block. Connect the grounding block to a ground source (the ground bus in the AC service panel).

For an expanded Chassis system, consider the chassis and the chassis expander as the same ground. Jumper the ground wire from the chassis expander to the chassis. Then, connect the ground wire from the chassis to the grounding block.

See Table 20 "Region-specific grounding wire requirements" (page 125) for region-specific grounding requirements.

Cabinets or chassis powered by different service panels

For each system cabinet in collocated multi-cabinet situations or for each chassis, connect a #6 AWG (#40 Metric Wire Gauge) ground wire from the cabinet or the chassis to an NTBK80 grounding block. If any cabinet or chassis cannot be powered from the same service panel, it must be grounded separately from the others back to the service panel that supplies it.

For an expanded Chassis system, all chassis and chassis expander pairs must be powered from the same service panel.

See Table 20 "Region-specific grounding wire requirements" (page 125) for region-specific grounding requirements.

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Table 20
Region-specific grounding wire requirements

Region	Grounding wire requirements
Germany	#8 AWG (10 mm^2) green/yellow wire
Other regions in Europe	not smaller than #6 AWG (16 mm^2) at any point
UK	two green/yellow wires no thinner than 10 mm^2 (3/8 in.)

Grounding instructions for cabinets and chassis

Procedure 12 "Grounding the cabinets or chassis" (page 125) describes how to ground Small System cabinets or chassis. Repeat the steps for each cabinet or for each chassis and chassis expander pair installed in the system.

Procedure 12
Grounding the cabinets or chassis

Step	Action
1	Make sure that you disconnect the AC power cord from the power outlet. ***Note:*** For the Chassis system in an equipment rack/cabinet configuration, equipment must be powered from the same service panel.

DANGER
DANGER OF ELECTRIC SHOCK
Never connect power to a cabinet or chassis that is not grounded correctly.

Step	Action
2	For a Cabinet system, if the cabinet is connected to a reserve power supply unit (battery backup), make sure that the circuit breaker on that unit is set to OFF.

DANGER
DANGER OF ELECTRIC SHOCK
Never connect backup power to a cabinet that is not grounded correctly.

Step	Action
3	Install an NTBK80 grounding block near the cabinet or chassis.

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Note: Use the grounding block as a bridging point for ground wires from:

- up to three nearby Cabinet systems. If you have remote cabinets, or when more than three cabinets are collocated, you require additional grounding blocks.
- up to six nearby chassis and chassis expander pairs. If you have additional chassis, you require additional grounding blocks.

4 *For the Cabinet system:* Install a #6 AWG (#40 Metric Wire Gauge) ground wire from the ground lug in each cabinet to the NTBK80 grounding block.

Connect the ground wire to the ground lug located in the bottom portion of the cabinet next to the cable connectors. Route the ground wire through the third groove from the left in the bottom of the cabinet. See Figure 54 "Ground/Earth lug in the NTAK11 system cabinets" (page 127).

Connect the ground wire to the grounding block. See Figure 56 "NTBK80 grounding block" (page 129).

Place a DO NOT DISCONNECT tag on the ground wire.

Go to step 6.

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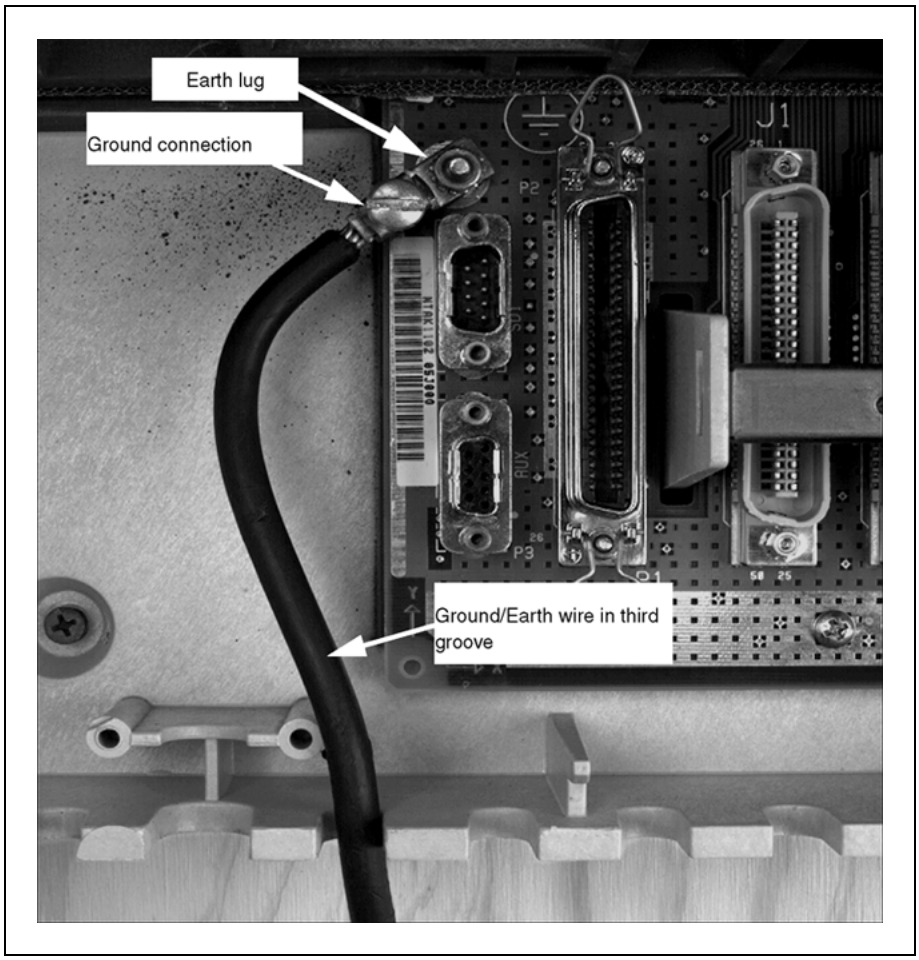
Figure 54
Ground/Earth lug in the NTAK11 system cabinets



5 *For the Chassis system:*Install a #6 AWG (#40 Metric Wire Gauge) ground wire from the ground lug on the back of the chassis to the NTBK80 grounding block.

Consider each chassis and chassis expander pair as one ground. Jumper the chassis expander ground to the chassis ground. See Figure 55 "Grounding a chassis and chassis expander pair" (page 128).

Place a DO NOT DISCONNECT tag on the ground wire.

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Figure 55
Grounding a chassis and chassis expander pair

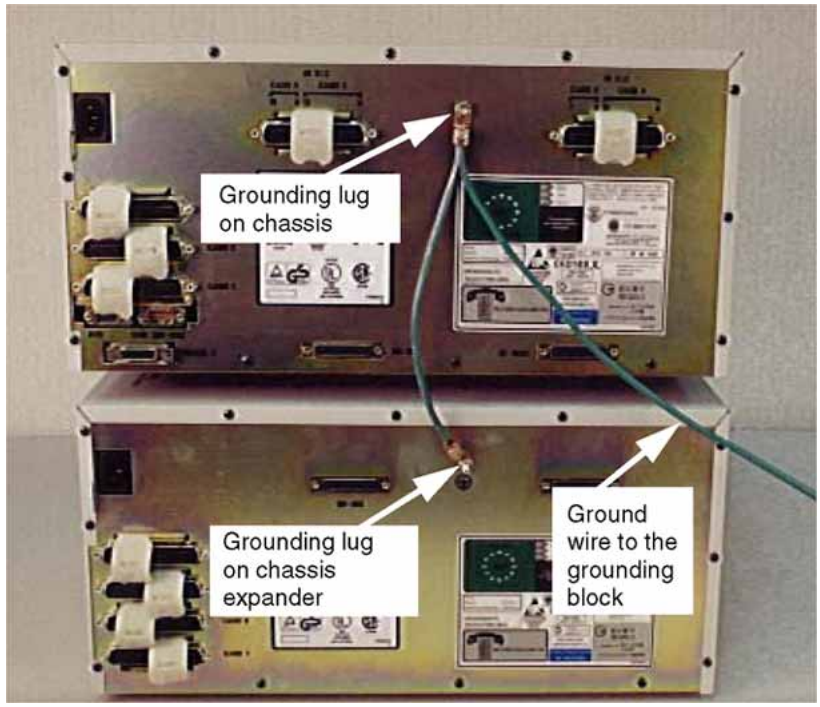

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Figure 56
NTBK80 grounding block

6 Connect the grounding block to the ground bus in the AC power service panel, using #6 AWG wire. See Table 20 "Region-specific grounding wire requirements" (page 125) for region-specific grounding requirements.

DANGER
DANGER OF ELECTRIC SHOCK
A qualified technician or electrician must make the connection in the AC power service panel.

7 Place a DO NOT DISCONNECT tag on the ground wire at the service panel.

8 Test the ground.

—End—

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Procedure 13
Earthing the cabinets or chassis (UK)

Step	Action
1	Connect a protective and functional earth wire from the earthing strip on the Krone Test Jack Frame to the earth at the building entry point. Use a green/yellow wire no thinner than 10 mm^2 (3/8 in.).
2	In each cabinet or chassis, connect an earth wire from the ground lug in the cabinet (see Figure 54 "Ground/Earth lug in the NTAK11 system cabinets" (page 127)) or chassis (see Figure 55 "Grounding a chassis and chassis expander pair" (page 128)) to the earth connection at the Test Jack Frame. Use a green/yellow wire no thinner than 10 mm^2 (3/8 in.). For the Cabinet system, route the earth wire through the third groove from the left in the bottom portion of the cabinet. Place a DO NOT DISCONNECT tag on the earthing wire.
3	Measure the resistance of the earth between the Krone Test Jack Frame and the Main Cabinet or Chassis frame earth. The resistance must not be more than 0.25 ohms at 30 amperes.

—End—

Multiple pieces of equipment in an equipment rack/cabinet

For a Chassis system with multiple pieces of equipment installed in an equipment rack/cabinet, make a separate ground connection from each piece of equipment to the NTBK80 grounding block. Consider each chassis and chassis expander pair, however, as one ground. Jumper the chassis expander ground to the chassis ground. See Figure 57 "Grounding multiple pieces of equipment in a rack" (page 131).

If a piece of Data Communication Equipment installed in a rack/cabinet does not have a grounding lug, ground the rack to the NTBK80 grounding block. See Figure 57 "Grounding multiple pieces of equipment in a rack" (page 131).

When you ground the rack to the grounding block, the equipment is grounded using the Single Point Grounding method, as shown in the grounding requirements in the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)*.

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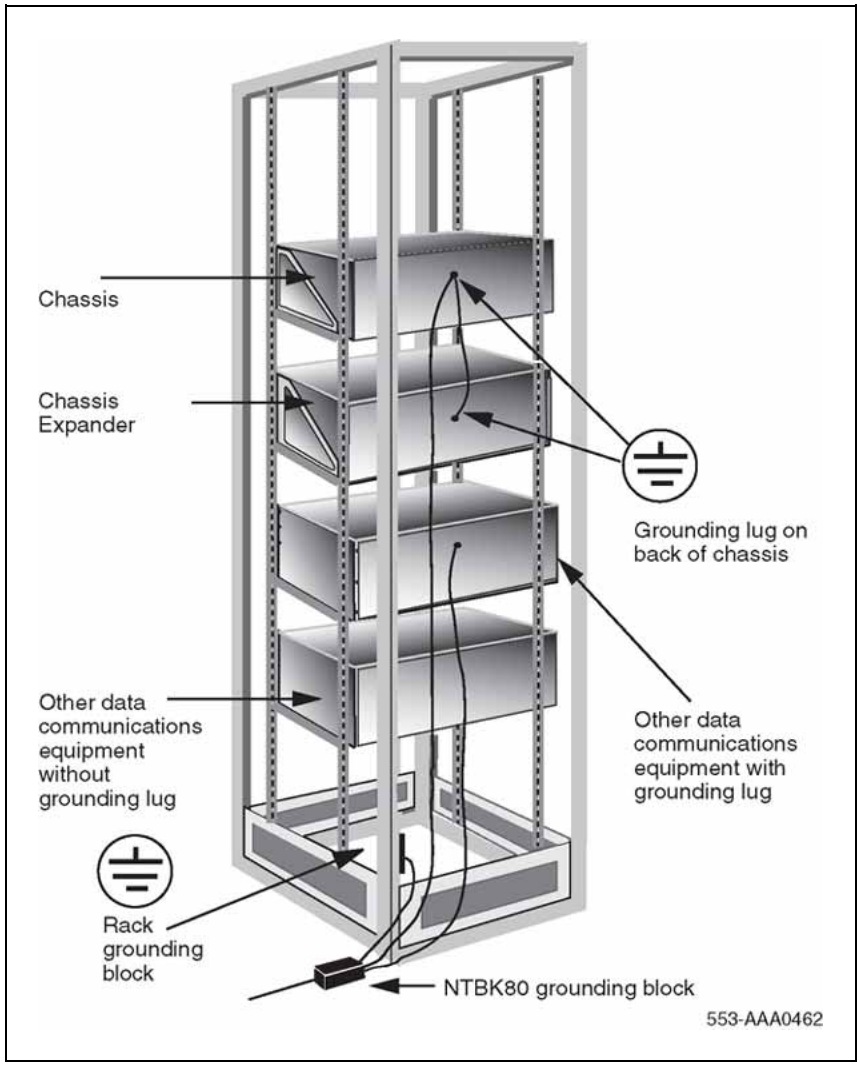
Figure 57
Grounding multiple pieces of equipment in a rack



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Installing the power supplies for the Cabinet system

Contents

This section contains information on the following topics:

"Introduction" (page 133)
"Power supplies" (page 134)
"AC-powered system" (page 134)
"DC-powered system" (page 134)
"Switch settings" (page 135)
"AC power supply installation" (page 135)
"DC power supply installation" (page 138)

Introduction

This chapter describes how and where to install the power supplies used in the Cabinet system. (The power supply for the Chassis system is installed before it is shipped to the customer. You do not have to install the power supply during system installation of the Chassis system.)

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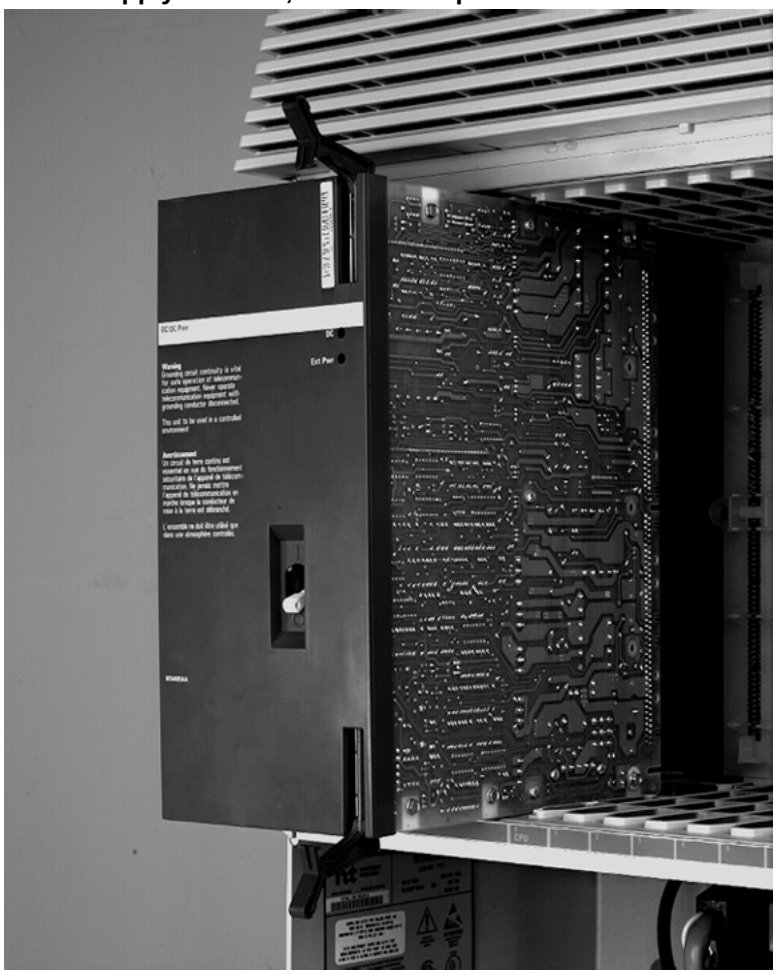
Figure 58
Power supply location, main and expansion cabinets



Power supplies

Power supplies are shipped separately from the cabinets.

AC-powered system

If you install an AC-powered system, an NTDK70 AC power supply is required with its appropriate line cord for each cabinet.

DC-powered system

If you install a DC-powered system, an NTDK72 DC power supply is required for each cabinet.

Additionally, one NTAK0420 power cable is required for each cabinet (for a DC power source).

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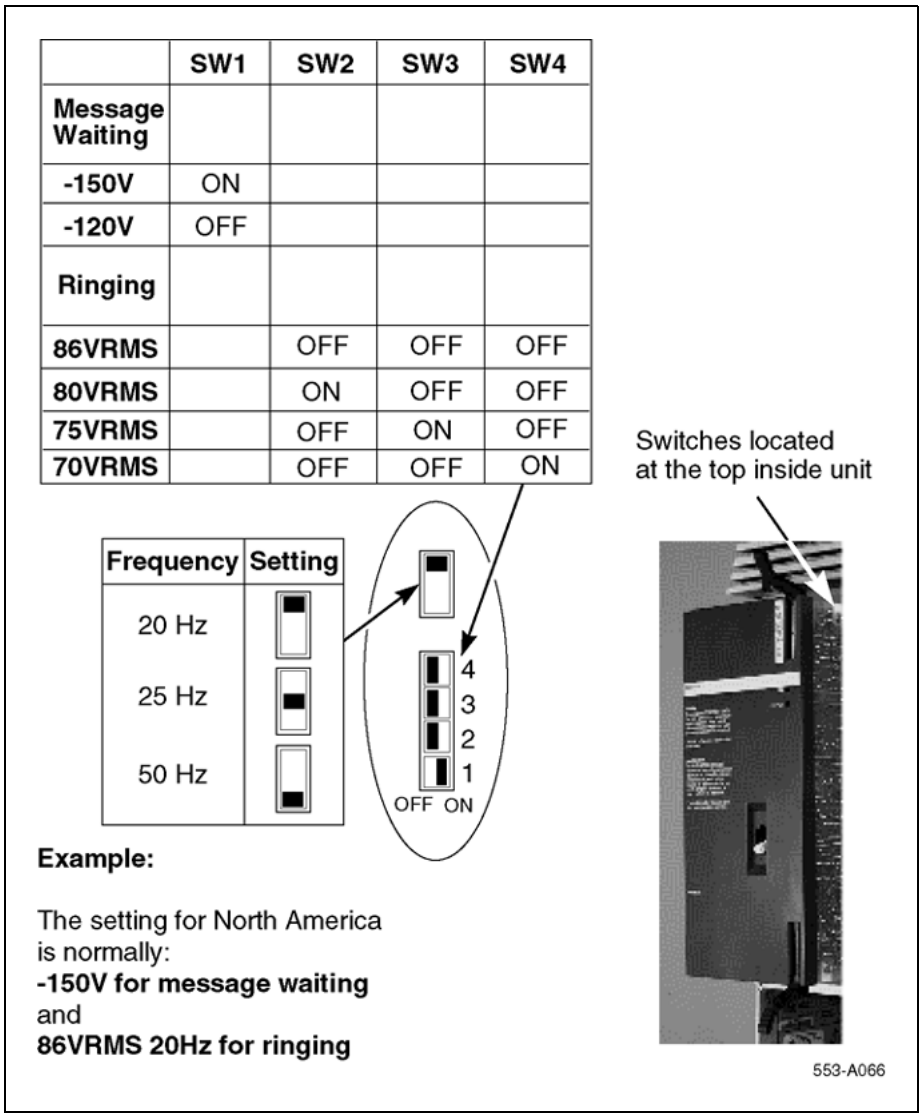
Switch settings

The power supplies are equipped with a series of switches which must be set before the units are installed in the cabinet. Refer to Figure 59 "NTDK70 and NTDK72 power supply switch settings" (page 135).

Figure 59
NTDK70 and NTDK72 power supply switch settings



AC power supply installation

AC power requirements

The AC-powered version requires a non-switched dedicated power outlet installed within 1.8 m (6 ft) of each cabinet, with:

- one non-switched dedicated outlet per cabinet with:

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— Voltage: Recommended 100 to 240 V
Maximum limits 90 and 250 V
Single phase

— Frequency: 50 or 60 Hz

— Power (I/P Max): 750VA

Refer to the commercial power requirements in the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)* for detailed information about power requirements.

WARNING
Wait at least five minutes after power to the unit is switched off before removing the unit from the cabinet. Make sure that the power cord and battery backup connection (if equipped) are both disconnected.

CAUTION
Service Interruption
The NTDK70 AC power supply cannot power up on battery alone. If the NTDK70 is powered down while operating on DC reserve power, then AC power is required to power up.

Procedure 14
Installing the AC power supply

Step	Action
1	Set the AC breaker on the front of the power supply to the OFF position.
2	Make sure that the switches on the power supply are properly set. See Figure 59 "NTDK70 and NTDK72 power supply switch settings" (page 135).
3	Insert the power supply into the first slot on the left of the card shelf (refer to Figure 58 "Power supply location, main and expansion cabinets" (page 134)).
4	Lock it into place with the card tabs.
5	Attach the power line cord to the connector on the left side of the power supply (see Figure 60 "AC power cable connection" (page 137)) by feeding the cord up through the card guides.

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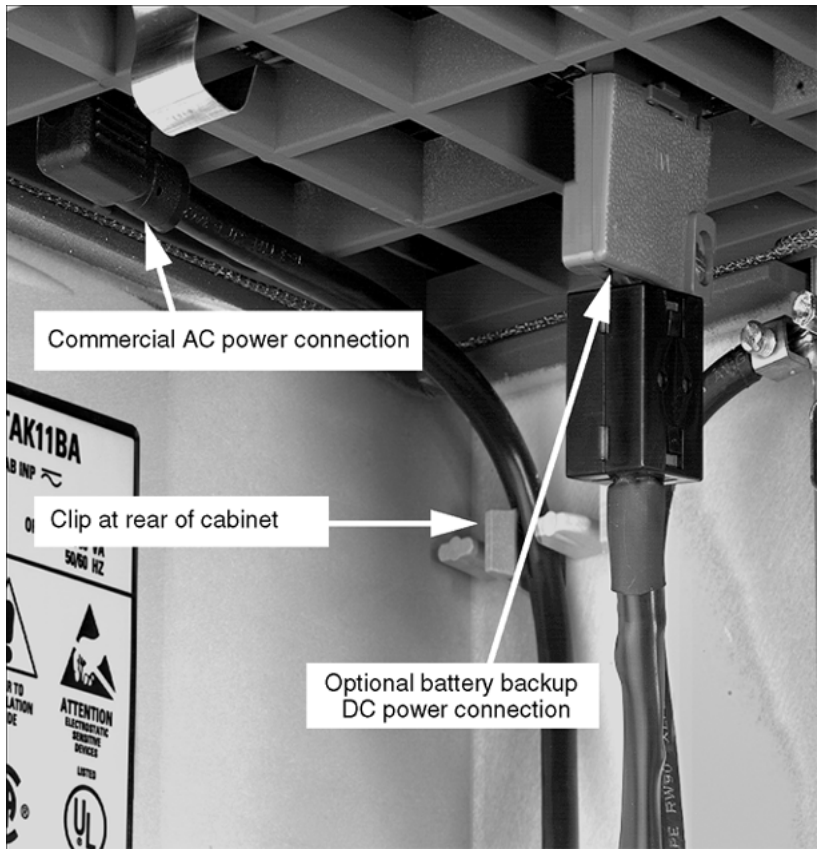
Figure 60
AC power cable connection



6 Secure the power line cord in place using the clip at rear of cabinet. See Figure 60 "AC power cable connection" (page 137).

7 Route the rest of the power line cord down through the opening at the bottom of the cabinet.

8 Test the ground of each system cabinet using the following:

a. Set the circuit breakers feeding the AC outlet used to power the cabinet to OFF.

b. Connect the power line cord to the NTDK70 main cabinet power supply.

c. Using an ohmmeter, measure the resistance from the ground pin on the line cord to the ground receptacle on the AC outlet.

The resistance must be less than 0.25 ohms.
If the cabinets are powered from different service panels, the ground must be traced back to the panel serving the cabinet.

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d. Reset the circuit breaker once the ground connection is verified.

—End—

DC power supply installation

Table 21
DC power requirements

	Minimum (see note)	Nominal	Maximum
Recommended	-42.5 V DC	-52 V DC	-54 V DC
Limits	-42.5 V DC	-52 V DC	-57 V DC
Noise (CMESS)	—	—	25 dBrnc
Current	—	—	12 Amps
AC Ripple	—	—	100 mv RMS

Note: The NTDK72 DC breaker will trip at -42.5 +/- 1.0 V DC.

Refer to the requirements for the DC-powered version in the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)* for detailed information about DC power requirements.

Procedure 15
Installing the DC power supply

Step	Action
1	Make sure the switches on the power supply are properly set. Refer to Figure 59 "NTDK70 and NTDK72 power supply switch settings" (page 135) of this chapter.
2	Insert the power supply into the first slot on the left of the card shelf (refer to Figure 58 "Power supply location, main and expansion cabinets" (page 134)).
3	Lock the power supply into place with the card tabs.

WARNING
Make sure the circuit breaker on the faceplate of the power supply is OFF before continuing.

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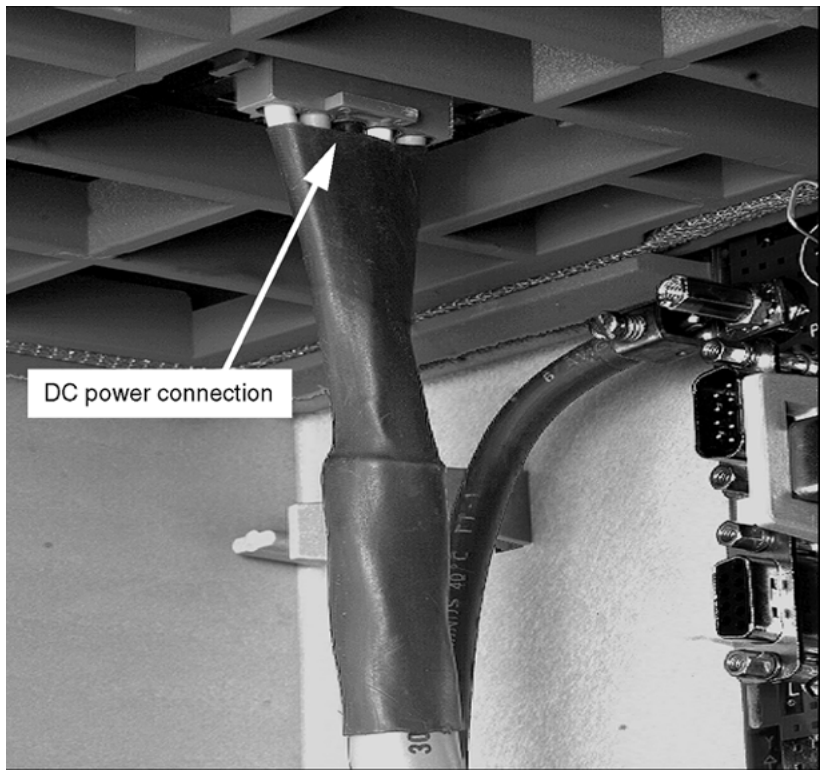
4 If a rectifier is to be installed with the system, install it using the instructions supplied with the rectifier.

5 Feed one end of the DC power cable up through the card guide and insert it into the connector on the right side of the DC power supply. See Figure 61 "NTDK72 DC power cable connection" (page 139).

Figure 61
NTDK72 DC power cable connection



6 Route the rest of the power cable down through the opening at the bottom of the cabinet as shown in Figure 62 "Power cord routing" (page 140).

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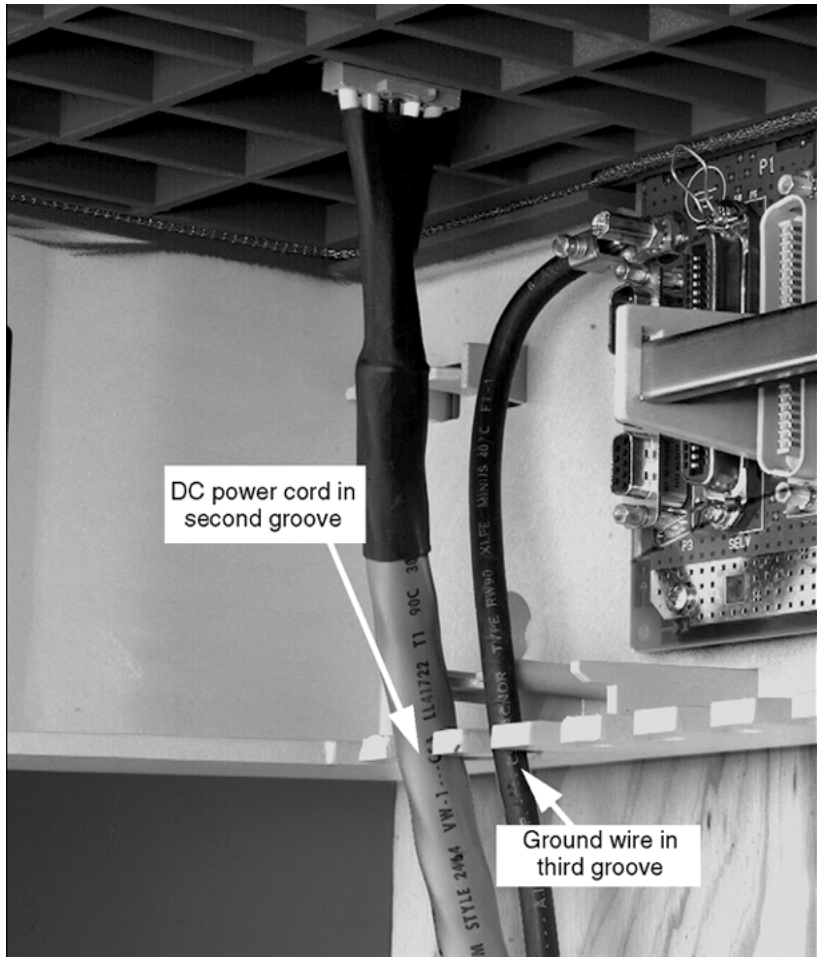
Figure 62
Power cord routing



7 Mount the NTAK28 Breaker Assembly to the wall within 0.9 m (3 ft) of the cabinet it is serving. See Figure 63 "NTAK28 Breaker Assembly location" (page 141).

Secure the breaker assembly with four #10 13 mm (1/2 in.) minimum wood screws.

Note: One NTAK28 Breaker Assembly is required for each cabinet.

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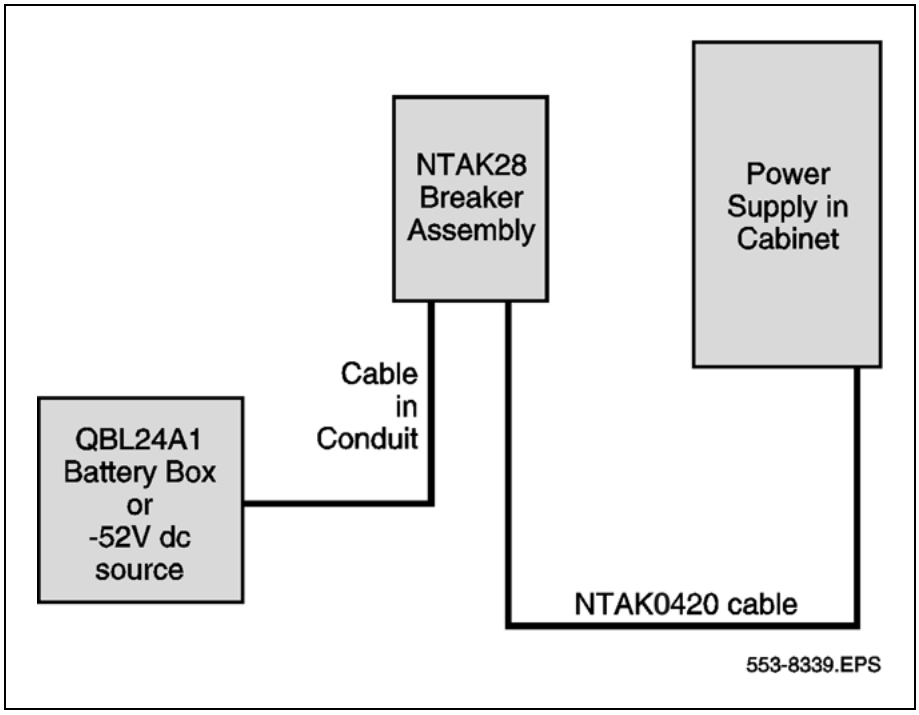
Figure 63
NTAK28 Breaker Assembly location



8 Set the breakers on the NTAK28 Breaker Assembly and on the NTDK72 power supply to OFF.

9 Connect the other end of the DC power cable (NTAK0420 cable) to the connector on the DC breaker assembly.

10 Connect the NTAK28 Breaker Assembly to a rectifier or other DC power source as shown in Figure 64 "Power connection at the NTAK28 breaker assembly" (page 142).

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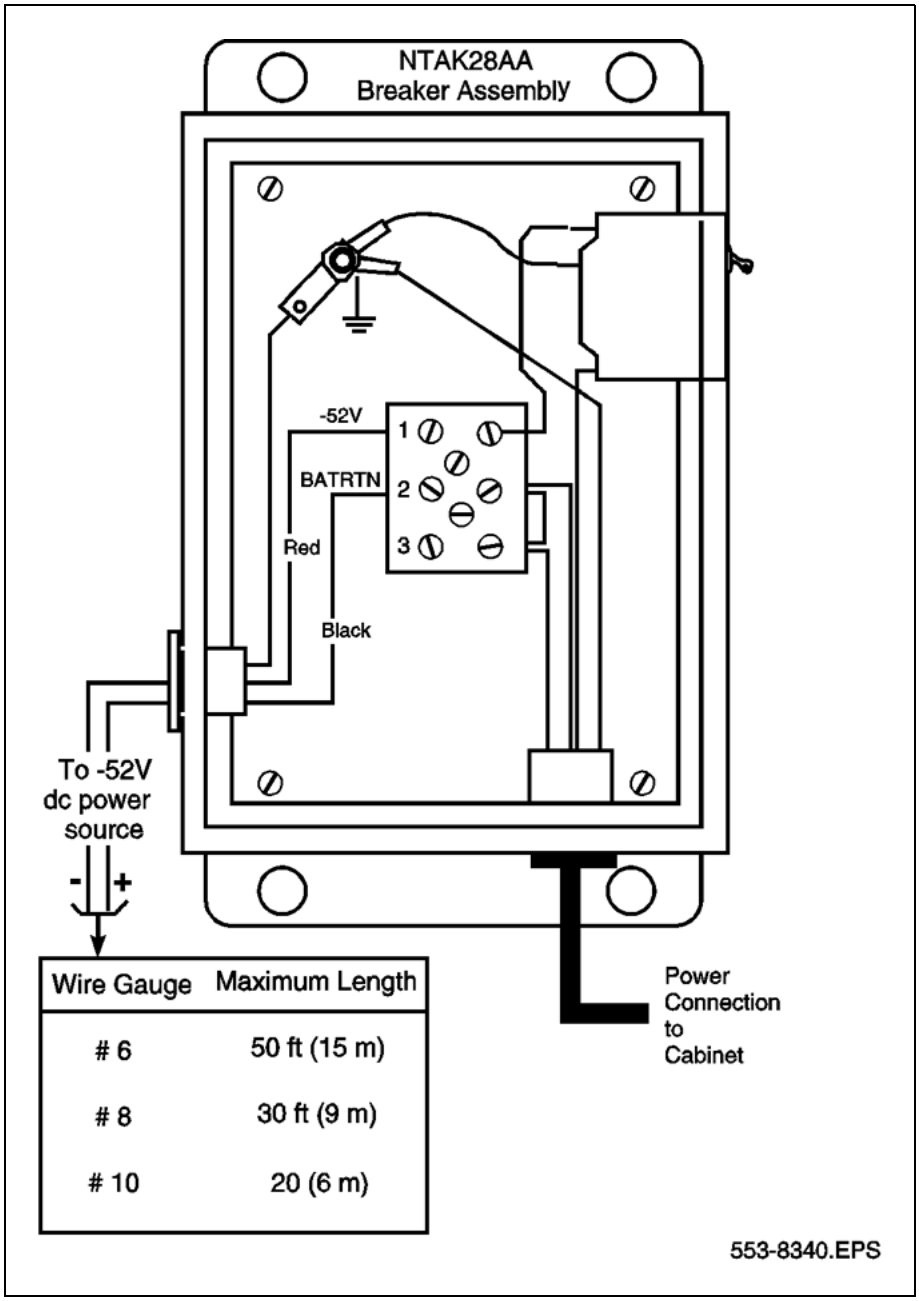
Figure 64
Power connection at the NTAK28 breaker assembly



Wire Gauge	Maximum Length
# 6	50 ft (15 m)
# 8	30 ft (9 m)
# 10	20 (6 m)

—End—

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Installing and connecting reserve power supplies for the Cabinet system

Contents

This section contains information on the following topics:

"Introduction" (page 143)

"Types of reserve power" (page 143)

"NTAK75 battery unit installation" (page 144)

"NTAK76 battery unit installation" (page 147)

"Connecting other battery backup systems" (page 151)

Introduction

This chapter describes how to install and connect a reserve DC power supply to Cabinet systems.

If installing a multiple-cabinet system, each cabinet must have its own reserve power supply.

Types of reserve power

The types of reserve battery power are:

- The NTAK75 battery box, which has the following features:
  - designed to be float-charged by the NTDK70 AC power supply
  - provides a minimum of 2 hours of reserve DC power
  - mounts to the floor
  - supports one system cabinet
- The NTAK76 battery box, which has the following features:
  - designed to be float-charged by the NTDK70 AC power supply

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— provides a minimum of 15 minutes of reserve DC power

— mounts to the wall

— supports one system cabinet

- An Uninterruptible Power Supply (UPS) which will provide a continuous AC power supply. Install this unit according to the manufacturer's instructions.

CAUTION
Service Interruption
If the NTDK70 AC power supply is powered down while it is operating on DC reserve power from a battery backup unit, the Cabinet system cannot be powered up again until AC power is restored. Be careful not to open the circuit breaker, either on the battery backup unit or on the NTDK70, while the system is operating on battery backup.

NTAK75 battery unit installation

Follow the steps in Procedure 16 "Installing the NTAK75 battery unit" (page 144) to install an NTAK75 battery unit. Repeat the procedure for each system cabinet being installed.

Note: The system external ground must be installed before installing the battery backup unit.

Procedure 16
Installing the NTAK75 battery unit

Step	Action
1	Unpack the NTAK75 battery unit and place it according to the equipment layout plan. • The battery unit must be a installed within 0.9 m (3 ft) of the cabinet it is serving. • Install to the side of or below the cabinet, not above. • If installed below, the minimum clearance from the top of the NTAK75 to the bottom of the wall-mounted cabinet is 0.6 m (2 ft). • The battery unit should be installed in an open, well-ventilated area. • The area must meet the following temperature limits: Maximum allowed range: 0 to 45¡C (32 to 113¡F) Recommended range: 20 to 35¡C (68 to 95¡F).

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2 Remove the cover of the battery unit.

The cover is secured by two captive screws on the front of the box.

3 Set the switch on the top of the NTAK75 battery box to OFF.

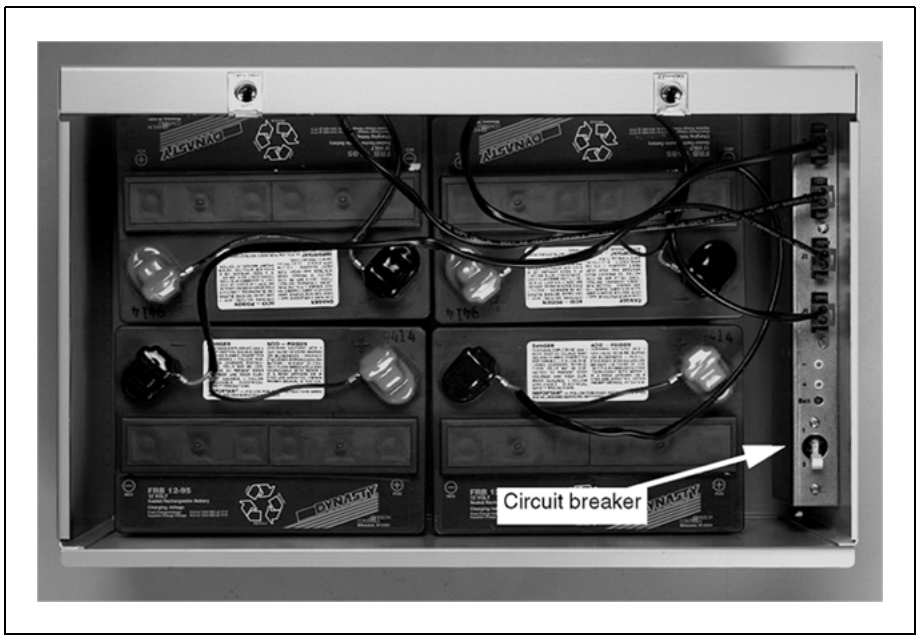
4 Unpack the batteries and check the expiry dates.

If the batteries do not have the same dates, contact your supplier.

DANGER
DANGER OF ELECTRIC SHOCK
The battery cells can deliver high currents when short-circuited. Make sure that you do not inadvertently short-circuit the terminals of the batteries.

5 Place the individual batteries into the battery box (see Figure 65 "NTAK75 battery backup: top view" (page 145)).

Figure 65
NTAK75 battery backup: top view



6 Locate the four black/red jumper cables supplied with the NTAK75.

7 Connect the battery packs by installing the jumper cables between the +/- terminals of one battery pack to the connectors marked J1 – J4.

Any of the batteries may be attached to any connector (J1 – J4).

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8 Ensure the jumper wires are securely fastened by pulling out on the tabs of the connector.

9 Switch the NTAK75 breaker to the ON position.

If the batteries are properly installed, the green LED will light. If this occurs, switch the breaker to OFF and proceed with step 10. If the LED does not light, return to Step 7 and check the wiring of the batteries.

10 Set the breakers on the NTAK75 and NTDK70 to OFF.

11 Plug the NTAK0420 cable from the battery box into the power supply in the cabinet (Figure 66 "Cable connections" (page 147)).

Secure the cable with the cable retainer inside the cabinet.

12 Set the breaker on the NTDK70 to ON. The BATT LED on the NTDK70 will remain off, indicating that the battery box breaker is OFF.

The LED on the NTAK75 will light indicating that the NTAK0420 cable connections are correct.

13 Set the breaker on the NTAK75 to ON.

The BATT LED on the NTDK70 will be lit.

14 Install the cover on the NTAK75.

—End—

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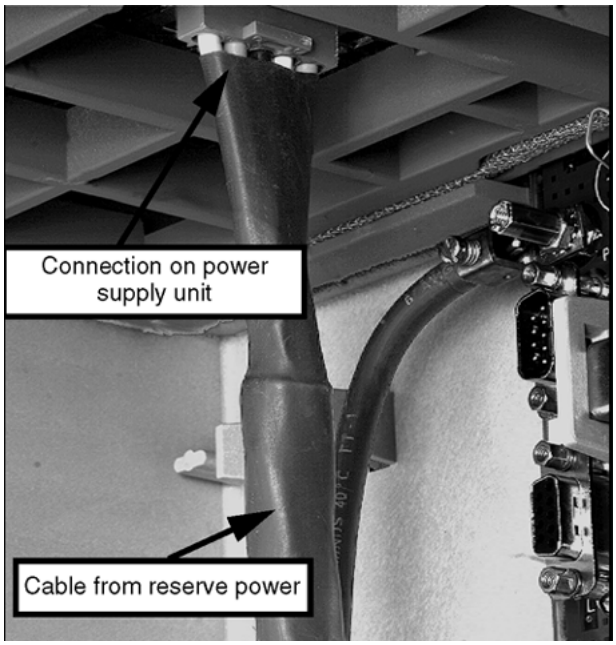
Figure 66
Cable connections



NTAK76 battery unit installation

Follow Procedure 17 "Installing the NTAK76 battery unit" (page 147) to install an NTAK76 battery unit. Repeat the procedure for each system cabinet being installed.

Note: The system external ground must be installed before installing the battery backup unit.

Procedure 17
Installing the NTAK76 battery unit

Step	Action
1	Unpack the NTAK76 battery unit and place it according to the equipment layout plan. • The battery unit must be installed within 0.9 m (3 ft) of the cabinet it is serving. • The battery unit must be installed beside or below the cabinet, not above. • If installed below, the minimum clearance from the top of the NTAK76 to the bottom of the wall-mounted cabinet is 0.6 m (2 ft). • The battery unit should be installed in an open, well-ventilated area.

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- The area must meet the following temperature limits:

  Maximum allowed range: 0 to 45¡C (32 to 113¡F)
  Recommended range: 20 to 35¡C (68 to 95 ¡F)

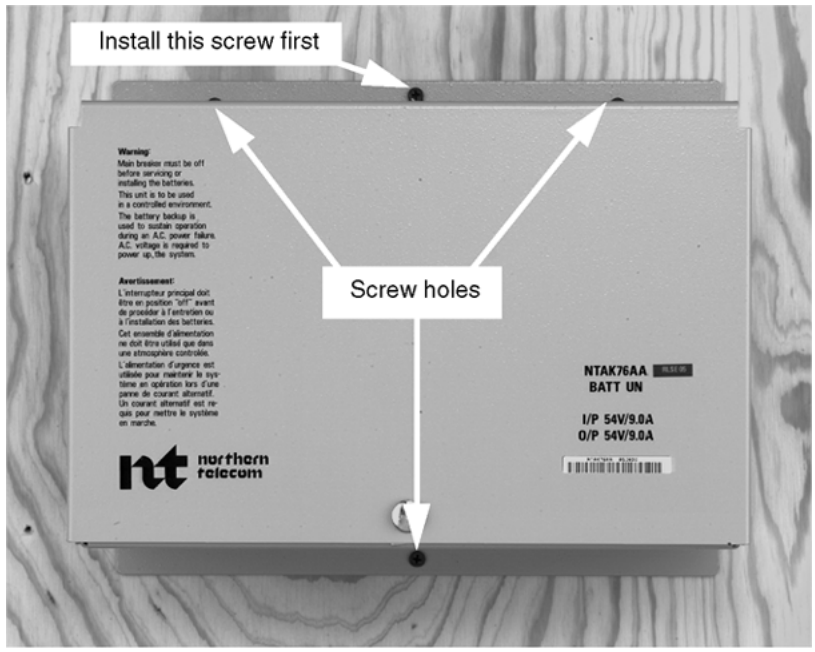
2 Remove the cover.

The cover is secured by one captive screw on the front of the box. (Refer to Figure 67 "Mounting the NTAK76 battery unit to the wall" (page 148).)

3 Mount the battery unit to the wall using the four #8 20 mm (3/4 in.) wood screws provided with the unit.

Install the center screw at the top of the battery unit. Level the unit and install the remaining screws.

Figure 67
Mounting the NTAK76 battery unit to the wall



4 Set the switch on the front of the NTAK76 battery box to OFF. (Refer to Figure 68 "Jumper connections" (page 149)).

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DANGER
DANGER OF ELECTRIC SHOCK
The battery cells can deliver high currents when short-circuited. Make sure that you do not inadvertently short-circuit the terminals of the batteries.

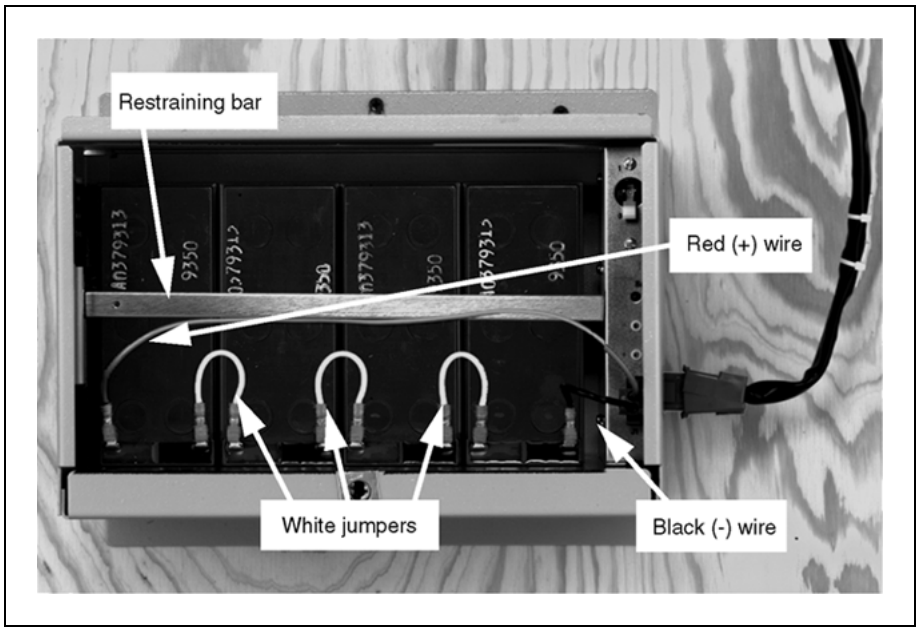
5 Unpack the batteries and check the expiry dates. If the batteries do not have the same dates, contact your supplier.

6 Place the batteries in the battery unit with the terminal end down. Hold the batteries in place with the restraining bar.

7 Locate the three white jumper wires and the red and black jumper cables supplied with the NTAK76 battery unit.

8 Connect the battery packs in series by connecting the white jumper wires between the + (red) terminal of one battery pack to the - (black) terminal of the next battery pack. (See Figure 68 "Jumper connections" (page 149).)

Figure 68
Jumper connections



9 Connect the remaining red and black jumper cable to red and black terminals of the first and fourth battery pack.

10 Connect the jumper cable to the NTAK76 breaker panel, marked J1.

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Note: The red positive (+) wire connects to the red (+) post of battery 1. The black negative (-) wire connects to the black post (-) of battery 4. Ensure all connections are secured.

ATTENTION

IMPORTANT!

If the wires you use are not the colors described here, make sure that you connect the wires to ensure positive grounding for your system.

11 Set the breaker in the battery unit to ON to test for correct wiring.

The NTAK76 green LED (BATT) should switch on.

DC voltage can be measured between the test points whenever the green BATT LED is lit on the NTAK76. The test points are protected by high resistance: it is impossible to damage the battery unit by short-circuiting the test points to each other or to the metal case. For valid readings the test points must not be short-circuited. The following different voltage readings can be made:

- open circuit battery voltage when the NTAK0420 cable is disconnected and the NTAK76 circuit breaker is closed
- NTDK70 output when the NTAK0420 cable is connected and the NTAK76 circuit breaker is open
- NTDK70 float charge voltage when the NTAK0420 cable is connected and the NTAK76 circuit breaker is closed

12 Set the breaker on the NTAK76 battery unit and the breaker on the NTDK70 power supply to OFF.

13 Plug the NTAK0420 cable from the battery box into the power supply in the cabinet. See Figure 69 "Power cord routing" (page 151).

Secure the cable with the cable retainer inside the cabinet.

14 Set the breaker on the Small System power supply to ON.

The NTDK70 BATT LED should be off and the NTAK76 LED should be on.

15 Set the breaker on the NTAK76 battery unit to ON.

The NTDK70 BATT LED should be lit and the NTAK76 LED should be on.

16 Replace the cover on the system cabinet and secure the latch.

—End—

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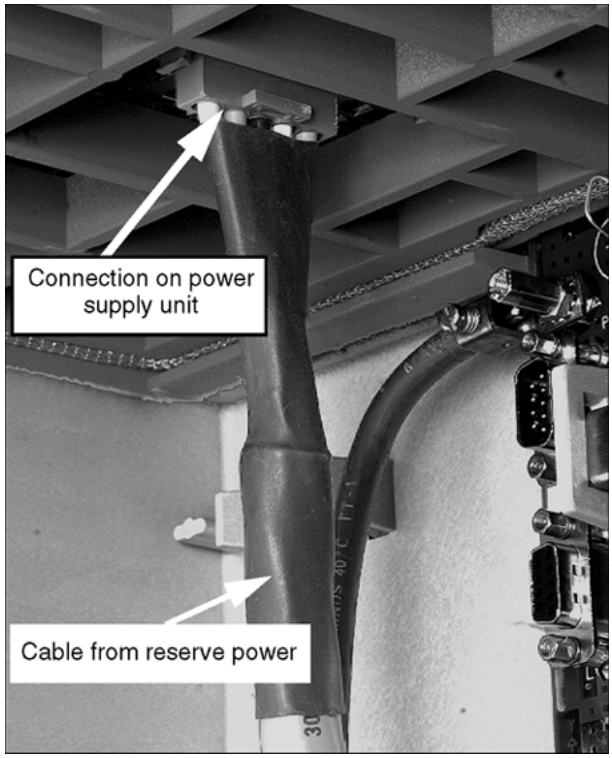
Figure 69
Power cord routing



Connecting other battery backup systems

This procedure describes how to install and connect customer-supplied battery backup systems.

Charging capabilities of the Cabinet system are described in *Meridian 1 Small System Planning and Engineering (NN43011-220)*. The system external ground must be installed before installing the battery backup.

Procedure 18
Installing other battery systems

Step	Action
1	Unpack the battery box and place it according to the equipment layout plan.
2	Remove its cover.
3	Set the switch on the battery box to OFF.
4	Unpack the batteries and check the expiry dates.

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If the batteries do not have the same dates, contact your supplier.

DANGER
DANGER OF ELECTRIC SHOCK
The battery cells can deliver high currents when short-circuited. Make sure that you do not inadvertently short-circuit the terminals of the batteries.

5 Place the batteries in the battery box.

6 Locate the black wires supplied with the box.

7 Connect the battery packs in series by installing the black wires between the + (large) terminal of one battery pack to the - (small) terminal of the next battery pack.

Note: Connect the black wire inside the battery box to the remaining positive (+) terminal and the red wire to the remaining negative (-) terminal.

ATTENTION
IMPORTANT!
If the wires you use are not the colors described here, make sure that you connect the wires to ensure positive grounding for your system.

8 Mount the NTAK28 Junction Box securely to the wall within 0.9 m (3 ft) of the cabinet it is serving. See Figure 70 "NTAK28 breaker assembly location" (page 153).

Note: One NTAK28 Junction Box is required for each cabinet.

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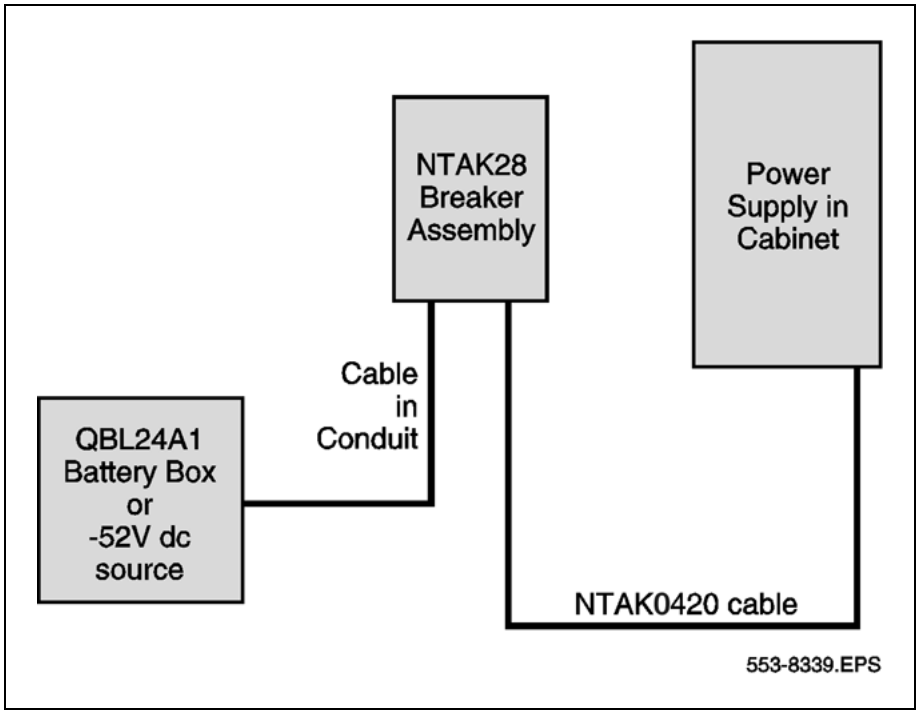
Figure 70
NTAK28 breaker assembly location



9 Set the breakers on the NTAK28 Junction Box and on the NTDK70 power supply to OFF.

10 Connect the NTAK0420 cable from the NTAK28 Junction Box to the power supply in the cabinet.

Secure the cable with the cable retainer in the cabinet.

11 Connect the other end of the DC power cable to the connector on the NTAK28 Junction Box.

12 Connect the cable from the battery box to the NTAK28 Junction Box as shown in Figure 71 "NTAK28 circuit breaker assembly" (page 154).

13 Set the breakers on the NTAK28 Junction Box and on the NTDK70 AC power supply to ON.

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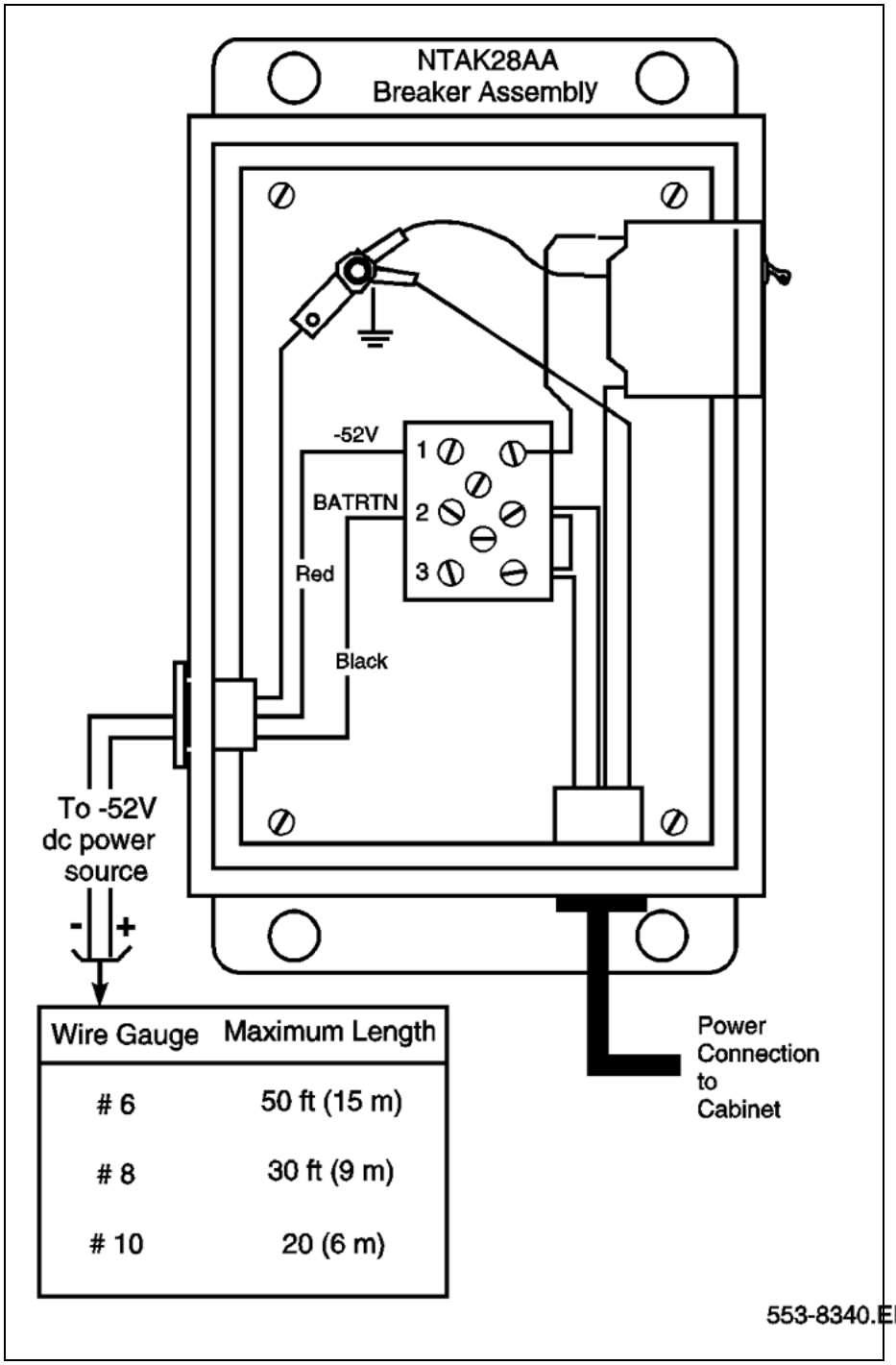
Figure 71
NTAK28 circuit breaker assembly



Wire Gauge	Maximum Length
# 6	50 ft (15 m)
# 8	30 ft (9 m)
# 10	20 (6 m)

—End—

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Installing Small System Controller cards on stand-alone systems

Contents

This section contains information on the following topics:

"Introduction" (page 155)

"Installing the NTDK20 SSC card on the cabinet or chassis" (page 156)

Introduction

This chapter describes how to prepare and install the Small System Controller (SSC) card on a Small System that consists of a single cabinet, single chassis, or single chassis with chassis expander.

ATTENTION

IMPORTANT!
If you are installing a system with fiber or IP expansion, do not follow the procedure in this chapter. Refer to "Installing fiber expansion" (page 159) or "Installing IP expansion" (page 175).

You must install an SSC card, equipped with a software daughterboard, in slot 0 of the cabinet or chassis.

The cabinet or chassis requires the SSC card vintage NTDK20HA or newer, or upgraded NTDK20CA-GA (upgraded using the NTTK19 SSC Upgrade Kit). For information on upgrading an SSC card, refer to the chapter on upgrading system controller cards in *Meridian 1 Small System Software-only Upgrade (NN43011-459)*.

"Installing optional circuit cards" (page 189) describes additional circuit cards, which are optional to the Small System.

Note: In a Meridian 1 PBX 11C Cabinet or Chassis system, the NTDK20 SSC card is also referred to as the Call Server.

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Installing the NTDK20 SSC card on the cabinet or chassis

The following components must be installed on the SSC card before it is inserted into the cabinet or chassis:

- software daughterboard
- security device

Follow Procedure 19 "Installing the software daughterboard and security device" (page 156) to install these components on the SSC card.

WARNING
The NTDK20 SSC card is equipped with components on both sides of the circuit board. Be careful not to damage any of the components when handling the card.

Procedure 19
Installing the software daughterboard and security device

Step	Action
1	Put on the antistatic wrist strap.
2	Place the SSC card on a clean, flat, electrostatic discharge (ESD)-dissipated surface.
3	Install the software daughterboard on the connector as shown in Figure 72 "Location of software daughterboard and security device on the NTDK20 SSC card" (page 157).
4	Press firmly on the standoffs to ensure that the daughterboard is secured well to the SSC card.
5	Insert the security device labeled NT_STD in the socket with the device markings facing outwards, as shown in Figure 72 "Location of software daughterboard and security device on the NTDK20 SSC card" (page 157).
6	Insert the SSC card into slot 0 of the cabinet or chassis. Lock the card into the faceplate latches.

—End—

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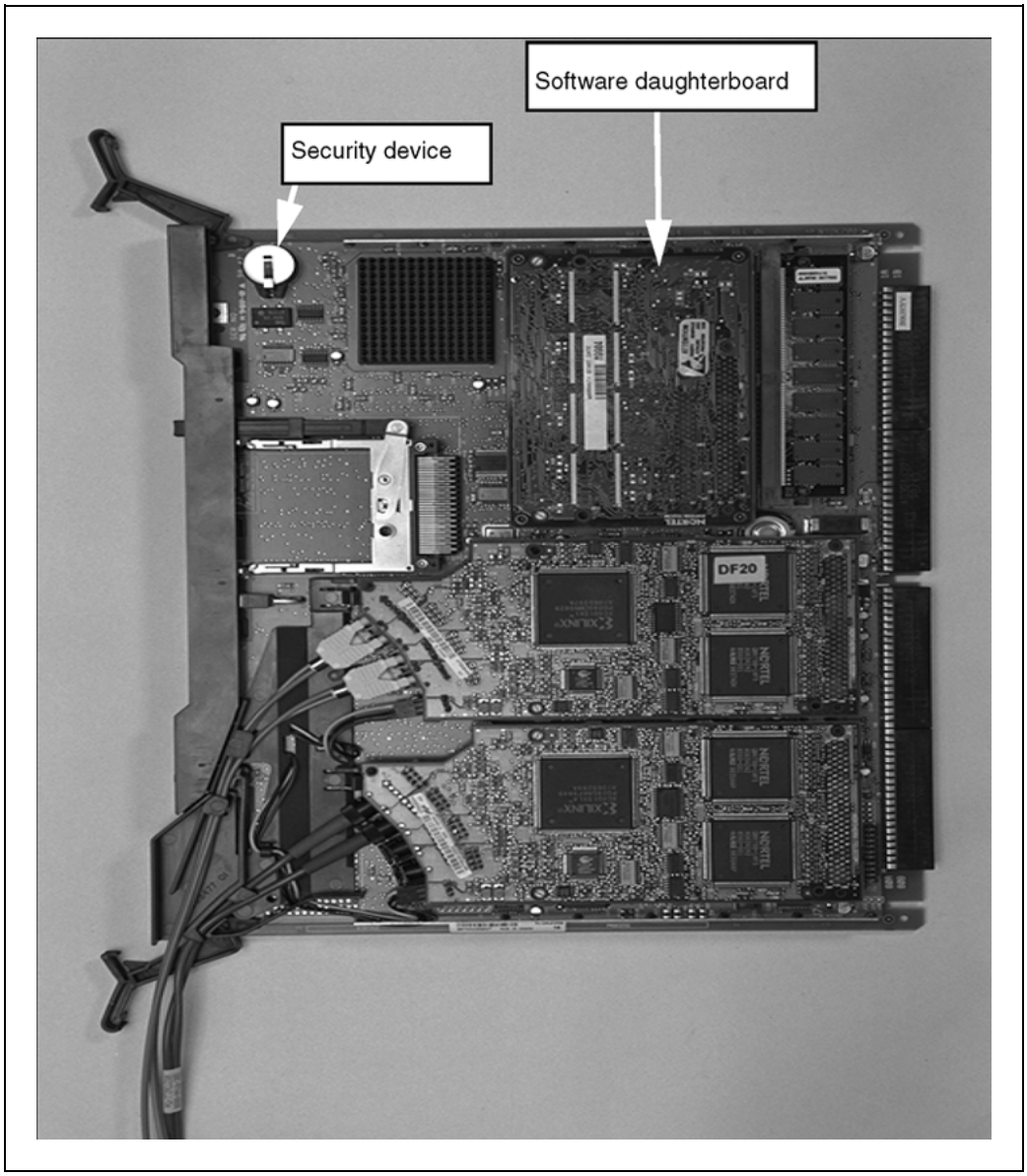
Figure 72
Location of software daughterboard and security device on the NTDK20 SSC card



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Installing fiber expansion

Contents

This section contains information on the following topics:

"Introduction" (page 155)

"Installing the NTDK20 SSC card on the Main Cabinet or Chassis" (page 160)

"Software daughterboard and security device" (page 160)

"Fiber expansion daughterboards and cables" (page 162)

"Installing fiber expansion daughterboard cables" (page 165)

"Installing Fiber Receiver cards on expansion cabinets and chassis" (page 170)

Introduction

This chapter describes how and where to install the Small System Controller (SSC) cards, software and expansion daughterboards, fiber receiver cards, and cables required for fiber expansion. The chapter includes information relevant to the main and fiber Expansion Cabinets or Chassis.

> ***Note:*** In a Meridian 1 PBX 11C Cabinet or Chassis system, the NTDK20 SSC card is also referred to as the Call Server.

For fiber expansion, you must install an SSC card, equipped with a software daughterboard and fiber expansion daughterboard(s), in slot 0 of the Main Cabinet or Chassis. You must also install a fiber receiver card in slot 0 of the Expansion Cabinet or Chassis.

> ***Note:*** The Main Cabinet and Chassis require SSC card vintage NTDK20HA or newer, or upgraded NTDK20CA-GA (upgraded using the NTTK19 SSC Upgrade Kit). For information on upgrading an SSC card, refer to the chapter on upgrading system controller cards in *Meridian 1 Small System Software-only Upgrade* (NN43011-459).

"Installing optional circuit cards" (page 189) describes additional circuit cards, which are optional to the Small System.

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This chapter contains the following procedures:

- Procedure 19 "Installing the software daughterboard and security device" (page 156)
- Procedure 21 "Installing the single-port Fiber Expansion daughterboards on the SSC card" (page 162)
- Procedure 22 "Installing the dual-port Fiber Expansion daughterboards on the SSC card" (page 163)
- Procedure 23 "Installing the A0632902 10m plastic fiber-optic cable" (page 166)
- Procedure 24 "Installing glass fiber-optic cable" (page 168)
- Procedure 25 "Installing the Fiber Receiver card" (page 170)

Installing the NTDK20 SSC card on the Main Cabinet or Chassis

The following components must be installed on the SSC card before it is inserted into the Main Cabinet or Chassis:

- software daughterboard
- security device
- fiber expansion daughterboard(s)
- cables

Software daughterboard and security device

WARNING
The NTDK20 SSC card is equipped with components on both sides of the circuit board. Be careful not to damage any of the components when handling the card.

Procedure 20
Installing the software daughterboard and security device

Step	Action
1	Put on the antistatic wrist strap.
2	Place the SSC card on a clean, flat, electrostatic discharge (ESD)-dissipated surface.
3	Install the software daughterboard on the connector as shown in Figure 73 "Location of software daughterboard and security device on the NTDK20 SSC card" (page 161).

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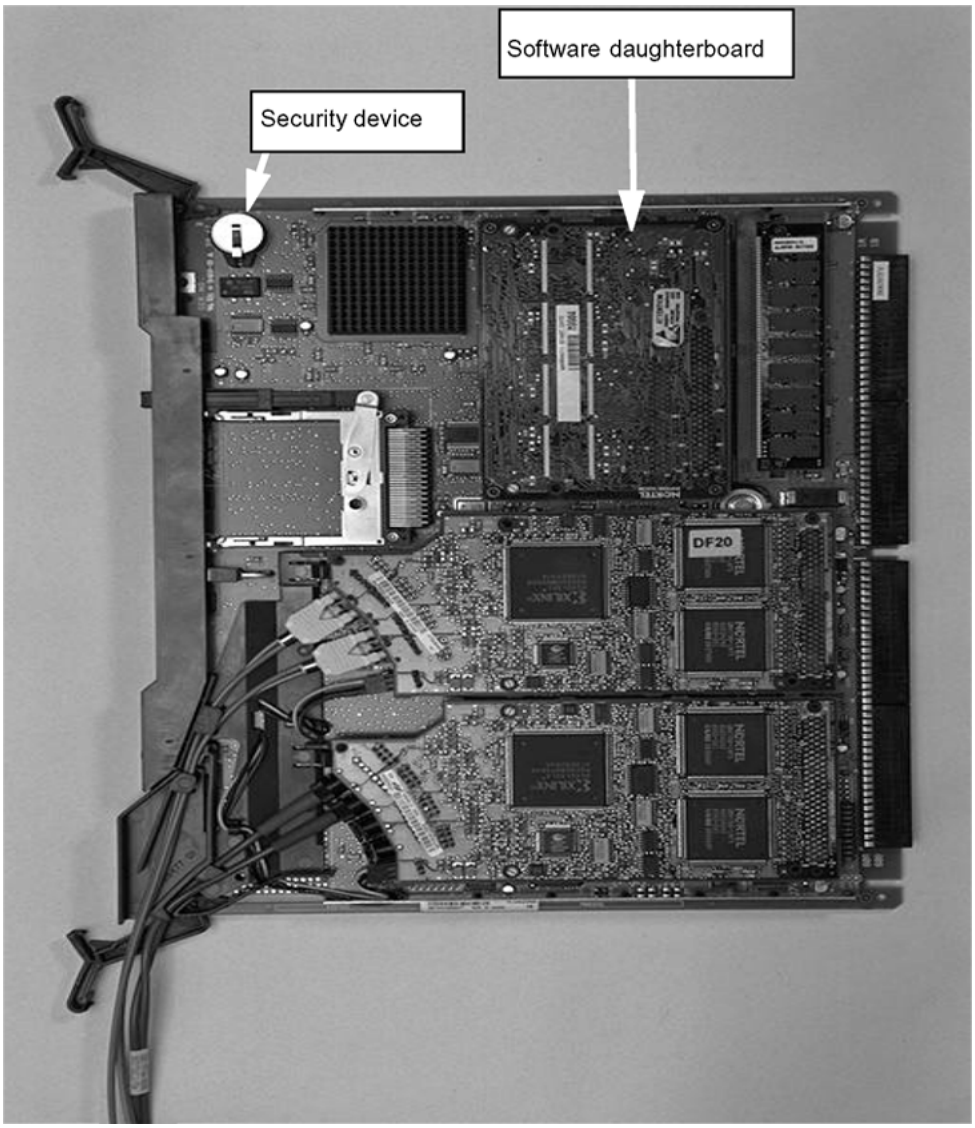
4 Press firmly on the standoffs to ensure that the daughterboard is secured well to the SSC card.

5 Insert the security device labeled NT_STD in the socket with the device markings facing outwards, as shown in Figure 73 "Location of software daughterboard and security device on the NTDK20 SSC card" (page 161).

—End—

Figure 73
Location of software daughterboard and security device on the NTDK20 SSC card



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Fiber expansion daughterboards and cables

There are five kinds of fiber expansion daughterboard that can be installed on the SSC card in the Main Cabinet or Chassis. Each daughterboard has a specific fiber receiver card counterpart that must be installed in the Expansion Cabinet or Chassis. Table 22 "Fiber Expansion daughterboards and Fiber Receiver cards" (page 162) lists the available fiber expansion daughterboards and their corresponding fiber receiver cards.

Table 22
Fiber Expansion daughterboards and Fiber Receiver cards

	Fiber Expansion daughterboard	Fiber Receiver card
Single-port	NTDK22	NTDK23 — 10 m (33 ft)
	NTDK24	NTDK25 — 3 km (1.8 mi), Multimode
	NTDK79	NTDK80 — 3 km (1.8 mi), Single Mode
Dual-port	NTDK84	NTDK23 — 10 m (33 ft)
	NTDK85	NTDK25 — 3 km (1.8 mi), Multimode

Two connectors are available on the SSC card, allowing a maximum of two (single or dual) daughterboards per main SSC card.

To install single-port Fiber Expansion daughterboards on the SSC card, refer to Procedure 21 "Installing the single-port Fiber Expansion daughterboards on the SSC card" (page 162).

To install dual-port Fiber Expansion daughterboards on the SSC card, refer to Procedure 22 "Installing the dual-port Fiber Expansion daughterboards on the SSC card" (page 163).

Procedure 21
Installing the single-port Fiber Expansion daughterboards on the SSC card

Step	Action
1	Put on the antistatic wrist strap.
2	Place the SSC card on a clean, flat, ESD-dissipated surface.
3	Install the Fiber Expansion daughterboard for Expansion Cabinet/Chassis 1 on the upper connector.
4	Install the Fiber Expansion daughterboard for Expansion Cabinet/Chassis 2 on the lower connector.

Note 1: If using the plastic fiber cable, see Procedure 23 "Installing the A0632902 10m plastic fiber-optic cable" (page 166).

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Note 2: If using glass fiber-optic cable, see Procedure 24 "Installing glass fiber-optic cable" (page 168).

5 Press firmly on the standoffs to ensure that the daughterboards are secured to the SSC card.

6 Route the fiber cable through the Cable Routing Guide on the SSC card.

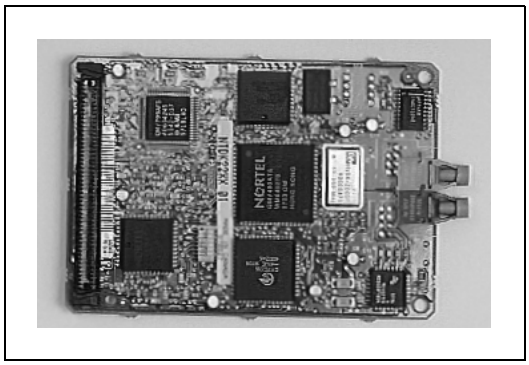
7 Insert the SSC card into slot 0 of the Main Cabinet or Chassis.

8 Route the fiber cable through the Cable Routing Guide under the main cabinet.

Note: Be sure to wrap the cable a **minimum** of one complete loop around the Cable Routing Guide to allow extra cable for removing the SSC card later.

—End—

Figure 74
NTDK22 single-port Fiber Expansion daughterboard



Procedure 22
Installing the dual-port Fiber Expansion daughterboards on the SSC card

Step	Action
1	Put on the antistatic wrist strap.
2	Place the SSC card on a clean, flat, ESD-dissipated surface.
3	Install the Fiber Expansion daughterboard for Expansion Cabinets/Chassis 1 and 3 on the connector as shown in Figure 76 "Cabinet or chassis assignments for dual-port daughterboards" (page 165) (the upper connector).

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4 Install the Fiber Expansion daughterboard for Expansion Cabinets/Chassis 2 and 4 on the connector as shown in Figure 76 "Cabinet or chassis assignments for dual-port daughterboards" (page 165) (the lower connector).

5 Connect the two faceplate LED cables to the 3-pin header on the two daughterboards. See Figure 76 "Cabinet or chassis assignments for dual-port daughterboards" (page 165).

6 Press firmly on the standoffs to ensure that the cards are secured to the SSC.

7 Route the cables through the SSC cable router on the SSC card. Refer to Figure 78 "Fiber-optic cable connection" (page 168).

8 Insert the SSC card into slot 0 of the Main Cabinet or Chassis.

9 Route the fiber cable through the Cable Routing Guide under the main cabinet.

Note 1: Be sure to wrap the cable a **minimum** of one complete loop around the Cable Routing Guide to allow extra cable for removing the SSC card later.

Note 2: When both Fiber and IP Expansion daughterboards coexist in a system, configure the Fiber Expansion daughterboard as expansions 1 and 3 and the IP Expansion daughterboard as expansions 2 and 4.

—End—

Figure 75
NTDK84 dual-port Fiber Expansion daughterboard, 10 m (33 ft))

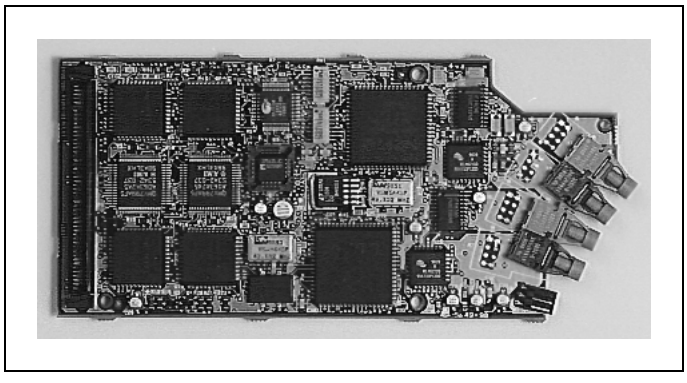

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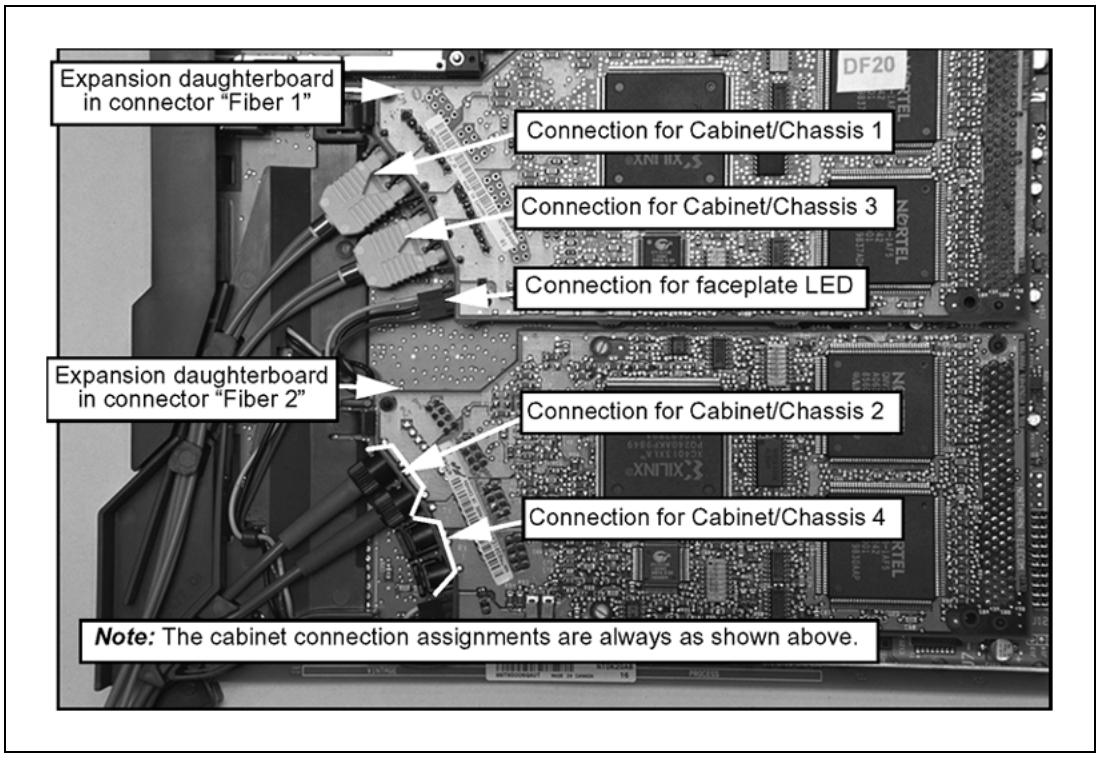
Figure 76
Cabinet or chassis assignments for dual-port daughterboards



Installing fiber expansion daughterboard cables

An A0632902 10 m plastic fiber-optic cable is used to connect the Main Cabinet or Chassis to an Expansion Cabinet or Chassis located within 10 m (33 ft) when using short-haul fiber daughterboards.

A glass fiber-optic cable, supplied and installed by a local facilities provider, can be used to connect an expansion cabinet located up to 3 km (1.8 mi) from the main cabinet when using long-haul fiber daughterboards.

Do not staple or twist fiber-optic cable. Do not bend it beyond a 35 mm (1.5 in.) bend radius (90û soft bend).

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CAUTION
Service Interruption
Incorrectly connected fiber-optic cables may cause the following problems:

- a series of repetitive fault-indicating messages
- a complete failure of the expansion cabinet

If fault-indicating messages appear, check the fiber-optic cable connections.

Since messages are stored in a buffer, they may continue to be displayed until the buffer is empty. After checking the cable connections, wait a couple of minutes for the messages to stop.

Procedure 23
Installing the A0632902 10m plastic fiber-optic cable

Step	Action
1	Put on the antistatic wrist strap.
2	Place the SSC card on a clean, flat, ESD-dissipated surface.
3	Remove the protective plugs from the connectors on the Fiber Expansion daughterboard.
4	Connect the fiber-optic cable to the Fiber Expansion daughterboard, making sure that the "V"-shaped groove on the cable connector is facing outward and that the connector is fully seated. See Figure 77 "Plastic fiber cable connection on dual-port daughterboard" (page 167). The mark (if equipped) on the sides of the cable connector should not be visible when properly connected. Refer to Figure 77 "Plastic fiber cable connection on dual-port daughterboard" (page 167).
5	Route the fiber cable through the SSC cable router on the SSC card.
6	Insert the SSC card into slot 0 of the Main Cabinet or Chassis. Lock card into faceplate latches.
7	Route the cables through the SSC Cable Routing Guide as shown in Figure 78 "Fiber-optic cable connection" (page 168). ***Note:*** Be sure to wrap the cable a **minimum** of one complete loop around the Cable Routing Guide to allow for extra cable for removing the SSC card later.

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—End—

Figure 77
Plastic fiber cable connection on dual-port daughterboard

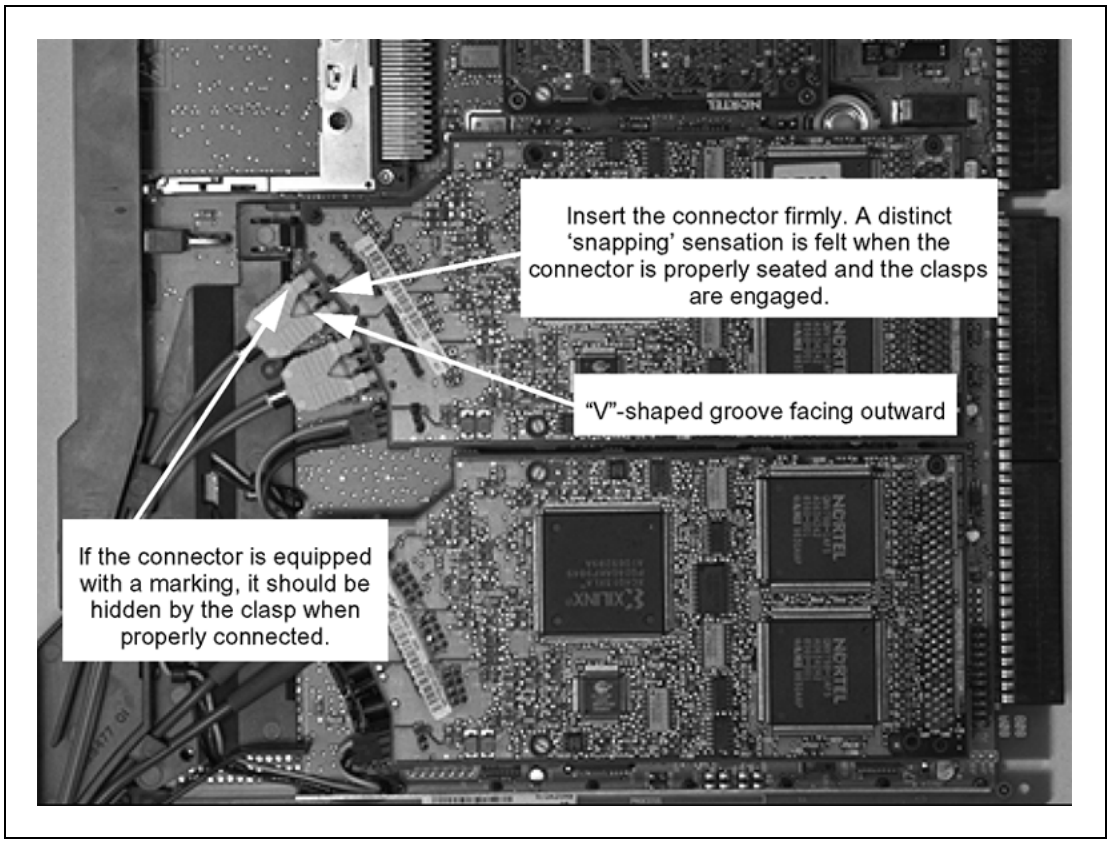

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Figure 78
Fiber-optic cable connection

Procedure 24
Installing glass fiber-optic cable

Step	Action
1	Put on the antistatic wrist strap.
2	Place the SSC card on a clean, flat, ESD-dissipated surface.
3	Remove the protective plugs from one connector on the Fiber Daughterboard.
4	Remove the protective cap from the corresponding plug (Tx or Rx) on the glass fiber-optic cable.

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5 Insert the plug in its designated connector on the daughterboard. Once inserted, lock the connector in place by turning it a half turn clockwise. Refer to Figure 79 "Glass fiber-optic cable connection on dual-port daughterboard" (page 169).

6 Repeat the steps above for the remaining connector and plug.

7 Route the fiber cables through the SSC cable router on the SSC card. Refer to Figure 79 "Glass fiber-optic cable connection on dual-port daughterboard" (page 169) for location of the cable router.

8 Insert the SSC card into slot 0 of the Main Cabinet or Chassis. Lock card into faceplate latches.

9 Route the cables through the SSC Cable Routing Guide under the main cabinet as shown in Figure 80 "Cable Routing Guide under main cabinet" (page 170).

—End—

Figure 79
Glass fiber-optic cable connection on dual-port daughterboard

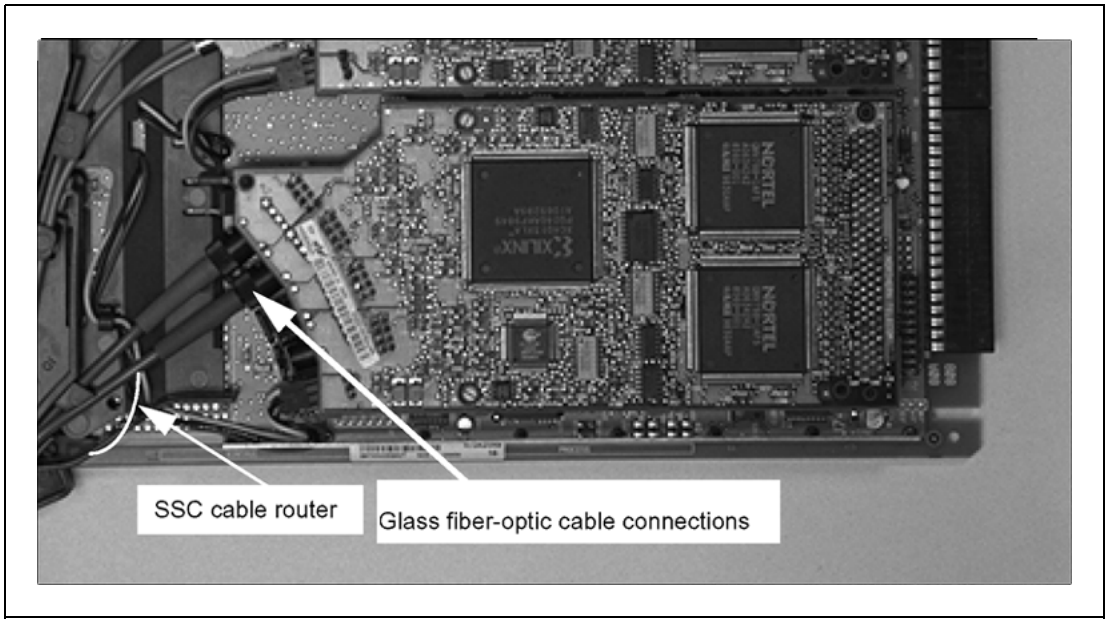

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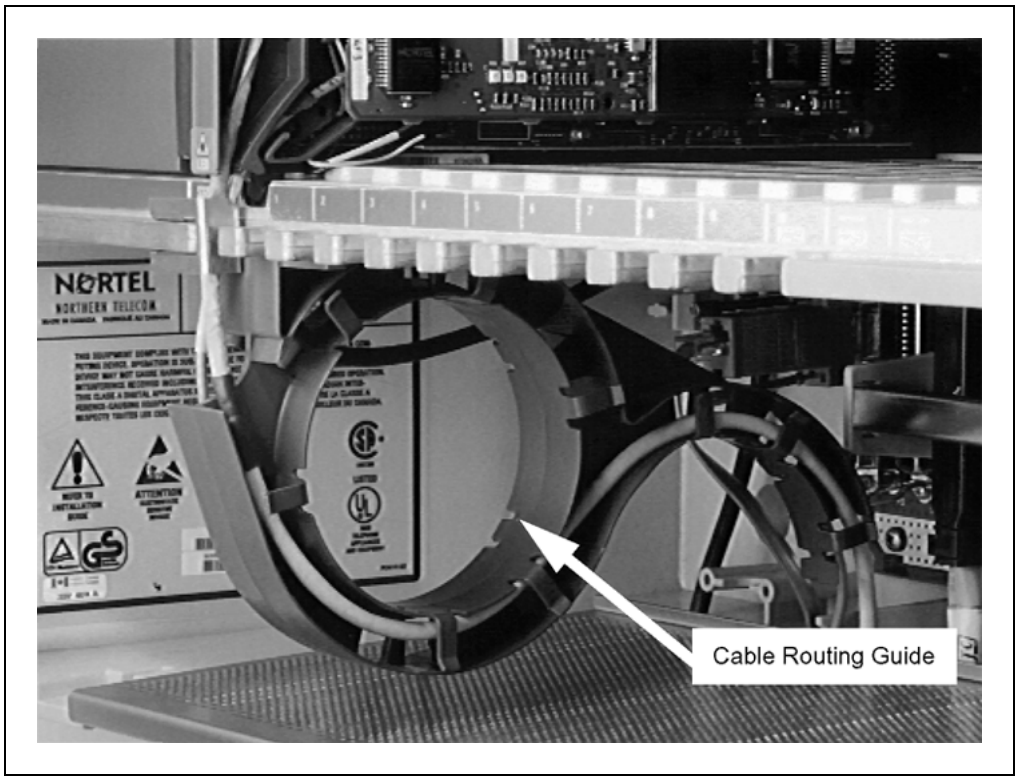
Figure 80
Cable Routing Guide under main cabinet



Installing Fiber Receiver cards on expansion cabinets and chassis

Fiber Expansion Cabinets or Chassis require a Fiber Receiver card. See Table 22 "Fiber Expansion daughterboards and Fiber Receiver cards" (page 162) for the Fiber Receiver cards and their corresponding Fiber Expansion daughterboards.

This section describes the steps necessary to connect the cables and install the Fiber Receiver card on the Expansion Cabinet or Chassis.

Procedure 25
Installing the Fiber Receiver card

Step	Action
1	Put on the antistatic wrist strap.
2	Place the Fiber Receiver card on a clean, flat, ESD-dissipated surface.
3	Remove the protective plugs from the connectors on the Fiber Receiver card.
4	Install the fiber-optic cable:

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- To install the 10 m (33 ft) plastic fiber-optic cable, refer to Figure 81 "Plastic fiber-optic connection on Fiber Receiver card" (page 172).
- To install glass fiber-optic cable, refer to Figure 82 "Glass fiber-optic connection on Fiber Receiver card" (page 173).

5 Insert the Fiber Receiver card in slot 0 of the Expansion Cabinet or Chassis, as shown in Figure 83 "Fiber Receiver card in slot 0 of the fiber expansion cabinet" (page 174).

6 Route the fiber-optic cable around the Cable Routing Guide as shown in Figure 83 "Fiber Receiver card in slot 0 of the fiber expansion cabinet" (page 174).

Note: Be sure to wrap the cable a **minimum** of one complete loop around the guide. This ensures sufficient cable for removing the Fiber Receiver card later.

—End—

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Figure 81
Plastic fiber-optic connection on Fiber Receiver card

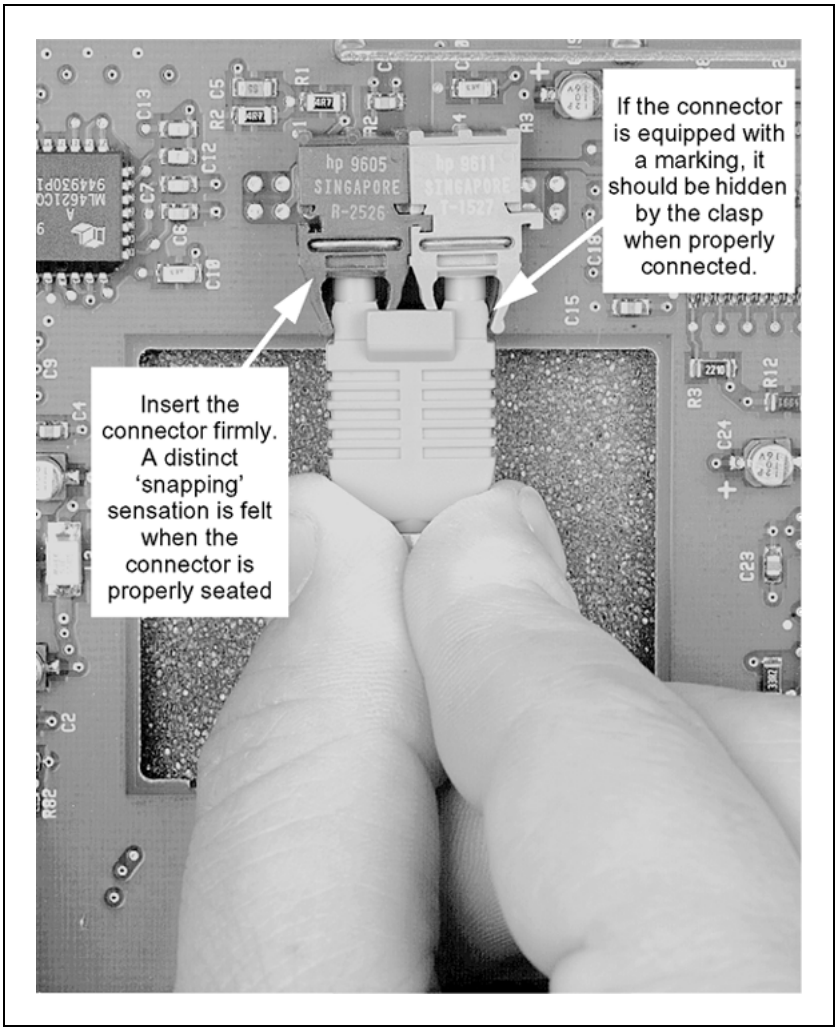

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Figure 82
Glass fiber-optic connection on Fiber Receiver card

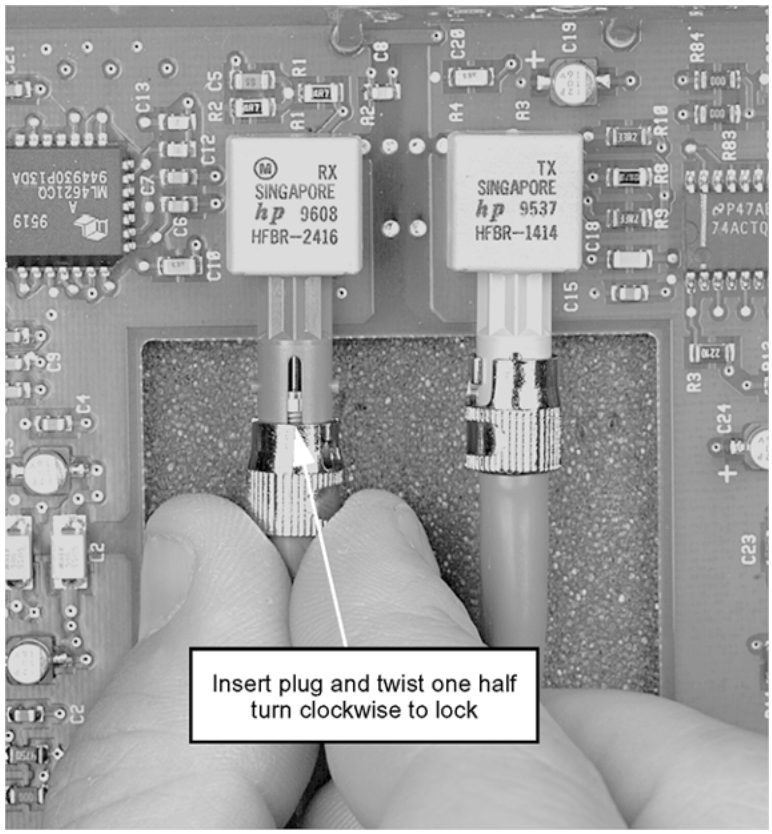

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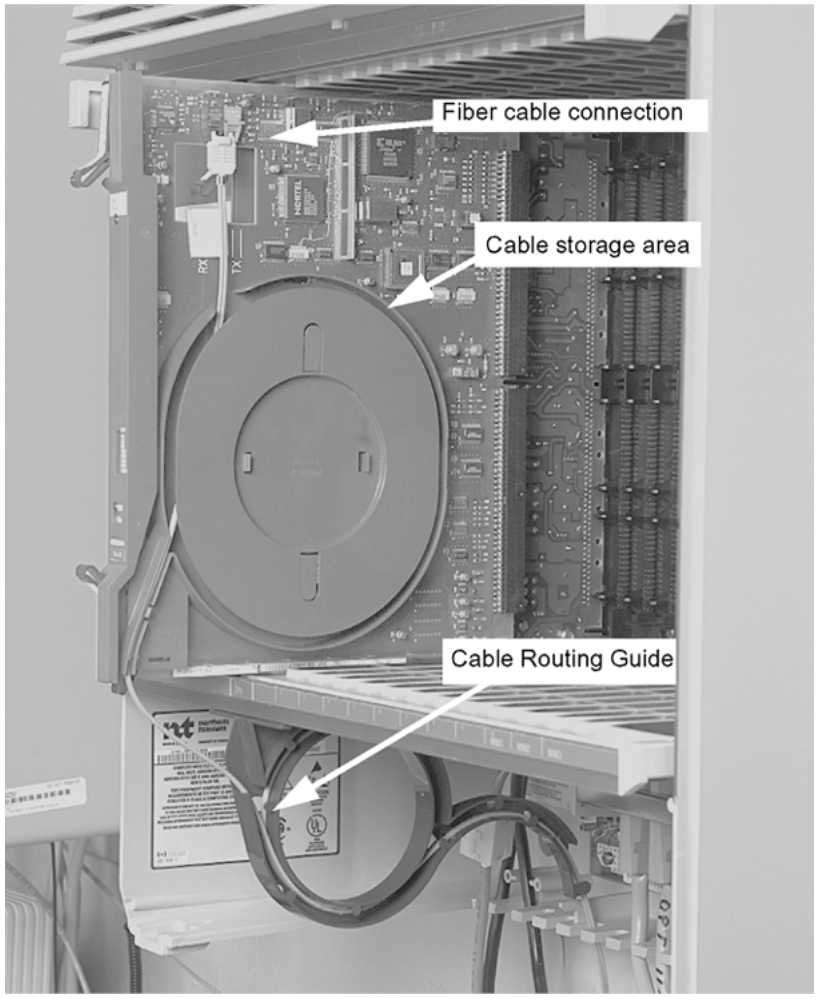
Figure 83
Fiber Receiver card in slot 0 of the fiber expansion cabinet



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Installing IP expansion

Contents

This section contains information on the following topics:

"Introduction" (page 175)

"Installing the NTDK20 SSC card on the Main Cabinet or Chassis" (page 176)

"Software daughterboard and security device" (page 176)

"IP expansion daughterboards and cables" (page 178)

"Installing the NTDK20 SSC card on IP expansion cabinets and chassis" (page 186)

"Software daughterboard and security device" (page 186)

"IP expansion daughterboards and cables" (page 186)

Introduction

This chapter describes how and where to install the Small System Controller (SSC) cards, software and expansion daughterboards, and cables required for IP expansion. The chapter includes information relevant to the Main and IP Expansion Cabinets or Chassis.

For IP expansion, you must install an SSC card, equipped with a software daughterboard and IP expansion daughterboard(s), in slot 0 of the Main Cabinet or Chassis. You must also install an SSC card, equipped with an IP expansion daughterboard and a software daughterboard, in slot 0 of the Expansion Cabinet or Chassis.

> ***Note:*** The main cabinet and all chassis require SSC card vintage NTDK20HA or newer, or upgraded NTDK20EA-GA (upgraded using the NTTK19 SSC Upgrade Kit). An expansion cabinet requires SSC card vintage NTDK20HA or newer, or upgraded NTDK20CA-GA (upgraded using the NTTK19 SSC Upgrade Kit). For information on upgrading an SSC card, refer to the chapter on upgrading system controller cards in *Meridian 1 Small System Software-only Upgrade* (NN43011-459).

"Installing optional circuit cards" (page 189) describes additional circuit cards, which are optional to the Small System.

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This chapter contains the following procedures:

- Procedure 19 "Installing the software daughterboard and security device" (page 156)
- Procedure 27 "Installing the 100BaseT daughterboards on the SSC card" (page 178)
- Procedure 28 "Installing the 100BaseF IP expansion daughterboard on the SSC card on the Main Cabinet or Chassis" (page 183)

Installing the NTDK20 SSC card on the Main Cabinet or Chassis

The following components must be installed on the SSC card before it is inserted into the Main Cabinet or Chassis:

- software daughterboard
- security device
- IP expansion daughterboard(s)
- cables

Software daughterboard and security device

WARNING
The NTDK20 SSC card is equipped with components on both sides of the circuit board. Be careful not to damage any of the components when handling the card.

Procedure 26
Installing the software daughterboard and security device

Step	Action
1	Put on the antistatic wrist strap.
2	Place the SSC card on a clean, flat, electrostatic discharge (ESD)-dissipated surface.
3	Install the software daughterboard on the connector as shown in Figure 84 "Location of software daughterboard and security device on the NTDK20 SSC card" (page 177).
4	Press firmly on the standoffs to ensure that the daughterboard is secured well to the SSC card.
5	Insert the security device labeled NT_STD in the socket with the device markings facing outwards, as shown in Figure 84 "Location of

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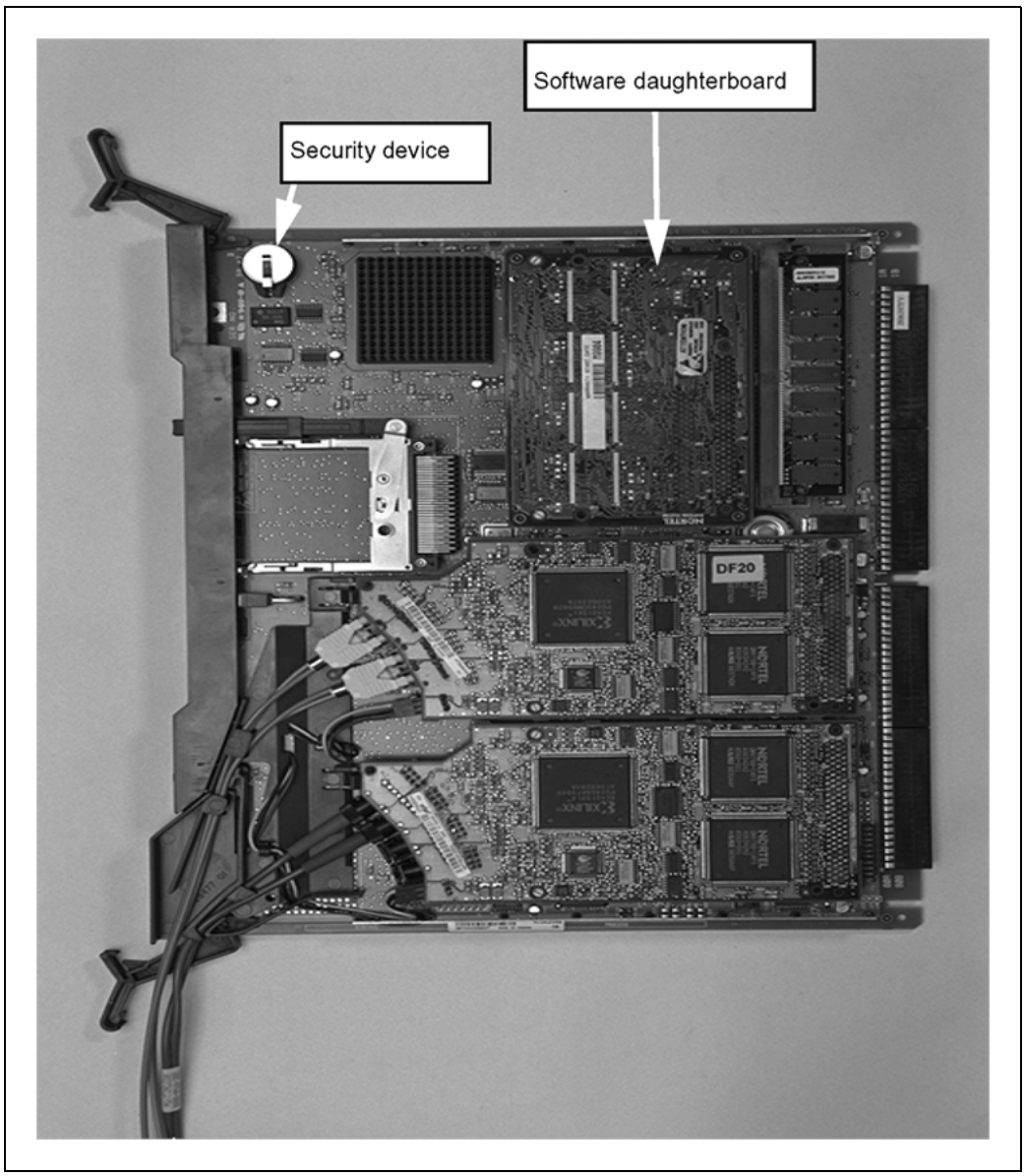
software daughterboard and security device on the NTDK20 SSC card" (page 177).

—End—

Figure 84
Location of software daughterboard and security device on the NTDK20 SSC card



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IP expansion daughterboards and cables

The following four daughterboards can be installed on the SSC card in the Main Cabinet or Chassis:

- NTDK83 dual-port 100BaseT IP Expansion daughterboard
- NTDK99 single-port 100BaseT IP Expansion daughterboard
- NTTK02 dual-port 100BaseF IP Expansion daughterboard
- NTTK01 single-port 100BaseF IP Expansion daughterboard

Two connectors are available on the SSC card, allowing a maximum of two (single or dual) daughterboards per main SSC card.

DANGER

The fiber-optic interface product used in the Small System is considered safe. However, as a precaution do not view the optical port or the end of fiber-optic cable. Under certain conditions (such as during cable testing or under light magnification) the cable or port may expose the eye beyond the limits of Maximum Permissible Exposure recommended in some jurisdictions. Do not remove protective caps or plugs until ready to connect the cable.

Procedure 27
Installing the 100BaseT daughterboards on the SSC card

Step	Action

The cables must be installed and connected before mounting the daughterboard on the SSC.

1 Put on the antistatic wrist strap.

2 Place the SSC card on a clean, flat, ESD-dissipated surface.

3 Replace the standoffs on the SSC card with the taller standoffs supplied with the IP expansion daughterboard.

4 Record the MAC address found on the back of the IP expansion daughterboard. This will be needed later to perform the software installation. See Figure 85 "SSC card with 100BaseT daughterboard installed" (page 180).

5 Insert the male end on the NTDK8305 cable into one port on the IP expansion daughterboard. Pull gently on the cable to make sure the connection is secure.

Note: The top connector on the SSC card is for Expansion Cabinets or Chassis 1 and 3. The lower connector is for Expansion Cabinets or Chassis 2 and 4.

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6 Connect the LED cable to the receptacle on the daughterboard. See Figure 85 "SSC card with 100BaseT daughterboard installed" (page 180) for exact location.

7 Mount the daughterboard onto the SSC card by inserting the plastic post into the designated slot on the daughterboard. See Figure 85 "SSC card with 100BaseT daughterboard installed" (page 180) for exact positioning.

Note: Tip the daughterboard down over the post and press down onto the two standoffs.

8 Firmly press the daughterboard down on the connector pin to secure it in place.

9 Route the expansion cable through the cable router on the SSC card.

10 Install the EMC grounding clip.

For the Cabinet system, the EMC grounding clip is mounted on the cabinet's stiffener rail. See Figure 86 "EMC grounding clip for the cabinet" (page 181) for exact positioning.

For the Chassis system, the EMC grounding clip is mounted on the fan baffle on the lower right-hand side of the chassis. See Figure 87 "EMC grounding clip for the chassis" (page 182) for exact positioning.

Note: Depending on the vintage of the cabinet, this clip may already be installed. In this case, loosen the screws that secure it to the stiffener rail and rotate the clip to an outward position.

CAUTION
CAUTION WITH ESDS DEVICES
The EMC grounding clip must be used to secure the contact between the cable and the metal stiffener rail. Failure to do so will compromise EMC compliance.

11 Insert the SSC card into slot 0 of the Main Cabinet or Chassis. Lock the card into the faceplate latches.

12 Route the NTDK8305 extension cable through the EMC clip. For the Cabinet system, push the cable to the left as shown in Figure 86 "EMC grounding clip for the cabinet" (page 181).

13 Route the cable through the Cable Routing Guide to secure the cable and tidy the installation.

Note: Be sure to wrap the cable a **minimum** of one complete loop around the Cable Routing Guide.

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—End—

Figure 85
SSC card with 100BaseT daughterboard installed

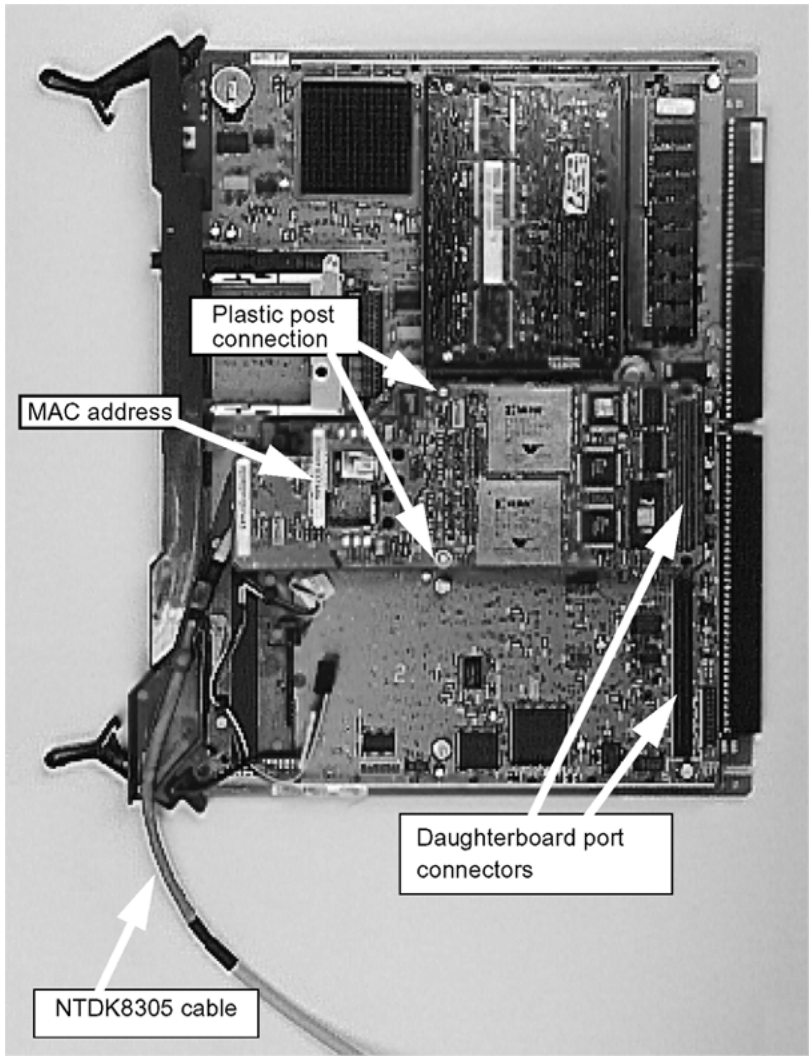

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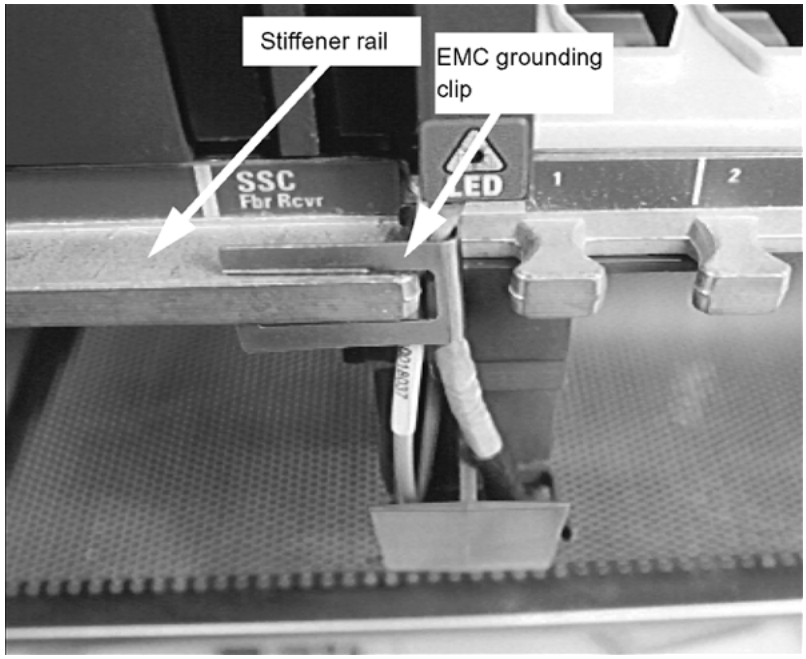
Figure 86
EMC grounding clip for the cabinet



Note: The EMC grounding clip is installed on the front of the stiffener rail on the IP cabinet. There is a small #4-40 screw to fasten the clip to the stiffener rail. The 100BaseT cable is then fed through and secured in the clip.

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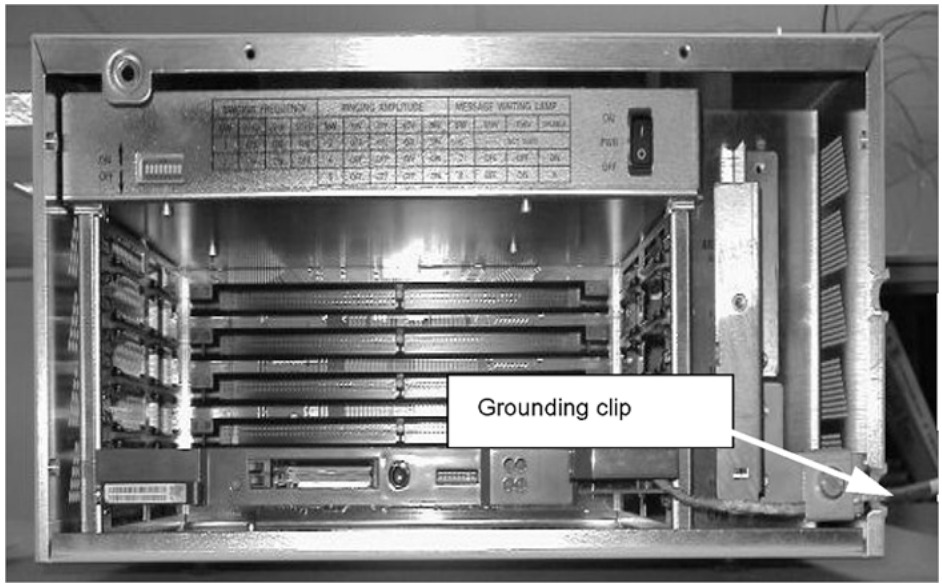
Figure 87
EMC grounding clip for the chassis



CAUTION
CAUTION WITH ESDS DEVICES
The grounding clip is required to ensure EMC compliance.

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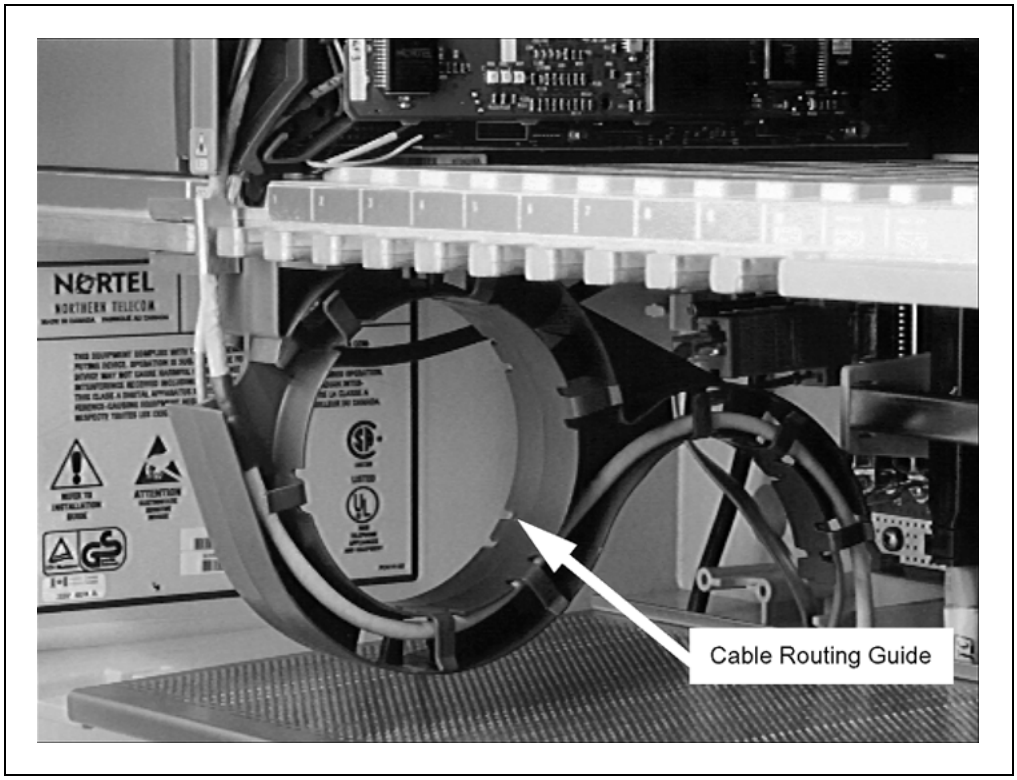
Figure 88
Cable Routing Guide under main cabinet



Procedure 28

Installing the 100BaseF IP expansion daughterboard on the SSC card on the Main Cabinet or Chassis

Step	Action
1	Put on the antistatic wrist strap.
2	Place the SSC card on a clean, flat, ESD-dissipated surface.
3	Remove the protective plugs from the connectors on the daughterboard.
4	Insert the A0817052 MT-RJ to ST cable end into the daughterboard connector. See Figure 90 "Cable ends and fiber coupler" (page 185) for identification of cable ends. Repeat step 4 if a second fiber connection is required. ***Note 1:*** With new connectors, push very firmly until a definite "click" is heard. Pull gently on the connection to make sure it is secure.

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Note 2: The top connector on the SSC card is for Expansion Cabinets or Chassis 1 and 3. The lower connector is for Expansion Cabinets or Chassis 2 and 4.

5 Replace the standoffs on the SSC card with the standoffs supplied with the IP expansion daughterboard.

6 Record the MAC address found on the back of the daughterboard of the Expansion Cabinets or Chassis. This will be needed later to perform the software installation.

7 Connect the faceplate LED to the 3-pin receptacle on the daughterboard. See Figure 89 "NTTK02 dual-port 100BaseF daughterboard" (page 185) for exact location.

8 Mount the daughterboard onto the SSC card by inserting the plastic post into the designated slot on the daughterboard. See Figure 85 "SSC card with 100BaseT daughterboard installed" (page 180) for exact positioning.

Note: Tip the daughterboard down over the post and press down onto the two standoffs.

9 Firmly press the daughterboard down on the connector pin to secure in place.

10 Route the expansion cable through the cable router on the SSC card.

11 Insert the SSC card into slot 0 of the Main Cabinet or Chassis. Lock the card into the faceplate latches.

12 Route the cable through the Cable Routing Guide under the main cabinet.

Note 1: Be sure to wrap the cable a **minimum** of one complete loop around the Cable Routing Guide.

Note 2: The use of the EMC clip is required for 100BaseT and is optional on 100BaseF connections.

—End—

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Figure 89
NTTK02 dual-port 100BaseF daughterboard

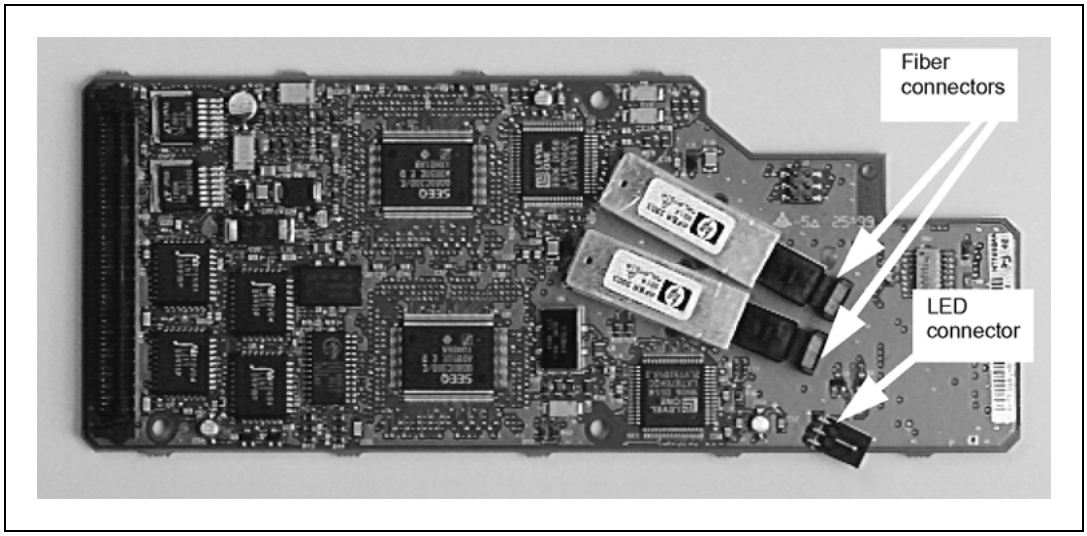
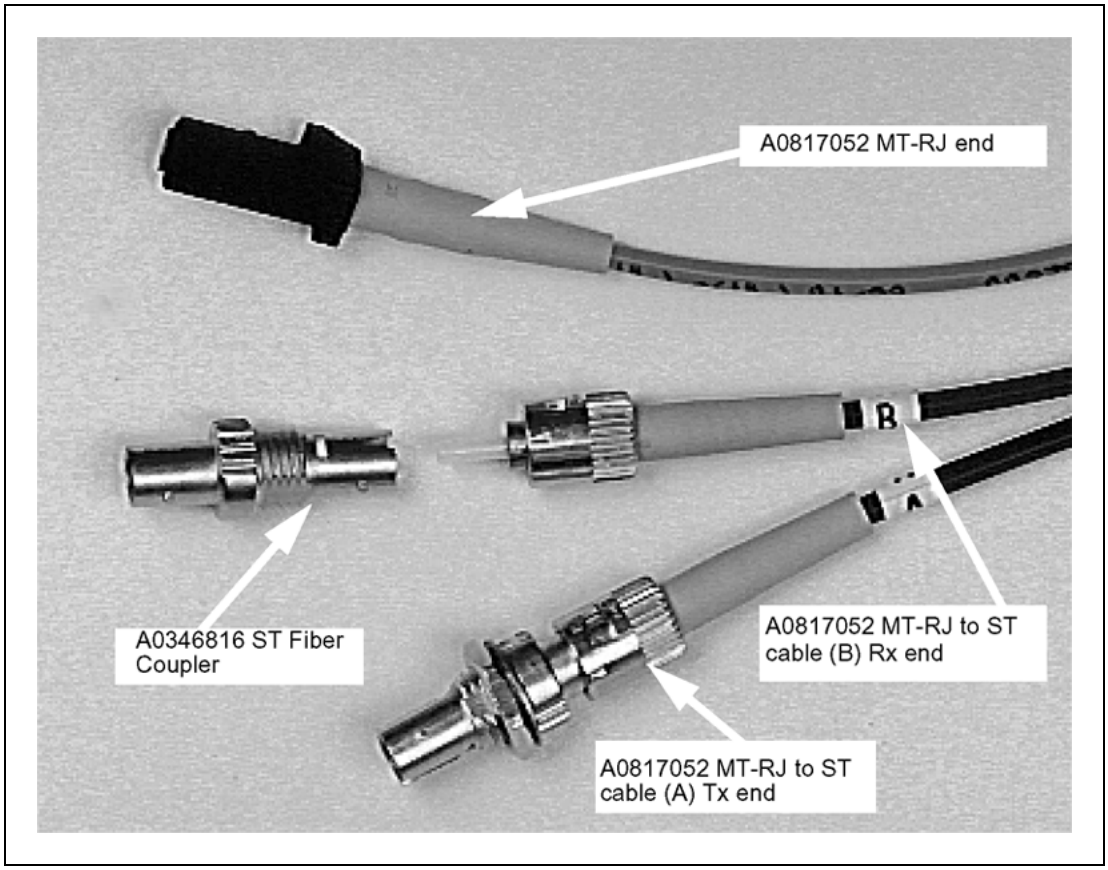


Figure 90
Cable ends and fiber coupler



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Installing the NTDK20 SSC card on IP expansion cabinets and chassis

IP Expansion Cabinets or Chassis require an NTDK20 SSC card equipped with an IP expansion daughterboard. An expansion cabinet requires an NTDK20HA or newer, or an upgraded NTDK20CA-GA (upgraded using the NTTK19 SSC Upgrade Kit). An expansion chassis requires an NTDK20HA or newer, or an upgraded NTDK20EA-GA (upgraded using the NTTK19 SSC Upgrade Kit). For information on upgrading an SSC card, refer to the chapter on upgrading system controller cards in *Meridian 1 Small System Software-only Upgrade (NN43011-459)*.

This section describes the steps necessary to install the SSC cards, daughterboards, cables, and any other components that are required on the SSC card.

Software daughterboard and security device

Refer to Procedure 26 "Installing the software daughterboard and security device" (page 176), "Installing the Software Daughterboard and security device".

Note: While the security device on the SSC card of the IP Expansion Cabinet or Chassis is installed as described in Procedure 26 "Installing the software daughterboard and security device" (page 176), the device itself is different. The security device for IP Expansion Cabinets or Chassis is labelled "NT_REM" and is programmed to match the security device on the Main Cabinet or Chassis.

IP expansion daughterboards and cables

Either of the following two daughterboards can be installed on the SSC card in an IP Expansion Cabinet or Chassis:

- NTDK99 single-port 100BaseT IP Expansion daughterboard
- NTTK01 single-port 100BaseF IP Expansion daughterboard

The installation of these daughterboards is the same as described in Procedure 27 "Installing the 100BaseT daughterboards on the SSC card" (page 178) and Procedure 28 "Installing the 100BaseF IP expansion daughterboard on the SSC card on the Main Cabinet or Chassis" (page 183) for the SSC card on the Main Cabinet or Chassis, with the following notable exceptions:

1. The IP expansion daughterboard must be installed in the lower (i.e., port 2/4) expansion connector on the SSC card to ensure clock synchronization.
2. Record the MAC address and associated Expansion Cabinet or Chassis number, to be used later in the software configuration.

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3. Do not connect the SSC faceplate LED.

To install the 100BaseT single-port daughterboard, refer to Procedure 27 "Installing the 100BaseT daughterboards on the SSC card" (page 178).

To install the 100BaseF single-port daughterboard, refer to Procedure 28 "Installing the 100BaseF IP expansion daughterboard on the SSC card on the Main Cabinet or Chassis" (page 183).

Note: When both Fiber and IP Expansion daughterboards coexist in a system, configure the Fiber Expansion daughterboard as expansions 1 and 3 and the IP Expansion daughterboard as expansions 2 and 4.

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Installing optional circuit cards

Contents

This section contains information on the following topics:

"Introduction" (page 189)
"Circuit card assignments for the Chassis system" (page 190)
"Circuit cards" (page 192)
"NTAK02 SDI/DCH card" (page 193)
"NT8D14 Universal Trunk card" (page 194)
"NT8D15 E and M Trunk card" (page 195)
"NTAG26 XMFR card" (page 196)
"NT5K21 XMFC card" (page 197)
"NT1R20 Off-Premise Station analog line card" (page 198)
"NTDK16 48-port Digital Line Card" (page 205)
"NT8D02 Digital Line Card" (page 207)
"Digital Trunk cards" (page 207)

Introduction

This chapter describes various circuit cards available for use in Small Systems, and how and where to install them. This chapter does not include information on installing the NTDK20 Small System Controller (SSC) card or the Fiber Receiver cards. For information on these cards, refer to "Installing fiber expansion" (page 159).

Refer to *Circuit Card Reference (NN43001-311)* for full descriptions of country-specific IPE cards and their installation procedures.

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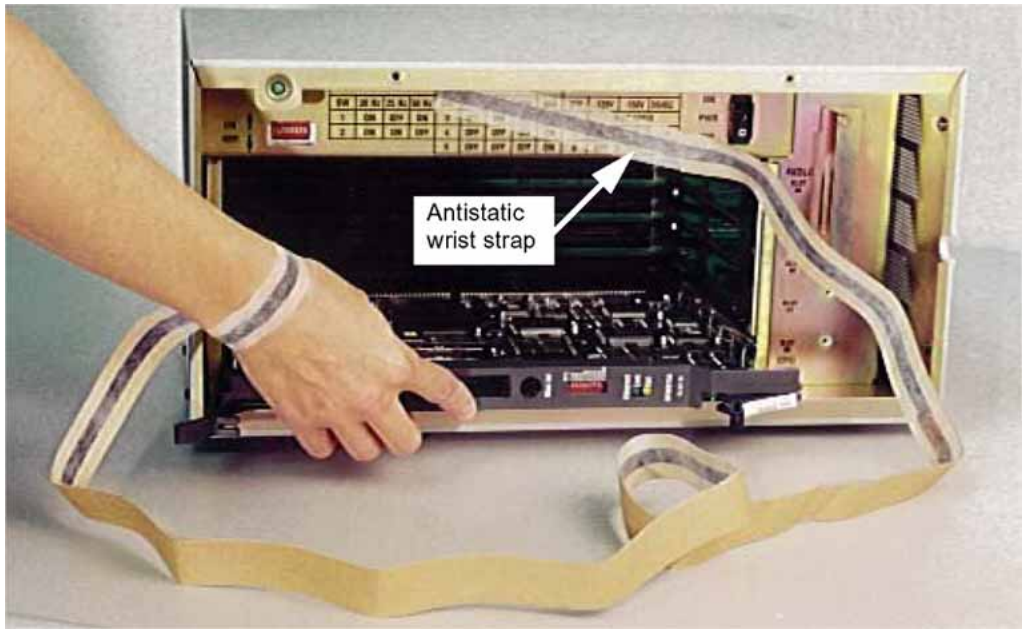
CAUTION
CAUTION WITH ESDS DEVICES
Always handle circuit cards with caution to avoid damage caused by static electricity. Always store circuit cards that are not in use in an antistatic bag or the original packaging.

Wear an antistatic wrist strap, such as the one shown in Figure 91 "Antistatic wrist strap" (page 190), when handling circuit cards. Static electricity can damage circuit card components.

Figure 91
Antistatic wrist strap



Circuit card assignments for the Chassis system

Figure 92 "Circuit card assignments in the chassis" (page 191) and Figure 93 "Circuit card assignments in the chassis expander" (page 192) show the circuit card assignments for the chassis and chassis expander. Follow these diagrams to make sure that you have all circuit cards inserted in the correct slots.

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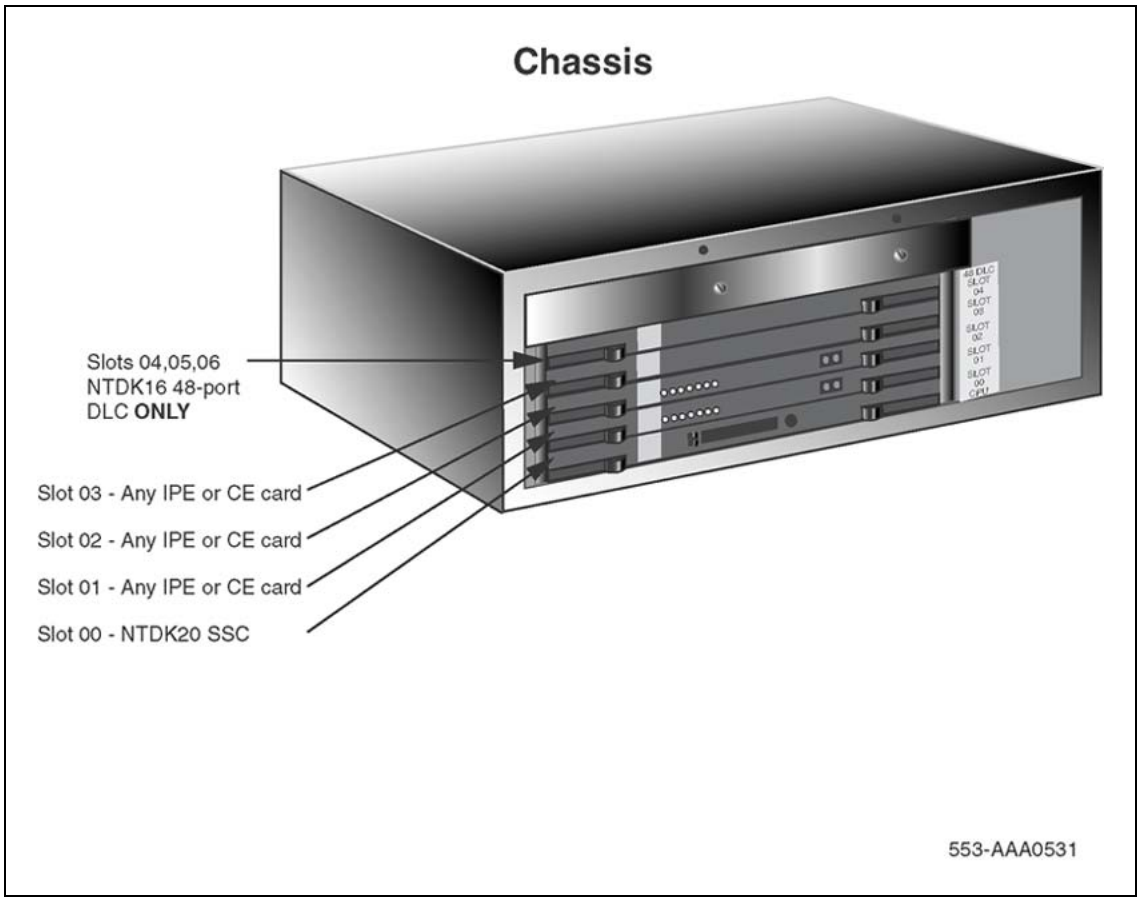
Figure 92
Circuit card assignments in the chassis



Note 1: See the card slot assignment table in the equipment layout chapter of *Meridian 1 Small System Planning and Engineering (NN43011-220)* for the cards that you can insert in the chassis.

Note 2: Slot 4 accepts the NTDK16 48-port Digital Line Card (DLC) only. However, you can place a double-width card in slot 3 and it can overlap into slot 4.

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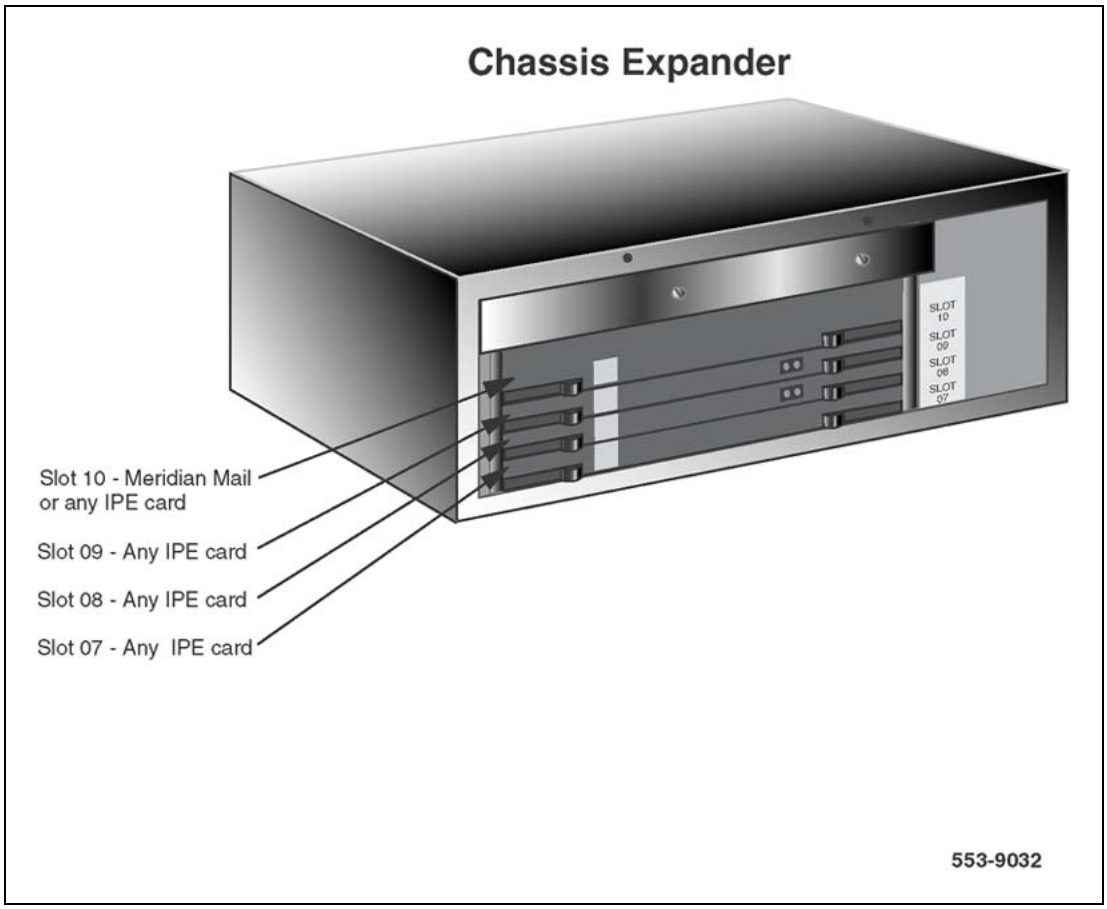
Figure 93
Circuit card assignments in the chassis expander



Note 1: See the card slot assignment table in the equipment layout chapter of *Meridian 1 Small System Planning and Engineering (NN43011-220)* for the cards that you can insert in the chassis expander.

Note 2: To configure Meridian Mail, you must place the Meridian Mail card in slot 10 of the chassis expander. The size of slot 10 is double that of the other slots in the chassis. Slot 10 supports Meridian Mail and other application cards that require a double slot.

Circuit cards

A circuit card displaying a symbol of a switch on its faceplate is equipped with option switches or strapping plugs or both. Other circuit cards, such as the NTDK20 SSC card, are capable of mounting daughterboards and other add-on devices. For information on installing the NTDK20 card, refer to "Installing fiber expansion" (page 159) or "Installing IP expansion" (page 175).

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The following circuit cards are commonly used in the Small System. A complete list of circuit cards and their settings can be found in *Circuit Card Reference (NN43001-311)*.

NTAK02 SDI/DCH card

Before inserting the NTAK02 SDI/DCH card into its slot, you must set the switches and attach the jumper plugs.

Note 1: In a Cabinet system, this circuit card can be installed in both the main cabinet and IP expansion cabinets. In a Chassis system, install this circuit card in the chassis only.

Note 2: Only DCH is supported in IP expansion cabinets. ESDI, AML, and TTY are not supported.

The NTAK02 SDI/DCH switches allow you to configure the four SDI ports on the Main Cabinet or Chassis as a combination of the following:

- SDI
- ESDI, or
- DCH/DPNSS

The NTAK02 SDI/DCH card uses jumper plugs to configure the RS232/RS422 interfaces as one of the following:

- DTE
- DCE

Procedure 29
Installing the NTAK02 circuit card

Step	Action
1	Set the switches and jumper plugs for the NTAK02 SDI/DCH card according to Table 23 "Switch settings (Ports 0 and 1)" (page 193) to Table 25 "Jumper settings" (page 194).

Table 23
Switch settings (Ports 0 and 1)

Port 0	Port 1	SW 1-1	SW 1-2
SDI	DCH	OFF	OFF
SDI	DPNSS	OFF	ON
—	ESDI	ON	ON

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Table 24
Switch settings (Ports 2 and 3)

Port 2	Port 3	SW 1-3	SW 1-4
SDI	DCH	OFF	OFF
SDI	DPNSS	OFF	ON
—	ESDI	ON	ON

Table 25
Jumper settings

Port	Jumper location	Strap for DTE	Strap for DCE	Jumper location	RS422	RS232
Port 0	J10	C - B	B - A			
Port 1	J7 J6	C - B C - B	B - A B - A	J9J8	C - B C - B	B - A B - A
Port 2	J5	C - B	B - A			
Port 3	J4 J3	C - B C - B	B - A B - A	J2J1	C - B C - B	B - A B - A

2 Insert the card in its assigned slot.

You can install the NTAK02 SDI/DCH card in:

- slots 1 through 10 of the cabinet
- slots 1 to 3 of the chassis

3 Connect an NTAK19FB four port cable (or an NE-A25B cable) from the corresponding connector at the back of the chassis. If you use an NE-A25B cable, terminate this cable at the cross-connect terminal. Because the NTAK19FB cable is equipped with connectors, it does not require termination at the cross-connect terminal.

—End—

NT8D14 Universal Trunk card

The Universal Trunk card provides eight analog trunks which can function in the modes shown in Table 26 "NT8D14 Universal Trunk: modes and option settings" (page 195).

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You can install this line card in:

- slots 1 through 10 in the main cabinet or slots 11 through 50 in the expansion cabinets
- slots 1 through 3 in the chassis, slots 7 through 10 in the chassis expander, or in the expansion chassis

Procedure 30
Installing the Universal Trunk card

Step	Action
1	Set the jumpers for the NT8D14 Universal Trunk circuit card according to Table 26 "NT8D14 Universal Trunk: modes and option settings" (page 195).
2	Insert the card in its assigned slot.

—End—

Table 26
NT8D14 Universal Trunk: modes and option settings

Modes	Location	Jumper strap
Central (CO)	J1, J2	OFF
2-way TIE trunk (loop Dial Repeat)	J1, J2	OFF
2-way TIE trunk (Outgoing Incoming Dial)	J1, J2	OFF
Recorded Announcement (RAN)	J1, J2	OFF
Paging trunk	J1, J2	OFF
Japan CO/DID operation	J1, J2	OFF
DID operation Loop length>2000 ohms	J1, J2	ON
DID operation Loop length <2000 ohms	J1, J2	OFF
OFF indicates no strap present. J1 and J2 locations apply to all 8 trunks.		

NT8D15 E and M Trunk card

The E and M trunk card provides four trunks which can function as 2W E&M, 4W E&M, and Paging.

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You can install this card in:

- slots 1 through 10 in the main cabinet or slots 11 through 50 in the expansion cabinets
- slots 1 through 3 in the chassis, slots 7 through 10 in the chassis expander, or in the expansion chassis

Procedure 31
Installing the E and M Trunk card

Step	Action
1	Set the switches for the NT8D15 E&M trunk circuit card according to Table 27 "NT8D15 E and M Trunk card option settings" (page 196).
2	Insert the card in its assigned slot.

—End—

Table 27
NT8D15 E and M Trunk card option settings

Mode of operation	J2	J9
4W — Type 1	ON	connect pins 2 - 3
4W — Type 2	ON	connect pins 2 - 3
2W — Type 1	ON	connect pins 2 - 3
Paging trunk	ON	connect pins 2 - 3

NTAG26 XMFR card

The NTDK20 SSC card provides the functionality of the Extended Multi-Frequency Receiver (XMFR) card. However, this card can exist with the SSC card if you want to access additional XMFR capability.

The XMFR card receives MF digit information. Connections are made between a PBX and a CO. Through the IPE MF Receiver, the Small System supports features such as Automatic Number Identification (ANI), Meridian 911 (M911), and Feature Group D (FGD).

Procedure 32
Installing the XMFR card

Step	Action
1	Insert the NTAG26 card in its assigned slot.

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You can install this card in:

- slots 1 through 10 in the main cabinet or slots 11 through 50 in the expansion cabinets
- slots 1 through 3 in the chassis, slots 7 through 10 in the chassis expander, or in the expansion chassis

2 Configure and enable the card through LDs 13 and 34.

Note: After the card is enabled, the LED will flash three times to indicate it is conducting a self-test. If the LED remains lit, then the self-test has failed.

—End—

NT5K21 XMFC card

The NTDK20 SSC card provides the functionality of the Extended Multi-Frequency Compelled Sender/Receiver (XMFC) card. However, the XMFC card can coexist with the SSC card if you wish to access extra XMFC capability.

The XMFC card provides four channels of R2 Standard signaling capability.

Procedure 33
Installing the XMFC card

Step	Action
1	Insert the NT5K21 card in its assigned slot. You can install this card in: • slots 1 through 10 in the main cabinet or slots 11 through 50 in the expansion cabinets • slots 1 through 3 in the chassis, slots 7 through 10 in the chassis expander, or in the expansion chassis
2	Configure and enable the card through LDs 13 and 34. ***Note:*** After the card is enabled, the LED will flash three times to indicate it is conducting a self-test. If the LED remains lit, then the self-test has failed.

—End—

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NT1R20 Off-Premise Station analog line card

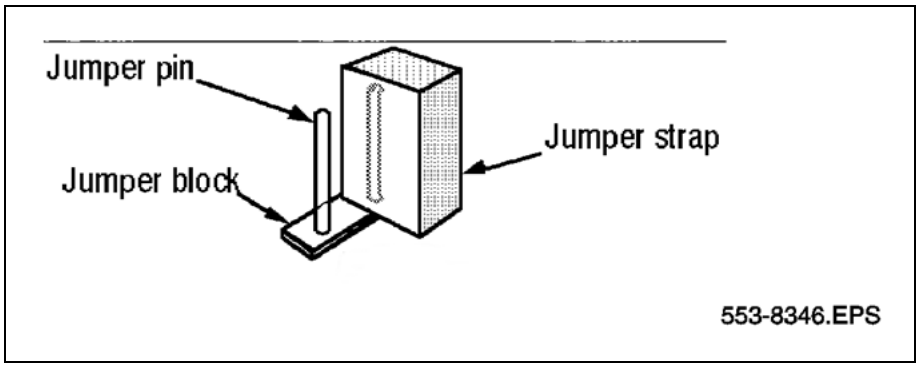
The Off-Premise Station (OPS) analog line card provides eight OPS lines. You can install this card in:

- slots 1 through 10 in the main cabinet or slots 11 through 50 in the expansion cabinets
- slots 1 through 3 in the chassis, slots 7 through 10 in the chassis expander, or in the expansion chassis

Procedure 34
Installing the OPS analog line card

Step	Action
1	Set the jumpers on the NT1R20 OPS card. Each line interface unit on the card is equipped with two jumper blocks that are used to select the proper loop current, depending upon loop length. Refer to Table 28 "OPS analog line card configuration" (page 199) and Figure 95 "OPS analog line card: jumper block locations" (page 200). For units connected to loops of 460 to 2300 ohms, both jumper blocks for that unit must have jumper straps installed. For loops that are 460 ohms or less, jumper straps are not installed.
2	Insert the OPS card in its assigned slot.
3	Cross-connect off-premise telephones as described in "Connecting off-premise telephones" (page 313). Refer to Figure 96 "OPS analog line card cross-connections" (page 201) for cross-connection information for the OPS card.

Figure 94
Set the jumpers



—End—

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Table 28 "OPS analog line card configuration" (page 199) provides OPS analog line card configuration information.

Table 28
OPS analog line card configuration

Application	On-premise station (ONS)			Off-premise station (OPS)			
Class of service (Note 1)	ONS			OPS			
Loop resistance	0–460 ohms			0–2300 ohms			
Jumper strap setting (Note 6)	Both JX.0 and JX.1 off			Both JX.0 and JX.1 off		Both JX.0 and JX.1 on	
Loop loss dB (Note 3)	0–1.5	1. –2.5	2.5–3.0	0–1.5	1.5–2.5	2.5–3.0	4.5–15
TIMP (Notes 1, 4)	600 ohms	600 ohms	600 ohms	600 ohms	600 ohms	600 ohms	600 ohms
BIMP (Notes 1, 4)	600 ohms	3COM1	3COM2	600 ohms	3COM1	3COM2	3COM2
Gain treatment (Note 5)	No						Yes

Note 1: Configured in the Single line Telephone Administration program (LD 10).

Note 2: The maximum signaling range supported by the OPS analog line card is 2300 ohms.

Note 3: Loss of untreated (no gain devices) metallic line facility. Upper loss limits correspond to loop resistance ranges for 26 AWG wire.

Note 4: Default software impedance settings are:

CLS	ONS	OPS
TIMP	600 ohms	600 ohms
BIMP	600 ohms	3COM2

Note 5: Gain treatment, such as a voice frequency repeater (VFR), is required to limit the actual OPS loop loss to 4.5 dB, maximum. VFR treatment of metallic loops having untreated loss greater than 15 dB (equivalent to a maximum signaling range of 2300 ohms on 26 AWG wire) is not recommended.

Note 6: Jumper strap settings JX.0 and JX.1 apply to all eight units; "X" indicates the unit number, 0–7. "OFF" indicates that a jumper strap is not installed across both pins on a jumper block. Store straps that are not in use on the OPS analog line card by installing them on a single jumper pin as shown in Figure 95 "OPS analog line card: jumper block locations" (page 200).

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Figure 95
OPS analog line card: jumper block locations

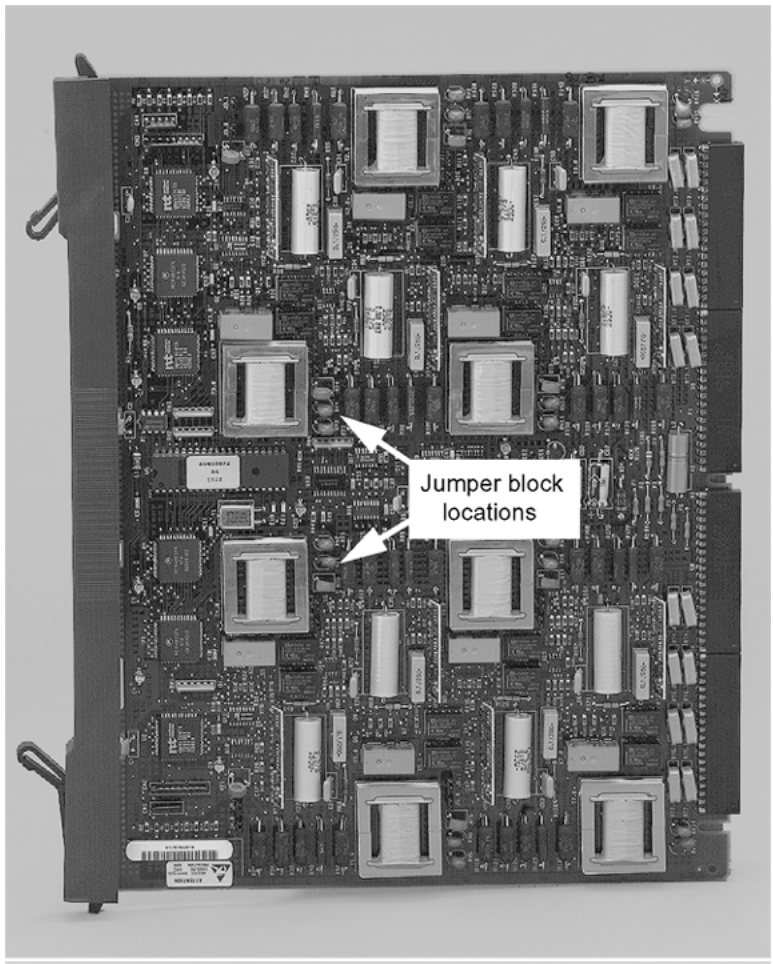

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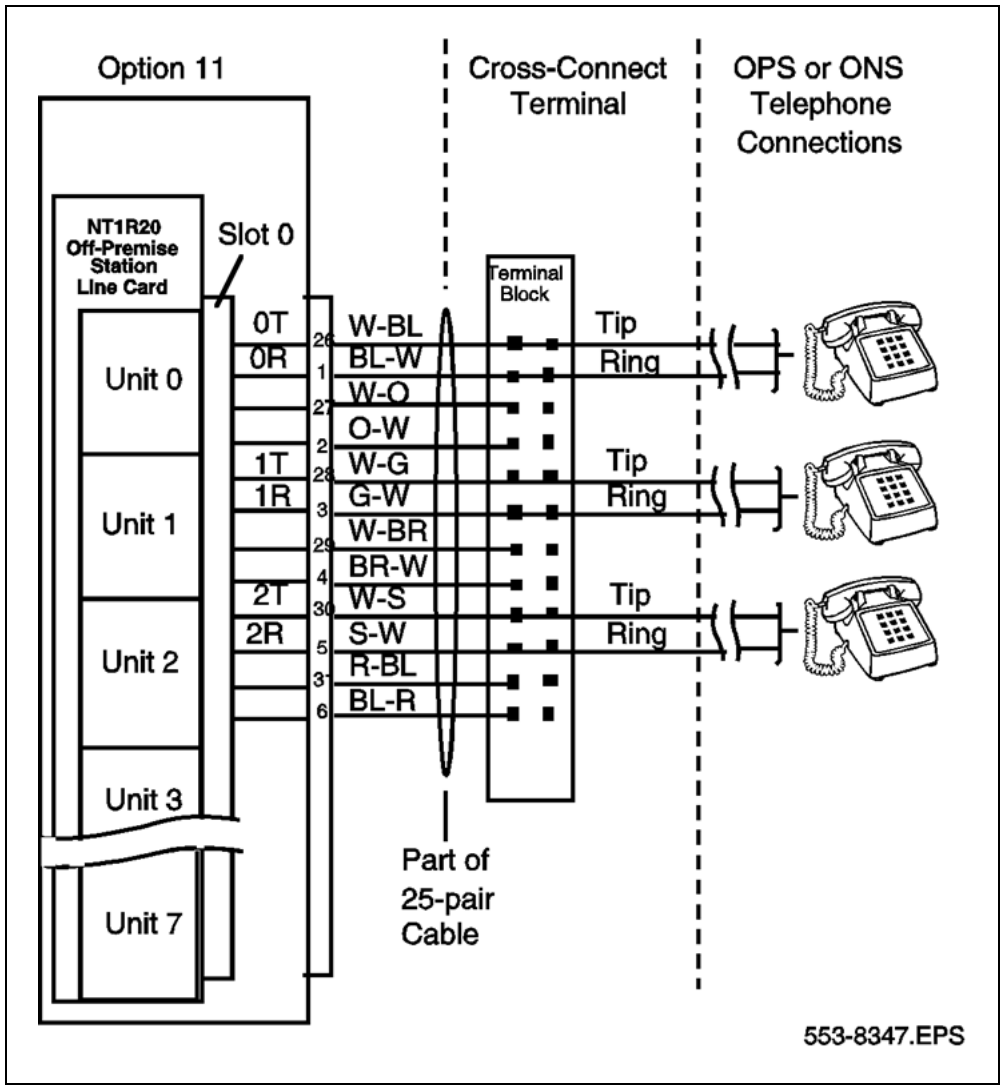
Figure 96
OPS analog line card cross-connections



NTDK20 Small System Controller (SSC) card

SSC card, Boot Code and Software Daughterboard compatibility

If the Software Daughterboard is an NTDK21, there are no compatibility issues and the installation can proceed.

Examine the Software Daughterboard being installed. If it is an NTDK81 Daughterboard, the Boot Code version on the NTDK20 SSC card must be REL 09 or higher.

The Boot Code will be REL 09 if:

- The Release number on the faceplate of the NTDK20 SSC is at least Release 11.

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or

- The Boot Code on the SSC has previously been updated to REL 09.

  Example: You are installing an NTDK20 SSC from a Spares Stock. The Boot Code may have been previously updated to REL 09 to make it compatible with both types of Software Daughterboards.

  Note: If the Boot Code is not REL 09 or higher, the installation cannot proceed. An NTDK20 SSC Release 11 should be acquired, or the Boot Code should be updated on the existing SSC (on an operational Small System) as described in the chapter on using the flash boot ROM utility in *Meridian 1 Small System Software-only Upgrade (NN43011-459)*.

Also note that X11 Release 23.30 or later software is required to use the NTDK81 Software Daughterboard. Software provided on the NTDK81 Software Daughterboard is Release 23.30 or later. It is only necessary to check the software release if software is to be installed from a PCMCIA card.

Expansion Daughterboards

Single port Fiber Expansion daughterboards can be installed on all versions of NTDK20 SSC.

Dual port Expansion daughterboards can be installed only on NTDK20CA and later versions of the SSC.

Procedure 35
NTDK20 SSC installation

Step	Action

Read the information under the heading "SSC card, Boot Code and Software Daughterboard compatibility" (page 201) before starting this procedure.

1 Install the Software Daughterboard and the Security Device on the NTDK20 SSC Card as shown in Figure on page 235.

CAUTION
The NTDK20 SSC card is equipped with components on both sides of the circuit board. Be careful not to damage any of the components when handling the card.

To install the Software Daughterboard and Security Device:

- Put on **the antistatic wrist strap** and insert the Software Daughterboard in the connector on the component side of the SSC card.

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- Install any required Expansion Daughterboards.
- Insert the Security Device in the socket on the component side of the SSC card.

2 Make sure that the option plug is:

- **in place**, if the system is equipped with ethernet capability
- **removed**, if there is no ethernet Small System Controller (SSC), which is typically an upgraded Option 11 or Option 11E with an expansion chassis connected with copper cable (no fiber optic cable).

3 If required, install a Fiber Expansion daughterboard on the SSC card for each expansion chassis. If you are connecting three or four expansion chassis, you will need to install one or two dual Fiber Expansion daughterboard(s).

Connect the Fiber Expansion Daughterboard to the connector labeled 'Fiber 1' for the first expansion chassis, and to connector 'Fiber 2' if for the second expansion chassis, and so on for each of the expansion chassis.

WARNING
The fiber optic interface product used in the Option 11C Mini is considered safe. However, as a precaution do not look directly at the optical port or the end of the fiber optic cable. Under certain conditions, such as during cable testing or under light magnification, the cable or port may expose your eyes beyond the limits of Maximum Permissible Exposure recommended in some jurisdictions. Do not remove protective caps or plugs until you are ready to connect the cable.

4 Connect the fiber optic cable to the Fiber Expansion Daughterboard on the NTDK20 SSC card as shown in Figure on page 235.

If using the A0632902 cable, remove the two protective plugs from the connectors on the Fiber Expansion Daughterboard. Connect the cable to the Fiber Expansion Daughterboard making sure that the 'V' shaped groove on the cable connector is facing outward and that the connector is fully seated. The black mark on the connector should not be visible when properly connected.
If using glass fiber optic cable, remove the protective plug from one connector on the Fiber Expansion Daughterboard and remove the protective cap from the corresponding plug (Tx or Rx) on the glass fiber optic cable. Insert the plug in its

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designated connector on the daughterboard. Once inserted, lock the connector in place by turning it a half turn clockwise.

5 Insert the NTDK20 SSC card in the CPU slot (slot 0) of the chassis.

—End—

Figure 97
Fiber Expansion Daughterboards on the NTDK20 SSC card

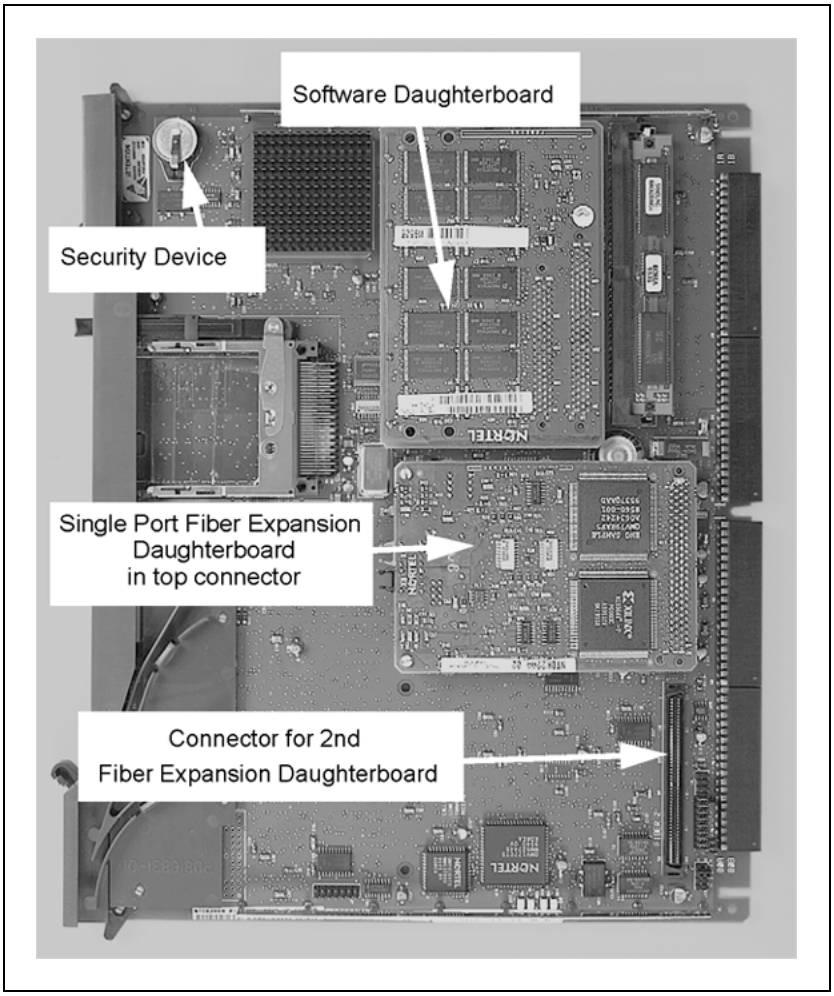

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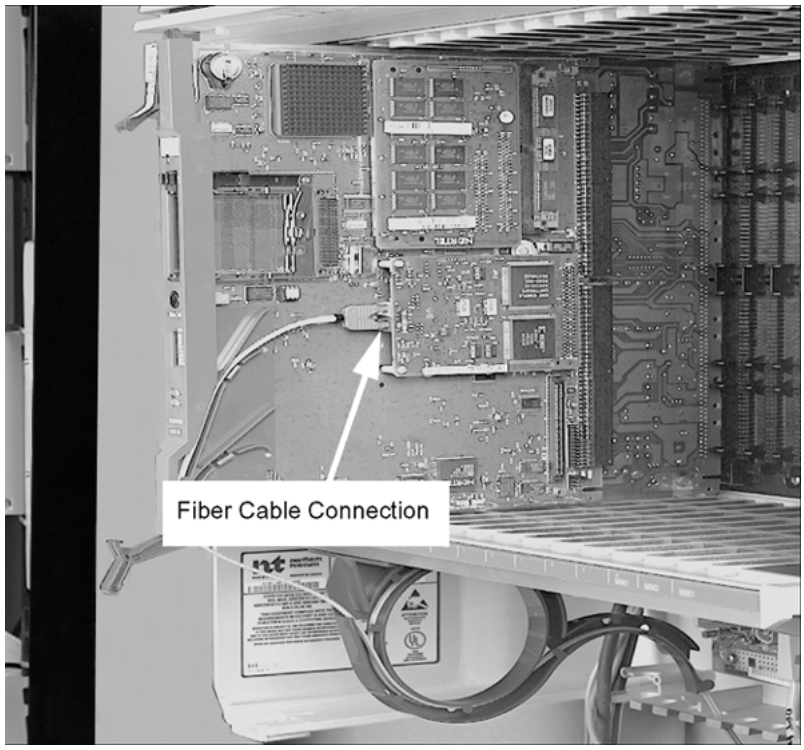
Figure 98
Fiber Optic Cable Connection (A0632902 cable shown) new illustration required



NTDK16 48-port Digital Line Card

The NTDK16 48-port Digital Line Card provides an interface to a maximum of 48 digital integrated voice and data sets in a Chassis system. The NTDK16 Digital Line Card is functionally equivalent to three NT8D02 Digital Line Cards. See Figure 99 "48-port Digital Line Card" (page 206).

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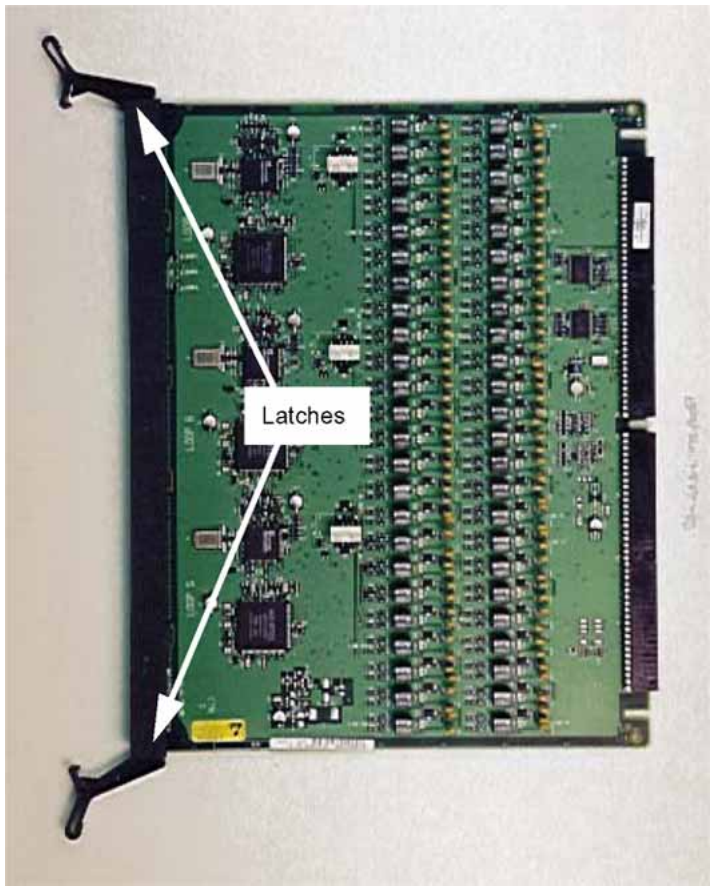
Figure 99
48-port Digital Line Card



Note 1: You can only place the NTDK16 Digital Line Card in slot 4 of the chassis.

Note 2: The Chassis system does not require the NTDK16 Digital Line Card to operate.

Procedure 36
Installing the NTDK16 48-port Digital Line Card

Step	Action
1	Insert the NTDK16 card in slot 4 of the chassis.
2	Lock the latches on the card.

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Note 1: The NTDK16 provides three independent loops (loops 4, 5, and 6). When the time comes to program this card in software, configure it as cards 4, 5, and 6 separately.

Note 2: Three LEDs provide card status.

Note 3: The NTDK16BA version of this card is not compatible with the NTDK91AA and the NTDK91AB chassis.

—End—

NT8D02 Digital Line Card

The NTDK16 48-port Digital Line Card is functionally equivalent to three NT8DO2 Digital Line Cards. However, the Chassis system also supports the NT8D02 Digital Line Card.

You can install this card in:

- slots 1 through 10 in the main cabinet or slots 11 through 50 in the expansion cabinets
- slots 1 through 3 in the chassis, slots 7 through 10 in the chassis expander, or in the expansion chassis

Procedure 37
Installing the NT8D02 circuit card

Step	Action
1	Insert the circuit card in its assigned slot.

—End—

Digital Trunk cards

Small Systems supports the following digital trunk cards:

- NTAK09 1.5 Mbit DTI/PRI
- NTAK10 2.0 Mbit DTI
- NTAK79 2.0 Mbit PRI
- NTBK22 MISP
- NTBK50 2.0 Mbit PRI
- NTRB21 1.5 Mbit DTI/PRI
- NT6D70 SILC (when used as a clock controller)

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Note: In a Chassis system, the digital trunk cards can be installed only in slots 1–3 of the chassis.

If you want to install digital trunk cards, refer to the following documents for information:

- *ISDN Primary Rate Interface Installation and Commissioning (NN43001-301)*
- *ISDN Primary Rate Interface Maintenance (NN43001-717)*
- *ISDN Basic Rate Interface Installation and Commissioning (NN43001-318)*
- *ISDN Basic Rate Interface Maintenance (NN43001-718)*

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Installing and connecting cross-connect terminals

Contents

This section contains the following topics:

"Introduction" (page 209)
"Terminal block requirements" (page 210)
"Terminal block requirements for the Cabinet system" (page 210)
"Terminal block requirements for the Chassis system" (page 210)
"Installing the BIX cross-connect terminal" (page 211)
"Installing the Krone Test Jack Frame for the UK" (page 214)
"Connecting the cables" (page 219)

Introduction

This chapter describes how to install and connect a cross-connect terminal to a Small System, using either:

- a BIX cross-connect terminal
- a Krone Test Jack Frame (UK)

Note: Although the use of the BIX system is not mandatory, it is the recommended choice.

This chapter contains the following procedures:

- Procedure 38 "Installing the BIX cross-connect terminal" (page 211)
- Procedure 39 "Installing the Krone Test Jack Frame (UK)" (page 215)
- Procedure 40 "Connecting the cables for the Cabinet system" (page 219)
- Procedure 41 "Connecting the cables for the Chassis system" (page 221)

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Terminal block requirements

This section describes the respective terminal block requirements for the Cabinet system and the Chassis system.

Terminal block requirements for the Cabinet system

The cross-connect terminal requires sufficient connecting blocks to terminate the following:

- up to ten 25-pair cables from each cabinet
  - — Each slot that is equipped with a trunk or line circuit card requires a cable.
    - – The connectors J1 through J10 correspond to slot numbers 1 through 10 in the main cabinet.
    - – Connectors J1 through J10 correspond to slot numbers 11 through 20 in the first expansion cabinet.
    - – Connectors J1 through J10 correspond to slot numbers 21 through 30 in the second expansion cabinet.
    - – Connectors J1 through J10 correspond to slot numbers 31 through 40 in the third expansion cabinet.
    - – Connectors J1 through J10 correspond to slot numbers 41 through 50 in the fourth expansion cabinet.
    - – Allow for additional cables at the cross-connect terminal if any of the ten slots in each cabinet are initially left vacant.
  - — If the NTAK19 SDI cable is not used with the NTAK02 card, then a 25-pair cable is required.
- nine conductors comprising the AUX cable from each cabinet
- one 25-pair cable from each QUA6 PFTU
- wiring from telephones and trunks

Terminal block requirements for the Chassis system

The cross-connect terminal requires enough connecting blocks to terminate the following wires:

- for the NTAK09 circuit card, use the NTBK04 cable
- for the NTAK10, NTAK79, and NTBK50 circuit cards, use the NTBK05 cable
- up to five 25-pair cables from each chassis
  - — Each slot that is equipped with a trunk or line circuit card requires a cable.

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  - Connectors Card 1 through Card 6 on the back of the chassis correspond to card numbers 1 through 6 in the chassis.
  - Connectors Card 7 through Card 10 on the back of the chassis expander correspond to card numbers 7 through 10 in the chassis expander.
  - Allow for additional cables at the cross-connect terminal if initially you leave any of the slots in the chassis empty. Additional cables may be required for each expansion chassis.

— If the NTAK19 SDI cable is not used with the NTAK02 card, then you require a 25-pair cable.

- four conductors for the AUX cable from the chassis
- one 25-pair cable from each QUA6 PFTU
- wiring from telephones and trunks

Installing the BIX cross-connect terminal

Procedure 38 "Installing the BIX cross-connect terminal" (page 211) describes how to install the BIX cross-connect terminal.

Procedure 38
Installing the BIX cross-connect terminal

Step	Action
1	Consult the equipment layout plan to determine where to place the cross-connect terminal. Refer to the system and site requirements chapters in *Meridian 1 Small System Planning and Engineering (NN43011-220)*.
2	Install the terminal blocks in a layout similar to that shown: • in Figure 100 "Typical BIX cross-connect terminal layout for the Cabinet system" (page 213) for the Cabinet system • in Figure 101 "Typical BIX cross-connect terminal layout for the Chassis system" (page 214) for the Chassis system
3	Attach labels on the cross-connect terminal to indicate the terminal blocks assigned to: • 25-pair cables from the cabinets or chassis • AUX wiring • Power Failure Transfer Units (PFTU) • Telephones and consoles

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- Trunks
- other miscellaneous equipment

Note: If you are installing the BIX cross-connect system, refer to *BIX In-Building Cross-Connect System Material Installation and Servicing (631-4511-200)*. This document provides information about labels used with the BIX terminal blocks.

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Figure 100
Typical BIX cross-connect terminal layout for the Cabinet system

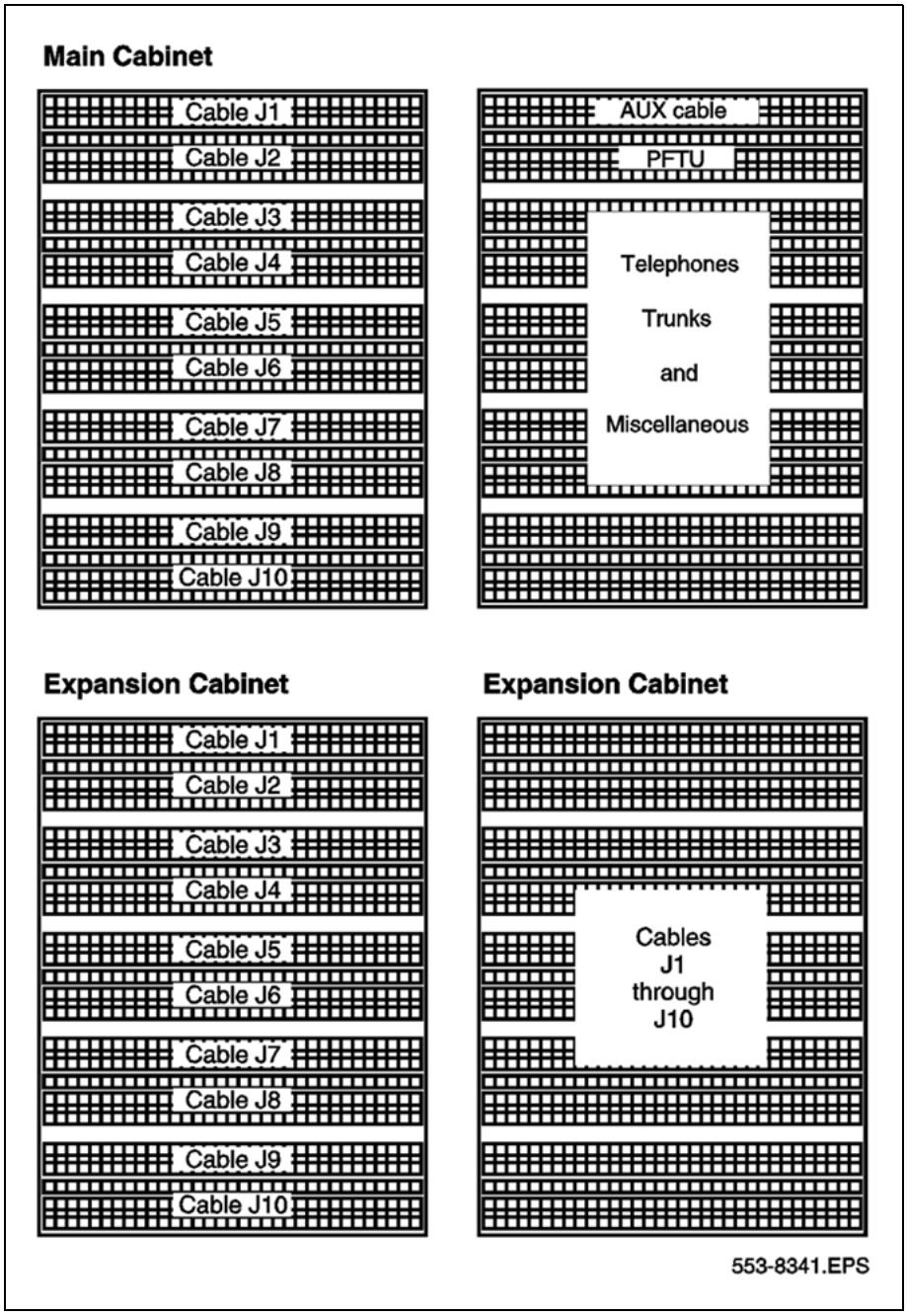

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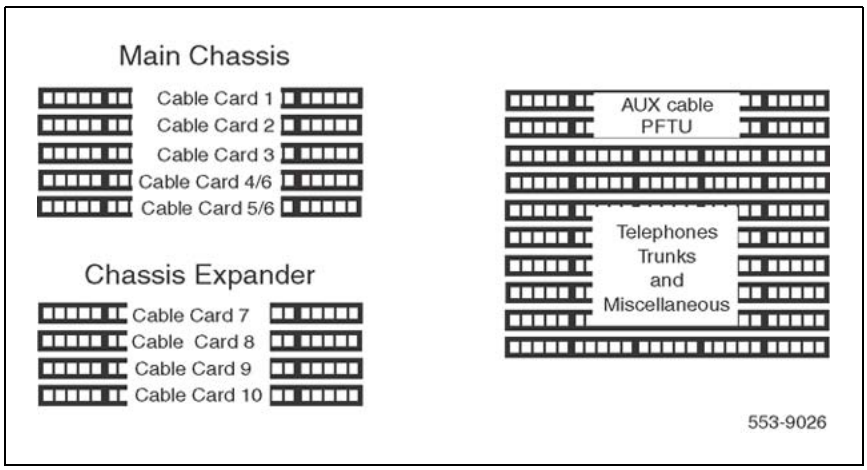
Figure 101
Typical BIX cross-connect terminal layout for the Chassis system



Note: One 25-pair cable contains Card 4 and Card 6 (units 0–7). Another 25-pair cable contains Card 5 and Card 6 (units 8–15).

—End—

Installing the Krone Test Jack Frame for the UK

The Krone Test Jack Frame provides terminating strips that hold 10 pairs of cable. Generally, only 8 of the 10 pairs are used. As a result, one 25-pair cable requires three terminating strips:

8 pairs/strip x 3 strips = 24 pairs

Figure 102 "25-pair cable on three Krone strips" (page 215) shows how one 25-pair cable is divided among three terminating strips on the Krone Test Jack Frame.

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Figure 102
25-pair cable on three Krone strips

Pair	Pin number	Wire Colour	Krone strip
1T	26	W-BL	1
1R	1	BL-W	
2T	27	W-O	
2R	2	O-W	
3T	28	W-G	
3R	3	G-W	
4T	29	W-BR	
4R	4	BR-W	
5T	30	W-S	
5R	5	S-W	
6T	31	R-BL	
6R	6	BL-R	
7T	32	R-O	
7R	7	O-R	
8T	33	R-G	
8R	8	G-R	
9T	34	R-BR	2
9R	9	BR-R	
10T	35	R-S	
10R	10	S-R	
11T	36	BK-BL	
11R	11	BL-BK	
12T	37	BK-O	
12R	12	O-BK	
13T	38	BK-G	
13R	13	G-BK	
14T	39	BK-BR	
14R	14	BR-BK	
15T	40	BK-S	
15R	15	S-BK	
16T	41	Y-BL	
16R	16	BL-Y	
17T	42	Y-O	3
17R	17	O-Y	
18T	43	Y-G	
18R	18	G-Y	
19T	44	Y-BR	
19R	19	BR-Y	
20T	45	Y-S	
20R	20	S-Y	
21T	46	V-BL	
21R	21	BL-V	
22T	47	V-O	
22R	22	O-V	
23T	48	V-G	
23R	23	G-V	
24T	49	V-BR	
24R	24	BR-V	
25T	50	V-S	
25R	25	S-V	

Procedure 39 "Installing the Krone Test Jack Frame (UK)" (page 215) describes how to install the Krone Test Jack Frame.

Procedure 39
Installing the Krone Test Jack Frame (UK)

Step	Action
1	Consult the equipment layout plan to determine where to place the cross-connect terminal. Refer to the system and site requirements chapters in *Meridian 1 Small System Planning and Engineering (NN43011-220)*.

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2 Install the terminal blocks in a layout similar to that shown:

- in Figure 103 "Typical Krone cross connect terminal layout for the Cabinet system" (page 217) for the Cabinet system
- in Figure 103 "Typical Krone cross connect terminal layout for the Cabinet system" (page 217) for the Chassis system

3 Attach labels on the cross-connect terminal to indicate the terminal blocks assigned to the following:

- AUX wiring
- Power Failure Transfer Units (PFTU)
- Telephones and consoles
- Analog line cards
- DC5/AC15/RAN/PAG cards
- Data Access Cards
- Digital line cards
- Exchange line trunk cards
- Direct Dialing Inward trunk cards
- other miscellaneous equipment

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Figure 103
Typical Krone cross connect terminal layout for the Cabinet system

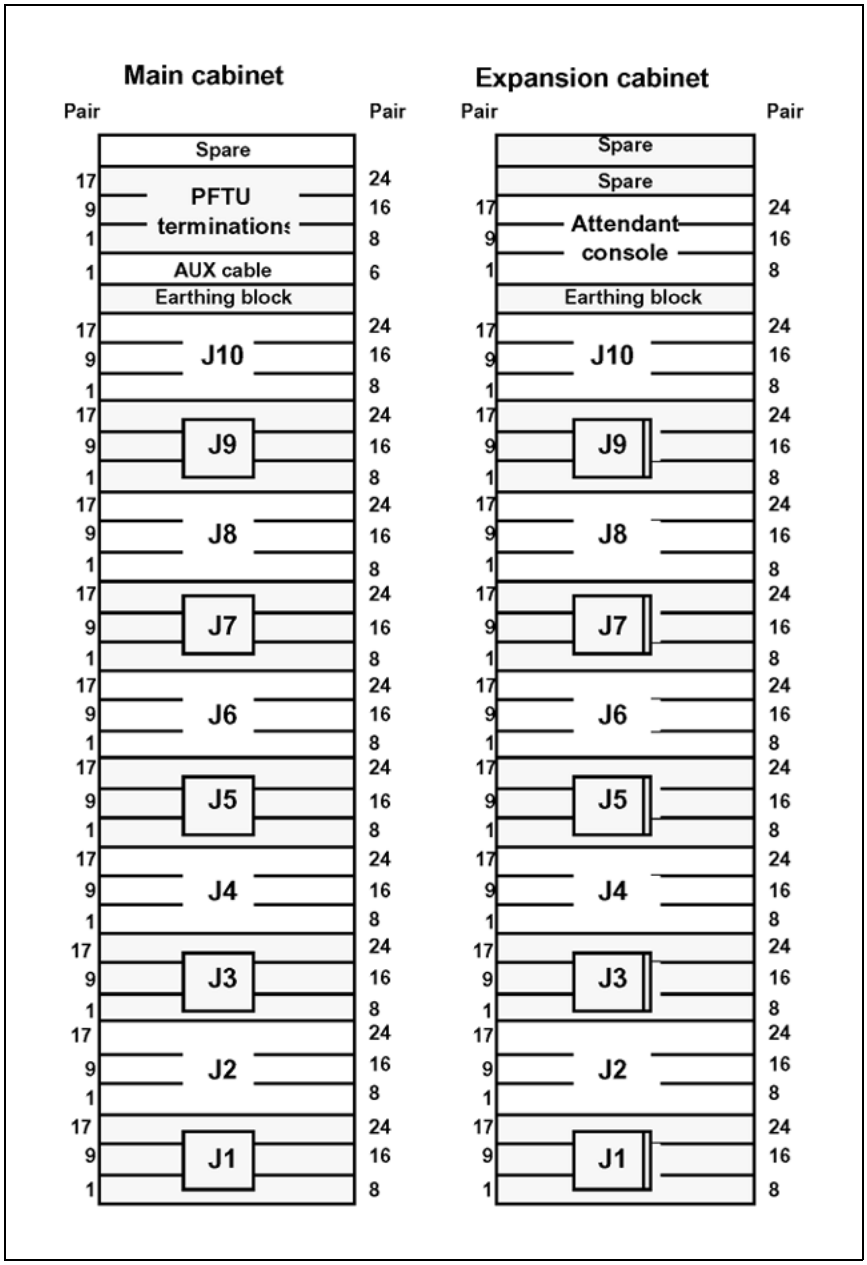

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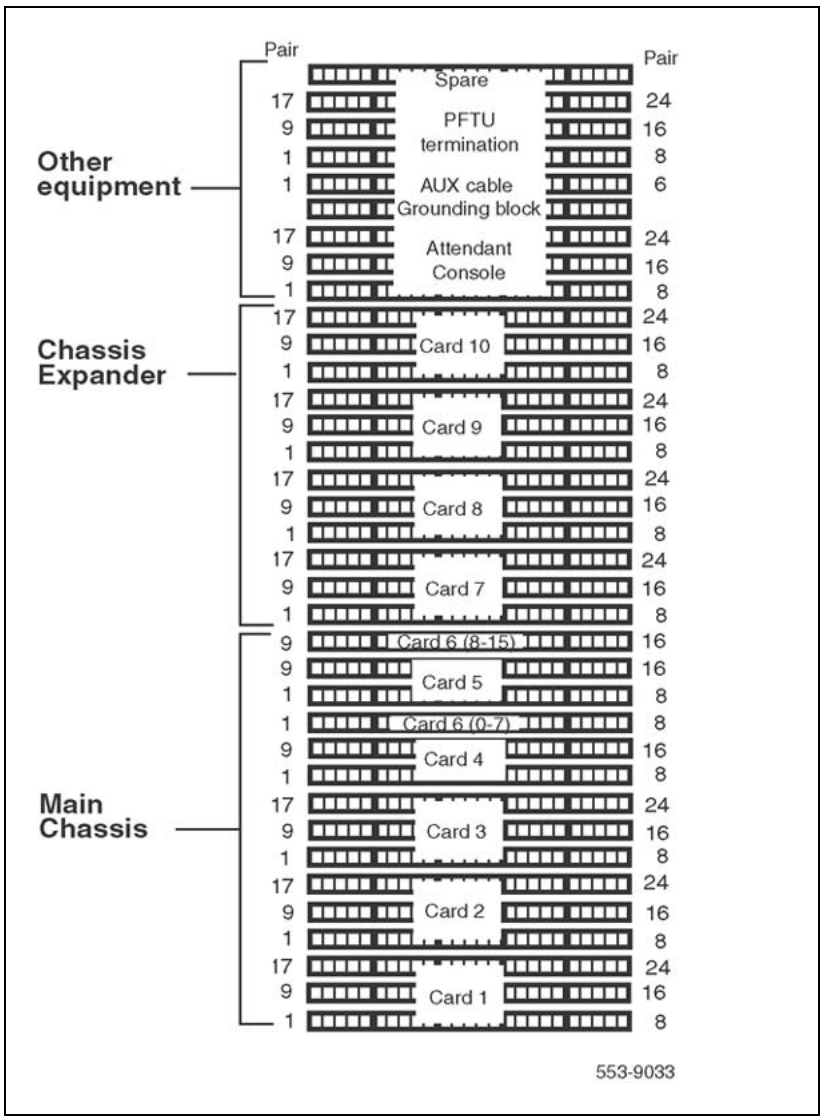
Figure 104
Typical Krone cross-connect terminal layout for the Chassis system



Note: One 25-pair cable contains Card 4 and Card 6 (units 0–7). Another 25-pair cable contains Card 5 and Card 6 (units 8–15).

—End—

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Connecting the cables

WARNING
Always use caution when installing or modifying telephone lines. Avoid installing telephone wiring during a lightning storm. Never touch uninsulated telephone wiring unless the line has been disconnected at the network interface.

For the Cabinet system:

- Each cabinet requires up to ten 25-pair cables. Each cabinet requires an additional terminal block at the cross-connect terminal for the termination of the 9-pin conductor auxiliary cable.
- All cables are connected at the bottom of the cabinet and are routed through the openings in the lower part of the cabinet.

For the Chassis system:

- Each chassis requires up to five 25-pair cables. The chassis requires an additional terminal block at the cross-connect terminal to terminate the 9-pin conductor auxiliary cable.
- Connect all cables at the back of the chassis.

  Note: Use caution when using NE-A25B cables with the NTAK02 card. These cables are not wired out to station equipment or trunk circuits. Do not use the NE-A25B cable with the NTAK10, NTBK50, or NTAK79 circuit cards.

For 1.5 Mbit and 2.0 Mbit DTI/PRI-related wiring and cable information, refer to the following documents:

- *ISDN Primary Rate Interface Installation and Commissioning (NN43001-301)*
- *ISDN Primary Rate Interface Maintenance (NN43001-717)*

Procedure 40
Connecting the cables for the Cabinet system

Step	Action
1	Remove the connector retaining bar from the connector panel in the lower part of each cabinet. See Figure 105 "Cable connectors in a system cabinet" (page 220).

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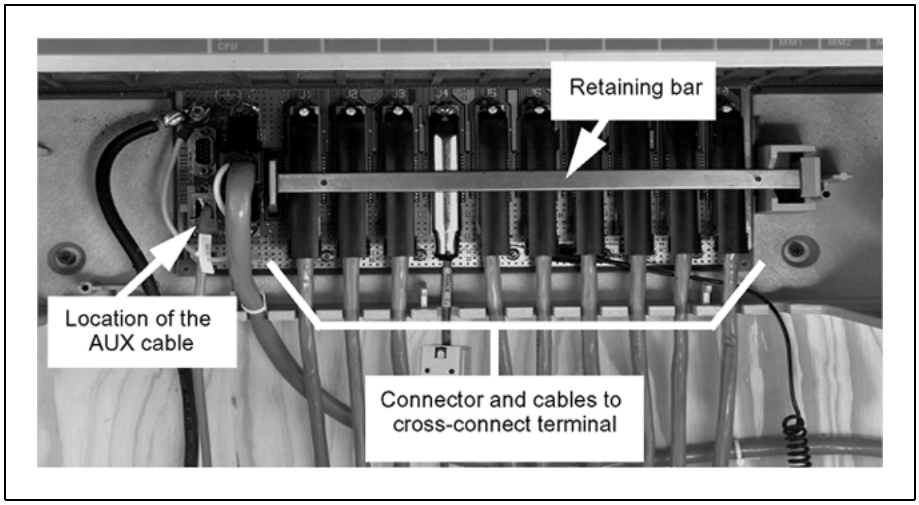
Figure 105
Cable connectors in a system cabinet



2 Using the card slot allocation plan, connect a 25-pair cable to each of the connectors that will contain a line or trunk card.

Make sure to tag both ends of each cable with the cabinet and connector numbers.

Note: Do not use the NE-A25B cable with the NTAK10, NTAK79, or NTBK50 circuit cards.

3 Route the cables down through the opening at the bottom of each cabinet.

4 Replace the retaining bar when you have connected all the cables to the cabinet.

5 Terminate all the 25-pair cables installed at the cross-connect terminal.

Label all the cables at the cross-connect terminal blocks according to the card slot allocation plan.

6 Install the AUX cable on the lower 9-pin connector located on the left side of the connector area in the lower part of each cabinet.

Terminate the AUX cable at the cross connector located on the left side of the connector. See Figure 105 "Cable connectors in a system cabinet" (page 220).

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Table 29
AUX cable terminations for the Cabinet system

Color	Wire number	Designation	Connection
W-BL	1	BRTN	to QUA6-J1 1R
BL-W	2	BRTN	to QUA6-J1 2R
O-W	3	-48V AUX (250mA)	to QUA6-J1 25T, 25R
W-O	4	PFTS	to QUA6-J1 2T
G-W	5	-15V AUX	Console power*
W-G	6	+15V AUX	Console power*
*Each AUX cable can provide power for only one console.			

—End—

Procedure 41
Connecting the cables for the Chassis system

Step	Action
1	Loosen the Velcro straps at each connector you plan to use.
2	Connect a 25-pair cable to each of the connectors that will contain a line or trunk card. Refer to the card slot assignment plan. Make sure you tag both ends of each cable with the chassis and connector numbers. See Figure 105 "Cable connectors in a system cabinet" (page 220).

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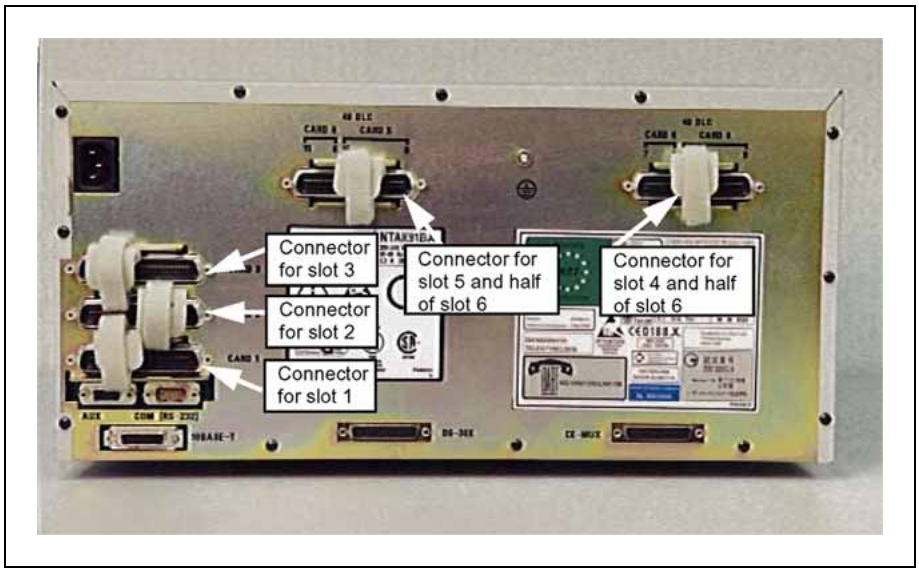
Figure 106
Cable connectors on the back of the chassis



3 Tighten the Velcro straps when you have connected each cable to the chassis.

4 Terminate all the 25-pair cables installed at the cross-connect terminal.

Label all the cables at the cross-connect terminal blocks according to the card slot assignment plan.

5 Install the AUX cable in the lower 9-pin connector located on the bottom left-hand side of the chassis. See Figure 107 "AUX cable connector" (page 223).

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Figure 107
AUX cable connector

Terminate the AUX cable at the cross connect terminal, according to Table 30 "AUX cable terminations for the Chassis system" (page 223).

Table 30
AUX cable terminations for the Chassis system

Color	Wire number	Designation	Connection
W-BL	1	BRTN	to QUA6-J1 1R
BL-W	2	BRTN	to QUA6-J1 2R
O-W	3	-48V AUX (250mA)	to QUA6-J1 25T, 25R
W-O	4	PFTS	to QUA6-J1 2T
G-W	5	Not used	Not used
W-G	6	Not used	Not used

6 For installations in Germany, complete the form shown in Figure 108 "Cross connections record" (page 224) for each card slot.

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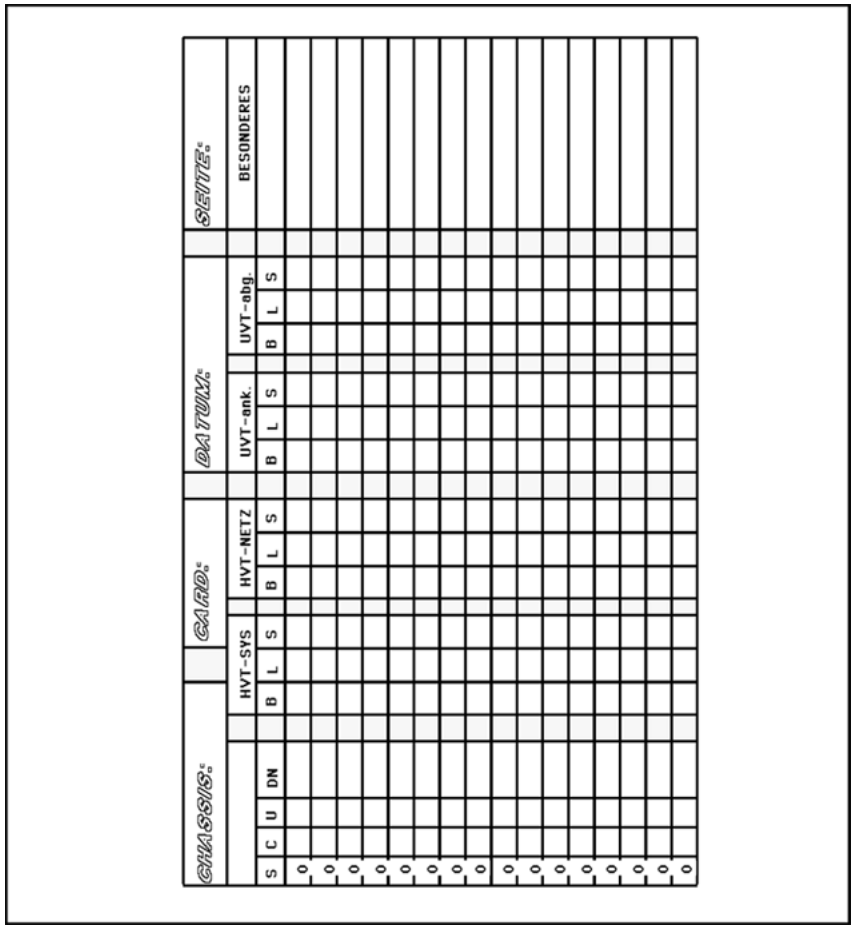
This form provides a record of cross connections that you will perform after you start the system.

Figure 108
Cross connections record



—End—

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Installing Power Failure Transfer Units

Contents

This section contains the following topics:

"Introduction" (page 225)

"PFTU installation" (page 225)

"PFTU control lead signals" (page 230)

Introduction

This chapter describes how to install a QUA6 Power Failure Transfer Unit (PFTU). This chapter contains the following procedure:

- Procedure 42 "Installing the PFTU" (page 226)

For the Cabinet system, you can connect PFTUs to the expansion cabinets as well as to the main cabinet. Only one PFTU is supported per cabinet. For the Chassis system, you can connect PFTUs to the chassis.

The QUA6 PFTU operates with loop-start and ground-start CO trunks.

> ***Note:*** With ground-start trunks, the associated telephone set must be equipped with a ground-start button.

If you require power failure backup as a fail safe for the system, use analog trunks. A PFTU does not support digital trunks.

PFTU installation

Refer to the equipment layout plan to determine where to locate the PFTU. See the chapters on system and site requirements in *Meridian 1 Small System Planning and Engineering (NN43011-220)*.

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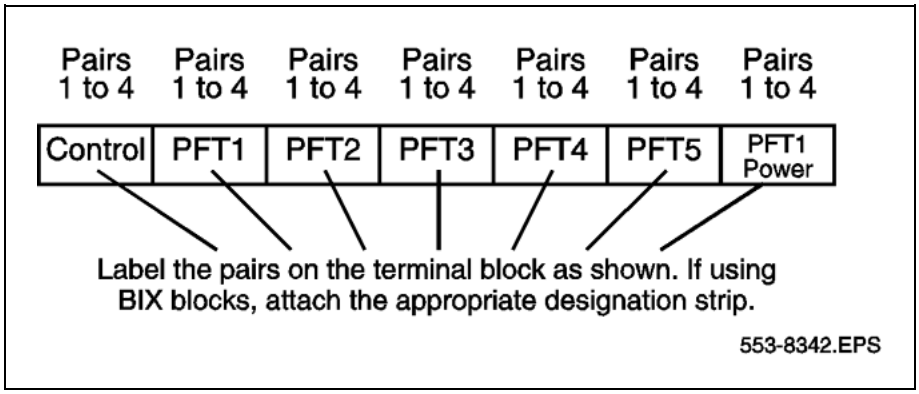
Procedure 42
Installing the PFTU

Step	Action
1	Mount the PFTU on the wall near the system cross-connect terminal and secure it with four screws.
2	Install an NE-A25B-type 25-pair cable from connector J1 on the faceplate of the PFTU to its assigned location at the cross-connect terminal.
3	Label the pairs of the J1 cable on the cross-connect terminal block as shown in Figure 109 "J1 cable labels" (page 226).

Figure 109
J1 cable labels



Step	Action
4	Connect the PFTU power and control connections to the AUX cable from the cabinet or chassis. See Table 31 "Control and power connections on cable J1" (page 226). For the location of the Auxiliary port on the cabinet, see Figure 110 "Auxiliary port location on cabinet" (page 228). For the location of the AUX connector on the chassis, see Figure 110 "Auxiliary port location on cabinet" (page 228).

Table 31
Control and power connections on cable J1

J1 Cable from QUA6 (see Figure 112 "Power fail transfer" (page 230))				
Function	**Pair Number**	**Pair Color**	**Connects to**	**Cross-connect to**
Control	1T	W-BL	(ALM)	Not used.
	1R	BL-W	BRTN	W-BL 1-dot connection on AUX cable from the cabinet or chassis.

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J1 Cable from QUA6 (see Figure 112 "Power fail transfer" (page 230))				
Function	**Pair Number**	**Pair Color**	**Connects to**	**Cross-connect to**
	2T	W-O	PFTS	W-O 1-dot connection on AUX cable from the cabinet or chassis. Transfer begins by applying ground to this lead.
	2R	O-W	BRTN	BL-W 1-dot connection on AUX cable from the cabinet or chassis.
	3T	W-G	(TC)	Console transfer switch. See console connections. Transfer begins by applying ground to this lead.
	3R	G-W		Not used.
	4T	W-BR		Not used.
	4R	BR-W		Not used.
PFTU power	25T 25R	S-V V-S	-48 V -48 V	O-W 1-dot connection on AUX cable. Maximum 250 mA draw on O-W lead.

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Figure 110
Auxiliary port location on cabinet

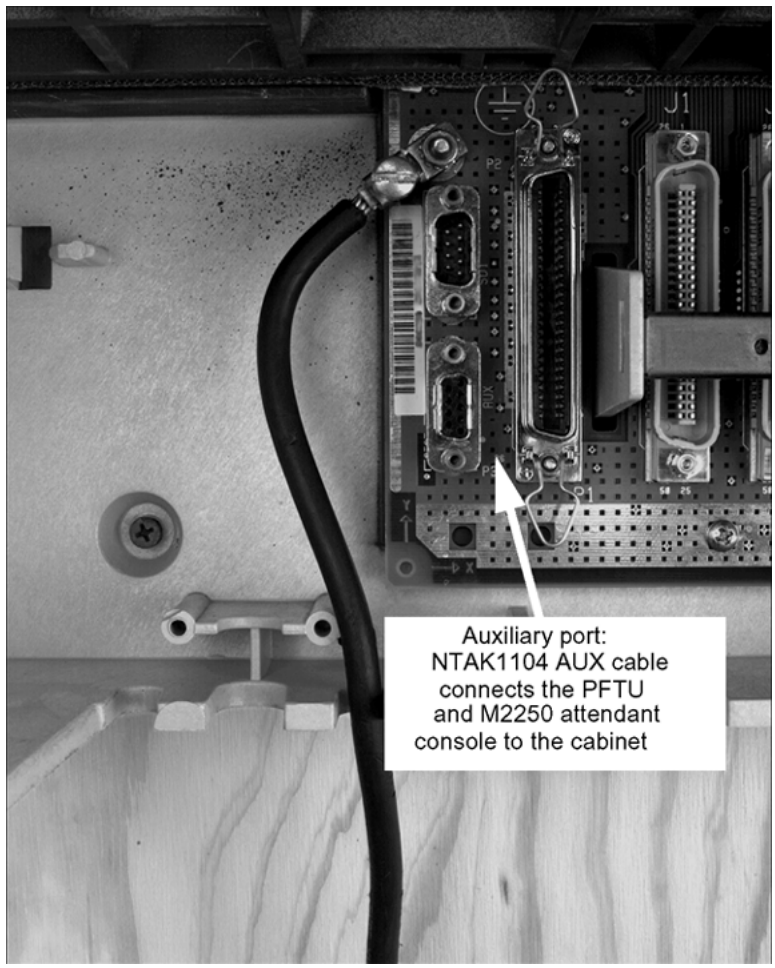

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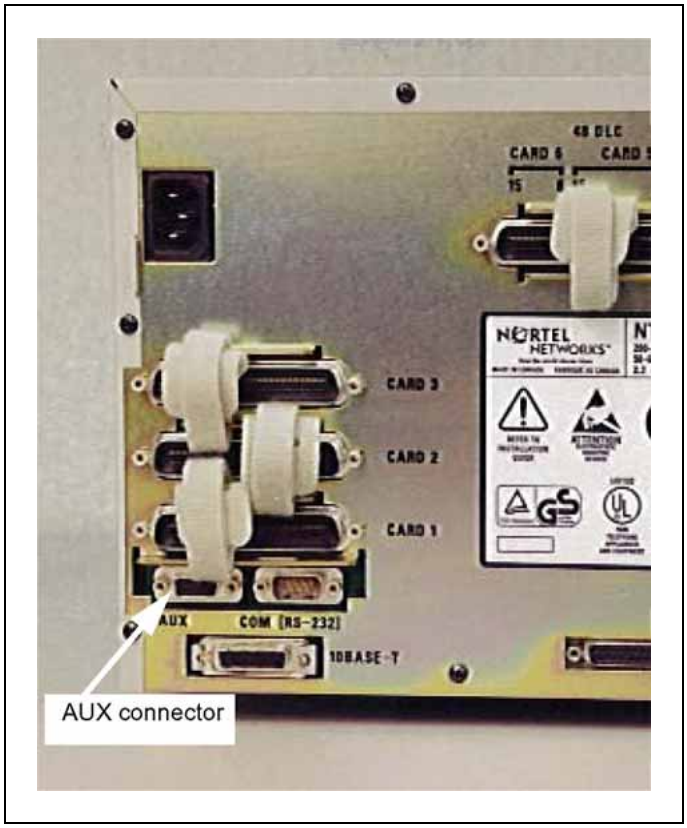
Figure 111
Auxiliary connector on chassis



5 Connect the attendant console to the PFTU:

- attendant console 14 Tip (14T) to ground
- 3 Tip (3T) of PFTU to 11 Ring (11R) of attendant console (power fail transfer switch)
- attendant console 11 Tip (11T) to ground

Note: The AUX cable on the Chassis system does not provide power to the M2250 attendant console. Two Digital Line Card TNs or an attendant console power supply provide power to the M2250 attendant console.

If power to the M2250 attendant console is not provided by two Digital Line Card TNs, connect:

- G-W of AUX to 8 Tip (8T) of attendant console (-15 V)
- W-G of AUX to 7 Tip (7T) of attendant console (+15 V)

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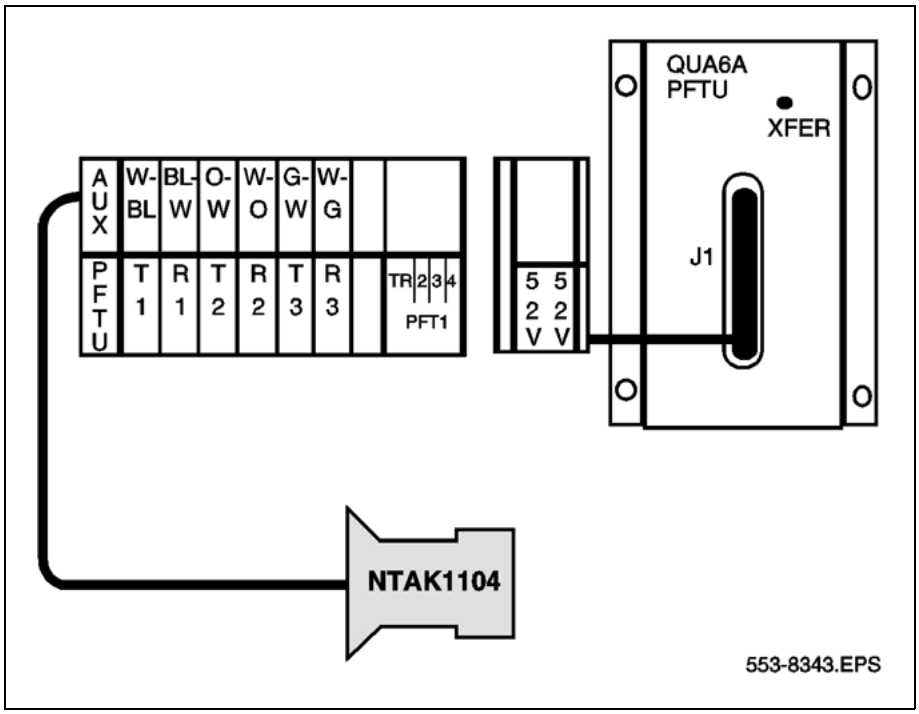
Figure 112
Power fail transfer



—End—

PFTU control lead signals

To connect PFTUs from other manufacturers, use the information provided in Table 32 "PFTU control lead signals" (page 230).

Table 32
PFTU control lead signals

NTAK1104 AUX cable lead	Lead State when PFTU is in non-transferred state	Lead State when PFTU is in transferred state
BRTN	GROUND	GROUND
BRTN	GROUND	GROUND
-48V AUX	-48V DC (250 mA max.)	-48V DC (250 mA max.)
PFTS	OPEN	GROUND

Note 1: Refer to Figure 110 "Auxiliary port location on cabinet" (page 228) for an illustration of where the Auxiliary cable connects to the Cabinet system. Refer to Figure 110 "Auxiliary port location on cabinet"

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(page 228) to see where the Auxiliary cable connects to the Chassis system.

Note 2: If power is removed from the QUA6, a transfer of the PFTU can occur.

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Installing and connecting SDI and Ethernet network interfaces

Contents

This section contains information on the following topics:

"Introduction" (page 233)
"Modem setup requirements" (page 234)
"SDI ports" (page 234)
"Cable connections and adapters" (page 235)
"Installing and connecting SDI ports" (page 237)
"NTDK20 SSC card" (page 237)
"NTDK23, NTDK25, and NTDK80 Fiber Receiver cards" (page 240)
"NTAK02 SDI/DCH card" (page 242)
"Terminal setup" (page 245)
"Installing and connecting an Ethernet cable" (page 248)
"Cabinet system: IP expansion 10BaseT port" (page 249)
"J7 Jumper plug" (page 249)
"Chassis system Ethernet connection" (page 251)

Introduction

This chapter contains modem setup requirements and the following procedures for connecting communication devices to the Small Systems:

- Procedure 43 "Connecting SDI ports on the SSC card" (page 238)
- Procedure 44 "Connecting SDI ports to the Fiber Receiver card" (page 241)
- Procedure 45 "Setting up the terminal" (page 245)
- Procedure 46 "Connecting the Ethernet cable to the Cabinet system" (page 250)

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- Procedure 47 "Connecting the Ethernet cable to the Chassis system" (page 252)

Modem setup requirements

Modems connected to the Small System should be set as follows:

- Carrier Detect (CD): Active if carrier detected on incoming call
- Clear to Send (CTS): Normal operation or forced active
- Hardware and software: Disabled flow control

The ports on the Small System are disabled if devices connected to the ports generate additional "garbage" characters. For this reason, do not use modems in the following modes:

- Loopback
- Auto Echo
- Self Test

Note: The Serial Data Interface (SDI) ports are designed for use with "dumb" modems. "Intelligent" modems can be used. Make sure that the modems do not enter into modes of operation that send additional characters to the system.

Table 33 "Modem problems" (page 234) lists some of the problems that may be encountered.

Table 33
Modem problems

Problem	Solution
CDR is not printing on an ESDI port configured as 8 bits, no parity, and 1 stop bit.	Change the modem setup to 7 bits, no parity, 1 stop bit, or add MTC or SCH to the ESDI user prompt.
Modem is not communicating with the Small System when the User is MTC, BUG or CTY. (The default setting of 8 bits, no parity, 1 stop bit is incompatible with the modem.)	Change the modem setup to 7 bits or the parity to EVEN/ODD.

SDI ports

In the Small System, SDI ports are provided by the following cards:

- NTDK20 Small System Controller (SSC) card — provides three SDI ports
- NTDK23, NTDK25 and NTDK80 Fiber Receiver cards — each provides one SDI port

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- NTAK02 SDI/DCH card — provides four ports, of which up to two can be SDI ports

  Note 1: The functionality of the NTAK03 card has been incorporated into the NTDK20 SSC card.

  Note 2: There are several circuit cards that provide SDI port connections in the Small System. However, only SDI port 0, 1, or 2, located on the SSC card, can be used to access the system for the Customer Configuration Backup and Restore (CCBR) feature.

Cable connections and adapters

An NTBK48 3-port 9- to 25-pin converter cable is supplied with the Small System. The cable can be used to connect SDI port 0, 1, or 2 directly to most types of modems. However, some modems may require a connector adapter to make the connection. For more information, refer to the modem manufacturer's instructions provided with the modem.

The signals carried by each lead in the NTBK48 3-port cable are shown in Figure 113 "NTBK48 port 0 signal leads" (page 235) and Figure 114 "NTBK48 Ports 1 and 2 signal leads" (page 236).

Figure 113
NTBK48 port 0 signal leads

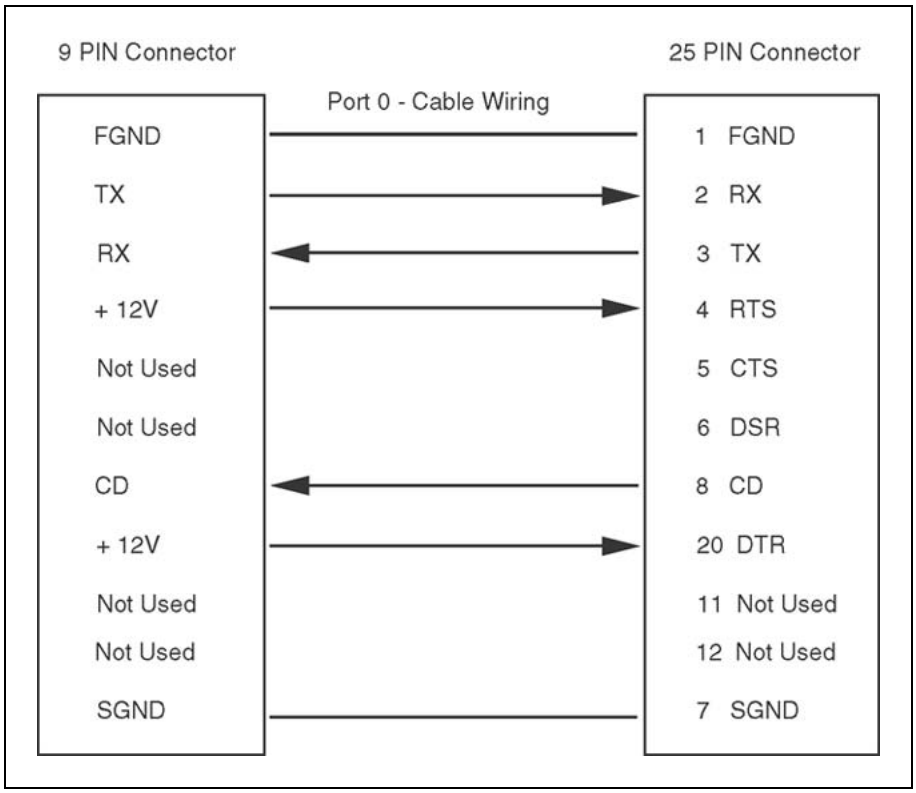

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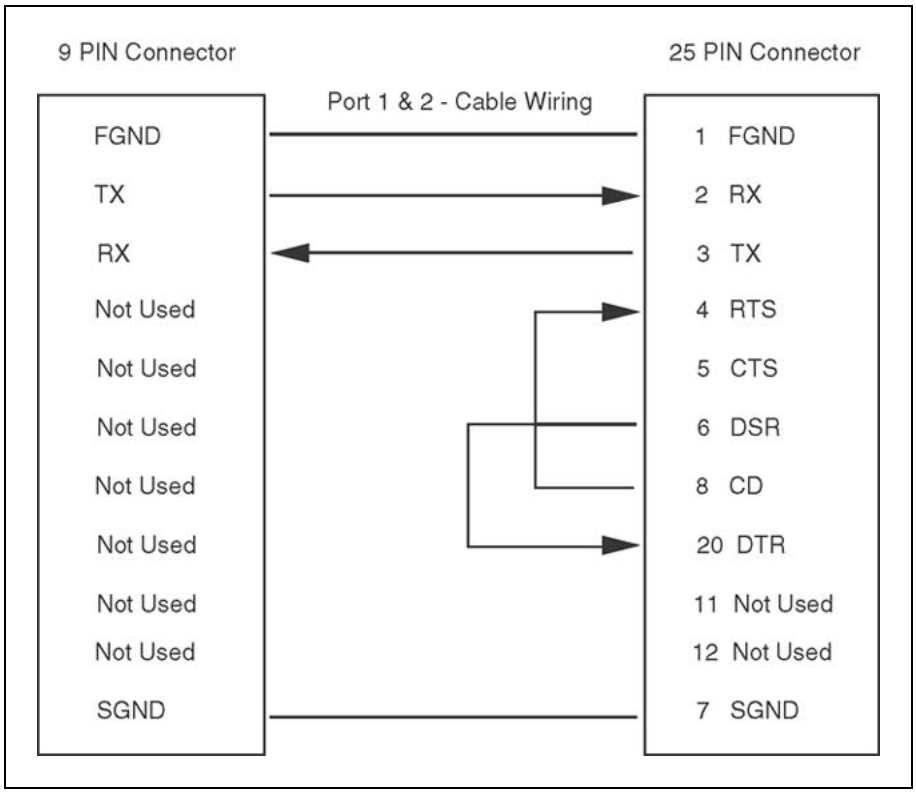
Figure 114
NTBK48 Ports 1 and 2 signal leads



A modem eliminator is required when a computer is connected on-site. Two are supplied with the Small System. One is equipped with a female-to-female connector; the other is equipped with a female-to-male connector. Refer to the manufacturer's instructions provided with your computer to determine which type is required.

Figure 115 "Modem eliminator connections and designations" (page 237) shows the modem eliminator's internal connections and lead designations.

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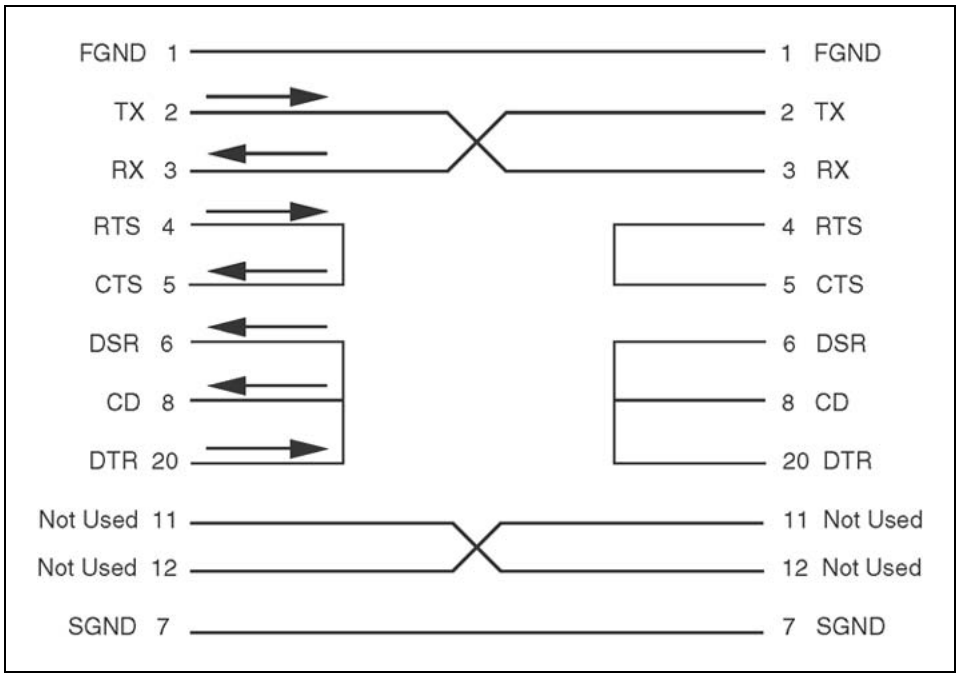
Figure 115
Modem eliminator connections and designations



Installing and connecting SDI ports

This section describes how to access SDI ports through the following:

- NTDK20 SSC card
- NTDK23, NTDK25 and NTDK80 Fiber Receiver cards
- NTAK02 SDI/DCH card

NTDK20 SSC card

You can use a switch setting on the circuit card's faceplate to control the baud rate for port 0. Make sure the baud rate and device option settings are set correctly.

Note: When the time comes to configure ports 1 and 2, configure them in LD 17.

- Use Port 0 for software installation and upgrades. SDI port 0 is the only SDI port that you can use for software installation and upgrades.
- You can use all three ports on the SSC card to connect terminals or modems.
- Use an NTBK48 3-port SDI cable with the SSC card.

Note: The default baud rate of the SSC card is 1200 bit/s; the maximum data rate is 19,200 bit/s. When changing the DIP switch on the faceplate,

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make sure only one baud rate switch is set to ON. Refer to Table 34 "Default port configuration for the NTDK20 SSC card" (page 238).

Table 34
Default port configuration for the NTDK20 SSC card

Port	Use	Baud rate	Data bits	Stop bits	Parity
0	MTC/SCH/BUG	Set by a DIP switch	8	1	None
1	MTC/SCH/BUG	1200	8	1	None
2	MTC/SCH/BUG	1200	8	1	None

Procedure 43 "Connecting SDI ports on the SSC card" (page 238) describes how to connect a terminal, modems, and other devices, such as CDR devices and additional TTYs, to the SSC card.

Procedure 43
Connecting SDI ports on the SSC card

Step	Action
1	Connect the NTBK48 3-port SDI cable to the 9-pin SDI connection provided by the SSC card. See Figure 116 "SDI cable connection on the cabinet" (page 239) for the location of the SDI connection at the top of the main or IP expansion cabinet. See Figure 117 "SDI cable connection on the chassis" (page 240) for the location of the SDI connection at the back of the chassis.
2	Connect the system terminal to the cable marked "port 1" on the NTBK48 3-port cable. A Modem Eliminator Adapter is required to connect the Small System to a TTY terminal.
3	If the system is to be accessed remotely, connect the system modem to the cable marked "port 0" on the NTBK48 cable. ***Note 1:*** If port 0 is used, check the baud rate setting on the front of the SSC card located in slot 0 of the Main Cabinet or Chassis. If port 1 or 2 is used, the baud rate is configured in the system software (LD 17). Make sure that the rate is compatible with the modem. ***Note 2:*** The CCBR feature works on all ports.
4	Connect the modem to an outside line.

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5 Test the modem for proper operation once the system is operating.

Note: The remaining ports can be used for other equipment such as CDR devices or TTYs.

—End—

Figure 116
SDI cable connection on the cabinet

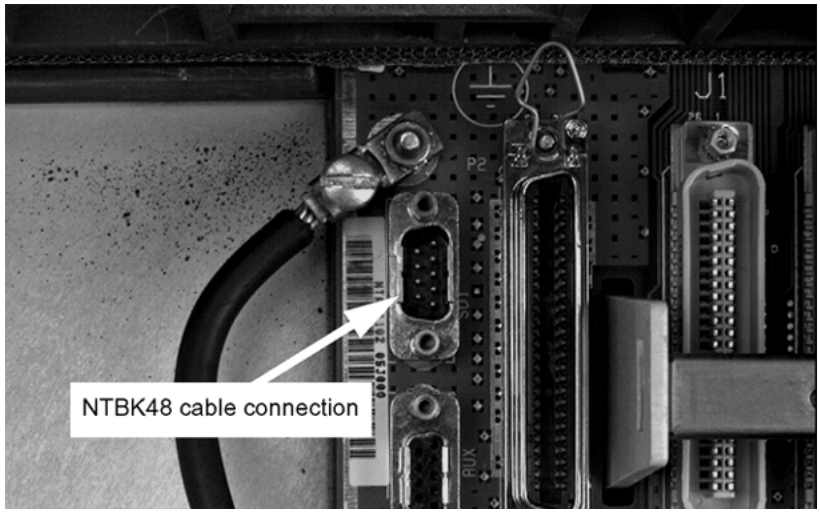

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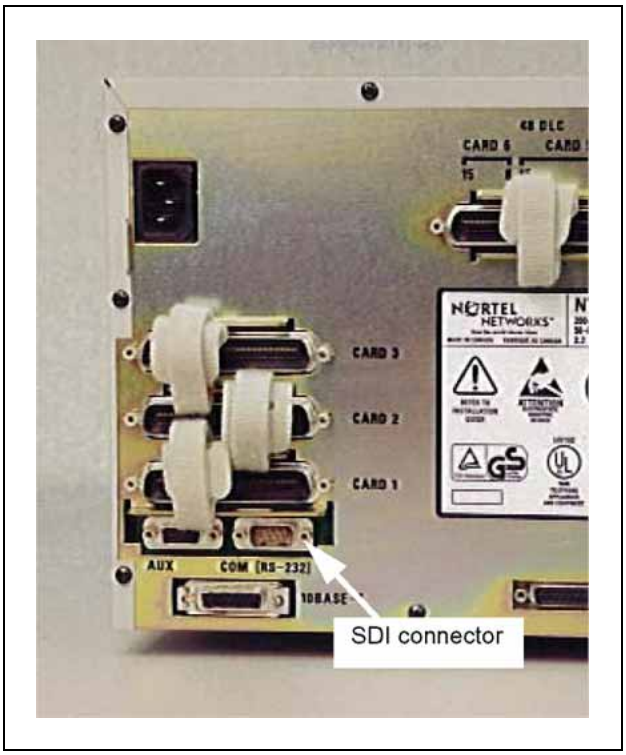
Figure 117
SDI cable connection on the chassis



NTDK23, NTDK25, and NTDK80 Fiber Receiver cards

The Fiber Receiver cards provide one SDI port per Expansion Cabinet or Chassis.

The baud rate is set by a DIP switch on the card's faceplate. Other communication settings are identical to the port 0 configuration on the SSC card (refer to Table 34 "Default port configuration for the NTDK20 SSC card" (page 238)).

A Fiber Receiver card port must be configured using LD 17 before it can be used to access overlays.

> ***Note:*** Although all device numbers can be assigned to any cabinet or chassis, TTY 0, 1, and 2 are usually assigned to the Main Cabinet or Chassis. TTY 3, 4, 5, and 6 are typically assigned to the first, second, third, and fourth Expansion Cabinets or Chassis respectively.

Procedure 44 "Connecting SDI ports to the Fiber Receiver card" (page 241) describes how to connect the SDI ports on Fiber Receiver cards.

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Procedure 44
Connecting SDI ports to the Fiber Receiver card

Step	Action
1	Connect the NTAK1118 one-port SDI cable to the 9-pin SDI connection provided by the Fiber Receiver card. See Figure 118 "SDI cable connection on the fiber expansion cabinet" (page 241) for the location of the SDI connection at the top of the fiber expansion cabinet. See Figure 119 "SDI cable connection on the fiber expansion chassis" (page 242) for the location of the SDI connection at the back of the fiber expansion chassis.
2	Connect the NTAK1118 SDI cable to a TTY terminal. ***Note:*** A Modem Eliminator Adapter is required to connect to a terminal.
3	If the system is to be accessed remotely, connect the SDI cable to the system modem.
4	Connect the modem to an outside line.
5	Test the modem for proper operation once you have started up the system.

—End—

Figure 118
SDI cable connection on the fiber expansion cabinet

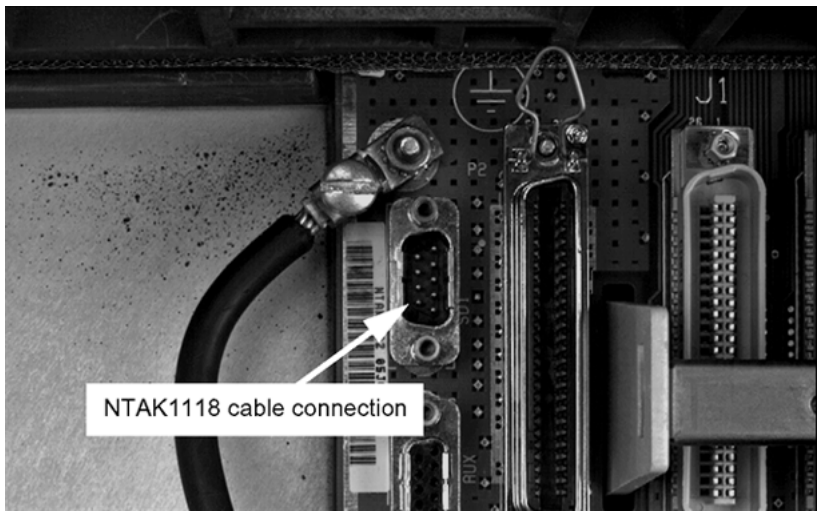

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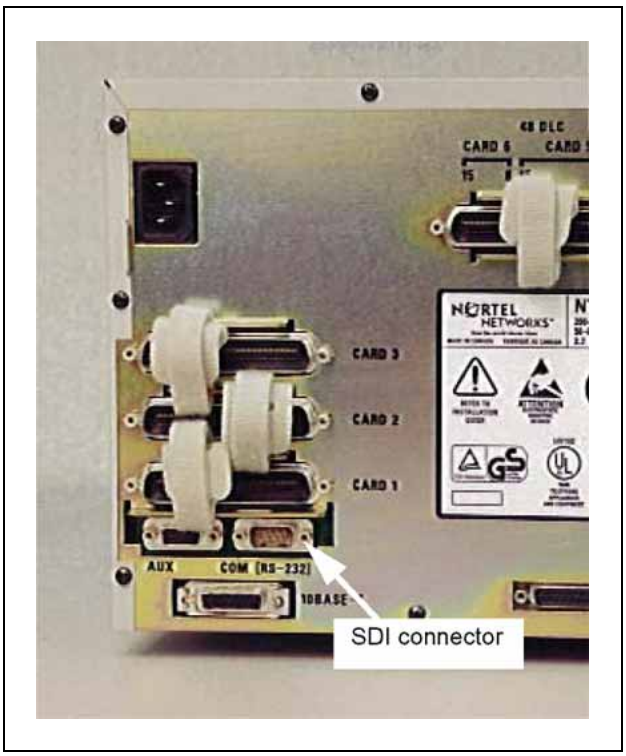
Figure 119
SDI cable connection on the fiber expansion chassis



NTAK02 SDI/DCH card

In the Cabinet system, the NTAK02 SDI/DCH card can be used in the main and IP expansion cabinets. In a Chassis system, only the chassis supports the NTAK02 SDI/DCH card.

You can configure this card to support ports for the following:

- two SDI and two DCHI
- one SDI, one DCHI, two ESDI
- four ESDI

Note: Only the DCH functionality is supported in IP Expansion cabinets. ESDL, AML and TTY are not supported.

You can use the NTAK02 ports to access overlay software. Define these ports in the configuration database as the SDI logical type.

An NTAK19FB 4-port SDI cable is designed for use with the NTAK02 circuit card. However, you can use an NE-A25B 25-pair cable to extend the connections to the cross-connect terminal. See Table 35 "NTAK02

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pinouts: Port 0 at the cross-connect terminal" (page 243) through Table 38 "NTAK02 connections at the cross-connect terminal: Port 3" (page 244) for the connections for each port.

Table 35
NTAK02 pinouts: Port 0 at the cross-connect terminal

Cable		RS232			
		Signal		Designations (I = input/O = output)	
Pair	Color	DTE	DCE	DTE	DCE
1T 1R	W-BL BL-W	0 DTR	0 DCD	- O	- I
2T 2R	W-O O-W	DSR DCD	CH/CI DTR	I I	O O
3T 3R	W-G G-W	RTS CTS	CTS RTS	O I	I O
4T 4R	W-BR BR-W	RX TX	TX RX	I O	O I
5T 5R	W-S S-W	- SG	- SG	- -	- -

Table 36
NTAK02 connections at the cross-connect terminal: Port 1

Cable		RS422				RS232			
		Signal		Designations (I = input O = output)		Designations (I = input O = output)		Signal	
Pair	Color	DTE	DCE	DTE	DCE	DTE	DCE	DTE	DCE
5T 5R	W-S S-W	SCTEA –	SCTA –	O –	I –	O –	I –	SCT –	SCT –
6T 6R	R-BL BL-R	SCTEB DTR	SCTB DCD	O O	I I	– –	– –	CH/CI DTR	– DCD
7T 7R	R-O O-R	DSR DCD	CH/CI DTR	I I	O O	I I	O O	DSR DCD	CH/CI DTR
8T 8R	R-G G-R	RTS CTS	CTS RTS	O I	I O	O I	I O	RTS CTS	CTS RTS
9T 9R	R-BR BR-R	SCRA SCTA	SCTEA RXCA	I I	O O	I I	O O	SCR SCT	SCT –
10T 10R	R-S S-R	SCRB SCTB	SCTEB RXCB	I I	O O	– –	– –	– –	– –

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Cable		RS422				RS232			
		Signal		Designations (I = input O = output)		Designations (I = input O = output)		Signal	
Pair	Color	DTE	DCE	DTE	DCE	DTE	DCE	DTE	DCE
11T 11R	BK-BL BL-BK	RXDA TXDA	TXDA RXDA	I O	O I	I O	O I	RXD TXD	TXD RXD
12T 12R	BK-O O-BK	RXDB TXDB	TXDB RXDB	I O	O I	– –	– –	– –	– –
25T 25R	V-S S-V	SG –	SG –	– –	– –	– –	– –	SG –	SG –

Table 37
NTAK02 connections at the cross-connect terminal: Port 2

Cable		RS422				RS232			
		Signal		Designations (I=input O=output)		Designations (I=input O=output)		Signal	
Pair	Color	DTE	DCE	DTE	DCE	DTE	DCE	DTE	DCE
13T 13R	BK-G G-BK			- -	- -	- O	- I	- DTR	- DCD
14T 14R	BK-BR BR-BK			- -	- -	I I	O O	DSR DCD	CH/CI DTR
15T 15R	BK-S S-BK			- -	- -	O I	I O	RTS CTS	CTS RTS
16T 16R	Y-BL BL-Y			- -	- -	I O	O I	RX TX	TXD RXD
17T 17R	Y-O O-Y			O -	I -	O -	I -	- SG	- SG

Table 38
NTAK02 connections at the cross-connect terminal: Port 3

Cable		RS422				RS232			
		Signal		Designations (I=input O=output)		Designations (I=input O=output)		Signal	
Pair	Color	DTE	DCE	DTE	DCE	DTE	DCE	DTE	DCE
17T 17R	Y-O O-Y	SCTEA –	SCTA –	O –	I –	O –	I –	SCT –	SCT –

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Cable		RS422				RS232			
		Signal		Designations (I=input O=output)		Designations (I=input O=output)		Signal	
Pair	Color	DTE	DCE	DTE	DCE	DTE	DCE	DTE	DCE
18T 18R	Y-G G-Y	SCTEB DTR	SCTB DCD	O O	I I	– –	– –	CH/CI DTR	– DCD
19T 19R	Y-BR BR-Y	DSR DCD	CH/CI DTR	I I	O O	I I	O O	DSR DCD	CH/CI DTR
20T 20R	Y-S S-Y	RTS CTS	CTS RTS	O I	I O	O I	I O	RTS CTS	CTS RTS
21T 21R	V-BL BL-V	SCRA SCTA	SCTEA RXCA	I I	O O	I I	O O	SCR SCT	SCT –
22T 22R	V-O O-V	SCRB SCTB	SCTEB RXCB	I I	O O	– –	– –	– –	– –
23T 23R	V-G G-V	RXDA TXDA	TXDA RXDA	I O	O I	I O	O I	RXD TXD	TXD RXD
24T 24R	V-BR BR-V	RXDB TXDB	TXDB RXDB	I O	O I	– –	– –	– –	– –
25T 25R	V-S S-V	– SG	– SG	– –	– –	– –	– –	SG –	SG –

Terminal setup

The terminal can be set up any time, except during data transmission. Do not set up the terminal during data transmission to avoid potential data loss.

Setup values are given in Table 40 "HP700/32 setup values" (page 246), Table 41 "VT420 setup values" (page 247), and Table 42 "VT220 setup values" (page 248). Use Procedure 45 "Setting up the terminal" (page 245) to set up the terminal.

Procedure 45
Setting up the terminal

Step	Action
1	Turn on the power for the terminal.
2	Enter setup mode by pressing the <SETUP> key located on the top row of the special function keys. The current setup values are displayed.
3	Change the value in each field on each setup screen as necessary.

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Use the keys listed in Table 39 "Setup (keys and functions)" (page 246) to view and change setup values.

Table 39
Setup (keys and functions)

Key	Function
Arrow key	Move from field to field
<Enter>	Scroll through possible values or cause requested action to take place (depends on type of field)
<Next Screen>	Move to next setup screen
<Prev Screen>	Move back to last screen

4 Save changes by returning to the **General setup** screen, moving the cursor to the **Saved** field, and pressing <Enter>.

Table 40
HP700/32 setup values

Global set-up screen			
Host Port	1	Keyboard	U.S.
Background	Dark	Message Translations	English
Screen Saver	10 Min	Setup Translations	English
Refresh Rate	72 Hz	Clear Display	
Key Click	Yes	Clear Comm	
User Set-up Screen			
Smooth Scroll	Jump scroll	Display Width	80
Cursor Type	Blink Line	Display Width Allowed	80 or 132
Cursor	Off	Char Cell Height	16
2nd Message Line	On	Clr on Width Change	Yes
Message Line	On	Aux Mode	Off
Status Line	On	Aux to Host	Off
On Line	Yes	Print Terminator=FF	No
Local Echo	Off	Logical Page Size	24
Auto Wrap	Off	Number of Pages	1
Auto Linefeed	Off		
Display Ctrl Codes	Off		
Emulation Set-up			
Emulation	VT320	Cursor Keys	Normal
Terminal Id	VT220	Print Scroll Region	Off
Control Codes	7-bit	User Features Locked	No
Characters Mode	8-bit	User Keys Locked	No
Preferred Char Set	DEC Supplemental	Data Procession Keys	No
Key Pad Mode	Application		
Port 1 Set-up			
Communications	Full Duplex	Limited Transmit	Off
Data Length	8-bits	DSRI	No
Parity	None	CTS	Ignore
Stop Bits	1	CD	Ignore
Xmit Baud	2400	Break Disconnect	170ms
RecvBaud	=Xmit	Disconnect Delay	Never
Xmit pace	Xoff	Aux printer Type	National
Recv Pace	Xoff at 128		
Port 2 Set-up			
Communications	Full Duplex	Xmit pace	Xon/Xoff
Data Length	8-bits	Recv Pace	Xoff at 128
Parity	None	Limited Transmit	Off
Stop Bits	1	Break Duration	170ms
Xmit Baud	9600	Aux Printer Type	National
RecvBaud	=Xmit		
Keyboard Set-up			
Lock Key	Caps Lock	Warning Bell	Yes
Kbd Lock Enable	Yes	Auto Answerback	Yes
Save Tabs	Yes	Answerback =	
Auto Repeat	Yes	Conceal Answerback	No
Margin Bell	Yes	Do not set any tabs or programmed keys.	

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Table 41
VT420 setup values

Global Set-Up	
On Line	Comm1=RS232
Sessions on Comm1	70Hz
CRT Saver	Printer Shared
Display Set-Up	
80 Columns	No Status Display
Interpret Controls	Cursor Steady
Auto Wrap	3x24 pages
Jump Scroll	24 Lines/Screen
Dark Screen	Vertical Coupling
Cursor	Page Coupling
Block Style Cursor	Auto Resize Screen
General Set-up	
VT400 Mode, 7-bit Controls	Normal Cursor Keys
User Defined Keys Unlocked	No New Line
User Features Unlocked	UPSS DEC Supplemental
8-bit Characters	VT420 ID
Application Keypad	When Available Update
Communications Set-Up	
Transmit=2400	Disconnect, 2 s Delay
Receive=Transmit	Limited Transmit
Xoff=64	No Auto Answerback
8bits, No Parity	Answerback=
1 Stop Bit	Not Concealed
No Local Echo	Modem High Speed = ignore
Data Leads Only	Modem Low Speed = ignore
Printer Set-Up	
Speed=2400	8bits, No Parity, 1 Stop bit
No printer to Host	Print Full Page
Normal Print Mode	Print National Only
XOFF	No Terminator
Keyboard Set-up	
Keyboard Set-up	Local Compose
Typewriter Keys	Ignore Alt
Caps Lock	F1 = Hold
Auto Repeat	F2 = Print
Keyclick High	F3 = Set-Up
Margin Bell	F4 = Session
Warning Bell High	F5 = Break
Character Mode	,< and .> Keys
<X] Delete	<> Key
	'~Key
Tab Set-Up	
Leave this screen at the default values	

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Table 42
VT220 setup values

Global Set-Up	
On Line	Comm1=RS232
Sessions on Comm1	70Hz
CRT Saver	Printer Shared
Display Set-Up	
80 Columns	Light Text, Dark Screen
Interpret Controls	Cursor
Auto Wrap	Block Style Cursor
Jump Scroll	
General Set-up	
VT200 Mode, 7-bit Controls	Application Keypad
User Defined Keys Unlocked	Normal Cursor Keys
User Features Unlocked	No New Line
Multinational	
Communications Set-Up	
Transmit=2400	No Local Echo
Receive=Transmit	Data Leads Only
Xoff at 64	Disconnect, 2 s Delay
8bits, No Parity	Limited Transmit
1 Stop Bit	
Printer Set-Up	
Speed=9600	
Normal Print Mode	Print Full Page
8bits, No Parity,	Print National Only
1 Stop bit	No Terminator
Keyboard Set-up	
Typewriter Keys	Warning Bell
Caps Lock	Break
Auto Repeat	Answerback=
Keyclick High	Not Concealed
Margin Bell	
Tab Set-Up Screen	
Leave this screen at the default values	

—End—

Installing and connecting an Ethernet cable

This section describes the procedures required to connect an Ethernet cable to:

- a Cabinet system (Procedure 46 "Connecting the Ethernet cable to the Cabinet system" (page 250))
- a Chassis system (Procedure 47 "Connecting the Ethernet cable to the Chassis system" (page 252))

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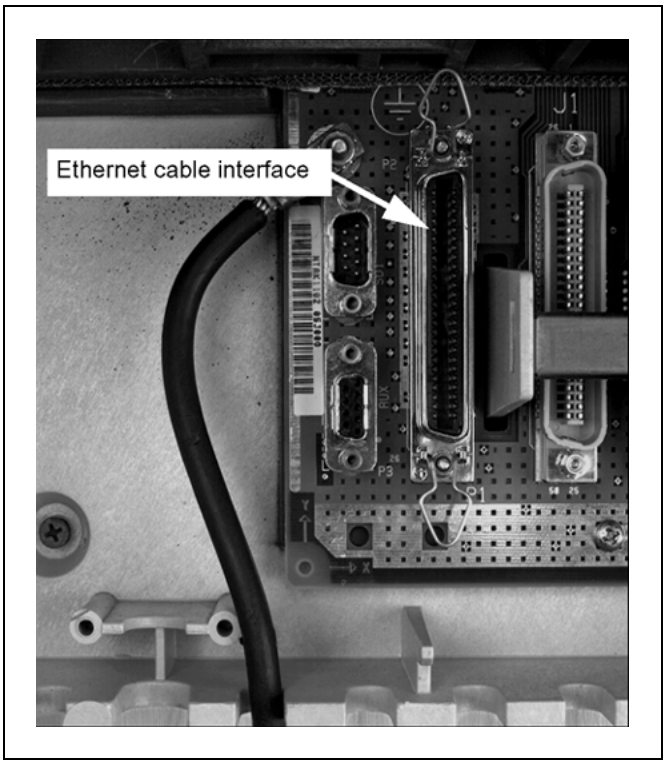
Cabinet system: IP expansion 10BaseT port

The Cabinet system provides one 10 Mbit/s Ethernet connection to a Local Area Network (LAN). The Ethernet cable connector is located just left of the retaining bar in the main and IP expansion cabinets, as shown in Figure 120 "Ethernet port location on the cabinet" (page 249). The 10BaseT Ethernet port available on the SSC of an IP expansion cabinet is functional. However, the Ethernet port on the IP expansion cabinet does not have a default IP configuration. This means that the IP port configuration must be performed before it can be used.

It is not recommended to use the remote 10BaseT port in normal mode, as maintenance or alarm management are not available. In survival mode it assumes the system level configuration of the main cabinet port.

Figure 120
Ethernet port location on the cabinet



J7 Jumper plug

The J7 jumper plug must be in place on the SSC card for the Ethernet function to operate. The jumper plug is present when the SSC card is shipped. See Figure 121 "J7 Jumper Plug location on NTDK20 SSC card" (page 250).

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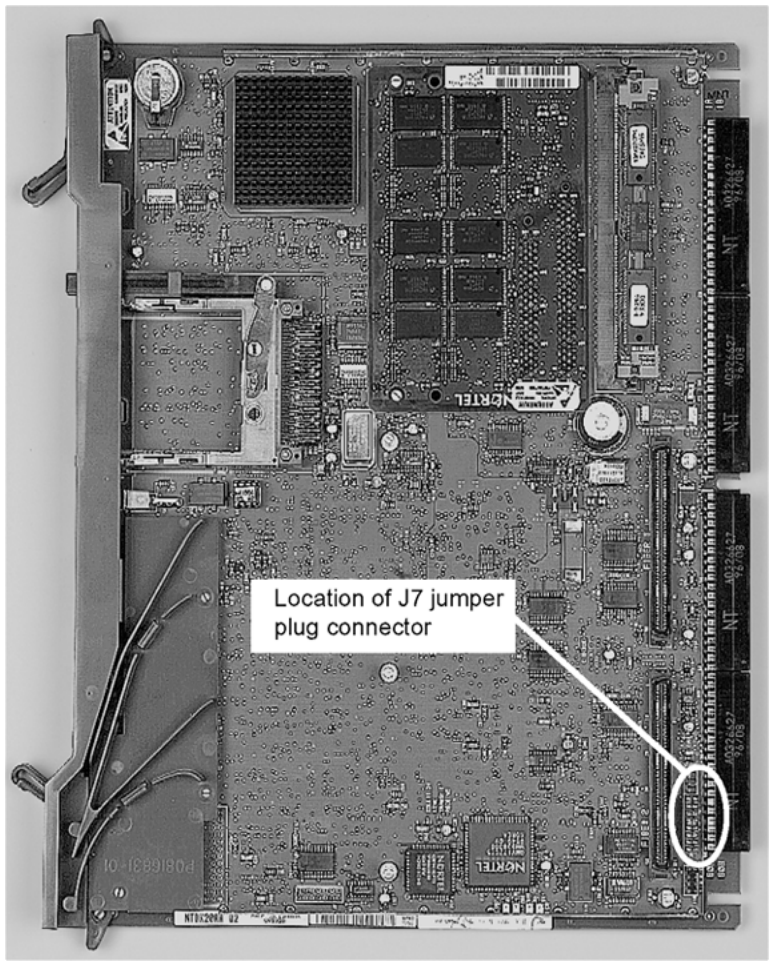
Figure 121
J7 Jumper Plug location on NTDK20 SSC card



Procedure 46
Connecting the Ethernet cable to the Cabinet system

Step	Action
1	Insert the 50-pin end of the cable into the cable connector on the left side of the retaining bar. See Figure 120 "Ethernet port location on the cabinet" (page 249).
2	Route the cable through the fifth cable groove from the left side. The Ethernet cable is a 50-pin amphenol to 15-pin AUI adaptor cable (part number for Ethernet cable NTDK27 A06030723). This provides a standard Media Access Unit (MAU) attachment point.

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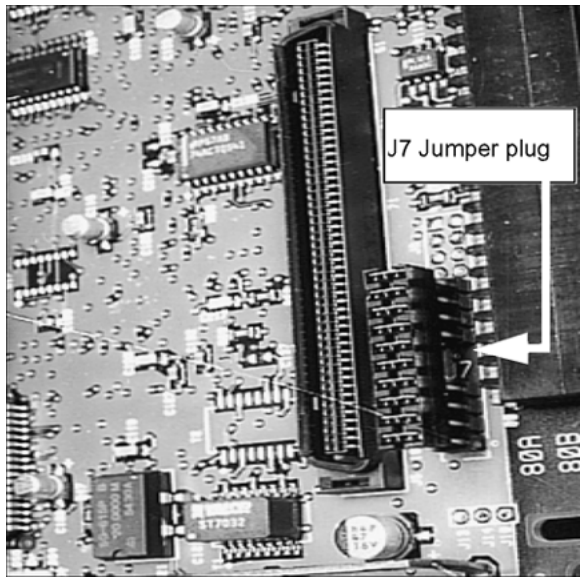
Note: A jumper block located on connector J7 (near the Fiber 2 connector) (see Figure 121 "J7 Jumper Plug location on NTDK20 SSC card" (page 250) and Figure 122 "Connector J7" (page 251)) on the component side of the NTDK20 SSC card must be in place for the Ethernet connection to function. The NTDK20 SSC card is normally shipped with the plug installed. If the Ethernet connection does not appear to function properly, check the jumper plug to make sure that it is installed.

Figure 122
Connector J7



3 If not previously done, configure the Ethernet port in LD 117, as described in *Software Input Output Reference - Maintenance (NN43001-711)*.

—End—

Chassis system Ethernet connection

The Chassis system provides a 10 Mbit Ethernet connection to a Local Area Network (LAN). The Ethernet cable connector is at the back of the chassis on the bottom left-hand side. See Figure 123 "Ethernet connection" (page 252).

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Figure 123
Ethernet connection

Procedure 47
Connecting the Ethernet cable to the Chassis system

Step	Action
1	Insert an industry-standard Media Access Unit (MAU) into the Ethernet connection at the bottom left-hand corner of the chassis. ***Note:*** The Chassis system does not include the MAU.
2	Insert the Ethernet cable into the MAU. See Figure 124 "Ethernet cable inserted into an industry-standard MAU" (page 253). ***Note:*** When the time comes to configure the Ethernet link, use LD 117.

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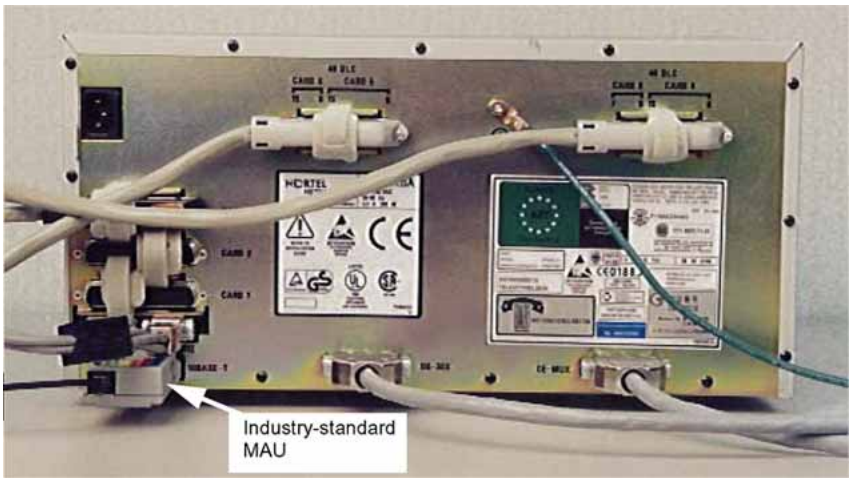
Figure 124
Ethernet cable inserted into an industry-standard MAU



—End—

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Starting the Chassis system

Contents

This section contains information on the following topics:

"Introduction" (page 255)

"Startup procedures" (page 255)

Introduction

This chapter describes how to start the Chassis system and how to make sure that the system is operating correctly.

This chapter contains the following procedures:

- Procedure 48 "Startup procedure for a new system installation, using the Small System Controller card" (page 255)
- Procedure 49 "Startup procedure for a previously installed system" (page 257)

Before you continue with the procedures described in this section, make sure all necessary hardware is connected to or installed in the system. Check all connections, and make sure that you have installed all of the circuit cards correctly.

Startup procedures

Before you start the system, complete Step 1 through Step 18 in "Installing the Chassis system" (page 89).

Procedure 48

Startup procedure for a new system installation, using the Small System Controller card

Step	Action
1	Test the power outlet. Make sure that the correct voltage of power is present before you plug the power cord into the outlet. The source must match the label on the back of the chassis.

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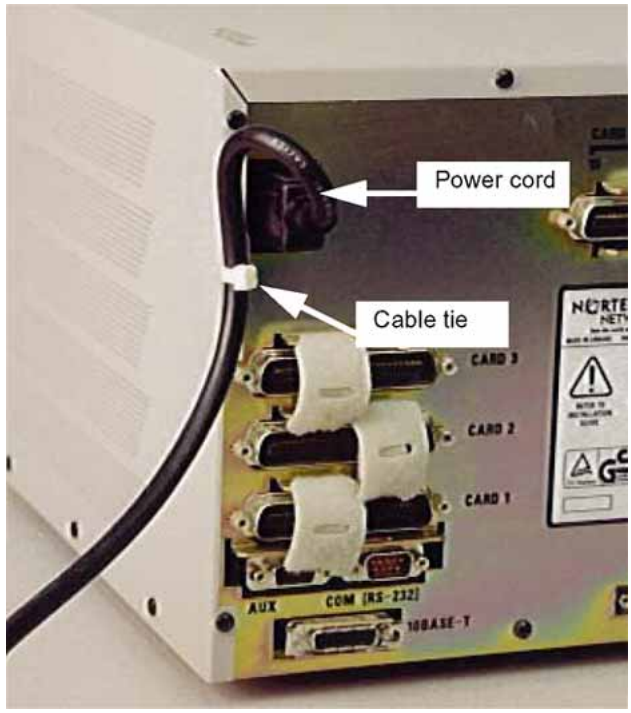
2 Connect the power cord from the power connector on the back of the chassis to an AC power source. See Figure 125 "Power connector on the back of the chassis" (page 256). Secure the power cable with a cable tie.

Figure 125
Power connector on the back of the chassis



3 Turn the power switch to ON.

4 Observe the TTY or terminal screen. The TTY must be connected to TTY port 0.

5 When you have completed the software installation (see "Installing software in a new system" (page 264)), observe the screen again.

6 Perform an EDD using LD 43.

—End—

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Procedure 49
Startup procedure for a previously installed system

Step	Action
1	Test the power outlet. Make sure that the correct voltage of power is present before you plug the power cord into the outlet. The source must match the label on the back of the chassis.
2	Connect the power cord from the power connector on the back of the chassis to an AC power source. See Figure 125 "Power connector on the back of the chassis" (page 256). Secure the power cable with a cable tie.
3	Turn the power switch to ON.
4	Observe the TTY or terminal screen. Messages appear on the TTY or the terminal screen. When the message `INIXXX` appears, the system is in operation.
5	If required, set the system time and date using LD 2.
6	Perform an EDD using LD 43.

—End—

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Installing software

Contents

This section contains information on the following topics:

"Introduction" (page 255)
Software Installation Program on page 320
"Keycodes" (page 261)
"Service levels (Feature sets) and License parameters" (page 262)
"Security device" (page 262)
"AUX ID" (page 262)
"Customer database" (page 262)
"Data loading" (page 263)
"Installing software in a new system" (page 264)
"Before you begin" (page 264)
"Summary of steps" (page 265)
"Installing software on cabinets and chassis" (page 266)
"Installing software on IP Expansion Cabinets or Chassis" (page 276)

Introduction

This chapter describes the Software Installation Program and how to install software in the Small System.

Before continuing with the procedures outlined in this chapter, verify that all pertinent hardware is either connected to or installed in the system. Check all connections, and make sure that you have installed all of the circuit cards correctly.

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Software Installation Program

The Software Installation Program provides a menu-driven method of selecting from the different options of installing, modifying, or upgrading the following:

- software
- customer data
- service level
- License parameters

The flash ROM stores information about the selections. The information is a list of instructions that the program follows when it runs.

Starting the program

The Software Installation Program must run from TTY 0 (port 0 on card 0). There are two methods to start the Software Installation Program:

- Issue the **UPGRADE** command in LD 143.
- Press the **<Control> I** keys while the terminal screen displays the installation prompt during SYSLOAD.

  Note: When you turn on a new system before you have installed the software, the Software Installation Program is called up automatically.

Function selection

The Software Installation Program is menu driven. The main menu provides the core functionality of the program. The Software Installation Program includes the following key functions:

- installs software in a new system
- upgrades and modifies software in an existing system
- uses utilities to work with archived databases, review data, back up data, undo an installation in progress, and clear unwanted data

After you have made all installation or upgrade selections, you must enter valid keycodes. The system validates the keycode. If you enter an invalid keycode, the installation function does not continue.

Note: If you enter a keycode that is not valid, the software and databases on the present system are not affected.

When the keycode validation passes, the software is installed on the system.

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The Software Installation Program has the following additional options:

- **Clear Upgrade Information:** If the installation terminates after you have entered the keycodes, but before the installation is complete, you can abort the installation with the "Clear Upgrade Information" option.
- **Confirm Upgrade Information:** This option allows you to review the selected installation options. You can use the "Confirm Upgrade Information" after the system validates the keycodes, but before the installation is complete.
- **Set system time and date:** The system time and date is usually set before installation. This makes sure that all flash drive files have the correct creation date.

Keycodes

A security keycode system protects the installation of software, service level, and License parameters. The installation does not continue unless you enter the correct keycodes.

You require keycodes for each new installation and for existing system upgrades. Keycodes are on a Keycode Data Sheet, which is supplied with the software and security device. There is a different keycode assigned to each site for a particular combination of items, such as software release, service level, and License parameters.

Note: Contact your Nortel representative if the Keycode Data Sheet is missing. The Keycode Data Sheet is also available through the Keycode Retrieval System (KRS) on the Nortel website.

The Software Installation Program validates the keycodes. If the keycodes are valid, the installation function continues.

If the keycodes are unsuccessful, check the following:

- software issue
- service level name
- any additional packages
- TNs
- License parameters
- security ID
- auxiliary ID (the old site ID, if this is an upgrade)
- ensure the correct keycodes were entered. All items must match the Keycode Data Sheet exactly.

If the keycodes still are not successful, then call your Service Representative.

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The system limits the validation of keycodes to three consecutive attempts. After the third unsuccessful attempt, the Software Installation Program returns to the main menu. Any data entered during this session is lost.

Service levels (Feature sets) and License parameters

The Software Installation Program allows the selection of service levels to be installed and enabled on the Small System. Service levels, such as Enhanced Business or Networking Services, have an associated list of software packages and License parameters. The Software Delivery card (PC Card) can include several preconfigured service levels.

The Software Installation Program also allows the addition of individual packages from the service level and the changing of system License parameters.

Additions and changes are keycode controlled; therefore, the packages and License parameters must match those corresponding to the site's keycodes.

Note: The Software Installation Program does not check the prerequisites and interactions of added packages.

Security device

A security device comes with each new Small System. Attach this device to the component side of the NTDK20 Small System Controller (SSC) card at the time of initial installation. The security device remains there for the life of the system.

AUX ID

Enter the AUX ID using the Software Installation Program. For new Small System sites, the AUX ID is the system security ID. When assigned, the AUX ID remains for the life of the system.

Customer database

The Software Installation Program allows the installation of a customer database from one of the following sources:

Pre-Configured database

The PC Card can include several preconfigured databases and their associated service levels. In addition, a minimal database is provided which contains basic system configuration information with no customer data.

Note: When prompted during the Software Installation Program, if you select any response other than "Pre-Configured database," preprogrammed data will not be loaded on the system. Preprogrammed data cannot be removed from the Small System with one command once

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it is loaded into the system. However, items can be removed one by one after installation. See "Changing preprogrammed data" (page 401).

Archived database

The Software Installation Program allows the archiving of various databases which can be used later at Small System sites. It allows multiple databases to be configured off-site and then installed ready-to-use at customer sites.

Note: Off-site programming of databases is subject to all security keycode restrictions. The off-site system must either use the security device that will be installed in the Small System at the customer site, or must have its own keycodes for the service level used.

Remote restored database

A database can be restored remotely using the LD 143 Customer Configuration Backup and Restore (CCBR) remote restore command.

Backed up Database

The Backed up Database option allows the copy on the backup flash drive to be installed. It is provided to recover a customer database if the customer database on the primary flash drive becomes corrupted.

Data loading

A Small System SYSLOAD is a sequence of events whereby the switch loads and verifies system and customer records into the NTDK20 SSC card's active memory area, or DRAM. The flow of data depends on the status of the software — new installation, software release upgrade, or user-initiated SYSLOAD — or the commands initiated in either LD 143 or the Software Installation Program.

Despite the various ways to initiate a SYSLOAD, the flow of data generally follows the path described below (refer to Figure 126 "Flow of data during a Small System SYSLOAD" (page 264) for a graphical illustration):

1. The Small System searches for customer records in the primary flash drive. If the files are located and verified, data is loaded into the NTDK20 SSC card's DRAM.
2. If the records are corrupt or cannot be found in the primary flash drive, the system searches the backup flash drive. If the customer records are located and verified, the Small System loads the data into DRAM.
3. If the customer records cannot be located in the backup flash drive, the Small System automatically searches the PC Card drive. If customer records are located and verified, data is loaded into DRAM.
4. If the customer records cannot be located in the PC Card drive, the Small System searches the primary flash drive for the secondary backup

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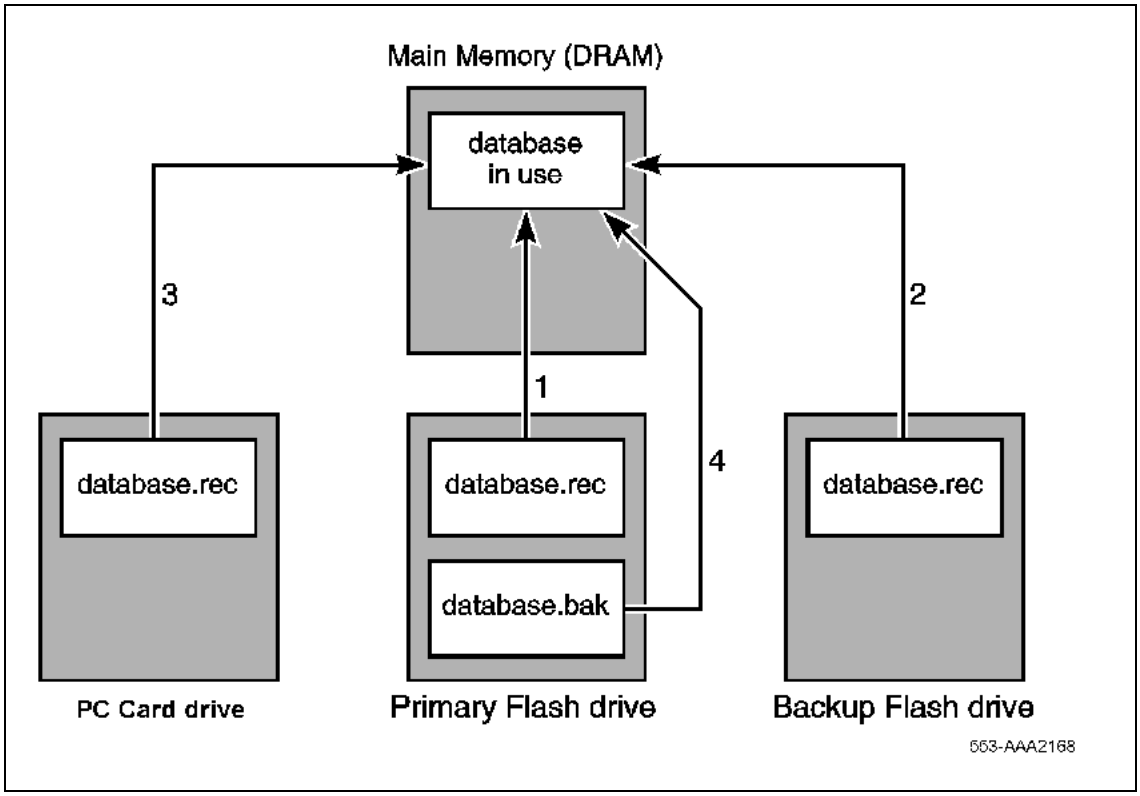
(.bak) file. If the customer records are located and verified, data is loaded into DRAM.

Figure 126
Flow of data during a Small System SYSLOAD



Installing software in a new system

Before you begin

Before beginning the software installation process, complete step 1 through step 9 in "Installing a new Cabinet system" (page 74) or Step 1 through Step 21 in "Introduction" (page 69). You must install the security device on the SSC card.

You must have the Keycode Data Sheet available.

Dependency Lists

Dependency Lists (DepLists) are the Nortel recommended Product Enhancement Packages (PEP) for a software release.

The Software Installation Program automatically installs DepLists on the Small System. As common practice, ensure that you have the latest issue of the DepLists at the time of system installation. The Installer's Checklist

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documentation references the issue and date of the DepLists provided with the software. Refer to the Enterprise Solution PEP Library for the latest issue of DepLists for the software release.

If the software delivery medium (preprogrammed daughterboard or PC Card) does not contain the latest issue of the DepLists, download the latest DepList zip file from the Enterprise Solution PEP Library onto a PC Card. After completing the Software Installation Program (see Procedure 50 "Installing software" (page 266)), use the Matrix DepList and PEPs (MDP) commands to install the Dependency Lists from the zip file.

Refer to the *Product Matrix Dependency List User Guide*, available on the Enterprise Solution PEP Library, for more information about accessing and using DepLists.

Summary of steps

The following list summarizes the software installation steps:

1. Get MAC address from IP daughterboard (if applicable).
2. Power up/install IP Expansion Cabinets or Chassis.
3. Power up Main Cabinet or Chassis. Ensure Link LED is green.
4. Perform software installation on the Main Cabinet or Chassis:
    a. Set the system time and date.
    b. Select the New System Installation menu.
    c. Identify if the system is a CS 1000E and has a Signaling Server.
    d. Select service level.
    e. Select whether or not to install DepLists as part of the software installation.
    f. Select packages.
    g. Select a database.
    h. Select License parameters. Ensure that the Survivability parameter is configured correctly.
    i. Select M3900 Language Set.
    j. Validate keycodes.
    k. Configure MAC address of the IP Expansion Cabinet or Chassis (if applicable).
5. Reboot the Main Cabinet or Chassis.
6. Wait for link to come up.
7. Perform software installation on IP Expansion Cabinets or Chassis.

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Note: IP Expansion Cabinet or Chassis software must be the same software version as the Main Cabinet or Chassis.

CAUTION
CAUTION WITH ESDS DEVICES
Wear the antistatic wrist strap provided in the bottom of the cabinet before handling circuit cards. Static electricity can damage the components of power supplies and circuit cards.

Installing software on cabinets and chassis

Follow Procedure 50 "Installing software" (page 266) to install the software on main cabinets and chassis.

For IP expansion, first install the software and customer database on the Main Cabinet or Chassis, then follow Procedure 51 "Installing software for IP expansion, using the preprogrammed software daughterboard" (page 276) (to install from the preprogrammed software daughterboard) or Procedure 52 "Installing software for IP expansion, using a PC Card" (page 278) (to install from a PC Card) to install the software on Expansion Cabinets or Chassis.

Procedure 50
Installing software

Step	Action

This procedure assumes that the system installation procedures in the chapters "Installing the Cabinet system" (page 73) or "Installing the Chassis system" (page 89) have been performed and that the system is up and running.

In the menus and screens, there are references to Option 11 and Option 11E. These references do not apply to the Chassis system.

1 Make sure the SSC card is in CPU slot (slot 0) of the Main Cabinet or Chassis.

2 Observe the terminal screen.

If	Then
The following is displayed: `SOFTWARE INSTALLATION PROGRAM`	Go to step 5.

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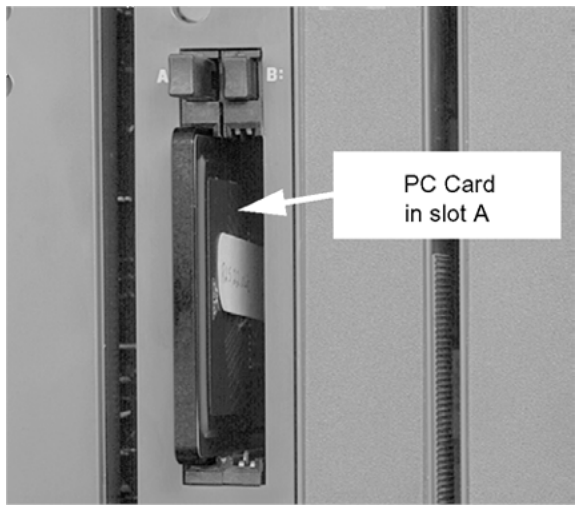
If	Then
The following is displayed: `current system time and date:  00:00:00 -- 00/00/00`	Go to step 4.
The following is displayed: `INSERT SOFTWARE DELIVERY CARD`	Go to step 3.
None of the above appears	Refer to *Meridian 1 Small System Maintenance (NN43011-700)*

3 Skip this step unless you are using the Software Delivery card (PC Card) to install the software.

Insert the card in slot A in the PC Card socket located in the faceplate of the NTDK20 SSC card. Carefully press on the PC Card until it is firmly seated. See Figure 127 "PC Card slot location" (page 267).

Note: You do not have to turn off the system power before you install the PC Card in slot A.

Figure 127
PC Card slot location



4 Set the system time and date.

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Note: The Time and Date prompt appears only when the Install Setup Program detects a system Year Date that is not in the range of 1995–2095. The responses shown below are examples of how to enter the system Time and Date:

```
Enter new time (hh/mm/ss)
08:00:00 <CR>
Enter new date (yy/mm/dd)
95/05/01 <CR>
08:00:00 -- 95/05/01 is the new system time and date
y <CR>
```

5 In the **Software Installation Main Menu**, select option 2 to install software on the Main Cabinet or Chassis.

```
Software Installation Main Menu:
1.  Media Gateway/IPExpansion Cabinet
2.  Call Server/Main Cabinet
[q]uit, [h]elp or [?], <CR> - redisplay
Enter selection:  2<CR>
```

6 The main menu for software installation on a Main Cabinet or Chassis displays.

Select option 1 for a new installation.
If you are installing from a PC Card, select item 4.

```
Call Server/Main Cabinet Software Installation Main
Menu:
1.  New Install or Upgrade from Option 11/11E - From
Software DaughterBoard
2.  System Upgrade
3.  Utilities
4.  New System Installation - From Software Delivery
Card
[q]uit, [p]revious, [m]ain menu, [h]elp or [?], <CR>
- redisplay
Enter selection:  1<CR>
```

7 Indicate whether the system has a Signaling Server.

Note: If the system contains a Signaling Server, an upgrade to a CS 1000E system is required. In this case, the answer is no.

```
Does this System have a Signaling Server?
(y/n/[a]bort):
*** NOTE: The following prompts require information
on the Keycode Data Sheet.
Please have it available.  ***
Enter selection:  y<CR>
```

8 Select the service level to be enabled.

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Note: The service level you select must match the one provided with keycodes.

```
Select Service Level You Wish to Enable:
1.  N.America Business Services-L1 (ntsk01cb)
2.  N.America Enhanced Business Services-L2 (ntsk01dc)
3.  N.America Adv.  Call Centre Service-L3A (ntsk01ec)
4.  N.America Adv.  Networking Services-L3B (ntsk01fc)
5.  N.America Premium Network Services-L4 (ntsk01gc)
6.  CALA Business Services-L1 (ntsk01hc)
7.  CALA Enhanced Business Services-L2 (ntsk01ic)
8.  CALA Adv.  Call Centre Service-L3A (ntsk01jc)
9.  CALA Adv.  Networking Services-L3B (ntsk01kc)
10.  CALA Premium Network Services-L4 (ntsk01lc)
[q]uit, [p]revious, [m]ain menu, [h]elp or [?], <CR>
- redisplay
```

(example only:)

```
Enter Selection:  5 <CR>
Service Level Selection:  N.America Premium Network
Services-L4
```

9 Indicate if you want to add packages.

```
Do you wish to add packages?  (y/n/[a]bort):
n <CR> (no)
y <CR> (yes)
a <CR> (abort, return to main menu)
```

If the response was NO, go to step 12.
If the response was YES, go to step 10.

10 Select the feature packages that you want to add.

```
Summary of Packages selected is:
0-2 4-5 7-14 16-25 28-29 32-64 67 70-77 79-83 86-93 95
98-104 107-111 113-116 118-120 122-125 127-129 131-133
135 137-141 167
Enter package(s) to be added, blank line to end:
215-235 <CR>
```

Note: A carriage return, <CR>, ends selection entry or indicates no packages are to be added.

11 Confirm service level and packages.

```
Your Service Level Selection is "N.America Premium
Network Services-L4":
Additional Packages selected:  215-235
Summary of Packages selected is:
```


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```
0-2 4-5 7-14 16-25 28-29 32-64 67 70-77 79-83 86-93 95
100-104 107-111 113-116 118-120 122-125 127-129
131-133 135 137-141 167
...
...
215-235
Is this selection correct?  (y/n/[a]bort):
n <CR> (no)
y <CR> (yes)
a <CR> (abort, return to main menu)
```

If the response was NO go to step 8.
If the response was YES go to step 12.

12 Select a database.

```
Select Database to Install:
1.  Pre-Configured database - N.America Premium Network
Services-L4
2.  Basic Configuration
3.  Archived database
[q]uit, [p]revious, [m]ain menu, [h]elp or [?], <CR>
redisplay
Enter Selection:  2 <CR>
Database Selection:  Basic Configuration
```

Note: Option 3 is available only if you are installing from a PC Card.

If you selected option 3 (Archived Database), go to step 13. If you selected option 1 or 2, go to step 14.

13 Select an archived database.

The terminal screen displays the available archived databases. The following are examples only.

```
Archived Database available:
1.  Company ABC
2.  XYZ.Offices
3.  Green.Packaging
[q]uit, [m]ain menu, [p]revious menu, <CR> - redisplay
```

14 Confirm database selection.

```
Do you wish to continue?  (y/n/[a]bort):
n <CR> (no)
y <CR> (yes)
a <CR> (abort, return to main menu)
```

If the response was NO, go to step 12.
If the response was YES, go to step 15.

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15 Review License parameters.

Note: On a new installation, the License parameters displayed on the terminal screen are the default settings related to the service level selection. You can accept these settings without changes or change the settings to meet the requirements of the new system.

Example:

```
Licenses will be set to:
TNS (2500) (maximum number of terminal numbers)
ACDN (300) (maximum number of ACD DNs)
AST (1) (maximum number of associate sets)
LTID (0) (maximum number of Logical Terminal IDs)
RAN CON (0) (default RAN connection)
RAN RTE (500) (default RAN routes)
MUS CON (0) (default MUS connection)
BRAND (2) (brandline)
ACD AGENTS (10) (maximum number of ACD agents)
ANALOGUE TELEPHONES (0) (maximum number of analogue
sets)
ATTENDANT CONSOLES (2500) (maximum number of attendant
sets)
BRI DSL (150) (maximum number of Digital Subscriber
Loops)
CLASS TELEPHONES (0) (maximum number of class sets)
DATA PORTS (2500) (maximum number of data ports)
DIGITAL TELEPHONES (0) (maximum number of digital sets)
IP USERS (0) (maximum number of IP Phone 2002 and 2004,
IP Softphone 2050 and MVC)
BASIC IP USERS (0) (maximum number of IP Phone 2001)
PHANTOM PORTS (2500) (maximum number of phantom ports)
WIRELESS TELEPHONES (0) (maximum number of wireless
sets)
WIRELESS VISITORS (0) (maximum number of wireless
visitors)
ITG ISDN TRUNKS (0) (maximum number of ISDN trunks)
TRADITIONAL TRUNKS (2500) (maximum number of
traditional trunks)
TMDI D-CHANNELS (64) (maximum number of channels)
SURVIVABILITY (0) (number of survivable IP Expansion
Cabinets or Chassis)
PCA (0) (maximum number of Personal Call Assistants)
IP PEER H.323 TRUNKS (0) (maximum number of trunks
using H.323 protocol)
SIP ACCESS PORTS (0) (maximum number of ports for calls
using Session Initiation Protocol)
Do you wish to change any Licenses?  (y/n/[a]bort):
n <CR> (no change)
y <CR> (change)
```


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```
a <CR> (abort, return to main menu)
```

If the response was YES, go to step 16.
If the response was NO, go to step 18.

16 Modify License parameters.

```
Enter new License, <CR> to leave unchanged:
TNS (2500)
ACDN (300)
AST (0)
LTID (0)
RAN CON (0)
RAN RTE (500)
MUS CON (0)
BRAND (2)
ACD AGENTS (10)
ANALOGUE TELEPHONES (0)
ATTENDANT CONSOLES (2500)
BRI DSL (150)
CLASS TELEPHONES (0)
DATA PORTS (2500)
DIGITAL TELEPHONES (0)
BASIC IP USERS (0)
PHANTOM PORTS (2500)
WIRELESS TELEPHONES (0)
WIRELESS VISITORS (0)
ITG ISDN TRUNKS (0)
TRADITIONAL TRUNKS (2500)
TMDI D-CHANNELS (64)
SURVIVABILITY (0) 4
PCA (0)
IP PEER H.323 TRUNKS (0)
SIP ACCESS PORTS (0)
```

17 Confirm License parameters.

```
TNS (2500)
ACDN (300)
AST (0)
LTID (0)
RAN CON (0)
RAN RTE (500)
MUS CON (0)
BRAND (2)
ACD AGENTS (10)
ANALOGUE TELEPHONES (0)
ATTENDANT CONSOLES (2500)
BRI DSL (150)
CLASS TELEPHONES (0)
DATA PORTS (2500)
```


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```
DIGITAL TELEPHONES (0)
BASIC IP USERS (0)
PHANTOM PORTS (2500)
WIRELESS TELEPHONES (0)
WIRELESS VISITORS (0)
ITG ISDN TRUNKS (0)
TRADITIONAL TRUNKS (2500)
TMDI D-CHANNELS (64)
SURVIVABILITY (4)
PCA (0)
IP PEER H.323 TRUNKS (0)
SIP ACCESS PORTS (0)
Is this correct?  (y/n/[a]bort):
n <CR> (no)
y <CR> (yes)
a <CR> (abort, return to main menu)
```

If the response was NO, go to step 15.
If the response was YES, go to step 18.

18 Define the AUX ID.

Note: The default AUX ID is the system ID provided with the Small System.

Example:

```
Security ID: 10000326
Current AUX ID: 10000326
Do you wish to change the AUX ID? (y/n/[a]bort):
y <CR> (yes)
n <CR> (no)
a <CR> (abort, return to main menu)
```

If the response was NO, go to step 20.
If the response was YES, go to step 19.

19 Enter the AUX ID.

```
Enter the Option 11/11E Security ID for the new AUX ID,
<CR> to maintain
12121212 <CR>
New AUX ID: 12121212
Is this correct?  (y/n/[a]bort):
y <CR> (yes)
n <CR> (no)
a <CR> (abort, return to main menu)
```

If the response was NO, go to step 18.
If the response was YES, go to step 20.

20 Select the M3900 Language Set.

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```
Select M3900 Language Set:
1.  Global 10 languages
2.  Western Europe 10 languages
3.  Eastern Europe 10 languages
4.  North America 6 languages
5.  Spare Group A
6.  Spare Group B
7.  Packaged languages
[q]uit, [p]revious, [m]ain menu, [h]elp or [?], <cr>
- redisplay
Enter Selection:  1
```

21 Review and confirm information entered.

Note: The terminal screen displays both the old and the new parameter values.

```
New Installation Information Summary:
Security ID : 10000326
Aux ID : 12121212
Cabinet Type :  Call Server/MAIN
Service Level :  N.America Premium Network Services-L4
Additional Pkgs :  215-235
Database :  Basic Configuration
S/W Release :  XXXX XXXX
Licenses
TNS : 2500 2500
ACDN : 300 300
AST : 0 0 LTID : 0 0
RAN CON : 0 0
RAN RTE : 500 500
MUS CON : 0 0
BRAND : 2 2 ACD
AGENTS : 1010
ANALOGUE TELEPHONES : 0 0
ATTENDANT CONSOLES : 2500 2500
BRI DSL : 150 150
CLASS TELEPHONES : 0 0
DATA PORTS : 2500 2500
DIGITAL TELEPHONES : 0 0
PHANTOM PORTS : 2500 2500
WIRELESS TELEPHONES : 0 0
WIRELESS VISITORS : 0 0
ITG ISDN TRUNKS : 0 0
TRADITIONAL TRUNKS : 2500 2500
TMDI D-CHANNELS : 64 64
SURVIVABILITY : 0 4
PCA : 0 0
IP PEER H.323 TRUNKS : 0 0
SIP Access Ports :  0 0
M3900 Language Set :  1.Global 10 languages
```


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```
Is this correct?  (y/n/[a]bort):
y <CR> (yes)
n <CR> (no)
a <CR> (abort, return to main menu)
```

If the response was NO, go to step 8.
If the response was YES, go to step 22.

22 Indicate if you wish to enable Automatic Centralized Software Upgrade.

```
Enable Automatic Centralized Software Upgrade?
(y/n/[a]bort):
```

23 Enter the keycodes from the Keycode Data Sheet.

```
Enter new Keycodes:
Key 1:
Key 2:
Key 3:
xxxxxxxx <CR>
yyyyyyyy <CR>
zzzzzzzz <CR>
```

After you enter the last keycode, the system validates the keycodes and displays a message indicating whether or not the validation succeeded. Follow the instructions given below.

```
Keycode validation successful.
***WARNING*** A system restart will be invoked as part
of the software installation process.
```

If the **successful** message appears, go to step 24.

If the **unsuccessful** message appears, repeat this step (step 22).

After three unsuccessful keycode validation attempts, the following message appears:

```
Keycode validation unsuccessful.
Installation aborted...returning to main menu.
```

24 Complete the software installation.

```
Are you sure you wish to perform the installation?
(y/n/[a]bort):
y <CR> (yes)
n <CR> (no)
a <CR> (abort, return to main menu)
```

If the response was NO, go to step 5.
If the response was YES, the software will be installed on the system. Continue with the next step (step 25).

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25 Observe the TTY or terminal screen. Progress messages will appear on the screen as the software is installed. When the installation program has ended, the following message displays:

```
Installation completed successfully.
```

Continue to observe the terminal screen. The system is operational when the following message displays:

```
INIXXX
```

26 Perform an EDD using LD 43. Refer to *Software Input Output Reference - Maintenance (NN43001-711)* for further information on LD 43.

27 For an IP expansion Small System, configure the IP Daughterboard MAC and IP addresses. Refer to LD 117 in *Software Input Output Reference - Maintenance (NN43001-711)*.

—End—

Installing software on IP Expansion Cabinets or Chassis

Point-to-Point or Layer 2 with BOOTP configuration

For Point-to-Point or Layer 2 with BOOTP configuration, you do not need a TTY connected to the IP Expansion Cabinet or Chassis. Power up the system, and the software installs automatically.

Layer 2 or Layer 3 with manual configuration

With a TTY connected to the IP Expansion Cabinet or Chassis:

- Follow Procedure 51 "Installing software for IP expansion, using the preprogrammed software daughterboard" (page 276) to install software from the SSC card, using the preprogrammed software daughterboard.
- Follow Procedure 52 "Installing software for IP expansion, using a PC Card" (page 278) to install software using a PC Card.

Procedure 51

Installing software for IP expansion, using the preprogrammed software daughterboard

Step	Action
1	Power up the system. The **Software Installation Main Menu** displays.
2	Select option 1 to install software on the IP Expansion Cabinet or Chassis.

```
Software Installation Main Menu:
```


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```
1.  Media Gateway/IPExpansion Cabinet
2.  Call Server/Main Cabinet
[q]uit, [h]elp or [?], <CR> - redisplay
Enter selection:  1
```

3 In the Media **Gateway/Expansion Cabinet Software Installation Main Menu**, select option 2 to access the **Utilities** menu.

```
Media Gateway/Expansion Cabinet Software Installation
Main Menu:
1.  Media Gateway/Expansion Cabinet Installation - From
Software Delivery Card
2.  Utilities
[q]uit, [p]revious, [m]ain menu, [h]elp or [?], <CR>
- redisplay
Enter selection:  2
```

4 In the **Utilities** menu, select option 1 to perform IP configuration.

```
Utilities Menu:
1.  IP Configuration (L3)
2.  Review Upgrade Information
3.  Clear Upgrade Information
4.  Flash Boot ROM Utilities
5.  Current Installation Summary
6.  IP FPGA Utilities
[q]uit, [p]revious, [m]ain menu, [h]elp or [?], <CR>
- redisplay
Enter selection:  1
Do you wish to do IP configuration?  (y/n/[a]bort):  y
```

5 The **IP Configuration** menu displays.
Select Manual Configuration (option 2).

ATTENTION

IIMPORTANT

BOOTP is a broadcast message used for IP Address discovery.

- For Point-to-Point installation, you must select option 1.
- For Layer 2 LAN installation, the recommended selection is option 1.
- For Layer 3 LAN installation, you must select option 2.

```
IP Configuration Menu:
1.  Automatically Using BOOTP
2.  Using Manual Configuration
3.  Keep Existing Configuration
```


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```
[q]uit, [p]revious, [m]ain menu, [h]elp or [?], <CR>
- redisplay
Enter Selection:  2
```

6 Configure IP expansion parameters.

The following sample IP parameters are examples. Use the correct parameters for your system.

```
Enter Media Gateway/Expansion New IP Parameters:
Media Gateway/Expansion IP: 47.147.20.101
Call Server/Main IP: 47.147.10.100
Media Gateway/Expansion NetMask:  255.255.255.0
L3 Configuration...
Media Gateway/Expansion Router:  47.147.20.1
Media Gateway/Expansion New IP Parameters:
Media Gateway/Expansion IP: 47.147.20.101
Call Server/Main IP: 47.147.10.100
Media Gateway/Expansion NetMask:  255.255.255.0
Media Gateway/Expansion Router:  47.147.20.1
Is this correct?  (y/n/[a]bort):
y <CR> (yes)
n <CR> (no)
a <CR> (abort, return to main menu)
```

Note 1: Media Gateway/Expansion Router appears only in a Layer 3 configuration.

Note 2: The IP address is configured on the Main Cabinet/Chassis using LD 117.

If the response was NO, repeat step 6.
If the response was YES, continue with the next step (step 7).

7 The software installation completes automatically without user intervention.

8 Refer to LD 117 in *Software Input Output Reference - Maintenance (NN43001-711)* to configure the IP Address of the IP Expansion Cabinet or Chassis.

—End—

Procedure 52
Installing software for IP expansion, using a PC Card

Step	Action
1	Make sure the SSC card is in slot 0 of the Expansion Cabinet or Chassis.

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2 Power up the system and observe the terminal screen. The following message displays:

```
INSERT SOFTWARE DELIVERY CARD
```

3 Insert the PC Card in slot A located in the faceplate of the SSC card. Carefully press on the PC Card until it is firmly seated. See Figure 127 "PC Card slot location" (page 267).

4 The **Software Installation Main Menu** displays.
Select option 1 to install software on the IP Expansion Cabinet or Chassis.

```
Software Installation Main Menu:
1.  Media Gateway/IPExpansion Cabinet
2.  Call Server/Main Cabinet
[q]uit, [h]elp or [?], <CR> - redisplay
Enter selection:  1
```

5 In the **Media Gateway/Expansion Cabinet Software Installation Main Menu**, select option 1 to install software from the Software Delivery card (PC Card).

```
Media Gateway/Expansion Cabinet Software Installation
Main Menu:
1.  Media Gateway/Expansion Cabinet Installation - From
Software Delivery Card
2.  Utilities
[q]uit, [p]revious, [m]ain menu, [h]elp or [?], <CR>
- redisplay
Enter selection:  1
```

6 Confirm that you wish to perform IP configuration.

```
Do you wish to do IP configuration?  (y/n/[a]bort):  y
```

7 The **IP Configuration** menu displays.
Select Manual Configuration (option 2).

ATTENTION

IMPORTANT

BOOTP is a broadcast message used for IP Address discovery.

- For Point-to-Point installation, you must select option 1.
- For Layer 2 LAN installation, the recommended selection is option 1.
- For Layer 3 LAN installation, you must select option 2.

```
IP Configuration Menu:
```


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```
1.  Automatically Using BOOTP
2.  Using Manual Configuration
3.  Keep Existing Configuration
[q]uit, [p]revious, [m]ain menu, [h]elp or [?], <CR>
- redisplay
Enter Selection:  2
```

8 Configure IP expansion parameters.

The following sample IP parameters are examples. Use the correct parameters for your system.

```
Enter Media Gateway/Expansion New IP Parameters:
Media Gateway/Expansion IP: 47.147.20.101
Call Server/Main IP: 47.147.10.100
Media Gateway/Expansion NetMask:  255.255.255.0
L3 Configuration...
Media Gateway/Expansion Router:  47.147.20.1
Media Gateway/Expansion New IP Parameters:
Media Gateway/Expansion IP: 47.147.20.101
Call Server/Main IP: 47.147.10.100
Media Gateway/Expansion NetMask:  255.255.255.0
Media Gateway/Expansion Router:  47.147.20.1
Is this correct?  (y/n/[a]bort):
y <CR> (yes)
n <CR> (no)
a <CR> (abort, return to main menu)
```

Note 1: Media Gateway/Expansion Router appears only in a Layer 3 configuration.

Note 2: The IP address is configured on the Main Cabinet/Chassis using LD 117.

If the response was NO, repeat step 8.
If the response was YES, continue with the next step (step 7).

9 Select the M3900 Language Set.

```
Select M3900 Language Set:
1.  Global 10 languages
2.  Western Europe 10 languages
3.  Eastern Europe 10 languages
4.  North America 6 languages
5.  Spare Group A
6.  Spare Group B
7.  Packaged languages
[q]uit, [p]revious, [m]ain menu, [h]elp or [?], <cr>
- redisplay
Enter Selection:  1
```

10 Complete the software installation.

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```
Communication Server 1000 Software Rls XXXX will be
installed.
***WARNING*** A system restart will be invoked as part
of the software installation process.
Are you sure you wish to perform the installation?
(y/n/[a]bort):
y <CR> (yes)
n <CR> (no)
a <CR> (abort, return to main menu)
```

If the response was NO, go to step 4.
If the response was YES, the software will be installed on the system. Continue with the next step (step 11) once the installation has completed.

11 Refer to LD 117 in *Software Input Output Reference - Maintenance (NN43001-711)* to configure the IP Address of the IP Expansion Cabinet or Chassis.

—End—

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Survivability

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"TN mapping during survival mode" (page 296)
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"Configuring a new system for Survivability" (page 296)
"Configuring trunks for Survivability" (page 298)
"Retrieving Call Detail Recording records" (page 303)

Introduction

This chapter provides a brief overview of the Small System's Survivability feature. It also describes the procedures to configure Survivability on a new system, or add the capability to an existing Small System.

Operating modes

The following are the two modes of operation:

- **Survivability** is the ability of a Small System's IP Expansion Cabinet or Chassis to perform Call Processing, for its local resources, when it is no longer connected to the Main Cabinet or Chassis. This is referred to as survival mode.

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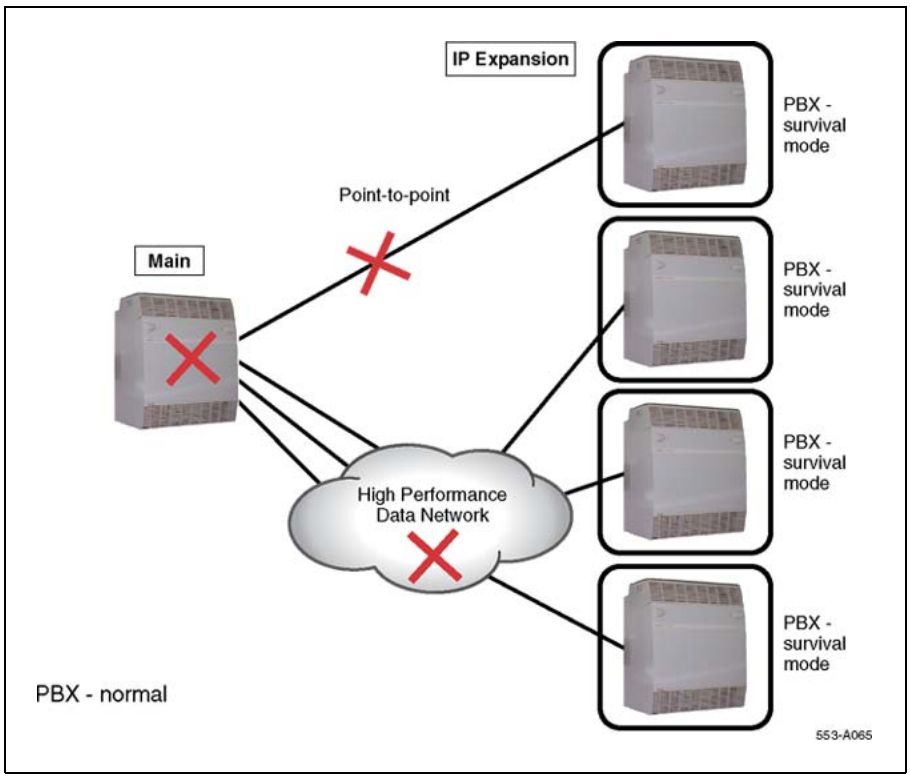
- **Normal mode** is when the local resources of an IP Expansion Cabinet or Chassis are controlled by the Call Processing of the Main Cabinet or Chassis.

Required software

Survivability is available for any IP Expansion Cabinet or Chassis with CS 1000 Release 5.5 software.

Description

Figure 128
Small System Survivability



Survivability License

The number of survivable cabinets or chassis in a system is defined by a License parameter labeled SURVIVABILITY. The Survivability parameter is keycode activated.

Database synchronization between the Main Cabinet or Chassis and an IP Expansion Cabinet or Chassis occurs with a datadump from the Main Cabinet or Chassis, or with an IP Expansion Cabinet or Chassis startup in normal mode.

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Switchover to survival mode

A survivable IP Expansion Cabinet or Chassis is able to restart after it loses communication with the Main Cabinet or Chassis, due to an outage of the Main Cabinet or Chassis or due to a failure of the link between the cabinets or chassis. During the restart procedure, the survivable IP Expansion Cabinet or Chassis attempts to register with the Main Cabinet or Chassis. If a connection cannot be made with the Main Cabinet or Chassis within approximately two minutes, the IP Expansion Cabinet or Chassis switches to survival mode and acts as a stand-alone Small System.

Triggers

If Survivability is configured on a cabinet or chassis, the following two scenarios can trigger a switchover to survival mode:

- Automatic Switchover is triggered when the IP Expansion Cabinet or Chassis loses communication with the Main Cabinet or Chassis and the Switchover Time Out timer (SWOTO) expires. This can occur if there is a catastrophic failure of the Main Cabinet or Chassis, or the link is lost between the Main Cabinet or Chassis and the IP Expansion Cabinet or Chassis.
- Manual Switchover is triggered with the Switchover to Survival (SOTS) command in LD 135.

Automatic switchover to survival mode

When an IP Expansion Cabinet or Chassis, with Survivability configured, loses communication with the Main Cabinet or Chassis, the IP Expansion Cabinet or Chassis automatically switches over to survival mode when the SWOTO timer expires.

The state of communication between the Main Cabinet or Chassis and the IP Expansion Cabinet or Chassis is monitored by a simple polling mechanism called a Heartbeat.

The following example illustrates the tasks performed by the Small System's IP Expansion Cabinet or Chassis when communication with the Main Cabinet or Chassis is lost:

1. The IP Expansion Cabinet or Chassis attempts to reestablish the connection to the Main Cabinet or Chassis. After four reconnection attempts with a predefined delay between each attempt, the SWOTO starts.
2. The SWOTO expires after the time defined in LD 117.
3. The IP Expansion Cabinet or Chassis restarts. As the IP Expansion Cabinet or Chassis is going through the restart procedure, it attempts to register with the Main Cabinet or Chassis.
4. If a connection cannot be made to the Main Cabinet or Chassis, the IP Expansion Cabinet or Chassis comes up in survival mode.

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Manual switchover to survival mode

Manual commands are provided to allow a technician to force a switchover to survival mode. These commands are only available on the Main Cabinet or Chassis. They can be used only if there is an established link between the Main Cabinet or Chassis and an IP Expansion Cabinet or Chassis. To manually switch over to survival mode, use the SOTS command in LD 135.

CAUTION
Service Interruption
A manually invoked switchover causes a restart of the IP Expansion Cabinet or Chassis.

After the SOTS command has been successfully executed, the IP Expansion Cabinet or Chassis remains in survival mode until the Switch Back From Survival (SBFS) command is issued in LD 135 by the technician.

Switchback from survival mode

A survivable IP Expansion Cabinet or Chassis can switch back to normal mode after communication with the Main Cabinet or Chassis is restored.

The following two scenarios can trigger a cabinet or chassis in survival mode to return to normal mode:

- Automatic Switch Back (AUTOSB) allows an IP Expansion Cabinet or Chassis to automatically switch back from survival mode to normal mode as soon as the link with the Main Cabinet or Chassis is restored, and the SWOTO timer has expired. A restart is initiated on the IP Expansion Cabinet or Chassis. At the end of the system start, the IP Expansion Cabinet or Chassis is ready to operate in normal mode.
- Manual Switch Back allows a technician to force the system into normal mode by issuing the SBFS command. This command returns the system to normal mode after the SOTS command has been used.

Automatic Switch Back from survival mode

When the Automatic Switch Back option is configured for a survivable IP Expansion Cabinet or Chassis, the IP Expansion Cabinet or Chassis automatically switches back from survival mode to normal mode as soon as the link with the Main Cabinet or Chassis is restored and the SWOTO timer expires.

A valid database must be downloaded to the IP Expansion Cabinet or Chassis for this option to take effect. The database is downloaded or "synchronized" each time a datadump is performed.

The AUTOSB command is available in LD 117:

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CHG AUTOSB <cab#> <Switchback setting>

where

cab# = 1–4
Switchback setting = (YES) NO

When the switchback parameter is set to YES, the cabinet or chassis automatically switches back from survival mode as soon as the SWOTO timer expires. If switchback is set to NO, the cabinet or chassis remains in survival mode until a technician enters the SBFS command.

Switchover timer The timer is started on a survivable IP Expansion Cabinet or Chassis as soon as the link with the Main Cabinet or Chassis goes up or down. When the timer expires, the switchover (or switchback) is triggered. The timer is used to avoid instability in the operating mode of the IP Expansion Cabinet or Chassis when the IP link with the Main Cabinet or Chassis becomes unstable.

The switchover timer is also used during the startup of a survivable IP Expansion Cabinet or Chassis in order to allow the cabinet or chassis to go into survival mode if the IP expansion cannot connect to the Main Cabinet or Chassis on system startup.

When the link restores for an IP Expansion Cabinet or Chassis in survival mode with AUTOSB configured, the SWOTO timer is started.

If the timer expires, a switchback is initiated to change from survival to normal mode. If a polling message is missed before the timer expires, the timer is reset.

If the link is detected as down again before the expiration of the SWOTO timer, the Operating Mode Manager stops the timer, and the IP Expansion Cabinet or Chassis remains in survival operating mode.

Manual switchback from survival mode

After the SOTS command has been successfully executed, the IP Expansion Cabinet or Chassis remains in survival mode until the technician issues the Switch Back From Survival (SBFS) command in LD 135.

Survivability notification

Telephones and terminals

When an IP Expansion Cabinet or Chassis operates in survival mode, users are notified with a special dial tone and display information. Special text is also displayed on the remote TTYs connected to the IP Expansion Cabinet or Chassis.

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Special dial tone The dial tone provided to the telephones in survival mode is different from the dial tone for telephones in normal mode. This Flexible Survivable Dial Tone is provided with the Small System; however, the user can alter the Flexible Survivable Dial Tone in LD 56.

The table Table 43 "LD 56: Flexible Survivable Dial Tone" (page 288) displays the prompts from LD 56 associated with the Flexible Survivable Dial Tone.

Table 43
LD 56: Flexible Survivable Dial Tone

Prompt	Response	Description
REQ	CHG	Change existing data.
TYPE	FTC	Flexible Tone and Cadence data block
TABL	0	Flexible Tone and Cadence data block number
...		
RING	(NO)	
HCCT	YES	Hardware Controlled Cadences and Tones
...		
SURV		Flexible Survivable Dial Tone
- XTON	0-(4)-255	Flexible Survivable Dial Tone Code
- XCAD	0-(253)-255	Flexible Survivable Dial Tone Cadence number

Remote TTY

Survivable IP remote TTY The three Serial Data Interface (SDI) ports on the Small System Controller (SSC) card of an IP Expansion Cabinet or Chassis are available for use as additional system remote TTYs.

If the IP Expansion Cabinet or Chassis is configured for Survivability, the SDI ports of the IP expansion SSC can be used during survival mode. In this mode, they function as a TTY connected to a stand-alone Small System. However, the TTY has no access to either LD 43 or LD 143. When in survival mode, the SDI ports of the IP expansion cannot be used to access the Main Cabinet or Chassis. Refer to Table 44 "SDI port numbering" (page 288) for SDI port numbering.

Table 44
SDI port numbering

Cabinet or chassis	Normal mode	Survival mode
Main	0, 1, 2	0, 1, 2
IP Expansion 1	3, 4, 5	0, 1, 2

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Cabinet or chassis	Normal mode	Survival mode
IP Expansion 2	6, 7, 8	0, 1, 2
IP Expansion 3	9, 10, 11	0, 1, 2
IP Expansion 4	12, 13, 14	0, 1, 2

Special text, which is displayed on the TTY of the IP Expansion Cabinet or Chassis, indicates when the IP Expansion Cabinet or Chassis is operating in survival mode. This text informs the technician of the difference between the remote TTY's access to the Main Cabinet or Chassis in normal mode and the IP Expansion Cabinet or Chassis in survival mode. The text displayed prior to login is as follows:

```
OVL111 0000 IDLE
TY 00 SCH MTC BUG 21:44
SURVIVAL MODE
```

The text displayed on the TTY of the IP Expansion Cabinet or Chassis after login is as follows:

```
TTY 00 LOGGED IN 21:44 3/10/1999 SURVIVAL MODE
OVL000 SURVIVAL MODE
```

Database synchronization

During survival mode, survivable IP Expansion Cabinets or Chassis use a copy of the database that was configured at the main and previously downloaded to the survivable IP Expansion Cabinet or Chassis. Use the Invoke Datadump Program (EDD) command at the Main Cabinet or Chassis, or upon startup in normal mode, to download the database.

Data can be changed on the IP Expansion Cabinet or Chassis while in survival mode, but new or changed data is lost when switched back to the Main Cabinet or Chassis. The local datadump (EDD) is supported only on the Main Cabinet or Chassis.

Datadump enhancements and new commands

With the introduction of survivable IP Expansion Cabinets or Chassis, the EDD command is enhanced to first perform an EDD on the main and then download the database files to each survivable IP Expansion Cabinet or Chassis.

Before the file transfer, the Main Cabinet or Chassis verifies that the software release of the survivable IP Expansion Cabinet or Chassis matches its own software release. If this check fails, the download operation is aborted for that cabinet or chassis.

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The data files are loaded from the primary (C:) drive of the IP Expansion Cabinet or Chassis to protected memory when a switchover to survival mode occurs. The database files downloaded from the main are used only when the survivable IP Expansion Cabinet or Chassis switches to survival mode.

DWL command (download)

If the download fails, the system prints a message that indicates on which cabinet or chassis the failure occurred. The download can be reattempted using the new command **DWL [<cab#>]**. This command triggers the transfer of the database to the cabinet or chassis specified as a parameter, without performing another datadump on the Main Cabinet or Chassis.

The DWL command is available in LD 43:

DWL [<cab#>]

where

cab# = specified survivable IP Expansion Cabinet or Chassis

Programming the cab# parameter is optional. If omitted, the database is downloaded to all connected survivable IP Expansion Cabinets or Chassis.

EDD LCL command (local EDD)

The Invoke Datadump Program (EDD) command supports the Invoke Datadump Program Local (EDD LCL) command. It performs a local datadump where data is dumped only on the Main Cabinet or Chassis. The databases on the survivable IP Expansion Cabinets or Chassis are not updated. This operation is used when the database changes are tested by the technician prior to downloading them to the survivable IP Expansion Cabinets or Chassis.

The EDD LCL command has the same effect as the former Option 11C EDD command. Its sequence of operations is as follows:

1. Prior to an actual dump, the Main Cabinet or Chassis performs a security check. If the security check fails, the datadump operation is aborted.
2. If the security check passes, the existing database files on the primary flash drive are renamed with the extension ".bak".
3. The data is then written to the primary flash drive.
4. When the database files in the primary flash drive are updated, data and patches are written to the internal backup flash drive (Z:).

   Note: LD 43 and 143 are not available on an IP Expansion Cabinet or Chassis in survival mode.

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SWP, RES, and RIB commands for Survivability

To ensure the database synchronization on the main and the survivable IP expansion cabinet(s) or chassis, the Swap (SWP), Restore (RES), and Restore Backup (RIB) commands are modified to produce the same results on the survivable IP expansion cabinet(s) or chassis as on the Main Cabinet or Chassis.

The optional parameter, [<cab#>], allows the technician to select a specific cabinet or chassis in order to restrict the effect of the command to a specific cabinet or chassis.

If no parameter is provided, the command is first performed on the Main Cabinet or Chassis. The technician is then prompted with a confirmation request. If <YES>, the command is performed on all survivable IP Expansion Cabinets or Chassis.

As with the database download operation, preliminary security checks are performed by the Main Cabinet or Chassis against the security ID and software release of the survivable IP expansion cabinet(s) or chassis. If these security checks fail for any cabinet or chassis, synchronization is aborted for that cabinet or chassis.

SWP command The SWP command is used to swap the regular and "*.bak" copies of the database on the primary flash drive. It restores the database to the state prior to the most recent datadump. Figure 129 "SWP command operation" (page 292) illustrates the operation of the SWP command. Only one IP expansion cabinet is shown for illustration purposes.

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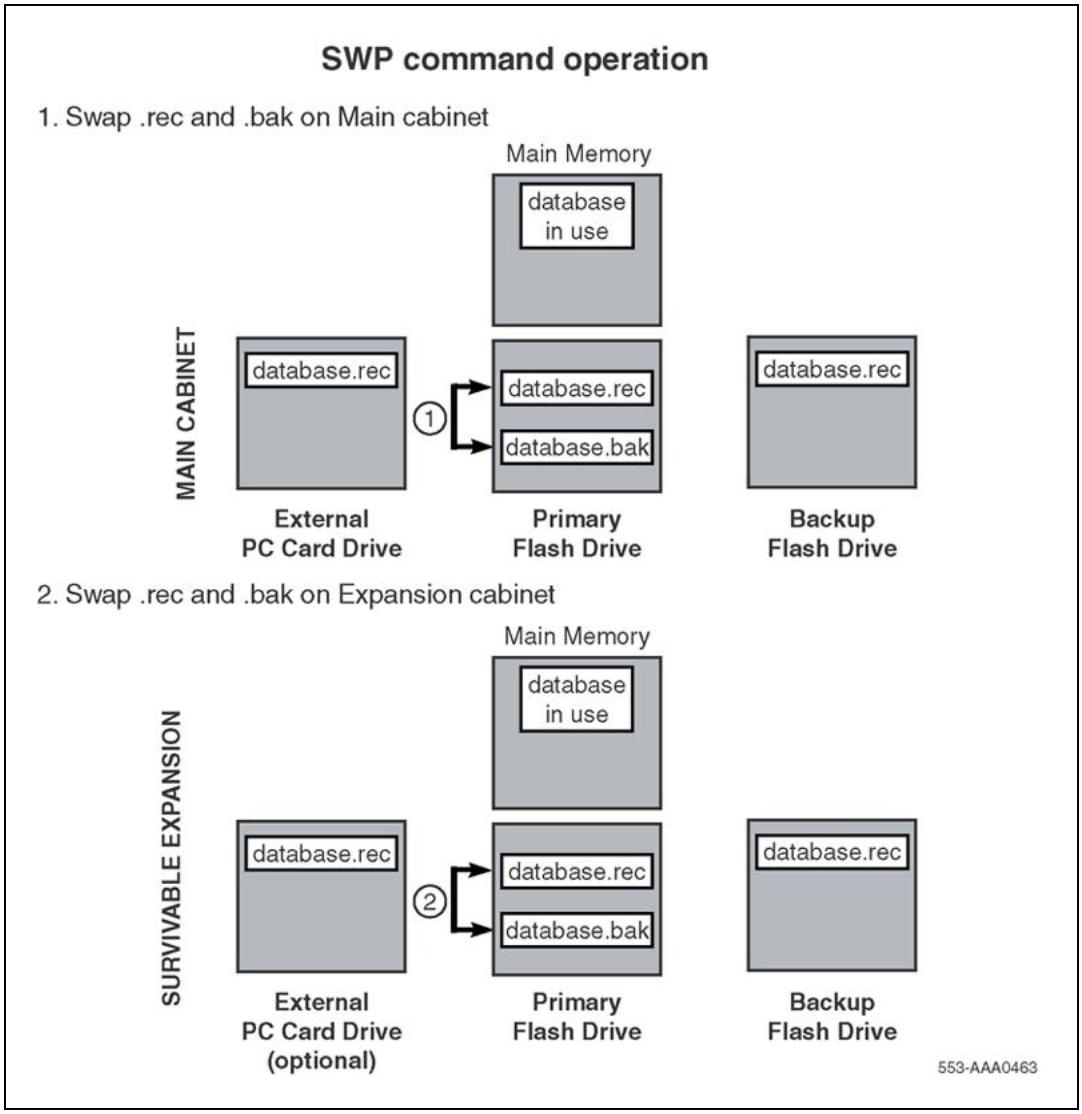
Figure 129
SWP command operation



RES and RIB Command The RES command restores data from the Main Cabinet or Chassis external PC Card drive to the Main Cabinet or Chassis (C:) drive and all survivable IP Expansion Cabinet or Chassis (C:) drives. The RIB command restores data from the Main Cabinet or Chassis internal backup flash drive to the Main Cabinet or Chassis (C:) drive and from the survivable IP Expansion Cabinet or Chassis internal backup flash drive to the (C:) drive. These commands are illustrated in Figure 130 "RES command" (page 293) and Figure 131 "RIB command" (page 294). Only one IP expansion cabinet is shown for illustration purpose; however, the synchronization is performed sequentially on all survivable IP Expansion Cabinets or Chassis.

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Figure 130
RES command

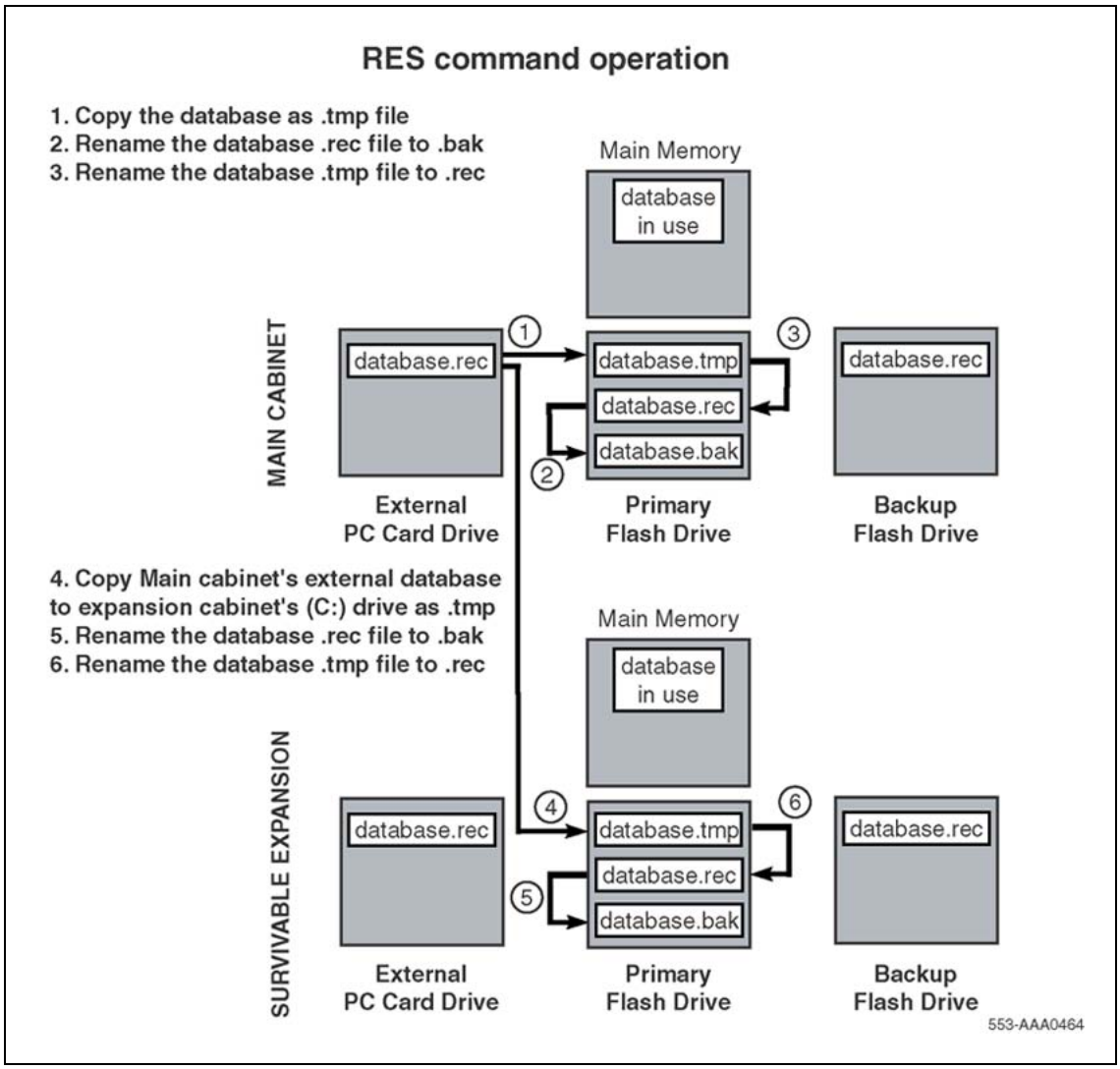

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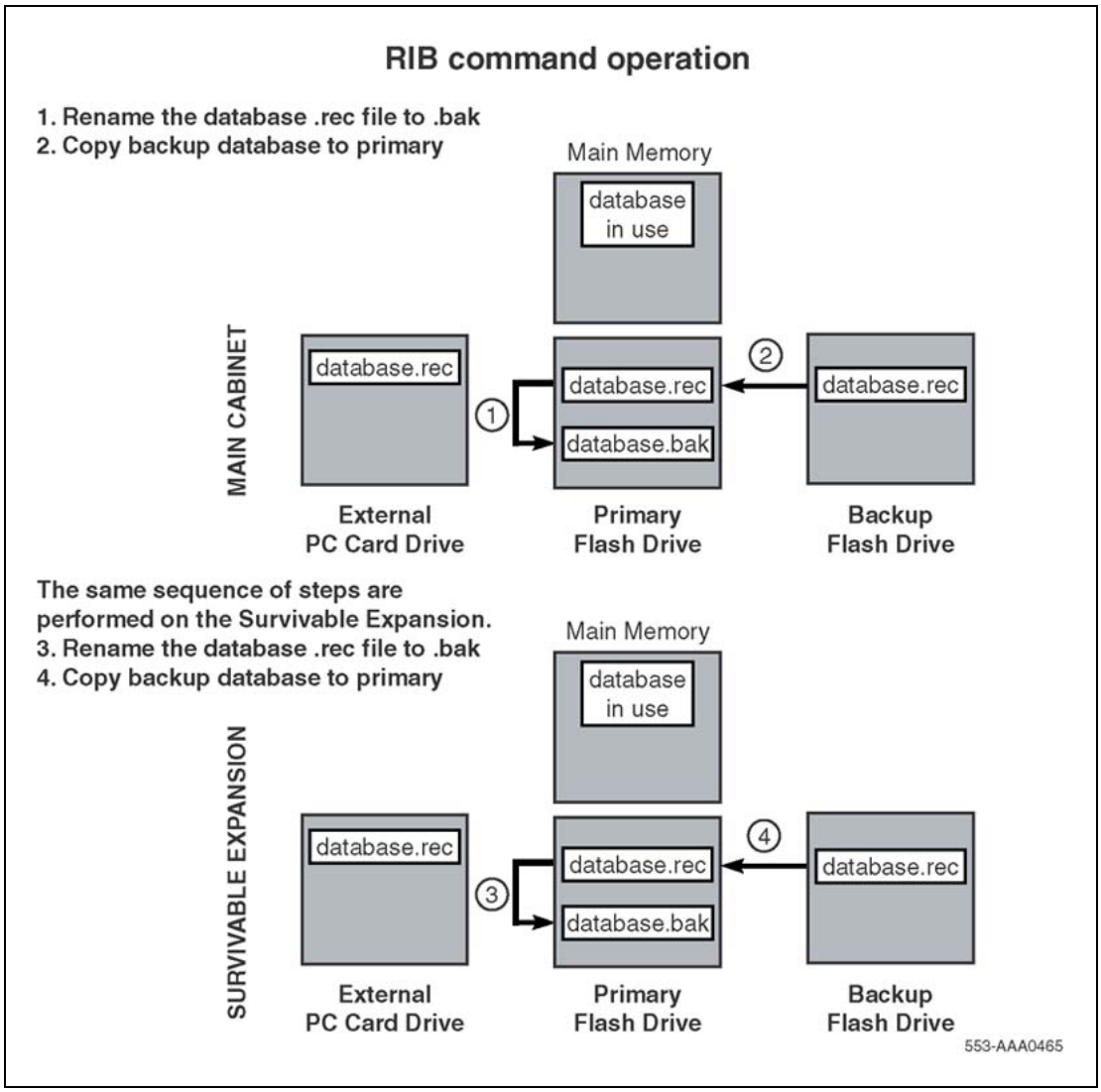
Figure 131
RIB command



DAT command

Use the DAT command to print the data issue and creation date of the Main Cabinet or Chassis primary and backup databases, as well as those of the survivable IP Expansion Cabinets or Chassis. The software release of the survivable IP Expansion Cabinets or Chassis must match that of the Main Cabinet or Chassis.

The DAT command is available in LD 43.

LOCK and UNLOCK commands

The LOCK and UNLOCK commands are available from the Main Cabinet or Chassis.

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The LOCK command locks an IP Expansion Cabinet or Chassis in the mode that it is in when the command is invoked. This does not require a restart of the selected IP Expansion Cabinet or Chassis.

- If the IP Expansion Cabinet or Chassis receives the LOCK command in normal mode, it goes into normal locked mode.
- If the IP Expansion Cabinet or Chassis receives the LOCK command in survival mode, it goes into survival locked mode.
- When an IP Expansion Cabinet or Chassis is in normal locked or in survival locked mode, no switchover (or switchback) is possible (automatic or manual) until the UNLOCK command is issued.

The UNLOCK command unlocks an IP Expansion Cabinet or Chassis. This does not require a restart of the selected IP Expansion Cabinet or Chassis.

- If the UNLOCK command is received in normal locked mode, the IP Expansion Cabinet or Chassis returns to normal mode.
- If the UNLOCK command is received in survival locked mode, the IP Expansion Cabinet or Chassis returns to survival mode.
- This command has no impact if it is received by an IP Expansion Cabinet or Chassis that has not been locked into either normal or survival mode.

The LOCK/UNLOCK command can be used in any mode by a technician to keep an IP Expansion Cabinet or Chassis in the current mode, regardless of the state of the link to the Main Cabinet or Chassis. For example, a technician can issue a SOTS command. This forces the selected IP Expansion Cabinet or Chassis into survival mode prior to restarting the Main Cabinet or Chassis. A LOCK command can be issued from the Main Cabinet or Chassis prior to a restart. This keeps the selected IP Expansion Cabinet or Chassis in survival mode, until manually returned to normal mode. Manually returning to normal mode reboots the IP Expansion Cabinet or Chassis.

These commands are applicable to both modes and can be used to keep a cabinet or chassis in survival mode after the Automatic Switch Back occurs.

The LOCK/UNLOCK command is issued in LD 135.

LOCK <cab #>

where

cab# = specified survivable IP Expansion Cabinet or Chassis

UNLOCK <cab #>

where

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cab# = specified survivable IP Expansion Cabinet or Chassis

TN mapping during survival mode

TN mapping remains the same for both normal and survival modes. For example, in a survivable Cabinet system, the second card slot of the first expansion cabinet is always card number 12.

Configuring for Survivability

Use this information to configure Survivability on a new system, or add the capability to an existing Small System. Before you configure Survivability, make sure you read and understand the information in "Description" (page 284) of this chapter.

Configuring a new system for Survivability

Follow the steps in Procedure 53 "Configuring for Survivability: new system" (page 296) to configure Survivability on a new Small System.

Procedure 53
Configuring for Survivability: new system

Step	Action
1	Ensure that you have the proper hardware installed to support Survivability. You can only configure Survivability on an IP Expansion Cabinet or Chassis. This means an IP Expansion Cabinet or Chassis that is connected to the Main Cabinet or Chassis with a 100BaseT or 100BaseF link. Refer to "Installing the Cabinet system" (page 73) for further details.
2	Ensure that the Survivability License parameter is set on your system for each cabinet or chassis that is to be configured as survivable.
3	Configure the Survivability (SURV) capability. Each IP Expansion Cabinet or Chassis must be separately configured to be survivable. The SURV command is configured in LD 117: **CHG SURV <cab#> <Survival setting>** where **cab#** = 1–4 **Survival setting** = (NO) YES
4	Configure the Automatic Switch Back parameter.

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The Automatic Switch Back (AUTOSB) option allows a survivable IP Expansion Cabinet or Chassis to switch back from survival mode to normal mode automatically as soon as the link with the Main Cabinet or Chassis is restored and the Switchover Time Out timer (SWOTO) expires.

The AUTOSB command is configured in LD 117:

CHG AUTOSB <cab#> <Switchback setting>

where

cab# = 1–4
Switchback setting = (YES) NO

5 Configure the SWOTO.

Configure the SWOTO separately for each IP Expansion Cabinet or Chassis.

The SWOTO command is configured in LD 117:

CHG SWOTO <cab#> <value>

where

cab# = 1–4
value = 2 - (120) - 600 seconds

For point-to-point connection (cabinets or chassis that are not connected over a LAN), it is recommended that you set the timer to a low value to minimize service interruption.

—End—

Printing survivable Small System parameters

The following Print commands, available in LD 117, print the Small System parameters and Survivability for all, or specified, IP Expansion Cabinets or Chassis:

PRT SURV cab

where

cab = 1–4

PRT CAB cab

where

cab = 1–4

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Configuring trunks for Survivability

When properly configured, the IP Expansion Cabinets or Chassis can make outgoing calls and, in some cases, receive incoming calls when in survival mode.

In order to make or receive calls, the survivable cabinet or chassis must be configured with the appropriate trunks. The sections below detail some examples of configuration options that may or may not suit your specific system setup.

Option 1: Dedicated DID/DOD trunks

Procedure 54
Configuring dedicated DID/DOD trunks for Survivability

Step	Action
1	Configure each IP Expansion Cabinet or Chassis with incoming and outgoing DID trunks.
2	Configure the Main Cabinet or Chassis with incoming and outgoing CO trunks. These Central Office (CO) trunks will handle most external calls. The DID trunks not only provide direct inward access for certain users, but they also provide a means of outward dialing for users of the IP Expansion Cabinets or Chassis in survival mode. They can also be programmed as outgoing overflow trunks for the CO trunks in normal mode. Ensure that the CO has configured the DID trunks to work in this mode.
3	Use the Network Alternate Route Selection (NARS), Basic Alternate Route Selection (BARS), or Alternate Trunk Route (STEP) prompt in LD 16 to program the CO trunks as outgoing overflow trunks in normal mode. Example: In survival mode, incoming calls (non-DID) are still directed to the main cabinet by the CO trunks. If the called non-DID DN exists in an expansion cabinet currently in survival mode, the call is intercepted since it cannot be completed to its intended destination. The call is then given the intercept treatment that is configured for Maintenance Busy Numbers (MBNR) in the Customer Data Block. The options are busy tone, overflow tone, transfer to attendant, recorded announcement, or voice mail. If the intercept treatment is "Mail", then the call is transferred to the called person's voicemail, such as Meridian Mail or CallPilot. The users of the IP expansion cabinets that are in survival mode can detect that they are in survival mode by the Flexible Survivable Dial Tone and "Local mode" display on their telephones.

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—End—

Advantages:

- Users can make outgoing calls at any time.
- Users can still access their mailboxes in survival mode if the Mail intercept feature is configured.
- The outgoing DOD trunks are used in both normal and survival modes.
- Users with DID numbers have direct inward access in both normal and survival modes.

Disadvantages:

- Non-DID users of the Expansion Cabinets or Chassis cannot directly receive incoming calls in survival mode.
- The customer must purchase enough DID/DOD trunks to handle entire outgoing call volume in survival mode.

Option 2: Outgoing-only, analog CO trunks

Procedure 55
Configuring analog CO trunks for Survivability

Step	Action
1	Configure each IP Expansion Cabinet or Chassis with some outgoing-only, analog CO trunks.
2	Configure the Main Cabinet or Chassis with incoming and outgoing CO trunks to handle most external calls. The operation is similar to Option 1 except that there are no inward DID capabilities. The Mail intercept feature can again be used in survival mode to allow incoming calls to be directed to the called person's voicemail.

—End—

Advantages:

- Users can make outgoing calls at any time.
- Users can still access their mailboxes in survival mode if the Mail intercept feature is configured.

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- The outgoing-only, analog CO trunks are more cost-effective than DID/DOD trunks.

Disadvantages:

- Users of the IP Expansion Cabinets or Chassis cannot directly receive incoming calls in survival mode.

Option 3: Multiple, public-exchange Listed Directory Numbers

Procedure 56

Configuring multiple, public-exchange Listed Directory Numbers (LDN) for Survivability

Step	Action
1	Configure the Main Cabinet or Chassis with incoming and outgoing CO trunks.
2	Configure the IP Expansion Cabinets or Chassis with incoming and outgoing CO trunks.
3	Assign each cabinet or chassis a unique public LDN (referred to here as LDN #0, LDN #1). When an external caller dials LDN #0, the CO trunks on the Main Cabinet or Chassis are accessed. When the external caller dials LDN #1, the CO trunks on the first IP Expansion Cabinet or Chassis are accessed. In normal mode, all the CO trunks are used for both incoming and outgoing calls. Unique LDNs are necessary to receive incoming calls when the system goes into survival mode. In survival mode, incoming calls to the Main Cabinet or Chassis cannot be redirected to an IP Expansion Cabinet or Chassis. The only way for an external caller to reach a user of an IP Expansion Cabinet or Chassis is through the unique LDN of that cabinet or chassis. When an external caller dials this LDN, the switch must be configured to manually distribute the calls to the users on the cabinet or chassis. These alternatives are described below. **Distributing calls to the users** a. Define one multiple appearance, Single Call Ringing (SCR) DN on at least one telephone on each cabinet or chassis. b. Assign this DN as the general Night DN for the system. c. Assign these telephones to users who will answer and redirect incoming calls in survival mode for each cabinet or chassis.

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The following example illustrates the process for manually distributing calls to the user:

- In normal mode, incoming calls to IP Expansion Cabinet 1 are processed by the main cabinet's answering service (which could be an attendant, or Meridian Mail). When the main cabinet's answering service is in night mode, all the telephones with the multiple appearance DN ring for incoming calls. The calls can be manually redirected by any of the users assigned to those telephones.
- However, when IP Expansion Cabinet 1 is in survival mode, incoming calls to IP Expansion Cabinet 1 (by LDN #1) are terminated only on IP Expansion Cabinet 1's telephone with the multiple appearance DN. Only the user assigned to IP Expansion Cabinet 1 is able to redirect these calls. The telephones with the multiple appearance DN on all other cabinets will not ring in this case.

—End—

Advantages:

- Users can receive incoming calls at any time.
- Users can make outgoing calls at any time.
- The CO trunks on the IP Expansion Cabinets or Chassis function in both normal and survival modes.

Disadvantages:

- Users must inform their contacts of their new LDN.
- The LDN changes if a user relocates to an area serviced by a different cabinet or chassis.
- Each cabinet or chassis must have a method of redirecting incoming calls while in survival mode. Use one of the procedures above.

Implementing the Mail intercept feature

When a system's IP Expansion Cabinets or Chassis are in survival mode, the Mail intercept feature allows incoming calls that cannot be redirected to an IP Expansion Cabinet or Chassis, to go to the called person's voicemail. The MBNR prompt in the Customer Data Block must be set to "mail". Enter the Meridian Mail DN after MLDN is prompted.

The MBNR and MLDN prompts are configured in LD 15.

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LD 15: Customer Data Block

Prompt	Response	Description
REQ:	CHG	Change existing data block
TYPE:	INT	Change Intercept Treatment
CUST		Customer number
	0-31	Range for Meridian 1 Small System and Media Gateway 1000B
...		
MBNR	MAIL MAIL MAIL MAIL	
MLDN	xxxx	Mail DN

The following is a sample printout of the Customer Data Block (CDB). Use LD 21 to print the CDB.

```
>ld 21
REQ: prt
TYPE: int
TYPE INT_DATA
CUST 0
TYPE INT_DATA
CUST 00
ACCD OVF OVF OVF ATN
CTVN OVF OVF OVF ATN
MBNR MAIL MAIL MAIL MAIL
MLDN 3001
CTRC OVF NAP OVF NAP
CLDN NAP OVF NAP NAP
NINV OVF OVF OVF ATN
NITR OVF OVF OVF ATN
NRES OVF OVF OVF ATN
NBLK OVF OVF OVF ATN
MVFO OVF OVF OVF ATN
MFVN OVF OVF OVF ATN
MFCG OVF OVF OVF ATN
LCKT BSY BSY BSY BSY
RCLE ATN OVF ATN ATN
CONG OVF
DLT OVF
LLT OVF
DNDT BSY
REQ:
```


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Supported applications

The Small System has been provisioned to support the following applications and telephones, and their circuit cards (if applicable). Contact your system supplier or your Nortel representative to verify that the functionality of the following is supported at this time:

- Attendant console
- Nortel Integrated Applications portfolio
  - — Hospitality Integrated Voice Services
  - — Integrated Call Assistant
  - — Integrated Call Director
  - — Integrated Conference Bridge
  - — Integrated Recorded Announcer
- MDECT
- OTM
- Remote Office

Administration Tools The Optivity Manager (OTM) is compatible with the Small System. OTM is an integrated suite of system management tools. Use OTM to configure, control, and manage your Small System. OTM operates on a platform that is compatible with a standard IBM PC.

Refer to the OTM User Guides — *Telephony Manager 3.1 Installation and Commissioning (NN43050-300)*, *Telephony Manager 3.1 System Administration (NN43050-601)*, and *Telephony Manager 3.1 Telemanagement Applications Fundamentals (NN43050-601)* — for information about the OTM application, its requirements, and how to install it for the CS 1000E system.

Peripheral Software Download

Peripheral Software Download (PSDL) is available from the Main Cabinet or Chassis in normal mode only. PSDL is not supported on IP Expansion Cabinets or Chassis when they are in survival mode.

Retrieving Call Detail Recording records

Call Detail Recording (CDR) records are available from an IP Expansion Cabinet or Chassis that has entered into survival mode. These records must be manually retrieved when the cabinet or chassis returns to normal mode (from survival mode) using the following XModem procedure.

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CDR is only generated from the survivable IP Expansion Cabinet or Chassis when the system is operating in survival mode. The CDR files are deleted from the IP Expansion Cabinet or Chassis after a successful transfer to a PC.

The XCDR command, file retrieval for small systems in LD 143, transfers the CDR file from the survivable IP expansion directly to the PC connected to the Main Cabinet or Chassis.

Use the following procedure to retrieve the CDR files stored on the survivable IP Expansion Cabinets or Chassis (one file per cabinet or chassis) using XModem.

Procedure 57
CDR retrieval using XModem

Step	Action
1	Connect a PC to the Main Cabinet or Chassis either remotely using a modem or directly using an SDI cable and a modem eliminator. Using a terminal emulation program such as Hyperterminal, establish a TTY session with the Small System through the modem or SDI cable.
2	Go into LD 143 on the Main Cabinet or Chassis from the PC. Enter the following command: **XCDR**
3	The system prompts for the IP Expansion Cabinet or Chassis number. Enter the number of the IP Expansion Cabinet or Chassis on which the <dba.cdr> file is stored.

4	The system prints the following:
	`Getting CDR file for EXP_CAB <num>`
	`Ready to transmit...`

5	Invoke the XModem protocol on the PC to receive the CDR file. Use the Hyperterminal transfer function to receive the file using XModem protocol. Rename the file to indicate which IP Expansion Cabinet or Chassis the CDR data is from. ***Note:*** Use a filename that will not overwrite any DBA-specific files if DBA is used to retrieve CDR/Traffic files from the Main Cabinet or Chassis.
6	Parse the CDR file into the Main Cabinet or Chassis database on the PC.

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Refer to the OTM NTPs for how to retrieve CDR records for Billing applications.

—End—

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Connecting the telephones

Contents

This section contains information on the following topics:

"Introduction" (page 307)
"Cable assignments for the Cabinet system" (page 308)
"Cross-connecting telephones" (page 309)
Procedure 59 "Connecting telephones without a PFTU" (page 311)
"Connecting analog 500/2500-type telephones with a PFTU" (page 312)
"Connecting off-premise telephones" (page 313)
"Connecting an attendant console" (page 315)
"Cross-connecting terminal Digital Subscriber Loops" (page 320)
"Activating telephones" (page 320)
"Activating a default model with a character display" (page 322)
"Activating a default model without a character display" (page 323)
"Activating a customized model with a character display" (page 324)
"Activating a customized model without a character display" (page 326)
"Activating terminals on a DSL" (page 327)

Introduction

This chapter contains instructions for connecting telephones to the cross-connect terminal. It also contains the location of the individual extension numbers (DNs) when you are implementing one of the default numbering plans and instructions on how to activate each telephone.

This chapter contains the following procedures:

- Procedure 58 "Cross-connecting telephones" (page 309)
- Procedure 59 "Connecting telephones without a PFTU" (page 311)
- Procedure 60 "Connecting 500/2500-type telephones with a PFTU" (page 312)

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- Procedure 61 "Connecting an off-premise telephone" (page 313)
- Procedure 62 "Connecting attendant console" (page 315)
- Procedure 63 "Activating a default model telephone with a character display" (page 322)
- Procedure 64 "Activating a default model telephone without a character display" (page 323)
- Procedure 65 "Activating a customized telephone" (page 324)
- Procedure 66 "Activating a customized telephone" (page 326)

Refer to "Telephones and attendant consoles" (page 32) and "Telephones and attendant consoles" (page 46) for a list of telephones and attendant consoles supported by the Cabinet system and Chassis system. Refer to the instructions provided with the telephone or console and to *Telephones and Consoles Fundamentals (NN43001-567)* for detailed information about installing telephones and consoles.

Refer to "Preprogrammed data" (page 357) for information about preprogrammed data.

Before you continue, install the cable from the slot that contains the line card associated with the telephone being connected. Refer to "Installing and connecting cross-connect terminals" (page 209), if you require additional cable installation.

Cable assignments for the Cabinet system

The cables from each cabinet are labeled J1 through J10 at the cross-connect terminal. Each cable represents a specific set of Terminal Numbers (TNs) as shown in Table 45 "Terminal number assignments: Main and Expansion Cabinets 1 and 2" (page 316).

DANGER

DANGER OF ELECTRIC SHOK

Always use caution when installing or modifying telephone lines. Avoid installing telephone wiring during a lightning storm. Do not install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Never touch uninsulated telephone wiring unless the line has been disconnected at the network interface.

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Cross-connecting telephones

Connect the telephones according to the following figures: Cross-connections for Analog (500/2500-type) telephones are shown in Figure 132 "NE-500/2500-type telephone cross-connections" (page 310), and for Meridian Digital Telephones in Figure 133 "Meridian Digital Telephone cross-connections" (page 311).

Procedure 58

Cross-connecting telephones

Step	Action
1	Locate the telephone terminations at the cross-connect terminal.
2	Connect the Z-type cross-connect wire to the leads of the telephone.
3	Locate line circuit card (TN) terminations at the cross-connect terminal.
4	Connect the other end of the cross-connect wire to the assigned TN terminal block.

—End—

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Figure 132
NE-500/2500-type telephone cross-connections

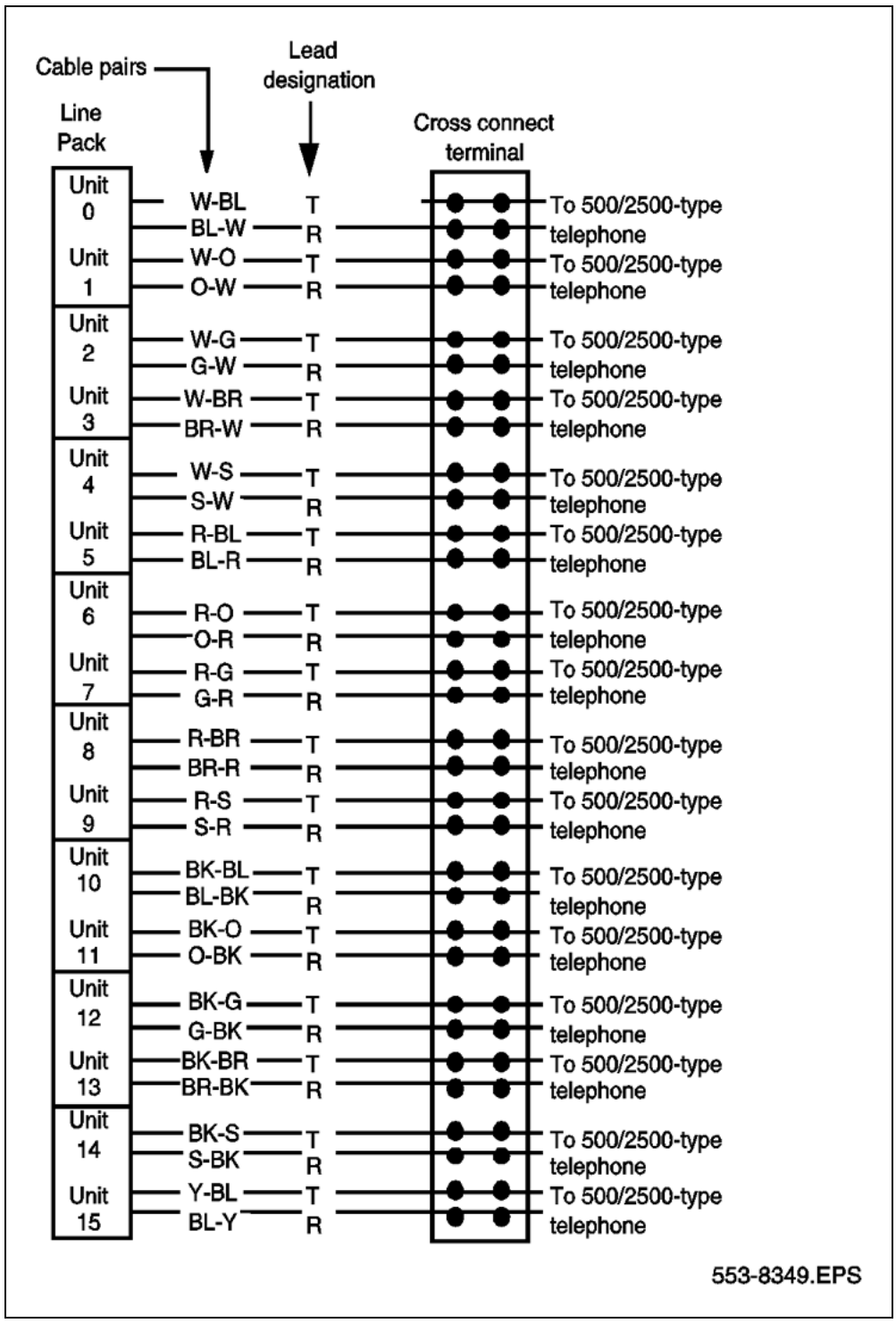

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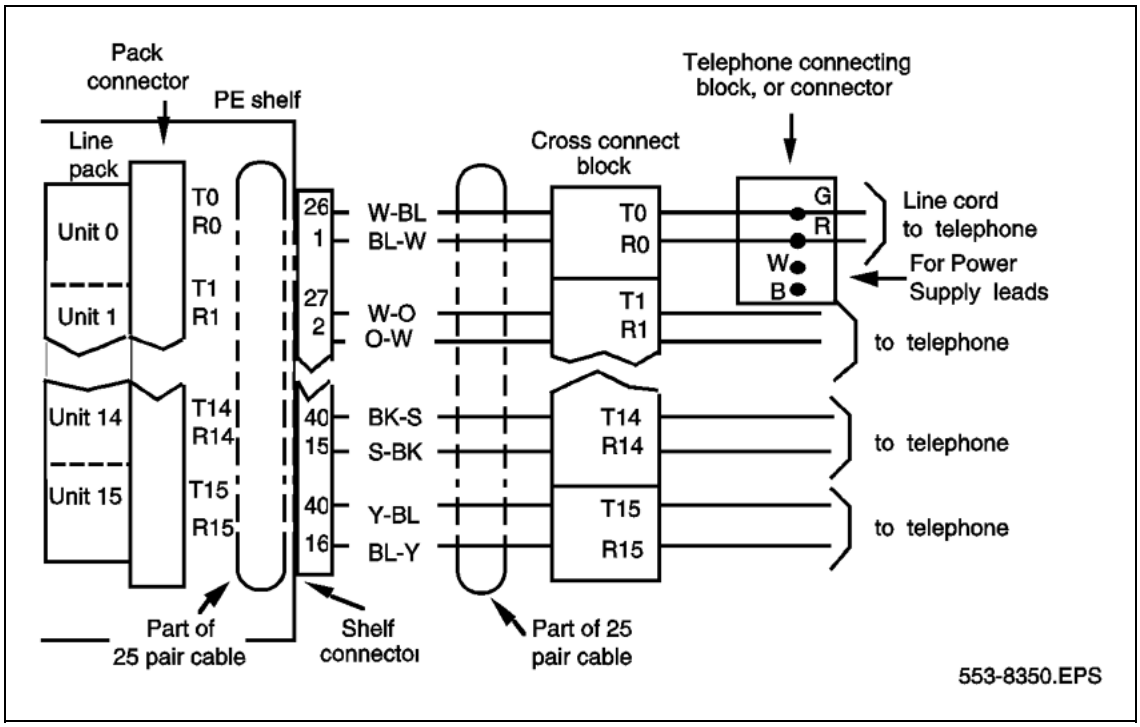
Figure 133
Meridian Digital Telephone cross-connections



Connecting telephones without a PFTU

Procedure 59
Connecting telephones without a PFTU

Step	Action
1	Locate the telephone terminations on the cross-connect terminal.
2	Connect one end of the cross-connect wire to the leads of the telephone.
3	Locate the line card terminations on the cross-connect terminal. For the Cabinet system, refer to Table 45 "Terminal number assignments: Main and Expansion Cabinets 1 and 2" (page 316) and Table 46 "Terminal number assignments: Expansion Cabinets 3 and 4" (page 317). For the Chassis system, refer to Table 47 "Terminal Number assignments: Chassis and chassis expander" (page 318).
4	Connect the other end of the cross-connect wire to the assigned TN terminal block.

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Refer to "Preprogrammed data" (page 357) for default DN assignments.

Now, you can activate the telephone, as described in "Activating telephones" (page 320).

—End—

Connecting analog 500/2500-type telephones with a PFTU

Procedure 60
Connecting 500/2500-type telephones with a PFTU

Step	Action
1	Locate the telephone terminations on the cross-connect terminal.
2	Connect one end of the cross-connect wire to the leads of the telephone.
3	Locate the PFTU connections (unit PFT 1 through PFT 5) assigned to this telephone at the cross-connect terminal. Refer to Table 48 "Power Failure Transfer Unit connections" (page 319).
4	Connect the other end of the cross-connect wire to the pair assigned to the telephone on the PFTU.
5	Connect a second cross-connect wire to the pair assigned to the line card on the PFTU.
6	Locate the line card terminations on the cross-connect terminal. For the Cabinet system, refer to: • Table 45 "Terminal number assignments: Main and Expansion Cabinets 1 and 2" (page 316) for the main cabinet and Expansion Cabinets 1 and 2 • Table 46 "Terminal number assignments: Expansion Cabinets 3 and 4" (page 317) for Expansion Cabinets 3 and 4 For the Chassis system, refer to: • Table 47 "Terminal Number assignments: Chassis and chassis expander" (page 318) for the chassis and chassis expander
7	Connect the other end of the cross-connect wire to the assigned TN terminal block.

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Refer to "Preprogrammed data" (page 357) for default DN assignments.

Now, you can activate the telephone, as described in "Activating telephones" (page 320).

—End—

Connecting off-premise telephones

Connect off-premise analog (500/2500-type) telephones through an NT1R20 Off-Premise Station Analog Line Card. Each card has Eight ports. Each of the units on the card can be configured to be operated as an OPS extension or in an On-premises (ONS) configuration.

DANGER
DANGER OF ELECTRIC SHOCK
The message waiting line card produces -150 V, which is considered hazardous on off-premise telephones. Make sure that the -150 V is disabled on off-premise telephones.

The voltage is disabled when the Class Of Service (CLS) assigned to the telephone is Message Waiting Lamp Denied (LPD) and Message Waiting Denied (MWD) in LD 10.

Refer to *Software Input Output Reference - Maintenance (NN43001-711)* for information about LD 10.

Do not assign a Class of Service of LPA or MWA to an off-premise telephone.

Procedure 61
Connecting an off-premise telephone

Step	Action
1	Mount the NT1R20 Off-Premise Protection Module on the wall using four #10 1/2 in. (minimum) screws.
2	Connect a #6 AWG (#40 Metric Wire Gauge) from the ground lug at the bottom of the NT1R20 Off-Premise Protection Module to an earth ground. Refer to Figure 134 "NT1R20 Off-Premise Protection Module connections" (page 315).

Note: In the UK, use a 2 mm2 (#6 AWG) ground lug. In Europe, use a #6 AWG (16 mm2) ground lug.

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WARNING
If connecting to a message waiting line card, unseat the card from its assigned slot before continuing with the next step.

3 Connect two NTAK9204 cables (one from connector J1 and one from connector J2) from the protection module to the cross-connect terminal.

Terminate the cables as shown in Figure 132 "NE-500/2500-type telephone cross-connections" (page 310).

4 Cross-connect the J1 cable to the Tip and Ring connections coming from the line card.

Refer to "Preprogrammed data" (page 357) for default DN assignments.

5 Cross-connect the J2 cable to the off-premise telephone.

6 Install the regulatory label provided with the Off-Premise Protection Module on the inside right-hand wall of the cabinet (near the Velcro wriststrap fastener) or chassis.

7 Install the line card in its assigned position.

Now, you can activate the telephone, as described in "Activating telephones" (page 320).

—End—

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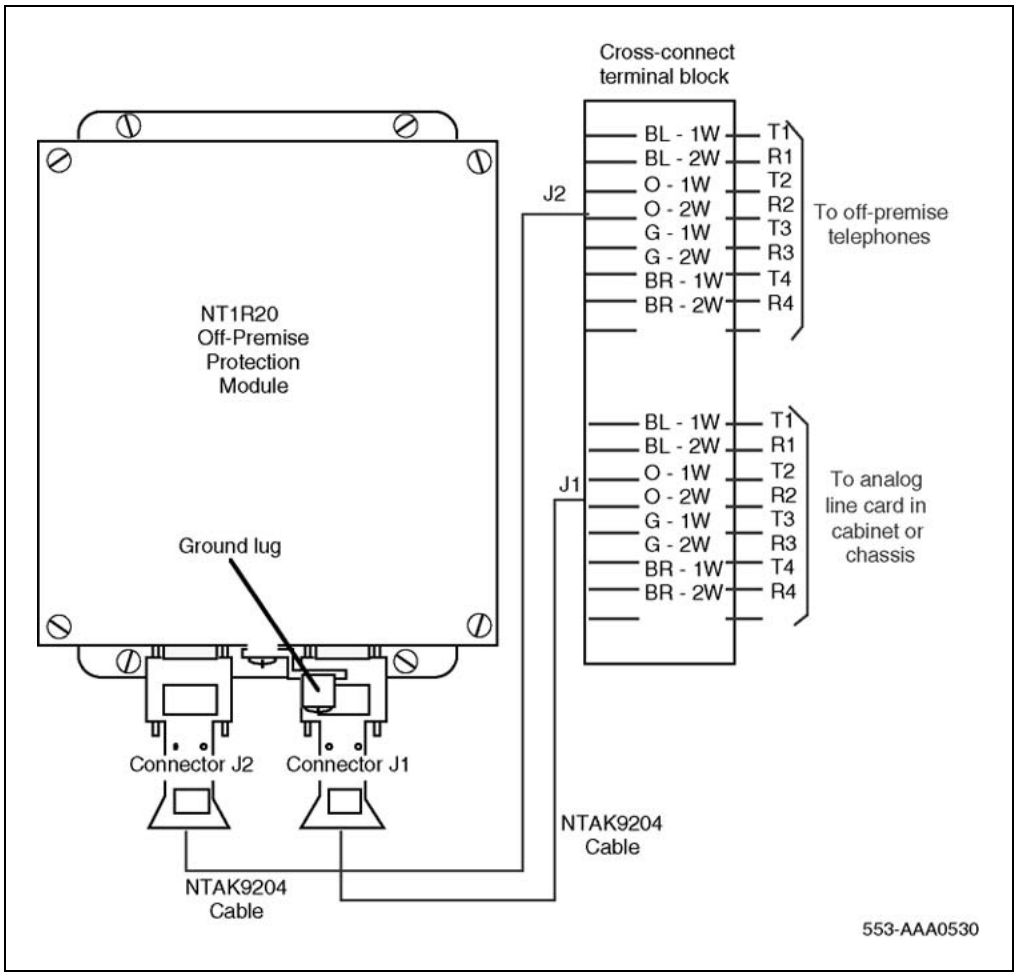
Figure 134
NT1R20 Off-Premise Protection Module connections



Connecting an attendant console

Procedure 62
Connecting attendant console

Step	Action
1	Locate the attendant console terminations at the cross-connect terminal.
2	Locate the line card terminations at the cross-connect terminal.
3	With cross-connect wire, connect the line card and other connections to the console as shown in Figure 135 "Attendant console connections" (page 316).

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—End—

Figure 135
Attendant console connections

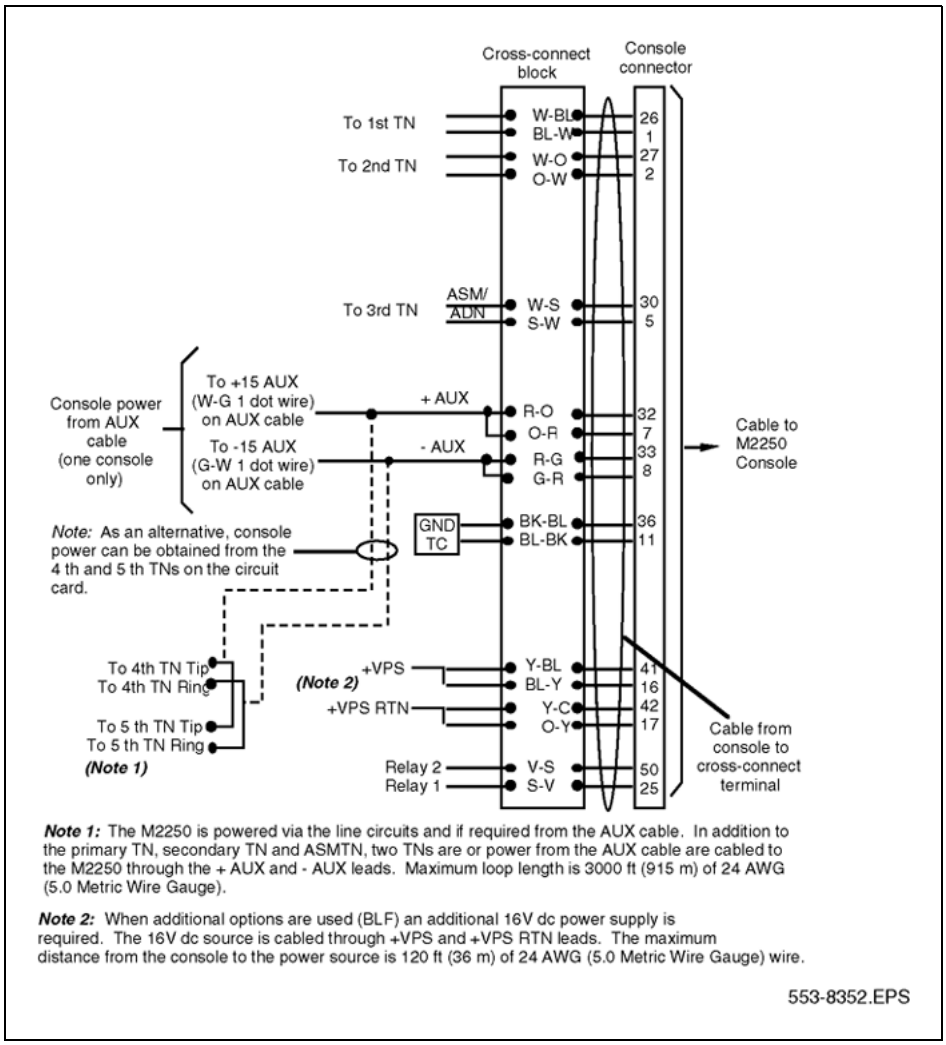

Table 45
Terminal number assignments: Main and Expansion Cabinets 1 and 2

Card	First TN.....Last TN	Cable	Cabinet
1	01 00.....01 15	J1	Main
2	02 00.....02 15	J2	Main
3	03 00.....03 15	J3	Main
4	04 00.....04 15	J4	Main
5	05 00.....05 15	J5	Main

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Card	First TN.....Last TN	Cable	Cabinet
6	06 00.....06 15	J6	Main
7	07 00.....07 15	J7	Main
8	08 00.....08 15	J8	Main
9	09 00.....09 15	J9	Main
10	10 00.....10 15	J10	Main
11	11 00.....11 15	J1	Expansion Cabinet 1
12	12 00.....12 15	J2	Expansion Cabinet 1
13	13 00.....13 15	J3	Expansion Cabinet 1
14	14 00.....14 15	J4	Expansion Cabinet 1
15	15 00.....15 15	J5	Expansion Cabinet 1
16	16 00.....16 15	J6	Expansion Cabinet 1
17	17 00.....17 15	J7	Expansion Cabinet 1
18	18 00.....18 15	J8	Expansion Cabinet 1
19	19 00.....19 15	J9	Expansion Cabinet 1
20	20 00.....20 15	J10	Expansion Cabinet 1
21	21 00.....21 15	J1	Expansion Cabinet 2
22	22 00.....22 15	J2	Expansion Cabinet 2
23	23 00.....23 15	J3	Expansion Cabinet 2
24	24 00.....24 15	J4	Expansion Cabinet 2
25	25 00.....25 15	J5	Expansion Cabinet 2
26	26 00.....26 15	J6	Expansion Cabinet 2
27	27 00.....27 15	J7	Expansion Cabinet 2
28	28 00.....28 15	J8	Expansion Cabinet 2
29	29 00.....29 15	J9	Expansion Cabinet 2
30	30 00.....30 15	J10	Expansion Cabinet 2

Table 46
Terminal number assignments: Expansion Cabinets 3 and 4

Card	First TN.....Last TN	Cable	Cabinet
31	31 00.....31 15	J1	Expansion Cabinet 3
32	32 00.....32 15	J2	Expansion Cabinet 3
33	33 00.....33 15	J3	Expansion Cabinet 3
34	34 00.....34 15	J4	Expansion Cabinet 3
35	35 00.....35 15	J5	Expansion Cabinet 3

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Card	First TN.....Last TN	Cable	Cabinet
36	36 00.....36 15	J6	Expansion Cabinet 3
37	37 00.....37 15	J7	Expansion Cabinet 3
38	38 00.....38 15	J8	Expansion Cabinet 3
39	39 00.....39 15	J9	Expansion Cabinet 3
40	40 00.....40 15	J10	Expansion Cabinet 3
41	41 00.....41 15	J1	Expansion Cabinet 4
42	42 00.....42 15	J2	Expansion Cabinet 4
43	43 00.....43 15	J3	Expansion Cabinet 4
44	44 00.....44 15	J4	Expansion Cabinet 4
45	45 00.....45 15	J5	Expansion Cabinet 4
46	46 00.....46 15	J6	Expansion Cabinet 4
47	47 00.....47 15	J7	Expansion Cabinet 4
48	48 00.....48 15	J8	Expansion Cabinet 4
49	49 00.....49 15	J9	Expansion Cabinet 4
50	50 00.....50 15	J10	Expansion Cabinet 4

Table 47
Terminal Number assignments: Chassis and chassis expander

Physical slot	Logical slot	First TN...Last TN	Cable	Chassis
1	1	01 00...01 15	Card 1	Main
2	2	02 00...02 15	Card 2	Main
3	3	03 00...03 15	Card 3	Main
4	4 5 6	04 00...04 15 05 00...05 15 06 00...06 07 06 08...06 15	Card 4/Card 6 Card 5/Card 6 Card 4/Card 6 Card 5/Card 6 (see note)	Main Main Main Main
7	7	07 00...07 15	Card 7	Expander
8	8	08 00...08 15	Card 8	Expander

Note: Refer to the labels on the back of the chassis. See Figure 105 "Cable connectors in a system cabinet" (page 220).

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Physical slot	Logical slot	First TN...Last TN	Cable	Chassis
9	9	09 00...09 15	Card 9	Expander
10	10	10 00...10 15	Card 10	Expander

Note: Refer to the labels on the back of the chassis. See Figure 105 "Cable connectors in a system cabinet" (page 220).

Table 48
Power Failure Transfer Unit connections

QUA6 J1 Cable			
Function	**Pair**	**Color**	**Connects to**
PFT 1	5T 5R	W-S S-W	Connect to the telephone
	6T 6R	R-BL BL-R	Connect to the telephone line card
	7T 7R	R-O O-R	Connect to the Central Office trunk
	8T 8R	R-G G-R	Connect to the trunk line card
PFT 2	9T 9R	R-BR BR-R	Connect to the telephone
	10T 10R	R-S S-R	Connect to the telephone line card
	11T 11R	BK-BL BL-BK	Connect to the Central Office trunk
	12T 12R	BK-O O-BK	Connect to the trunk line card
PFT 3	13T 13R	BK-G G-BK	Connect to the telephone
	14T 14R	BK-BR BR-BK	Connect to the telephone line card
	15T 15R	BK-S S-BK	Connect to the Central Office trunk
	16T 16R	Y-BL BL-Y	Connect to the trunk line card

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QUA6 J1 Cable			
Function	**Pair**	**Color**	**Connects to**
PFT 4	17T 17R	Y-O O-Y	Connect to the telephone
	18T 18R	Y-G G-Y	Connect to the telephone line card
	19T 19R	Y-BR BR-Y	Connect to the Central Office trunk
	20T 20R	Y-S S-Y	Connect to the trunk line card
PFT 5	21T 21R	V-BL BL-V	Connect to the telephone
	22T 22R	V-O O-V	Connect to the telephone line card
	23T 23R	V-G G-V	Connect to the Central Office trunk
	24T 24R	V-BR BR-V	Connect to the trunk line card

Table 49
Cable Pair Color Combinations

Color	W-Bl Bl-W	W-O O-W	W-G G-W	W-BR BR-W	W-S S-W	R-BL BL-R	R-O O-R	R-G G-R
Unit	0	1	2	3	4	5	6	7
Color	R-BR BR-R	R-S S-R	BK-BL BL-BK	BK-O O-BK	BK-G G-BK	BK-BR BR-BK	BK-S S-BK	Y-B B-Y
Unit	8	9	10	11	12	12	14	15

Cross-connecting terminal Digital Subscriber Loops

Refer to *ISDN Basic Rate Interface Installation and Commissioning (NN43001-318)* for a complete description of terminal Digital Subscriber Loops (DSL) cross-connecting and installation.

Activating telephones

Activating telephones is not difficult. Activate each telephone by performing a procedure on the telephone. Automatic Set Configuration is the software feature used to activate telephone sets.

Note: You cannot activate the data feature using the procedures in this chapter. To program a telephone with the data feature, configure it in LD 11 with Data Class of Service as described in *Software Input Output Reference - Maintenance (NN43001-711)*.

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This chapter contains procedures for activating the following models of telephones:

- a default model with a default extension number
- a customized model with a customized extension number

This chapter provides these procedures for telephones with and without character displays.

Telephone tones

There are a number of different telephone tones. Table 50 "Telephone tones" (page 321) includes tones that you hear during telephone activation. Table 51 "Telephone tones for Germany" (page 321) includes tones that you hear during telephone activation in Germany.

Table 50
Telephone tones

Tone	Description
Dial tone	A continuous tone.
Special dial tone	Three beeps followed by continuous dial tone.
Overflow tone	Like a busy tone, except faster and higher.
Relocation tone	A short high-pitched beep that continues for 4 seconds, followed by silence.

Table 51
Telephone tones for Germany

Tone	Description	Specification
Dial tone	Sequences of three short beeps with a pause between cycles	Beep: 420 Hz tone for 200 ms Pause between beeps: 275 ms Pause between cycles: 875 ms
Special dial tone	Six short beeps followed by continuous tone	Beep: 420 Hz tone for 125 ms Pause between beeps: 125 ms
Overflow tone	Continuous beeping, like a busy tone	Beep: 420 Hz tone for 200 ms Pause: 600 ms
Relocation tone	Short, high-pitched beep followed by silence	Beep: 1400 Hz tone for 1.4 seconds

Note 1: Before you activate a telephone, make sure that you have decided on its final location. Also, know the model number assigned to the telephone and if it is to be customized.

Note 2: When you are activating Meridian Digital Telephones, remember that they are different from the older Meridian Modular

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Telephones. Meridian Modular Telephones can have a combined total of 128 model telephones. Meridian Digital Telephones can have 128 models for each type of telephone. When you activate a Meridian Digital Telephone, select the model associated with that telephone type, or the telephone will not work.

Activating a default model with a character display

Procedure 63
Activating a default model telephone with a character display

Step	Action
1	Plug the telephone set into the jack and wait 20 seconds before picking up the handset. If you do not receive a dial tone, replace the handset and wait another 10 seconds before going off-hook again. Repeat this procedure until dial tone is received. If successful, the character display shows either "MODEL? X" (if the telephone relocation feature is **not** in use) or "RELOC OR MODEL? X" (if the telephone relocation feature **is** in use). "X" represents the default model for the telephone that you are activating. ***Note 1:*** If you do not see the prompt "MODEL X" after lifting the handset, disconnect the telephone from the wall jack, wait five seconds, and reinsert the telephone into the jack. The telephone now shows "MODEL X" when you lift the handset. ***Note 2:*** The 20 second time interval is required for the system to determine whether the set is new or if it is being relocated using the Modular Telephone Relocation feature.
2	Press the pound key (#) to select the default model. The character display shows "OK, EXTENSION? XXXX". "XXXX" represents the default extension number for this telephone type.
3	Press the pound key again to select the default extension number. You hear the relocation tone. The character display, shows "OK". OR If the extension number is already in use by another telephone, you hear the special dial tone. If the telephone has a display it shows "MULTI-LINE, EXTENSION?". To accept the default extension number press the pound key. To select a new extension number, manually enter an extension number and press the pound key.

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OR

If the extension number is not available for use, the character display shows "ERROR, EXTENSION?" and you hear overflow tone.

This happens when you choose an extension number manually or when extension numbers are entered for additional keys. A default extension number will not be offered if it is not available.

You must repeat step 3 and manually enter a new extension number.

Note 1: If other keys require secondary extension numbers, you are prompted until you enter all of the required extension numbers for the model.

Note 2: These extension numbers cannot be defaulted. The text display prompting for further extension numbers is "KEY kk EXT?" where "kk" represents the key number requiring the extension number.

Note 3: Each prompt for another extension number is accompanied by special dial tone. When you are programming an extension number, the lamp associated with that number on the telephone is lit.

4 Hang up the telephone receiver.

After approximately 10 seconds, the telephone is configured.

Note: If you replace the handset before completing the prompt sequence, the installation will automatically fail. This can be useful if you make an error and want to restart the procedure.

—End—

Activating a default model without a character display

Procedure 64

Activating a default model telephone without a character display

Step	Action
1	Plug the telephone set into the jack and wait 20 seconds before picking up the handset. If you do not receive dial tone, replace the handset and wait another 10 seconds before going off-hook again. Repeat this procedure until dial tone is received. ***Note:*** The 20 second time interval is required for the system to determine whether the set is new or if it is being relocated using the Modular Telephone Relocation feature.

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2 Press the pound key (#) to select the default model.

3 Press the pound key again to select the default extension number.

You hear a short, high-pitched beep lasting four seconds followed by silence (relocation tone).

Note: If the extension number is already in use by another telephone, you hear three beeps followed by continuous dial tone (special dial tone).

To accept the default extension number press the pound key.

To select a new extension number, manually enter an extension number and press the pound key.

If the extension number is not available for use, you hear a fast, high-pitched broken tone (overflow tone). This happens when you choose an extension number manually or when extension numbers are entered for additional keys. A default extension number is not offered if it is not available. You must repeat step 3 and you must manually enter a new extension number.

Note: If other keys require secondary extension numbers, you are prompted until you enter all of the required extension numbers for the model. These extension numbers cannot be defaulted. You are prompted for each additional extension number with three beeps followed by continuous dial tone (special dial tone). When you are programming an extension number, the lamp associated with that number on the telephone is lit.

—End—

Activating a customized model with a character display

Procedure 65
Activating a customized telephone

Step	Action
1	Plug the telephone set into the jack and wait 20 seconds before picking up the handset. If you do not receive dial tone, replace the handset and wait another 10 seconds before going off-hook again. Repeat this procedure until dial tone is received.

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If successful, the character display shows either "MODEL? X" (if the telephone relocation feature is **not** in use) or "RELOC OR MODEL? X" (if the telephone relocation feature **is** in use). "X" represents the default model for the telephone that you are activating.

Note 1: If you do not see the prompt "MODEL X" after lifting the handset, disconnect the telephone from the wall jack, wait five seconds, and reinsert the telephone into the jack. The telephone now shows "MODEL X" when you lift the handset.

Note 2: The 20 second time interval is required for the system to determine whether the set is new or if it is being relocated using the Modular Telephone Relocation feature.

2 Press the digits associated with the customized model and press the pound key (#).

Dial tone disappears after the first digit is pressed and you hear special dial tone after you press the pound key. If you enter a valid model number the character display reads "OK, EXTENSION?". If you enter an invalid model, the previous prompt is reissued and you hear overflow tone.

3 Enter the customized extension number and press the pound key.

You hear relocation tone. The character display shows "OK".

OR

If the extension number is already in use by another telephone, you hear special dial tone again. The character display shows "MULTI-LINE, EXTENSION?".

OR

If the extension number is not available for use, you hear overflow tone. The character display shows "ERROR, EXTENSION?" and you must repeat this step.

Note: If other keys require secondary extension numbers, you are prompted until you enter all of the required extension numbers for the model. These extension numbers cannot be defaulted. The text display prompting for further extension numbers is "KEY kk EXT?" where "kk" represents the key number requiring the extension number. Each prompt for another extension number is accompanied by special dial tone. When you are programming an extension number, the lamp associated with that number on the telephone is lit.

4 Hang up the telephone handset.

After approximately 10 seconds, the telephone is configured.

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Note: If you replace the handset before you complete the prompt sequence, the installation automatically fails. This can be useful if you make an error and want to restart the procedure.

—End—

Activating a customized model without a character display

Procedure 66
Activating a customized telephone

Step	Action
1	Plug the telephone set into the jack and wait 20 seconds before picking up the handset. If you do not receive dial tone, replace the handset and wait another 10 seconds before going off-hook again. Repeat this procedure until dial tone is received. ***Note:*** The 20 second time interval is required for the system to determine whether the set is new or if it is being relocated using the Modular Telephone Relocation feature.
2	Press the digits associated with the customized model and press the pound key (#). Dial tone disappears after the first digit is pressed, and you hear three beeps followed by continuous dial tone (special dial tone) after you press the pound key.
3	Enter the customized extension number and press the pound key. You hear a short high-pitched beep lasting four seconds, followed by silence (relocation tone). If the extension number is already in use by another telephone, you hear special dial tone again. If the extension number is not available for use, you hear a fast, high-pitched broken tone (overflow tone), and you must repeat this step.
4	Hang up the telephone handset. After approximately 10 seconds, the telephone is configured. ***Note:*** If other keys require secondary extension numbers, you are prompted until you enter all of the required extension numbers for the model. These extension numbers cannot be defaulted. You are prompted for each additional extension number with three beeps followed by continuous dial tone

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(special dial tone). When you are programming an extension number, the lamp associated with that number on the telephone is lit.

—End—

Activating terminals on a DSL

Refer to *ISDN Basic Rate Interface Installation and Commissioning (NN43001-318)*, for information about activating and initializing the various terminals that can be connected to a terminal DSL.

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Connecting the trunks

Contents

This section contains information on the following topics:

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"Connecting trunks without PFTU" (page 330)
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"Trunk connections" (page 333)
"NT8D14 Universal Trunk card" (page 333)
"NT8D15 E and M Trunk card" (page 335)
"NT6D70 SILC and NT6D71 UILC cards" (page 336)
"Trunk connections (Europe)" (page 337)
"E and M TIE trunk card (2-wire)" (page 337)
"E and M TIE trunk card (4-wire)" (page 338)
"E and M TIE trunk card (2280 Hz)" (page 341)
"E and M TIE trunk card (RAN)" (page 341)
"E and M TIE trunk card (MUS)" (page 342)
"CO and DID trunk card" (page 342)
"Central Office trunk card" (page 343)
"Trunk connections (UK)" (page 344)
"NT5K17 Direct Inward Dial card terminations" (page 344)
"NT5K18 Exchange line trunk card terminations" (page 345)
"NT5K19 Analog TIE line trunk card terminations" (page 346)
"Activating a default model trunk" (page 349)
"Activating a selected model trunk" (page 351)

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Introduction

This chapter describes how to connect trunks directly to the trunk card, with or without the use of a Power Failure Transfer Unit (PFTU). This chapter contains the following procedures:

- Procedure 67 "Connecting trunks without PFTU" (page 330)
- Procedure 68 "Connecting trunks with PFTU" (page 331)
- Procedure 69 "Activating a default model trunk" (page 349)
- Procedure 70 "Activating a selected model trunk" (page 351)

Note: The QUA6 PFTU operates with loop start and ground start CO trunks. However, with ground-start trunks the related telephone set must have a ground-start button.

During initial software installation on the Small System, you can load a default database, containing preprogrammed trunk data, into software. If necessary, you can modify the default data at any time to meet the specific needs of a customer. For a description of how to modify preprogrammed trunking data, refer to "Preprogrammed data" (page 357) in this document.

DANGER
DANGER OF ELECTRIC SHOCK
Always use caution when installing or modifying telephone lines. Avoid installing telephone wiring during a lightning storm. Do not install telephone jacks in wet locations unless the jack is specifically designed for wet locations. Never touch uninsulated telephone wiring unless the line has been disconnected at the network interface.

Connecting trunks without PFTU

Procedure 67
Connecting trunks without PFTU

Step	Action
1	From the assignment record, determine the location of the trunk connection and its associated Terminal Number (TN) at the cross-connect terminal.
2	With cross-connect wire, connect the trunk to the TN. Make sure that the wiring is not reversed and is on the correct terminals.

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Table 53 "NT8D14 Universal Trunk: modes and option settings" (page 333) to Table 55 "NT8D15 E and M Trunk card" (page 335) list the connections for trunks. For trunk connections for Europe, see Table 56 "E and M TIE trunk card (2-wire)" (page 337) to Table 64 "Central Office trunk connections" (page 343). For trunk connections for the UK, see Table 65 "NT5K17 DID cross-connect terminations" (page 344) to Table 71 "NT5K19 Recorded Announcement mode pair terminations" (page 349).

—End—

Connecting trunks with PFTU

Procedure 68
Connecting trunks with PFTU

Step	Action
1	Locate the PFTU terminal blocks at the cross-connect terminal.
2	Cross-connect the first pair of the assigned PFT to the telephone. Refer to Table 52 "Power Failure Transfer Unit connections" (page 332) for PFTU connections.
3	Cross-connect the second pair of the PFT to the TN assigned to the telephone.
4	Cross-connect the third pair of the PFT to the Central Office trunk.
5	Cross-connect the third pair of the PFT to the TN assigned to the trunk.
6	Repeat for each trunk assigned to the PFTU.

—End—

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Table 52
Power Failure Transfer Unit connections

QUA6 J1 cable				
Function	**Pair**	**Color**	**Connects to**	**Comments**
PFT 1	5T 5R	W-S S-W	Connect to the telephone	
	6T 6R	R-BL BL-R	Connect to the telephone line card	Connect to TN assigned to the telephone
	7T 7R	R-O O-R	Connect to the Central Office trunk	
	8T 8R	R-G G-R	Connect to the trunk line card	Connect to TN assigned to the trunk
PFT 2	9T 9R	R-BR BR-R	Connect to the telephone	
	10T 10R	R-S S-R	Connect to the telephone line card	Connect to TN assigned to the telephone
	11T 11R	BK-BL BL-BK	Connect to the Central Office trunk	
	12T 12R	BK-O O-BK	Connect to the trunk line card	Connect to TN assigned to the trunk
PFT 3	13T 13R	BK-G G-BK	Connect to the telephone	
	14T 14R	BK-BR BR-BK	Connect to the telephone line card	Connect to TN assigned to the telephone
	15T 15R	BK-S S-BK	Connect to the Central Office trunk	
	16T 16R	Y-BL BL-Y	Connect to the trunk line card	Connect to TN assigned to the trunk
PFT 4	17T 17R	Y-O O-Y	Connect to the telephone	
	18T 18R	Y-G G-Y	Connect to the telephone line card	Connect to TN assigned to the telephone
	19T 19R	Y-BR BR-Y	Connect to the Central Office trunk	
	20T 20R	Y-S S-Y	Connect to the trunk line card	Connect to TN assigned to the trunk

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QUA6 J1 cable				
Function	Pair	Color	Connects to	Comments
P F T 5	21T 21R	V-BL BL-V	Connect to the telephone	
	22T 22R	V-O O-V	Connect to the telephone line card	Connect to TN assigned to the telephone
	23T 23R	V-G G-V	Connect to the Central Office trunk	
	24T 24R	V-BR BR-V	Connect to the trunk line card	Connect to TN assigned to the trunk

Trunk connections

NT8D14 Universal Trunk card

The Universal Trunk card provides eight analog trunks which can function in the modes shown in Table 53 "NT8D14 Universal Trunk: modes and option settings" (page 333).

Table 53
NT8D14 Universal Trunk: modes and option settings

Modes	Location	Jumper strap
Central (CO)	J1, J2	OFF
2-way TIE trunk (loop Dial Repeat)	J1, J2	OFF
2 -way TIE trunk (Outgoing Incoming Dial)	J1, J2	OFF
Recorded Announcement (RAN)	J1, J2	OFF
Paging trunk	J1, J2	OFF
Japan CO/DID operation	J1, J2	OFF
DID operation Loop length>2000 ohms	J1, J2	ON
DID operation Loop length <2000 ohms	J1, J2	OFF

Note: OFF indicates no strap present.
J1 and J2 locations apply to all eight trunks.

Refer to Table 54 "NT8D14 Universal Trunk connections" (page 334) for the connections to the NT8D14 Universal Trunk at the cross-connect terminal.

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Table 54
NT8D14 Universal Trunk connections

Cable from cabinet or chassis		Designations			
Pair	Color	Unit #	RAN mode	Paging mode	All other modes
1T 1R 2T 2R	 W-BL BL-W W-O O-W	0	 T0 R0 CP MB	 T0 R0 A PG	 T0 R0
3T 3R 4T 4R	W-G G-W W-BR BR-W	1	T1 R1 CP MB	T1 R1 A PG	T1 R1
5T 5R 6T 6R	W-S S-W R-BL BL-R	2	T2 R2 CP MB	T2 R2 A PG	T2 R2
7T 7R 8T 8R	R-O O-R R-G G-R	3	T3 R3 CP MB	T3 R3 A PG	T3 R3
9T 9R 10T 10R	R-BR BR-R R-S S-R	4	T4 R4 CP MB	T4 R4 A PG	T4 R4
11T 11R 12T 12R	BK-BL BL-BK BK-O O-BK	5	T5 R5 CP MB	T5 R5 A PG	T5 R5
13T 13R 14T 14R	BK-G G-BK BK-BR BR-BK	6	T6 R6 CP MB	T6 R6 A PG	T6 R6

Note: Remaining pairs are spares.

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Cable from cabinet or chassis		Designations			
Pair	Color	Unit #	RAN mode	Paging mode	All other modes
15T 15R	BK-S S-BK	7	T7 R7	T7 R7	T7 R7
16T 16R	Y-BL BL-Y		CP MB	A PG	

Note: Remaining pairs are spares.

NT8D15 E and M Trunk card

Table 55
NT8D15 E and M Trunk card

Cables J1 through J10 from cabinet/Card 1 through Card 10 from chassis			Designations			
Pair	Color	Unit #	2W Paging mode	2W Type 1 mode	4W Type 1 mode	4W Type 2 mode
1T 1R	W-BL BL-W	0	T0 R0	T0 R0	TA TB	TA TB
2T 2R	W-O O-W				RA RB	RA RB
3T 3R	W-G G-W			E M	E M	EA EB
4T 4R	W-BR BR-W		A PG		ESC ESCG	MA MB

Note: A and B are the transmit and receive pairs, where:
TA = Transmit Tip, and RA = Receive Tip
TB = Transmit Ring, and RB = Receive Ring

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Cables J1 through J10 from cabinet/Card 1 through Card 10 from chassis		Unit #	Designations			
Pair	Color		2W Paging mode	2W Type 1 mode	4W Type 1 mode	4W Type 2 mode
5T 5R	W-S S-W	1	T1 R1	T1 R1	TA TB	TA TB
6T 6R	R-BL BL-R				RA RB	RA RB
7T 7R	R-O O-R			E M	E M	EA EB
8T 8R	R-G G-R		A PG		ESC ESCG	MA MB
9T 9R	R-BR BR-R	2	T2 R2	T2 R2	TA TB	TA TB
10T 10R	R-S S-R				RA RB	RA RB
11T 11R	BK-BL BL-BK			E M	E M	EA EB
12T 12R	BK-O O-BK		A PG		ESC ESCG	MA MB
13T 13R	BK-G G-BK	3	T3 R3	T3 R3	TA TB	TA TB
14T 14R	BK-BR BR-BK				RA RB	RA RB
15T 15R	BK-S S-BK			E M	E M	EA EB
16T 16R	Y-BL BL-Y		A PG		ESC ESCG	MA MB

Note: A and B are the transmit and receive pairs, where:
TA = Transmit Tip, and RA = Receive Tip
TB = Transmit Ring, and RB = Receive Ring

NT6D70 SILC and NT6D71 UILC cards

Refer to *ISDN Basic Rate Interface Installation and Commissioning (NN43001-318)* for a complete description of trunk DSL installation and connections.

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Trunk connections (Europe)

E and M TIE trunk card (2-wire)

Note: Refer to *Circuit Card Reference (NN43001-311)* for a complete description of European circuit cards.

Table 56
E and M TIE trunk card (2-wire)

Cables J1 through J10 from cabinet/Card 1 through Card 10 from chassis		Unit #	Pins	Typical lead designations		
Pair	**Color**			**Paging**	**Paging**	**Type 5 (BPO)**
1T 1R	W-O O-W	0	27 2	T0 R0	T0 R0	T0 R0
2T 2R	W-BR BR-W		29 4	A PG	SIGB SIGA	E M
3T 3R	R-BL BL-R	1	31 6	T1 R1	T1 R1	T1 R1
4T 4R	R-G G-R		33 8	A PG	SIGB SIGA	E M
5T 5R	R-S S-R	2	35 10	T2 R2	T2 R2	T2 R2
6T 6R	BK-O O-BK		37 12	A PG	SIGB SIGA	E M
7T 7R	BK-BR BR-BK	3	39 14	T3 R3	T3 R3	T3 R3
8T 8R	Y-BL BL-Y		41 16	A PG	SIGB SIGA	E M

Table 57
E and M 2-wire Type 2

Lead designations	Pins	Pair color	Unit number
T0 R0	27 2	W-O O-W	
E1 E2	28 3	W-G G-W	Unit 0
M1 M2	29 4	W-G G-W	

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Lead designations	Pins	Pair color	Unit number
T1 R1 E1 E2 M1 M2	31 6 32 7 33 8	R-BL BL-R R-O O-R R-G G-R	 Unit 1
T2 R2 E1 E2 M1 M2	35 10 36 11 37 12	R-S S-R BK-BL BL-BK BK-O O-BK	 Unit 2
T3 R3 E1 E2 M1 M2	39 14 40 15 41 16	BK-BR BR-BK BK-S S-BK Y-BL BL-Y	 Unit 3

E and M TIE trunk card (4-wire)

Table 58
E and M TIE trunk card (4-wire)

Cables J1 through J10 from cabinet/Card 1 through	Unit #	Pins	Typical lead designations

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Card 10 from chassis					
Pair	**Color**			**Type 1 & 5**	**Type 1 & 5**
1T 1R	W-BL BL-W	0	26 1	RA RB	TA TB
2T 2R	W-O O-W		27 2	TA TB	RA RB
3T 3R	W-G G-W		28 3	E M	E M
4T 4R	W-S S-W	1	30 5	RA RB	TA TB
5T 5R	R-BL BL-R		31 6	TA TB	RA RB
6T 6R	R-O O-R		32 7	E M	E M
7T 7R	R-BR BR-R	2	34 9	RA RB	TA TB
8T 8R	R-S S-R		35 10	TA TB	RA RB
9T 9R	BK-BL BL-BK		36 11	E M	E M
10T 10R	BK-G G-BK	3	38 13	RA RB	TA TB
11T 11R	BK-BR- BR-BK		39 14	TA TB	RA RB
12T 12R	BK-S S-BK		40 15	E M	E M

Note: The cable pair designated TA, TB is the transmit pair. The pair designated RA, RB is the receive pair.

Table 59
E and M TIE trunk card (4-wire)

Cables J1 through J10 from cabinet/Card 1 through	**Unit #**	**Pins**	**Typical lead designations**

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Card 10 from chassis					
Pair	Color			Type 2	Type 2
1T 1R	W-BL BL-W	0	26 1	RA RB	RA RB
2T 2R	W-O O-W		27 2	TA TB	TA TB
3T 3R	W-G G-W		28 3	E1 E2	E M
4T 4R	W-BR BR-W		29 4	M1 M2	SIG0A SIG0B
5T 5R	W-S S-W	1	30 5	RA RB	RA RB
6T 6R	R-BL BL-R		31 6	TA TB	TA TB
7T 7R	R-O O-R		32 7	E1 E2	E M
8T 8R	R-G G-R		33 8	M1 M2	SIG1A SIG1B
9T 9R	R-BR BR-R	2	34 9	RA RB	RA RB
10T 10R	R-S S-R		35 10	TA TB	TA TB
11T 11R	BK-BL BL-BK		36 11	E1 E2	E M
12T 12R	BK-O O-BK		37 12	M1 M2	SIG2A SIG2B
13T 13R	BK-G G-BK	3	38 13	RA RB	RA RB
14T 14R	BK-BR BR-BK		39 14	TA TB	TA TB
15T 15R	BK-S S-BK		40 15	E1 E2	E M
16T 16R	Y-BL BL-Y		41 16	M1 M2	SIG3A SIG3B

Note: The cable pair designated TA, TB is the transmit pair. The pair designated RA, RB is the receive pair.

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E and M TIE trunk card (2280 Hz)

Table 60
E and M 2280 Hz TIE trunk connections

Lead designations	Pins	Pair color	Unit #
TA TB RA RB	26 1 27 2	W-BL BL-W W-O O-W	0
TA TB RA RB	30 5 31 6	W-S S-W R-BL BL-R	1
TA TB RA RB	34 9 35 10	R-BR BR-R R-S S-R	2
TA TB RA RB	38 13 39 14	BK-G G-BK BK-BR BR-BK	3

E and M TIE trunk card (RAN)

Table 61
E and M 2-wire Recorded Announcement trunk connections

Lead designations	Pins	Pair color	Unit #
T0 R0 SIG B SIG A	26 1 29 4	W-BL BL-W W-BR BR-W	0
T1 R1 SIG B SIG A	30 5 33 8	W-S S-W R-G G-R	1
T2 R2 SIG B SIG A	34 9 37 12	R-BR BR-R BK-O O-BK	2

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Lead designations	Pins	Pair color	Unit #
T3 R3 SIG B SIG A	38 13 41 16	BK-G G-BK Y-BL BL-Y	3

E and M TIE trunk card (MUS)

Table 62
E and M 2-wire Music trunk connections

Lead designations	Pins	Pair color	unit #
T0 R0	26 1	W-BL BL-W	0
T1 R1	30 5	W-S S-W	1
T2 R2	34 9	R-BR BR-R	2
T3 R3	38 13	BK-G G-BK	3

CO and DID trunk card

Table 63
Central Office and Direct Inward Dial trunk connection

Cable from cabinets or chassis		Unit #	Pins	Lead designations		
Pair	Color			Column 1	Column 2	Column 3
1T 1R 2T 2R	W-BL BL-W W-O O-W	0	26 1 27 2	T0 R0	T0 R0 PPM0 —	A0 B0 C0 Spare
3T 3R 4T 4R	W-G G-W W-BR BR-W	1	28 3 29 4	T1 R1	T1 R1 PPM1 —	A1 B1 C1 Spare
5T 5R 6T 6R	W-S S-W R-BL BL-R	2	30 5 31 6	T2 R2	T2 R2 PPM2 —	A2 B2 C2 Spare

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Cable from cabinets or chassis		Unit #	Pins	Lead designations		
Pair	Color			Column 1	Column 2	Column 3
7T 7R 8T 8R	R-O O-R R-G G-R	3	32 7 33 8	T3 R3	T3 R3 PPM3 —	A3 B3 C3 Spare
9T 9R 10T 10R	R-BR BR-R R-S S-R	4	34 9 35 10	T4 R4	T4 R4 PPM4 —	A4 B4 C4 Spare
11T 11R 12T 12R	BK-BL BL-BK BK-O O-BK	5	36 11 37 12	T5 R5	T5 R5 PPM5 —	A5 B5 C5 Spare
13T 13R 14T 14R	BK-G G-BK BK-BR BR-BK	6	38 13 39 14	T6 R6	T6 R6 PPM6 —	A6 B6 C6 Spare
15T 15R 16T 16R	BK-S S-BK Y-BL BL-Y	7	40 15 41 16	T7 R7	T7 R7 PPM7 —	A7 B7 C7 Spare

Central Office trunk card

Table 64
Central Office trunk connections

Cable from cabinets or chassis		Unit #	Pins	Lead designations
Pair	Color			
1T 1R	W-BL BL-W	0	26 1	T0 R0
2T 2R	W-O O-W		27 2	
3T 3R	W-G G-W		28 3	
4T 4R	W-BR BR-W		29 4	

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Cable from cabinets or chassis		Unit #	Pins	Lead designations
Pair	Color			
5T 5R	W-S S-W	1	30 5	T1 R1
6T 6R	R-BL BL-R		31 6	
7T 7R	R-O O-R		32 7	
8T 8R	R-G G-R		33 8	
9T 9R	R-BR BR-R	2	34 9	T2 R2
10T 10R	R-S S-R		35 10	
11T 11R	BK-BL BL-BK		36 11	
12T 12R	BK-O O-BK		37 12	
13T 13R	BK-G G-BK	3	38 13	T3 R3
14T 14R	BK-BR BR-BK		39 14	
15T 15R	BK-S S-BK		40 15	
16T 16R	Y-BL BL-Y		41 16	

Trunk connections (UK)

NT5K17 Direct Inward Dial card terminations

Cross-connect the NT5K17 DID card as shown in Table 65 "NT5K17 DID cross-connect terminations" (page 344).

Table 65
NT5K17 DID cross-connect terminations

Pair	Pins	Pair color	Unit #
T0 R0	26 1	W-BL BL-W	0
	27 2	W-O O-W	

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Pair	Pins	Pair color	Unit #
T1 R1	28 3 29 4	W-G G-W W-BR BR-W	1
T2 R2	30 5 31 6	W-S S-W R-BL BL-R	2
T3 R3	32 7 33 8	R-O O-R R-G G-R	3
T4 R4	34 9 35 10	R-BR BR-R R-S S-R	4
T5 R5	36 11 37 12	BK-BL BL-BK BK-O O-BK	5
T6 R6	38 13 39 14	BK-G G-BK BK-BR BR-BK	6
T7 R7	40 15 41 16	BK-S S-BK Y-BL BL-Y	7

NT5K18 Exchange line trunk card terminations

Cross-connect the NT5K18 Exchange line trunk card as shown in Table 66 "NT5K18 Exchange line trunk card cross-connect terminations" (page 346).

Note: The connections on the NT5K18 Exchange line trunk card are polarity sensitive. Make sure the ground side of the trunk is connected to the A leg of the NT5K18 circuit. Make sure the -50 V side of the trunk is connected to the B leg of the NT5K18 circuit.

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Table 66
NT5K18 Exchange line trunk card cross-connect terminations

Pair	Pins	Pair color	Unit #
T0 R0	26 1 27 2	W-BL BL-W W-O O-W	0
T1 R1	28 3 29 4	W-G G-W W-BR BR-W	1
T2 R2	30 5 31 6	W-S S-W R-BL BL-R	2
T3 R3	32 7 33 8	R-O O-R R-G G-R	3
T4 R4	34 9 35 10	R-BR BR-R R-S S-R	4
T5 R5	36 11 37 12	BK-BL BL-BK BK-O O-BK	5
T6 R6	38 13 39 14	BK-G G-BK BK-BR BR-BK	6
T7 R7	40 15 41 16	BK-S S-BK Y-BL BL-Y	7

NT5K19 Analog TIE line trunk card terminations

Cross connect the NT5K19 analog TIE line trunk card as shown in Table 67 "NT5K19 2W paging mode terminations" (page 347).

Note: The speech pairs on the NT5K19 card are polarity insensitive. The E&M signalling pairs, however, are polarity sensitive. Make sure the

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ground side of the trunk is connected to the A leg of the NT5K19 circuit. Make sure the -50 V side of the trunk is connected to the B leg.

Table 67
NT5K19 2W paging mode terminations

Pair	Pins	Pair color	Unit #
T0 R0 A PG	27 2 29 4	W-O O-W W-BR BR-W	0
T1 R1 A PG	31 6 33 8	R-BL BL-R R-G G-R	1
T2 R2 A PG	35 10 37 12	R-S S-R BK-O O-BK	2
T3 R3 A PG	39 14 41 16	BK-BR BR-BK Y-BL BL-Y	3

Table 68
NT5K19 2W Type 1 mode terminations

Pair	Pins	Pair color	Unit #
T0 R0 E M	27 2 28 3	W-O O-W W-G G-W	0
T1 R1 E M	31 6 32 &	R-BL BL-R R-O O-R	1
T2 R2 E M	35 10 36 11	R-S S-R BK-BL BL-BK	2
T3 R3 E M	39 14 40 15	BK-BR BR-BK BK-S S-BK	3

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Table 69
NT5K19 4W Type 1 mode terminations

Pair	Pins	Pair color	Unit #
TA TB	26 1	W-BL BL-W	0
RA RB	27 2	W-O O-W	
E M	28 3	W-G G-W	
RA RB	30 5	W-S S-W	1
TA RB	31 6	R-BL BL-R	
E M	32 7	R-O O-R	
TA TB	34 9	R-BR BR-R	2
RA RB	35 10	R-S S-R	
E M	36 11	BK-BL BL-BK	
TA TB	38 13	BK-G G-BK	3
RA TB	39 14	BK-BR BR-BK	
E M	40 15	BK-S S-BK	

Table 70
NT5K19 AC15 mode pair terminations

Pair	Pins	Pair color	Unit #
TA TB	26 1	W-BL BL-W	0
RA RB	27 2	W-O O-W	
TA TB	30 5	W-S S-W	1
RA RB	31 6	R-BL BL-R	

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Pair	Pins	Pair color	Unit #
TA TB RA RB	34 9 35 10	R-BR BR-R R-S S-R	2
TA TB RA TB	38 13 39 14	BK-G G-BK BK-BR BR-BK	3

Table 71
NT5K19 Recorded Announcement mode pair terminations

Pair	Pins	Pair color	Unit #
T0 R0 SIG B SIG A	26 1 29 4	W-BL BL-W W-BR BR-W	0
T1 R1 SIG B SIG A	30 5 33 8	W-S S-W R-G G-R	1
T2 R2 SIG B SIG A	34 9 37 12	R-BR BR-R BK-O O-BK	2
T3 R3 SIG B SIG A	38 13 41 16	BK-G G-BK Y-BL BL-Y	3

Activating a default model trunk

Due to the automatic 30 second timeout on the administration menu, prepare the data that you want to input before you begin. To determine the corresponding TNs and trunks, check the location of trunk cards in the cabinet or chassis or use LD 32.

Procedure 69
Activating a default model trunk

Step	Action
1	Pick up the handset of the administration telephone.

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2 Enter the administration Flexible Feature Code to access the administration menu.

The prompt "PASSWORD?" appears.

3 Enter the default administration telephone password.

You hear special dial tone, and the prompt
"TASK?"
appears in the top line of the character display.

The second line of the display reads "1 ADD TRUNK".

4 Select "1 ADD TRUNK" by entering the number "1".

The prompt "ROUTE ACCESS?" appears on the character display.

5 Enter the access code of the route to which you want to add a trunk and press the pound key (#).

The prompt
"TN?"
asks you to enter a TN (Terminal Number) from one of the installed trunk cards.

If you do not enter a valid route number, "TN?" does not appear and the screen remains the same. If the type of trunk card does not match the route, the prompt "ROUTE ACCESS?" appears again, and you hear overflow tone.

6 Enter the TN in Small System format (cu) and press the pound key.

The prompt
"MODEL"
appears. If you enter an invalid TN, the display shows "INVALID, TN?" and you must enter a new TN using the Small System format.

7 Press the digits to select a trunk model (as assigned in LD 16).

The character display shows
"OK".
After a delay of approximately 4 seconds you hear special dial tone. The sequence is repeated when the prompt
"TN?"
appears on the character display.
The next valid trunk TN is automatically incremented after each trunk is activated.

8 Terminate the sequence by hanging up the telephone receiver.

OR

Repeat the sequence by going through the steps again.

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By entering "#" when the procedure repeats, you accept the next TN and are prompted for the model type.

By entering "#" again, you accept the previously accepted model.

Note: The model chosen during the first trunk activation sequence will be the default model for all subsequent trunks until you hang up the telephone or manually enter a new trunk model number.

—End—

Activating a selected model trunk

Due to the automatic 30 second timeout on the administration menu, prepare the data that you want to input before you begin. To determine the corresponding TNs and trunks, check the location of trunk cards in the cabinet or chassis or use LD 32.

Procedure 70
Activating a selected model trunk

Step	Action
1	Pick up the handset of the administration telephone.
2	Enter the administration Flexible Feature Code to access the administration menu.
3	Enter the default administration telephone password. You hear special dial tone and the prompt "TASK?" appears on the top line of the character display. The second line of the character display reads "1 ADD TRUNK".
4	Select "1 ADD TRUNK" by entering the number "1". The prompt "ROUTE ACCESS?" appears.
5	Enter the access code of the configured trunk route to which you want to add the trunk and press the pound key (#). The prompt "TN?"

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asks you to enter a TN from one of the installed trunk cards. If you do not enter a valid route number, "TN?" does not appear and the screen remains the same. If the card does not match the route, the prompt "ROUTE ACCESS?" appears again, and you hear overflow tone.

6 Enter the TN in Small System format (cu).

The response
"MODEL?"
prompts you to select a model number for the trunk.

7 Enter a trunk model number for the specified TN and route, and press the pound key.

The character display shows:

"OK"

After a delay of approximately 4 seconds you hear special dial tone and the sequence is repeated when the following prompt appears on the character display.

"TN?"

8 Hang up or repeat the sequence.

The sequence ends when the last unit in the card is used and the program is complete, or when you hang up the telephone receiver.

Note: The model used for the first trunk activated in the sequence will be the default for all subsequent trunks until the telephone is hung up unless you manually enter a new trunk model number.

—End—

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Connecting an external alarm

Contents

This section contains information on the following topics:

"Introduction" (page 353)

"Alarm port assigned in software" (page 353)

"Alarm through a QUA6 PFTU" (page 354)

Introduction

This chapter describes the procedures for connecting an external alarm to the Small System.

There are two methods of connecting an external alarm to the system:

- through an alarm port assigned in software
- through contacts in a QUA6 Power Failure Transfer Unit (PFTU)

This chapter contains the following procedure:

- Procedure 71 "Installing an alarm using an alarm port" (page 354)

Alarm port assigned in software

The system can be equipped with an alarm port using an analog line connected to an analog (500/2500-type) telephone or other similar type of ringing or alerting device.

The alarm will operate when a BSD090 message indicates a power fault in the system. Information about BSD090 messages is contained in *Software Input Output Reference - Maintenance (NN43001-711)*.

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Procedure 71
Installing an alarm using an alarm port

Step	Action
1	Install an analog (500/2500-type) line as described in "Connecting the telephones" (page 307).
2	Install an analog (500/2500-type) telephone or other similar alerting device used as an alarm to the line. You can assign the set as Model 20.
3	Use LD 15 and make the following changes. Only the prompts requiring a response are listed. Use a Carriage Return, <CR>, to accept the default values for the other prompts. a. Enter CHG in response to the prompt REQ. b. Enter CDB in response to the prompt TYPE. c. Enter the customer number (0–99) in response to the prompt CUST. d. Enter the DN of the line assigned as an alarm port in response to the prompt ALDN. ***Note:*** If the DN assigned to the alarm is accidentally called, the alarm activates. To avoid false alarms, make sure the DN is not consistent with the assigned numbering. e. Press <CR> in response to the remaining prompts.

—End—

Alarm through a QUA6 PFTU

A QUA6 PFTU can be used to connect an external alarm through normally open or normally closed contacts of one of its units. The contacts operate under the same conditions as the PFTU, and can support the capacities listed in Table 72 "AC and DC capacities" (page 354).

Table 72
AC and DC capacities

	AC	DC (for cabinet)
Maximum switching power	50.0 V A.	30.0 W
Maximum switching voltage	125.0 V rms	150.0 V
Maximum switching current	0.5 A	0.5 A

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Figure 136 "Contacts in PFTU" (page 355) shows an example of the contacts on one unit (PFT1) of the PFTU. The contacts are shown in normal operating mode, not in failure mode. Table 73 "Power Failure Transfer Unit connections" (page 355) gives the connections for all units on the PFTU.

Figure 136
Contacts in PFTU

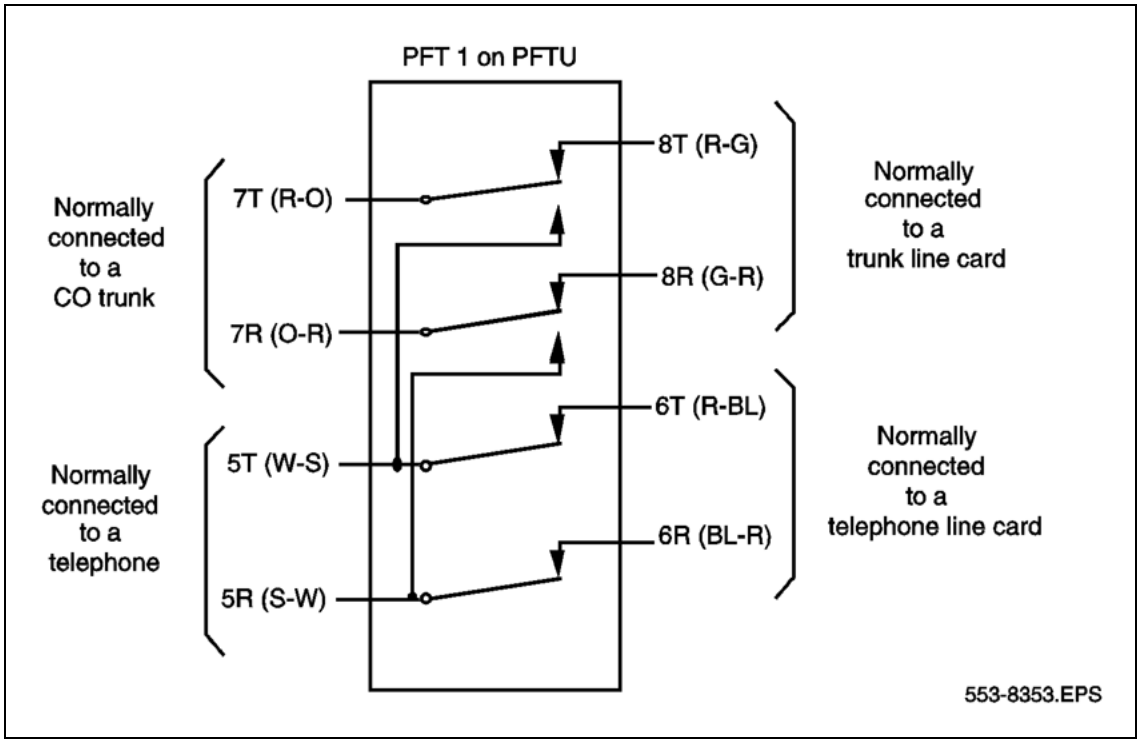

Table 73
Power Failure Transfer Unit connections

Unit	Pair	Color	Normal mode	Failure mode
P F T 1	5T 5R	W-S S-W	Makes with 6T and 6R	Opens 6T and 6R Makes with 7T and 7R
	6T 6R	R-BL BL-R	Makes with 5T and 5R	Open
	7T 7R	R-O O-R	Makes with 8T and 8R	Opens 8T and 8R Makes with 5T and 5R
	8T 8R	R-G G-R	Makes with 7T and 7R	Open

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Unit	Pair	Color	Normal mode	Failure mode
PFT 2	9T 9R	R-BR BR-R	Makes with 10T and 10R	Opens 10T and 10R Makes with 11T and 11R
	10T 10R	R-S S-R	Makes with 9T and 9R	Open
	11T 11R	BK-BL BL-BK	Makes with 12T and 12R	Opens 12T and 12R Makes with 9T and 9R
	12T 12R	BK-O O-BK	Makes with 11T and 11R	Open
PFT 3	13T 13R	BK-G G-BK	Makes with 14T and 14R	Opens 14T and 14R Makes with 15T and 15R
	14T 14R	BK-BR BR-BK	Makes with 13T and 13R	Open
	15T 15R	BK-S S-BK	Makes with 16T and 16R	Opens 16T and 16R Makes with 13T and 13R
	16T 16R	Y-BL BL-Y	Makes with 15T and 15R	Open
PFT 4	17T 17R	Y-O O-Y	Makes with 18T and 18R	Opens 18T and 18R Makes with 19T and 19R
	18T 18R	Y-G G-Y	Makes with 17T and 17R	Open
	19T 19R	Y-BR BR-Y	Makes with 20T and 20R	Opens 20T and 20R Makes with 17T and 17R
	20T 20R	Y-S S-Y	Makes with 19T and 19R	Open
PFT 5	21T 21R	V-BL BL-V	Makes with 22T and 22R	Opens 22T and 22R Makes with 23T and 23R
	22T 22R	V-O O-V	Makes with 21T and 21R	Open
	23T 23R	V-G G-V	Makes with 24T and 24R	Opens 24T and 24R Makes with 21T and 21R
	24T 24R	V-BR BR-V	Makes with 23T and 23R	Open

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Preprogrammed data

Contents

This section contains information on the following topics:

"Introduction" (page 357)
"Passwords and codes" (page 358)
"Default numbering plan" (page 359)
"First digits" (page 360)
"Important extension numbers" (page 361)
"Extensions assigned to card slots" (page 361)
"Flexible Feature Codes" (page 369)
"SDI ports" (page 370)
"Modem port" (page 371)
"Enhanced Serial Data Interface (ESDI) port" (page 371)
"Telephone tones" (page 371)
"Trunk routes" (page 372)
"Trunk models" (page 373)
"Model telephones" (page 375)
"Administration telephone models" (page 377)
"Central Answering Position (CAP) telephone models" (page 378)
"General business telephone models" (page 379)
"Analog (500/2500-type) telephone models" (page 383)
"Digital telephone models" (page 394)

Introduction

When you first install a Small System, you must enter customer data into the overlay programs. You must, for example, assign features to telephone keys for the telephones to work correctly.

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Nortel or its distributors can program the Small System's software daughterboard with customer data before they send the card to the customer site. If you load preprogrammed data into the system during the installation process, some overlay entries configure automatically on the telephones. For example, you can select a telephone model that has feature and key assignments already determined and a Class of Service already assigned. If you have to program several types of telephone models, using preprogrammed data can save you time.

Preprogrammed data is not mandatory for software installation. In fact, the software daughterboard or SSC card can be programmed with the minimum number of files to allow the system to operate.

Passwords and codes

Table 74 "Passwords and codes" (page 358) shows each function in the left column and a corresponding password or code on the right.

Table 74
Passwords and codes

Function	Code or extension(s)
TTY password (for access to TTY Small System overlays)	0000
Meridian Mail administration password	adminpwd
Administration telephone password Administration telephone FFC	1234 *41
SPRE code	1
Telephone relocation Flexible Feature Code	*40
Telephone Removal Flexible Feature Code	*42
Telephone relocation password (SCRD)	1234

If a user requires configuration of the default Meridian Mail Administration Account, they must perform the following steps:

Procedure 72
Meridian Mail Administration Account configuration

Step	Action
1	Enter ld 17.
2	Enter REQ **chg**.

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3 Enter TYPE **pwd**.

4 Enter PWD2.

5 Enter PSWD_COMP.

....

6 Enter INIT.

7 Enter ACCOUNT_REQ **new**.

8 Enter PWD_TYPE **lapw**.

9 Enter PWTP **ovly**.

10 Enter USER_NAME **user0**.

11 Enter PASSWORD **mmail**.

12 Enter CONFIRM **mmail**.

13 Enter OVLA **2**.

14 Enter OVLA **48**.

15 Enter OVLA.

16 Enter CUST **all**.

17 Enter CUST.

18 Enter HOST **no**.

19 Enter MAT **no**.

20 Enter MAT **no**.

21 Enter OPT **pscd rdbd cfpd llcd prod losd forcd mond**.

22 Enter OPT.

PWD ACCOUNT SETTINGS SAVED

—End—

Default numbering plan

The default numbering plan for Small Systems is based on the following guidelines:

- The default numbering plan uses four digits and starts at 2200.

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- The prime extension number (DN) for each telephone is in the range 2200–2XXX. The value of "XXX" varies depending on the number of telephones that you have in the system. Any secondary extension numbers use numbers outside this range. This arrangement allows the Small System and Meridian Mail to automatically configure telephones and corresponding mailboxes without manual intervention.
- Meridian Mail uses extension 7000 for access, 7001 for Auto Attendant, 7002 for Express Messaging, and 7003 for Prompt Maintenance.
- *For the Cabinet system:*
  Meridian Mail Virtual Agents are preconfigured for Card 10 in Unit 0, 1, 2, 8, 9, and 10 of the main cabinet.
- *For the Chassis system:*
  Meridian Mail Virtual Agents are preconfigured for card slot 10 in Units 0, 1, 2, 4, 5, 8, 9, 10, 11, 12, and 13 of the chassis expander.
- The Central Answering Position has an extension of 7700. You can change this extension in LD 15.

First digits

Table 75 "Default numbering plan: First digit" (page 360) shows the default numbering plan for Small Systems.

Table 75
Default numbering plan: First digit

First digit	Preprogrammed use for digit
1	SPRE code
2	Not used
3	Not used
4	Not used
5	Not used
6	Not used
7	COT/TIE/DID/WATS/FEX/RAN/MUS/AWR/Paging Trunk access codes, Meridian Mail queues and attendant DN, Call park DNs
8	Not used
9	Not used
0	Attendant extension

Note: The first number of the default numbering plan is preprogrammed as 2200. The remaining numbers in the default numbering plan are assigned in software. These numbers do not become active, however, until you select the numbers during the telephone activation procedure.

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The digit "7" in the default numbering plan is programmed with many system features to assist you in configuring the Small System. If you have the Meridian Mail card option software, it automatically configures user mailboxes to correspond with the 2200 numbering plan. In addition, the preprogrammed Meridian Mail queues in the Meridian Mail software match the default data on the system.

Important extension numbers

Table 76
Default numbering plan: important extension numbers

Extension	Use
Attendant extension	0
First number in numbering plan	2200
Night number	7700*
Queue for Central Answering Position	7700*
General ACD queue	7750*
Meridian Mail miscellaneous ACD queues: * Meridian Mail extension * Auto attendant extension * Express messaging * Prompt maintenance * Miscellaneous queues	7000–7009 7000 7001 7002 7003 7004–7009
Meridian Mail position I.D.	7800–7811
Meridian Mail agent extensions	7830–7841
Call park extensions	7900–7919

* The thresholds which control the agent AWC keys have been set as follows:

CWTH1
CWLF2
CWLW4

Extensions assigned to card slots

For the Cabinet system: Table 77 "Extensions assigned to card slots in the main cabinet" (page 362) through Table 81 "Extensions assigned to card slots in Expansion Cabinet 4" (page 363) provide the extension numbers assigned to card slots in the main and expansion cabinets. *For the Chassis*

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system: Table 82 "Extensions assigned to card slots in the chassis and chassis expander" (page 364) provides the extension numbers assigned to card slots in the chassis and chassis expander.

Table 77
Extensions assigned to card slots in the main cabinet

Slot number	Extension numbers
1	2200 through 2215
2	2216 through 2231
3	2232 through 2247
4	2248 through 2263
5	2264 through 2279
6	2280 through 2295
7	2296 through 2311
8	2312 through 2327
9	2328 through 2343
10	2344 through 2359

Table 78
Extensions assigned to card slots in Expansion Cabinet 1

Slot number	Extension numbers
1	2360 through 2375
2	2376 through 2391
3	2392 through 2407
4	2408 through 2423
5	2424 through 2439
6	2440 through 2455
7	2456 through 2471
8	2472 through 2487
9	2488 through 2503
10	2504 through 2519

Table 79
Extensions assigned to card slots in Expansion Cabinet 2

Slot number	Extension numbers
1	2520 through 2535
2	2536 through 2551

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Slot number	Extension numbers
3	2552 through 2567
4	2568 through 2583
5	2584 through 2599
6	2600 through 2615
7	2616 through 2631
8	2632 through 2647
9	2648 through 2663
10	2664 through 2679

Table 80
Extensions assigned to card slots in Expansion Cabinet 3

Slot number	Extension numbers
1	2680 through 2695
2	2696 through 2711
3	2712 through 2727
4	2728 through 2743
5	2744 through 2759
6	2760 through 2775
7	2776 through 2791
8	2792 through 2807
9	2808 through 2823
10	2824 through 2839

Table 81
Extensions assigned to card slots in Expansion Cabinet 4

Slot number	Extension numbers
1	2840 through 2855
2	2856 through 2871
3	2872 through 2887
4	2888 through 2903
5	2904 through 2919
6	2920 through 2935
7	2936 through 2951
8	2952 through 2967

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Slot number	Extension numbers
9	2968 through 2983
10	2984 through 2999

Table 82
Extensions assigned to card slots in the chassis and chassis expander

Slot number	Card number	Extension numbers
Chassis		
1	1	2200 through 2215
2	2	2216 through 2231
3	3	2232 through 2247
4	4	2248 through 2263
4	5	2264 through 2279
4	6	2280 through 2295
Chassis expander		
7	7	2296 through 2311
8	8	2312 through 2327
9	9	2328 through 2343
10	10	2344 through 2359

Table 83 "Main cabinet default DN assignments" (page 364) through Table 89 "Default DN assignments for the chassis and chassis expander (Germany)" (page 369) provide the default DN assignments for Cabinet and Chassis systems.

Table 83
Main cabinet default DN assignments

Cable	Unit	Default Directory Number (DN)							
J1	**0 - 7**	2200	2201	2202	2203	2204	2205	2206	2207
J1	**8 - 15**	2208	2209	2210	2211	2212	2213	2214	2215
J2	**0 - 7**	2216	2217	2218	2219	2220	2221	2222	2223
J2	**8 - 15**	2224	2225	2226	2227	2228	2229	2230	2231
J3	**0 - 7**	2232	2233	2234	2235	2236	2237	2238	2239
J3	**8 - 15**	2240	2241	2242	2243	2244	2245	2246	2247
J4	**0 - 7**	2248	2249	2250	2251	2252	2253	2254	2255
J4	**8 - 15**	2256	2257	2258	2259	2260	2261	2262	2263
J5	**0 - 7**	2264	2265	2266	2267	2268	2269	2270	2271

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Cable	Unit	Default Directory Number (DN)							
J5	8 - 15	2272	2273	2274	2275	2276	2277	2278	2279
J6	0 - 7	2280	2281	2282	2283	2284	2285	2286	2287
J6	8 - 15	2288	2289	2290	2291	2292	2293	2294	2295
J7	0 - 7	2296	2297	2298	2299	2300	2301	2302	2303
J7	8 - 15	2304	2305	2306	2307	2308	2309	2310	2311
J8	0 - 7	2312	2313	2314	2315	2316	2317	2318	2319
J8	8 - 15	2320	2321	2322	2323	2324	2325	2326	2327
J9	0 - 7	2328	2329	2330	2331	2332	2333	2334	2335
J9	8 - 15	2336	2337	2338	2339	2340	2341	2342	2343
J10	0 - 7	2344	2345	2346	2347	2348	2349	2350	2351
J10	8 - 15	2352	2353	2354	2355	2356	2357	2358	2359

Table 84
Expansion Cabinet 1 default DN assignments

Cable	Unit	Default Directory Number (DN)							
J1	0 - 7	2360	2361	2362	2363	2364	2365	2366	2367
J1	8 - 15	2368	2369	2370	2371	2372	2373	2374	2375
J2	0 - 7	2376	2377	2378	2379	2380	2381	2382	2383
J2	8 - 15	2384	2385	2386	2387	2388	2389	2390	2391
J3	0 - 7	2392	2393	2394	2395	2396	2397	2398	2399
J3	8 - 15	2400	2401	2402	2403	2404	2405	2406	2407
J4	0 - 7	2408	2409	2410	2411	2412	2413	2414	2415
J4	8 - 15	2416	2417	2418	2419	2420	2421	2422	2423
J5	0 - 7	2424	2425	2426	2427	2428	2429	2430	2431
J5	8 - 15	2432	2433	2434	2435	2436	2437	2438	2439
J6	0 - 7	2440	2441	2442	2443	2444	2445	2446	2447
J6	8 - 15	2448	2449	2450	2451	2452	2453	2454	2455
J7	0 - 7	2456	2457	2458	2459	2460	2461	2462	2463
J7	8 - 15	2464	2465	2466	2467	2468	2469	2470	2471
J8	0 - 7	2472	2473	2474	2475	2476	2477	2478	2479
J8	8 - 15	2480	2481	2482	2483	2484	2485	2486	2487
J9	0 - 7	2488	2489	2490	2491	2492	2493	2494	2495
J9	8 - 15	2496	2497	2498	2499	2500	2501	2502	2503
J10	0 - 7	2504	2505	2506	2507	2508	2509	2510	2511
J10	8 - 15	2512	2513	2514	2515	2516	2517	2518	2519

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Table 85
Expansion Cabinet 2 default DN assignments

Cable	Unit	Default Directory Number (DN)							
J1	0 - 7	2520	2521	2522	2523	2524	2525	2526	2527
J1	8 - 15	2528	2529	2530	2531	2532	2533	2534	2535
J2	0 - 7	2536	2537	2538	2539	2540	2541	2542	2543
J2	8 - 15	2544	2545	2546	2547	2548	2549	2552	2551
J3	0 - 7	2552	2553	2554	2555	2556	2557	2558	2559
J3	8 - 15	2560	2561	2562	2563	2564	2565	2566	2567
J4	0 - 7	2568	2569	2570	2571	2572	2573	2574	2575
J4	8 - 15	2576	2577	2578	2579	2580	2581	2582	2583
J5	0 - 7	2584	2585	2586	2587	2588	2589	2590	2591
J5	8 - 15	2592	2593	2594	2595	2596	2597	2598	2599
J6	0 - 7	2600	2601	2602	2603	2604	2605	2606	2607
J6	8 - 15	2608	2609	2610	2611	2612	2613	2614	2615
J7	0 - 7	2616	2617	2618	2619	2620	2621	2622	2623
J7	8 - 15	2624	2625	2626	2627	2628	2629	2630	2631
J8	0 - 7	2632	2633	2634	2635	2636	2637	2638	2639
J8	8 - 15	2640	2641	2642	2643	2644	2645	2646	2647
J9	0 - 7	2648	2649	2650	2651	2652	2653	2654	2655
J9	8 - 15	2656	2657	2658	2659	2660	2661	2662	2663
J10	0 - 7	2664	2665	2666	2667	2668	2669	2670	2671
J10	8 - 15	2672	2673	2674	2675	2676	2677	2678	2679

Table 86
Expansion Cabinet 3 default DN assignments

Cable	Unit	Default Directory Number (DN)							
J1	0 - 7	2680	2681	2682	2683	2684	2685	2686	2687
J1	8 - 15	2688	2689	2690	2691	2692	2693	2694	2695
J2	0 - 7	2696	2697	2698	2699	2700	2701	2702	2703
J2	8 - 15	2704	2705	2706	2707	2708	2709	2710	2711
J3	0 - 7	2712	2713	2714	2715	2716	2717	2718	2719
J3	8 - 15	2720	2721	2722	2723	2724	2725	2726	2727
J4	0 - 7	2728	2729	2730	2731	2732	2733	2734	2735
J4	8 - 15	2736	2737	2738	2739	2740	2741	2742	2743
J5	0 - 7	2744	2745	2746	2747	2748	2749	2750	2751

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Cable	Unit	Default Directory Number (DN)							
J5	8 - 15	2752	2753	2754	2755	2756	2757	2758	2759
J6	0 - 7	2760	2761	2762	2763	2764	2765	2766	2767
J6	8 - 15	2768	2769	2770	2771	2772	2773	2774	2775
J7	0 - 7	2776	2777	2778	2779	2780	2781	2782	2783
J7	8 - 15	2784	2785	2786	2787	2788	2789	2790	2791
J8	0 - 7	2792	2793	2794	2795	2796	2797	2798	2799
J8	8 - 15	2800	2801	2802	2803	2804	2805	2806	2807
J9	0 - 7	2808	2809	2810	2811	2812	2813	2814	2815
J9	8 - 15	2816	2817	2818	2819	2820	2821	2822	2823
J10	0 - 7	2824	2825	2826	2827	2828	2829	2830	2831
J10	8 - 15	2832	2833	2834	2835	2836	2837	2838	2839

Table 87
Expansion Cabinet 4 default DN assignments

Cable	Unit	Default Directory Number (DN)							
J1	0 - 7	2840	2841	2842	2843	2844	2845	2846	2847
J1	8 - 15	2848	2849	2850	2851	2852	2853	2854	2855
J2	0 - 7	2856	2857	2858	2859	2860	2861	2862	2863
J2	8 - 15	2864	2865	2866	2867	2868	2869	2870	2871
J3	0 - 7	2872	2873	2874	2875	2876	2877	2878	2879
J3	8 - 15	2880	2881	2882	2883	2884	2885	2886	2887
J4	0 - 7	2888	2889	2890	2891	2892	2893	2894	2895
J4	8 - 15	2896	2897	2898	2899	2900	2901	2902	2903
J5	0 - 7	2904	2905	2906	2907	2908	2909	2910	2911
J5	8 - 15	2912	2913	2914	2915	2916	2917	2918	2919
J6	0 - 7	2920	2921	2922	2923	2924	2925	2926	2927
J6	8 - 15	2928	2929	2930	2931	2932	2933	2934	2935
J7	0 - 7	2936	2937	2938	2939	2940	2941	2942	2943
J7	8 - 15	2944	2945	2946	2947	2948	2949	2950	2951
J8	0 - 7	2952	2953	2954	2955	2956	2957	2958	2959
J8	8 - 15	2960	2961	2962	2963	2964	2965	2966	2967
J9	0 - 7	2968	2969	2970	2971	2972	2973	2974	2975
J9	8 - 15	2976	2977	2978	2979	2980	2981	2982	2983
J10	0 - 7	2984	2985	2986	2987	2988	2989	2990	2991
J10	8 - 15	2992	2993	2994	2995	2996	2997	2998	2999

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Table 88 "Default DN assignments for the chassis and chassis expander" (page 368) lists the default DN assignments for the chassis and chassis expander.

Table 88
Default DN assignments for the chassis and chassis expander

	Cable	Unit	Default Directory Number (DN)							
Chassis	Card 1	0 - 7	2200	2201	2202	2203	2204	2205	2206	2207
	Card 1	8 - 15	2208	2209	2210	2211	2212	2213	2214	2215
	Card 2	0 - 7	2216	2217	2218	2219	2220	2221	2222	2223
	Card 2	8 - 15	2224	2225	2226	2227	2228	2229	2230	2231
	Card 3	0 - 7	2232	2233	2234	2235	2236	2237	2238	2239
	Card 3	8 - 15	2240	2241	2242	2243	2244	2245	2246	2247
	Card 4	0 - 7	2248	2249	2250	2251	2252	2253	2254	2255
	Card 4	8 - 15	2256	2257	2258	2259	2260	2261	2262	2263
	Card 5	0 - 7	2264	2265	2266	2267	2268	2269	2270	2271
	Card 5	8 - 15	2272	2273	2274	2275	2276	2277	2278	2279
	Card 6	0 - 7	2280	2281	2282	2283	2284	2285	2286	2287
	Card 6	8 - 15	2288	2289	2290	2291	2292	2293	2294	2295
Chassis expander	Card 7	0 - 7	2296	2297	2298	2299	2300	2301	2302	2303
	Card 7	8 - 15	2304	2305	2306	2307	2308	2309	2310	2311
	Card 8	0 - 7	2312	2313	2314	2315	2316	2317	2318	2319
	Card 8	8 - 15	2320	2321	2322	2323	2324	2325	2326	2327
	Card 9	0 - 7	2328	2329	2330	2331	2332	2333	2334	2335
	Card 9	8 - 15	2336	2337	2338	2339	2340	2341	2342	2343
	Card 10	0 - 7	2344	2345	2346	2347	2348	2349	2350	2351
	Card 10	8 - 15	2352	2353	2354	2355	2356	2357	2358	2359

Table 89 "Default DN assignments for the chassis and chassis expander (Germany)" (page 369) lists the default DN assignments for the chassis and chassis expander for Germany.

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Table 89
Default DN assignments for the chassis and chassis expander (Germany)

	Cable	Unit	Default Directory Number (DN)							
Chassis	Card 1	0 - 7	100	101	102	103	104	105	106	107
	Card 1	8 - 15	108	109	110	111	112	113	114	115
	Card 2	0 - 7	116	117	118	119	120	121	122	123
	Card 2	8 - 15	124	125	126	127	128	129	130	131
	Card 3	0 - 7	132	133	134	135	136	137	138	139
	Card 3	8 - 15	140	141	142	143	144	145	146	147
	Card 4	0 - 7	148	149	150	151	152	153	154	155
	Card 4	8 - 15	156	157	158	159	160	161	162	163
	Card 5	0 - 7	164	165	166	167	168	169	170	171
	Card 5	8 - 15	172	173	174	175	176	177	178	179
	Card 6	0 - 7	180	181	182	183	184	185	186	187
	Card 6	8 - 15	188	189	190	191	192	193	194	195
Chassis expander	Card 7	0 - 7	196	197	198	199	200	201	202	203
	Card 7	8 - 15	204	205	206	207	208	209	210	211
	Card 8	0 - 7	212	213	214	215	216	217	218	219
	Card 8	8 - 15	220	221	222	223	224	225	226	227
	Card 9	0 - 7	228	229	230	231	232	233	234	235
	Card 9	8 - 15	236	237	238	239	240	241	242	243
	Card 10	0 - 7	244	245	246	247	248	249	250	251
	Card 10	8 - 15	252	253	254	255	256	257	258	259

Flexible Feature Codes

Many administrative procedures use Flexible Feature Code (FFC) data. Table 90 "Flexible Feature Codes" (page 369) lists the FFCs for the Small Systems.

Table 90
Flexible Feature Codes

FFC prompt	FFC	Definition
ASRC	*40	Automatic Set Relocation
AREM	*42	Automatic Set Removal Code
ADMN	*41	Administration Set Access Code
CFWA	#1	Call Forward All Calls Activate
CFWD	#1	Call Forward All Calls Deactivate

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FFC prompt	FFC	Definition
C6DS	*70	6 Party Conference Code
HOLD	#4	Permanent Call Hold
MNTC	*43	Maintenance Access Code
PUGR	*71	Pick-Up Group Code
RDLN	*72	Last Number Redial
	*73	Store Last Number Redial
RGAA	*74	Ring Again Activate
RGAD	*75	Ring Again Deactivate
RGAV	*77	Ring Again Verify
SPCC	#2/*80	Speed Call Controller Code
SPCU	#3/*81	Speed Call User Code
SSPU	*89	System Speed Call User Code

SDI ports

The minimum system port configuration for the Small System is 3 SDI ports, all of which can be found on the Small System's NTDK20 SSC card.

You can obtain additional ports by installing an NTAK02 SDI/DCH circuit card. The SDI/DCH card has 4 serial I/O ports with three possible configurations:

- 2 asynchronous ESDI ports with 2 DCHI ports
- 2 synchronous ESDI ports, or
- 2 SDI ports.

Table 91 "Preconfigured SDI ports" (page 370) shows the default SDI port configuration. The value for "XX" is set on the faceplate of the Cabinet system's CPU/CONF circuit card or the Chassis system's SSC circuit card.

Table 91
Preconfigured SDI ports

TTY Number	Card	Port	Use	Configuration
0	0	0	MTC/SCH/BUG	XX/8/1/NONE
1	0	0	MTC/SCH/BUG	1200/8/1/NONE
2	0	1	MTC/SCH/BUG	1200/8/1/NONE
8	10	0	LSL	1200/8/1/NONE
9	10	1	CMS	4800

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Modem port

The preconfigured modem port allows the remote maintenance modem to be connected without further system programming. This port is preconfigured as TTY 0 (port 0 on the SSC card) and is programmed for Maintenance (MTC), Service Change (SCH), and BUG messages.

Enhanced Serial Data Interface (ESDI) port

Port 9 is preprogrammed as an ESDI port and supports Meridian Mail. It functions as a Command and Status Link with the settings given in Table 92 "ESDI settings" (page 371).

Table 92
ESDI settings

Setting	Code
BPS	4800
CLOK	EXT
IADR	003
RADR	001
T1	10
T2	002
T3	040
N1	128
N2	08
K	7
RXMT	05
CRC	10
ORUR	005
ABOR	005
USER	CMS
ENL	NO

Telephone tones

The telephone tones in North America are as follows:

- **Dial tone:** A continuous tone.
- **Special dial tone:** Three beeps followed by continuous dial tone.
- **Overflow tone:** Like a busy tone, except faster and higher.
- **Relocation tone:** A short high-pitched beep that continues for 4 seconds, followed by silence.

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Trunk routes

Table 93 "Preprogrammed trunk route information" (page 372) shows preprogrammed trunk route information that you need on hand to activate and modify trunks.

Table 93
Preprogrammed trunk route information

Route	Type	Access Code	Mode	Interface
00 *	COT	7100	IAO	–
01 *	COT	7101	ICT	–
02 *	COT	7102	OGT	–
03	TIE	7103	IAO	-
04	TIE	7104	ICT	–
05	TIE	7105	OGT	–
06	DID	7106	ICT	–
07	WAT	7107	IAO	–
08	WAT	7108	ICT	–
09	WAT	7109	OGT	–
40	MUS	7140	OGT	–
41	AWR	7141	–	AUD
42	RAN	7142	–	DGT
43	RAN	7143	–	AUD
44	PAG	7144	OGT	–
50	FEX	7150	IAO	–
51	FEX	7151	ICT	–
52	FEX	7152	OGT	–

Note: Trunk routes marked with an asterisk (*) are configured support Call Detail Recording (CDR) output. The CDR is preconfigured as follows:

CDR	YES
INC	YES
OAL	YES
AIA	YES

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Trunk models

Note: All trunks are programmed as immediate start/supervision = Yes, with the exception of trunks with an asterisk (*) next to them. Trunks marked with an asterisk (*) are set for Wink start/supervision = Yes.

Table 94
Trunk model information

Mode	Pack	Model	Signaling	DIP or DTN	BIMP and TIMP
COT	XUT	1	GRD	DIP	3COM/600
		2	LOP	DIP	3COM/600
		3	GRD	DTN	3COM/600
		4	LOP	DTN	3COM/600
		5	GRD	DIP	3COM/900
		6	LOP	DIP	3COM/900
		7	GRD	DTN	3COM/900
		8	LOP	DTN	3COM/900
TIE	XUT	1	OAD	DIP	3COM/600
		2	LDR	DIP	3COM/600
		3	OAD	DTN	3COM/600
		4	LDR	DTN	3COM/600
		5	OAD	DIP	3COM/900
		6	LDR	DIP	3COM/900
		7	OAD	DTN	3COM/900
		8	LDR	DIP	3COM/900
	XEM	16	EAM	DIP	—/600
		17	EM4	DIP	—
		18	EAM	DTN	—/ 600
		19	EM4	DIP	—
DID	XUT	1	LDR (Wink Start Supv = Yes)	DIP	3COM/600
		2	LDR (Wink Start Supv = Yes)	DTN	3COM/600
		3	LDR (Wink Start Supv = Yes)	DIP	3COM/900
		4	LDR (Wink Start Supv = Yes)	DTN	3COM/900
* These trunks are set for Wink start.					

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Mode	Pack	Model	Signaling	DIP or DTN	BIMP and TIMP
		5*	LDR (Wink Start Supv = Yes)	DIP	3COM/600
		6*	LDR (Wink Start Supv = Yes)	DTN	3COM/600
		7*	LDR (Wink Start Supv = Yes)	DIP	3COM/900
		8*	LDR (Wink Start Supv = Yes)	DTN	3COM/900
WAT	XUT	1	GRD	DIP	3COM/600
		2	LOP	DIP	3COM/600
		3	GRD	DTN	3COM/600
		4	LOP	DTN	3COM/600
		5	GRD	DIP	3COM/900
		6	LOP	DIP	3COM/900
		7	GRD	DTN	3COM/900
		8	LOP	DTN	3COM/900
MUS	XUT	1			3COM/600
AWR	XUT	1			600/1200
RAN	XUT	1			600/1200
PAG	XUT	1	LDR	DIP	3COM/600
		2	OAD	DIP	3COM/600
		3	LDR	DTN	3COM/600
		4	OAD	DTN	3COM/600
		5	LDR	DIP	3COM/900
		6	OAD	DIP	3COM/900
		7	LDR	DTN	3COM/900
		8	OAD	DTN	3COM/900
	XEM	16	EAM	DIP	—/600
		17	EM4	DIP	—
		18	EAM	DTN	—/600
		19	EM4	DTN	—
FEX	XUT	1	GRD	DIP	3COM/600
		2	LOP	DIP	3COM/600
		3	GRD	DTN	3COM/600
* These trunks are set for Wink start.					

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Mode	Pack	Model	Signaling	DIP or DTN	BIMP and TIMP
		4	LOP	DTN	3COM/600
		5	GRD	DIP	3COM/900
		6	LOP	DIP	3COM/900
		7	GRD	DTN	3COM/900
		8	LOP	DTN	3COM/900
* These trunks are set for Wink start.					

Model telephones

This section provides model numbers for each telephone type and tables showing the numbering and placement of the keys, and the feature assigned to each key.

> ***Note:*** OPS telephones do not have their own telephone models. You can, however, create OPS models in by entering DD in response to the CDEN prompt in LD 10.

With the exception of the administration and CAP model telephones, the models are organized according to software packages, as follows:

Administration telephones

- M2008 — one model
- M2616 — one model

CAP telephones

- M2616 — one model
- M2216 — one model

General business telephones

- Analog (500/2500-type) telephones — seven models
- M2000 telephones
  - M2317 — two models
  - M2009 — two models
  - M2112 — two models
  - M2018 — two models
- M2006 — five models
- M2008 — fifteen models

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- M2616 — twelve models
- M2216 — two models
- M3000 — two models

Hotel and Motel telephones

- 500- and 2500-type telephones — one model
- M2006 — two models
- M2008 — two models
- M2616 — one model

Health Care telephones

- M2006 — one model
- M2008 — four models
- M2616 — two models

Table 95 "Class of Service options: analog telephones" (page 376) through Table 97 "Class of Service Options: ACD telephones" (page 377) show the acronyms for the Class of Service options for each telephone model in this section.

Table 95
Class of Service options: analog telephones

Prompt	Meaning
TLD	Toll Denied
HTA	Hunting Allowed
LNA	Last Number Redial Allowed
FNA	Call Forward No Answer Allowed
PUA	Pickup Allowed
XRA	Ring Again Allowed
MWA	Message Waiting Allowed

Table 96
Class of Service options: digital telephones

Prompt	Meaning
TLD	Toll Denied
AAD	Automatic Answerback Denied
ADD	Automatic Digit Display

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Prompt	Meaning
HTA	Hunting Allowed
LNA	Last Number Redial Allowed
FNA	Call Forward No Answer Allowed
PUA	Pickup Allowed
XRA	Ring Again Allowed
MWA	Message Waiting Allowed

Table 97
Class of Service Options: ACD telephones

Prompt	Meaning
UNR	Unrestricted
AAD	Automatic Answerback Denied
ADD	Automatic Digit Display
HTA	Hunting Allowed
LNA	Last Number Redial Allowed
FND	Call Forward No Answer Allowed
PUD	Pickup Denied
MWA	Message Waiting Allowed

Administration telephone models

M2008 model 99

Intended use: Administration (maintenance) telephone

Assigned Class of Service options:
MTA/ADD/LNA/FNA/GPUA/MWA/FBD

Table 98
M2008 model 99

Key number position	Feature
7	Blank
6	Message
5	Transfer
4	Speed Call (personnel: 99)
3	Forward
2	Conference
1	DN
0	DN

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M2616 model 99

Intended use: Administration (maintenance) telephone

Assigned Class of Service options:
MTA/LNA/FNA/GPUA/MWA/ADD/HFA/FBD

Table 99
M2616 model 99

Feature	Key number position	Key number position	Feature
—	15	7	—
Auto Dial	14	6	Message
Auto Dial	13	5	Transfer
Auto Dial	12	4	Ring Again
Auto Dial	11	3	Forward
Auto Dial	10	2	Conference
Auto Dial	9	1	DN
Speed Call (personnel: 99)	8	0	DN

Central Answering Position (CAP) telephone models

M2616 and 2216 CAP telephone model 60

Intended use: Central Answering Position telephone

Assigned Class of Service options:
LNA/FND/GPUA/MWA/ADD/HFD/AGN/FBD/SPV

Table 100
M2616 and 2216 CAP telephone model 60

Feature	Key number position	Key number position	Feature
Hot *	15	7	—
Make Set Busy	14	6	DN
Display Waiting Calls	13	5	Park
Auto Dial	12	4	Override
Auto Dial	11	3	Add
Auto Dial	10	2	Consult/Join
* This key is used as a Hotline to connect to the office paging system. Assign it with the paging route access code and define it when you activate the telephone.			

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Feature	Key number position	Key number position	Feature
Auto Dial	9	1	Extend
Auto Dial	8	0	ACD Queue (7700)
* This key is used as a Hotline to connect to the office paging system. Assign it with the paging route access code and define it when you activate the telephone.			

Note: With the M2616 CAP you must use an ACD character display. In the system software, the Extend key is actually called a Transfer key; the Consult/Join key is called a Conference key; and the Add key is called a No Hold Conference key.

General business telephone models

M2000 series telephones

The M2000 series telephones — M2112, M2018, M2317, M2009, and M3000 — are limited to a combined total of 128 model telephones. (In other words, there can be no more than a **combined total** of 128 different models for all the M2000 series telephones.)

It is up to you to make sure that the model associated with the telephone you are activating is predefined. You must select the model associated with the telephone or the telephone will not work.

M2317 model 20

Intended use: Two-line general business telephone with display
Assigned Class of Service options: FND/GPUA/LND/MWD/ADD/FBD

Table 101
M2317 model 20

Feature	Key number position	Key number position	Feature
—	—	5	Auto Dial
Auto Dial	10	4	Auto Dial
Auto Dial	9	3	Auto Dial
Auto Dial	8	2	Auto Dial
Auto Dial	7	1	DN
Auto Dial	6	0	DN

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Table 102
Default features available using M2317 model 20 softkeys

Key number position	Feature
29	Language
28	Privacy Release
27	Ring Again
26	Transfer
25	Charge Account
24	Calling Party Number
23	Conference
17	Call Park

M2317 model 25

Intended use: Two-line general business telephone with message indication and display
Assigned Class of Service options: FNA/GPUA/LND/MWA/ADD/FBD

Table 103
M2317 model 25

Feature	Key number position	Key number position	Feature
—	—	5	Auto Dial
Auto Dial	10	4	Auto Dial
Auto Dial	9	3	Auto Dial
Auto Dial	8	2	Auto Dial
Auto Dial	7	1	DN
Auto Dial	6	0	DN

Table 104
Default features available using M2317 model 25 softkeys

Key number position	Feature
29	Language
28	Privacy Release
27	Ring Again
26	Transfer
25	Charge Account
24	Calling Party Number
23	Conference

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Key number position	Feature
20	Message
17	Call Park

M2009 model 21

Intended use: Two-line general business telephone
Assigned Class of Service options: FND/GPUA/LNA/MWA/NDD/FBD

Table 105
M2009 model 21

Key number position	Feature
8	Auto Dial
7	Auto Dial
6	Transfer
5	Ring Again
4	Pick-Up
3	Call Forward
2	Conference
1	DN
0	DN

M2009 model 26

Intended use: Two-line general business telephones with message indication
Assigned Class of Service options: FNA/GPUA/LNA/MWA/NDD/FBD

Table 106
M2009 model 26

Key number position	Feature
8	Auto Dial
7	Message
6	Transfer
5	Ring Again
4	Pick-Up
3	Call Forward
2	Conference
1	DN
0	DN

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M2112 model 22

Intended use: Two-line general business telephone
Assigned Class of Service options: FND/GPUA/LNA/MWA/NDD/FBD

Table 107
M2112 model 22

Feature	Key number position	Key number position	Feature
—	—	5	Ring Again
Auto Dial	10	4	Pick-Up
Auto Dial	9	3	Call Forward
Auto Dial	8	2	Conference
Transfer	7	1	DN
Speed Call	6	0	DN

M2112 model 27

Intended use: Two-line general business telephone with message indication
Assigned Class of Service options: FNA/GPUA/LNA/MWA/NDD/FBD

Table 108
M2112 model 27

Feature	Key number position	Key number position	Feature
—	—	5	Ring Again
Auto Dial	10	4	Pick-Up
Auto Dial	9	3	Call Forward
Message	8	2	Conference
Transfer	7	1	DN
Speed Call	6	0	DN

M2018 model 24

Intended use: Two-line general business telephone
Assigned Class of Service options: FND/GPUA/LNA/MWA/NDD/FBD

Table 109
M2018 model 24

Feature	Key number position	Key number position	Feature
Auto Dial	17	8	Auto Dial

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Feature	Key number position	Key number position	Feature
Auto Dial	16	7	Auto Dial
Auto Dial	15	6	Transfer
Auto Dial	14	5	Ring Again
Auto Dial	13	4	Pick-Up
Auto Dial	12	3	Call Forward
Auto Dial	11	2	Conference
Auto Dial	10	1	DN
Auto Dial	9	0	DN

M2018 model 29

Intended use: Two-line general business telephone with message indication

Assigned Class of Service options: FNA/GPUA/LNA/MWA/NDD/FBD

Table 110
M2018 model 29

Feature	Key number position	Key number position	Feature
Auto Dial	17	8	Auto Dial
Auto Dial	16	7	Message
Auto Dial	15	6	Transfer
Auto Dial	14	5	Ring Again
Auto Dial	13	4	Pick-Up
Auto Dial	12	3	Call Forward
Auto Dial	11	2	Conference
Auto Dial	10	1	DN
Auto Dial	9	0	DN

Analog (500/2500-type) telephone models

Note: When you are activating an analog (500-type) telephone, you must use an analog (2500-type) telephone to define the features. When you have done this, disconnect the analog (2500-type) telephone and replace it with the analog (500-type) telephone that you are activating.

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Analog (500/2500-type) support personnel telephone models

Table 111
Analog (500/2500-type) telephone models

Model	Type of telephone	Assigned Class of Service options
20	Support personnel telephone with toll denied	TLD, C6A, CFXD, DTN, FND, GPUA, LNA, XFA, XRA, FBD
21	Support personnel telephone	UNR, C6A, CFXD, DTN, FND, GPUA, LNA, XFA, XRA, FBD
22	Support personnel telephone with message indication lamp	MWA, TLD, C6A, CFXD, DTN, FNA, GPUA, LNA, XFA, XRA, FBD, LPA
23	Support personnel telephone with message indication lamp	MWA, UNR, C6A, CFXD, DTN, FNA, GPUA, LNA, XFA, XRA, FBD, LPA
24	Support personnel telephone with message indication and no lamp	MWA, TLD, C6A, CFXD, DTN, FNA, GPUA, LNA, XFA, XRA, FBD, LPD
25	Support personnel telephone with message indication and no lamp	MWA, UNR, C6A, CFXD, DTN, FNA, GPUA, LNA, XFA, XRA, FBD, LPD
26	Courtesy telephone	MNL, TLD

Hotel and motel models

Note: When you are activating a 500-type telephone, you must use a 2500-type telephone to define the features. Once you have done this, unplug the 2500-type telephone and replace it with the 500-type telephone that you are activating.

Table 112
Hotel and motel models

Model	Type of telephone	Assigned Class of Service options
40	Guest room telephone	CCSA, MWA, DTN

Health care telephone models

Note: When you are activating a 500-type telephone, you must use a 2500-type telephone to define the features. Once you have done this, unplug the 2500-type telephone and replace it with the 500-type telephone that you are activating.

Table 113
Health care telephone models

Model	Type of telephone	Assigned Class of Service options
50	Nurses' station telephone with speed call	FND, LNA, GPUA, MWA, FBD

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Model	Type of telephone	Assigned Class of Service options
51	Nurses' station telephone with message and speed call	FND, LNA, GPUA, MWA, NDD, FBD
52	Nurses' station telephone with speed call and display	FND, LNA, GPUA, MWA, ADD, FBD
53	Nurses' station set with message, speed call and display	ND, LNA, GPUA, MWA, ADD, FBD

M2006 General business telephone models

Table 114
M2006 General business telephone models

Model	Intended use	Assigned Class of Service options	Key number position with assigned feature
20	General business telephone	FND, GPUA, LNA, MWA, FBD, UNR	5 - Transfer 4 - Ring Again 3 - Pick-Up 2 - Forward 1- Conference 0 - DN
21	General business telephone with message indicator	FNA, GPUA, LNA, MWA, FBD, UNR	5 - Message 4 - Transfer 3 - Pick-Up 2 - Forward 1 - Conference 0 - DN
22	General business telephone with message indication and speed call	FNA, GPUA, LNA, MWA, FBD, UNR	5 - Message 4 - Speed Call 3 - Pick-Up 2 - Forward 1 - Conference 0 - DN
23	General business telephone	FND, GPUA, LNA, MWA, FBD, TLD	5 - Transfer 4 - Ring Again 3 - Pick-Up 2 - Forward 1 - Conference 0 - DN

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Model	Intended use	Assigned Class of Service options	Key number position with assigned feature
24	General business telephone with message indicator	FNA, GPUA, LNA, MWA, FBD, TLD	5 - Message 4 - Transfer 3 - Pick-Up 2 - Forward 1 - Conference 0 - DN
25	General business telephone with message indication and speed call	FNA, GPUA, LNA, MWA, FBD, TLD	5 - Message 4 - Speed Call 3 - Pick-Up 2 - Forward 1 - Conference 0 - DN

M2006 model 40

Intended use: Hotel guest room telephone without message indication
Assigned Class of Service options: CCSA/MWA/FBD/CNDD/TLD/FND

Table 115
M2006 model 40

Key number position	Feature
5	Hot *
4	Hot *
3	Hot *
2	Hot *
1	Hot *
0	DN
* These keys are Hotlines to various Hotel and Motel services, such as Room service, and the front desk. You define them when you activate the telephone.	

M2006 model 41

Intended use: Hotel guest room telephone with message indication
Assigned Class of Service options: CCSA/MWA/FBD/FNA/CNDD/TLD

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Table 116
M2006 model 41

Key number position	Feature
5	Message
4	Hot *
3	Hot *
2	Hot *
1	Hot *
0	DN
* These keys are Hotlines to various Hotel and Motel services, such as Room service, and the front desk. You define them when you activate the telephone.	

M2006 model 50

Intended use: Nurses' station telephone with speed call
Assigned Class of Service options: FND/LNA/GPUA/MWA/FBD

Table 117
M2006 model 50

Key number position	Feature
5	Speed Call (personnel: 20)
4	Ring Again
3	Pick-Up
2	Forward
1	Conference
0	DN

M2008 General business telephone models

Table 118
M2008 General business telephone models

Model	Intended use	Assigned Class of Service options	Key number position with assigned feature
20	General business telephone	FND, GPUA, LNA, MWA, NDD, FBD	7 - Auto Dial 6 - Auto Dial 5 - Transfer 4 - Ring Again 3 - Pick-Up 2 - Forward 1 - Conference 0 - DN

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Model	Intended use	Assigned Class of Service options	Key number position with assigned feature
21	General business telephone with message indication	FNA, GPUA, LNA, MWA, NDD, FBD	7 - Auto Dial 6 - Message 5 - Transfer 4 - Ring Again 3 - Pick-Up 2 - Forward 1 - Conference 0 - DN
22	General business telephone with display	FND, GPUA, LNA, MWA, ADD, FBD	7 - 6 - Auto Dial 5 - Transfer 4 - Ring Again 3 - Pick-Up 2 - Forward 1 - Conference 0 - DN
23	General business telephone with message indication and display	FNA, GPUA, LNA, MWA, ADD, FBD	7 - 6 - Message 5 - Transfer 4 - Ring Again 3 - Pick-Up 2 - Forward 1 - Conference 0 - DN

M2008 Two-line general business telephone models

Table 119
M2008 Two-line general business telephone models

Model	Intended use	Assigned Class of Service options	Key number position with assigned feature
24	Two-line general business telephone	FND, GPUA, LNA, MWA, NDD, FBD	7 - Auto Dial 6 - Transfer 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN

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Model	Intended use	Assigned Class of Service options	Key number position with assigned feature
25	Two-line general business telephone with message indication	FNA, GPUA, LNA, MWA, NDD, FBD	7 - Auto Dial 6 - Message 5 - Transfer 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN
26	Two-line general business telephone with display	FND, GPUA, LNA, MWA, ADD, FBD	7 - 6 - Transfer 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN
27	Two-line general business telephone with message indication and display	FNA, GPUA, LNA, MWA, ADD, FBD	7 - 6 - Message 5 - Transfer 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN
28	Two-line general business telephone	FND, GPUA, LNA, MWA, NDD, FBD	7 - Auto Dial 6 - Auto Dial 5 - Auto Dial 4 - Auto Dial 3 - Forward 2 - Conference 1 - DN 0 - DN

M2008 manager telephone models

Table 120
M2008 Manager telephone models

Model	Intended use	Assigned Class of Service options	Key number position with assigned feature
30	Manager telephone	FND, GPUA, LNA, MWA, NDD, FBD	7 - Transfer 6 - Voice Call 5 - Speed Call (personnel: 20) 4 - Ring Again 3 - Forward 2 - Conference

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Model	Intended use	Assigned Class of Service options	Key number position with assigned feature
			1 - DN 0 - DN
31	Manager telephone with message indication	FNA, GPUA, LNA, MWA, NDD, FBD	7 - Voice Call 6 - Message 5 - Speed Call (personnel: 20) 4 - Ring Again 3 - Forward 2 - Conference 1 - DN 0 - DN
32	Manager telephone with display	FND, GPUA, LNA, MWA, ADD, FBD	7 - 6 - Voice Call 5 - Speed Call (personnel: 20) 4 - Ring Again 3 - Forward 2 - Conference 1 - DN 0 - DN
33	Manager telephone with message indication and display	FNA, GPUA, LNA, MWA, ADD, FBD	7 - 6 - Message 5 - Voice Call 4 - Speed Call (personnel: 20) 3 - Forward 2 - Conference 1 - DN 0 - DN

M2008 model 40

Intended use: Two-line guest room telephone

Assigned Class of Service options: CCSA/MWA/FBD/CNDD/FND/TLD

Table 121
M2008 model 40

Key number position	Feature
7	Hot *
6	Hot *
5	Hot *
4	Hot *
3	Hot *
2	Hot *
* These keys are Hotlines to various Hotel and Motel services, such as Room service, and the front desk. You define them when you activate the telephone.	

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Key number position	Feature
1	DN
0	DN
* These keys are Hotlines to various Hotel and Motel services, such as Room service, and the front desk. You define them when you activate the telephone.	

M2008 model 41

Intended use: Two-line guest room telephone with message indication
Assigned Class of Service options: CCSA/MWA/FBD/FNA/CNDD/TLD

Table 122
M2008 model 41

Key number position	Feature
7	Message
6	Hot *
5	Hot *
4	Hot *
3	Hot *
2	Hot *
1	DN
0	DN
* These keys are Hotlines to various Hotel and Motel services, such as Room service, and the front desk. You define them when you activate the telephone.	

M2008 model 50

Intended use: Nurses' station telephone with speed call
Assigned Class of Service options: FND/LNA/GPUA/MWA/NDD/FBD

Table 123
M2008 model 50

Key number position	Feature
7	Auto Dial
6	Transfer
5	Speed Call
4	Ring Again
3	Pick-Up
2	Forward
1	Conference
0	DN

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M2008 model 51

Intended use: Nurses' station telephone with message and speed call
Assigned Class of Service options: FNA/LNA/GPUA/MWA/NDD/FBD

Table 124
M2008 model 51

Key number position	Feature
7	Auto Dial
6	Message
5	Speed Call
4	Ring Again
3	Pick-Up
2	Forward
1	Conference
0	DN

M2008 model 52

Intended use: Nurses' station telephone with speed call and display
Assigned Class of Service options: FND/LNA/GPUA/MWA/ADD/FBD

Table 125
M2008 model 52

Key number position	Feature
7	–
6	Auto Dial
5	Speed Call
4	Ring Again
3	Pick-Up
2	Forward
1	Conference
0	DN

M2008 model 53

Intended use: Nurses' station set with message, speed call and display
Assigned Class of Service options: FNA/LNA/GPUA/MWA/ADD/FBD

Table 126
M2008 model 53

Key number position	Feature
7	–

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Key number position	Feature
6	Message
5	Speed Call
4	Ring Again
3	Pick-Up
2	Forward
1	Conference
0	DN

M2008 Message center telephone models

Table 127
M2008 Message center telephone models

Model	Intended use	Assigned Class of Service options	Key number position with assigned feature
60	Message center telephone	FND, GPUA, LNA, MWA, NDD, FBD	7- Message Cancellation 6 - Message Indication 5 - Speed Call (personnel: 20) 4 - Ring Again 3 - Forward 2 - Conference 1 - DN 0 - DN
61	Message center telephone with display	FND, GPUA, LNA, MWA, ADD, FBD	7- 6 - Message Cancellation 5 - Message Indication 4 - Speed Call (personnel: 20) 3 - Forward 2 - Conference 1 - DN 0 - DN

M2216 ACD telephone models

Table 128
M2216 ACD telephone models

Model	Intended use	Assigned Class of Service options	Key number position with assigned feature	
20	ACD agent with display	LNA, FND, GPUA, MWA,	15 - Auto Dial 14 - Auto Dial 13 - Auto Dial	7 - 6 - Transfer 5 - Speed Call

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Model	Intended use	Assigned Class of Service options	Key number position with assigned feature	
		ADD, FBD	12 - Auto Dial 11 - Auto Dial 10 - Auto Dial 9 - ACD calls waiting 8 - DN	4 - Forward 3 - Conference 2 - Make Set Busy 1 - Not ready 0 - ACD DN (7750)
30	ACD supervisor with display	LNA, FND, GPUA, MWA, ADD, FBD	15 - Auto Dial 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Display Agents 9 - Display Queue 8 - DN	7 - 6 - Transfer 5 - Speed Call 4 - Forward 3 - Conference 2 - Make Set Busy 1 - Not Ready 0 - ACD DN (7750)

Digital telephone models
M2616 Secretary telephone models

Table 129
M2616 Secretary telephone models

Model	Intended use	Assigned Class of Service options	Key number position with assigned feature	
20	Secretary telephone with display	LNA, FND, GPUA, MWA, ADD, HFA, FBD	15 - Auto Dial 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Auto Dial 9 - Auto Dial 8 - Auto Dial	7 - 6 - Speed Call (personnel: 20) 5 - Transfer 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN
21	Secretary telephone with display and message indication	LNA, FNA, GPUA, MWA, ADD, HFD, FBD	15 - Auto Dial 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Auto Dial	7 - 6 - Message 5 - Ring Again 4 - Speed Call (personnel: 20) 3 - Forward 2 - Conference 1 - DN

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Model	Intended use	Assigned Class of Service options	Key number position with assigned feature	
			9 - Auto Dial 8 - Transfer	0 - DN

M2616 Advanced business telephone

Table 130
M2616 Advanced telephone models

Model	Intended use	Assigned Class of Service options	Key number position with assigned feature	
22	Advanced business telephone	LNA, FND, GPUA, MWA, NDD, HFA, FBD	15 - 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Auto Dial 9 - Auto Dial 8 - Auto Dial	7 - Transfer 6 - Speed Call 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN
23	Advanced business telephone with message indication	LNA, FNA, GPUA, MWA, NDD, HFA, FBD	15 - 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Auto Dial 9 - Auto Dial 8 - Transfer	7 - Speed Call 6 - Message 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN
24	Advanced business telephone with display	LNA, FND, GPUA, MWA, ADD, HFA, FBD	15 - 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Auto Dial 9 - Auto Dial 8 - Transfer	7 - 6 - Speed Call 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN
25	Advanced business telephone with message indication and	LNA, FNA, GPUA, MWA, ADD, HFA, FBD	15 - 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial	7 - 6 - Message 5 - Ring Again 4 - Pick-Up 3 - Forward

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Model	Intended use	Assigned Class of Service options	Key number position with assigned feature	
	display		10 - Auto Dial 9 - Transfer 8 - Speed Call	2 - Conference 1 - DN 0 - DN

M2616 Manager telephone models

Table 131
M2616 Manager telephone models

Model	Intended use	Assigned Class of Service options	Key number position with assigned feature	
30	Manager telephone	LNA, FND, GPUA, MWA, NDD, HFA, FBD	15 - 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Auto Dial 9 - Auto Dial 8 - Voice Call	7 - Transfer 6 - Speed Call (personnel: 20) 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN
31	Manager telephone with message indication	LNA, FNA, GPUA, MWA, NDD, HFA, FBD	15 - 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Auto Dial 9 - Voice Call 8 - Transfer	7 - Speed Call (personnel: 20) 6 - Message 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN

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Model	Intended use	Assigned Class of Service options	Key number position with assigned feature	
32	Manager telephone with display	LNA, FND, GPUA, MWA, ADD, HFA, FBD	15 - 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Auto Dial 9 - Voice Call 8 - Transfer	7 - 6 - Speed Call (personnel: 20) 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN
33	Manager telephone with message indication and display	LNA, FNA, GPUA, MWA, ADD, HFA, FBD	15 - 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Voice Call 9 - Transfer 8 - Speed Call (personnel: 20)	7 - 6 - Message 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN

M2616 model 40

Intended use: Front desk console with display
Assigned Class of Service options:
LNA/FND/GPUA/MWA/ADD/CNDA/HFA/FBD

Table 132
M2616 model 40

Feature	Key number position	Key number position	Feature
–	15	7	–
Hot *	14	6	Speed Call (personnel: 20)
Control Class of Service	13	5	Ring Again
Message Registration	12	4	Pick-Up
Room Status	11	3	Forward
Message Cancellation	10	2	Conference
Message Indication	9	1	DN
Transfer	8	0	DN
* These keys are Hotlines to various Hotel and Motel services, such as Room service, and the front desk. You define them when you activate the telephone.			

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M2616 model 50

Intended use: Nurses' station telephone
Assigned Class of Service options:
LNA/FND/GPUA/MWA/NDD/HFA/FBD

Table 133
M2616 model 50

Feature	Key number position	Key number position	Feature
–	15	7	Transfer
Auto Dial	14	6	Speed Call (personnel: 20)
Auto Dial	13	5	Ring Again
Auto Dial	12	4	Pick-Up
Auto Dial	11	3	Forward
Auto Dial	10	2	Conference
Hot *	9	1	DN
Group Call - Group 0 **	8	0	DN
* These keys are Hotlines to various Hotel and Motel services, such as Room service, and the front desk. Define them when you activate the set.			
** Although group 0 is predefined in LD 18, you must assign extensions for this group when the telephones have been installed.			

M2616 model 51

Intended use: Nurses' station telephone with display
Assigned Class of Service options:
LNA/FND/GPUA/MWA/ADD/HFA/FBD

Table 134
M2616 model 51

Feature	Key number position	Key number position	Feature
–	15	7	Speed Call (personnel: 20)
Auto Dial	14	6	–
Auto Dial	13	5	Ring Again
Auto Dial	12	4	Pick-Up
Auto Dial	11	3	Forward
* These keys are Hotlines to various Hotel and Motel services, such as Room service, and the front desk. You define them when you activate the telephone.			
** Although group 0 is predefined in LD 18, you must assign extensions for this group when the telephones have been installed.			

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Feature	Key number position	Key number position	Feature
Hot *	10	2	Conference
Group Call - Group 0 **	9	1	DN
Transfer	8	0	DN
* These keys are Hotlines to various Hotel and Motel services, such as Room service, and the front desk. You define them when you activate the telephone.			
** Although group 0 is predefined in LD 18, you must assign extensions for this group when the telephones have been installed.			

M2616 Message center telephone models

Table 135
M2616 Message center telephone models

Model	Intended use	Assigned Class of Service options	Key number position with assigned feature	
61	Message center telephone	LNA, FND, GPUA, MWA, NDD, HFA, FBD	15 - 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Auto Dial 9 - Message Cancellation 8 - Message Indication	7 - Transfer 6 - Speed Call (personnel: 20) 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN
62	Message center telephone with display	LNA, FND, GPUA, MWA, ADD, HFA, FBD	15 - 14 - Auto Dial 13 - Auto Dial 12 - Auto Dial 11 - Auto Dial 10 - Message Cancellation 9 - Message Indication 8 - Transfer	7 - 6 - Speed Call (personnel: 20) 5 - Ring Again 4 - Pick-Up 3 - Forward 2 - Conference 1 - DN 0 - DN

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Changing preprogrammed data

Contents

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Introduction

The preprogrammed data on the Small System can provide an effective starting point for programming the system's telephone and trunking information.

This chapter shows how to change the default Small System numbering plan. You may want to change the numbering plan for one or more of the following reasons:

- to change the first number in the numbering plan
- to shift the start of the numbering plan to another card slot
- because the default numbering plan interferes with the system data

This section describes how to make changes to the default numbering plan. This section also provides information about modifying model telephone and trunk programming stored in the system's preprogrammed data.

Changing the default numbering plan

You may need to change the default numbering plan in order to improve performance or to remove numbering plan conflicts. Refer to Table 83 "Main cabinet default DN assignments" (page 364) through Table 89 "Default DN assignments for the chassis and chassis expander (Germany)" (page 369) on Table 83 "Main cabinet default DN assignments" (page 364) Table 89 "Default DN assignments for the chassis and chassis expander (Germany)" (page 369) for a full listing of the default DN assignments for Cabinet and Chassis systems.

Extensions assigned differ from the default numbering plan

Compare the first digits assigned to this system with the default numbering plan as shown in Table 75 "Default numbering plan: First digit" (page 360).

- If the first digit is in the unused range, change the first number in the default numbering plan. To do this, follow the instructions in "Changing the first number in the numbering plan" (page 403).

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- If the first digit is being used by Meridian Mail, trunk routes, or other data, you must remove these interferences. Follow the instructions found in "Removing numbering plan conflicts" (page 406).

Changing the first number in the numbering plan

To change the first number in the numbering plan perform the following procedure.

Procedure 73
Changing the first number in the numbering plan

Step	Action
1	Pick up the handset of the administration telephone.
2	Enter the administration Flexible Feature Code. (For some countries, this value is listed in the Table 90 "Flexible Feature Codes" (page 369).)
3	Enter the administration telephone password. (For some countries, this value is listed in Table 74 "Passwords and codes" (page 358).)
4	You hear special dial tone and the prompt "TASK?" appears on the top line of the character display.
5	Press the asterisk (*) three times. The second line of the character display reads "4 INSTALLATION OPTIONS".
6	Select "4 INSTALLATION OPTIONS" by entering the number "4". The character display reads: 1 DEFAULT SETS 2 NUMBERING PLAN
7	Select "2 NUMBERING PLAN" by entering the number "2". The character display reads: FIRST NUMBER (XXXX)?
8	To create a new first number, enter the digits you want and press the pound key.
9	The number you enter as the first number in the numbering plan is assigned to slot 1, unit 0 of the Main Cabinet or Chassis. The default numbers assigned to the remaining card and unit combinations are in sequence, assuming each slot has up to 16 units.

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—End—

Determining new extension numbers

If you wish to change the default numbering plan, and need to determine the extension number that will be assigned to a specific telephone, perform the following procedure:

Procedure 74
Determining the extension number

Step	Action
1	Identify the line card to which the telephone is connected. Take the card slot number associated with the card and subtract 1.
2	Multiply this number by 16.
3	Add the first extension number in the new numbering plan.
4	Identify the unit number the telephone is terminated on and add it to the result obtained in Step 3.

—End—

Example:

Assume the new numbering plan starts at extension number 4500. You wish to know the extension number of the telephone connected to card 8, unit 12:

1	Subtract 1 from the card slot number (8 - 1):=	7
2	Multiply by 16:x =	16 112
3	Add the first extension number:+	4500
4	Add the unit number:+	12
5	Number assigned to card 8, unit 12 is	4624

Note: If you are using a three digit numbering plan, follow the same procedure.

Example:

The new three digit numbering plan starts at extension number 300, and you wish to know the extension number of the telephone connected to card 8 unit 12:

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1	Subtract 1 from the card slot number (8 -1):=	7
2	Multiply by 16:x =	16 112
3	Add the first extension number:+	300
4	Add the unit number:+	12
5	Number assigned to card 8, unit 12 is	424

If you want the system to have a consecutive numbering plan, make sure that the line cards are in consecutive card slots in the cabinet or chassis.

If you arrange the line cards consecutively, the preassigned telephone extensions automatically configure during telephone activation. You do not have to manually enter the extensions.

Using the Meridian Mail Auto-configure feature

The Meridian Mail Auto-configure feature automatically matches Meridian Mail mailboxes with telephone extensions. If you have the Meridian Mail card option and you want to use the Meridian Mail Auto-configure feature, make sure:

- The numbering plan is consecutive.
- The first number in the Small System and the Meridian Mail system are the same.

Shifting the numbering plan to a new card slot

The first number in the numbering plan is assigned to slot 1, unit 0. You may wish to shift the first number in the numbering plan to a different card slot, since the TDS/DTR card is preprogrammed for slot 1.

The following procedure describes how to shift the first number in the numbering plan to a specific card slot.

Procedure 75
Shifting the first number in the numbering plan to a different card slot

Step	Action
1	Locate the first line card. Subtract 1 from the number of the card slot that it is in.
2	Multiply this number by 16.
3	Take the first number in the numbering plan and subtract the value obtained in Step 2.

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Note: When you enter the value from Step 3 in response to the prompt "FIRST NUMBER (XXXX)?" on the administration telephone menu, the number is shifted to the appropriate slot.

—End—

Example:
The first number in the numbering plan is 2200. If you want the first number in the numbering plan to be 2300, and the first line card is located in slot 6, perform the following calculation:

1. Locate the first line card. Subtract 1 from the card slot number it is housed in:

   6 - 1 = 5

2. Multiply the number obtained in Step 1 by 16:

   5 x 16 = 80

3. Subtract this number from the first number in the numbering plan:

   2300 - 80 = 2220

4. Enter this value in response to the "FIRST NUMBER (2200)?" prompt on the administration telephone:

   ```
   FIRST NUMBER (2200)?  2220
   ```

Removing numbering plan conflicts

This section contains methods for removing any numbering plan conflicts that occur.

Conflicts with Meridian Mail data

The Small System is shipped with preprogrammed data to support a Meridian Mail card option. The preprogrammed Meridian Mail data may cause problems in the following situations:

- There is a numbering plan conflict with preprogrammed Meridian Mail data and the programming required for another feature.
- Card slot 10 is required for another circuit card.

Obtaining the use of card slot 10

If card slot 10 is required for another circuit card, simply remove the six Meridian Mail agents programmed for this card slot. To do this, load LD 11 on the TTY and respond to the system prompts as shown below. Repeat the procedure once for each of the six units that you want to remove.

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LD 11

REQ	OUT	
TYPE	2008	
TN	10 XX	where "XX" = a value of 0,1,2,8,9, or 10

Obtaining the use of Meridian Mail ACD queues

The Meridian Mail feature also uses a number of ACD queues in the Small System. See "Conflicts with ACD queues" (page 407) for information on how to remove this data from the system.

Conflicts with ACD queues

The Small System has preprogrammed ACD queues for Meridian Mail, the Central Answering Position, and general purpose ACD. (For some countries, preprogrammed ACD queues are listed in Table 76 "Default numbering plan: important extension numbers" (page 361).) To remove these values, use LD 23.

Note: Before you remove this data from the system, make sure that all ACD agent information is removed from the queue.

In LD 23, respond to the prompts as follows:

LD 23

REQ	OUT	
TYPE	ACD	
CUST	0	
ACDN	XXXX	where "XXXX" = value of ACD queue

Repeat for each ACD queue you wish to remove.

Conflicts with Call Park extension numbers

System call park extension numbers are preprogrammed for the Central Answering Position. (For some countries, the default call park extensions are listed in Table 76 "Default numbering plan: important extension numbers" (page 361).) To remove this data from the system, load LD 50 and respond to the prompts as follows:

LD 50

REQ	OUT
TYPE	CPK

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CUST	0	
SPDN	XXXX	where "XXXX" = value of Call Park extension

Repeat for each Call Park extension you wish to remove.

Conflicts with SDI ports

Five SDI/ESDI ports are preprogrammed on the Small System. Ports 8 and 9 are associated with the Meridian Mail card option, and ports 0, 1, and 2 are associated with the NTDK20 Small System Controller (SSC) card. You cannot remove port 0; however, you can remove any of the remaining ports using LD 17 as follows.

LD 17

REQ	CHG	
TYPE	CFN	
ADAN	OUT TTY X	where "X" = the TTY that you are removing

Conflicts with the SPRE code

If the preprogrammed SPRE code interferes with the programming required for the Small System, use LD 15 to remove it. (For some countries, the default SPRE access code is listed in Table 75 "Default numbering plan: First digit" (page 360).) For customer 0 enter the following in response to the SPRE prompt:

LD 15

SPRE	X y where "y" = the value of the SPRE code

Note: To define a new SPRE code, type a space and enter the new number.

Conflicts with the attendant extension number

You cannot remove the attendant extension number entirely from the Small System data; you can only replace it with another number.

LD 15

REQ	CHG	where CHG = Change
TYPE	CDB	where CDB = Customer Data Block
CUST	x	where "x" = Customer number
ATDN	xxxx	where "xxxx" = the new extension number

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Changing or removing the preprogrammed night number

If you wish to change or remove the night number, use LD 15. (For some countries, the default value of the night number is listed in Table 76 "Default numbering plan: important extension numbers" (page 361).)

LD 15

REQ	CHG	where CHG = Change
TYPE	CDB	where CDB = Customer Data Block
CUST	x	where "x" = Customer number
NIT1	bbbb	where"bbbb" = the new extension number (DN)
or		
	X aaaa	where "aaaa" = the current night number (the night number now removed)

Conflicts with Flexible Feature Codes

If the preprogrammed Flexible Feature Codes interfere with the programming required for the Small System, use LD 57 to remove the data from the system. (For some countries, default FFCs are listed in Table 90 "Flexible Feature Codes" (page 369).)

LD 57

To change one or more access codes, enter the following commands:

REQ	CHG END	Change or end
TYPE	FFC	FFC = Flexible feature codes
CUST	0-31	Customer Number
FFCT	YES (NO)	FFFC Confirmation tone
CODE	aaaa	Enter access code prompt (aaaa)
AAAA	xx	Enter the new access code prompt (AAAA)
CODE	<CR>	Return to REQ
REQ	END	End program

To remove one access code, enter the following commands:

REQ	OUT	Action request
TYPE	FFC	FFC = Flexible feature codes
CUST	0-31	Customer Number
FFCT	YES (NO)	FFC Confirmation tone
ALL	NO	Remove specific access code

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CODE	aaaa	Enter access code prompt (aaaa)
AAAA	xx	Enter the new access code prompt (AAAA)
CODE	<CR>	Return to REQ
REQ	END	End program

To remove all access codes, enter the following commands:

REQ	OUT	Action request
TYPE	FFC	FFC = Flexible feature codes
CUST	0-31	Customer Number
FFCT	YES (NO)	FFC Confirmation tone
ALL	YES	Remove all access codes
CODE	<CR>	Return to REQ
REQ	END	End program

Creating, changing, and removing model telephones

If you need a model telephone different from the default models provided in Small System software, use overlays to design your own models using the information in Table 136 "Design model telephones" (page 410).

Table 136
Design model telephones

Task	Overlay (LD)
Create your own model telephones:	
Analog telephones (500/2500-type telephones)	10
Digital telephones	11
Get information on model telephones	20 (printout)

If you require additional assistance when creating your own model telephones and trunks, refer to the system software NTPs that are shipped with every system.

Creating analog telephone models

You must enter the following information in LD 10 to create an analog (500/2500- type) telephone model:

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LD 10

REQ	NEW	
TYPE	500 M	
MODL	YYY	where "YYY" = the model number of the telephone that you are creating

Enter responses to the remaining prompts in order to complete the new model. Refer to the system software guides for a complete list of prompts and possible responses.

Modifying analog model telephones

If you want to modify an analog telephone, use LD 10 and type in the following commands on the TTY.

LD 10

REQ	CHG	
TYPE	500 M	
MODL	YYY	where "YYY" = the model number of the telephone that you are modifying

For more information about LD 10 and its associated prompts and commands, refer to the system software NTPs that are shipped with the system.

Creating digital model telephones

When you create model telephones for digital telephones, you must program key 0 with a function that can act as a prime extension number or its equivalent. This includes telephones that are programmed to have Single Call Ringing (SCR), Multiple Call Ringing (MCR), Single Call Non-Ringing (SCN), Multiple Call Non-Ringing (MCN), and Automatic Call Distribution (ACD).

For ACD telephones, the model telephone defines the ACD queue. To define the extension number, you must enter the ID number of the agent or the Central Answering Position.

You must enter the following information in LD 11 in order to create a digital telephone model.

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LD 11

REQ	NEW	
TYPE	2XXX M or 3000 M	where "XXX" = allowed telephone types
MODL	YYY	where "YYY" = the model number of the telephone that you are creating (between 1–127)

Enter the responses to the remaining prompts in order to complete the new model. Refer to the system software NTPs for a complete list of prompts and possible responses.

Modifying digital model telephones

If you want to modify a digital telephone, load LD 11 and enter the following commands on the TTY:

LD 11

REQ	CHG	
TYPE	2XXX M or 3000 M	where "XXX" = allowed telephone types
MODL	YYY	where "YYY" = the model number of the telephone that you are modifying

For more information about LD 11 and its associated prompts and commands, refer to the system software NTPs that are shipped with the system.

Printing model information

To print information about model telephones, use LD 20.

Analog telephones

LD 20

REQ	PRT	
TYPE	500 M	
MODL	YYY	where "YYY" = the telephone model number. If you want to print all of the models for this telephone type, leave this value blank.

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Digital telephones

Note: To print M3000 telephone models, you must enter "TYPE 3000 M". If you enter "TYPE 2XXX M", you print all the Meridian Digital Telephone models except the M3000.

LD 20

REQ	PRT	
TYPE	2XXX M or 3000 M	where "XXX" = the telephone type
MODL	YYY	where "YYY" = the telephone model number (between 1–127). If you want to print all of the models for this telephone type, leave this value blank.

Removing model telephones

Use LD 10 to remove analog telephone models and LD 11 to remove digital telephone models. Respond as follows to the prompts in either overlay:

LD 10 or LD 11

REQ	OUT	
TYPE	XXXX M	where "XXXX" = telephone type for the model you are removing. (Example: 500, 2006, 2317, 2216, 3000, etc.)
CUST	0	
MODL	YYY	where "YYY" = the model number associated with the telephone type you are removing. (Valid range is 1–127.)

Creating model trunks and changing route access codes

If you need a trunk that is different from the default models provided in Small System software, use LD 14 to design your own model. Change route access codes using the administration telephone.

If you require additional assistance when creating your own model telephones and trunks, refer to the system software NTPs.

Creating model trunks

To create a new model trunk, load LD 14 and enter the following commands on the TTY:

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LD 14

REQ	NEW	
TYPE	aaa M	where "aaa" = the type of trunk that you are creating (TIE, COT, WATS, and so on)
MODL	YYY	where "YYY" = the model number of the trunk that you are creating (between 1–127)
XTRK	a...a	Where a...a = XUT, XEM, XCOT, XDID This prompt only appears when you define the first model in a group. Each group consists of 16 consecutive model definitions. (Refer to the group boundaries listed below.) Once the first model in a group is defined, the remaining model numbers in the group(s) are assumed to be of the same type.

Group boundaries are as follows:

1–15, 16–31, 32–47, 48–63, 64–79. 80–95, 96–111, 112–127.

Examples:

If, for example, you define a model trunk as XUT, with a model number of 12, all models in the group 1–15 will automatically be XUT models. If you define another model trunk as an XEM, with a model number of 33, all models in the group 32–47 will automatically be XEM models.

> ***Note:*** When you create trunk models you are not prompted for the trunk route or member number. This information is defined by using the administration telephone to program the XUT or XEM circuit card.

For more information about LD 14 and its associated prompts and commands, refer to the system software NTPs that are shipped with the system.

Modifying model trunks

If you want to modify a trunk, load LD 14 and enter the following commands on the TTY:

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LD 14

REQ	CHG	
TYPE	aaa M	where "aaa" = the type of trunk that you are modifying
MODL	YYY	where "YYY" = the model number of the trunk that you are modifying (between 1–127)

Removing model trunks

To remove a trunk model from the system, load LD 14 and respond to the prompts as follows:

LD 14

REQ	OUT	
TYPE	XXX M	where "XXX" = the trunk type of the model that you are removing. (Examples: COT, TIE, DID, FEX, WAT, etc.)
CUST	0	
MODL	YYY	where "YYY" = the model number associated with the trunk type you are removing. (Valid range is 1–127).

Printing model information

To print information about model trunks, load LD 20 and enter the following commands on the TTY:

LD 20

REQ	PRT	
TYPE	TTTT	where "TTTT" = the trunk type
MODL	YYY	where "YYY" = the model number. If you want to print all of the models for this trunk type, leave this value blank.

Changing a route access code

Use this procedure to change a route access code.

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Procedure 76
Changing a route access code

Step	Action
1	Pick up the handset of the administration telephone.
2	Enter the administration Flexible Feature Code to access the administration menu. (For some countries, this value is listed in Table 90 "Flexible Feature Codes" (page 369).)
3	Enter the default administration telephone password. (For some countries, this value is listed in Table 74 "Passwords and codes" (page 358).) You hear special dial tone and the prompt "TASK?" appears on the top line of the character display. If you press the asterisk, "2 CHANGE ROUTE ACCESS" appears on the second line of the character display.
4	Select "2 CHANGE ROUTE ACCESS" by entering the number "2". The prompt "ROUTE ACCESS?" appears on the character display.
5	Enter the access code of the route you want to modify, and press the pound key (#). The prompt "NEW ACCESS CODE?" asks you for a new access code for the route.
6	Enter the new access code and press the pound key. The display shows "CODE CHANGED". After a delay of approximately 4 seconds you hear special dial tone and the sequence is repeated when the prompt "ROUTE ACCESS?" appears. OR If the route access code is not available for use, you hear overflow tone. The display shows "USED, ROUTE ACCESS?" and you must repeat this step. You must enter a **different** access code. This sequence continues until you enter an appropriate new access code.

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7 Terminate the sequence by hanging up the telephone.

OR

Repeat the sequence by going through the steps again.

—End—

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Central Answering Position

Contents

This section contains information on the following topics:

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"Configuring your CAP" (page 428)
"Logging into and out of the ACD queue" (page 433)
"Small System configured in Position ID mode" (page 433)
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"Direct Station Select (BFS)" (page 435)
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"Call Forward and Busy Status" (page 441)

"Forced Camp-on/Priority Override" (page 443)

Introduction

This chapter contains the following information:

- overview of the Central Answering Position (CAP) feature
  - — a description of what the CAP is
  - — required equipment
- descriptions of the CAP key layouts and key expansion modules
- procedures for configuring the CAP
- procedures for installing and removing key expansion modules
- common CAP features and how to use them

About the Central Answering Position

The Central Answering Position (CAP) is an alternative to the M2250 attendant console, and must be a Meridian Digital 2616 or 2216 Automatic Call Distribution (ACD) telephone. It provides many console features, including responding to requests for information and transferring, parking, and placing calls. If you choose to add an optional key expansion module(s), the CAP also has Direct Station Select and Busy Lamp Field features.

The equipment required for a basic CAP is:

- an M2616 or M2216 ACD digital telephone
- an ACD Liquid Crystal Display (LCD) display

  Note: With the M2616 CAP telephone, you must use an ACD display.

- optional key expansion module(s)

Up to two NT2K22XH Meridian key expansion modules can be used with the CAP for a total of 60 keys (22 keys per module, plus 16 keys on the telephone). If you use key expansion modules, you require a local power supply and power board as well as an expanded telephone footstand.

A preprogrammed Small System uses an attendant console; if the console is not activated or is unstaffed, it is said to be in Night Service. Calls that come in to be answered by a console that is not activated or is in Night Service are transferred to the CAP extension number (ACD queue). Calls are placed in the queue in the order of their arrival.

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The CAP receives all calls that come in on the ACD queue. To answer calls, the CAP agent must be logged onto the ACD queue. There are two ways of logging onto the ACD queue, described in "Logging into and out of the ACD queue" (page 433).

If multiple CAP telephones are configured, calls are distributed among these positions. For example, the CAP that has been idle the longest receives the next incoming call. If equipped, a recorded announcement (RAN) can be used to advise the calling party of any delay in answering.

CAP functionality versus M2250 functionality

Although the CAP is an attendant position, it does NOT operate in the same way as the M2250 attendant console. The CAP is an ACD agent, and therefore provides attendant functionality in a different manner than the attendant console.

Note: The CAP console should not be viewed as having M2250 attendant console capabilities, because it is just an M2616 or M2216 digital telephone with optional key expansion modules. As a result of this limitation, the CAP set does not have access to attendant features such as Network Attendant Services (NAS).

Table 137 "CAP features versus M2250 features" (page 421) illustrates the CAP features that duplicate or simulate attendant console features.

Table 137
CAP features versus M2250 features

Central Answering Position (CAP)	M2250 attendant console
Override.	Busy Verify
Not Ready.	Position Busy
Make Set Busy (Night Service is entered when the last Central Answering Position logs out of the ACD queue by depressing the Make Set Busy Key).	Night Service
A Night Service key can also be defined, for the ACD DN with that service.	
Transfer / No Hold Conference.	Release (to extend)
Transfer.	Exclude Source/Destination
Conference / No Hold Conference.	Conference
In Calls Key (Key 0) — incoming calls only.	Loop Key 0
(One or more DN keys can be assigned for outgoing calls.)	
Call Forward and Busy Status (BFS) and Add-on modules.	Busy Lamp Field
Keys configured as BFS keys enable you to connect to an extension by pressing a single key.	Direct Station Select

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Central Answering Position (CAP)	M2250 attendant console
ACD position configured as supervisor and provisioned with an ACD agent observe key.	Supervisor Console
Overflow/Interflow.	Attendant Overflow Position
ACD Recorded Announcement.	Attendant RAN
ACD position configured as supervisor and provisioned with a Display Calls Waiting key.	Call Waiting Indicator

Attendant console features not available with a CAP

The following is a list of attendant console features that are not available with a CAP:

- The CAP does not have the capability to provision feature keys which function like incoming call indicators.
- The following attendant features have no equivalent on the CAP:
  - Trunk Group Busy
  - Incoming Call Indicators
  - Attendant Administration Function Keys
  - Multiple Loop Keys (for incoming/outgoing calls)
  - Signal Source/Destination

The above information should be carefully considered when deciding between the functionality of a CAP and that of an M2250 console.

Key layout

A number of features make it easy for you to respond to and transfer calls using the CAP. Each CAP telephone is preconfigured with certain features. (Preprogrammed data can be found in "Preprogrammed data" (page 357).)

To activate preconfigured CAP data, select a CAP model using the administration telephone and carry out the appropriate overlays on the CAP, as described later in this chapter. You are not locked into the preconfigured model, however. If you choose, you can change features to meet your specific needs.

The feature keys shown in Figure 137 "Default M2216 or 2616 CAP model" (page 423) provide an example of the most commonly used CAP functions. The CAP extension key (ACD queue) is found at the bottom right-hand corner of the keypad and has a default extension number.

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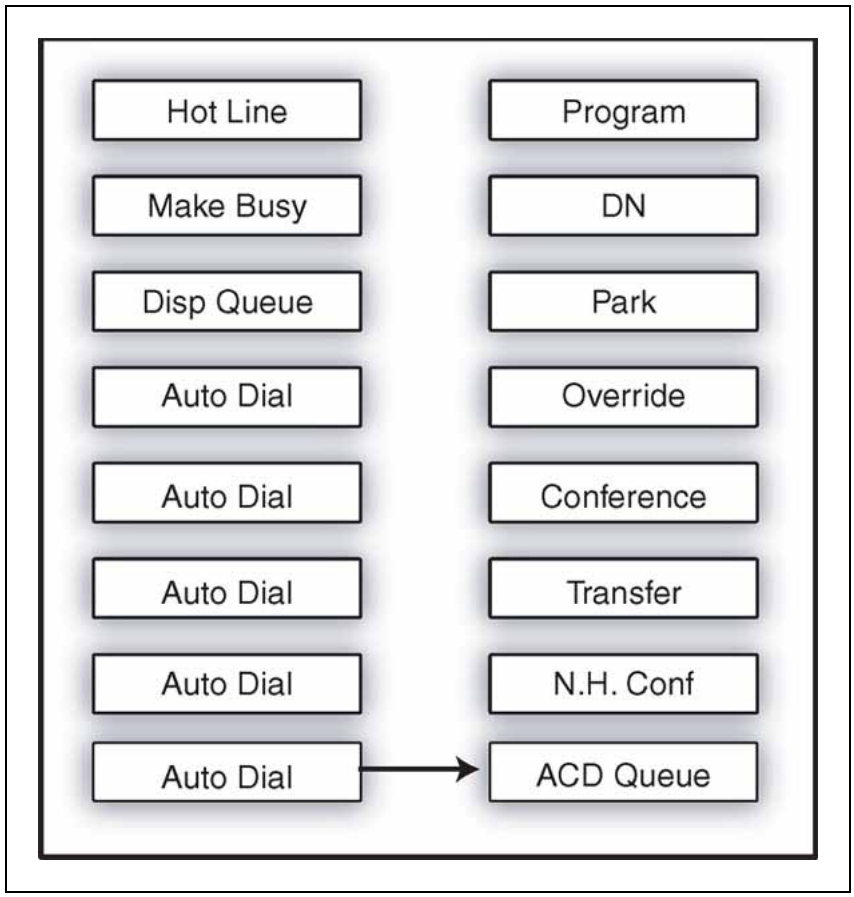
Note: See "Using common CAP features" (page 434) for a brief description of the common features for a CAP and for detailed instructions on how to use each feature.

Figure 137 "Default M2216 or 2616 CAP model" (page 423) shows the model feature key assignments on the CAP telephone. These are the features you get when you select a CAP model using the administration telephone.

Figure 137
Default M2216 or 2616 CAP model



* This key is used to connect to the office paging system. Assign it with the paging route access code and define it when you activate the telephone.

Key expansion modules

Up to two optional Meridian Key Expansion Modules (NT2K22XH) can be used with the base CAP telephone. The keys in Figure 138 "Optional key expansion module" (page 425) show the key expansion module with example labels for department or individual names. These keys act as

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Direct Station Select (DSS) keys and Busy Lamp Field arrays. Each of these keys is programmed with the Terminal Number (TN) of the telephone to which it corresponds. To program these keys use LD 11, explained later in this chapter.

You can use these keys to visually find out the status of a telephone, or to contact and extend calls to telephones. The status of a telephone is indicated by the key lamp in the following ways:

Idle — The key lamp is off.
Busy — The key lamp is steadily lit.
Forwarding — The key lamp is flashing.

Figure 138 "Optional key expansion module" (page 425) shows an example of a key expansion module.

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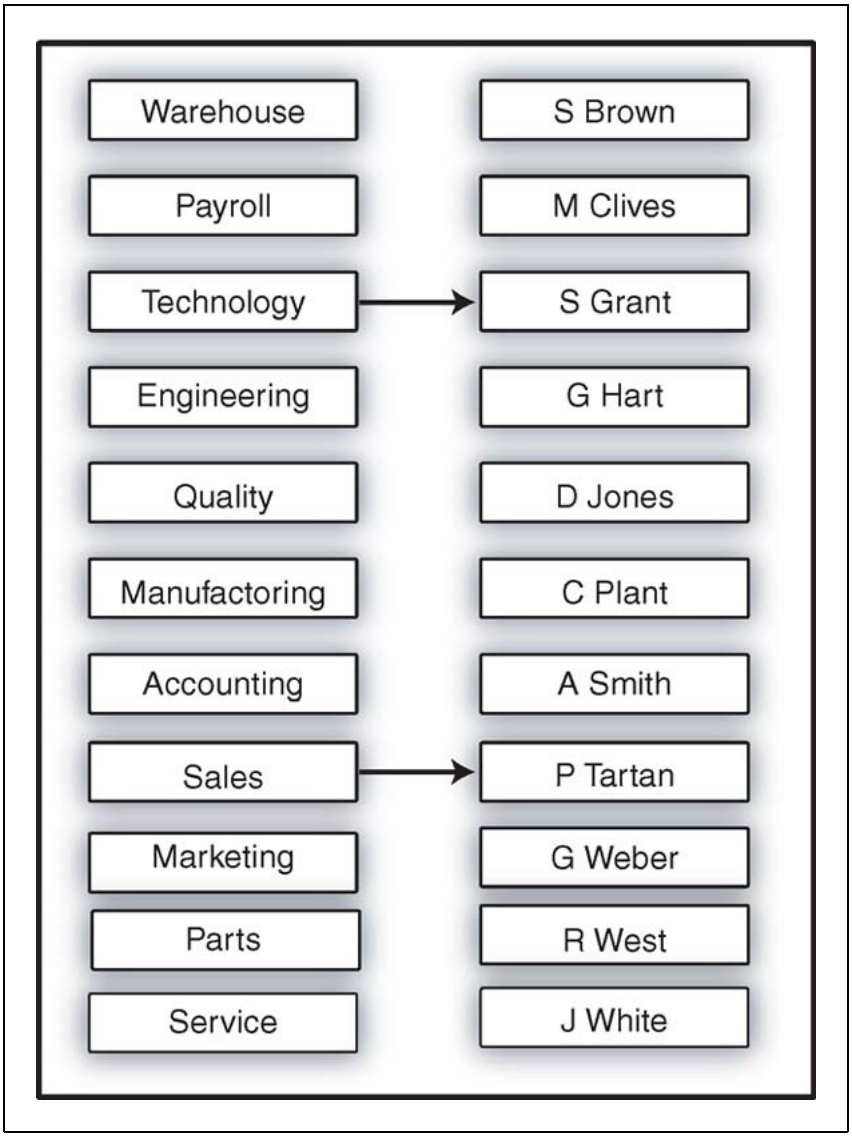
Figure 138
Optional key expansion module



Installing the key expansion module(s)

Use this procedure to add one (single) or two (double) key expansion module(s) to the M2616 or M2216 ACD CAP telephone.

Note: Before installing the key expansion module(s), make sure that you have the associated footstand, the power supply board, and the additional power source.

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Procedure 77
Installing a key expansion module

Step	Action
1	Remove the telephone handset and place the telephone upside down on top of a level, solid work surface covered with soft material or paper to avoid damaging the keys or the telephone face.
2	Disconnect all cords from the telephone.
3	Remove the two screws from the stand assembly and unsnap it from the telephone by pressing inward at the back of the stand (where it meets the base) and pulling upward. ***Note:*** If you are using an M2616 telephone and it is equipped with a Programmable Data Adapter, the Programmable Data Adapter must be removed and installed into the key expansion module footstand.
4	If the telephone is not yet equipped with the power board, install the power board now.
5	Align the bottom of the key expansion module(s) to the bottom of the telephone. (Refer to Figure 139 "Key expansion module connections (bottom view)" (page 428).)
6	Snap the end of the ribbon cable connector(s) into the bottom interface jack on the key expansion module. Snap the other end of the ribbon cable into the interface jack in the left side of the telephone. Gather the excess cable in the base of the key expansion module.
7	If you are adding a second key expansion module, snap the end of a second ribbon cable connector into the bottom interface jack on the second key expansion module. Snap the other end of the ribbon cable into the top interface jack on the first key expansion module. (Refer to Figure 139 "Key expansion module connections (bottom view)" (page 428).) Gather the excess cable in the base of the second key expansion module.
8	If the telephone is equipped with a Programmable Data Adapter, reconnect the data cable to the base telephone jack. Make sure that the Programmable Data Adapter cable and the interface cable do not get pinched between the base and the stand.
9	Secure the footstand to the key expansion module(s) and to the telephone by placing the footstand tabs into the slots provided on the base of the key expansion module and telephone and pressing down. Make sure that the stand is firmly attached to the

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base. Ensure that the ribbon cable(s) are not pinched between the footstand and the mounting posts.

10 Insert the three (or four if you have two modules) self-tapping Phillips head screws supplied with the key expansion module into the mounting holes in the bottom of the footstand. Tighten the screws firmly with a #1 Phillips screwdriver.

11 Tighten all screws, replace all cords and place the telephone in its normal operating position. Place the label supplied with the key expansion module(s) on the bottom cover of the telephone (or the footstand) for tracking purposes.

12 Perform the self test and acceptance test procedures. (Refer to *Software Input/Output Administration (NN43001-611)* for information about these test procedures.)

—End—

Removing the key expansion module(s)

Use this procedure to remove one (single) or two (double) key expansion modules to the M2616 or M2216 ACD CAP telephones.

Procedure 78
Removing a key expansion module

Step	Action
1	Remove the telephone handset and place the telephone upside down on top of a level, solid work surface covered with soft material or paper to avoid damaging the keys or the telephone face.
2	Disconnect all cords from the telephone.
3	Remove the screws from the stand assembly (where it meets the key expansion module) and unsnap the stand assembly from the key expansion module and the telephone by pressing inward at the back of the stand (where it meets the base) and pulling upward.
4	Remove the interface cable from the telephone by pressing down on the locking tab. If you have an interface cable on the first key expansion module (closest to the telephone), remove it now.

—End—

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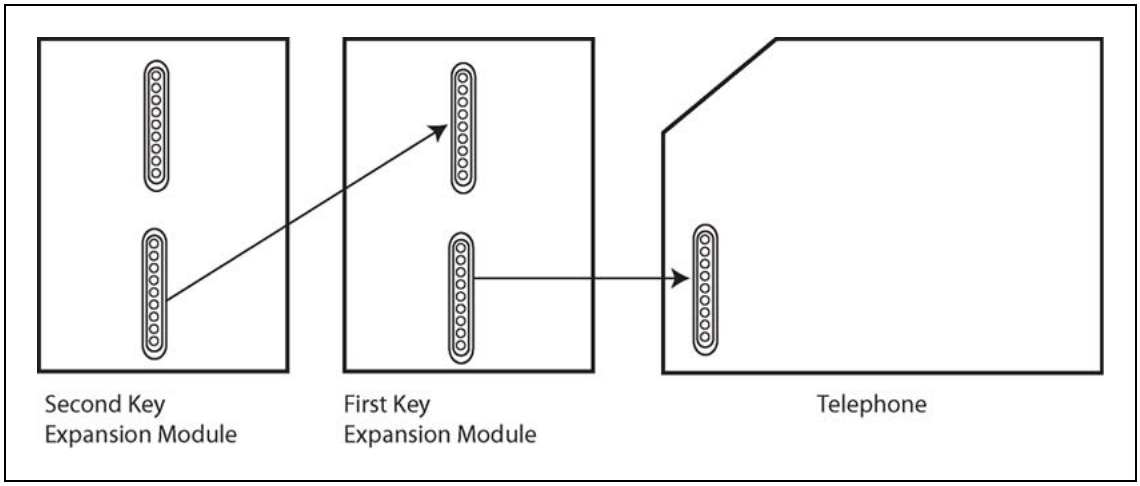
Figure 139
Key expansion module connections (bottom view)



For more information about installing key expansion modules, refer to *Telephones and Consoles Fundamentals (NN43001-567)*.

Configuring your CAP

The CAP can be configured using the CAP telephone model as described in "Preprogrammed data" (page 357).

The CAP can also be configured using a TTY.

To configure the CAP, use the system's TTY to access the following overlays in the order listed:

- LD 16: Use this overlay to configure your RAN trunk routes.
- LD 14: Use this overlay to configure your RAN trunks.
- LD 23: Use this overlay to configure the CAP queue.
- LD 15: Use this overlay to do the following:
  - — Define and modify the attendant extension number.
  - — Define the night number and time.
  - — If necessary, define a second night number and time.
  - — Define customer options.
- LD 11: Use this overlay to define the CAP features, including Busy Lamp Field and Direct Station Select.

  Note: The following is a summary of the steps to follow when configuring the CAP from a TTY. Refer to *Software Input/Output Administration (NN43001-611)* for a complete listing of prompts and responses for the overlays.

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To configure RAN trunk routes, respond as follows for prompts in LD 16:

LD 16: Defining and modifying trunk routes

Prompt	Response	Description
REQ	aaa	"aaa" = NEW, OUT, CHG, END
TYPE	bbb	"bbb" = trunk type (COT, TIE, DID, etc.)
DMODL	ccc	"ccc" = the default model number for this route.

To configure RAN trunks, respond as follows for prompts in LD 14:

Note: LD 14 is also used to assign incoming trunks with a Priority (via CLS=APY)

LD 14: Defining and modifying trunks

Prompt	Response	Description
REQ	aaa	"aaa" = NEW, OUT, CHG, MOV, END
TYPE	bbb <M>	"bbb" = the trunk type (COT, TIE, DID, etc.) "M" is optional. Enter "M" if you are using a model trunk.
MODL		Model Number ***Note:*** Only prompted if "M" is entered in response to the "TYPE" prompt.
	1-127	Range for Meridian 1 Small System and Media Gateway 1000B.
TN		Terminal number ***Note:*** Not prompted if "M" is entered in response to the "TYPE" prompt.
	c u	Format for Meridian 1 Small System and Media Gateway 1000B, where c = card and u = unit.
CDEN		***Note:*** Not prompted if "M" is entered in response to the "TYPE" prompt.

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Prompt	Response	Description
TOTN		To Terminal Number ***Note:*** Not prompted if "M" is entered in response to the "TYPE" prompt.
	c u	Format for Meridian 1 Small System and Media Gateway 1000B, where c = card and u = unit.

The CAP queue (ACD queue) is configured using LD 23. Respond as follows for the specified prompt:

LD 23: Configuring ACD as the night number

Prompt	Response	Description
REQ	NEW	
TYPE	ACD	"ACD" = ACD data block
CUST		Customer number as defined in LD 15.
ACDN	xxxx	"xxxx" = ACD directory number
MWC	NO	not message center
ACPQ	(NO) YES	answered calls are (are not) given priority when reentered in queue
AST	<CR>	Associated set (used with Meridian Link only).
DSAC	<CR>	Server IS/data service access code (used with Meridian Link only).
MAXP	1–120	Maximum number of positions.
SDNB	(NO) YES	Block (or not) calls to the Secondary DN.
BSCW	(NO) YES	Block (or not) calls to the secondary DN on walkaway.
ISAP	(NO) YES	ACD messages sent (not sent) across the ISDN/AP link.
FRT	0–2044	Time in seconds allowed before unanswered incoming ACD calls are connected to the first RAN (appears if FRRT RAN route number is identified above).
SRRT	0–511	Second RAN route number for ACD.
SRT	0-2044	Time in seconds before second RAN is connected to ACD calls (appears if SRRT RAN route number is identified above).
NRRT	0-127	RAN route number assigned as night announcement for ACD calls.
FROA	(NO) YES	First RAN to be given to incoming calls immediately.
NCFW	x...x	Night call forward DN for ACD calls (up to 23 digits).

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Prompt	Response	Description
FORC	(NO) YES	Call forcing option.
FRT	0–2044	Time in seconds allowed before unanswered incoming ACD calls are connected to the first RAN (appears if FRRT RAN route number is identified above).
SRRT	0–511	Second RAN route number for ACD.
SRT	0–2044	Time in seconds before second RAN is connected to ACD calls (appears if SRRT RAN route number is identified above).
NRRT	0–127	RAN route number assigned as night announcement for ACD calls.

In LD 15, respond as follows for the specified prompts:

LD 15: Configuring customer options

Prompt	Response	Description
REQ:	CHG	Change
TYPE:	NIT	Night Service
CUST		Customer number
	0-31	Range for Small System and Media Gateway 1000B
NIT1	xxxxxxx	xxxxxxx is the ACD directory number of the CAP queue defined in LD 23. Up to 7 digits are allowed if the DNXP package is equipped, otherwise only 4 digits can be entered.
TIM1	hh mm	Hour and Minute for First Night Service DN
...		
REQ:	CHG	change
TYPE:	MPO	Multi-Party Operations
CUST		Customer number
	0-31	Range for Small System and Media Gateway 1000B
FMOP	YES	set misoperation prompts
- RGNA	STD ATN	Ring No Answer treatment
- AOCS	<CR>	
- RCY1	<CR>	
- RCY2	1 - (6) - 15	Ring Cycles before forwarding to attendant

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In LD 15, the customer data block, the prompt **ATDN**, or Attendant Directory Number, defaults to **0**. When **0** is dialed by a station user, the nonexistent console is seen by the Small System as being in Night Service. Therefore, all dial **0** calls are directed to the night number, which is the ACD directory number of the CAP.

All calls redirected to the CAP which are subsequently transferred to a station, may be redirected to Meridian Mail or recalled to the CAP ACD queue. The software associated with this produces prompts in LD 15, which determine whether or not a call is recalled to the CAP queue or redirected to a forward no answer destination such as Meridian Mail.

In LD 11, respond as follows for the specified prompts:

LD 11: Configuring your CAP

Prompt	Response	Description
AOM	0, 1, 2	add-on modules 0, 1, or 2
CLS	SPV ADD SWA	"SPV" = supervisor "ADD "= automatic digit display "SWA" = station-to-station call waiting allowed
KEY	0 ACD xxxx yyyy	"xxxx" = ACD queue directory number "yyyy" = position ID
	xx MSB	"xx" = key number MSB = Make Set Busy
	xx DWC yyyy	"xx" = key number DWC = ACD Display Waiting Calls "yyyy" = ACD-DN
	xx TRN	"xx" = key number TRN = Transfer
	xx AO6	"xx" = key number A06 = Conference
	xx NHC	"xx" = key number NHC = No Hold Conference
	xx PRK	"xx" = key number PRK = Call Park
	xx BFS aa bb	"xx" = key number BFS = Busy-Forward Status "aa bb" = TN (repeated for all digital stations being monitored)

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Logging into and out of the ACD queue

There are two different procedures for logging into the ACD queue. The method by which you log in depends on whether your Small System is configured in "Position ID" mode or "Agent ID" mode.

Small System configured in Position ID mode

Logging into the ACD queue

- The CAP is in the Make Set Busy state.
  - — The Make Set Busy lamp may or may not be on.
- Pick up the handset.
- Press the **Make Set Busy** key.
  - — You are now logged into the ACD queue.

Logging out of the ACD queue

- You are logged into the ACD queue.
- Press the **Make Set Busy** key or unplug the headset.
  - — You are now logged out of the ACD queue.

Small System configured in Agent ID mode

Logging into the ACD queue

- The CAP is in the Make Set Busy state.
  - — The Make Set Busy lamp may or may not be on.
- Press the **Make Set Busy** key.
- Enter your agent ID.

  Note: The length and valid range of numbers in your agent ID depends on how the ADS feature is programmed in LD 23.

  - — You are now logged into the ACD queue.

Logging out of the ACD queue

- You are logged into ACD queue.
- Press the **Make Set Busy** key on the CAP or unplug the headset.
  - — You are now logged out of the ACD queue.

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Using common CAP features

This section describes each of the commonly configured features on the CAP and explains how to use them. The feature keys in Figure 137 "Default M2216 or 2616 CAP model" (page 423) correspond to the features listed in this section. All of the features are listed in alphabetical order.

Note: If you are using an M2616 as your CAP and are logged into the CAP queue, placing the handset in the cradle or unintentionally pressing the switchhook will automatically log you out. In this situation, the lamp is not lit. The only situation that this will not occur in is if you have the HOML prompt set to "YES" in LD 23. If this prompt is set to "YES", you must press the **Make Set Busy** key to log out.

Conference

This key allows the CAP to create conferences and to join parties together. The first party is put on hold while the second party is being added.

Procedure 79
Adding a person to a call

Step	Action
1	You have answered a call from the ACD queue.
2	Press **Conference**.
3	Dial the number of the person to be added to the call. OR Press the appropriate Direct Station Select key. The incoming call is put on hold. You can consult with the person called when they answer.
4	Press **Conference** to link the conference.
5	You can repeat the process to add more people to the call. OR Press **RIs** to disconnect yourself from the call.
6	To talk with two people back and forth, press **Hold**, placing your second caller on hold, and press the ACD queue key to connect with your first caller. To connect to the second caller, press **Hold** and then press **Conference**.

—End—

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Direct Station Select (BFS)

Keys configured as Busy Forward Status (BFS) keys enable you to connect to an extension by a BFS key. The keys on the add-on module(s) work as Direct Station Select (DSS) keys.

Note: When you press a DSS key, it is important to remember that you need to press an extension (DN) key first.

Procedure 80
Making a Direct Station Select call

Step	Action
1	Press the **DN** key.
2	Press the DSS extension key.

—End—

Directory Number (DN)

This key is used for internal calling or when required by one of the feature keys. For example, you use the DN key to retrieve a parked call. If you have a PBX system, this feature can be used for outgoing public network calls.

Note: To make outgoing calls from the CAP you must use the DN key. You cannot use the ACD queue to make outgoing calls, since it is only able to receive calls.

Procedure 81
Making an internal call

Step	Action
1	Lift the handset.
2	Press the **DN** key.
3	Dial the extension of the person that you want to call or press the DSS key.

—End—

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Display Queue (Disp Queue)

This key shows the number of calls in the queue, the number of staffed CAPs, and the waiting time of the oldest call in the queue. With this feature, the telephone does not have to be idle for you to display information. If the CAP is an M2616, you must have an ACD display, as a regular business display will not support this feature.

Note: To use this feature, the CAP must be programmed to have Supervisor (SPV) class of service. This is done in LD 11.

Procedure 82
Displaying CAP information

Step	Action
1	Press the **Disp Queue** key.
2	To remove information from the display, press the **Disp Queue** key again.

—End—

Make Busy

This key allows the CAP to indicate that it is not staffed or cannot receive calls. When the CAP is in the Make Busy state, calls are directed to the programmed night call forward number for the CAP queue.

Procedure 83
Making the CAP appear busy

Step	Action
1	Press **Make Busy**. OR For an M2616 CAP, place the handset in the cradle or press the hookswitch. The indicator comes on.
2	To cancel the Make Busy feature, press **Make Busy** again. The indicator goes off.

—End—

No Hold Conference (N. H. Conf)

This key allows you to add people to a conversation. The original party is **not** put on hold as others are added.

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Procedure 84
Adding a person to a call

Step	Action
1	You have answered a call from the ACD queue.
2	Press **N. H. Conf**.
3	Dial the number of the person to be added to the call. OR Press the appropriate Direct Station Select key. The incoming call is not put on hold. You do not hear the phone ringing and you can still talk to the caller.
4	The called person answers and is automatically connected to the conversation.
5	You can repeat the process to add more people to the call. OR Press the **RIs** key to disconnect yourself from the call. ***Note:*** The maximum number of people that you can add to a conversation is four. This means that the total number of people in a conference, including the originator of the conference, cannot exceed six.

—End—

Override

This key allows the CAP to "break in" to an established call. The priority level of the telephone involved in the call and the level of the CAP determine whether override is permitted.

Procedure 85
Overriding a busy signal and connecting to a call

Step	Action
1	You have dialed an internal call and received a busy signal.
2	Press **Override**. You are now joined to the call in progress.

—End—

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Park

Since you cannot hold multiple calls on the ACD queue, a call can be parked in order to receive other calls. The parked call can be retrieved by the CAP or another telephone that has access to Call Park.

Note: To retrieve calls before the call timer expires, note the extension that the calls are parked on.

Procedure 86
Parking a call on the System Park extension

Step	Action
1	You are on a call.
2	Press **Park** twice.
3	Press **Rls**.

—End—

Procedure 87
Parking a call on an extension other than the System Park extension

Step	Action
1	You are on a call.
2	Press **Park**.
3	Dial the extension number on which you want to park the call.
4	Press **Park** again.
5	Press **Rls**.

—End—

Procedure 88
Retrieving a parked call

Step	Action
1	Press the **DN** key.
2	Dial the extension on which the call is parked if the call is parked on an extension other than the system call park number.

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Note: Any telephone with access to Call Park can retrieve a call that is parked.

—End—

Privacy Release (Priv Rls)

This key allows someone to join or pick up a call that is on a private line. This "added party" must have a telephone which shows the private line.

Procedure 89

Removing privacy from a line

Step	Action
1	You are on a call on a private line.
2	Press **Priv Rls**. Any telephone that has access to this line can now join the conversation.
3	To disconnect yourself from the call once someone else has joined the conversation, press the **Rls** key.

—End—

Program

This key allows you to change various display features. Data parameters such as transmission speed, parity, and terminal mode can also be changed if the CAP is equipped with an optional data adapter.

- Press **Program**.
- Use the volume control bar to scroll through the programmable features, and press the number associated with the feature you wish to program.
- Use the volume bar to adjust the feature you select.

  The display features that can be programmed using this key are:

  — Volume adjustment

  — Predial recall

  — Contrast adjustment

  — Call timer enable

  — Idle screen format

  — Language selection

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— Display diagnostics

— Key click

Transfer

This key is used to transfer a call to an extension without having to wait for the desired party to answer.

Procedure 90
Transferring a call without consultation

Step	Action
1	You have answered a call from the ACD queue.
2	Press **Transfer**.
3	Dial the desired number. OR Press the appropriate Direct Station Select key.
4	Press **Transfer** while you still hear the phone ringing. You are no longer connected to the call.
5	If the call is not answered or forwarded by the call forward feature, it rings back to the CAP telephone (programmable in LD 15).

—End—

Procedure 91
Transferring a call with consultation

Step	Action
1	You have answered a call from the ACD queue.
2	Press **Transfer**.
3	Dial the desired number. OR Press the appropriate Direct Station Select key.
4	Wait until the call is answered. The original call is put on hold.
5	Speak to the person called.
6	To return to the original caller without extending the call, press the ACD queue extension key.

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7 To disconnect yourself from the call and connect the calling and called parties, press **Transfer** again.

—End—

Other CAP features

Your CAP also supports other features, which are discussed in detail in this section.

Call Forward and Busy Status

The Call Forward and Busy Status (BFS) feature was designed for an environment where party A forwards their calls to party B, for screening.

Feature operation

By using a BFS key, party B can:

- monitor, activate or deactivate the Call Forward feature of party A
- override the Call Forward feature of party A, in order to place a call to party A
- determine whether party A is busy on a call

The BFS lamp state of party B indicates whether party A is:

- forwarded and not busy (lamp in "wink" state)
- forwarded and busy (lamp in "flash" state)
- not forwarded and not busy (lamp in "dark" state)
- not forwarded and busy (lamp in "lit" state)

If the customer associated with party A has Forward Key Denied Class of Service (FKD) defined in the customer data, party A’s Call Forward key becomes inoperative and party B’s BFS key will operate as follows when depressed:

- Party A has already been forwarded to another station by another BFS key, then party A remains forwarded to that station.
- Party A has been forwarded to a DN by a remote Flexible Feature Code, then the call forward is overridden and all new calls are forwarded to party B.
- Party A’s calls were forwarded to party B, then party A’s call forward is canceled.
- Party A’s call forward is not activated, then party A’s calls are forwarded to party B and the CFW lamp on party A’s set lights up.

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If the customer associated with Party A has Forward Key Allowed Class of Service (FKA), then depressing the BFS key by party B will result in one of the following:

- Party A has already been forwarded to a station other than station B, then party A remains forwarded to that station.
- Party A's calls are not forwarded, then party A's calls are forwarded to party B and the CFW lamp on party A's set lights up.
- Party A's calls were forwarded to party B, then party A's call forward is canceled.

Note: If party B presses the BFS key while receiving dial tone or special dial tone, the BFS key then works as an Auto Dial key to party A.

If a call originates to party A, a CAP set with the BFS key depressed, the call will automatically transfer to the designated Call Forward/Busy number, party B. If party B is in Call Forward state, the call will ring three times, then immediately transfer to party C.

In contrast, if a call originates to party A, a CAP set without the BFS key depressed, the call will automatically transfer to party C.

Feature requirements

Party B must have a Meridian Digital Telephone. Party A may have a Meridian Digital Telephone or an analog (500/2500-type) set, with Call Forward All Calls equipped.

A station may be monitored by a maximum of 16 other stations, using the BFS key.

The same feature requirements apply as for Call Forward All Calls.

Feature interactions

None.

Feature programming

To activate this feature, use the following task list in LD 11 and LD 15.

LD 11: Configuring a BFS key

Prompt	Response	Description
REQ:	CHG	Modify existing data.

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Prompt	Response	Description
TYPE:	xxxx	xxxx is one of 2006, 2008, 2616, 2216, 2317, 2009, M2016, 2018, 2112.
	xxxx M	If the set type is followed by an "M" then the set definition is that of a model set.
MODL		Model Number
		Note: Only prompted if "xxxx M" is entered in response to the "TYPE" prompt.
	1-127	Range for Meridian 1 Small System and Media Gateway 1000B
TN		Terminal number
		Note: Not prompted if "xxxx M" is entered in response to the "TYPE" prompt.
	c u	Format for Meridian 1 Small System and Media Gateway 1000B, where c = card and u = unit.
...		
KEY	nn BFS cc uu	Key number nn = 0–69, Busy Forward Status, TN to be monitored/screened.

LD 15: Configuring customer for Forward Key Allowed

Prompt	Response	Description
REQ:	CHG	Modify existing data.
TYPE:	FTR	Features and Options.
CUST	xx	Customer Number as defined in LD 15.
....	....	....
OPT	FKA	Forward Key Allowed.

Forced Camp-on/Priority Override

Forced Camp-on allows a station to "camp-on" to another party involved in an active call regardless of whether they have an internal or external call on hold. When used with Priority Override, the capability is called Enhanced Override. Forced Camp-on is activated automatically (if Automatic Forced

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Camp-on, AFCO, is defined for the customer) or manually using the Enhanced Override (**EOVR**) key on Meridian Digital Telephone sets, or the Enhanced Override Flexible Feature Code on analog (500/2500-type) sets. Associated with this feature are four new station Class Of Service entries:

- CPFD/CPFA — Forced camp-on from another set denied/allowed.
- CPTD/CPTA — Forced camp-on to another set denied/allowed.

These are used to identify the ability of a station to invoke the camp-on feature or to be camp-on by another station.

The Priority Override feature allows an established call to be broken into and another call presented to the desired party. Before break-in occurs, a warning tone is given to all parties involved in the established call. The set performing the override must have a priority level equal to or higher than both sets being overridden. To activate Priority Override, the user of an analog (500/2500-type) set must invoke a recall followed by the dialing of the Override Flexible Feature Code, while the user of a Meridian Digital Telephone presses the Override key (**OVR**). Priority Override can also be activated using the Enhanced Override Flexible Feature Code or the Enhanced Override key (**EOVR**), as described in the preceding paragraph.

Associated with the Priority Override feature are seven priority levels which can be assigned to analog (500/2500-type) and Meridian Digital Telephones. This level defines the ability of one set to override another as follows:

- level 0 — This set cannot override and cannot be overridden.
- level 1 — This set cannot override but can be overridden.
- level 2 — This set can override level 1 and 2 sets and can be overridden by sets with priorities 2–7. (This is the default level.)
- level 3–6 — Similar to level 2 — Can override sets of equal or lesser priority level other than 0, and can be overridden by sets of greater or equal priority level.
- level 7 — Can override levels 1–7, but can only be overridden by another set of priority 7.

Note: Camp-on is not affected by the override levels.

A new Class Of Service (COS), named Override Denied/Allowed (OVRD/OVRA), has been introduced for stations which defines the ability of a station to use or be overridden by the Priority Override feature.

Feature operation

Several combinations of the Automatic Forced Camp-on and Priority Override features exist. Each combination provides the station with specific call scenarios. For this reason, they are detailed below.

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Setting the Automatic Forced Camp-On (AFCO) prompt to "NO" in the customer data, and equipping only an **OVR** key or OVRD Flexible Feature Code disallows the use of forced camp-on. The Priority Override feature remains operational as described above.

Setting the Automatic Forced Camp-On (AFCO) prompt to "NO", the priority level to "0", and the camp-on classes of service to CPFA and CPTA gives only manual camp-on.

Setting the Automatic Forced Camp-On (AFCO) prompt to "NO", and adding an **OVR** and **EOVR** key/FFC gives the user the option of using only Priority Override (**OVR** key/FFC) or using manual Forced Camp-on which is invoked by the first depression of the **EOVR** key/FFC, followed by Priority Override (second depression of the **EOVR** key/FFC).

Setting the Automatic Forced Camp-On (AFCO) prompt to "YES" and equipping only the **OVR** key/FFC automatically applies Forced Camp-on where applicable, and allows the use of the **OVR** key/FFC to implement Priority Override.

Using the **EOVR** key/FFC with AFCO set to "YES" simulates the **OVR** key/FFC and attempts a Priority Override, unless Automatic Forced Camp-on was initially denied. In this case, Forced Camp-on is reattempted.

Feature requirements

The Flexible Feature Code package (FFC) 139 and Multiple-Party Operation package (MPO) 141 must be equipped.

All stations involved in an established call being broken into must have Warning Tone Allowed Class of Service. Otherwise, both Priority Override and Forced Camp-on features are denied.

Priority Override and Forced Camp-on can operate independently of each other.

Priority Override and Forced Camp-on cannot be applied to telephones involved in any of the following:

- a non-established call
- a conference call
- an attendant call
- a Release Link attendant call
- an attendant call through a Centralized Attendant Service or Primary Rate Access/Integrated Services Digital Network trunk
- an ACD call
- a data call

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- a parked call
- a call-waiting call
- a held call
- an operator callback or toll operator break-in call
- Make Set Busy active
- Do Not Disturb active

External trunks cannot perform priority override. They can be overridden only if they are the undesired party of an established call being broken into.

Feature interactions

Multiple-Party Operation: When a consultation call is made on a set equipped with Priority Override, a control digit has to be dialed from the set to perform a recall and return the call on hold.

Override: Priority Override, when activated, replaces normal Override.

Digit Display: Once Priority Override has been performed on a set, its digit display shows the DN of the overriding set.

Feature programming

To activate this feature, use the following task list in LD 10, LD 11, LD 14, LD 15, LD 16, and LD 57.

LD 10: Configuring Forward Camp-on/Priority Override on a set

Prompt	Response	Description
REQ:	CHG	Modify the existing data.
TYPE:	500 500 M	500/2500 telephone data block. Model set.
MODL		Model Number ***Note:*** Only prompted if "500 M" is entered in response to the "TYPE" prompt.
	1-127	Range for Meridian 1 Small System and Media Gateway 1000B.

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Prompt	Response	Description
TN		Terminal number ***Note:*** Not prompted if "500 M" is entered in response to the "TYPE" prompt.
	c u	Format for Meridian 1 Small System and Media Gateway 1000B, where c = card and u = unit.
....		
CLS	CPFA	Forced Camp-on from another set allowed.
	CPTA	Forced Camp-on to another set allowed.
	WTA	Warning Tone allowed.
....		
PLEV	0-(2)-7	Priority Level. 2 = set can override sets of level 1 and 2, and can be overridden by sets of level 2–7. ***Note:*** Prompted when POVR package is equipped.

LD 11: Configuring Forward Camp-on/Priority Override on a set

Prompt	Response	Description
REQ:	CHG	Modify existing data.
TYPE:	xxxx	xxxx is one of 2006, 2008, 2616, 2216, 2317, 2009, M2016, 2018, 2112, 3000 Digital telephone.
	xxxx M	Model set.
MODL		Model Number ***Note:*** Only prompted if "xxxx M" is entered in response to the "TYPE" prompt.
	1-127	Range for Meridian 1 Small System and Media Gateway 1000B

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Prompt	Response	Description
TN		Terminal number ***Note:*** Not prompted if "xxxx M" is entered in response to the "TYPE" prompt.
	c u	Format for Meridian 1 Small System and Media Gateway 1000B, where c = card and u = unit.
....		
CLS	CPFA	Forced Camp-on from another set allowed.
	CPTA	Forced Camp-on to another set allowed.
	WTA	Warning Tone allowed.
....		
PLEV	0-(2)-7	Priority Level. 2 = set can override sets of level 1 and 2, and can be overridden by sets of level 2–7. Prompted when POVR package is equipped.
KEY	xx OVR	Key number, override.
	xx EOVR	Key number, enhanced override.

LD 14: Configuring Warning Tone Allowed

Prompt	Response	Description
REQ	CHG	Modify existing data.
TYPE	aaa	Trunk type.
....		
CLS	WTA	Warning Tone allowed.

LD 15: Configuring Multi Party Operations

Prompt	Response	Description
REQ:	CHG	Modify existing data.
TYPE:	MPO	Multi Party Operations data block.
CUST		Customer number
	0-31	Range for Small System and Media Gateway 1000B

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Prompt	Response	Description
....		
AFCO	YES	Automatic Forced Camp-on. Prompted when the POVR package is equipped.

LD 16: Configuring Priority Level in route data

Prompt	Response	Description
REQ	CHG	Modify existing data.
TYPE	RDB	Route data block.
CUST	xx	Customer number as defined in LD 15.
DMODL	1–127	Default model number for this route.
ROUT		Route number
	0-127	Range for Meridian 1 Small System and Media Gateway 1000B.
TKTP	xxx	Trunk data block.
....		
PLEV	0-(2)-7	Priority Level. 2 = set can override sets of level 1 and 2, and can be overridden by sets of level 2–7. Prompted when POVR package is equipped.

LD 57: ConfigurIng Flexible Feature Codes

Prompt	Response	Description
REQ	NEW	Add new data to the system.
	CHG	Modify existing data.
....		
	EOVR	Enhanced Override FFC.
	OVRD	Override/Priority Override.

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Appendix A Communication protocol specifications

Contents

This section contains information on the following topics:

"Introduction" (page 451)

"XModem protocol specifications" (page 451)

"CRC protocol specifications" (page 452)

Introduction

The protocol specifications information given in this chapter is intended to assist those who wish to create a personal communication software package that is compatible with the protocols used by the SDI port in the Small System.

XModem protocol specifications

Note: Not all XModem CRC protocols are identical. Some may not operate properly with the CCBR feature. Ensure that your communication package complies to the protocol specifications outlined in this chapter.

XModem transmission medium level protocol is asynchronous, 8 data bits no parity, one stop bit. It allows the sending of all types of data including binary, which is the data type used with the Customer Configuration Backup and Restore (CCBR) feature.

The following definitions apply to XModem protocol:

<soh>01H
<eot>04H
<ack>06H
<nak>15H
<C>43H

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This protocol does not restrict the contents of data sent. Control characters are not processed in the 128-byte data messages (they are handled the same as other characters).

CRC protocol specifications

The Cyclic Redundancy Check (CRC) protocol is a form of block check which provides more robust error detection than the original checksum. The CRC-CCITT used by the modem protocol detects all single- and double-bit errors, all errors with an odd number of bits, all burst errors of length 16 or less, 99.97% of 17-bit error bursts, and 99.98% of 18-bit and longer bursts.

Each block of the transfer in CRC mode looks like:

<soh><blk #><255-blk #><--128 data bytes--><CRC hi><CRC lo>
in which:
<soh>= 01 hex
<blk #>= binary number, starts at 01 increments by 1, and wraps OFFH to 00H (not 01)
<255-blk #>= ones complement of blk #
<CRC hi>= byte containing the 8 hi order coefficients of the CRC
<CRC lo>= byte containing the 8 lo order coefficients of the CRC

CRC Calculation

To calculate the 16-bit CRC, the message bits are considered to be the coefficients of a polynomial. This message polynomial is first multiplied by X^{16} and then divided by the generator polynomial ($X^{16} + X^{12} + X^5 + 1$) using modulo 2 arithmetic. The remainder left after the division is the desired CRC. Since a message block in the Modem Protocol is 128 bytes or 1024 bits, the message polynomial will be to the order of X^{1023}. The hi order bit of the first byte of the message block is the coefficient of X^{1023} in the message polynomial. The lo order bit of the last byte of the message is the coefficient of X^0 in the message polynomial.

Example:

```
/* update CRC */
unsigned short
updcrc(c, crc)
register c;

register unsigned crc;
{

    register count;
    for (count=8; --count>=0;) {
    if (crc & 0x8000) {
    crc <<= 1;
```


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```
crc += (((c<<=1) & 0400)!= 0);
crc ^= 0x1021;
}
else {
crc <<= 1;
crc += (((c<<=1) & 0400)!= 0);
}
}
return crc;
```

A receiving program that wishes to receive in CRC mode implements the mode setting handshake by sending a <C>. After the receiver has sent the <C> it waits up to 3 seconds for the <soh> that starts the first block. If no <soh> is received within 3 seconds, the receiver will re-send a <C>. After the mode has been sent by the initial <C> the protocol follows the flow shown in the following example.

Example

This flow example shows a case where the receiver requests transmission in the CRC mode and the sender supports the CRC option. The example includes various transmission errors. <xxxx> represents 2 CRC bytes.

```
SENDERRECEIVER
    <---<C>
    times out after 3.4 seconds,
    <---<C>
    times out after 3.4 seconds,
    <---<C>
    times out after 3.4 seconds,
    <---<C>
    times out after 3.4 seconds,
    <---<C>
<soh> 01 FE -data- <xxxx>--->
    <---<ack> <soh> 02 FD -data- <xxxx> --->(data gets line hit)
    <---<nak>
<soh> 02 FD -data- <xxxx>--->
    <---<ack>
<soh> 03 FC -data- <xxxx>--->
(ack gets garbage)<---<ack>
    times out after 6.8 seconds
    <---<nak>
<soh> 03 FC -data- <xxxx>--->
    <---<ack>
<eot>--->
    <---<ack>
```


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Nortel Meridian 1

Meridian 1 Small System Installation and Commissioning

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