Communication Server 1000M and Meridian 1

Large System Installation and Commissioning

Avaya Communication Server 1000
Release 7.6

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Contents

New in this release

This chapter contains information about Avaya Communication Server 1000 Release 7.6 new features.

Features

There are no updates to the feature descriptions in this document.

Other

See the following sections for information about changes that are not feature related.

Revision history

March 2013

Standard 06.01. This document is up-issued to support Communication Server 1000 Release 7.6. It includes updated task flows for CS 1000M and Signaling Server upgrades.

April 2012

Standard 05.05. This document is up-issued to include information about the surge-suppression cable for certain COT and DDI trunk cards.

March 2012

Standard 05.04. This document is up-issued to include updates to the Installing a Signaling Server chapter.

November 2011

Standard 05.03. This document is up-issued to remove legacy feature and hardware content that is no longer applicable to or supported by Communication Server 1000 systems.

May 2011

Standard 05.02. This document is up-issued to include updates to the Cabling lines and trunks chapter.

November 2010

Standard 05.01. This document is issued to support Avaya Communication Server 1000 Release 7.5.

June 2010

Standard 04.02. This document is upissued to update the Avaya CS 1000M task flow graphic and to include CP PM version 2 content.

June 2010

Standard 04.01. This document is issued for Avaya Communication Server 1000 Release 7.0.

June 2009

Standard 03.03. This document is upissued to update the CP PM BIOS upgrade procedure.

May 2009

Standard 03.02. This document is upissued to include task flow graphics for Communication Server 1000 Release 6.0

May 2009

Standard 03.01. This document is issued for Communication Server 1000 Release 6.0

December 2007

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

July 2007

Standard 01.03. This document is up-issued for Communication Server 1000 Release 5.0.

July 2007

Standard 01.02. This document is up-issued for Communication Server 1000 Release 5.0.

May 2007

Standard 01.01. This document is up-issued for Communication Server 1000 Release 5.0. This document contains information previously contained in the following legacy document, now retired: *Avaya Communication Server 1000M and Meridian 1: Large System Installation and Configuration* (553-3021-210).

April 2006

Standard 4.00. This document is up-issued with corrections from CR Q01311083. The corrections appear in the “Configuring the System Monitor' section (page 157 to page 161).

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 to support Communication Server 1000 Release 4.0.

October 2003

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

- *Cabling Guide* (553-3001-109)
- *System Installation Procedures* (553-3001-210)

List of Procedures

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Navigation

- “Getting technical documentation” on page 25
- “Getting product training” on page 25
- “Getting help from a distributor or reseller” on page 26
- “Getting technical support from the Avaya Web site” on page 26

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System information

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

Subject

WARNING

Before a Large System can be installed, a network assessment **must** be performed and the network must be VoIP-ready.

If the minimum VoIP network requirements are not met, the system will not operate properly.

For information about the minimum VoIP network requirements and converging a data network with VoIP, refer to *Converging the Data Network with VoIP* (NN43001-260).

This document provides installation and acceptance testing procedures for Meridian 1 Large Systems and Avaya Communication Server 1000M Large Systems.

Communication Server 1000 Release 7.6 supports only the Call Processor Pentium IV (CP PIV) in the CS 1000M SG, Meridian 1 Option 61C, CS 1000M MG, and Meridian 1 Option 81C. For older system installations, see the CS 1000 Release 7.0 version of this document, available on the web at:

www.avaya.com/support

To access the document from the Technical Support page, go to the content listing page for Avaya Communication Server 1000M:

1 Select the **Browse product support** tab on the main page.

2 Select **Product Families** from the drop-down menu, and then **Enterprise Communication Servers** in the first window.

3 Select **Communication Server 1000M Cabinet/Chassis** from the second window.

4 Select **Documentation** from the third window and click the **Go** button on the right.

5 Use the filter provided under the Documentation tab to search for **Communication Server 1000M** .

Note on legacy products and releases

This document contains information about systems, components, and features that are compatible with Avaya Communication Server 1000 software. For more information about legacy products and releases, click the **Documentation** link under **Support** on the Avaya home page:

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Applicable systems

This document applies to the following systems:

- Communication Server 1000M Single Group (CS 1000M SG)
- Communication Server 1000M Multi Group (CS 1000M MG)

- Meridian 1 Option 61C
- Meridian 1 Option 81C

Note: When upgrading software, memory upgrades may be required on the Signaling Server, the Call Server, or both.

System migration

When particular Meridian 1 systems are upgraded to run Communication Server 1000 software and configured to include a Signaling Server, they become CS 1000M systems. Table 1 lists each Meridian 1 system that supports an upgrade path to a CS 1000M system.

Table 1
Meridian 1 systems to Avaya CS 1000M systems

This Meridian 1 system...	Maps to this CS 1000M system
Meridian 1 Option 61C	CS 1000M Single Group
Meridian 1 Option 81C	CS 1000M Multi Group

For more information, see *Communication Server 1000M and Meridian 1 Large System Upgrade NTPs* (NN43021-458 to 474).

Intended audience

This document is intended for individuals responsible for installing and configuring Large Systems. To use this document, you should have a basic knowledge of Large System equipment and operation. Contact Avaya for information about installation courses. You should also read and fully understand the *Communication Server 1000M and Meridian 1: Large System Overview* (NN43021-110) before you install a system.

Conventions

Terminology

The following systems are referred to generically as Large System:

- Communication Server 1000M Single Group (CS 1000M SG)
- Communication Server 1000M Multi Group (CS 1000M MG)
- Meridian 1 Option 61C
- Meridian 1 Option 81C

In this document, the following hardware platforms are referred to generically as Server.

- Call Processor Pentium IV (CP PIV)
- Common Processor Pentium Mobile (CP PM)
- Common Processor Dual Core (CP DC)
- Commercial off-the-shelf (COTS) servers
  - IBM x306m server (COTS1)
  - HP DL320 G4 server (COTS1)
  - IBM x3350 server (COTS2)
  - Dell R300 server (COTS2)

In this document, the generic term COTS refers to all COTS servers. The term COTS1 or COTS2 refers to the specific servers in the preceding list.

Related information

This section lists information sources that relate to this document.

Documents

The following documents are referenced in this document:

- *Circuit Card Reference* (NN43001-311)
- *Linux Platform Base and Applications Installation and Commissioning* (NN43001-315)
- *System Security Management* (NN43001-602)
- *Software Input/Output: Administration* (NN43001-611)
- *Telephones and Consoles: Description, Installation, and Operation* (NN43001-567)
- *Software Input/Output: System Messages* (NN43001-712)
- *Communication Server 1000M and Meridian 1: Large System Overview* (NN43021-110)
- *Communication Server 1000M and Meridian 1 Large System Planning and Engineering* (NN43021-220)
- *CS 1000M and Meridian 1 Large System Upgrades Overview* (NN43021-458)
- *CS 1000M and Meridian 1 51C to CS 1000M SG CP PIV Upgrade* (NN43021-459)
- *CS 1000M and Meridian 1 61C to CS 1000M SG CP PIV Upgrade* (NN43021-461)
- *CS 1000M and Meridian 1 61C CP PII to CS 1000M SG CP PIV Upgrade* (NN43021-462)
- *CS 1000M and Meridian 1 61C to CS 1000M MG CP PIV FNF Upgrade* (NN43021-463)
- *CS 1000M and Meridian 1 61C CP PII to CS 1000M MG CP PIV FNF Upgrade* (NN43021-465)
- *CS 1000M and Meridian 1 CS1000M SG CP PIV to CS 1000M MG CP PIV FNF Upgrade* (NN43021-466)

- *CS 1000M and Meridian 1 71 to CS 1000M MG CP PIV FNF Upgrade* (NN43021-467)
- *CS 1000M and Meridian 1 81C IGS to CS 1000M MG CP PIV FNF Upgrade* (NN43021-471)
- *CS 1000M and Meridian 1 CS 1000M MG CP PII IGS to CS 1000M MG CP PIV FNF Upgrade* (NN43021-473)
- *CS 1000M and Meridian 1 CS 1000M MG CP PII FNF to CS 1000M MG CP PIV FNF Upgrade* (NN43021-474)

Other documentation

The following documentation is referenced in this document:

- *Candeo Power System User Guide* (P0914425)
- *Candeo Power System Installation Guide* (P0914426)
- *Candeo SP 48300 Power System AP6C55AA User Manual* (P7000154)
- *Candeo SP 48300 Power System AP6C55AA Installation Manual* (P7000289)

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Introduction

Contents

This chapter contains information about the following topics:

Overview

WARNING

Before a Large System can be installed, a network assessment **must** be performed and the network must be VoIP-ready.

If the minimum VoIP network requirements are not met, the system will not operate properly.

For information about the minimum VoIP network requirements and converging a data network with VoIP, see *Converging the Data Network with VoIP* (NN43001-260).

This document describes the procedures used to install and configure a Large System. For proper installation, perform the steps in the sequence stated in "Summary of procedures." The summary will refer you to other sections within this document. After completing the steps listed in those sections, return to the summary and continue on to the next step.

Whenever possible, install external power equipment before the system installation. If reserve power equipment is used, install it according to the manufacturer's instructions.

To install telephones and attendant consoles, see *Telephones and Consoles: Description, Installation, and Operation* (NN43001-567).

System installation must be performed by qualified personnel only.

Upgrade and New Install Wizards

The Upgrade and New Install Wizards, components of the Health Check Tool, are introduced in Communication Server Release 7.6 to provide guidance through the major steps of the upgrade and new installation processes. The Health Check tool is a PC based GUI application available for download from the Avaya Support portal.

The upgrade wizard does not change the installation programs of the various system elements. It simply guides the user through each process by identifying the required tasks and recommending best practices, such as capturing critical pre-upgrade information.

The actual installation/upgrade tasks are performed manually under the direction of the appropriate Wizard.

The Wizard provides the user with an estimated completion time for each task and references to proper documentation and/or a best practices checklists.

For more information on the Upgrade and New Install Wizards, see 18-xxxxxxx Upgrades Guide.

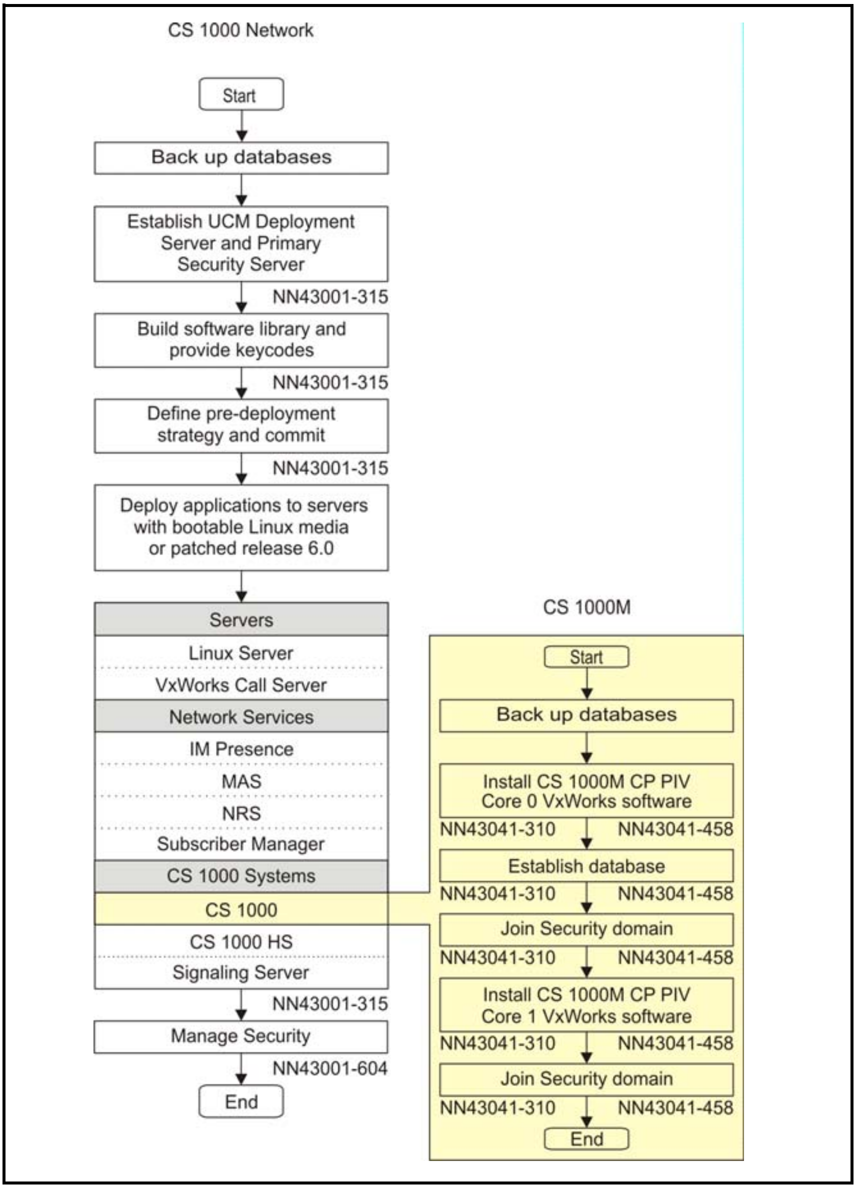
Avaya Communication Server 1000 task flow

This section provides a high-level task flow for the installation or upgrade of an Avaya CS 1000 system. The task flow indicates the recommended sequence of events to follow when configuring a system and provides the document number that contains the detailed procedures required for the task.

For more information refer to the following documents, which are referenced in Figure 1 on page 36:

- *Linux Platform Base and Applications Installation and Commissioning* (NN43001-315)
- *Communication Server 1000M and Meridian 1 Large System Installation and Commissioning* (NN43021-310)
- *CS 1000M and Meridian 1 Large System Upgrades Overview* (NN43021-458)

Figure 1
Avaya Communication Server 1000M task flow



Summary of procedures

1 Prepare equipment for installation; go to "Preparing the equipment for installation" on page 66.

2 Place the fourth module on a column (if required); go to "Placing the fourth module on a column" on page 69.

3 Position and level equipment; go to "Positioning and leveling equipment" on page 75.

Note: If earthquake bracing is required, go to "Installing earthquake bracing" on page 327. The section will provide procedures for installing column and floor bracing and positioning and levelling equipment. When those procedures are complete, return to Step 4 or Step 5 (as applicable) in this summary.

4 Install overhead cable tray kits (if required); go to "Installing overhead cable tray kits" on page 81.

5 Install power supplies in all modules:

a Make sure the system is disconnected from any power source.

b Set switches and breakers on all module power supplies or module power distribution units (MPDU) to OFF.

c Insert each power supply into the appropriate card cage and hook the locking devices.

6 Install a NT4N39AA CP PIV Processor Pack and blank faceplate (N0026096) to cover MMDU slot

7 Install power equipment and ground wiring:

— For AC-powered systems, go to "Installing AC power" on page 85.

— For DC-powered systems, go to "Installing DC power" on page 97.

8 Plan and designate the main distribution frame (MDF); go to "Planning and designating a Main Distribution Frame" on page 137.

9 Install Power Failure Transfer Units (PFTU) (if required); go to "Installing Power Failure Transfer Units" on page 149.

10 Configure the system monitor; go to "Configuring the system monitor" on page 155.

11 Connect a system terminal (or modem); go to "Connecting a system terminal or modem" on page 175.

12 Install cabling:

— To cable Common Equipment, go to "Cabling Common Equipment in a Single Group system" on page 191.

— To cable network loops, go to "Cabling network modules and loops" on page 367.

— To cable IPE Modules to the MDF and to connect lines and trunks, go to "Cabling lines and trunks" on page 245.

13 Power up the system and load the system software; go to "Powering up the system and initial loading" on page 283.

Note: If you upgrade your current system, do not install new software. Instead, return to the upgrade procedures in *Communication Server 1000M and Meridian 1 Large System Upgrade NTPs* (NN43021-458 to 474).

14 Perform acceptance tests; go to "Performing acceptance tests" on page 319.

15 To test circuit cards, see "Acceptance tests" in *Circuit Card Reference* (NN43001-311). To test telephones and attendant consoles, see *Telephones and Consoles: Description, Installation, and Operation* (NN43001-567).

16 Replace all covers and grills on the front and rear of the system.

Table 2
List of tasks in subsections

Preparing for installation

Contents

This chapter contains information about the following topics:

Requirements

WARNING

Before a Large System can be installed, a network assessment **must** be performed and the network must be VoIP-ready.

If the minimum VoIP network requirements are not met, the system will not operate properly.

For information about the minimum VoIP network requirements and converging a data network with VoIP, see *Converging the Data Network with VoIP* (NN43001-260).

Before system equipment is delivered to the installation site, you must consider these requirements:

- Fire protection and safety requirements
- Equipment room requirements
- Grounding and power requirements
- Cable requirements

Specifications for these requirements and for developing the equipment room floor plan are in *Communication Server 1000M and Meridian 1 Large System Planning and Engineering* (NN43021-220).

System equipment – UEMs

Universal Equipment Modules (UEM) are the building blocks of the communication system. UEMs are generic metal frames equipped with covers. Each UEM is a self-contained unit with power, a card cage, I/O panels, and cable routing channels. Each UEM houses sets of equipment used in system operations (see Figure 2 on page 43).

UEMs are stacked in columns

UEMs are stacked in columns, up to four modules high. Within a column, the levels are referred to as tiers. The UEMs are numbered 0 to 3 from the bottom up (see Figure 2 on page 43). Cables connect cards in the same module, between two modules, and between cards and the I/O panel in the same module.

Column components

Each column contains a pedestal base, a top cap, and up to four modules.

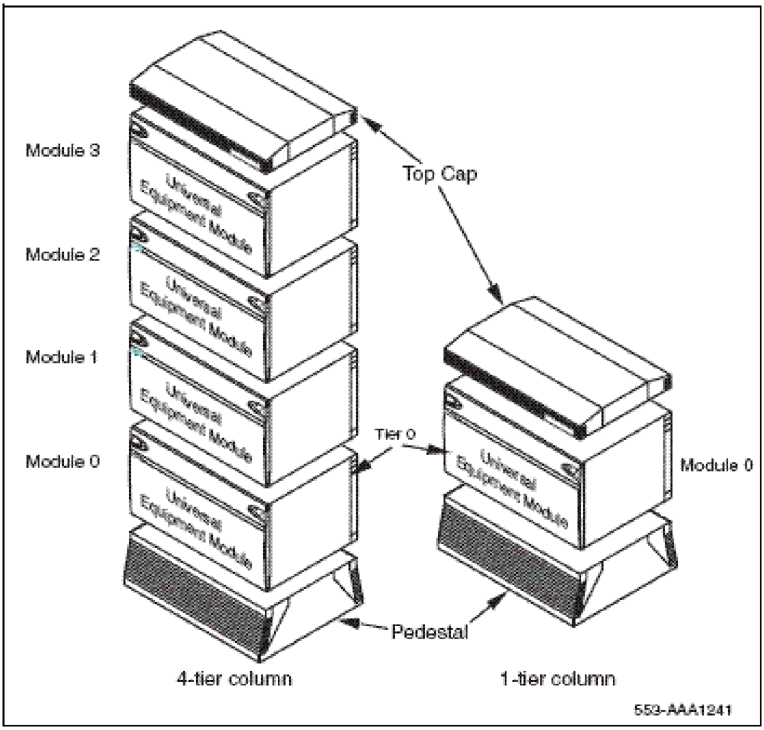
Pedestals

Each column sits on a pedestal. The pedestal contains power, cooling, and system monitoring equipment.

- A Power Distribution Unit (PDU) in the back of the pedestal supplies either AC or DC power to the column.

- A System Monitor checks the column's cooling and power systems.
- A blower unit (accessible from the front of the pedestal) forces air up through the modules to cool the circuit cards.

Figure 2
Universal Equipment Modules



Top caps

A top cap is mounted on the top module of each column. It contains:

- Air exhaust grills in the cap that release air from the blowers in the pedestal.
- A heat sensor that monitors the temperature of the column.

- A red LED in the front of the cap's exhaust grill that lights if the system overheats or if a power outage occurs.
- Ladder racks for routing cables can also be fitted to the top caps.

Modules

Up to four modules can be included in a column. The modules can include

- NT4N41 CompactPCI® (cCPI) Core/Network Module – required for all Large Systems
- NT8D35 Network Module – required for Meridian 1 Option 81C and CS 1000M MG
- NT8D37 Intelligent Peripheral Equipment (IPE) Module – required for all Large Systems

In addition, modules that house application-specific equipment can be included in a column.

Columns are grouped in rows

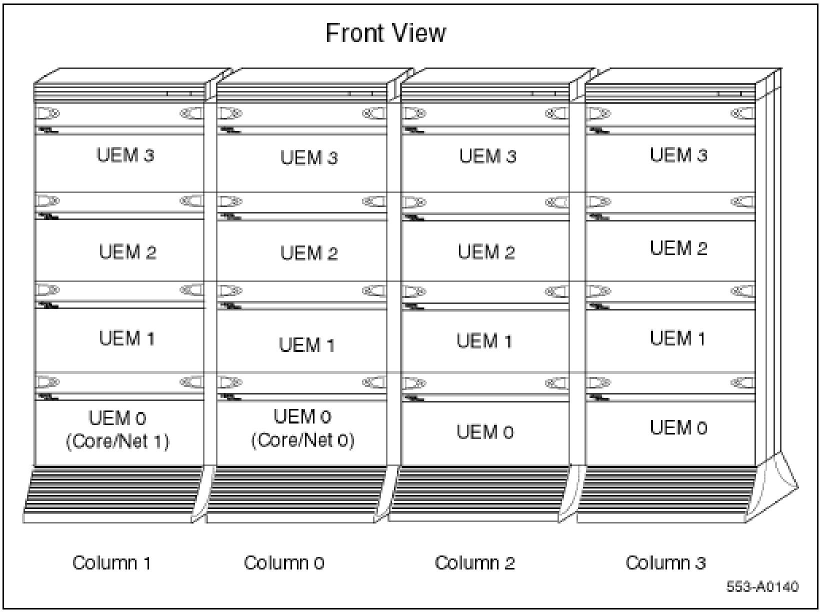
A system can have one column, or multiple columns attached in rows. Column 0 is always the column containing the "Core/Net 0" module. Column 1 is placed to the left of Column 0 and must contain the "Core/Net 1" module.

Column 0 and Column 1 are placed at the far left of the row (front view). Column numbering then continues to the right of Core 0 (see Figure 3 on page 45).

Additional rows are configured with the lowest numbered column on the far left and the highest numbered column on the far right (front view).

For compliance with electromagnetic interference/radio frequency interference (EMI/RFI) standards, spacer kits are provided to interconnect the columns in a multiple-column system.

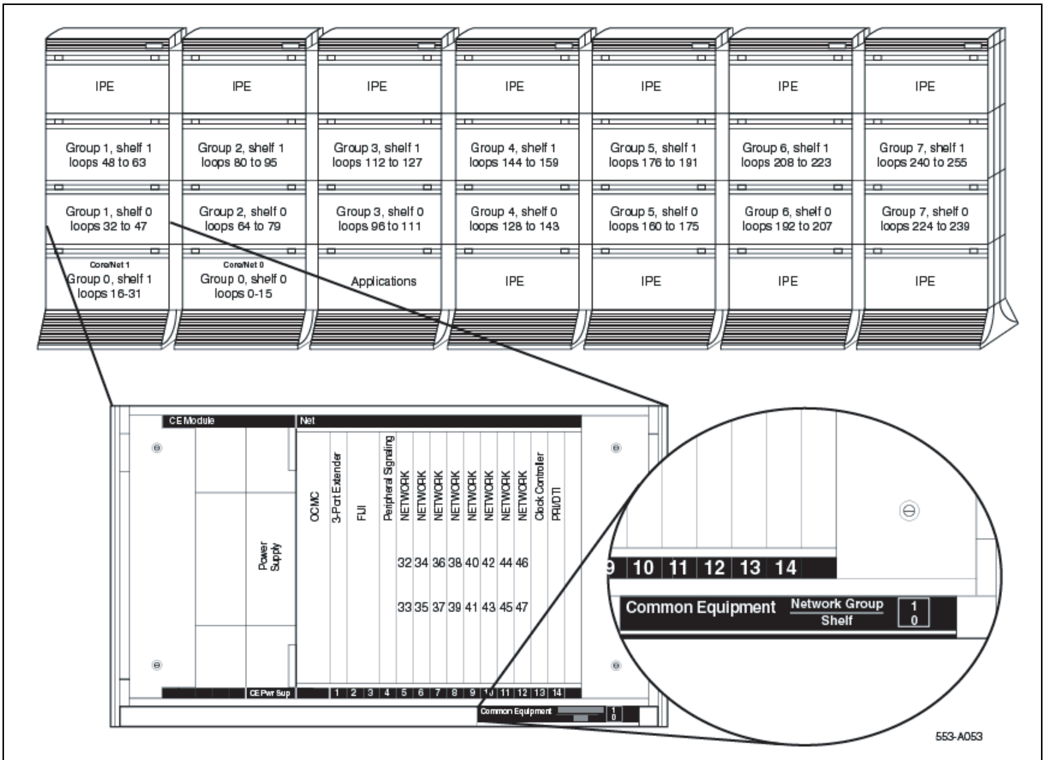
Figure 3
Example of Large System column row



UEMs are identified by function

Each UEM contains a specialized set of equipment to digitalize, process, and route phone calls and voice messages (see Figure 4 on page 46).

Figure 4
UEMs identified by function



Card cage

Inside each UEM is a metal card cage. This card cage holds the circuit cards, power card, and related equipment for that module. UEMs are named for the function of that card cage.

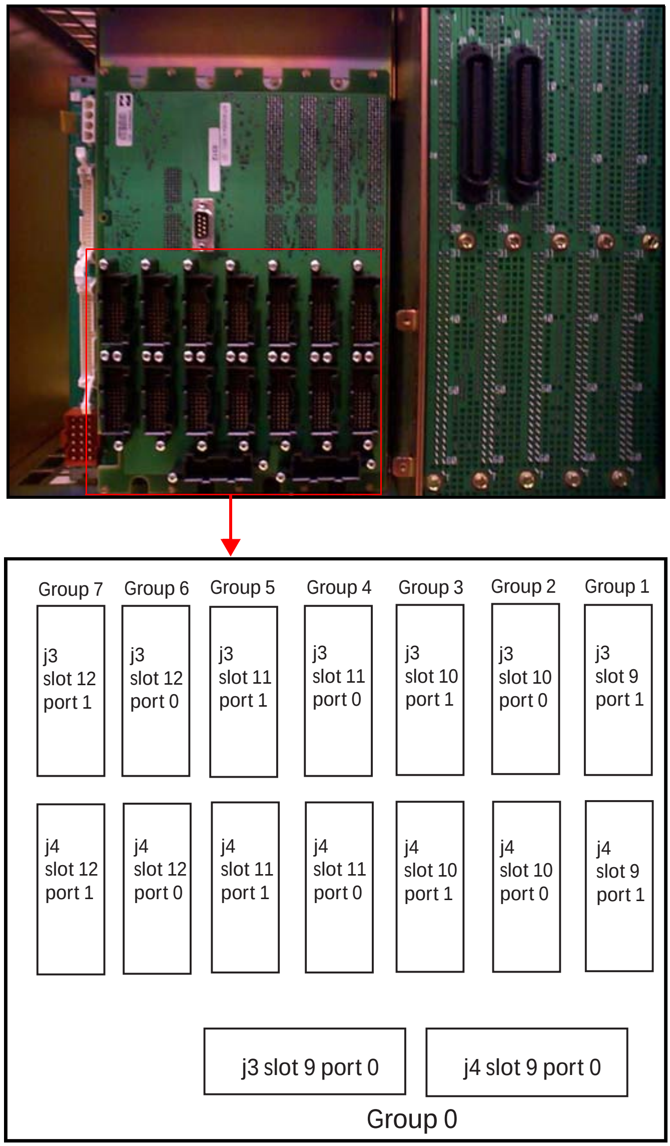
Card cages are bolted inside the UEM case. Card cages can be removed and replaced for repairs or upgrades.

Core/Net module

Large Systems feature the NT4N41 Core/Net module. The Core/Net module provides a unified hardware platform for single group and multi-group configurations. The Core/Net module supports:

- An integrated cPCI shelf.
- A NT4N48 System Utility card that incorporates the functionality of the System Utility Transition card, LCD display, and the security device holder.
- A fanout panel (see Figure 5 on page 48) to provide connectivity to the network shelf.
- Upgrades from single group to multi-group configurations (requiring a new keycode file and any additional hardware necessary for a multi-group system).

Figure 5
NT4N41 Core/Net shelf fanout panel (backplane)



System options

The procedures in this document apply to the following system options

- Meridian 1 Option 61C: dual CPU, full network group
- Meridian 1 Option 81C: dual CPU, multiple network groups
- CS 1000M SG: a Meridian 1 Option 61C system upgraded to include a Signaling Server
- CS 1000M MG: a Meridian 1 Option 81C system upgraded to include a Signaling Server

For information about Signaling Server installation and configuration, see *Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

All system options are available in both AC- and DC-powered versions.

System architecture and module types are described in *Communication Server 1000M and Meridian 1: Large System Overview* (NN43021-110). The components of AC-powered systems, DC-powered systems, and reserve power options for both are described in this document.

Meridian 1 Option 61C and CS 1000M SG

These systems feature a dual Pentium Processor with standby processing capability, fully redundant memory, and a full network group. Two Core/Net modules and one IPE module are the minimum installation requirements. Additional IPE modules and application modules can be used. The modules are stacked (see Figure 6 on page 50) or installed side-by-side (see Figure 7 on page 50).

Figure 6
Meridian 1 Option 61C stacked configuration

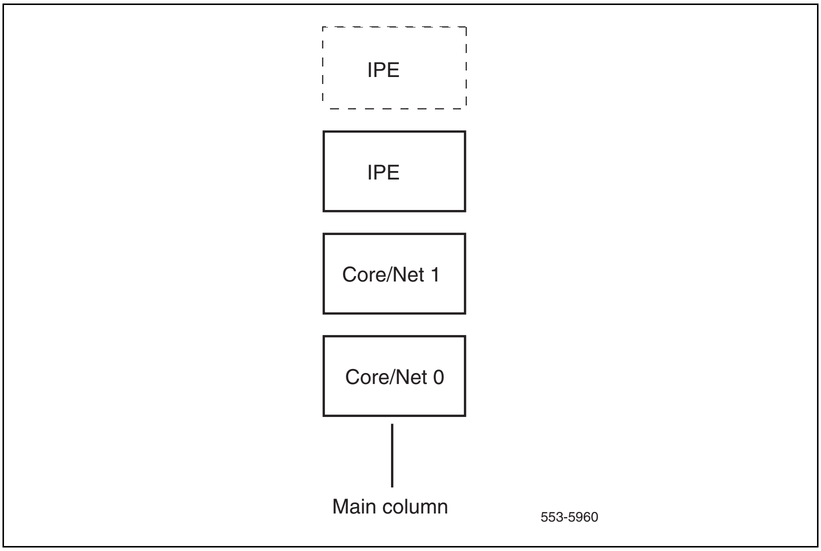
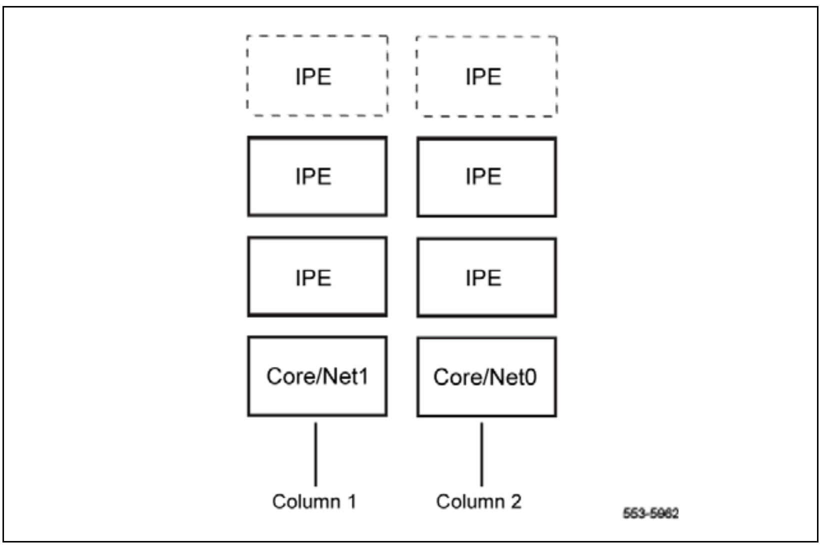


Figure 7
Meridian 1 Option 61C side-by-side configuration



Meridian 1 Option 81C and CS 1000M MG

These systems feature a dual Pentium Processor with standby processing capability, two Core/Net modules installed side-by-side, and two or more network groups. The Core/Net modules provide the first network group, and network module pairs provide additional network groups.

These systems support up to eight network groups, as shown in Figure 4 on page 46. Fiber Network Fabric provides complete non-blocking communication between the network groups, eliminating busy signals for network-blocked calls between groups.

Figure 8 on page 51 shows a multi-group system with four network modules. If the ceiling height is too low for the four-tier column, a three-tier column can be used, as shown in Figure 9 on page 52.

Figure 8
Four-tier multi-group system

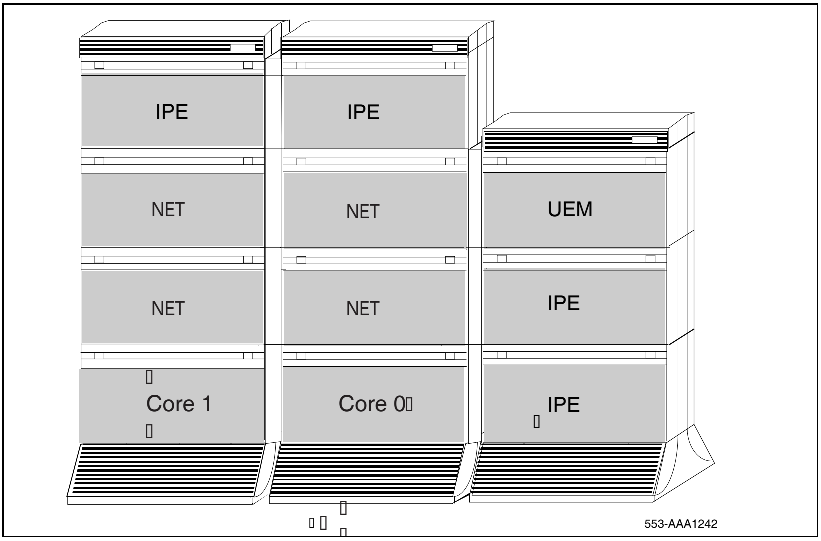
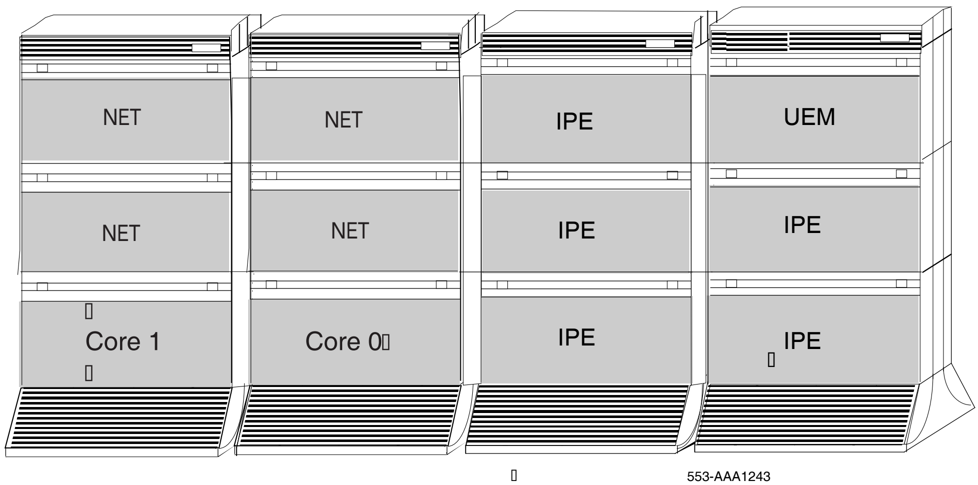


Figure 9
Three-tier multi-group system



CP PIV

The Call Processor Pentium IV (CP PIV) Large System processor contains the following features:

- a PCI-based design that is compatible with current architecture
- an Intel Pentium 4 processor
- two Compact Flash (CF) sockets (one on-board and one hot-swappable on the faceplate). The on-board CF is referred to as the Fixed Media Disk (FMD), and the faceplate CF is referred to as the Removable Media Disk (RMD). See Figure 10 on page 54 and Figure 11 on page 55.
- 512 MBytes of DRAM memory

New system types

There are two new system types for CP PIV:

- 3521 (Meridian 1 Option 61C and CS 1000M SG)
- 3621 (Meridian 1 Option 81C and CS 1000M MG, Avaya CS 1000E)

New hardware

CP PIV features the following new hardware:

- A CP PIV processor board. See Figure 10 on page 54 (side view) and Figure 11 on page 55 (front view).
- A blank panel to fill the gap and ensure proper air flow direction.

  Note: The front panel USB port on the CP PIV card is reserved for future applications.

Figure 10
CP PIV call processor card (side)

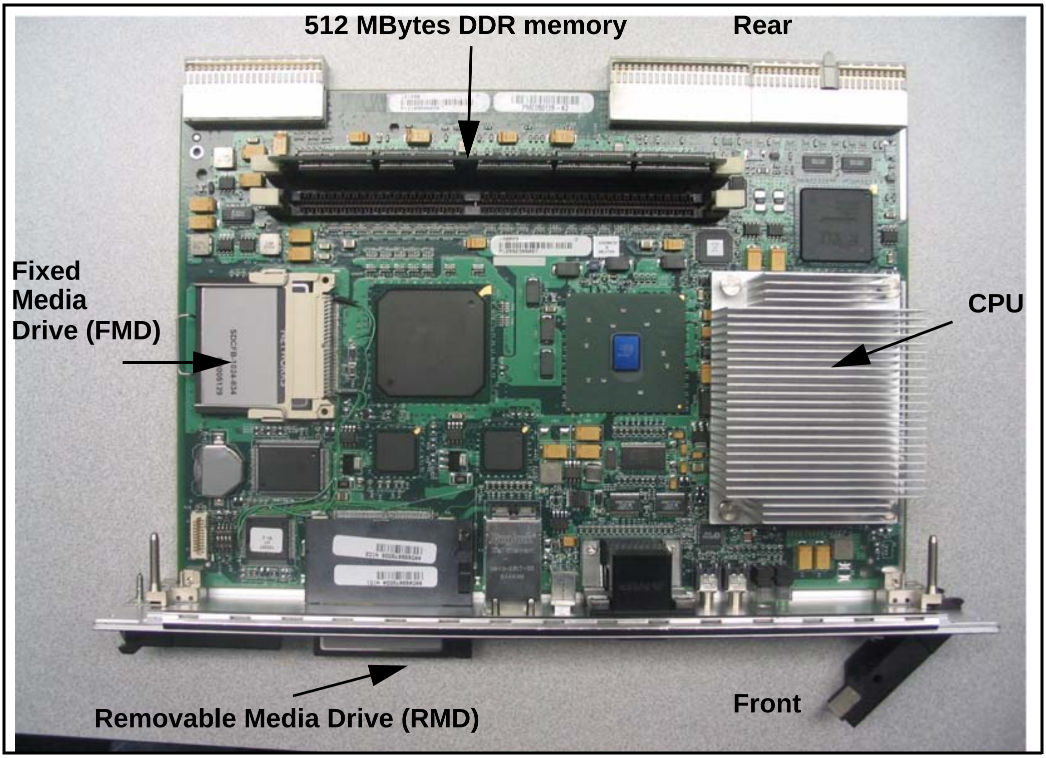
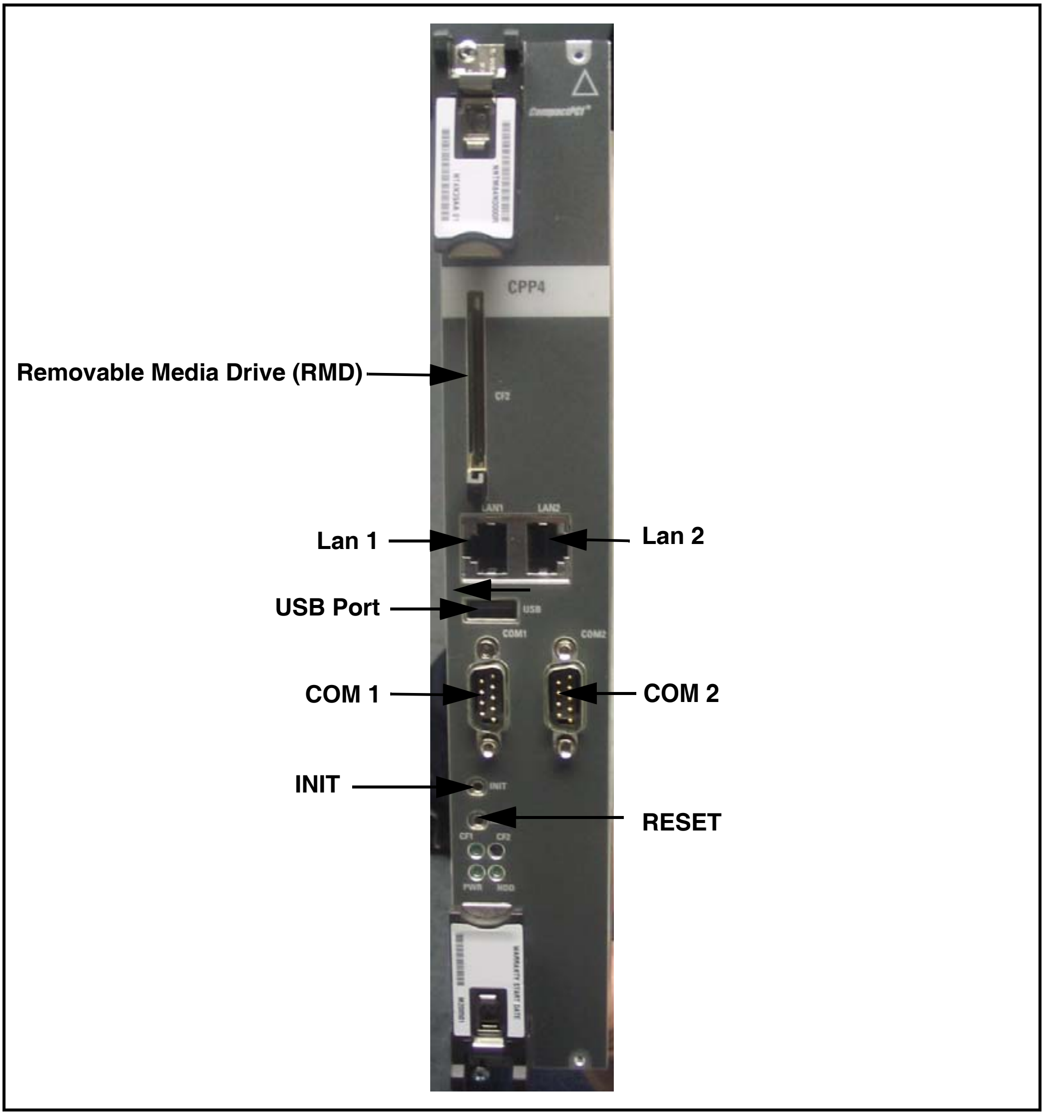


Figure 11
CP PIV call processor card (front)



Signaling Server

CS 1000M systems use a Signaling Server. The Signaling Server provides a central processor to drive the signaling for IP Phones and IP Peer Networking. The Signaling Server is a Common Processor Pentium Mobile (CP PM) circuit card or a Commercial off-the-shelf (COTS) server that provides signaling interfaces to the IP network, using software components that operate on the Linux Base operating system.

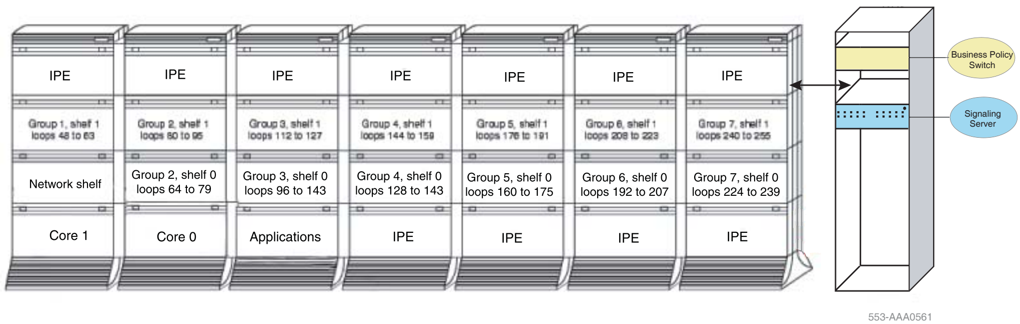
You can install the Signaling Server in a load-sharing redundant configuration for high scalability and reliability. The following software components can operate on the Signaling Server.

- IP Line Terminal Proxy Server (LTPS)
- SIP/H.323 Gateway Signaling software
- Network Routing Service (NRS) (optionally redundant)
- SIP Line Gateway software (stand-alone only)
- Element Manager Web server
- Application Server for Personal Directory, Redial List, and Callers List for UNIStim IP Phones

The Signaling Server is an application server that can host various co-resident Signaling Server applications. SIP Line Gateway software cannot co-reside with any other signaling software. A server configured with a SIP Line Gateway can be referred to as a SIP Line Server.

The CP PM Signaling Server is housed in the system chassis. The COTS Signaling Server is mounted on an external rack (see Figure 12).

Figure 12
CS 1000M Large System



Engineering rules

Each system is defined using the following assumptions and general engineering rules.

1 A system may be upgraded to the next larger system type as defined in *Communication Server 1000M and Meridian 1 Large System Upgrade NTPs* (NN43021-458 to 474).

2 When expanding to the next system type, the changes to the physical configuration should be kept as simple as possible to reduce downtime and installation costs.

3 A module column should be built up to the maximum of four modules before moving to the next new column. In installations where the ceiling does not allow four-high columns, the alternate configuration of three-high tiers can be used.

4 Vertical routing of the internal signal cables should be done only on the right side of a module.

5 The CPU modules must be on the bottom of a column or one level up for proper cooling and reliability.

6 Sending and receiving cables must be of equal lengths and as short as possible.

7 In order to optimize network FIJI cabling, mount the NTD35 network modules in pairs in the same column, one module on top of the other in the middle tiers. The modules must be stacked in one contiguous equipment bay. The longest FIJI cable (NTRC48FA) is 8 m (26 ft), which is the maximum distance of the furthest network module from the Core/Net modules.

8 The IPE modules can be located separately from the CPU and network bay, by up to the maximum network cable length of 13.5 m (45 ft).

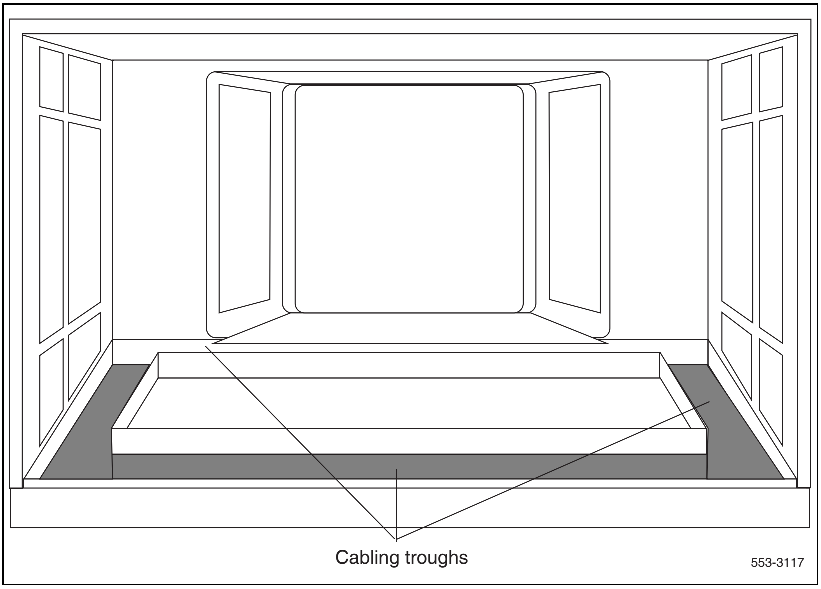
9 Core/network modules can also be on top of each other in the first and second tier in multi-group systems.

Cable routing guidelines

A system layout, preconfigured at the factory, is included in the software box with each system shipment. Before you route cables, see the “to-from” cable connections in the system layout. Note that there are a variety of cable lengths. Make sure you install the designated cable for each connection.

Because the cable troughs (see Figure 13 on page 59) and spaces on the sides of each module are within the EMI shielding of the system, unshielded cables can be routed in those areas. The corner vertical channels in the rear of the module are outside of the EMI shield. Cables routed in the vertical channels must be shielded, and must enter and exit the EMI-shielded area through I/O panels and adapters.

Figure 13
Cable routing troughs – front view of module



A typical routing scenario from the faceplate of a printed circuit pack (PCP) to one of the I/O panels is as follows:

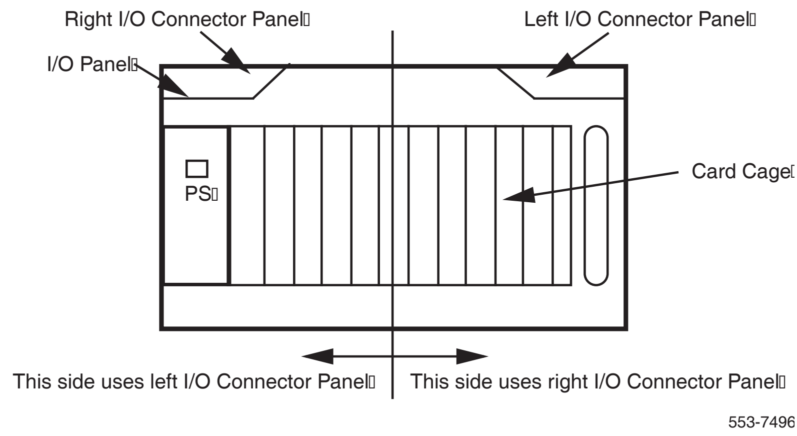
- The cable comes off the faceplate of a PCP and drops down into the front horizontal cable trough.
- The cable is routed to the right side of the module in the horizontal cable trough to the vertical cable trough.
- The cable is routed to the back of the module and into the rear horizontal cable trough.
- The cable is routed to the left or right I/O panel at the rear of the module.

When connecting two half-group networks together, the cables are routed vertically through the square holes in the rear horizontal cable trough.

All other internal vertical cable routing from one module to another should be done only in the right vertical cable trough.

Since all faceplate to I/O panel cables are the same length and card positions in the card cage vary, a cable can contain excess slack. It is therefore recommended that cables from cards in the left side of the card cage use the right I/O panel and cables from cards in the right side of the card cage use the left I/O panel whenever possible, as shown in Figure 14.

Figure 14
Top view of front to I/O connector panel routing



As space permits, cables can be routed:

1 Horizontally in the cable troughs at the front, rear, and sides of the module

Note: In a DC-powered module, because there is no MPDU, there is room to route cables horizontally from front to rear on the left side (front view) of the module.

2 Vertically on the sides of the module

3 Vertically in the corner channels in the rear of the module (shielded cables only)

CAUTION — Service Interruption

Damage to Equipment

Cables must be routed as perpendicular as possible to any nearby power cables. Avoid routing cables near power cables if alternate routing is available. (At the rear of the module, cables routed between the I/O panel and the rear cover can be parallel to the power cables because the panel provides EMI shielding.)

Avaya recommends that you use the 90° connector end of the cable to route the cable through a module or cabinet instead of the 180° end, since some openings are small (see Figures 15 and 16). Furthermore, Avaya recommends that you route cables top-to-bottom so gravity will ease installation.

Figure 15
90° cable connector

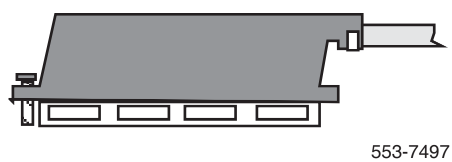
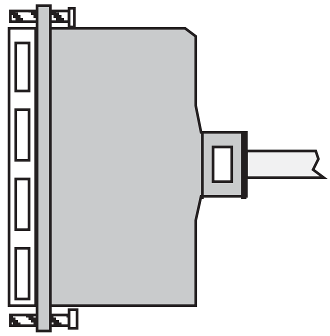


Figure 16
180° cable connector



Equipment handling precautions

To avoid personal injury and equipment damage, review the following guidelines before handling the equipment.

Unloading equipment

Special ramps, packed inside the pallet holding Column 0, must be used to move the equipment off the pallet. Follow the instructions provided with the ramps.

CAUTION — Service Interruption

Damage to Equipment

Never pry up the pedestal to lift the column. This could damage to the pedestal. Manually slide the column down the ramps provided.

Working with power supplies

There are no user-repairable components in the power supply. If a power supply fails, the complete unit must be replaced. Do *not* disassemble a power supply under any circumstances.

DANGER OF ELECTRIC SHOCK

To avoid the danger of electric shock, be careful when working with power equipment and connections.

Comply with all Warnings.

External power supplies such as a UPS, power plant, or batteries, may be heavy and require special handling procedures and additional personnel for unloading and installation. Also, be aware of weight distribution and keep the equipment room floor from being overly stressed.

Handling circuit cards

Follow these precautions when handling circuit cards.

1 Unpack or handle cards away from electric motors, transformers, or similar machinery.

2 Handle cards by the edges only. Do not touch the contacts or components.

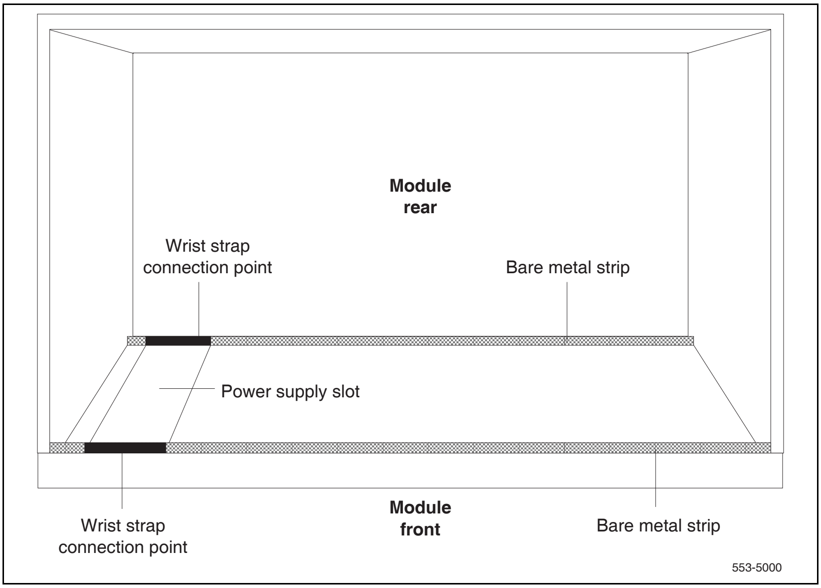
3 Set cards on a protective antistatic bag. If an antistatic bag is not available, hand-hold the card, or set it in a card cage unseated from the connectors.

4 Store cards in protective packing.

5 Do not stack cards on top of each other unless they are packaged.

6 Wear a properly connected antistatic wrist strap when you work on the equipment. If a wrist strap is not available, regularly touch one of the bare metal strips in the module to discharge static. Figure 17 on page 64 shows the wrist strap connection points and the location of the bare metal strips you should touch.

Figure 17
Static discharge points



DenAn regulatory notice for Japan

取扱説明書

安全上のご注意

本取扱説明書「安全上のご注意」は以下のノーテル製品の取扱説明書の別紙であり、取扱説明書本文と不可分のものです。

- Communication Server 1000M Cabinet/Chassis
- Communication Server 1000S
- Communication Server 1000E
- Meridian 1 Option 11C
- Meridian 1 Option 11C Mini
- Media Gateway 1000
- Multimedia Communication Server 5100
- CallPilot 703t server
- Hospitality Messaging Server 400
- Media Processing Server 500
- Media Processing Server 1000

⚠ 警告

本製品を安全にご使用頂くため、以下のことにご注意ください。

- 接続ケーブル、電源コード、ACアダプタなどの部品は、必ず製品に同梱されております添付品または指定品をご使用ください。添付品・指定品以外の部品をご使用になると故障や動作不良、火災の原因となることがあります。
- 同梱されております付属の電源コードを他の機器には使用しないでください。上記注意事項を守らないと、死亡や大怪我など人身事故の原因となることがあります。

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Preparing the equipment for installation

Use the equipment room floor plan to position equipment. See *Communication Server 1000M and Meridian 1 Large System Planning and Engineering* (NN43021-220) to prepare the equipment room and floor plan.

WARNING

A fully loaded column weighs 275 kg (606 lb). More than one person is required to remove equipment from shipping pallets.

WARNING

Module covers are *not* hinged; do not let go of the cover. Lift the cover away from the module and set it out of the work area.

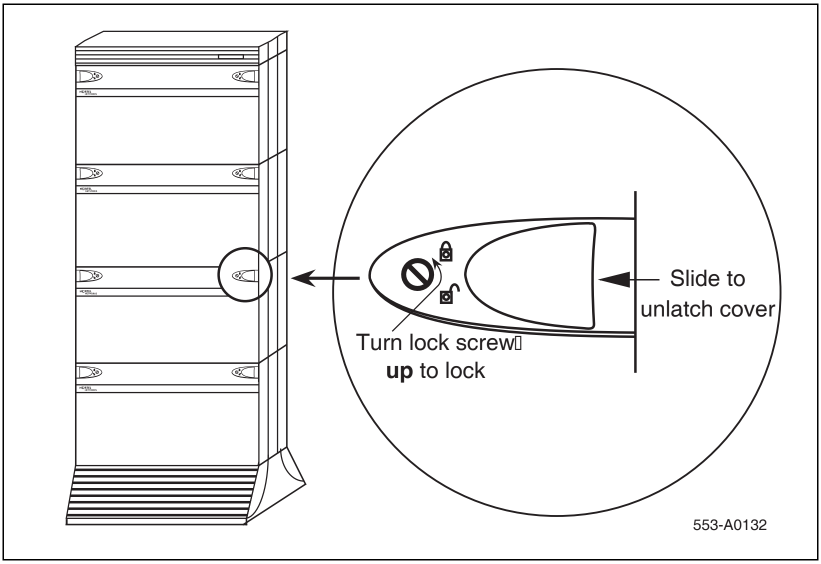
Procedure 1
Preparing the equipment for installation

1 Remove equipment from the shipping pallets; follow the unpacking instructions that come with the packaging material.

2 Remove the front and rear covers from each module:

a. With a flat blade screwdriver, turn the lock clockwise on the two locking latches (see Figure 18 on page 67).

Figure 18
Locking latches on the module cover



b. Simultaneously push the latches toward the center of the cover and pull the cover toward you while lifting it away from the module.

c. Set the covers aside until the installation is complete.

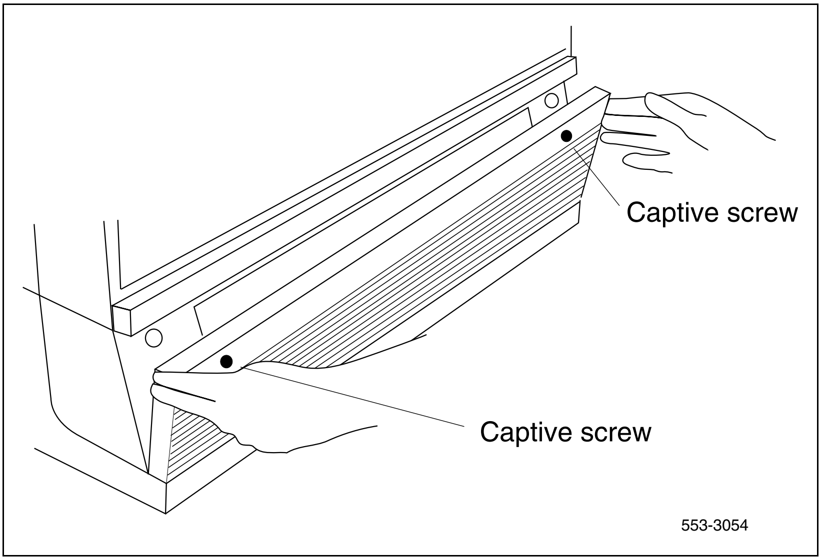
3 Remove the front and rear grills from each pedestal:

a. Loosen the two captive screws that secure the grill.

b. Pull the grill forward and lift it out of the base of the pedestal (see Figure 19 on page 68).

c. Set the grills aside until the installation is complete.

Figure 19
Removing the pedestal grill



4 Make sure all of the items on the system order form are on the packing slip that comes with the equipment.

5 Inspect all equipment for physical damage. Report any damage to your supplier.

6 Check the option settings on all cards that have a switch symbol on the faceplate.

For more information about option switch and jumper settings, see *Circuit Card Reference* (NN43001-311).

End of Procedure

Placing the fourth module on a column

Contents

This chapter contains information about the following topics:

Overview

A four-module column is shipped in two segments. One shipping pallet carries the pedestal and three modules. Another shipping pallet carries the fourth module and top cap.

Starting at the bottom of the column, modules are numbered from zero to three in each column.

Placing the fourth module on a column

Use Procedure 2 to place the fourth module and top cap on the column. To add a module to a column that is already powered, see the procedures in “Adding a module to a column” on page 347.

CAUTION — Service Interruption

System Failure

Never add a Common Equipment module in the third or the fourth tier of a column.

WARNING

A fully loaded module weighs approximately 60 kg (130 lb). More than one person is required to place a module on a column.

Procedure 2
Placing the fourth module on a column

1 Position and secure the fourth module.

- **a.** Locate the positioning guides on the third module (see Figure 20).
- **b.** Position the fourth module so it faces the same direction as the column.
- **c.** Remove the front and rear module covers on the fourth module and rear module cover on the third module.
- **d.** Place the fourth module on top of the column and adjust it until it is seated securely on the positioning guides.
- **e.** Remove the I/O safety panel in the fourth module to gain access for installing the center mounting bolt.
- **f.** Use a 14 mm (9/16 in.) socket wrench to secure the fourth module with five mounting bolts (see Figure 21 on page 72).

Figure 20
Module positioning guides

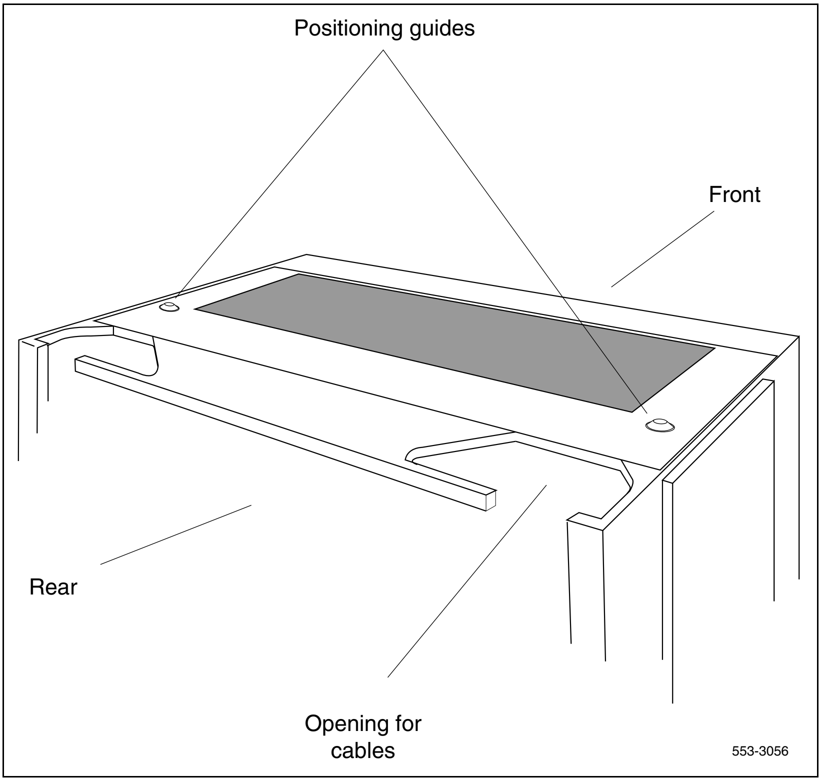
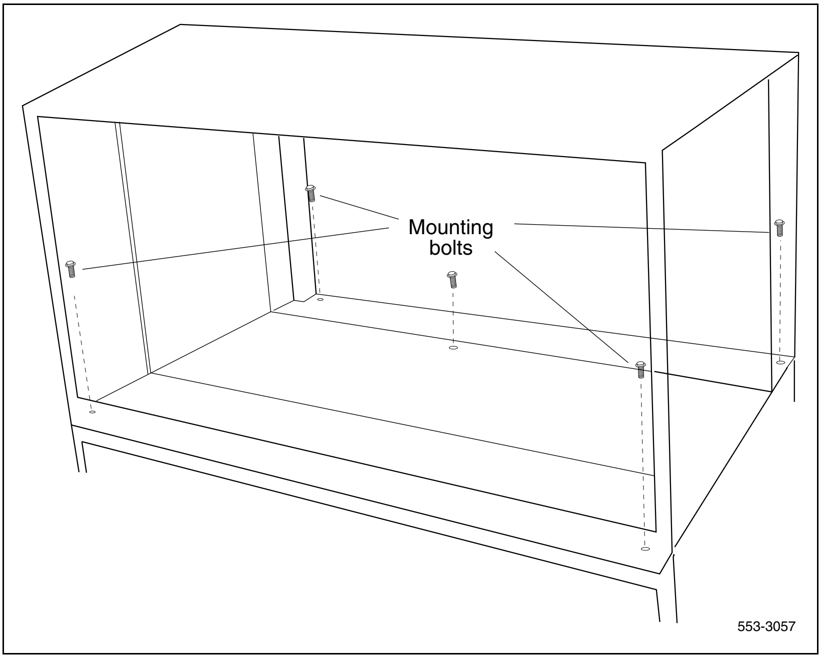


Figure 21
Module mounting bolts

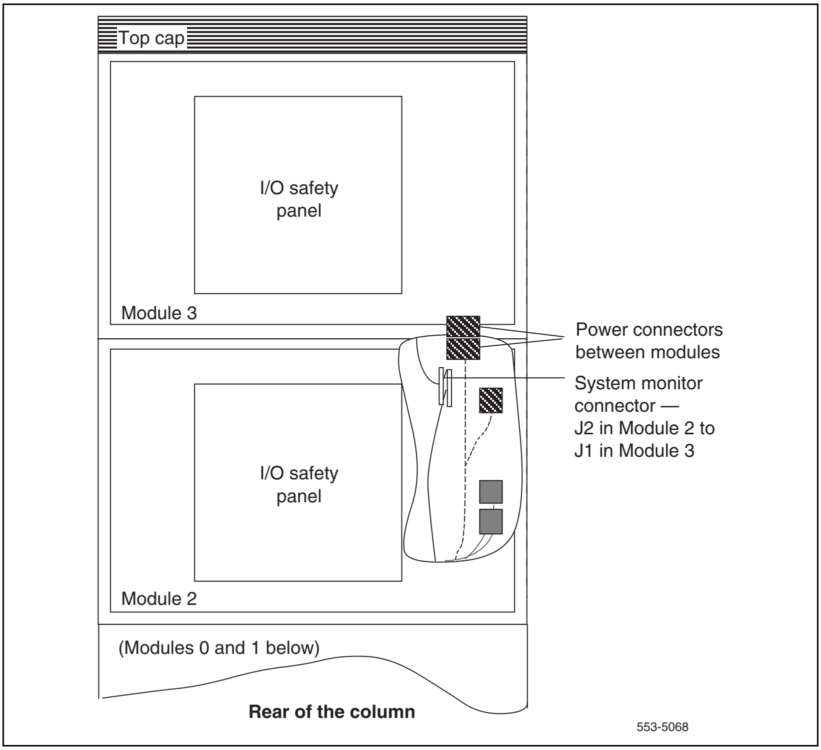


2 Connect the module-to-module power and system monitor cables.

a. Connect the power connectors between the modules (see Figure 22 on page 73).

b. Connect the system monitor cable from connector J2 on the third module to J1 on the fourth module.

Figure 22
Power and system monitor connections



3 Reinstall the I/O safety panel in each module.

4 Replace the module covers.

End of Procedure

Positioning and leveling equipment

Contents

This chapter contains information about the following topic:

Positioning and leveling the equipment

Columns normally stand on adjustable feet that provide leveling capability and ground isolation. However, casters are available and can be used for two-tier columns. If a third module is added to a column with casters, the casters must be replaced with leveling feet.

> ***Note:*** If earthquake bracing is required, go to "Installing earthquake bracing" on page 327 to install column and floor bracing, and to position and level equipment. When those procedures are complete, return to Step 4 or Step 5 (as applicable) in the initial installation procedure.

Use Procedure 3 to position and level the equipment.

Procedure 3
Positioning and leveling the equipment

1. Check the equipment room floor plan to position columns.
2. Level the column.
   a. Remove the front and rear exhaust grills.
   b. Remove the front and rear air intake grills.

c. Position a level across the top module cover on the front of the column.

d. Loosen the locking nuts on the feet.

e. Adjust the feet on each pedestal up or down to level the column.

f. Perform step a to step e for leveling the rear of the system.

g. Tighten the locking nuts.

Note: Leave at least 12.5 mm (1/2 in.) between the floor and the bottom of the pedestal for air flow required by the blower unit.

3 **For a multiple-column system**, install NT8D49 Spacer Kits between columns.

a. Remove the front and rear module covers.

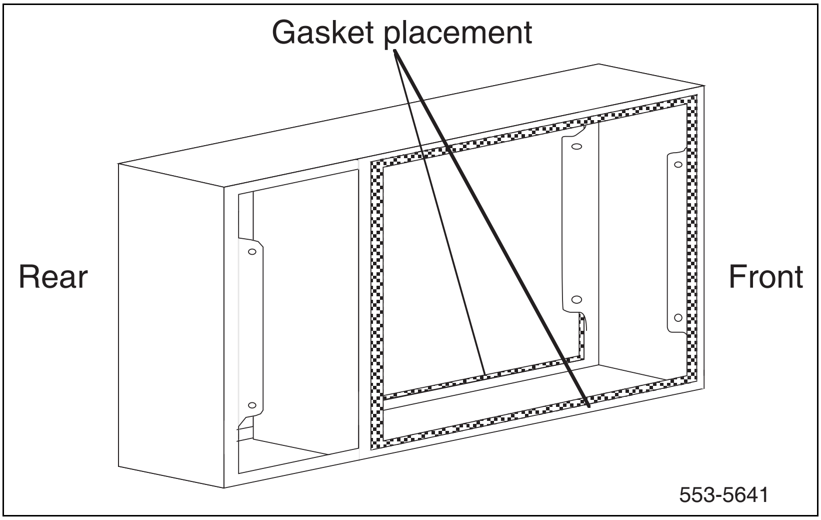
b. Remove the front and rear intake grills, if not already removed.

c. Remove the trim plates from the module side where the spacer will be attached by removing the four screws securing the trim plates to the module.

d. Remove the side panel from the module's side where the spacer is being attached by removing the four screws securing the side panel to the module.

e. Attach gaskets to both sides in the front section of each spacer (see Figure 23).

Figure 23
Positioning spacer gaskets



f. Attach a spacer to one side of each module, except the end column (see Figures 24 and 25).

- — Position a spacer against the module.
- — Insert one standoff between the spacer and module.
- — Insert the one screw and tighten.
- — Repeat the process for the remaining standoff and screws.

> **CAUTION — Service Interruption**
>
> **Damage to Equipment**
>
> Do not try to adjust the horizontal position of a column by tightening the spacer screws. Tightening the screws with the columns too far apart will warp the spacer.

g. One at a time, push columns together, level, align, and attach the other side of the spacers.

Figure 24
Spacer positioning

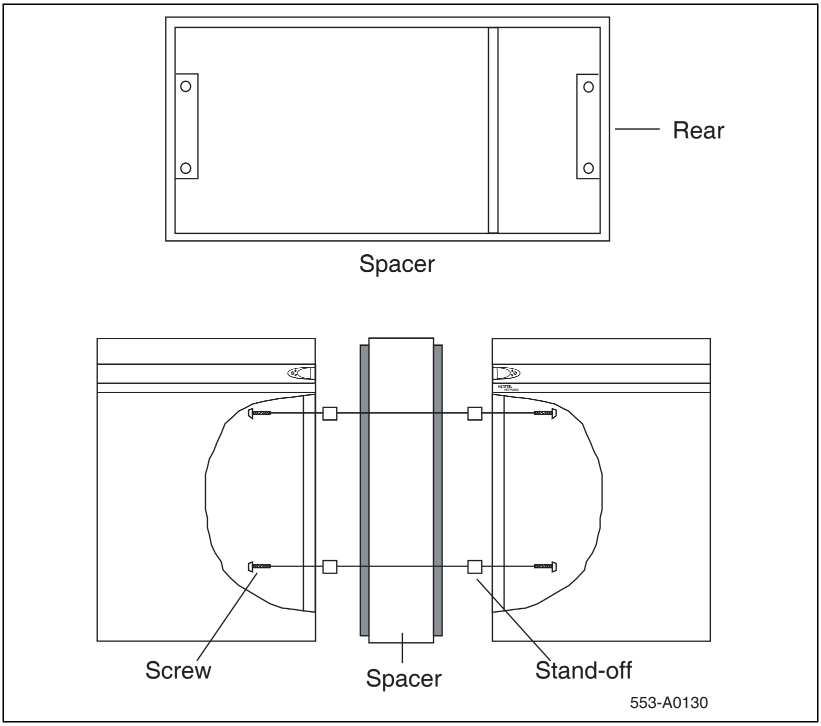
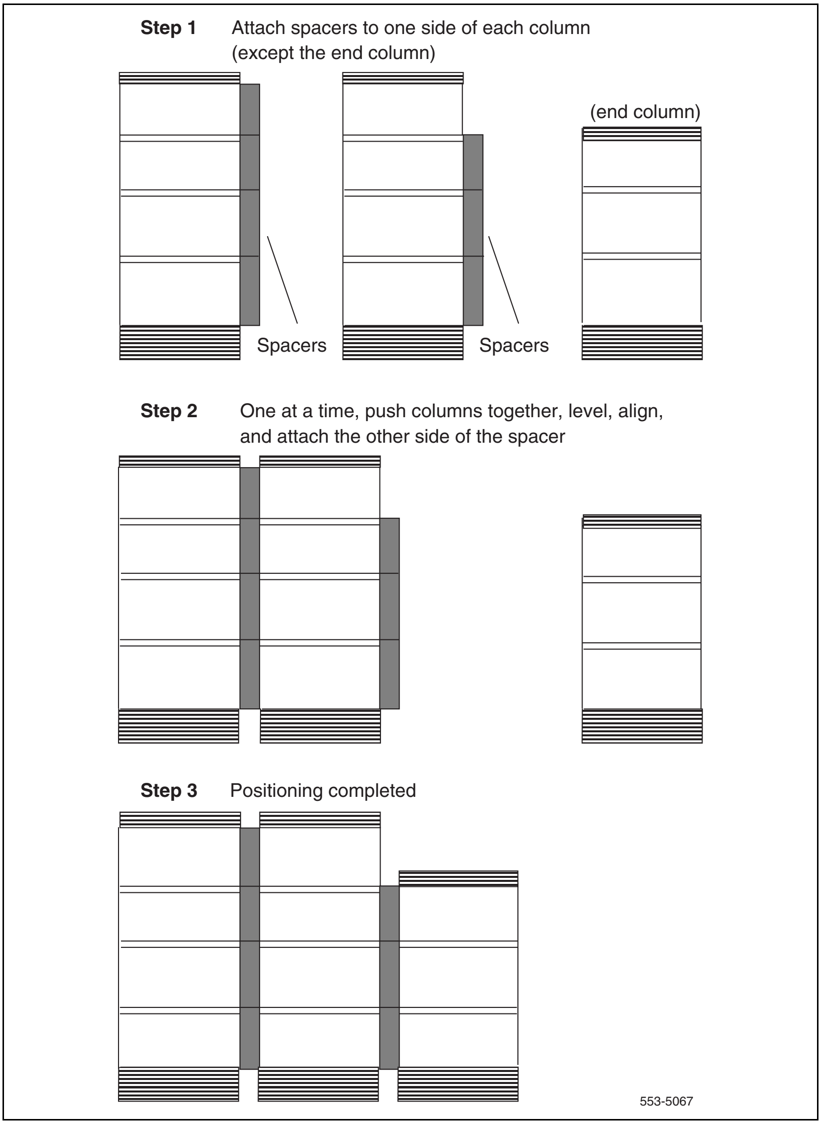


Figure 25
Column positioning with spacers



End of Procedure

Installing overhead cable tray kits

Contents

This chapter contains information about the following topic:

Installing overhead cable tray kits

Cable trays (also called ladder racks) can hang from a ceiling, or they can be mounted across the tops of the columns. If ceiling-hung racks are used, the rear top cap grill on each column must be replaced with a Top Cap Cable Egress Panel (P0699851). The optional Top Cap Egress Panel has cutouts for cable routing. The cable trays and the equipment required to hang them must be provided by the customer and installed according to the manufacturer's instructions.

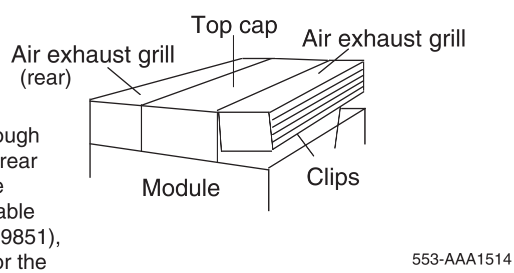
Avaya offers an NT8D63 Overhead Cable Tray Kit, which provides equipment for mounting cable trays on four-tier columns. The kit includes two support brackets, and front and rear exhaust grills with cutouts for cable routing. The cable tray itself must be provided by the customer; it is not included in the kit. Use Procedure 4 on page 82 to install the NT8D63 kit.

> ### CAUTION — Service Interruption
>
> **System Failure**
>
> Column frames must be insulated from contact with building structures such as concrete walls, floors, and ceilings. Whether the cable racks are column-mounted or ceiling-hung, the installation must maintain the integrity of the grounding architecture.

Procedure 4
Installing the overhead cable tray kits

1 Remove air exhaust grills at the front and rear of the top cap. Pull forward on the two clips underneath the front edge of each grill and lift up to remove the grill (see Figure 26).

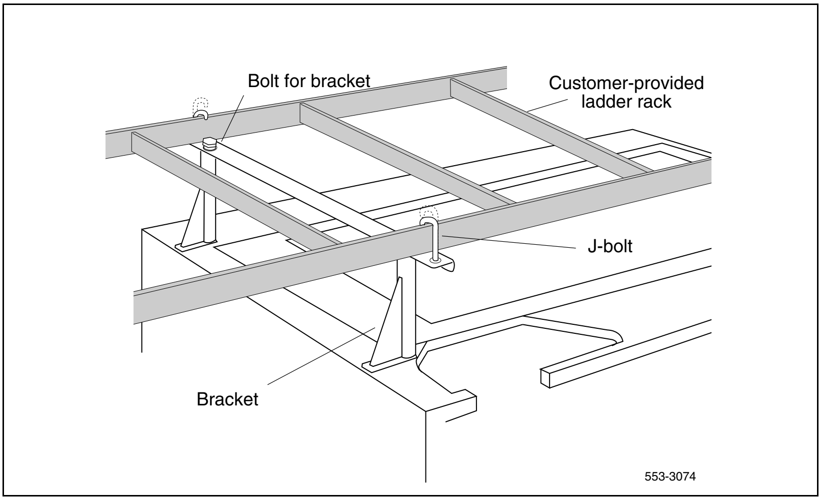
Figure 26
Removing top cap grills



Note:
If routing cables through the top, replace the rear exhaust grill with the optional Top Cap Cable Egress Panel (P0699851), which has cutouts for the cables.

2 Mount a support bracket at the front and rear of the module (see Figure 27 on page 83). Using two bolts, secure each support to the threaded holes in the top of the module.

Figure 27
Overhead cable tray kit



3 Install the front and rear air exhaust grills that come with the kit.

4 Place the cable rack on top of the support brackets and fasten it to the supports with the J-bolts as shown in Figure 27.

End of Procedure

Installing AC power

Contents

This chapter contains information about the following topics:

AC-powered systems

For AC-powered systems, use Procedure 5 on page 90 to install safety ground/protective earth and logic return wiring, and to install ground and alarm cabling for a UPS.

For AC-powered systems without reserve power, one input receptacle is required per column, within 2.4 m (8 ft) of each pedestal. One IG-L6-30 or L6-30 receptacle is required for each column. Instead of using the power plug provided, the Power Distribution Unit (PDU) can be hard-wired to the power source. In this case, #10 AWG conductors routed through 20 mm (3/4 in.) conduit are generally used. The leads connect to the L1, L2, and GND terminations on the field wiring terminal block on the PDU.

> ***Note:*** Do not use ground fault circuit interrupt (GFCI) devices on Large System AC power feeds.

Systems that use reserve power plug into the UPS, which in turn plugs into the power source (associated batteries can be located within the UPS or installed externally). Consult the UPS documentation for receptacle requirements.

As a safety precaution, all AC service panels should be located in an area that is easily accessible at all times to allow for emergency shutdown. An optimal location would be near, or just outside the entry to the room containing the Large System (or the UPS, if equipped). Each circuit breaker in the panels should be clearly marked to identify the system component or components it services.

Safety ground/protective earth and logic return wiring

A separate safety ground/protective earth connection is required. The safety ground/protective earth wire must be #6 AWG or larger. It must connect the pedestal to the single-point ground (SPG). Using an isolated ground (IG) bus as the single-point ground is recommended. To fulfill this function, Avaya offers the NT6D5304 Logic Return Equalizer (LRE), equipped with nine terminations. A large ground bar (NT6D5303), equipped with 48 terminations, is also available.

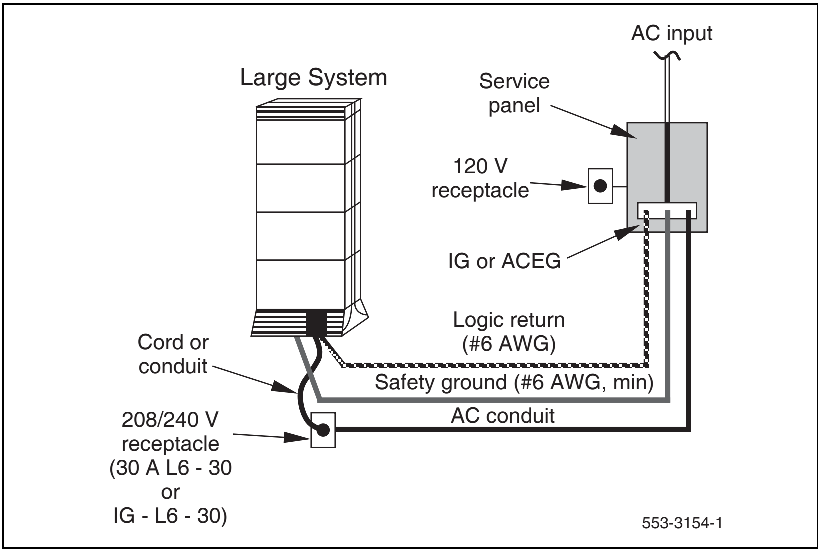
An AC equipment ground (ACEG) bus in the service panel or transformer is acceptable but not recommended. If used, the ACEG bus conductor must be a low impedance path to an approved source for ground. It must not contain induced electrical noise from sources such as building metallic structures (building steel, metallic conduit, metal pipes, etc.). Figures 28, 29, and 30 beginning on page 87 show an ACEG as the single-point ground.

Depending on the distances between columns, the location of the service panel, and the availability of panel SPG connection points, safety ground/ protective earth wiring can be daisy-chained or run independently from each column to the service panel. Figures 29 and Figure 30 show safety ground/ protective earth wiring in daisy-chain configurations.

For more information about approved ground sources and methods, see *Communication Server 1000M and Meridian 1 Large System Planning and Engineering* (NN43021-220). Insulated ground wire must be used for system grounding.

Multiple-column systems use an insulated ground bus as the point where the logic return wires from different columns are consolidated before connecting to the single-point ground.

Figure 28
Single column – ground and logic return distribution



Note: In an isolated ground system, the dedicated isolated ground bus bar in the service panel serves as the ground window. It is used for all AC safety grounds and logic returns. It also accommodates a conductor that references the (+) battery bus in DC systems.

Figure 29
Multiple column – ground and logic return distribution

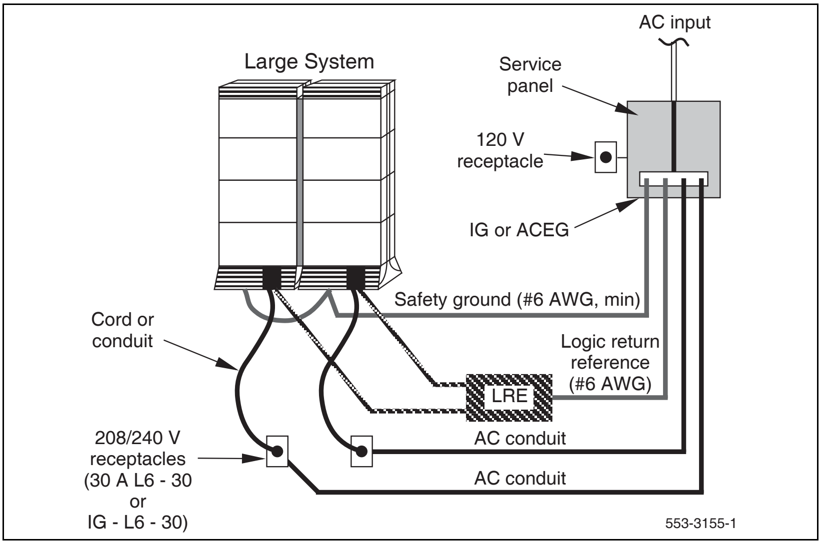
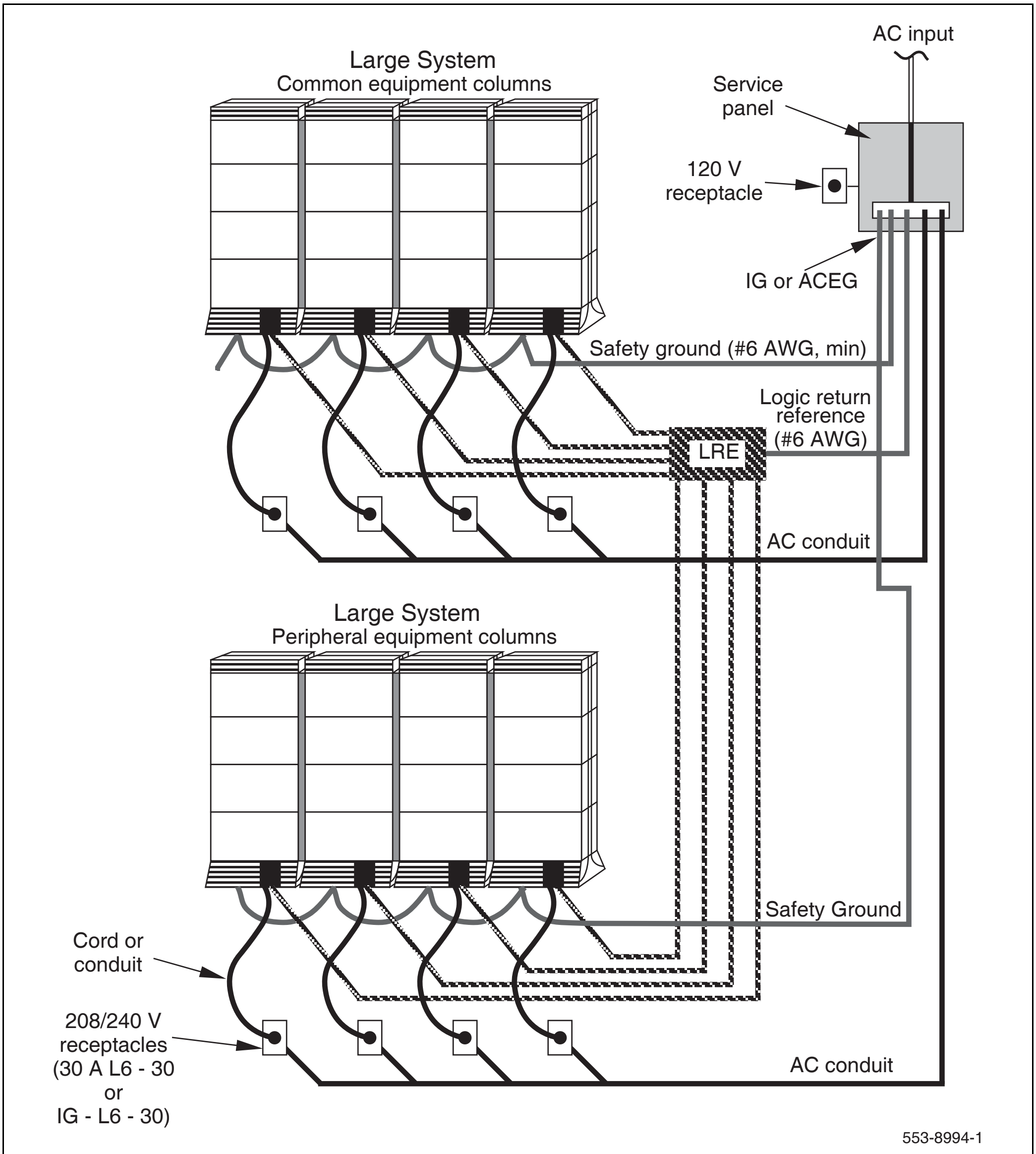


Figure 30
Multiple column, multiple row – ground and logic return distribution



Installing safety ground/protective earth and logic return wiring

Follow Procedure 5 to install safety ground/protective earth and logic return wiring.

Procedure 5
Installing safety ground/protective earth and logic return wiring

> **CAUTION — Service Interruption**
>
> **System Failure**
>
> Failure to follow grounding procedures can result in unsafe or faulty equipment. See *Communication Server 1000M and Meridian 1 Large System Planning and Engineering* (NN43021-220) for a complete description of approved ground sources and methods.

1 Make sure the power cord is disconnected from the power source.

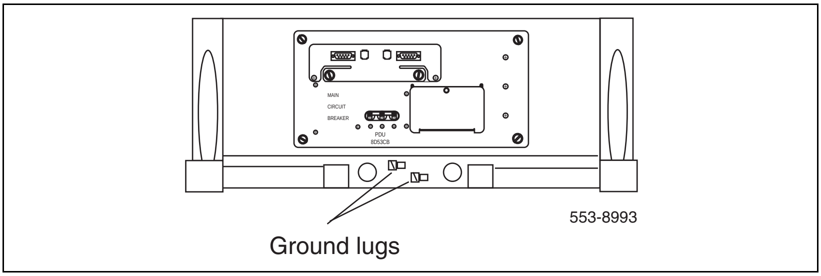
Note: As a safety precaution, disable the circuit of each column at the service panel.

2 Remove the air intake grill.

3 Using a volt/ohm meter, measure the resistance between the ground pin on the power plug and a ground lug on the rear of the pedestal (see Figure 31).

Note: The resistance should be 0 ohms; if it is greater than 0.5 ohms, check the power cord connections.

Figure 31
PDU ground lug locations

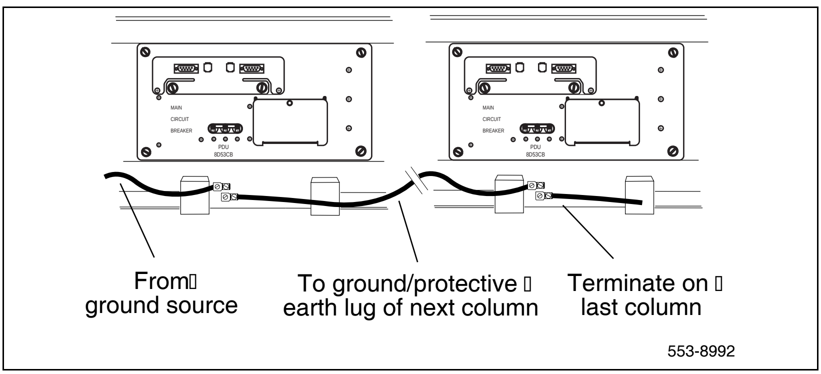


4 Connect the safety ground/protective earth wire (insulated ground wire *must* be used for system grounding).

   a. **For a single-column system**, connect a #6 AWG wire from the ground source in the service panel to a ground lug on the pedestal.

   b. **For a multiple-column system**, connect a #6 AWG wire from the ground source in the service panel to a ground lug on the closest column. Daisy-chain #6 AWG ground wires from one pedestal to the next as illustrated in Figure 32, connecting all of the columns together. You can also run a #6 AWG wire from the ground source to each column individually. If the columns are not bolted together, physically separated groups of columns should be grounded individually as shown in Figure 30 on page 89.

Figure 32
AC column ground lug daisy chain connection



5 Place a warning tag on the connection at the ground source. The warning tag should read WARNING—TELEPHONE SYSTEM GROUND CONNECTION—DO NOT DISCONNECT.

6 Using a volt/ohm meter, measure the resistance between the ground pin on the power plug and the ground terminal on the power outlet.

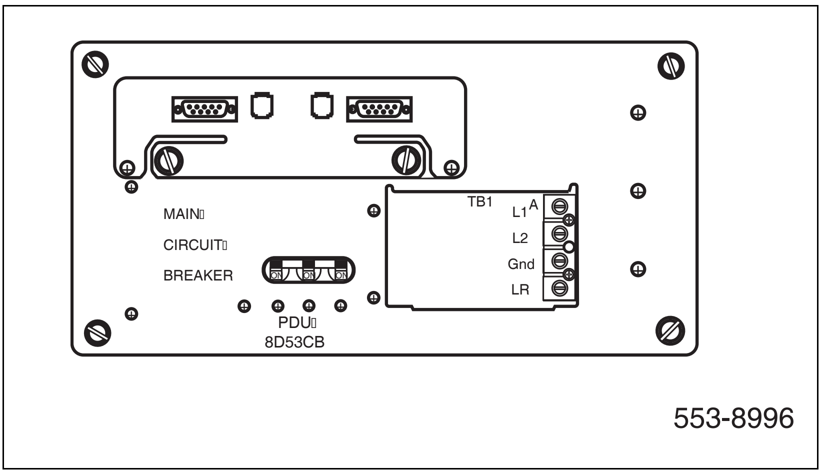
7 The resistance should be 0 ohms. If the resistance is greater than 0.5 ohms, check the power outlet ground and safety ground/protective earth connections.

8 Remove the PDU field wiring access plate.

9 Connect the logic return wire.

Starting at the LRE, connect a #8 AWG wire and route it to the column and up or down the I/O channel area, as appropriate. Then route the wire through the conduit hole in the pedestal to LRTN on the field wiring block (see Figure 33).

Figure 33
Logic return connection for each column



10 Replace the PDU field wiring access plate.

End of Procedure

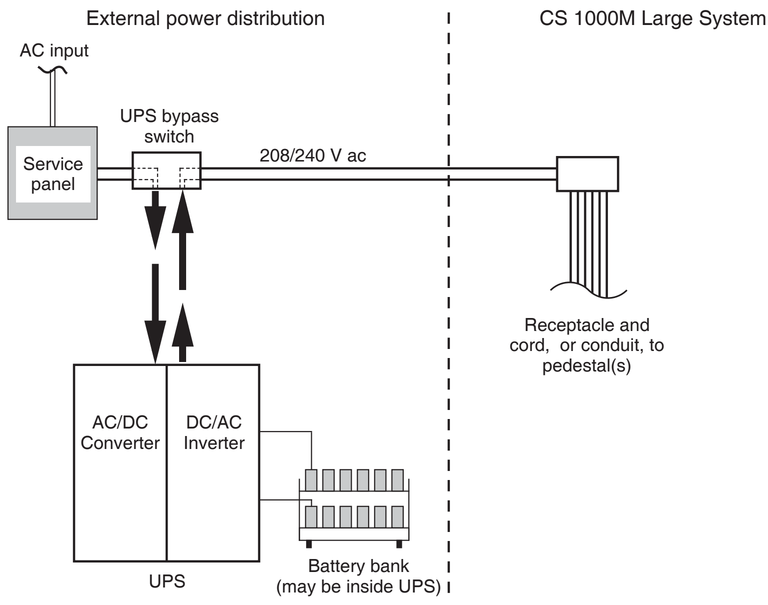
Installing UPS ground cabling

Use the manufacturer's documents to install and cable a UPS. If the UPS does not contain an integral bypass switch, add one externally during initial UPS wiring. Figure 34 is a block diagram of a UPS installation and associated wiring.

Follow Procedure 6 to install UPS ground cabling.

> *Note:* Because UPS installation can be complex, Avaya recommends that installers attend vendor training programs.

Figure 34
AC reserve power configuration



Note: The ac safety ground (green wire) must route from the service panel, through the UPS, to the Large System panel or receptacles.

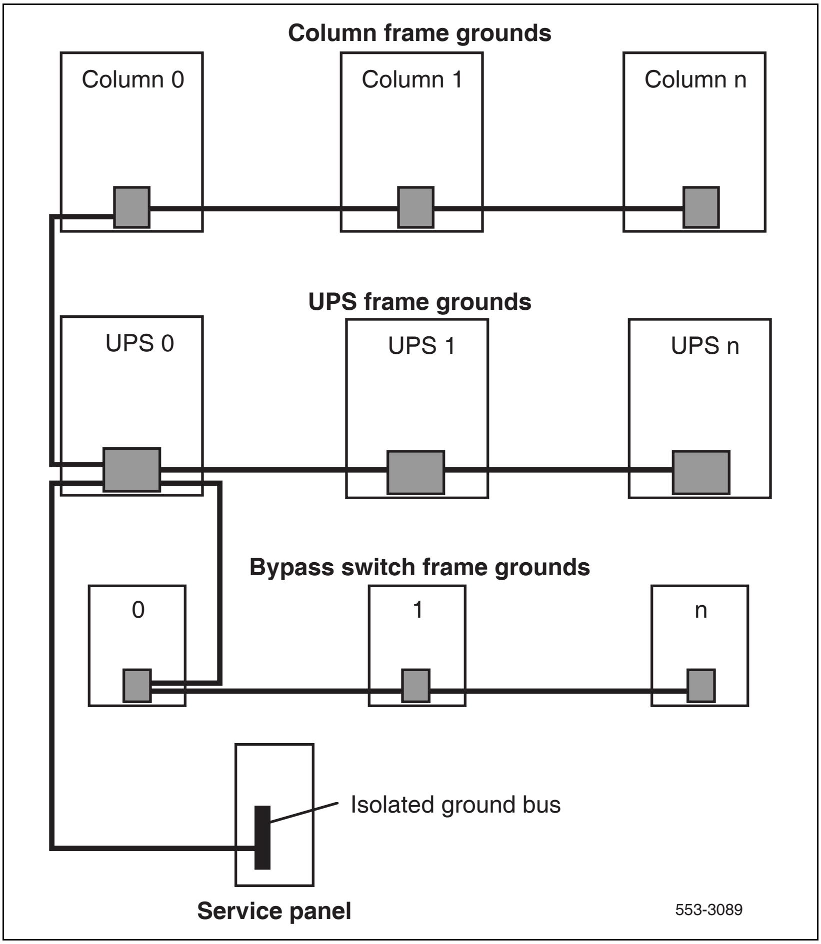
Procedure 6
Installing the UPS ground cabling

> **CAUTION — Service Interruption**
>
> **Damage to Equipment**
>
> Take care when connecting battery leads to the UPS. A battery reversal can result in severe damage to the UPS.

1. Make sure the safety ground/protective earth wire is connected on all Large System columns.
2. Daisy-chain ground cables to each UPS (see Figure 35) using #6 AWG wire.
3. Daisy-chain ground cables to each bypass switch (if equipped) using #6 AWG wire.
4. Run a #6 AWG wire between the ground lug on the rear of the pedestal, the bypass switch, and the UPS to a common frame ground point.
5. Run a #6 AWG wire between the common ground point and the ground bus in the service panel.

End of Procedure

Figure 35
UPS grounding diagram



Installing DC power

Contents

This chapter contains information about the following topics:

DC-powered systems

This chapter provides procedures to install safety ground/protective earth and logic return wiring, configure system monitors, and connect PFTUs for DC-powered systems using a Candeo DC Power Plant power system.

> ***Note:*** The procedures in this chapter apply to the global power distribution unit (PDU). Throughout this document, the global PDU is referred to as the NT4N49AA PDU.

To install reserve power equipment (batteries), follow the instructions provided with the equipment. To comply with safety requirements, consult the following before working with any battery systems.

- Read the “Material Safety Data Sheet” that must be posted to meet Occupational Safety and Health Administration (OSHA) requirements. This article outlines appropriate reserve battery handling procedures.
- Refer to National Electric Code 645-10. This article outlines requirements that call for the installation of AC- and DC-power kill switches to battery systems in certain environments.

As a safety precaution, all DC service panels should be located in an area that is easily accessible at all times to allow for emergency shutdown. An optimal location would be near, or just outside, the entry to the room containing the DC power system for the Large System. Each circuit breaker within a panel should be clearly marked to identify the system component or components it services.

Candeo DC power systems

The Candeo platform provides a simple, quick to deploy, and easy to operate power solution. Based upon modular building blocks (rectifiers, System Manager, DC distribution, and battery connection modules), the system is designed to power –48 V DC applications. The Candeo platform can be expanded by adding rectifiers, battery connection modules, frames, and distribution modules.

There are two types of Candeo systems:

- Large Candeo (MP481200), which uses 50 A rectifiers and has a capacity of 1000 A.
- Small Candeo (SP48300), which uses 30 A rectifiers and has a capacity of 300 A.

Both Large and Small Candeo systems provide “plug and walk-away” installation and setup. The platform can be reconfigured or expanded while it remains online. Installation and maintenance benefits include:

- fully front accessible
- (for Large Candeo) shelfless rectifiers
- automatic alarms and rectifier configuration settings
- no inter-module wiring
- all hot-insertable modules
- all internal bussing
- fully insulated environment
- high efficiency
- IP ready for simplified internet connectivity
- HTML-based graphical user interface
- automated web-based maintenance and comprehensive on-screen troubleshooting
- (for Small Candeo only) Simple Network Management Protocol (SNMP) communication functionality
- remote access via modem or Ethernet, permitting remote operation of the power system
- intelligent backbone simultaneously carrying DC power, alarm information, and data signals
- built-in temperature compensation
- built-in charge current limiting
- EMI FCC class B or CISPR class B for systems up to 1000 A (50 kW)

Note 1: The Candeo DC power plant is considered “external” power equipment because it is not housed in Large System columns.

Note 2: The Large Candeo system generally requires one input receptacle for each rectifier, within 1.8 m (6 ft) of each rectifier. The commercial power receptacles required are determined by the number and type of rectifiers used.

Note 3: The Small Candeo system requires two 30 A feeds for each rectifier shelf, with each shelf supporting five or six rectifiers.

In a single frame configuration, a Candeo system can power a complete range of medium-sized applications.

- *Large Candeo:* Built around the shelfless Candeo Rectifier 50/48, this system operates from any voltage between 80 V AC to 300 V AC (single phase). When configured with 50 A Candeo rectifiers, the system delivers up to 500 A from a single 1.05 m (42 in.) frame and up to 1000 A from a single 2.1 m (84 in.) frame.
- *Small Candeo:* Built around the Candeo Rectifier 30/48, this system operates from any voltage between 75 V AC to 310 V AC (single phase). When configured with 30 A Candeo rectifiers, the system delivers up to 150 A from a single rectifier shelf and up to 300 A from a system equipped with a supplementary rectifier shelf. The Small Candeo system comes in 1.3 m (51 in.) and 2.1 m (84 in.) versions.

More detailed information is supplied in the following Candeo power system manuals, which are included with the system and also available on the Partner Information Center web page:

- *Candeo MP481200 Power System User Manual* (P0914425)
- *Candeo MP481200Power System Installation Guide* (P0914426)
- *Candeo SP 48300 Power System User Manual* (P7000154)
- *Candeo SP 48300 Power System Installation Manual* (P7000289)
- *Candeo SP 48300 Power System Quick Installation Guide for Meridian 1 and Avaya Communication Server 1000 Systems* (N0029343)

Large Candeo modules

The Candeo platform uses a combination of modules or building blocks to deliver custom configurations. The modules include:

1 Rectifier 50/48 Module

2 System Manager Module

3 Distribution 500 Module

Rectifier 50/48 Module

The shelfless Rectifier 50/48 provides up to 50 A (2 750 W) of –48 V DC power. Designed to operate at a nominal input voltage of 208/240 V AC, the rectifier will also operate over an input range of 80 V AC to 300 V AC (45 to 65 Hz) at reduced output power. The rectifier delivers full output power when operating in environments ranging between 0°C (32°F) and 50°C (122°F).

Rectifier features include:

- High power density — 4.3 W /in.
- High efficiency (> 92%)
- Shelfless design
- Hot insertable
- Tool-less rectifier installation
- 100% tool-less maintenance strategy
- Ultra-low total harmonic distortion (THD) < 5%
- Temperature-controlled cooling fans
- Mean time before failure (MTBF) > 250 000
- Zone 4 seismic
- Compliant with global standards (FCC part 15 class B, UL 1950, CSA 22.2#950, CE, VDE, IEC 950, and CISPR22 class B)

System Manager Module

The System Manager is the main control element of the Large Candeo system. The System Manager's local and remote system management capabilities provide total control over the power system.

System Manager Module features include:

- Automatic set-up
- Single point of adjustment
- User-friendly interface
- Rapid troubleshooting
- Real-time updates
- Extensive data reporting
- Inventory mapping
- Battery management functions: temperature compensation, discharge tests, charge control, equalize, load shedding and rectifier sequential start
- Alarm and statistical history
- Built in remote access using any web browser
- System cloning
- Integrated system management facilities through several interfaces, including RS-232 and RS-485 serial data ports and programmable dry-C contacts
- Optional modem

Distribution 500 Module

The Large Candeo's Distribution 500 module provides the DC distribution connectivity for a capacity of 500 A. The module plugs in the system anywhere when greater distribution capacity is required. The module can accommodate a wide variety of distribution elements, including single and double pole circuit breakers as well as GMTX type fuses.

Distribution Module features include:

- Wide selection of distribution elements:
  - up to twenty, 1 to 100 A single pole circuit breakers
  - or up to ten, 100 to 150 A double pole circuit breakers
  - or up to six, 50 A capacity blocks, each providing 10 positions for (0 to 10 A) GMTX fuses
  - up to 20 fuse holders
  - or any mix of the above elements
- Completely modular
- No pre-set limits to the number of distribution modules
- Tool-less additions or upgrades
- Hot-insertable
- Front access
- Fully insulated environment
- No configuration required
- Troubleshooter alarm indicators
- System capacity monitoring

Additional information is available in the following Candeo Power System manuals:

- Candeo Power System User guide (P0914425)
- Candeo Power System Installation Guide (P0914426)

Large Candeo sample configurations

Example configuration #1

- 1.05 m (42 in.) Frame with battery kit, LVD and distribution 500 (with 20 breaker positions).
- 17 mid trip breakers (30 A), one GMTX fuse block (takes up 3 breaker positions).
- System monitor.
- Up to 10 rectifiers (500 A capacity).

Example configuration #2

- 1.05 m (42 in.) Frame with battery kit, LVD and distribution 500 (with 20 breaker positions). 17 mid trip breakers (30 A), one GMTX fuse block (takes up 3 breaker positions).
- Additional distribution 500 (with 20 breaker positions). 11 mid trip breakers (30 A), three GMTX fuse blocks (takes up 3 breaker positions per block).
- System monitor.
- Up to 6 rectifiers (300 A capacity).

Example configuration #3

- 2.1 m (84 in.) Frame with battery kit, LVD and distribution 500 (with 20 breaker positions). 20 mid trip breakers (30 A).
- Second 2.1 m (84 in.) Frame with battery kit, LVD and distribution 500 (with 20 breaker positions). 11 mid trip breakers (30 A), three GMTX fuse blocks (takes up 3 breaker positions per block).
- Additional distribution 500 (with 20 breaker positions), 10 mid trip breakers (30 A).
- System monitor.
- Up to 10 rectifiers (500 A capacity) in frame one, up to 10 rectifiers (500 A capacity) in frame two.
- One interframe DC link bar kit.

Small Candeo modules

The Candeo platform uses a combination of modules or building blocks to deliver custom configurations. The modules include:

- Rectifier 30/48
- Power shelves
- System Manager SP
- Distribution 300 panel

Rectifier 30/48

The Rectifier –48 V DC, 1500 W is a switch-mode rectifier that converts the single-phase AC source at the input into an isolated, filtered, and regulated DC power output (up to 30 A) used to feed the loads and to charge a positive grounded battery. These rectifiers are of the plug-in type to facilitate their installation, maintenance, replacement, and repair. Each rectifier is equipped with a cooling fan that is field replaceable.

Designed to operate at a nominal input voltage of 110/120 or 208/240 V AC, the rectifier will also operate over an input range of 75 V AC to 310 V AC (45 to 65 Hz) at reduced output power. The rectifier delivers full output power when operating in environments ranging between –40°C (–40°F) and 55°C (131°F).

The rectifier requires no adjustments. Under normal operation, operating parameters of the rectifiers in a system, such as float voltage and boost voltage, are entirely configured and controlled by the System Manager SP.

Power shelves

The Candeo SP48300 can have either one or two power shelves. The initial power shelf provides five rectifier positions and one system manager position, while the supplementary power shelf has six rectifier positions and an optional AC interface box for front access applications. Each rectifier position provides interconnection points for the AC input, the DC output, and the control and alarm data bus (CAN protocol).

The total output capacity of the system is 300 A. The output capacity of the initial shelf is 150 A (five rectifiers delivering 30 A each). The output capacity of the supplementary shelf is 180 A (six rectifiers delivering 30 A each), but the sixth rectifier is for N+1 redundancy and kicks in only if one of the other rectifiers fails.

System Manager SP

The System Manager SP is the advanced controller available with the Candeo SP power systems. The operational features of the System Manager SP are as follows:

- graphical LCD screen
- local alarm display by means of LED indicators
- eight programmable alarm outputs (dry-C contacts), with Minor, Major, and Observation being the factory defaults for outputs 1, 2, and 3
- eight programmable alarm inputs
- several processed alarms
- alarms and events history files
- alarm management
- built-in web server
- Ethernet (LAN) and modem (RS-232) access
- four levels of access security (one hardware and four passwords)
- battery database
- temperature compensation
- voltage boost (equalize)
- battery discharge test
- charge control
- delivered DC power calculation
- CAN protocol communication with up to 30 modules
- maintenance of an inventory of the units in the system
- field replaceable without interruption of the rectifiers

- remote or local access (PSTN, GSM, EEM, TCP/IP, SNMP)
- local and remote Graphical User Interface (GUI) with multi-language compatibility

Distribution 300 panel

The Candeo SP48300 can have either one or two distribution panels. Each distribution panel can support 300 A. The panels are used to connect small and medium capacity distribution loads. They can accommodate a wide variety of distribution hardware in various configurations.

The initial distribution panel supports 18 load feeds and 8 battery feeds, together with Battery Low Voltage Detection (BLVD). The supplementary distribution panel supports an additional 26 load feeds.

Both the initial (main) and supplementary distribution panels provide local fuse and/or circuit breaker alarm indication by means of a red LED indicator.

In addition to providing protection and connecting points for the battery and battery return cables for the loads, the initial distribution panel provides:

- a connecting point for the system's main battery return reference (BRR) cable
- connecting points for the bus bar links to bridge the supplementary distribution panel, if provided
- connecting points for the bridge cables for a field-installed supplementary rectifier shelf, if provided
- connecting points for the interface with the outside world (alarms inputs and outputs, etc.)
- an LVD contactor inhibit switch

Battery enclosure for EMEA countries

For EMEA countries, if backup batteries are used, a battery enclosure is required. Individual batteries are Hawker Energy SBS 60 Valve Regulated Lead Acid (VRLA), 12 V DC nominal voltage, with a capacity of 50.8 Ah. They are available in battery modules containing four batteries each (A0669283 Battery Module). Install the modules in the N0003344 Battery

Enclosure, an enclosed shelf for use in Candeo racks. Each battery shelf can accommodate two modules, for a total of eight batteries.

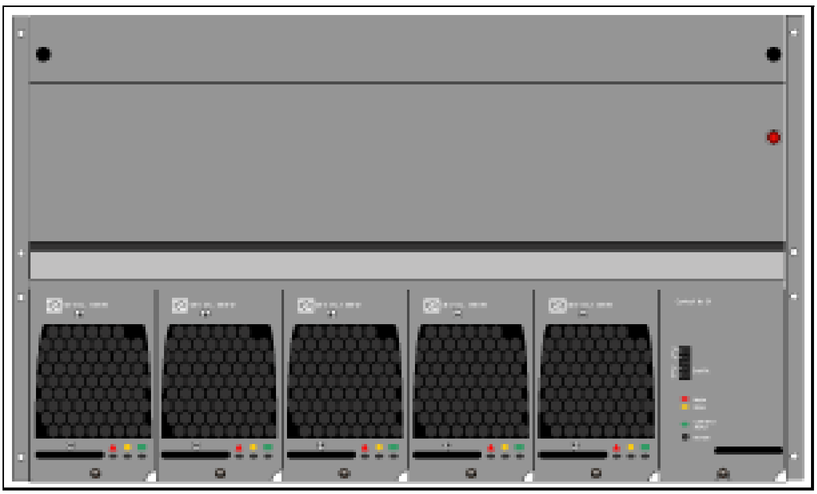
Small Candeo sample configurations

Example configuration #1

A basic 120 A system (see Figure 36 on page 108):

- initial power shelf equipped with a System Manager SP and five 1500 W rectifiers (N+1)
- initial distribution and battery connection panel with 18 plug-in positions for load protection devices and eight positions for battery protection devices

Figure 36
Basic 120 A Small Candeo configuration



Example configuration #2

A 300 A system:

- initial power shelf equipped with a System Manager SP and five 1500 W rectifiers
- supplementary power shelf equipped with six rectifiers
- initial distribution and battery connection panel with 18 plug-in positions for load protection devices and eight positions for battery protection devices

Example configuration #3

A 300 A system (see Figure 37 on page 110):

- initial power shelf equipped with a System Manager SP and five 1500 W rectifiers
- supplementary power shelf equipped with six rectifiers
- initial distribution and battery connection panel with 18 plug-in positions for load protection devices and eight positions for battery protection devices
- supplementary distribution panel with 26 plug-in positions for load protection devices

Figure 37
Small Candeo 300 A system with supplementary distribution panel

Installation reference guide

The Candeo system is easy to install. For more information about the *Candeo SP 48300 Power System AP6C55AA*, see *Candeo Power Systems Installation Manual AP6C75* (P0914426) for the Large Candeo system, or *Installation*

Manual (P7000289) for the Small Candeo system. The installation manuals cover the following topics.

Large Candeo

1 Site Preparation — Overview, tools and test equipment, precautions, and receiving materials.

2 Locating and Erecting Frames — Locating and installing the frame on various floor types and consideration for earthquake anchoring. Included also are procedures for isolating the frame for ISG (isolated system ground).

3 Cabling and Connecting — Basic rules, connecting AC to rectifiers, connecting DC cables from batteries, connecting DC loads and miscellaneous cabling. This section details all grounding for frame as well as battery return connections. Under connecting the DC load cables details on wiring and installing the load clips, fuse blocks and breakers are detailed. Miscellaneous cables details remote sensing to batteries, input ports and alarm connections, communication port connections to connect to RS-232, Ethernet or external modem.

4 Startup and Adjustment Procedures — The Candeo system comes pre configured with the Distribution 500 and Battery Connection Kit installed. In this section the rectifiers are added and the system is powered up and will go through a self test. At this point, see Chapter 5 "Configuring and Operating the Candeo Power System" in the user manual (UM6C75).

5 End of Job Routines and Turnover — This section covers end of job routines such as designating circuits, numbering frames, installing the top cover, optional doors and turn over to the customer.

Small Candeo

1 Preparation — Overview, tools and test equipment, precautions, and receiving materials.

2 Locating the system — Mounting the power system shelves in existing facilities and bridging the supplementary distribution panel, if furnished, to the initial distribution panel.

3. Cabling and connecting — Basic rules, specifications for connecting lugs, torque values for bolted lug to bus bar connections, cabling layouts, and procedures for cabling and connecting the ground leads, AC supplies for the rectifiers, DC load cables, miscellaneous cables, and final connections at the batteries.
4. Startup and adjustment procedures — Installation of the rectifiers in the power shelves and initial startup, testing, and adjustment of the power system. Candeo SP 48300 power systems make use of a microprocessor-based controller, which controls the settings for the rectifiers. There are no hardware-based adjustments for the System Manager SP, but there are other configuration steps required. Refer to chapter “Configuring and operating the system” in the user manual (P7000154).
5. End of job routines and turnover — End-of-job routines include designating frame numbers, rectifiers, and distribution circuits, and touching up damaged and/or scratched painted surfaces, then turning over the system to the customer.

Configuration reference guide

The Candeo system is easy to configure. For more information, see Candeo Power System User manual UC6C75 (P0914425) for the Large Candeo system, or *Candeo SP 48300 Power System AP6C55AA User Manual* (P7000154) for the Small Candeo system. The installation manuals cover the following topics.

Large Candeo

1. Overview of the Candeo Power System
2. System Description and Specifications
3. System Engineering
4. Configuring and Operating the Candeo Power System
5. Maintenance
6. Troubleshooting
7. Replacement Parts

8 Abbreviations and Acronyms

9 Technical Service Assistance

Small Candeo

1 Introduction – description of the system, equipment applications, and configurations

2 Specifications

3 Functional description

4 Configuring and operating the system

5 Communicating with the System Manager SP

6 Maintenance – routine maintenance, troubleshooting, replacement and addition of components

7 Recommended replacement parts

8 List of terms

9 Technical service assistance

Safety ground/protective earth and logic return wiring

To ensure electrical system grounding integrity, follow the isolated ground topology for all Meridian 1 / Succession 1000M Large System equipment implementations. Isolated ground provides the best method for avoiding the introduction of ground noise to the system from other external equipment.

When isolated ground topology is not possible, an alternative grounding method may be used if it provides the required Meridian 1 / Succession Single Point Ground (SPG) reference. The SPG source must be the AC Equipment Ground (ACEG) bus located inside the Meridian 1 / Succession service panel. Service panel grounding facilities must be properly referenced to an acceptable AC grounding source, which provides a low noise, low impedance path.

Installations that have elected not to deploy an isolated ground methodology will be noted during Avaya system audits. Locations experiencing system operational performance difficulties attributed to ground noise or improper grounding methods will be required to rectify the issue.

To eliminate potential of system problems and ensure the best grounding method possible is used, obtain the services of a certified power contractor or auditor prior to system installation or cutover.

> ***Note:*** For a more information about approved ground sources and methods, see *Communication Server 1000M and Meridian 1 Large System Planning and Engineering* (NN43021-220). You must use Insulated ground wire for system grounding.

Cabling and connecting the grounding leads

This section covers cabling and connecting the grounding leads for the Candeo power system. The Candeo's two grounding leads are:

- the frame or safety ground leads for the frames
- the battery return reference ground lead for the system

CAUTION

Follow local requirements and electrical code

The grounding methods described in this section are generic. Specific local, provincial, state or federal electrical codes and grounding requirements, as well as specific Customer or communication equipment requirements shall prevail.

CAUTION

Maintain the integrity of the frame or safety ground

The frame or safety ground shall not be confused with the reference ground lead, nor with the battery return leads. The frame or safety ground shall be wired in such a way as not to be carrying any AC or DC current at any time.

Note 1: In some equipment sites, depending on the grounding topology and the size of the building, the floor ground bar (FGB) and the building principal ground (BPG) may be the same busbar.

Note 2: In some equipment sites, depending on the grounding topology, the power plant BRR ground bar may be determined as being the SPG. Then, the BRR lead is usually run to the FGB.

Cabling and connecting the ground leads involves:

1 "Connecting the power plant frame ground (or safety ground) leads" on page 115

2 "Installing safety ground/protective earth wiring" on page 127

Connecting the power plant frame ground (or safety ground) leads

Unless specifically instructed otherwise in the specifications or by the Customer, the frame ground leads, also referred to as the safety ground leads, are usually connected using the approach described in Procedure 7 and as shown in Figure 38 on page 118 and Figure 39 on page 119.

Note 1: The frame ground collector cable is normally sized according to its length (distance between the main DC distribution cabinet and the FGB or BPG) as well as the maximum fuse or circuit breaker size that can be provided in the power plant. See Table 3 for the recommended cable size for the Candeo power system.

Note 2: The frame ground drop into the Candeo frame must be the same size as the frame ground collector. The frame ground drop into battery stands, racks or stacks is usually #6 AWG.

Table 3
Recommended cable size for the frame ground collector

Cable length	Recommended size (see notes 1 and 2 above)
0 to 6 m (0 to 20 ft)	#2 AWG
6 to 12 m (20 to 40 ft)	#0 AWG
12 to 24 m (40 to 80 ft)	#0000 AWG
24 to 50 m (80 to 160 ft)	#500 kcmil

Table 4
Torque values for bolted connections (Part 1 of 2)

Bolt size	Threads/inch	Torque (in.-lb)	Tension (lb)
#8	32 36	18 20	625 685
#10	24 32	23 32	705 940
6 mm (1/4 in.)	20 28	80 100	1840 2200
8 mm (5/16 in.)	18 20	140 150	2540 2620
9.5 mm (3/8 in.)	16 24	250 275	3740 3950

Table 4
Torque values for bolted connections (Part 2 of 2)

Bolt size	Threads/inch	Torque (in.-lb)	Tension (lb)
11 mm (7/16 in.)	14 20	400 425	5110 5120
13 mm (1/2 in.)	13 20	550 575	6110 6140
16 mm (5/8 in.) (see note)	11	920	7350
19 mm (3/4 in.) (see note)	10	1400	9300
22 mm (7/8 in.) (see note)	9	1950	11100
25 mm (1 in.) (see note)	8	2580	12900
Note: Bolt sizes 6 mm to 25 mm (5/8 in. to 1 in.) apply to Large Candeo only.			

Procedure 7
Installing and connecting the power plant frame ground leads

1 Use the appropriate two-hole lug to connect one end of a cable to the frame ground plate at the top of the frame for a top-fed system or at the bottom for a bottom-fed system, as shown in Figure 39 on page 119. Apply the appropriate torque (see Table 4 for torque values).

Note: Refer to Note 2 and Table 3 on page 116 for the recommended cable size.

If	Then
The power system shares a frame ground (FG) collector cable with other equipment	go to step 2.
The power system does not share an FG collector cable with other equipment	go to step 3.

2 Connect the other end of the cable to the FG collector with a parallel tap connector, as shown in the left side illustration of Figure 38 on page 118. Continue with step 4.

3 Connect the other end of the cable to the nearest floor ground bar (FGB), which in some sites may be the building principal ground (BPG), as shown in the right side illustration of Figure 38 on page 118.

4 Repeat step 1 for any other frames as applicable.

5 Secure the cables as required and use an identification tag with the wording “PWR PLT FG” to identify the cables at the BPG or FGB connection.

End of Procedure

Figure 38
Typical installation of the power system frame ground lead

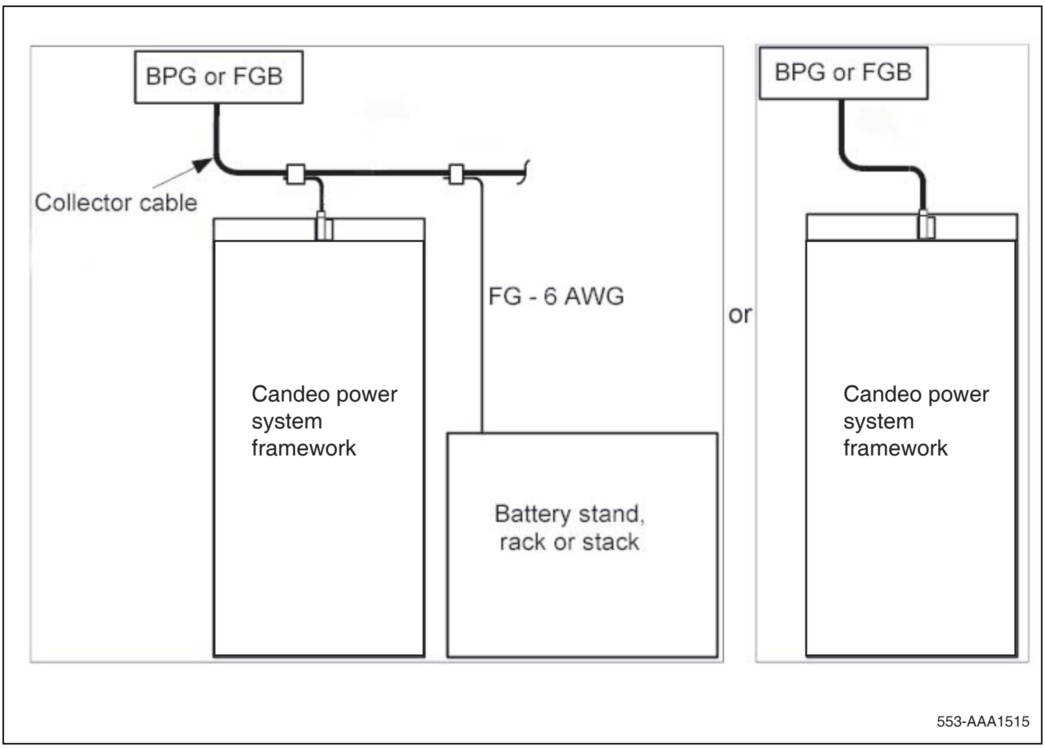


Figure 39
Connection of the frame ground lead inside the frame

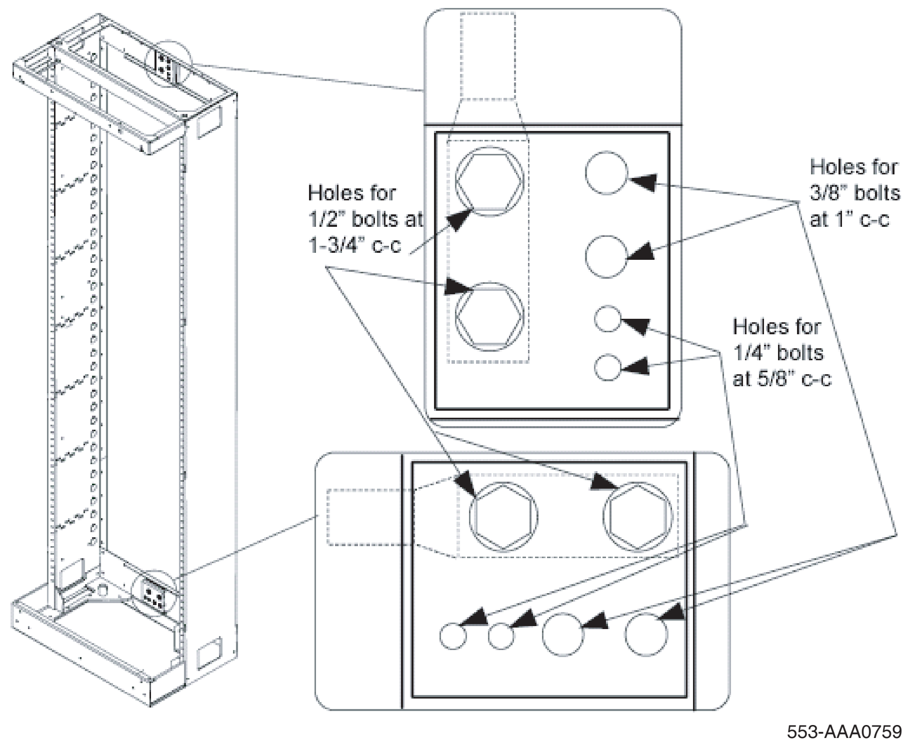
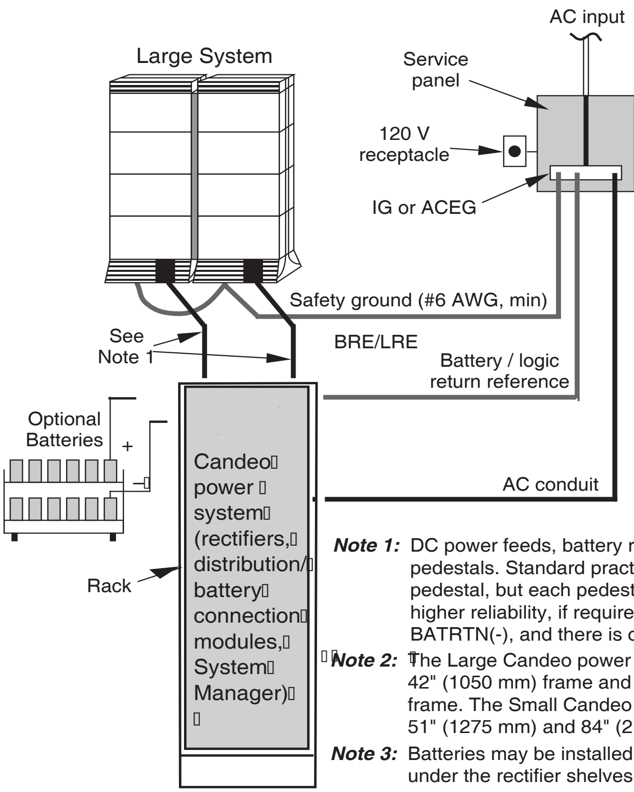


Figure 40
Ground and logic return distribution – Large and Small Candeo power systems



Note 1: DC power feeds, battery returns, and logic return for Large System pedestals. Standard practice is to provide two load feeds for each pedestal, but each pedestal can support up to four load feeds for higher reliability, if required. Each BAT(-) feed is paired with a BATRTN(-), and there is one LRTN(+) for each pedestal.

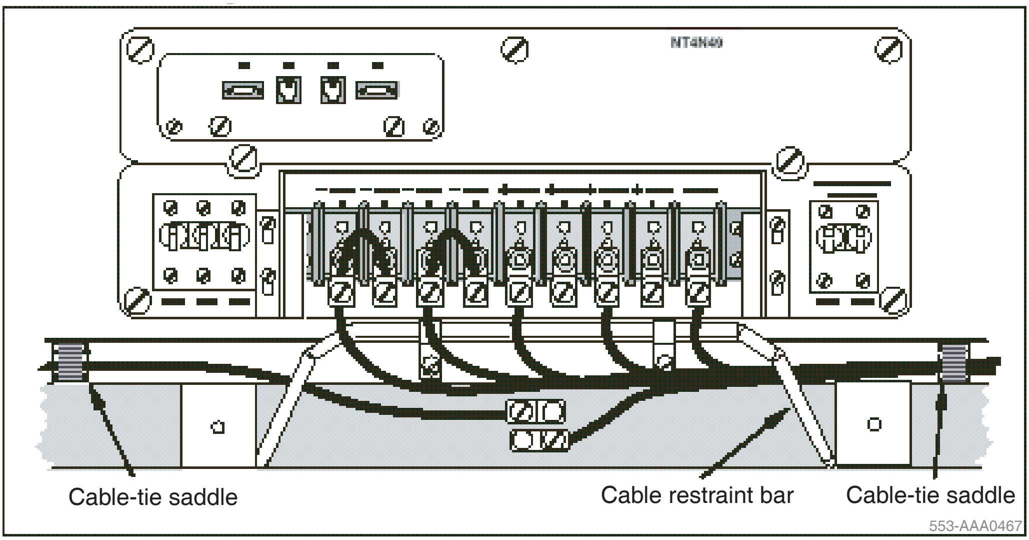
Note 2: The Large Candeo power system delivers up to 500 A from a single 42" (1050 mm) frame and up to 1000 A from a single 84" (2100 mm) frame. The Small Candeo power system, which comes in 51" (1275 mm) and 84" (2100 mm) racks, delivers up to 300 A.

Note 3: Batteries may be installed in two optional battery trays located under the rectifier shelves.

Four-Feed PDU

The Four-Feed PDU (NT4N49AA) supports independent power feeds to each of four modules in a stack if required. However, in a typical installation where independent power feeds are not required, two jumper wires are provided to jumper adjacent battery leads. When the jumper wires are used, the four-wire PDU effectively provides the same “shared” power configuration provided by the existing DC PDU. Therefore, the new PDU is backward compatible and can replace an existing PDU unit in a stack, if required.

Figure 41
Standard two-feed wiring

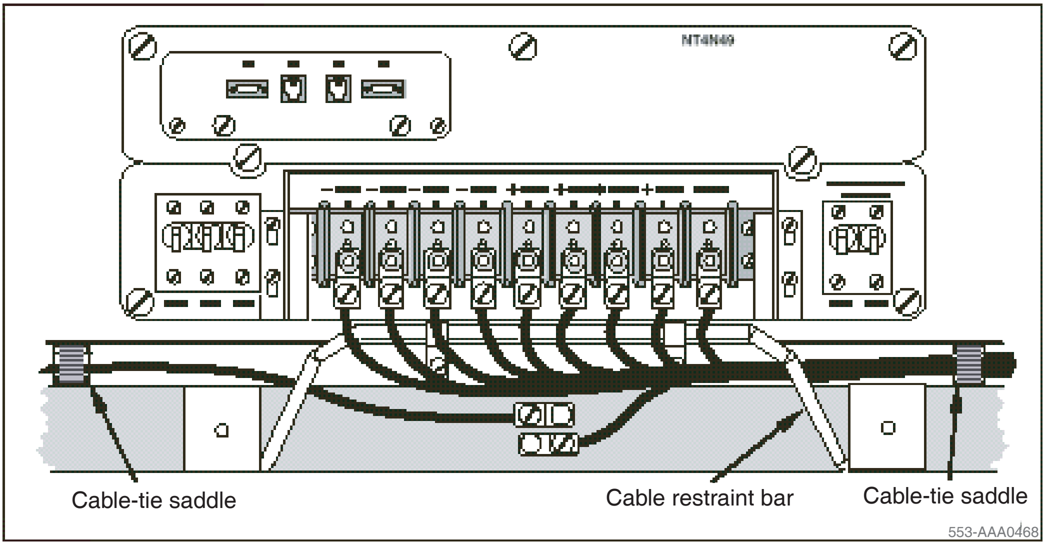


The NT4N49AA DC PDU:

- supports four input circuits, implemented through the following terminal configuration: four (negative) battery leads, four return leads, and logic return lead
- is fully backward compatible with the existing PDU it is replacing
- supports independent power feeds to each of four modules

The four breakers (one for each module) in the existing DC PDU (NT4N50AA) are rated at 18 A each. The same breakers in the four-feed PDU are rated at 28 A.

Figure 42
Optional four-feed wiring



A readily accessible disconnect device for input power is required.

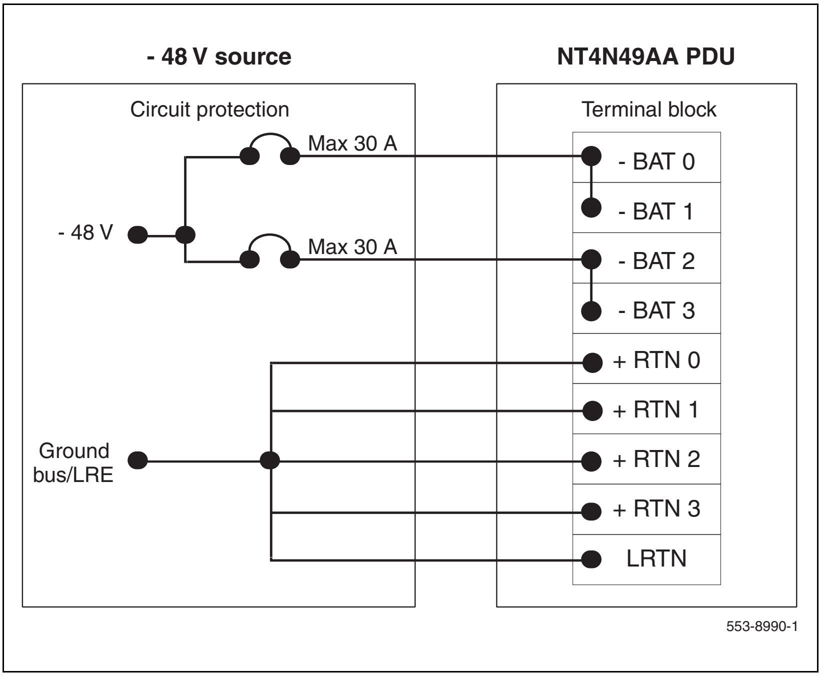
CAUTION — Service Interruption

Damage to Equipment

DC power for the NT7D09 pedestal must be provided with circuit protection of 30 A for the -BAT 0/1 and -BAT 2/3 feeds (see Figure 43 on page 123).

Circuit breakers must be located next to each other and labeled to show that both must be shut off to remove all power to the system.

Figure 43
PDU circuit protection



A maximum loop drop of 2 V is allowed between the pedestal, or junction box, and the external power equipment. See Table 5 for allowable wire sizes. For more information about calculating wire size, see *Communication Server 1000M and Meridian 1 Large System Planning and Engineering* (NN43021-220).

Table 5
Wire gauge requirements with two 30 A feeds (five wires)

Length	#8 AWG	#6 AWG	Single #4 AWG	Double #4 AWG
0 to 3 m (10 ft)	Yes	Yes	Yes	Yes
3 to 6 m (20 ft)	Yes	Yes	Yes	Yes
6 to 9 m (30 ft)	Yes	Yes	Yes	Yes
9 to 12 m (40 ft)	Yes	Yes	Yes	Yes
12 to 15 m (50 ft)	Yes	Yes	Yes	Yes
15 to 18 m (60 ft)	No	Yes	Yes	Yes
18 to 21 m (70 ft)	No	Yes	Yes	Yes
21 to 24 m (80 ft)	No	Yes	Yes	Yes
24 to 27 m (90 ft)	No	No	Yes	Yes
27 t o 30 m (100 ft)	No	No	Yes	Yes
30 to 60 m (200 ft)	No	No	No	Yes
over 60 m (200 ft)	No	No	No	No

Note 1: Two 30 A feeds are typically adequate for a column with four modules (five wires total—two 30 A feed pairs plus logic return).

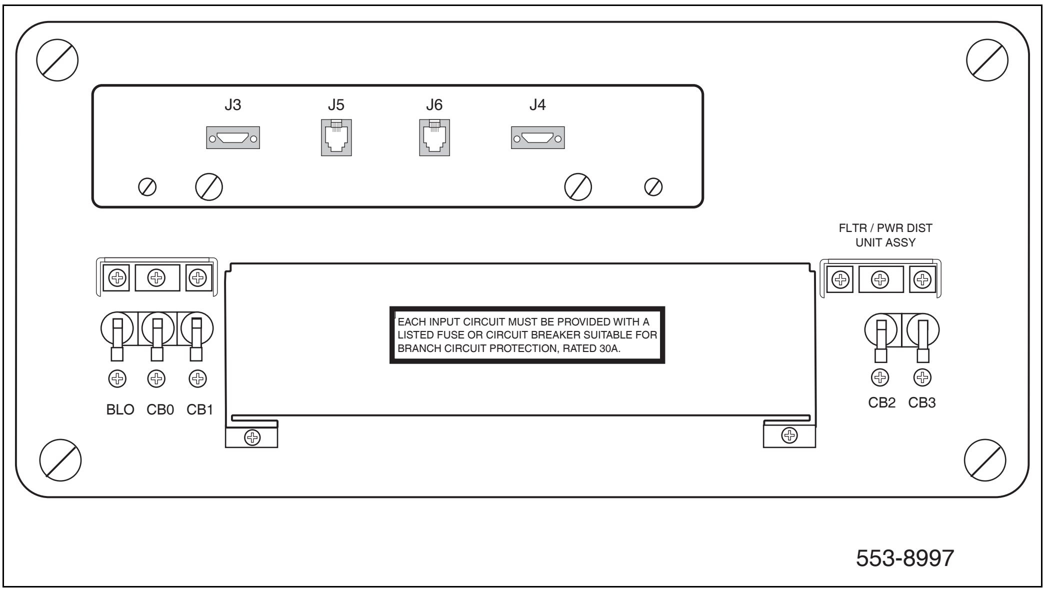
Note 2: If dual conduit is used, the wires must be run in battery/battery return pairs, with one pair in one conduit and the other pair, plus logic return, in the other conduit.

Legend:
Yes = Wire size is adequate for the distance.
No = Wire size has too high a voltage drop and is inadequate for the distance.

The following equipment is located in the rear of each pedestal (see Figure 44) in Large System columns.

- The PDU distributes power to the entire column.
- The field wiring terminal provides the connection point for wiring brought into the pedestal.
- A circuit breaker is provided for each module in the column and for the blower unit.
- All column circuit breakers will trip if a column thermal overload is detected or a DC power low-voltage condition is sensed.
- The system monitor checks the column temperature, cooling system status, and system voltage status and controls alarms and line transfer states accordingly.

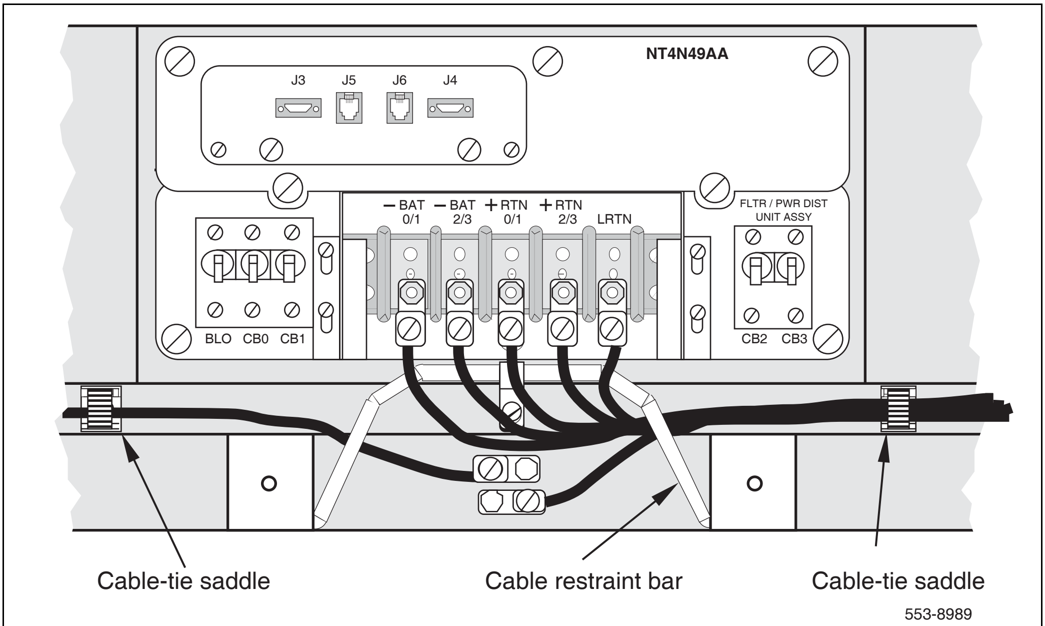
Figure 44
DC-power equipment in the rear of the pedestal – NT4N49AA PDU



With the NT4N49AA PDU, the safety ground/protective earth wires and all wiring to the terminal block in the PDU must be neatly routed within the cable-tie saddles and under the cable restraint bar at the base of the pedestal (see Figure 45 on page 126). This ensures that there is room to install the PDU cover, safety cover, and rear grill.

Conduit is not required with the NT4N49AA PDU. However, 32 mm (1 1/4 in.) or 20 mm (3/4 in.) conduit can be used if local codes or individual installations require it. Conduit can be routed down through the column from overhead racks or up through the floor. Conduit clamps and the hardware to fasten the conduit are provided in the pedestal. If the NT7D0902 Rear Mount Conduit Kit is used, conduit can enter from the rear of the column (above the floor).

Figure 45
Cable routing in the rear of the pedestal – NT4N49AA PDU



Installing the Four-Feed PDU

Installing the NT4N49AA PDU is a two-step process. It involves:

1. Installing safety ground/protective earth wiring on page 127
2. Connecting power from the power plant to the PDU on page 129

Note: For installation in the UK, see procedure “Connecting UK power to the Four-Feed PDU” on page 133.

Installing safety ground/protective earth wiring

CAUTION — Service Interruption

System Failure

Failure to follow grounding procedures can result in unsafe or faulty equipment. For more information about approved grounding sources and methods, see *Communication Server 1000M and Meridian 1 Large System Planning and Engineering* (NN43021-220).

Procedure 8
Installing safety ground/protective earth wiring

1. Remove the associated 30 A fuse or set circuit breakers to the OFF position in the power plant to disconnect each pedestal from the power source.
2. Remove the air intake grill from the rear of the pedestal.
3. At the rear of the pedestal, use a Phillips screwdriver to remove the metal cover over the terminal block to access the safety ground/protective earth lugs. Leave the cover off until all pedestal connections are made.
4. Connect the safety ground/protective earth wire.
   - **For a single-column system**, connect a #6 AWG wire from the ground source in the service panel to a ground lug on the pedestal.
   - **For a multiple-column system**, connect a #6 AWG wire from the ground source in the service panel to a ground lug on the closest column. Daisy-chain #6 AWG ground wires from one pedestal to the

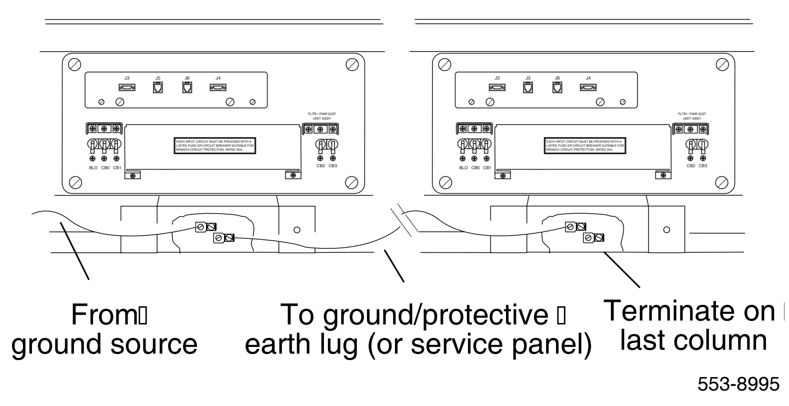
next as illustrated in Figure 46, connecting all of the columns together (or run a #6 AWG wire from the ground source to each column individually).

Note 1: Use only insulated ground wire for system grounding.

Note 2: The safety ground/protective earth wire must be routed within the cable-tie saddles and under the cable restraint bar at the base of the pedestal.

5 Place a warning tag on the connection at the ground source. The warning tag should read: "WARNING—TELEPHONE SYSTEM GROUND CONNECTION—DO NOT DISCONNECT."

Figure 46
DC column ground lug daisy-chain connection.



End of Procedure

Connecting power from the power plant to the PDU

Note 1: It is good installation practice to fully wire out a pedestal, even if only one or two columns are being installed at first. This facilitates future expansion to a four-module column. The number of wires depends on whether the requirements are for two feeds per column (standard), four feeds per column (enhanced reliability), or one feed per Common Equipment (CE) module.

Note 2: If only two modules are used in the column, set the CB2 and CB3 circuit breakers to OFF.

Procedure 9
Connecting power from the power plant to the PDU (NT4N49AA)

1 Ensure that power to the power plant is removed from the service panel.

2 Remove the air intake grill from the rear of the column pedestal being wired by removing the two screws securing the air intake grill to the pedestal.

3 Use a Phillips screwdriver to remove the PDU safety cover.

4 Remove the top cover from the power plant.

- **a.** Remove the six screws from the top of the power plant.
- **b.** Release the captive screw on the front control panel.
- **c.** Lay the control panel down and remove the top cover.

5 Route the wires between the power plant and the pedestal of the column being wired.

6 For installations that use a junction box:

- **a.** Insert the conduit from the junction box into one of the conduit access holes in the pedestal.
- **b.** Route the wires within the cable-tie saddles and under the cable restraint bar at the base of the pedestal.

c. Connect the wires to the matching connections on the terminal block on the junction box.

i. Connect the red wires to – BAT 0, – BAT 1, – BAT 2, and – BAT 3.

ii. Connect the black wires to + BATRTN 0, + BATRTN 1, + BATRTN 2, and + BATRTN 3.

iii. Connect the orange or white wire to LRTN.

7 For installations that do not use a junction box:

a. Route two red wires between the power plant and the pedestal of the column being wired.

b. Route two black wires between the power plant and the pedestal of the column being wired.

c. Route one (orange or white) wire for the logic return ground (LRTN) between the power plant and the pedestal of the column being wired.

d. Route the wires within the cable-tie saddles and under the cable restraint bar at the base of the pedestal.

8 Connect wires to the PDU.

a. Connect a red wire for each module to – BAT 0, – BAT 1, – BAT 2, and – BAT 3 on the connection block.

b. Connect a black wire for each module to + BATRTN 0, + BATRTN 1, + BATRTN 2, and + BATRTN 3 on the connection block.

c. Connect the (orange or white) wire to the LRTN terminal on the connection block.

9 Connect wires to the power plant.

a. Connect the red wires to the first two circuit breakers in the main control/distribution panel. See Figure 47 for PDU to Large Candeo DC Power Plant connections. Each new column connects the next two available circuit breakers.

Note: If only two modules are used in the column, make sure the CB2 and CB3 circuit breakers are set to OFF.

b. Connect the black wires to the ground bus/LRE.

c. Connect the orange or white wire to the ground bus/LRE.

10 Replace the metal safety cover over the terminal block on the PDU.

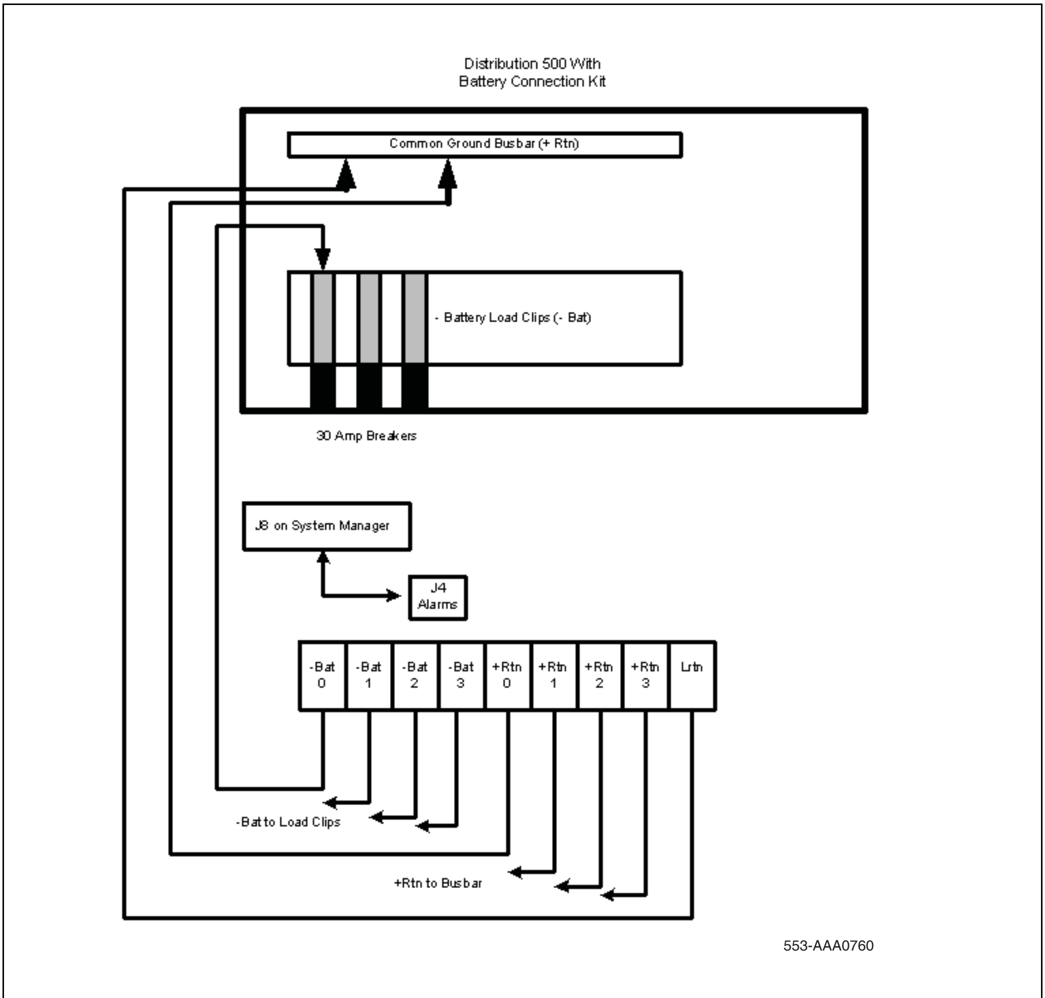
  a. Lower the front panel over the mounting screws on the PDU.

  b. Tighten the screws holding the cover.

11 Replace the power plant cover.

12 Replace the junction box cover.

Figure 47
PDU to Large Candeo connections



End of Procedure

Connecting UK power to the Four-Feed PDU

To connect the external power system to the pedestal, use the following procedure for each column (this procedure gives the connections for a four-module column).

> ***Note:*** All wiring to the PDU must be routed within the cable-tie saddles and under the cable restraint bar at the base of the pedestal.

Procedure 10
Connecting UK power to the Four-Feed PDU

1 Open the front door of the 8B/2R or 8B/4R master power cabinet.

2 If a junction box is used, insert the conduit from the junction box into one of the conduit access holes in the pedestal.

Connect the wires from the junction box to the matching connections on the terminal block on the PDU.

- **a.** Connect the red wires – BAT 0, – BAT 1, – BAT 2, and – BAT 3.
- **b.** Connect the black wires + BATRTN 0, + BATRTN 1, + BATRTN 2, and + BATRTN 3.
- **c.** Connect the remaining LRTN wire (orange or white wire).

Note: If a junction box is used, the connections described in Steps 2 through 4 apply to the junction box rather than the pedestal.

3 Connect the red BAT (–48 V) wires.

- **a.** At the 8B/2R or 8B/4R master power cabinet, connect wires to the terminals on the –ve distribution rail (see Figure 47 on page 132).
- **b.** At the PDU, connect the wires to the terminal block.
  - **i.** Connect module 0 to – BAT 0.
  - **ii.** Connect module 1 to – BAT 1.
  - **iii.** Connect module 2 to – BAT 2.
  - **iv.** Connect module 3 to – BAT 3.

4 Connect the black BATRTN (+48 V) wires.

a. At the 8B/2R or 8B/4R master power cabinet, connect wires to the +ve bus.

b. At the PDU, connect the wires to the terminal block:

i. Connect modules 0 to + BATRTN 0.

ii. Connect modules 1 to + BATRTN 1.

iii. Connect modules 2 to + BATRTN 2.

iv. Connect modules 3 to + BATRTN 3.

5 Connect an orange #8 AWG (10 mm^2) LRTN wire from the logic return equalizer (LRE) in the rear of the master power cabinet to LRTN on terminal block TB1 in the pedestal. (See Figure 47 on page 132.)

6 Reinstall the metal safety cover over the terminal block.

a. Lower the front panel over the mounting screws on the PDU.

b. Tighten the screws holding the cover.

7 Close the covers on the 8B/2R or 8B/4R master power cabinet.

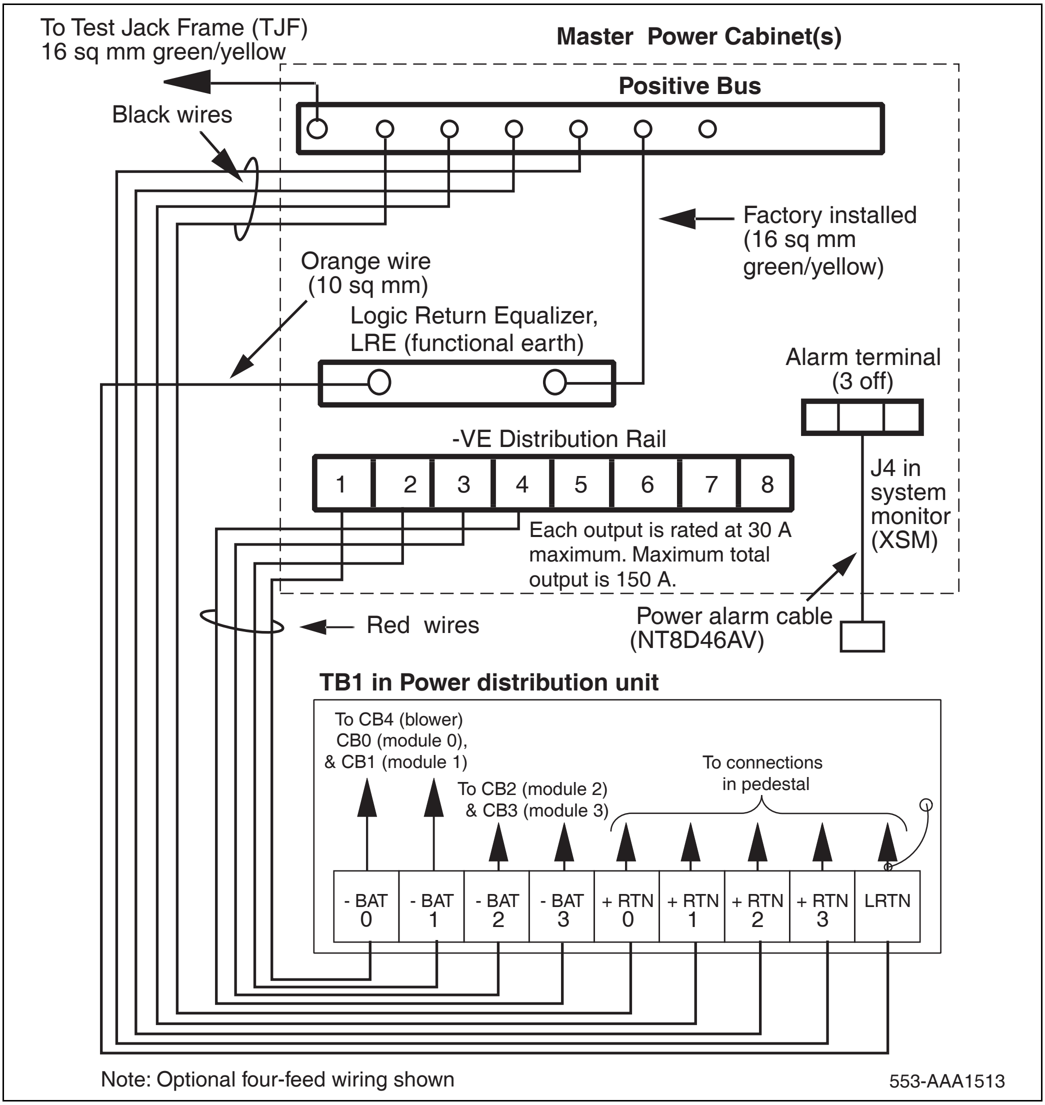
End of Procedure

System monitor connections

When connecting to an 8B/2R or 8B/4R master power cabinet, one NT8D46AV cable is required to extend the alarm terminal to the master system monitor in the pedestal. See Figure 47 on page 132.

The orange-colored wire on NT8D46AV marked “ALARM” extends from any of three alarm terminals on the top of the power cabinet to connector marked J4 in the system monitor. The remaining “Trip” and “DC ON” wires on the NT8D46AV cable are not used and should be snipped before installing the cable.

Figure 48
UEM to 8B/2R or 8B/4R master power cabinet connections



Planning and designating a Main Distribution Frame

Contents

This chapter contains information about the following topics:

About terminations

All Large System terminations are cross-connected on frame-mounted or wall-mounted modules and connecting blocks. The layout of the blocks can vary to meet the requirements of the site.

DANGER OF ELECTRIC SHOCK

Tip, ring, A, B, E, M, ESC, and ESCG connections can be considered to be Telecommunication Network Voltages (TNV).

Installation and designation

Use the manufacturer's documentation for recommendations and detailed procedures on installing and labelling the cross-connect blocks.

This chapter describes how to install and connect an Avaya Communication Server 1000M system using the BIX or Krone Test Jack Frame (UK) cross-connect terminals.

> ***Note:*** The examples shown here are BIX and Krone cross-connect systems. These items are commercially available, but are not supplied by Avaya.

This chapter contains the following procedures:

- Procedure 11: "Installing the BIX cross-connect terminal" on page 139.
- Procedure 12: "Installing the Krone Test Jack Frame (UK)" on page 142.

Terminal block requirements

The cross-connect terminal requires enough connecting blocks to terminate:

- up to 16 25-pair cables for each IPE shelf
- up to four 25-pair cables for each Media Gateway and Media Gateway Expander
- four conductors for the AUX cable from the Media Gateway
- one 25-pair cable from each PFTU
- wiring from telephones and trunks.

DANGER
Always use caution when installing or modifying telephone lines. Do not install telephone wiring during a lightning storm. Never touch uninsulated telephone wiring, unless the line is disconnected at the network interface.

Installing the BIX cross-connect terminal

Procedure 11 describes how to install the BIX cross-connect terminal.

Procedure 11
Installing the BIX cross-connect terminal

1 Refer to the equipment layout plan to determine where to place the cross-connect terminal.

2 Lay out the terminal blocks as shown in Figure 51 on page 141.

3 Attach labels on the cross-connect terminal to indicate the terminal blocks assigned to the following:

- 25-pair cables from the system
- AUX wiring
- Power Failure Transfer Units (PFTU)
- Telephones and consoles
- Trunks
- Miscellaneous equipment

End of Procedure

Figure 49
Typical BIX cross-connect terminal layout

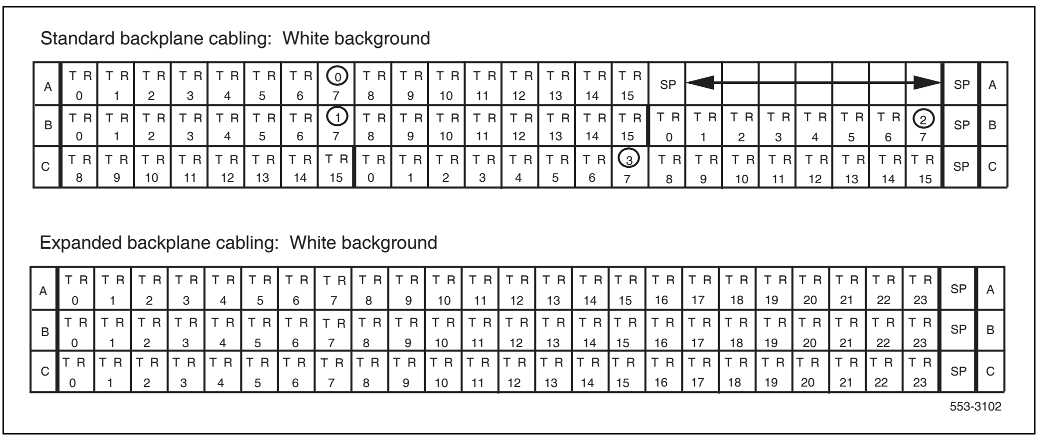


Figure 50
BIX module

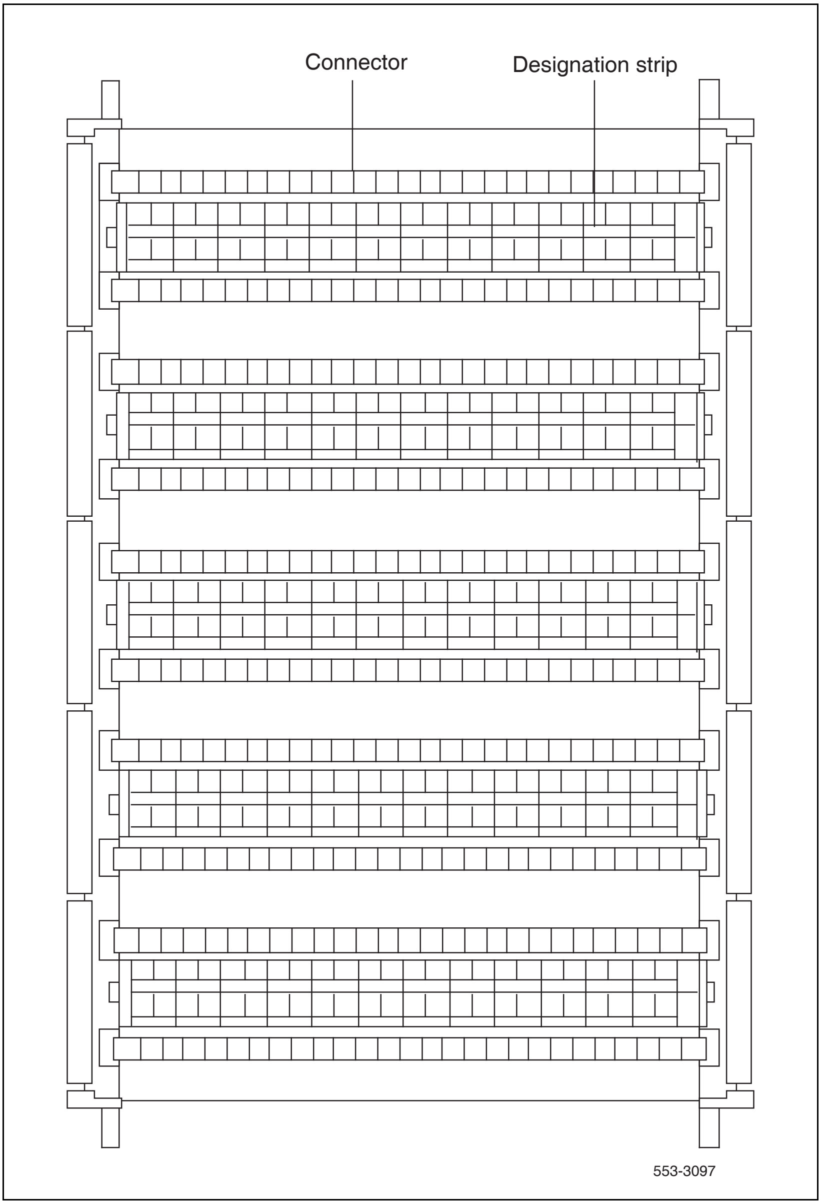


Figure 51
Recommended layout for NT8D37 IPE Modules

Cable terminations for one NT8D37 IPE Module

From I/O panel	Cable A
	Cable B
	Cable C
	Cable D (Note)
	Cable E
	Cable F
	Cable G
	Cable H (Note)
	Cable K
	Cable L
	Cable M
	Cable N (Note)
	Cable R
	Cable S
	Cable T
	Cable U (Note)
	Spare
	Spare
	Spare
	Spare

Note: In NT8D37DC IPE Modules, these slots are not used. They *are* used in NT8D37EC IPE Modules.

553-3099

Installing the Krone cross-connect system (UK)

In the Krone cross-connect system, one terminating strip holds ten pairs of cable. When cross-connecting a 25-pair cable on this system, eight of the ten terminating points are used on each strip. One 25-pair cable, therefore, occupies three terminating strips:

8 pairs per strip by 3 strips = 24 pairs

Card allocations

Figures 52 and 53 provide module card allocations for the Krone cross-connect system.

Procedure 12 describes how to install the Krone Test Jack Frame for the UK.

Procedure 12
Installing the Krone Test Jack Frame (UK)

1 Refer to the equipment layout plan to determine where to place the cross-connect terminal.

2 Lay out the terminal blocks.

3 Attach labels on the cross-connect terminal to indicate the terminal blocks assigned to the following:

- Analog line cards
- DC15/AC15/RAN/PAG cards
- Data Access cards
- AUX wiring
- Power Failure Transfer Units
- Digital line cards
- Telephones
- Exchange line trunk cards
- Direct Dialing Inward trunk cards
- Miscellaneous equipment

End of Procedure

Figure 52
IPE module card allocation – Krone cross-connect system

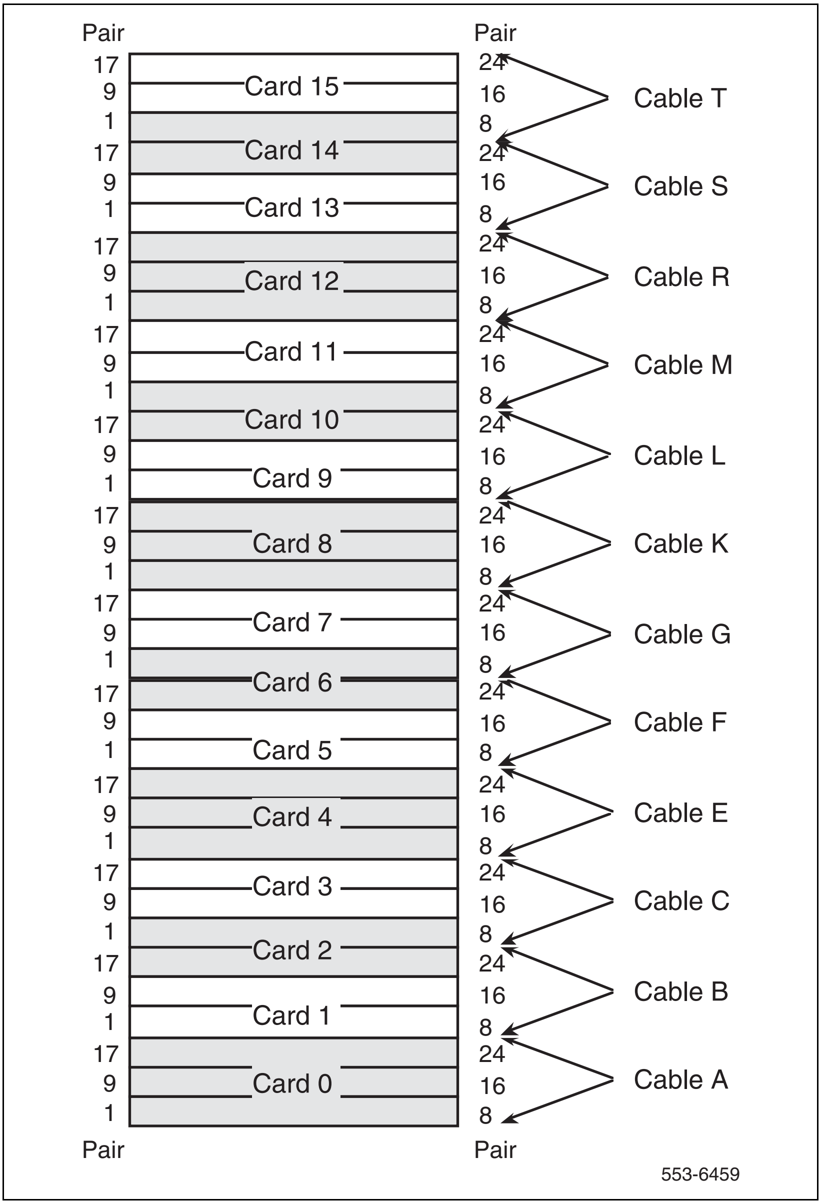
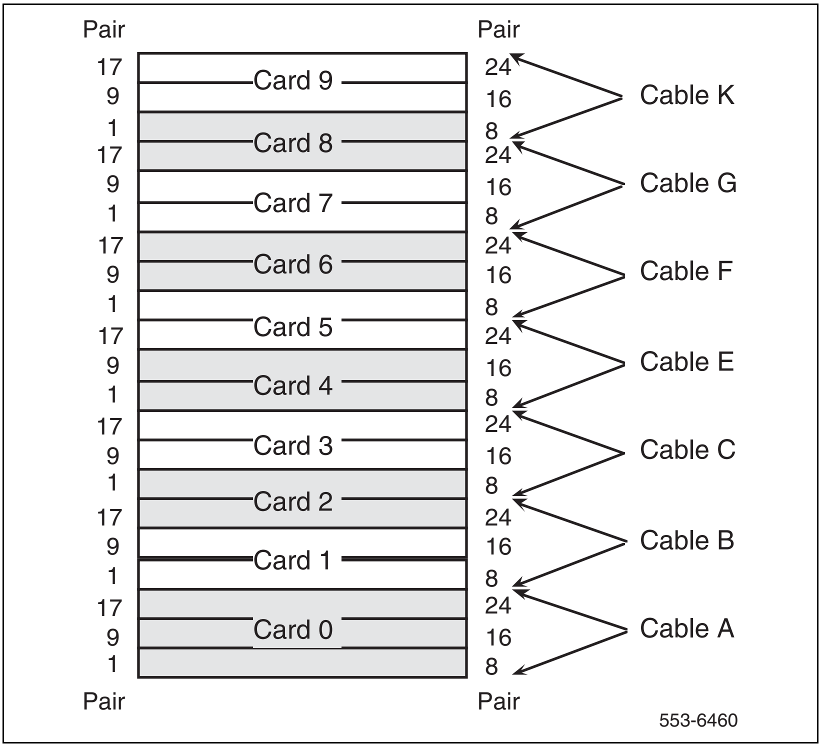


Figure 53
CE/PE module card allocation – Krone cross-connect system



Labels

Terminating strips on the Krone cross-connect must be labeled if they contain wiring. The labels that attach to the terminating strips have two sides: the front side shows the card name and card number, and the reverse side (flip-up side) shows pair designations for that card.

There are two types of mandatory labels: those with safety warnings and those without. Mandatory labels with safety warnings are required for the following cards:

- NT5K02 analog line card
- NT5K19 analog tie trunk card
- QUA6 Power Failure Transfer Unit (PFTU)

Labels are mandatory for the following cards but they do not need safety warnings:

- NT5K18 Exchange line card
- NT5K17 Direct Dial Inwards (DDI) card

Figure 54 through to Figure 60 show labels for the Krone cross-connect system.

Figure 54
Label for Analog Line Card

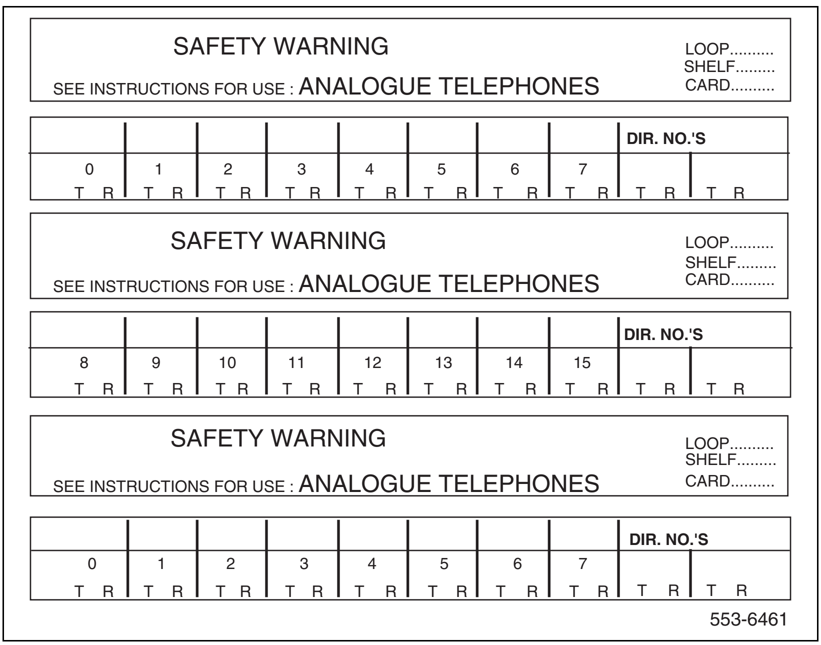


Figure 55
Label for Analog Tie Trunk Card

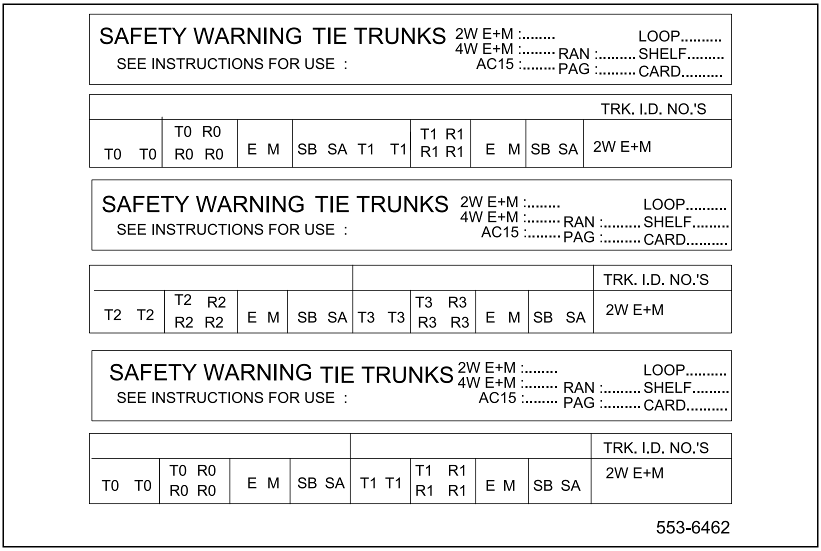


Figure 56
Label for Data Access Line Card (NT7D16)

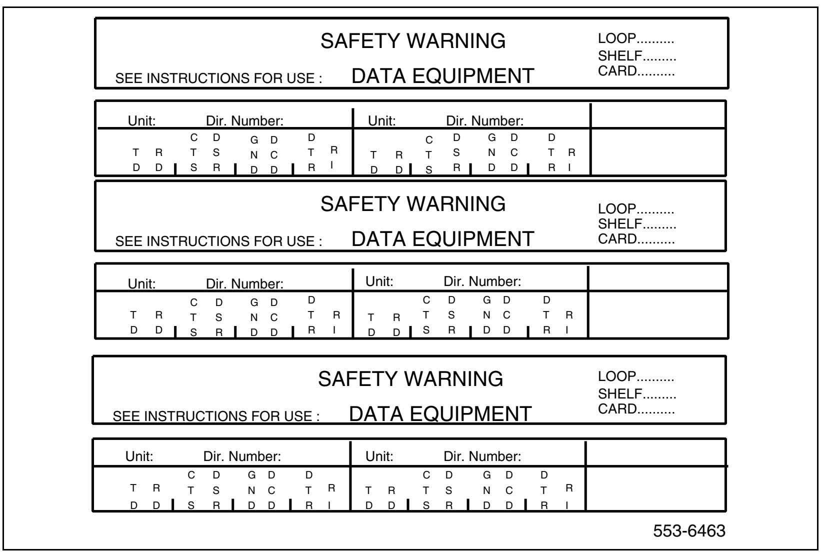


Figure 57
Label for Power Failure Transfer Unit

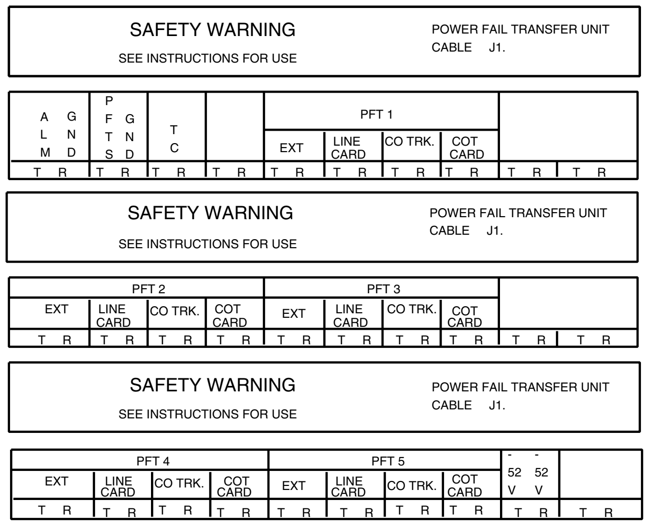


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Figure 58
Label for Digital Line Card (NT8D02)

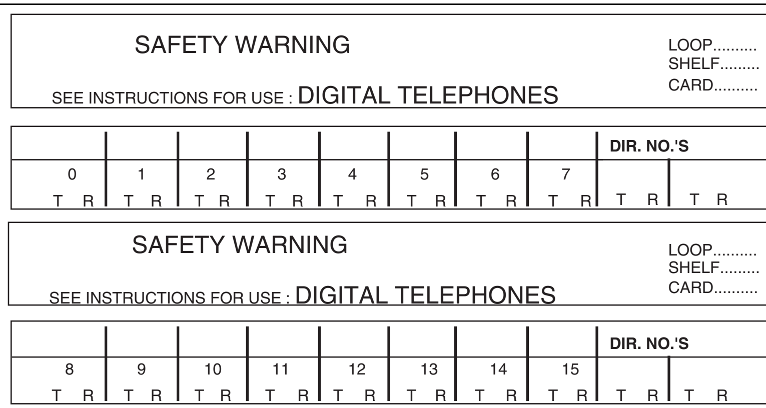

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Figure 59
Label for Exchange Line Trunk Card (NT5K18)

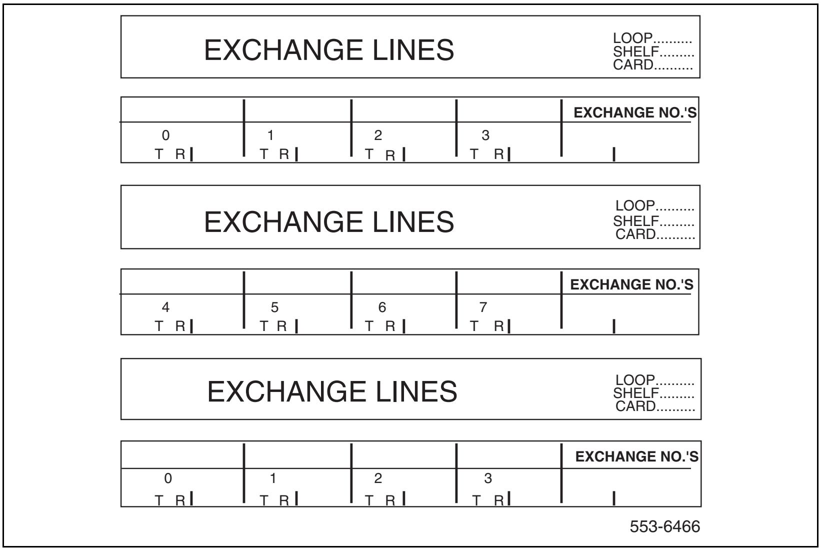
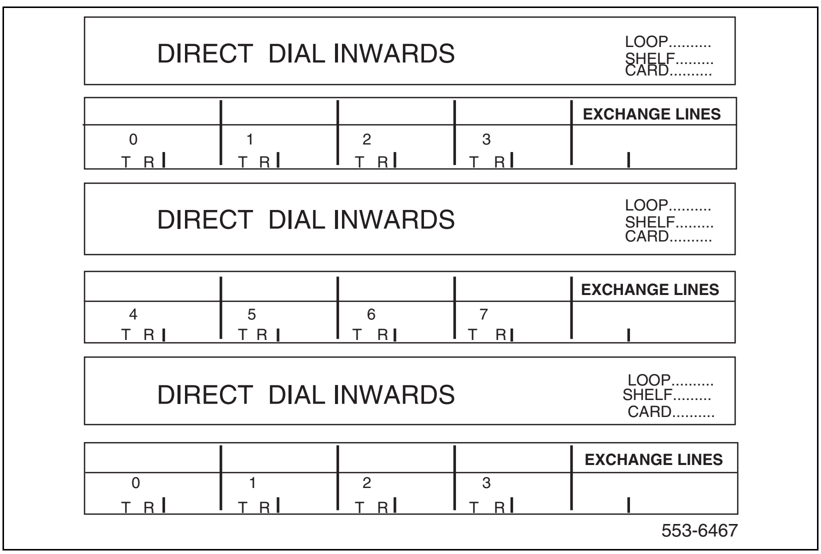


Figure 60
Label for Direct Dial Inward Trunk Card (NT5K17)



Installing Power Failure Transfer Units

Contents

This chapter contains information about the following topics:

PFTU configurations

In AC-powered systems, Power Fail Transfer Units (PFTU) are powered by the A0367916 Auxiliary –48 V Power Supply (up to six PFTUs can be supported by one power supply). In DC-powered systems, PFTUs are powered from an auxiliary –48 V DC fused output from the external power equipment.

Figure 61 shows a high-level view of PFTU alarm connections. For PFTU operation, the wiring from the following equipment cross-connects through termination areas at the MDF:

1 PFTU

2 Auxiliary power supply

3 System monitor

4 Attendant console (optional)

5 Designated telephones (DTMF or rotary dial types)

6 Central office trunks

Figure 61
MDF terminations for typical PFTU operation

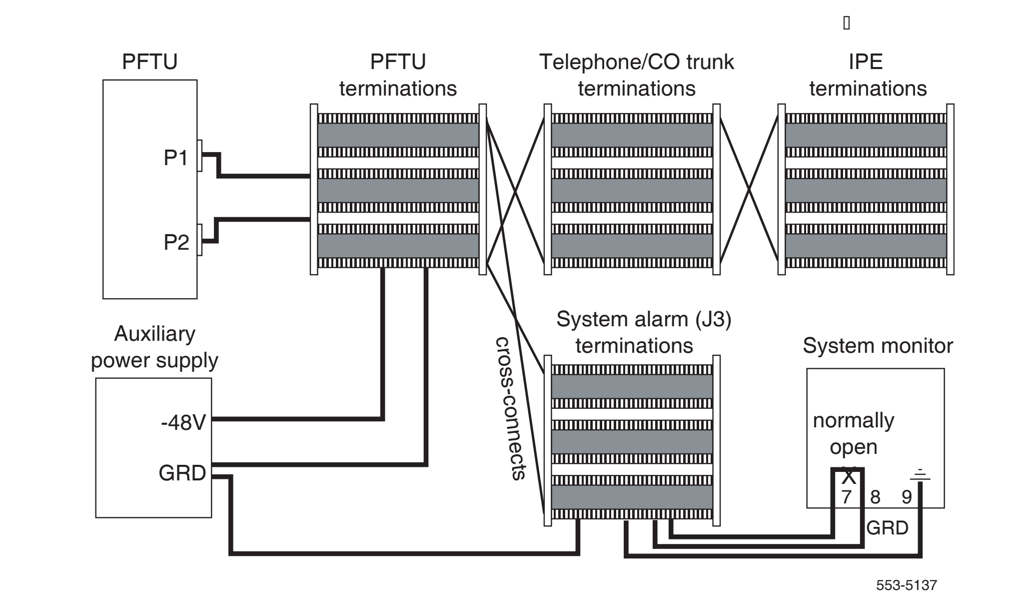
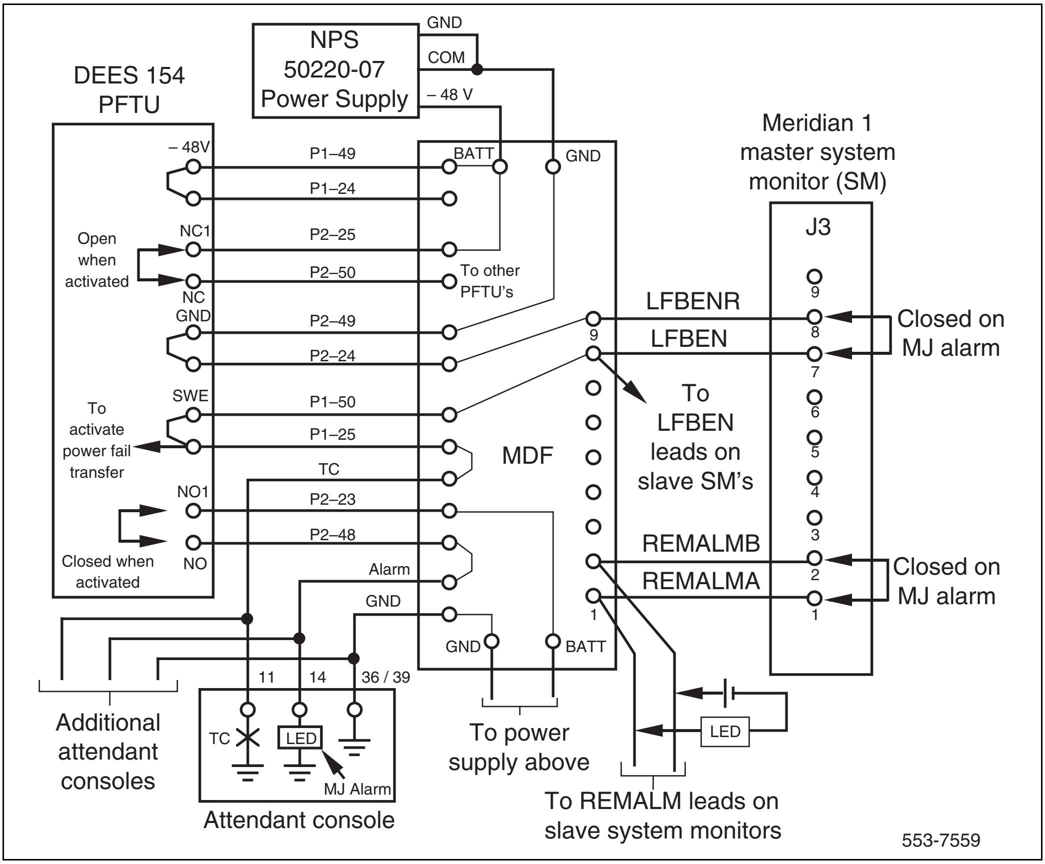


Figure 62 on page 151 shows detail view of the PFTU alarm connections. The PFTU can be activated by system power failure and using the Attendant console TC switch. If more than one Attendant console is connected to the system, it must be connected in parallel with the main Attendant console as shown in the figure.

Figure 62
Typical PFTU connection to the MDF and the Master System Monitor



Installing a PFTU

Use the following procedure and any instructions provided with the Power Failure Transfer Unit (PFTU) to install and connect PFTUs.

Procedure 13
Installing a PFTU

1. Install a PFTU according to the manufacturer's instructions.
2. Attach the yellow PFTU label to the designation strip, indicating the top connector as P1 and the bottom connector as P2.
3. Install two NE-A25B type 25-pair cables from connectors P1 and P2 on the front of the PFTU to the PFTU termination area at the MDF.
4. Cross-connect wiring for PFTU operation as shown in Table 6.

Table 6
MDF cross-connections for PFTU operations

Description	Connection
–48 V DC + return (GND)	PFTU connector P1, pin 49 PFTU connector P2, pin 49 and MDF GND
All grounds on system monitor cable	MDF GND
Console cable pin 11 Console cable pin 36	PFTU connector P1, pin 25 MDF GND
LFBEN (line forced bypass enable) LFBENR (line forced bypass enable return)	PFTU connector P1, pin 50 MDF GND
MDF GND	PFTU connector P2, pin 24

Note: At connector P1 on the PFTU, pins 25 and 50 are labeled SWE for "switch enable." When pin 25 is grounded by the attendant console or pin 50 is grounded by the system monitor, line transfer is activated.

5. For AC-powered systems, install the A0367916 auxiliary power supply.
   - **a.** Attach the unit to the wall using screws in the four mounting holes.
   - **b.** Connect a #24 (or larger) AWG wire from the –48 V connection on the auxiliary power supply to the PFTU termination area on the MDF.

c. Connect a #24 (or larger) AWG wire from the ground (GND) connection on the auxiliary power supply to the PFTU termination area on the MDF.

d. Connect a second #24 (or larger) AWG wire from the GND connection on the auxiliary power supply to the Large System alarm termination area on the MDF.

e. Plug in the A0367916 auxiliary power supply.

— If a UPS is used, you must plug the power supply into an auxiliary output on the UPS.

— Without a UPS, plug the power supply into an outlet in the equipment room.

6 For DC-powered systems, power the PFTU from the fused low-current auxiliary power outputs on the DC power system. One 1.33 A fuse supports up to six PFTUs.

End of Procedure

Connecting trunks and telephones

The "ground start" feature on 500/2500-type telephones connected to CO trunks requiring a ground start condition is not required. Automatic ground start is performed by the PFTU. However, rotary dials (dial pulse) are required on telephones assigned to trunks that are not equipped to recognize tone pulses (touch tone).

See the PFTU documentation for MDF cable terminations for telephones and trunks associated with the PFTU. If the connections are not designated on the connecting blocks, mark the blocks as shown in the documentation or install the appropriate designation strips.

Procedure 14
Connecting trunks and telephones

1 For each telephone assigned to the PFTU.

- Connect the tip and ring of the line card to the first pair of the assigned PFTU.
- Connect the tip and ring of the telephone to the second pair of the assigned PFTU.

2 For each trunk assigned to the PFTU.

- Connect the tip and ring of the CO card to the third pair of the assigned PFTU.
- Connect the tip and ring of the trunk to the fourth pair of the assigned PFTU.

End of Procedure

Installing QUA6 PFTUs

QUA6 PFTUs are used for Large System installations. The QUA6 PFTU is powered from an auxiliary –48 V DC fused output from the external power equipment.

Figure 61 on page 150 shows a high-level view of QUA6 PFTU alarm connections. For PFTU operation, the wiring from the following equipment cross-connects through termination areas at the MDF:

1 PFTU

2 Auxiliary –48 V DC

3 System monitor

4 Attendant console (optional)

5 Designated telephones

6 Central Office trunks

Configuring the system monitor

Contents

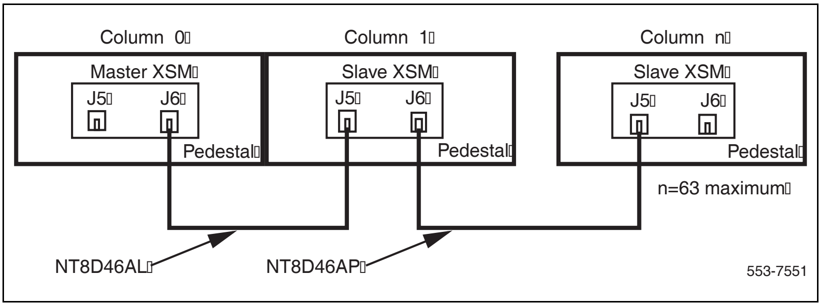
This chapter contains information about the following topics:

System monitor cabling

Multi-column systems

Cabling between system monitors in a multi-column system requires the use of a single cable. The cabling is done in a daisy-chain fashion with the master system monitor at the beginning of the chain. The address of each slave system monitor must be unique and there cannot be any gaps in the slave numbering. Figure 63 shows a typical cabling scheme between columns.

Figure 63
System monitor to system monitor serial link cabling



Power failure transfer control

The system monitor can be cabled to the MDF to provide power failure transfer control or additional alarms. The cable used is the NT8D46BH, EH, or DH and it is plugged into J3 on the system monitor. With the same J3 connector, the system monitor can be used with a variety of cables.

AC power control

The system monitor can also monitor and control an AC-powered UPS. Connector J4 is used for this interface. Three cables are available for connecting to a UPS: NT8D46AQ, NT8D46AJ, and NT8D46AU.

DC power observation

The system monitor can also work with DC power supplies. A J4 connector monitors the rectifiers. Cable requirements depend on the battery distribution box in use. With the Candeo power system, a NT8D46xx cable interfaces from the connector **J4** of the Large System's system monitor to the Candeo's System Manager alarm output ports. See "Alarm interfacing to Candeo" on page 169 for additional information.

Configuring the System Monitor

The master System Monitor (NT8D22) interfaces with a Serial Data Interface (SDI) port in the column with CPU 0.

Procedure 15
Configuring the System Monitor (NT8D22)

1 Set the baud rate for the SDI port associated with the system monitor to 1200 baud in DTE mode.

2 In the rear of the pedestal, loosen the two retaining screws on the system monitor and remove it from the PDU.

3 Configure the option switches for each system monitor. For more information about switch setting options, see *Circuit Card Reference* (NN43001-311).

a. **For a single-column system**, configure the switches as shown in Table 7.

Note: Connect and cable the system monitor in a single-column system like a master system monitor for the rest of this procedure.

Table 7
NT8D22 switch settings for a single-column system

Switch	1	2	3	4	5	6	7	8
SW1	off	off	*	on**	off	off	off	off
SW2	on	Always off	on	on	on	on	on	on
SW3	on	on	on	on				
*	Set to on for a DC-powered system; set to off for an AC-powered system.							
**	Set to off if the system is not equipped with a PFTU.							

b. **For a multiple-column system**, configure the system monitor in the column with CPU 0 as the master, using the settings shown in Table 8 and Table 10 on page 158.

c. Configure option switches on slave system monitors as shown in Table 9 on page 158 and Table 11 on page 160. If CPU 0 and CPU 1 are in different columns, configure the system monitor in the column with CPU 1 as slave unit 1. Number the slaves sequentially wherever possible.

Table 8
Switch settings for *master* in multiple-column system

Switch	1	2	3	4	5	6	7	8
SW1	off	off	*	on**	off	off	off	off
SW2	on	off	To configure positions 3–8, see Table 10					
SW3	on	on	on	on				
*	Set to on for a DC-powered system; set to off for an AC-powered system.							
**	Set to off if the system is not equipped with a PFTU.							

Table 9
Switch settings for *slaves* in multiple-column system

Switch	1	2	3	4	5	6	7	8
SW1	off	off	*	**	off	off	off	off
SW2	off	off	To configure positions 3–8, see Table 11 on page 160					
SW3	off	off	off	off				
*	Set to on for a DC-powered system; set to off for an AC-powered system.							
**	Set to on to enable PFTU (if equipped) during over-temperature condition. Set to off to disable PFTU during over-temperature condition.							

Table 10
SW2 on *master*—total number of slaves in the system (Part 1 of 2)

How many slave units	Switch position						How many slave units	Switch position					
	3	4	5	6	7	8		3	4	5	6	7	8
0	on	on	on	on	on	on	32	off	on	on	on	on	on
1	on	on	on	on	on	off	33	off	on	on	on	on	off
2	on	on	on	on	off	on	34	off	on	on	on	off	on
3	on	on	on	on	off	off	35	off	on	on	on	off	off

Table 10
SW2 on *master*—total number of slaves in the system (Part 2 of 2)

How many slave units	Switch position						How many slave units	Switch position					
	3	4	5	6	7	8		3	4	5	6	7	8
4	on	on	on	off	on	on	36	off	on	on	off	on	on
5	on	on	on	off	on	off	37	off	on	on	off	on	off
6	on	on	on	off	off	on	38	off	on	on	off	off	on
7	on	on	on	off	off	off	39	off	on	on	off	off	off
8	on	on	off	on	on	on	40	off	on	off	on	on	on
9	on	on	off	on	on	off	41	off	on	off	on	on	off
10	on	on	off	on	off	on	42	off	on	off	on	off	on
11	on	on	off	on	off	off	43	off	on	off	on	off	off
12	on	on	off	off	on	on	44	off	on	off	off	on	on
13	on	on	off	off	on	off	45	off	on	off	off	on	off
14	on	on	off	off	off	on	46	off	on	off	off	off	on
15	on	on	off	off	off	off	47	off	on	off	off	off	off
16	on	off	on	on	on	on	48	off	off	on	on	on	on
17	on	off	on	on	on	off	49	off	off	on	on	on	off
18	on	off	on	on	off	on	50	off	off	on	on	off	on
19	on	off	on	on	off	off	51	off	off	on	on	off	off
20	on	off	on	off	on	on	52	off	off	on	off	on	on
21	on	off	on	off	on	off	53	off	off	on	off	on	off
22	on	off	on	off	off	on	54	off	off	on	off	off	on
23	on	off	on	off	off	off	55	off	off	on	off	off	off
24	on	off	off	on	on	on	56	off	off	off	on	on	on
25	on	off	off	on	on	off	57	off	off	off	on	on	off
26	on	off	off	on	off	on	58	off	off	off	on	off	on
27	on	off	off	on	off	off	59	off	off	off	on	off	off
28	on	off	off	off	on	on	60	off	off	off	off	on	on
29	on	off	off	off	on	off	61	off	off	off	off	on	off
30	on	off	off	off	off	on	62	off	off	off	off	off	on
31	on	off	off	off	off	off	63	off	off	off	off	off	off

Table 11
SW2 on *slaves*—total unit number for the slaves (Part 1 of 2)

Slave unit address	Switch position						Slave unit address	Switch position					
	3	4	5	6	7	8		3	4	5	6	7	8
**							32	off	on	on	on	on	on
1	on	on	on	on	on	off	33	off	on	on	on	on	off
2	on	on	on	on	off	on	34	off	on	on	on	off	on
3	on	on	on	on	off	off	35	off	on	on	on	off	off
4	on	on	on	off	on	on	36	off	on	on	off	on	on
5	on	on	on	off	on	off	37	off	on	on	off	on	off
6	on	on	on	off	off	on	38	off	on	on	off	off	on
7	on	on	on	off	off	off	39	off	on	on	off	off	off
8	on	on	off	on	on	on	40	off	on	off	on	on	on
9	on	on	off	on	on	off	41	off	on	off	on	on	off
10	on	on	off	on	off	on	42	off	on	off	on	off	on
11	on	on	off	on	off	off	43	off	on	off	on	off	off
12	on	on	off	off	on	on	44	off	on	off	off	on	on
13	on	on	off	off	on	off	45	off	on	off	off	on	off
14	on	on	off	off	off	on	46	off	on	off	off	off	on
15	on	on	off	off	off	off	47	off	on	off	off	off	off
16	on	off	on	on	on	on	48	off	off	on	on	on	on
17	on	off	on	on	on	off	49	off	off	on	on	on	off
18	on	off	on	on	off	on	50	off	off	on	on	off	on
19	on	off	on	on	off	off	51	off	off	on	on	off	off
20	on	off	on	off	on	on	52	off	off	on	off	on	on
21	on	off	on	off	on	off	53	off	off	on	off	on	off
22	on	off	on	off	off	on	54	off	off	on	off	off	on
23	on	off	on	off	off	off	55	off	off	on	off	off	off
24	on	off	off	on	on	on	56	off	off	off	on	on	on
25	on	off	off	on	on	off	57	off	off	off	on	on	off
26	on	off	off	on	off	on	58	off	off	off	on	off	on
27	on	off	off	on	off	off	59	off	off	off	on	off	off
28	on	off	off	off	on	on	60	off	off	off	off	on	on
29	on	off	off	off	on	off	61	off	off	off	off	on	off
30	on	off	off	off	off	on	62	off	off	off	off	off	on

Table 11
SW2 on *slaves*—total unit number for the slaves (Part 2 of 2)

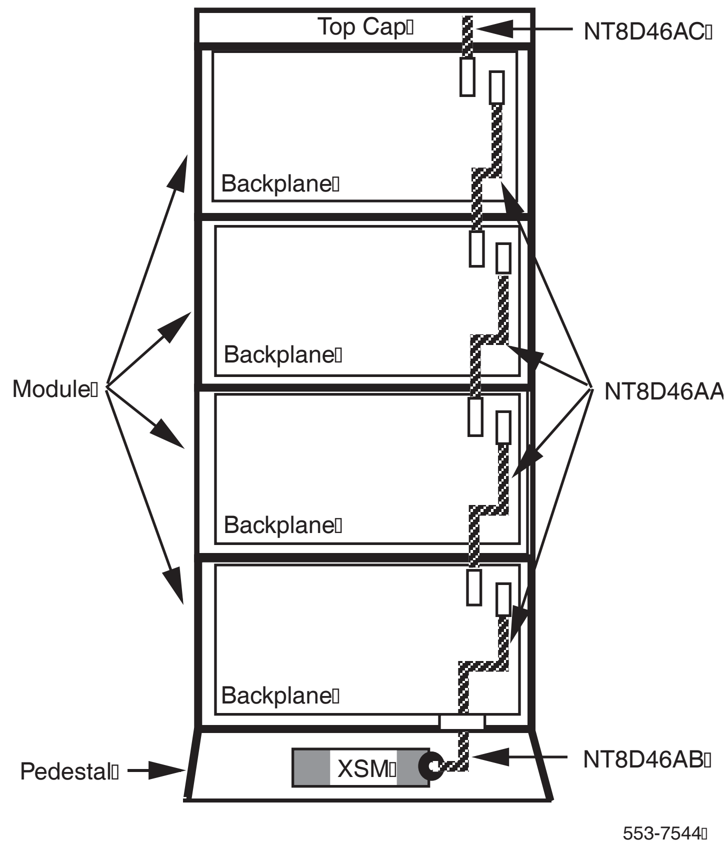
Slave unit address	Switch position						Slave unit address	Switch position					
	3	4	5	6	7	8		3	4	5	6	7	8
31	on	off	off	off	off	off	63	off	off	off	off	off	off
Note: **Slave addresses are 1-63.													

End of Procedure

Cabling the System Monitor

The System Monitor (NT8D22) is used to monitor the temperature, power supplies, and blower unit in a column. A series of daisy-chained flat-ribbon cables between each module is used to connect the power supplies and the top cap thermal sensors to the system monitor located in the pedestal. The flat cable routes through the square holes in the rear horizontal cable trough. Figure 64 shows the cabling of the system monitor in a column.

Figure 64
System monitor module-to-module cabling



Follow the steps in Procedure 16 to cable the NT8D22 System Monitor.

Procedure 16
Cabling the System Monitor (NT8D22)

1 Remove the I/O safety panel in the rear of the module with CPU 0.

2 Connect the master system monitor to the SDI port.

3 Connect the master system monitor to slave unit 1 with an NT8D46AS cable.

4 Connect the narrow ribbon on an NT8D46AG cable from connector J2 in the module with CPU 0 to the assigned port on the SDI card (see Figure 65).

Figure 65
Cabling two side-by-side NTD40 shelves – system monitor to slave unit 1 and SDI port

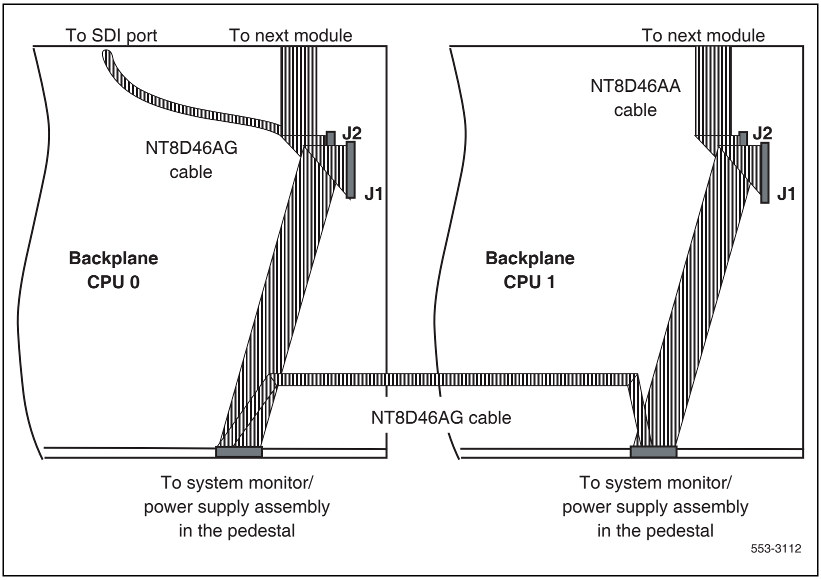
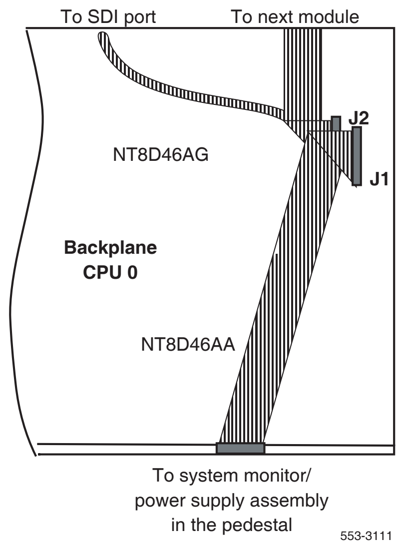


Figure 66
Cabling CS 1000M SG or Meridian 1 Option 61C, single column with stacked Core/Net modules – cable master system monitor to SDI port



5 Daisy-chain slave system monitors to the master.

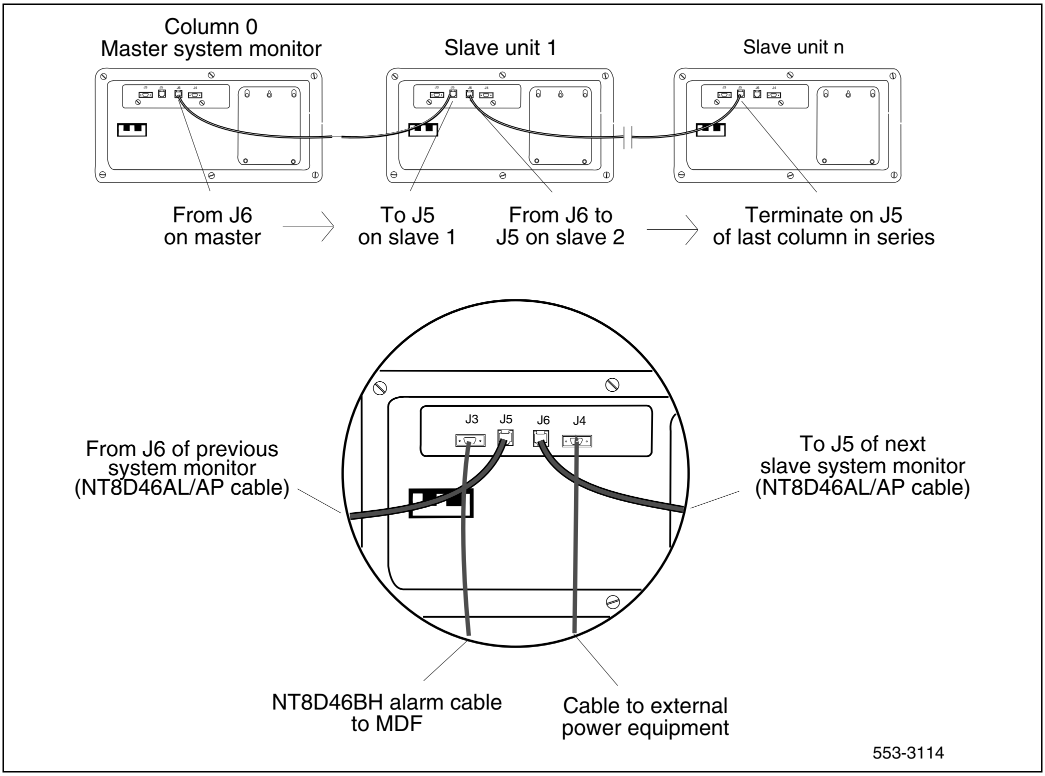
a. **For a single-column system**, skip this step.

b. **For a multiple-column system**, beginning with the master system monitor, cable in series (slave 1 to slave 2, slave 2 to slave 3, and so on) from connector J6 to connector J5 on each system monitor (see Figure 67 on page 165). Terminate at connector J5 on the last column.

— If columns are adjacent, use an NT8D46AL cable.

— If columns are not adjacent, use an NT8D46AP cable.

Figure 67
Multiple-column system monitor connections



6 For PFTU or external alarm cabling, connect a system monitor to MDF cable.

- Connect a system monitor to MDF cable to connector J3 on the master system monitor.
- Connect the cable at the alarm termination area at the MDF. See Table 12 for the terminating sequence.

Note 1: The system monitor to MDF cable is available in three lengths: NT8D46BH (9.75 m/32 ft), NT8D46EH (30 m/100 ft), and NT8D46DH (45 m/150 ft).

Note 2: If additional contact closures are required through the J3 REMALMA or REMALMB leads (for a hard alarm in case a column loses power, for example), additional system monitor to MDF cables can be ordered.

Table 12
NT8D22 System Monitor – pin assignments at J3

Pin	Direction	Color	Signal name	Description
1	out	BL/W	REMALMA	Remote major alarm (connect for external alarm)
2	out	OR/W	REMALMB	Remote major alarm return (connect for external alarm)
3	out	GR/W	CE-SYSLT	CE system line transfer (upgraded systems only)
4	—	BR/W	MDF0/GND	MDF return (ground)
5	in	SL/W	CEALMIN	CE alarm (upgraded systems only)
6	—	BL/R	SYSLTIN	System line transfer in (upgraded systems only)
7	out	W/BL	LFBEN	Line forced bypass enable (connect for PFTU operation)
8	out	W/OR	LFBENR	Line forced bypass enable return (connect for PFTU operation)
9	—	W/GR	GND	Ground
Note: Pins 6, 8, and 9 should be connected and grounded at the MDF.				

7 For AC-powered systems with a UPS:

a. Connect the appropriate cable (see the following list) from connector J4 on the system monitor in the column with CPU 0 (the master system monitor) to the associated UPS. Table 13 gives the pin assignments and signal descriptions for the alarm cables.

— For a Best Inc. UPS, use an NT8D46AJ alarm cable.

— For an Exide UPS, use an NT8D46AQ alarm cable.

— For an Alpha UPS, use an NT8D46AU alarm cable.

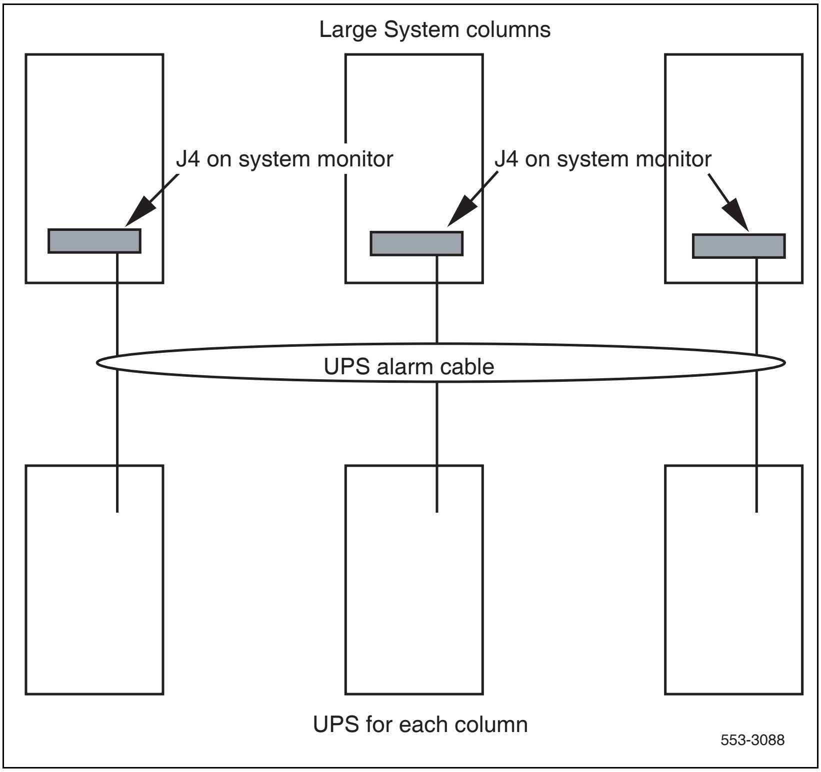
b. Connect the cable to the UPS as specified by the manufacturer.

c. Repeat this step for each system monitor with an associated UPS (see Figure 68 on page 168).

Table 13
NT8D22 System Monitor – pin assignments at J4

Pin	Signal description
1	Not used
2	Not used
3	Not used
4	Not used
5	Alarm 1 (AC fail; to UPS)
6	Alarm 1 return
7	Alarm 2 (Power sense; from UPS)
8	Alarm 2 return
9	Not used

Figure 68
UPS alarm cabling



8 For DC-powered systems, extend the alarm and trip leads from connector J4 on the system monitor in the column with CPU 0 (the master system monitor) to the external power equipment using an NT8D46AV cable (see Table 14 on page 169).

Note 1: Conduit is not required.

Note 2: An NT8D46BV cable (19.5 m/64 ft) or NT8D46CV cable (30 m/ 100 ft) can be used instead of the NT8D46AV cable. Connections are the same as the NT8D46AV cable.

Table 14
Alarm and trip lead connections—NT8D46AV Cable

Color	Description	Connection at control and distribution panel	
		Terminal block No	Pwr Sys Alarm Name
OR	Alarm	TB2 Position 6	Low Float
BL	DCON 0	TB4 Position 8	Rectifier Fail Alarm
R	DCON 1*	TB5 Position 2	Major Alarm
W	DCON 2*	TB5 Position 2	Major Alarm
GR	DCON 3*	TB5 Position 2	Major Alarm

* Connect the red, white, and green wires together at MJA.

Alarm interfacing to Candeo

The Candeo interfaces with the system through the Candeo's System Manager alarm output ports.

The alarm cable for the Candeo (NT8D46xx) interfaces from the connector **J4** of the System Monitor (NT8D22xx) located in the Large System pedestal to the Candeo's System Manager alarm output ports.

The Candeo’s System Manager can be accessed in several ways to monitor the operating status and the alarms on the system, view and modify the operating parameters, and download configuration files and software upgrades:

- local access
  - — by means of the display and buttons on the front of the unit
  - — by means of the web browser on computer connected locally into the RJ-45 network interface through a crossover CAT5 Ethernet cable

- remote access
  - by means of the web browser on a computer connected through a dial-up network connection into the RS-232 port, using an external modem
  - by means of the web browser on a computer connected remotely through a LAN or WAN network connection into the RJ-45 network interface

Monitoring alarms allows the Large System to report conditions such as low float voltage, major alarms, and AC fail alarms. Customers have the option of customizing these alarms through the Candeo System Manager, and can define what major or minor alarms they wish to monitor.

In addition, the Small Candeo provides SNMP functionality.

The Large Candeo System Manager produces a Major Alarm for the following faults:

- High voltage shut down (HVSD)
- High voltage (HV)
- Battery on discharge (BOD)
- Low voltage (LV)
- Low voltage disconnect (LVD)
- Alarm busy supply (ABSF)
- Internal fuse alarm (INT FA)
- Fuse alarm (FA)
- Rectifier fail alarm (RFA)

The Small Candeo (SP48300) System Manager produces a Major Alarm for the following faults:

- Battery fuse alarm
- High battery temperature
- High voltage shutdown (HVSD)

- Main AC fail
- Rectifier fail major (RFA major)
- Low voltage disconnect (LVD)
- High voltage (HV)
- Fuse alarm (FA)
- Priority low voltage disconnect
- AC input over-voltage
- Rectifier AC fail
- Remote shutdown
- System Manager SP fail
- Configuration fail
- Battery on discharge (BOD)
- Low voltage (LV)
- Very high battery temperature

Table 15
System Monitor connections – NT8D46xx

Wire	Connector pins	Colour	Label	Suggested alarm
1	P1-1	Black	DCON0	Rectifier Fail
2	P1-2	Red	DCON1	Major
3	P1-3	White	DCON2	Major
4	P1-4	Green	DCON3	Major
5	P1-5	Orange	ALARM	Low Float Voltage
6-9	Not used	Not used	Not used	Not used

Table 16
Cable lengths

Cable	Length
NT8D46AV	9.75 m (32 ft)
NT8D46BV	19.5 m (64 ft)
NT8D46CV	30 m (100 ft)

Cabling the Candeo

There are eight configurable Candeo output ports for output alarms. Each output port can use one of the following three contact types: normally open, normally closed, and common. Large Systems use normally closed contacts. Common contacts connect to the Candeo battery return bus. The connector strip J8 is used for all output connections and is removable from the System Manager for ease of wiring. Ensure that pin 1 is in the correct orientation for wiring when strip has been removed.

Table 17
Alarm configuration – NT8D46xx

Label	Colour	Candeo alarm port	Candeo J8 connector	Candeo configuration
DCON0	Black	Port 1	J8-1 Normally Closed	Loss of AC power
DCON1*	Red	Port 2	J8-1 Normally closed	Major alarms
DCON2*	White	Port 2	J8-4 Normally closed	Major alarms
DDON3*	Green	Port 2	J8-4 Normally closed	Major alarms
ALARM	Orange	Port 3	J8-7 Normally Closed	Low float
* Twist red, white and green together and connect to port 2 as Major Jumper together and connect to battery return bus. J8-2,5,8				

Configuring the alarm ports

Follow the steps in Procedure 17 to configure the alarm ports.

Procedure 17
Configuring the alarm ports

1 Select “Alarm Severity and Output” from the System Manager display screen.

2 Under “Alarm Name”, select the line with “AC Fail”, and change “Output Port” to 1.

3 Under “Alarm Name”, select the line with “Major”, and change “Output Port” to 2 (by default it should already be 2).

4 Under “Alarm Name”, select the line with “Low Float”, and change “Output Port” to Port 3.

5 All other “Output Ports” should be set to “None”.

Note: For more information, see the Alarms section in the *Candeo Power System User Guide (P0914425*).

End of Procedure

Customizing alarms

Under “Alarm Severity and Outputs”, the ports and severity can be configured per customers requirements. If the customer wishes they can utilize signals DCON1, DCON2 and DCON3 by connecting them to other available “No Connect” ports (connect commons on J8 to the battery return bus) and customize as desired.

Under the alarm output screen the relay state is defaulted to “not energized” when alarm is on. To change the relay state an engineering password is required. Contact Astec support for a temporary password to change this field. After the setting has been changed use the normally open contacts when wiring J8.

Note: For further information about all alarms that can be configured for the Candeo, see the Alarms section in the *Candeo Power Systems User Guide* (P0914425) and *Candeo SP 48300 Power System AP6C55AA User Manual* (P7000154).

Connecting a system terminal or modem

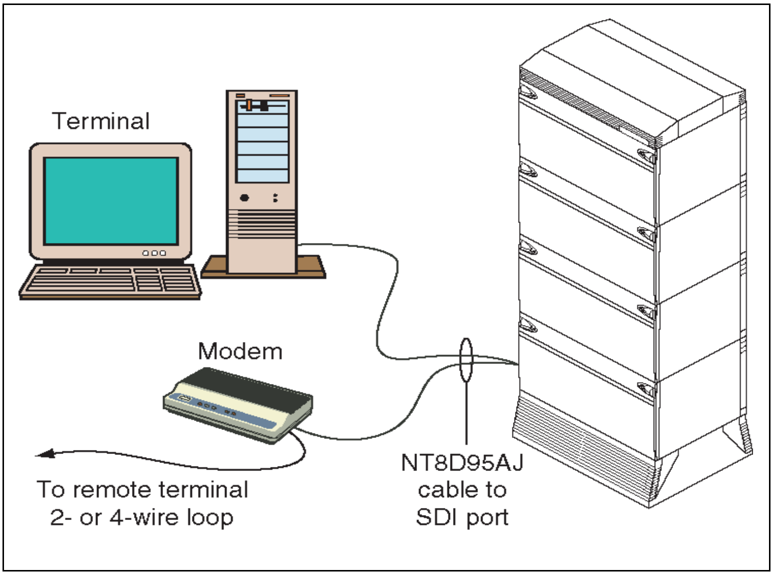
Contents

This chapter contains information about the following topics:

About the system terminal

At this point in the installation, a terminal must be connected to a serial data interface (SDI) port to provide an I/O interface to the system. When the installation is complete, a terminal (for local access) or a modem (for remote access) must remain permanently connected to an SDI port to provide a constant I/O interface to the system (see Figure 69 on page 176).

Figure 69
Terminal connection diagram



During the initial installation of a dual CPU system, you may want to temporarily install additional terminals for split mode monitoring, or programming, or both.

> ***Note:*** In a Large System, I/O ports on the Call Processing (CP) cards can be used to monitor CPU operations. These configurations should not be used as the permanent I/O connection for the system because the port is only active when the associated CPU, or CP card, is active.

Connecting a terminal

During the system installation and for continuing system operation, a terminal must be connected to an SDI port in a network slot to provide an I/O interface to the active CPU in the system (for local access). In addition, a data terminal equipment (DTE) port (COM1) and a data communication equipment (DCE) port (COM2) on the Call Processor Pentium IV (CP PIV) card can be used for direct access of the cPCI Core/Network Module. Typically, the CP card ports (COM ports) or COM1 and COM2 are pre-configured on I/O addresses four and five.

The COM1 and COM2 ports are active only when the CPU associated with the CP card is active. Therefore, the COM1 and COM2 ports should not be used as the only I/O connection for the system.

When the initial installation is complete, you must leave a terminal or a modem connected to the system. One SDI port in a network slot must be permanently connected to a terminal or modem. On the COM1 and COM2 ports you can:

1 disconnect the ports;

2 leave terminals connected for local monitoring; and,

3 connect modems for remote monitoring.

The ABCDE-Switch, which provides up to four-to-one switching, is available from Avaya as part number A0377992. The switch box can be used to connect the SDI and COM1 and COM2 ports to a terminal or a modem. If used, one switch box must be used for terminals and one for modems.

Commercial terminal servers can also be used to concentrate the serial ports on the equipment in a telecom room.

Terminal guidelines

During an installation, you can connect terminals to the COM1 ports for split mode monitoring, or programming, or both. (Due to the speed of the system messages displayed, personal computers are useful for file capture and review.)

Terminals connected to the COM1 ports can be installed as follows.

1 One terminal connects to a COM1 port in one CPU (the cable is switched from module to module as needed); one terminal is required in addition to the terminal for the SDI port connection (see Figure 70 on page 179).

2 One terminal connects to a switch box that connects to a COM1 port in each CPU; one terminal and a switch box are required in addition to the terminal for the SDI port connection (see Figure 71 on page 180).

3 One terminal connects to a switch box that connects to an SDI port and to a COM1 port in each CPU; one terminal and a switch box are required (see Figure 72 on page 182).

Connecting a terminal to a COM port

Use Procedure 18 to connect a COM1 port directly (no switch box) to a terminal (see Figure 70 on page 179).

Procedure 18
Connecting a terminal to a COM port

1 Set the terminal to 9600 baud, 7 data, space parity, one stop bit, full duplex, XON.

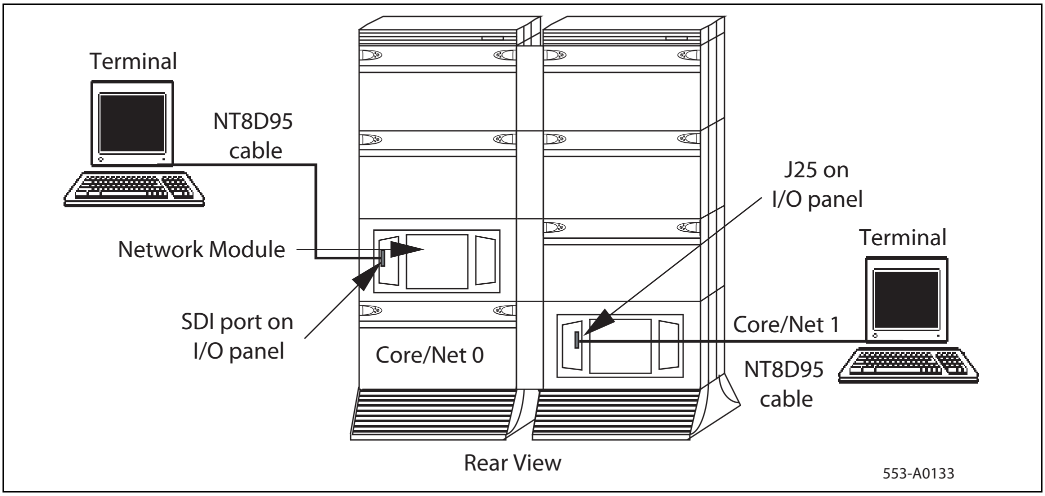
2 Connect an NT8D95 cable to a matching connector on the terminal.

3 Connect the NT8D95 cable to J25 on the I/O panel in the rear of the cPCI Core/Network Module.

4 If you are using only one terminal for both COM1 ports, switch the cable as needed. The terminal connected to the SDI port always communicates with the active CPU.

End of Procedure

Figure 70
One terminal for the COM1 ports



Connecting a switch box and terminal to COM1 and COM2 ports

Use Procedure 19 to connect COM1 ports to a switch box and a terminal (see Figure 71 on page 180).

Procedure 19
Connecting a switch box and terminal to COM1 and COM2 ports

1 Set the terminal to 9600 baud, 7 data, space parity, one stop bit, full duplex, XON.

2 Connect an NT8D95 cable to the terminal and to the switch box.

3 Connect NT8D95 cables to a matching connector on the switch box. When using an A0377992 ABCDE box, connect:

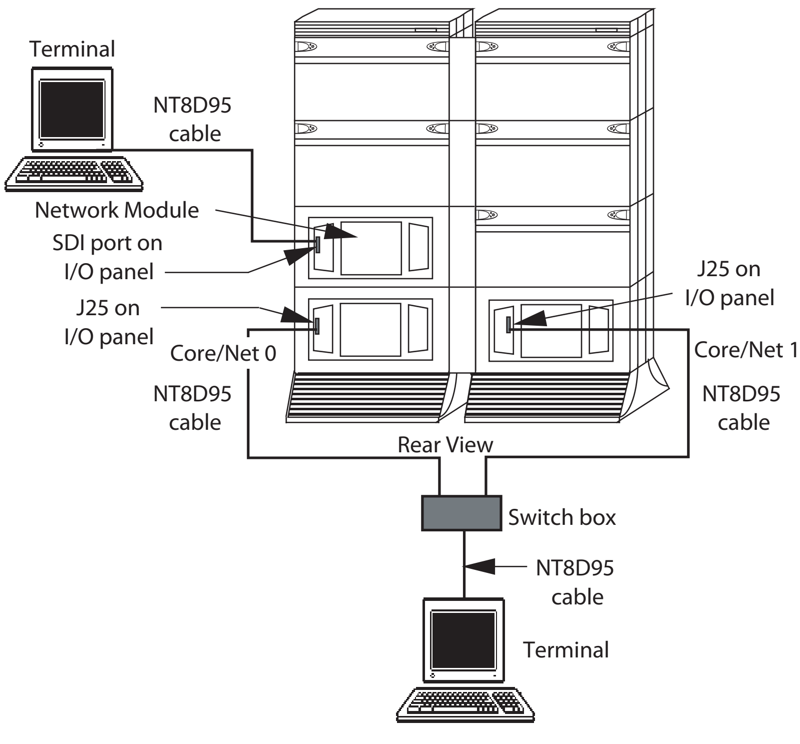
- — CPU 0 to connector A.
- — CPU 1 to connector B.

4 Connect the NT8D95 cables from the switch box to J25 on the I/O panel in the rear of the cPCI Core/Network Modules.

5 To communicate directly with a COM1 port, switch the cable as needed. The terminal connected to the SDI port will always communicate with whichever CPU is active.

End of Procedure

Figure 71
One terminal and a switch box to two COM1 ports



Note: The A0377992 switch box can be used in this configuration.

Connecting a switch box and terminal to SDI and COM1 ports

Use Procedure 20 to connect COM1 ports to a switch box and a terminal (see Figure 71 on page 180 and Figure 72 on page 182).

Procedure 20
Connecting a switch box and terminal to the SDI and COM1 ports

1 Set the terminal to 9600 baud, 7 data, space parity, one stop bit, full duplex, XON.

2 Connect an NT8D95 cable to the terminal and to the switch box.

3 Connect NT8D95 cables to a matching connector on the switch box. When using an A0377992 ABCDE box, connect:

- CPU 0 to connector A.
- CPU 1 to connector B.
- The SDI port to connector D (connector C is common).

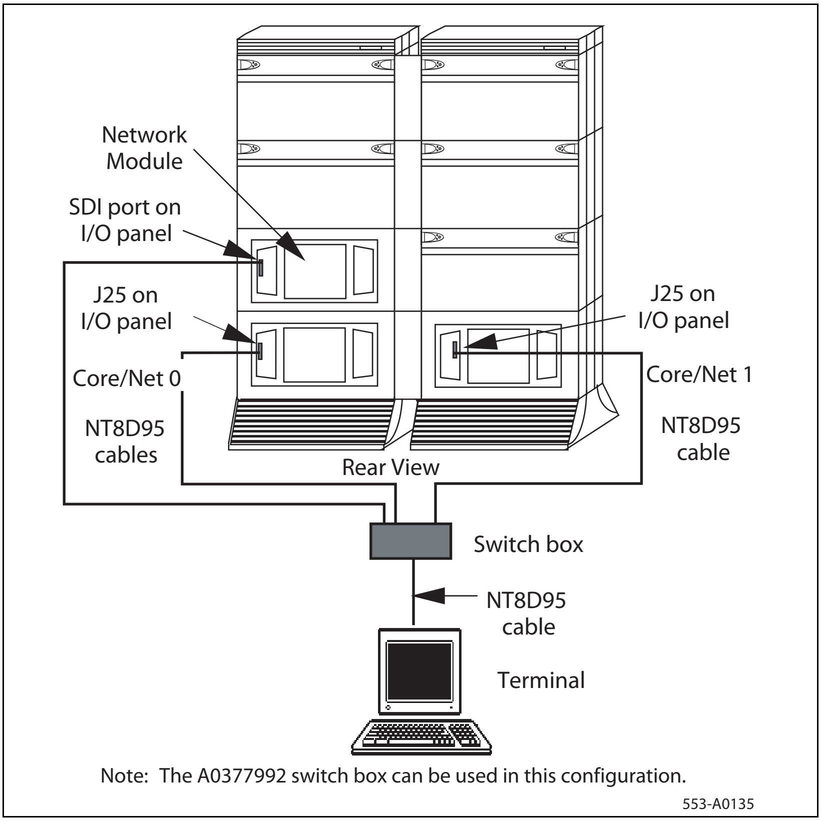
4 Connect NT8D95 cables from the switch box to J25 on the I/O panel in the rear of each cPCI Core/Network Module.

5 Connect an NT8D95 cable from the switch box to the I/O panel slot for the SDI card.

6 To communicate with the system in general, set the switch box to the SDI port. To communicate directly with a COM1 port, switch the cable as needed.

End of Procedure

Figure 72
One terminal and a switch box to the SDI and COM1 ports



Connecting a modem

A modem must be connected to an SDI port in a network slot. The modem provides an I/O interface to the active CPU in the system for remote access.

You can connect a modem to one of the following:

1. An SDI port to remotely monitor general system operation
2. The COM ports for debugging and patch downloading (through your Avaya representative)
3. A remote connection to both the SDI and COM2 ports

Modem guidelines

At the Large System end (the local end), modems must be set to dumb mode (command recognition OFF, command echo OFF). The local end modems can be configured with:

1. one modem connected to the SDI port and the cable switched to each COM2 port as needed (see Figure 73 on page 187), or
2. one modem connected to a switch box that is connected to the SDI and COM2 ports (see Figure 74 on page 189).

   Note: The second method listed here is preferred. Other configurations, such as a separate modem for each port, are possible.

At the remote end, at least one modem (which can be set to smart mode), one terminal, and one RS-232 cable are required in all modem configurations.

Required and recommended specifications for local end modems are:

1. *Required:* true, not buffered, 9600 baud support (required for remote Avaya technical support)
2. *Required:* CCITT V.32 or V.32bis compliance
3. *Recommended*: the ability to adjust to lower and higher speeds, depending on line quality, while maintaining 9600 baud at local DTE
4. *Recommended*: V.42 error correction
5. *Recommended*: V.42bis data compression

A dispatch or call back modem, normally connected to the SDI port, can be used if it meets the requirements. To use a dispatch or call back modem that does not meet the requirements, the modem must be used with a modem that meets specifications.

Configuring a modem

Use Procedure 21 to configure the modem. You must configure the modem before you connect it to the Large System. A terminal, such as a PC computer, is required to configure the modem.

Procedure 21
Configuring a modem

1 Turn the modem off.

2 Configure the modem DIP switches as follows.

- DIP switches 1, 3, 7, and 8 to ON (down)
- DIP switches 2, 4, 5, and 6 to OFF (up)

3 Connect an RS-232 cable to the modem and to a terminal.

4 Configure the terminal with the following values:

- 9600 baud
- 8 bits
- 1 stop bit
- no parity

5 Turn the modem on and enter each command listed in Table 18 with a carriage return (press Enter or Return key).

The modem responds **OK** to every command (except for the last two commands, ATQ1 and AT&W).

Table 18
Modem Commands

Command	Effect
AT&F	Load active profile.
AT&H0	Flow control disabled.
AT&D3	Resets on receipt of DTR.
AT&S1	Modem controls DSR.
ATS0=1	Answer after 1 ring.
ATS2=128	Escape character = ASCII 128.
ATS7=60	Pause one second for carrier detection.
ATQ1	Quiet mode.
AT&W	Store active profile.

6 Disconnect the power cord and serial from the modem.

7 Set DIP switches 1 and 4 to ON (down) and the remaining switches OFF (up).

End of Procedure

Connecting a modem to an SDI port

Use Procedure 22 to connect an SDI port directly (no switch box) to a modem (see Figure 73 on page 187).

Procedure 22
Connecting a modem to an SDI port

1 At the remote end, connect an RS-232 cable to the terminal and to the modem.

2 At the remote end, connect the cable from the modem to an RJ11 telephone jack. If a cable is required, connect an NT8D46 cable to the modem and to the RJ11 jack.

3 At the local end, configure the modem.

Follow the manufacturer's instructions to set the modem for 9600 baud, auto answer, dumb mode, command recognition OFF, command echo OFF.

4 At the local end, connect an NT8D95 cable to the SDI port on the I/O panel in the rear of the module and to the modem.

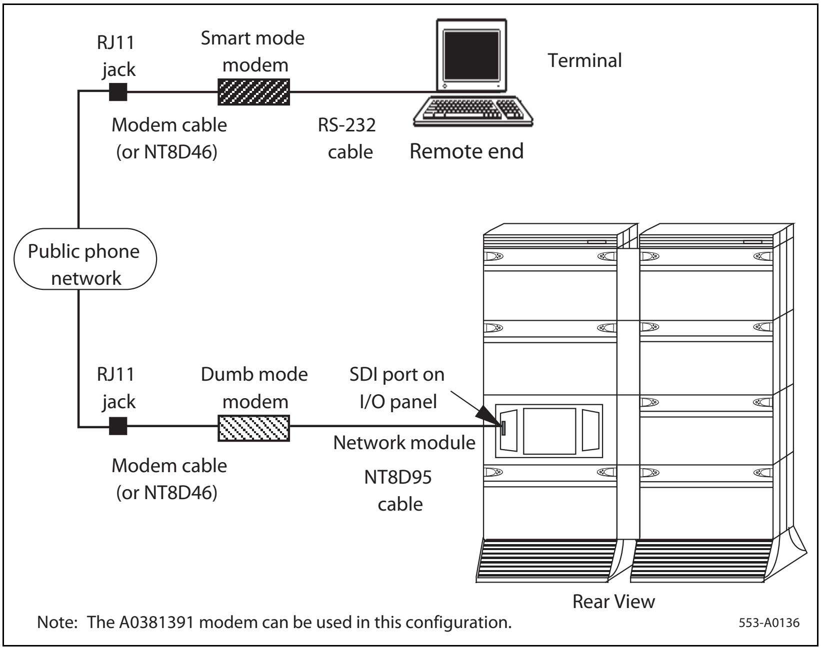
5 At the local end, connect the cable from the modem to an RJ11 telephone jack. If a cable is required, connect an NT8D46 cable to the modem and to the RJ11 jack.

6 To communicate with a COM2 port, switch the cable from the modem to the port as needed.

- For debugging or monitoring, connect the cable to the *active* CPU at J21 on the I/O panel in the rear of the cPCI Core/Network Module.
- For patch downloading, connect the cable to the *inactive* CPU at J21 on the I/O panel in the rear of the cPCI Core/Network Module.

End of Procedure

Figure 73
Modem to SDI port



Connecting a modem to switch box, COM2 ports, SDI ports

Use Procedure 23 to connect SDI and COM2 ports to a switch box and a modem (see Figure 74 on page 189 and Figure 75 on page 190).

Procedure 23
Connecting a modem to a switch box, COM2 and SDI ports

1 At the remote end, connect an RS-232 cable to the terminal and to the modem.

2 At the remote end, connect the cable from the modem to an RJ11 telephone jack. If a cable is required, connect an NT8D46 cable to the modem and to the RJ11 jack.

3 At the local end, configure the modem.

Follow the manufacturer's instructions to set the modem for 9600 baud, autoanswer, dumb mode, command recognition OFF, and command echo OFF.

4 At the local end, connect NT8D95 cables to:

- J21 on the I/O panel in the rear of the Core or Core/Network Modules
- the SDI port on the I/O panel in the rear of the Network module

5 At the local end, connect NT8D84 cables to the SDI Paddle Board at the Core/Network backplane to the I/O panel in the rear of the cPCI Core/ Network Module.

6 At the local end, connect NT8D95 cables from the I/O panels to a matching connector on the switch box.

a. If you are using an A0377992 ABCDE box, connect cables as follows.

— Connect CPU 0 to connector A.

— Connect CPU 1 to connector B.

— Connect the SDI port to connector D (connector C is common).

7 At the local end, connect an NT8D95 cable from the switch box to the modem.

8 At the local end, connect the cable from the modem to an RJ11 telephone jack. If a cable is required, connect an NT8D46 cable to the modem and to the RJ11 jack.

9 At the local end, configure the switch box as needed to communicate with the COM2 ports.

- During normal operation, set the switch to the SDI port.
- For debugging, set the switch to the *active* CPU.
- For patch downloading, set the switch to the *inactive* CPU.

End of Procedure

Figure 74
Modem to a switch box and SDI and COM2 ports (dual-column systems)

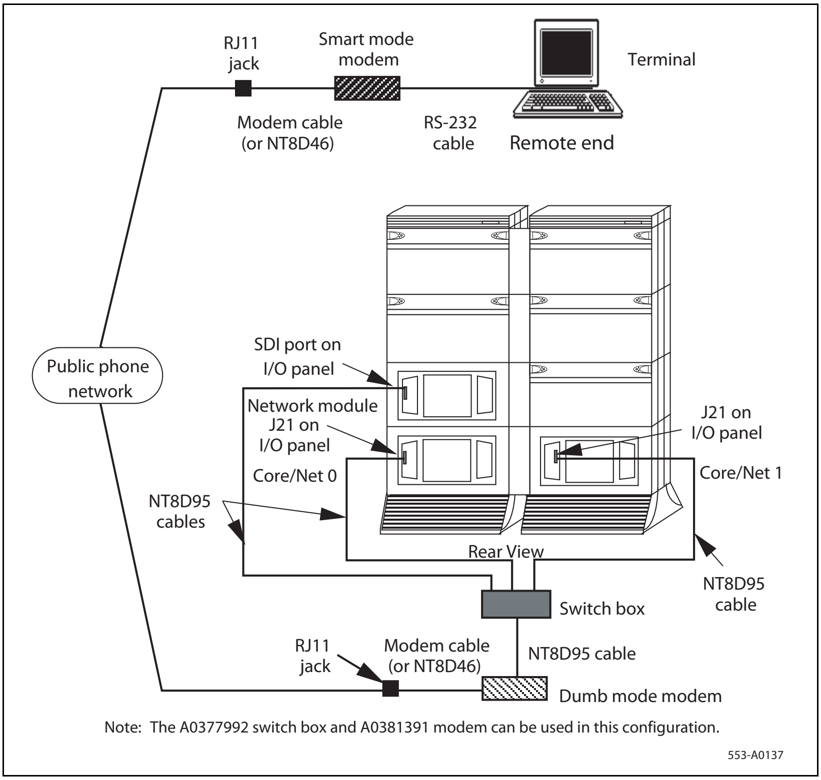
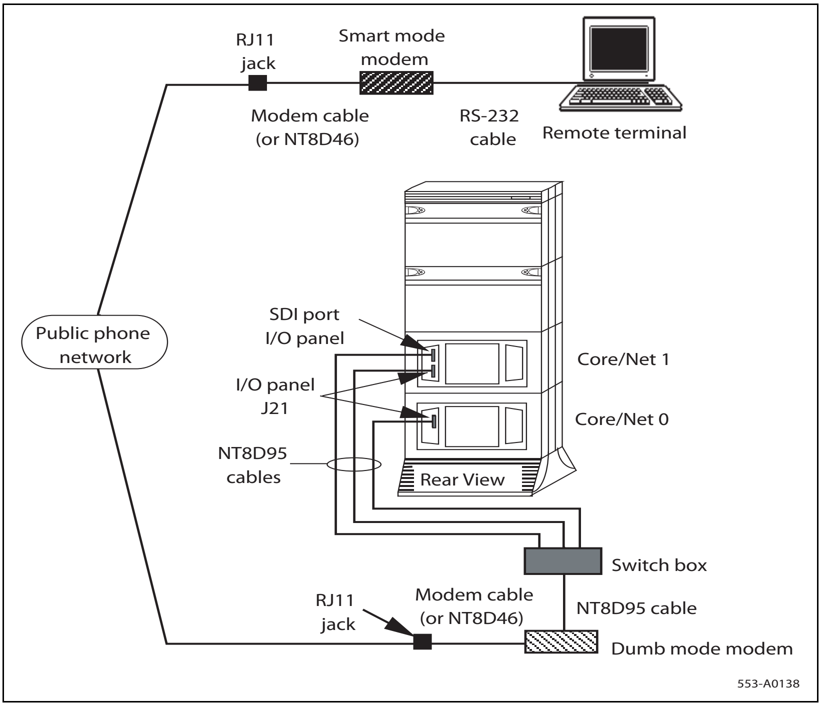


Figure 75
Modem to a switch box and SDI and COM2 ports (single-column systems)



Cabling Common Equipment in a Single Group system

Contents

This chapter contains information about the following topics:

Cabling guidelines

The NT4N41 Core/Net module backplane (see Figure 76 on page 193), like all circuit boards, has a primary side and a secondary side. The primary side, which faces the front of the module, contains the primary shrouds, which provide mechanical guidance for the pins of the card edge connectors. The secondary side of the backplane, which faces the rear of the module, contains the secondary shrouds, which provide mechanical guidance for cable connectors.

Because the cable troughs and spaces on the sides of a module are within the EMI shielding of the system, unshielded cables can be routed in those areas. As space permits, Common Equipment cables can be routed horizontally in the cable troughs at the front, rear, and sides of the module or vertically on the sides of the module.

> ***Note:*** In a DC-powered module, because there is no MPDU, there is room to route cables horizontally from front to rear on the left side (front view) of the module.

CAUTION — Service Interruption

System Failure

Cables must be routed as perpendicular as possible to any nearby power cables. Avoid routing cables near power cables if alternate routing is available.

At the rear of the module, cables routed between the I/O panel and the rear cover can be parallel to the power cables because the panel provides EMI shielding.

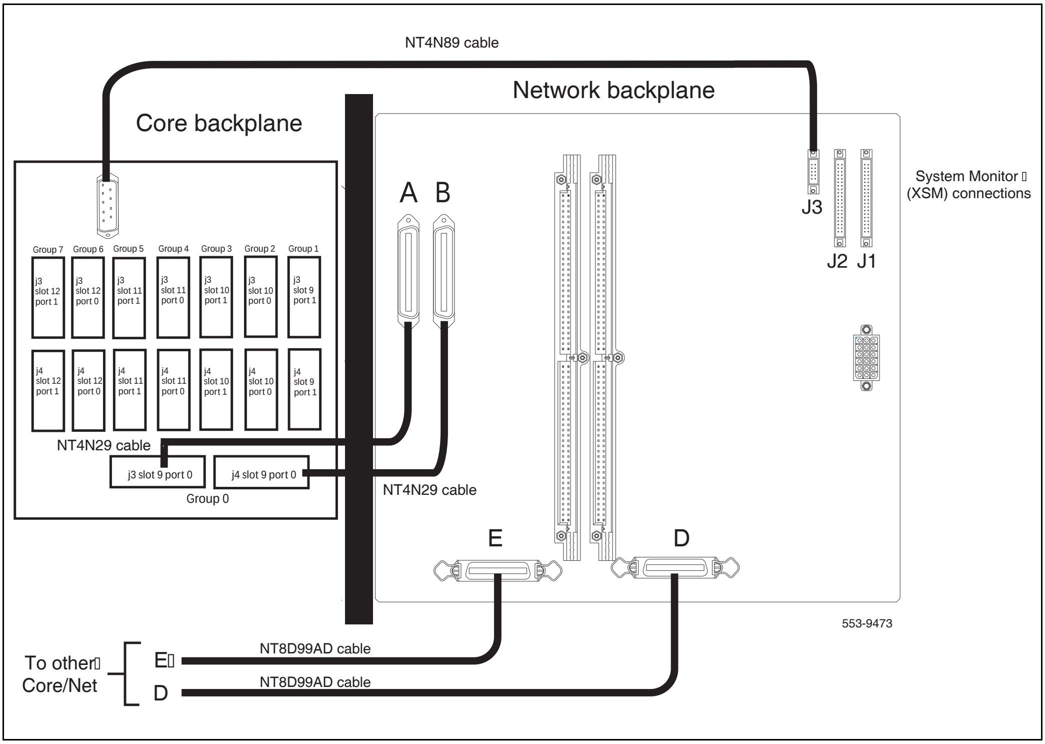
A label kit is included in system package. Use of these labels is optional.

> ***Note:*** To replace cables from the Core/Net module backplane, you must use the P0741489 Extraction Tool provided, located in the rear of the module (behind the I/O safety panel).

CAUTION — Damage to Equipment

Do not pry the against the connector with the extraction tool. Simply inserting the tool between the connector and the securing clip is sufficient to unlock the connector. Prying may cause damage to the connector or the backplane pins.

Figure 76
NT4N41 Core/Net shelf fanout panel (backplane)



Core/Net module

The Core/Net modules contain two distinct sets of circuit cards: Core cards and Network cards. This section contains instructions on:

1. "Reviewing Core/Net module placement" on page 194
2. "Reviewing required Core cards" on page 196
3. "Checking that the Core cards (front side) are installed" on page 196

Reviewing Core/Net module placement

Core/Net modules can be installed side-by-side on top of separate pedestals (see Figure 77) for power and cooling redundancy or in a stacked configuration (see Figure 78) in a single column.

Core/Net 1 is always on the left. Core/Net 0 is always on the right.

Figure 77
Stacked configuration of Core/Net modules

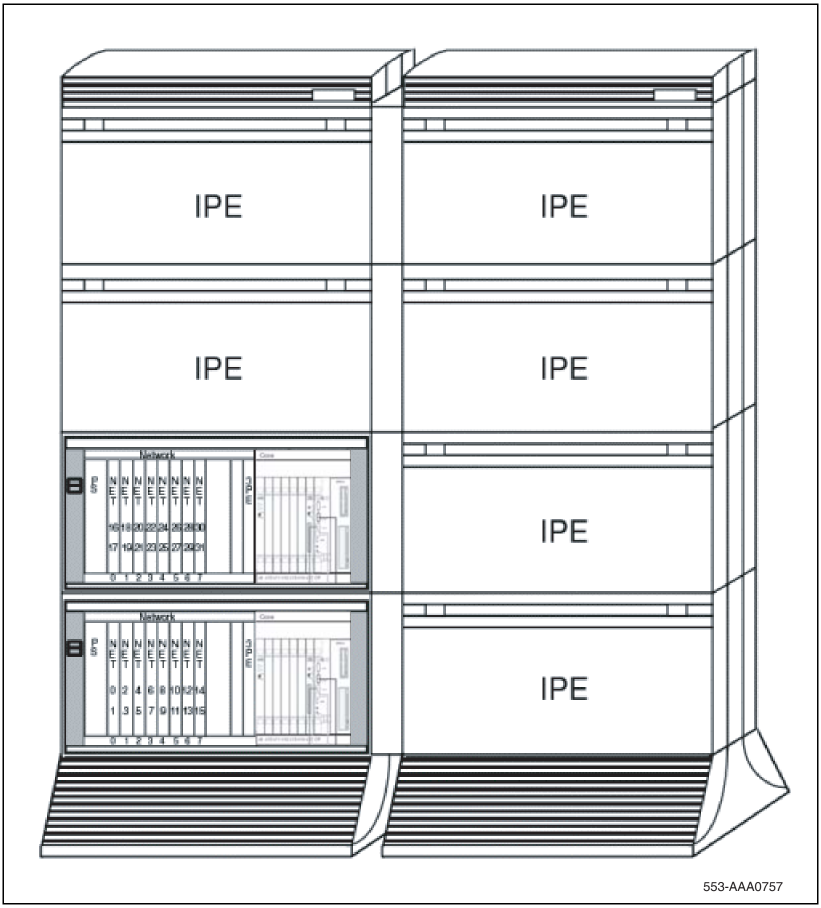
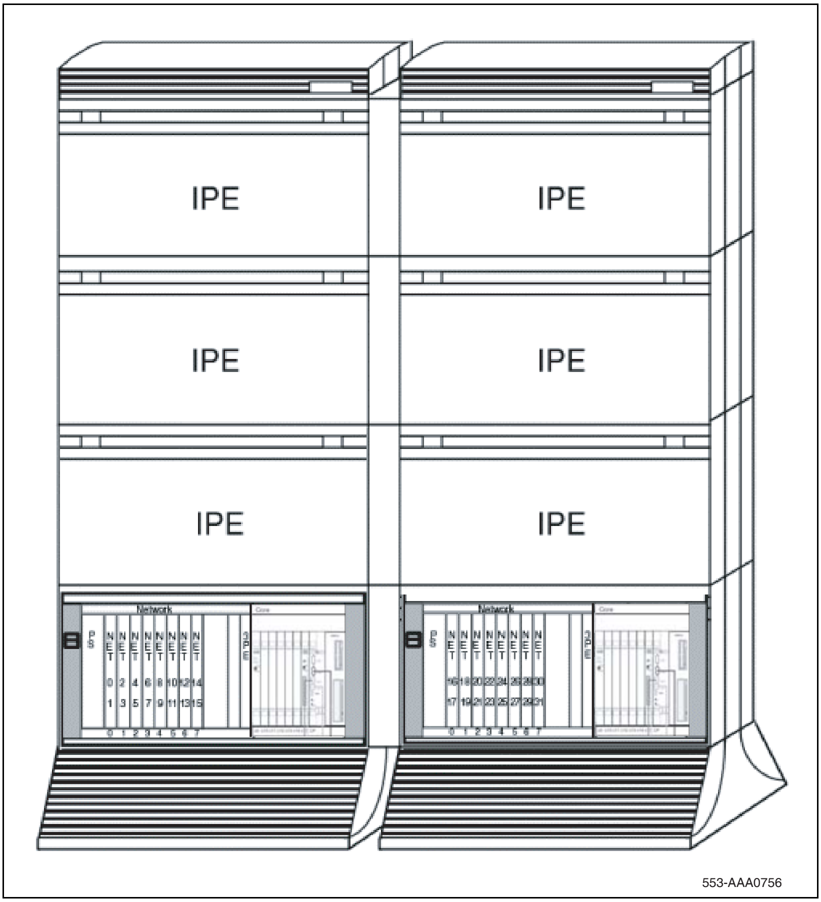


Figure 78
Side-by-side configuration of Core/Net modules



Reviewing required Core cards

All Core cards are installed in the factory. See Table 19 for the Core card requirements for each Core/Net module. For module and card descriptions, see "System equipment – UEMs" on page 42.

Table 19
Required Core cards (minimum per Core/Net module)

Order Code	Description	Number required per Core/Net module	Backplane side
NT4N65	cCNI: cPCI Core Network Interface Card	1	front
NT4N48	System Utility Card	1	front
NT4N39AA	CP PIV Call Processor Card (512 MB memory)	1	front
N0026096	MMDU replacement faceplate	1	front

Checking that the Core cards (front side) are installed

All Core cards are factory installed. The three Core cards (front side) are:

1 **NT4N65 cPCI Core Network Interface (cCNI) card**. Each system contains one NT4N65 cCNI card per Core/Net module. The cCNI cards are located in slot c9. If not already installed, install a P605337 cPCI Card Slot Filler Panel to cover slots c10 to c12, which do not contain cCNIs.

Note: In the NT4N41 Core/Net module, you must configure port 0 on the NT4N65 Core to Network Interface (cCNI) Card in slot c9 as Group 0. Communication between the bv cCNI and 3PE cards for Group 0 is accomplished by using the NT4N29 cable. You require only one cCNI card for Group 0.

Note: Slots c13 and c14 remain empty. If necessary, install a P0605337 cPCI Card Slot Filler Panel in each slot.

2 **NT4N48 System Utility card**. The System Utility card is located in slot c15.

3 **NT4N39AA Call Processor PIV (CP PIV)**. This card is located in the slot marked CP.

Cabling the Core side

This section describes installation of the Core cables. Table 20 lists field-installed cables. Table 21 lists factory-installed cables.

Table 20
Field-installed Core cables (internal)

Order Code	Description	Number required per system
NT4N88AA	COM1 (DTE/terminal)	2
NT4N88BA	COM2 (DCE/modem)	2
NT4N90BA	Ethernet (CP PIV card to I/O panel)	2
NTRC17BA	Crossover Ethernet cable (Core to Core)	1
customer supplied	Standard Ethernet cable (I/O Panel to LAN switch)	2
Note: If there is no connection to a LAN, connect the two LAN 1 connectors using the NTRC17BA crossover cable.		

Table 21
Factory installed Core cables (internal)

Order Code	Description	Number required per system
NT4N4405	Shelf Power: Net backplane to Core backplane	2
NT4N29AA	cCNI to 3PE Core/Net shelf cable	4
NT4N89AA	System Utility Card to XSM (see Figure 80)	2

Figure 79
Core/Net cable connections (top view)

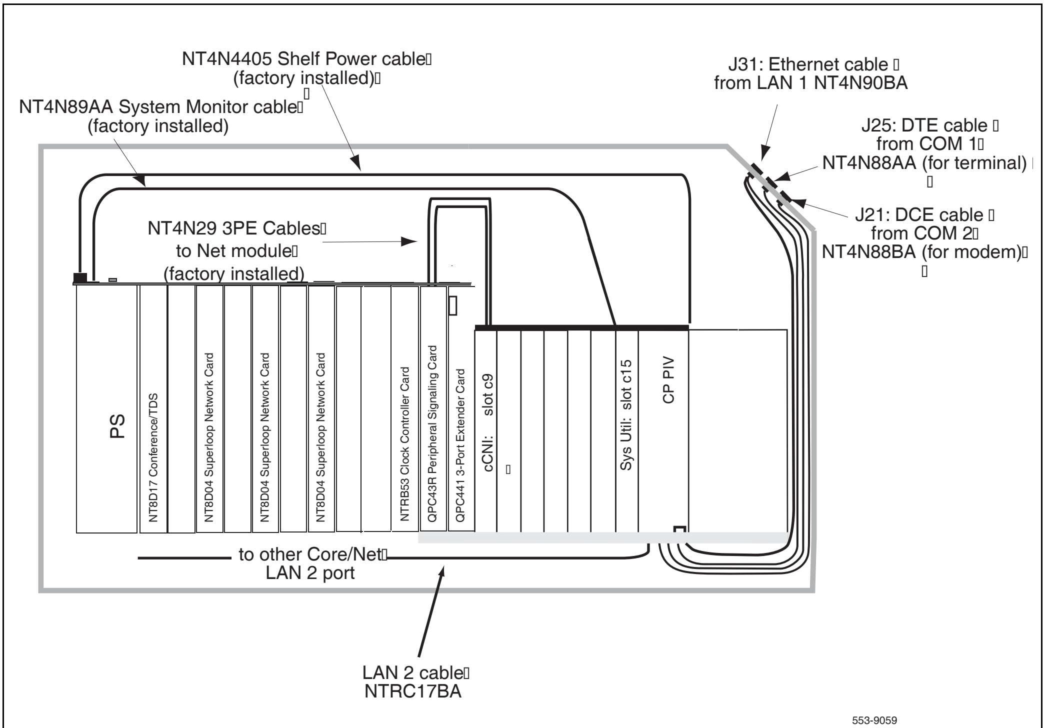
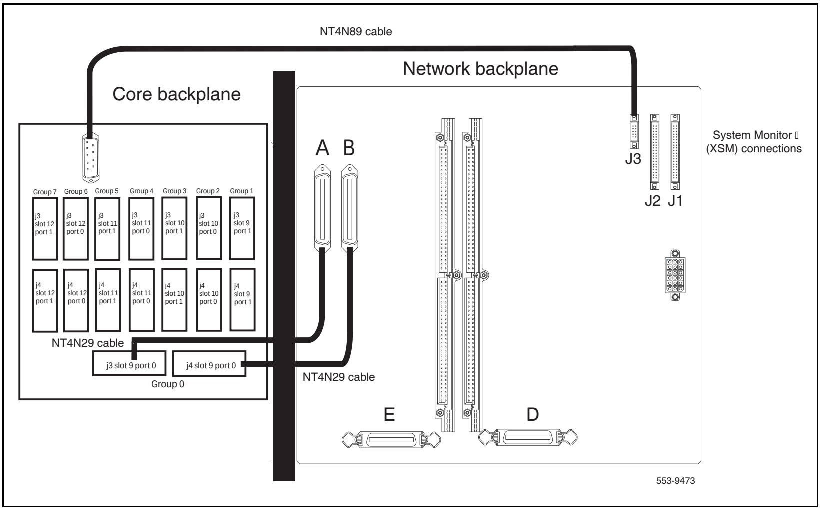


Figure 80
CP PIV Core and Network backplanes



Cabling the I/O panel

Connect the cables from the CP PIV card faceplate to the I/O panel on the back of the Core/Net modules. Figure 79 on page 198 displays the COM and LAN cable connections.

- COM1 is used to connect a terminal.
- COM2 is used to connect a modem.
- LAN 1 (ELAN) is used to connect the system to a LAN switch.
- LAN 2 (HSP) is used to connect Core 0 to Core 1 for system redundancy.

  Note: If there is no LAN, LAN 1 and LAN 2 are connected from Core 0 to Core 1.

CAUTION — Service Interruption

Loss of Data

Label all cables on both ends before installation. Labels help ensure that the cables are properly routed and connected. Cable labels also help installers to troubleshoot problems and replace equipment.

Procedure 24
Installing the CP PIV to I/O panel cables

1 Connect COM1 on the CP PIV faceplate to J25 on the I/O panel with cable NT4N88AA.

2 Connect COM2 on the CP PIV faceplate to J21 on the back of the I/O panel with cable NT4N88BA.

3 Connect the Dual Ethernet Adapter (RJ-45) for I/O Panel (NTRE40AA) to J31. Secure the adapter to J31 with the two screws included in the shipment.

4 Connect LAN 1 (Ethernet) on the CP PIV faceplate to J31 (top) of the I/O panel with cable NT4N90BA.

This connection can only be made *after* the Dual Ethernet Adapter is installed (see step 3 above).

Note: If a LAN switch is not used, connect LAN 1 in Core 0 to LAN 1 in Core 1.

5 Connect a crossover Ethernet cable (NTRC17BA) from the LAN 2 port in Core 0 to the LAN 2 port Core 1. This connection is for Core redundancy.

Note: To ensure EMI shielding, route the cable along the front of the card cage and through the sides of the Core/Net modules.

6 Repeat steps 1 through 4 in the second Core/Net module.

End of Procedure

Cabling the Network side

Table 22 lists the number of circuit cards required by each system. Table 23 lists the number of net cables required by each system.

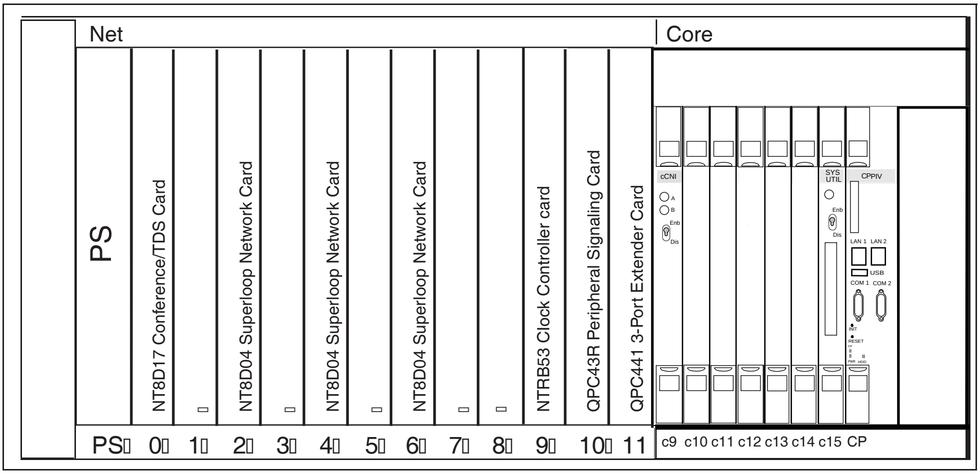
Table 22
Required Net side cards

Quantity	Order Code	Description
2 per system	NTRB53	Clock Controller card
2 per system	3PE QPC441 vintage F or later	3 Port Extender
2 per system	PS QPC43 vintage R or later	Peripheral Signaling Card

Table 23
Required Net side cables

Quantity	Order Code	Description
1 per system	NT8D75	Clock Controller cable
2 per system	NT8D80 3PE to 3PE	3 Port Extender cable

Figure 81
CP PIV Core/Net Module slot



Configuring and cabling the Clock Controllers

Two Clock Controller cards (NTRB53) are required in each system to synchronize functions. The Clock Controllers cards must be installed as directed in the following two rules.

1 Two Clock Controller cards must be installed in each system. The Clocks must be connected to each other in Network Group 0.

2 The two Clock Controllers must be installed in Slot 9 of each Core/Net module.

For more information about Clock controller DIP-switch settings, see *Circuit Card Reference* (NN43001-311).

Procedure 25
Connecting the Clock Controller cables

See Figure 85 on page 209.

1 Connect P1 of the NT8D75 cable to port J3 of Clock Controller 0.

2 Connect P2 of the NT8D75 cable to port J3 of Clock Controller 1.

End of Procedure

Network Group 0: Shelf 0 to Shelf 1

Each Single Group System contains one Network group, Group 0. Each Network group is comprised of two Network shelves: Shelf 0 and Shelf 1.

The Core/Net modules contain Network Group 0. Shelf 0 is in Core/Net 0, Shelf 1 is in Core/Net 1. Shelf 0 must be connected to Shelf 1 for Network Group 0 to operate correctly.

This section contains instructions on:

1 "Connecting the 3PE faceplates in the Core/Net modules" on page 203

2 "Inspecting CNI to 3PE factory installed cables" on page 204

3 "Connecting the Core/Net backplanes" on page 206

Connecting the 3PE faceplates in the Core/Net modules

The 3PE cards in the Core/Net modules must be directly connected with an NT8D80 cable. See Figure 82 on page 205. This connection is only made between the Group 0 shelves in the Core/Net modules.

Procedure 26
Connecting the 3PE faceplates in the Core/Net modules

1 Connect a NT8D80 cable from the J4 port in the Core/Net 0 3PE card to J4 port in the Core/Net 1 3PE card.

2 Connect a second NT8D80 cable from the J3 port in Core/Net 0 to the J3 port in Core/Net 1.

Note: The 3PE cards are located in Core/Net slot 11.

End of Procedure

Inspecting CNI to 3PE factory installed cables

New NT4N29AA cables must be installed for existing Network Group 0. If the system has XSDI cards, reinstall the cards and attach the cables.

Procedure 27
Inspecting NT4N29AA factory installed cables

1 If Network Group 0 will be in the Core/Net, the factory configuration of the new Core/Net modules is correct. Continue on to “Connecting the Core/Net backplanes” on page 206.

2 If Network Group 0 will not be in the Core/Net module, reconfigure the processor module.

Note: Reconfiguration of the processor module is required to allow for concurrent or future use of the Network portion of the Core/Net for a higher Network group. The NT4N41 shelf (card cage) is factory installed with NT4N29 cables and is configured as Group 0.

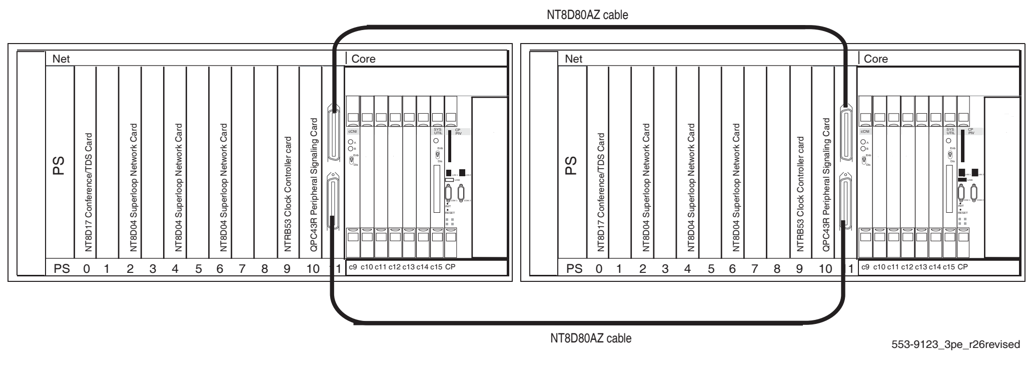
a. Use the extraction tool to disconnect the NT4N29 cables from the Core backplane.

b. Connect the cables to the appropriate group (see Table 24).

Table 24
Fanout panel to 3PE card connectors

Group Number		Fanout Panel connector		3PE card connector
0	connects from	9-0, J3	to	A
0	connects from	9-0, J4	to	B
Note: Group 0 cables (NT4N29) connect the fanout panel directly to the network backplane of Core/Net 1.				

Figure 82
3PE faceplate connections



End of Procedure

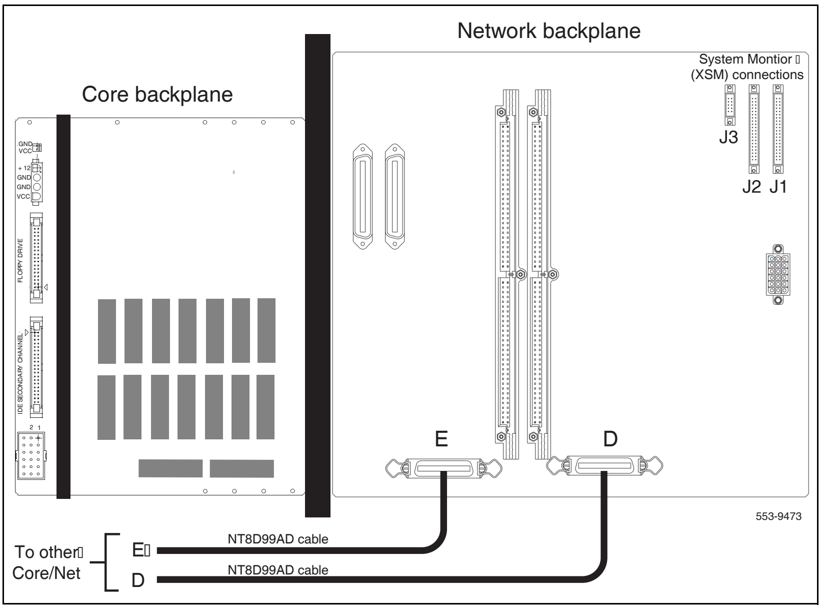
Connecting the Core/Net backplanes

The Shelf 0 and Shelf 1 backplanes must be connected with two NT8D99AD cables (Core/Net modules only).

Procedure 28
Connecting the Core/Net backplanes

1. Connect one NT8D99AD cable from the “E” port in Core/Net 0 to the “E” port in Core/Net 1.
2. Connect a second NT8D99AD cable from the “D” port in Core/Net 0 to the “D” port in Core/Net 1. See Figure 83.

Figure 83
Connecting the Core/Net backplanes



End of Procedure

Optioning the System Utility Card

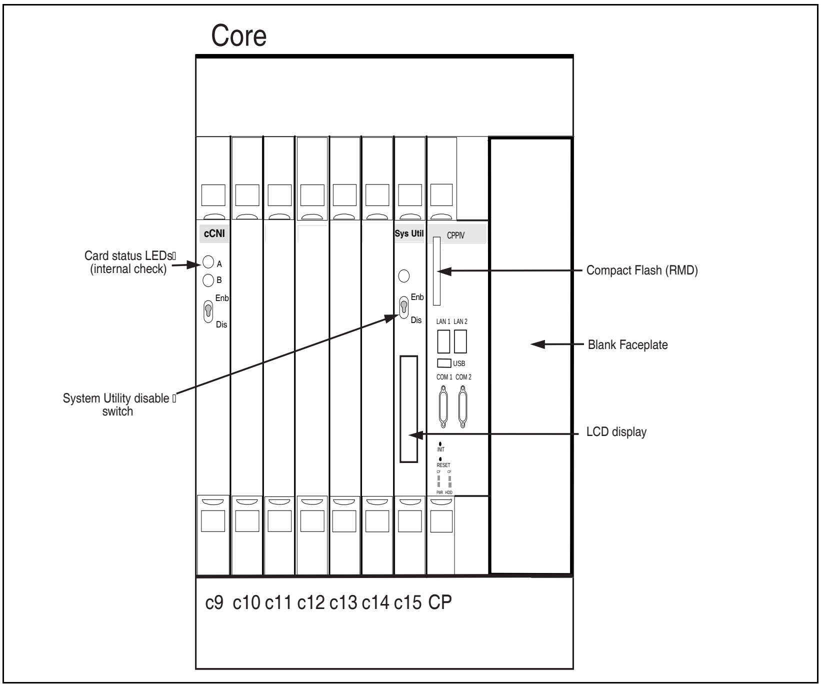
To install the system utility card, first identify Core/Net 0 and Core/Net 1 shelves. Then adjust the DIP switches according to Table 25.

Table 25
System Utility Card DIP switch settings

	Core/Net 0	Core/Net 1
DIP switch 1	on	off
DIP switch 2	on	on

Figure 84 on page 207 shows Core card (front side) placement. If the Core cards are not installed, see Figure 84 to add or replace cards.

Figure 84
Core side of Core/Net module



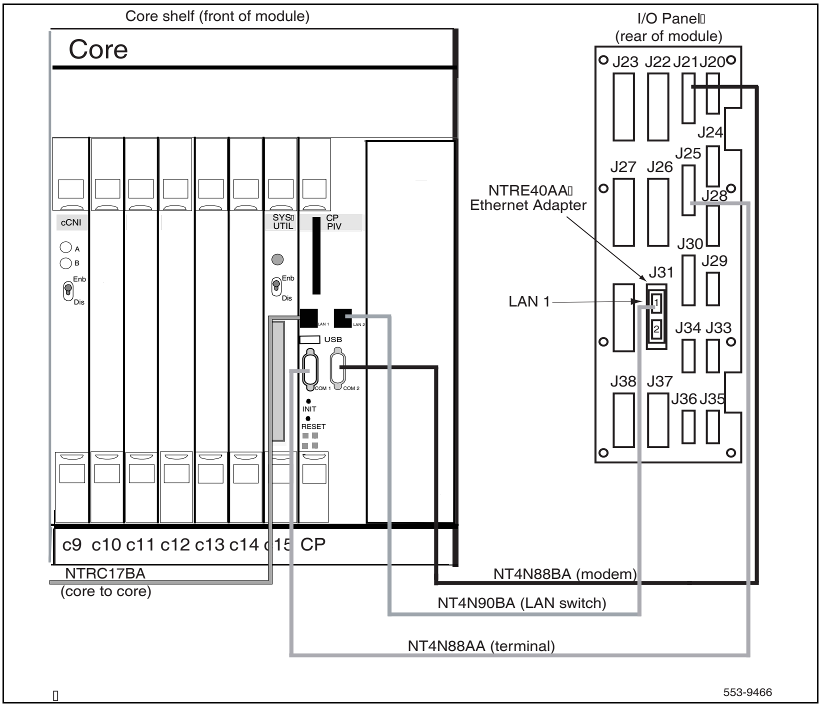
Connecting Core modules to a LAN

Connect each Core/Net module to a local area network (LAN). This connection provides a communication channel for LAN-based systems management tools such as Element Manager. This connection also supplies additional redundancy capabilities. See Figure 86 on page 210.

Note 1: If a LAN is not available, connect the second NTRC17BA crossover Ethernet cable (included in the basic package) between the J31 ports in Core/Net 0 and Core/Net 1.

Note 2: The Core/Net I/O panel cables must be installed as described on "Cabling the I/O panel" on page 199 before the Ethernet connections can be completed.

Figure 85
CP PIV to I/O panel connections



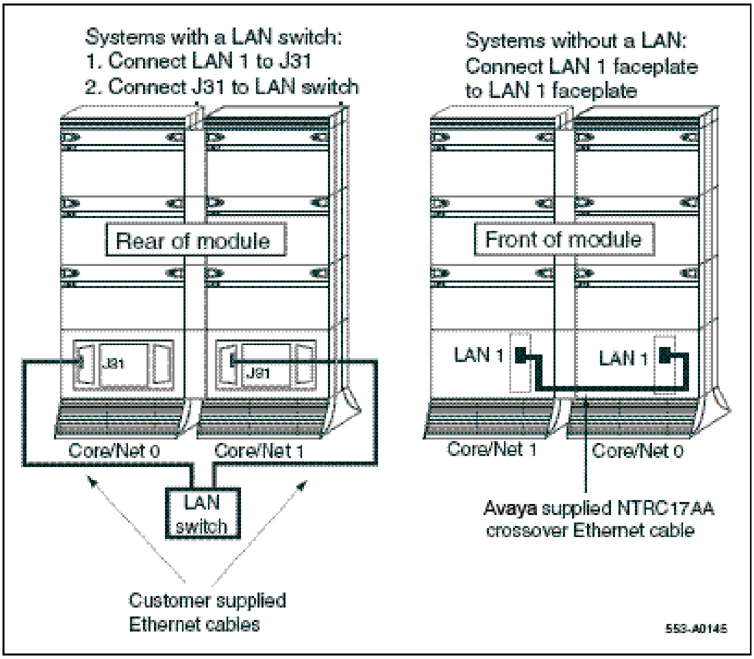
Procedure 29
Connecting the Core module to a LAN

1 Label both sides of two *customer supplied* Ethernet cables.

2 Connect a CAT5 Ethernet cable from J31 (top) on the Core/Net 0 I/O panel to the LAN switch.

3 Connect a second CAT5 Ethernet cable from J31 (top) on the Core/Net 1 I/O panel to the LAN switch.

Figure 86
Options for LAN 1 connections



End of Procedure

Cabling Common Equipment in a Multi Group system

Contents

This chapter contains information about the following topics:

Cabling guidelines

The NT4N41 Core/Net module backplane (see Figure 87 on page 213), like all circuit boards, has a primary side and a secondary side. The primary side, which faces the front of the module, contains the primary shrouds, which provide mechanical guidance for the pins of the card edge connectors. The secondary side of the backplane, which faces the rear of the module, contains the secondary shrouds, which provide mechanical guidance for cable connectors.

When routing cCNI to 3PE cables, store any excess cable length near the associated Network module. Do not store excess cable in the Core/Net module.

Because the cable troughs and spaces on the sides of a module are within the EMI shielding of the system, unshielded cables can be routed in those areas. As space permits, Common Equipment cables can be routed horizontally in the cable troughs at the front, rear, and sides of the module or vertically on the sides of the module.

> ***Note:*** In a DC-powered module, because there is no MPDU, there is room to route cables horizontally from front to rear on the left side (front view) of the module.

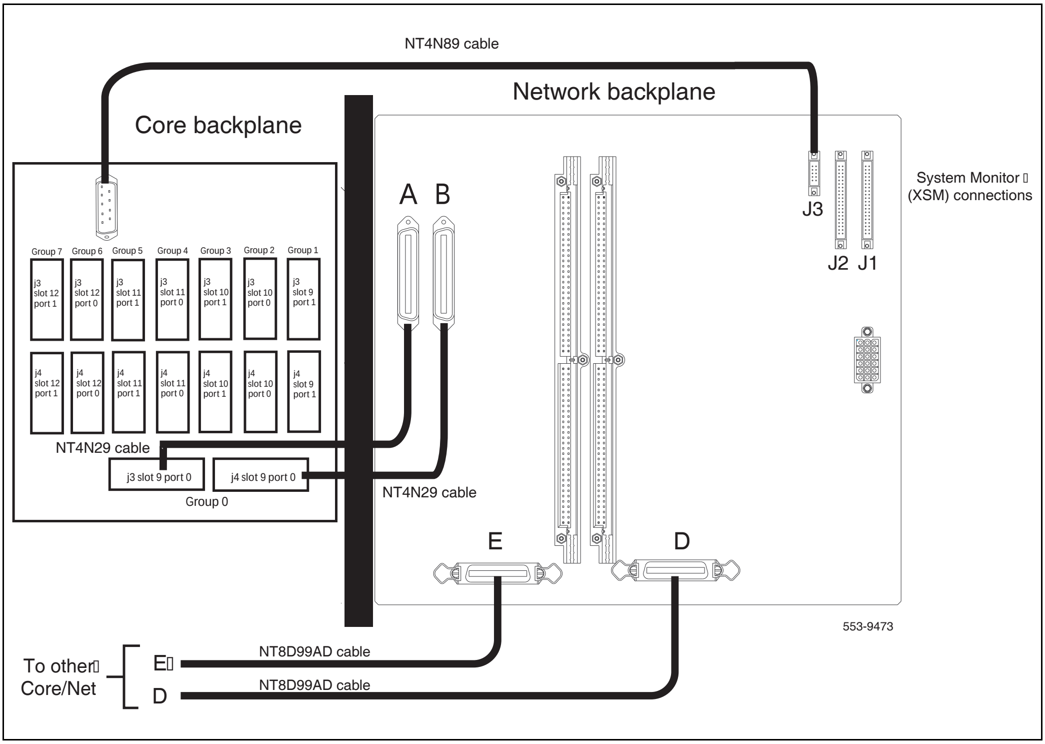
CAUTION — Service Interruption

System Failure

Cables must be routed as perpendicular as possible to any nearby power cables. Avoid routing cables near power cables if alternate routing is available.

At the rear of the module, cables routed between the I/O panel and the rear cover can be parallel to the power cables because the panel provides EMI shielding.

Figure 87
NT4N41 Core/Net shelf fanout panel (backplane)



A label kit is included in the system package. Use of these labels is optional.

Core/Net module

The Core/Net modules contain two distinct sets of circuit cards: Core cards and Network cards (see Figure 88 on page 215). This chapter contains instructions on how to configure the Core side of the CP PIV Core/Net modules. To configure the Network side of the Core/Net modules, follow the instructions in “Cabling network modules and loops” on page 367.

Reviewing Core/Net module placement

Core/Net modules are installed side-by-side on top of separate pedestals, for power and cooling redundancy. Core/Net 1 is always on the left. Core/Net 0 is always on the right (see Figure 88 on page 215).

Reviewing required Core cards

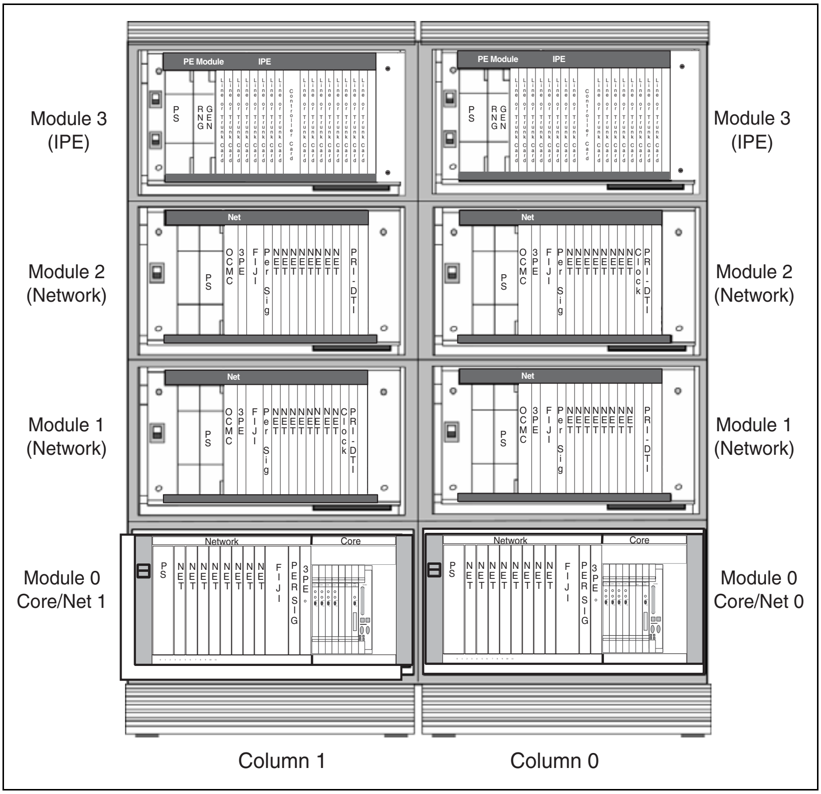
All Core cards are installed in the factory. See Table 26 on page 214 for the Core card requirements for each Core/Net module. For module and card descriptions, see "System equipment – UEMs" on page 42.

Table 26
Required Core cards (minimum per Core/Net module)

Order Code	Description	Number required per Core/Net module	Backplane side
NT4N65	cCNI: cPCI Core Network Interface Card	1 to 4[1]	front
NT4N48	System Utility Card	1	front
NT4N39AA	CP PIV Call Processor Card (512 MB memory)	1	front
N0026096	MMDU blank faceplate	1	front

Note 1: Each cCNI card supports two Network groups. The number of cCNI cards in each system depends on the number of Network groups installed in the system. See the System Layout plan to determine the number and placement of cCNI cards.

Figure 88
Side-by-side placement of CP PIV Core/Net modules



Checking Core card (front side) installation

All Core cards are factory installed. The Core cards (front side) are:

1 **NT4N65 cPCI Core Network Interface (cCNI) cards**. Each system contains between one and four NT4N65 cCNI cards per Core/Net Module. The cCNI cards are located in slots c9-c12. If not already installed, install a P0605337 cPCI Card Slot Filler Panel to cover any of slots, c10 - c12, which do not contain cCNIs.

Note: In the NT4N41 Core/Net module, you must configure port 0 on the NT4N65 Core to Network Interface (cCNI) Card in slot c9 as Group 0. Communication between the bv cCNI and 3PE cards for Group 0 is accomplished by using the NT4N29 cable.

Note: Slots c13 and c14 remain empty. If necessary install a P0605337 cPCI Card Slot Filler Panel in each slot.

2 **NT4N48 System Utility (Sys Util) card**. The System Utility card is located in slot c15.

3 **NT4N39AA Call Processor PIV (CP PIV)**. This card is located in the slot marked CP.

Cabling the Core/Net module backplane

Before you connect cables to the backplane, visually inspect the backplane shroud connectors to make sure there are no bent pins.

> **CAUTION — Service Interruption**
>
> **Damage to Equipment**
>
> Pins may be bent or broken if you try to insert the cable connector at an angle. Do not push the connector in any further after you hear the click.

Procedure 30
Cabling the Core/Net module backplane

1 Orient the cable connector so the strain relief paddle is to the right.

2 Partially insert the cable connector so its guides mate to the corresponding backplane connector.

3 Apply a small amount of pressure to push the cable connector straight into the backplane connector. You will feel a click when the connector seats.

End of Procedure

Disconnecting cables from the Core/Net module backplane

To disconnect cables from the Core/Net module backplane, you must use the P0741489 Extraction Tool provided, located in the rear of the module (behind the I/O safety panel).

CAUTION — Service Interruption

Damage to Equipment

Use the P0741489 Extraction Tool to disconnect cables from the backplane shrouds in NT4N41 Core/ Network modules.

Follow the procedure below to avoid bending or breaking pins when removing cable connectors from the backplane shrouds.

Do not insert the extraction tool unless the cable connector is locked into the shroud.

Do not force the extraction tool deeper than the detent on the cable connector.

Do not improvise with common hand tools.

Procedure 31
Disconnecting cable connectors from the backplane

Use extreme caution to avoid bending or breaking backplane pins. Do not insert the extraction tool unless the cable connector is locked into the securing clip. A gentle tug on the cable will allow you to determine whether or not the connector is secured. Do not force the extraction tool deeper than the tab on side of the cable connector hood.

1 Grasp the cable connector by the strain relief tab.

2 Center the long flat edge at the straight end of the tool between the cable connector hood and the securing clip.

Note: If the straight end of the tool is notched, use that end if the connector can be accessed straight-on. If you must approach the connector from any angle at all, use the angled end.

3 Gently insert the extraction tool and gradually apply pressure in the direction directly toward the backplane while gently pulling the cable away from the backplane. A gentle side-to-side rocking motion may be used on the cable if needed.

CAUTION — Service Interruption

Damage to Equipment

Do not pry the against the connector with the extraction tool. Simply inserting the tool between the connector and the securing clip is sufficient to unlock the connector. Prying may cause damage to the connector or the backplane pins.

4 Stop applying pressure as soon as the cable connector comes loose from the backplane.

5 Slowly remove the extraction tool and the cable connector.

End of Procedure

Optioning the System Utility Card

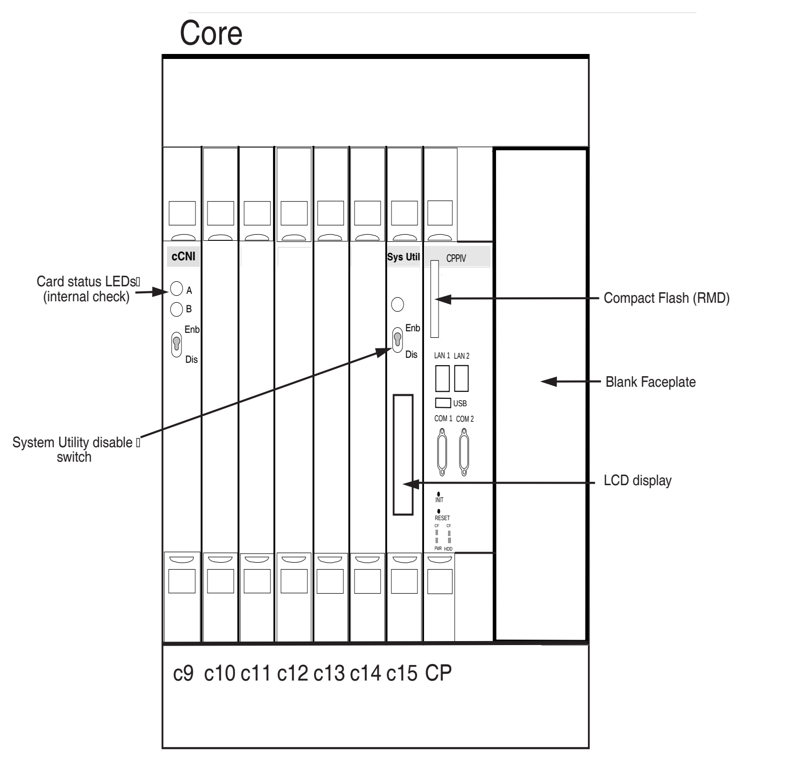
To install the system utility card, first identify Core/Net 0 and Core/Net 1 shelves. Then adjust the DIP switches according to Table 27 below.

Table 27
System Utility Card DIP switch settings

	Core/Net 0	Core/Net 1
DIP switch 1	on	off
DIP switch 2	on	on

Figure 89 on page 220 shows Core card (front side) placement. If the Core cards are not installed, refer to this figure to add or replace cards.

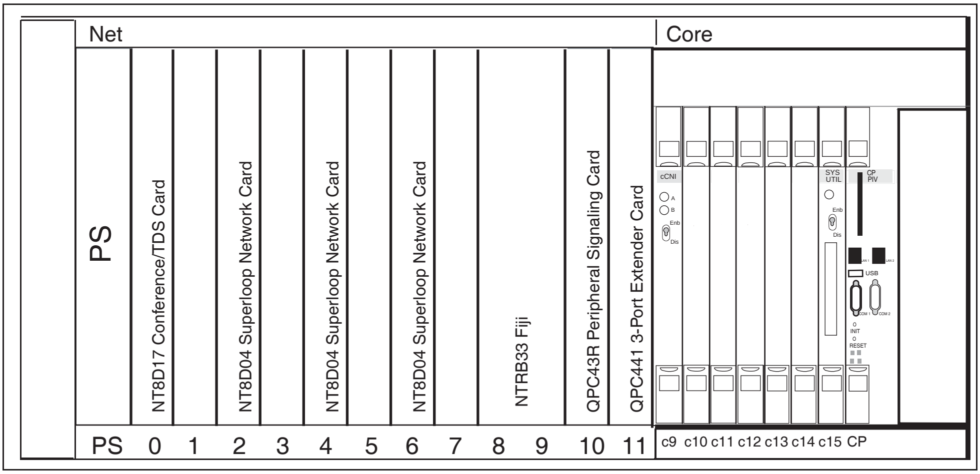
Figure 89
Core card placement in the NT4N41 Core/Net Module (front)



Core shelf cabling

This section describes installation of the *internal* Core cables (see Figure 91 on page 223). Cables for Core to non-Core modules are described in subsequent sections.

Figure 90
Card placement in the NT4N41 Core/Net Module



Required Core cables

Table 28 on page 221 lists field installed cables. Cables in Table 29 on page 222 are factory installed.

Table 28
Field installed Core cables (internal) (Part 1 of 2)

Order Code	Description	Number required per system
NT4N88AA	COM1 (DTE/terminal)	1
NT4N88BA	COM2 (DCE/modem)	2
NT4N90BA	Ethernet (CP PIV card to I/O panel)	2
NTRC17BA	Crossover Ethernet cable (Core to Core)	2

Table 28
Field installed Core cables (internal) (Part 2 of 2)

Order Code	Description	Number required per system
Customer supplied	Standard CAT5 Ethernet cable (I/O Panel to LAN switch)	2
Note: If there is no connection to a LAN, connect the two LAN 1 connectors using the NTRC17BA crossover cable.		

Table 29
Factory installed Core cables (internal)

Order Code	Description	Number required per system
NT4N4405	Shelf Power: Net backplane to Core backplane	2
NT4N29AA	cCNI to 3PE Core/Net shelf cable	4
NT4N89AA	System Utility card to XSM (see Figure 92)	2

Figure 91
Core/Net cable connections (top view)

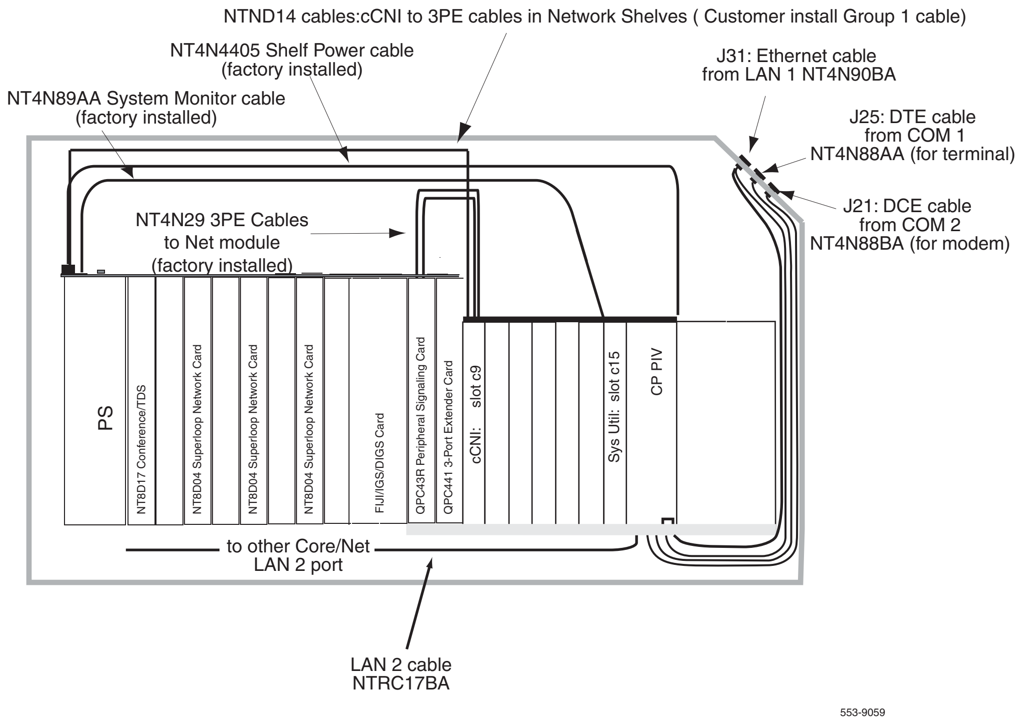
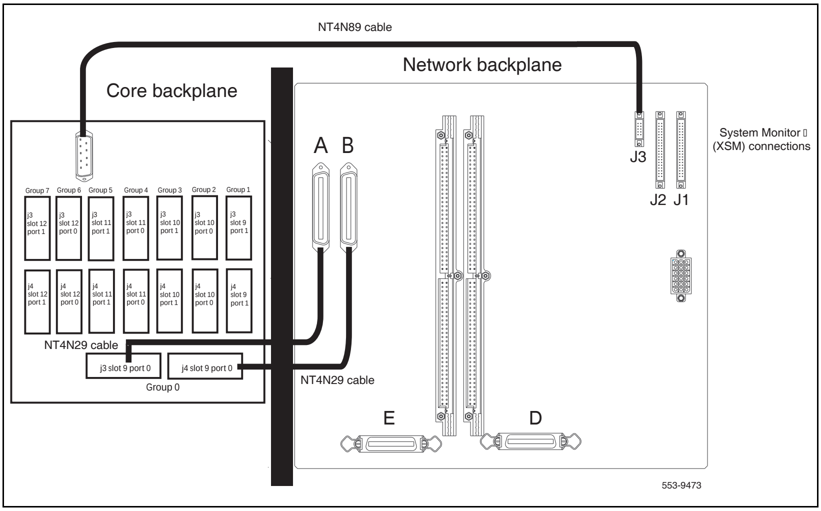


Figure 92
CP PIV Core and Network backplanes



Installing the CP PIV to I/O panel cables

Connect the cables from the CP PIV card faceplate to the I/O panel on the back of the Core/Net modules:

- COM1 is used to connect a terminal.
- COM2 is used to connect a modem.
- LAN 1 is used to connect the system to a LAN switch.
- LAN 2 is used to connect Core 0 to Core 1 for system redundancy.

  Note: If there is no LAN, LAN 1 and LAN 2 are connected from Core 0 to Core 1.This connection is made on the backplane.

Figure 93 on page 226 displays the COM and LAN cable connections.

> **CAUTION — Service Interruption**
>
> **Damage to Equipment**
>
> Label all cables on both ends before installation. Labels help ensure that the cables are properly routed and connected. Cable labels also help installers to troubleshoot problems and replace equipment.

Procedure 32
Installing the CP PIV to I/O panel cables

1 Connect COM1 on the CP PIV faceplate to J25 on the I/O panel with cable NT4N88AA.

2 Connect COM2 on the CP PIV faceplate to J21 on the back of the I/O panel with cable NT4N88BA.

3 Connect the Dual Ethernet Adapter (RJ-45) for I/O Panel (NTRE40AA) to J31. Secure the adapter to J31 with the two screws included in the shipment.

4 Connect LAN 1 (Ethernet) on the CP PIV faceplate to J31 (top) of the I/O panel with cable NT4N90BA.

This connection can only be made *after* the Dual Ethernet Adapter is installed (see step 3 above).

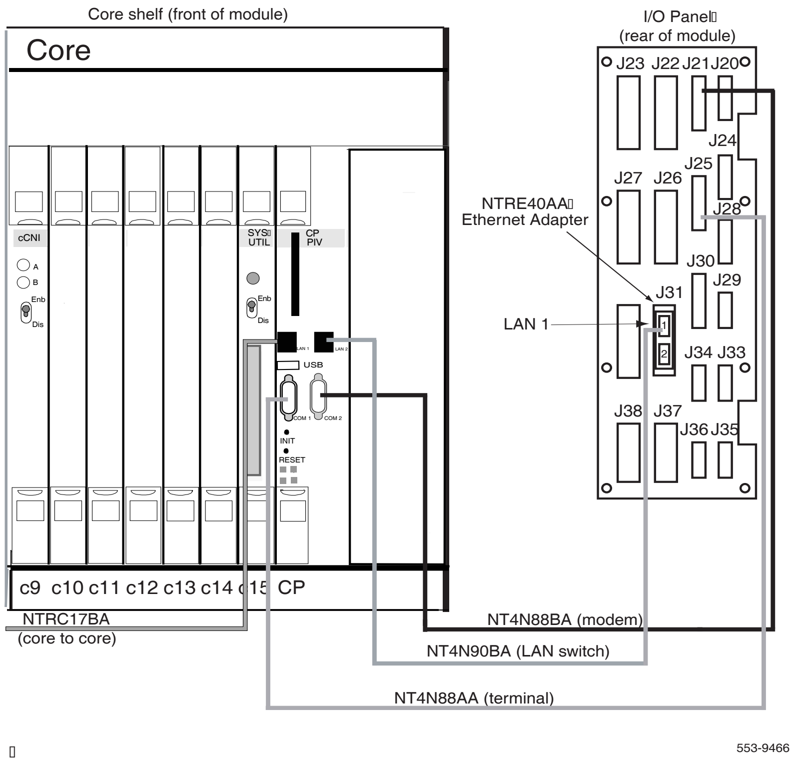
Note: If a LAN switch is not used, connect LAN 1 in Core 0 to LAN 1 in Core 1.

5 Connect a crossover Ethernet cable (NTRC17BA) from the LAN 2 port in Core 0 to the LAN 2 port Core 1. This connection is for Core redundancy.

Note: To ensure EMI shielding, route the cable along the front of the card cage and through the sides of the Core/Net modules.

6 Repeat steps 1 through 4 in the second Core/Net module.

Figure 93
I/O panel connections



End of Procedure

Connecting the Core module to a LAN

Connect each Core/Net module to a local area network (LAN). This connection provides a communication channel for LAN based systems management tools such as Element Manager. This connection also supplies additional redundancy capabilities. See Figure 94 on page 228.

> ***Note 1:*** If a LAN is not available, connect the second NTRC17BA crossover Ethernet cable (included in the basic package) between the J31 ports in Core/Net 0 and Core/Net 1.

> ***Note 2:*** The Core/Net I/O panel cables must be installed as described on "Installing the CP PIV to I/O panel cables" on page 224 before the Ethernet connections can be completed.

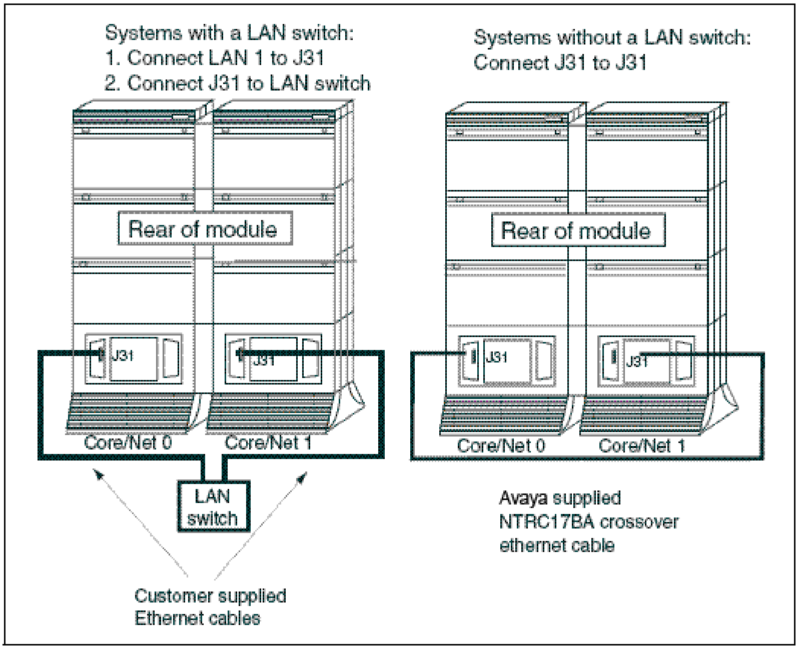
Procedure 33
Connecting the Core module to a LAN

1 Label both sides of two *customer supplied* Ethernet cables.

2 Connect a CAT5 Ethernet cable from J31 (top) on the Core/Net 0 I/O panel to the LAN switch.

3 Connect a second CAT5 Ethernet cable from J31 (top) on the Core/Net 1 I/O panel to the LAN switch.

Figure 94
Options for LAN 1 connections



End of Procedure

Cabling a Dual Ring Fiber Network

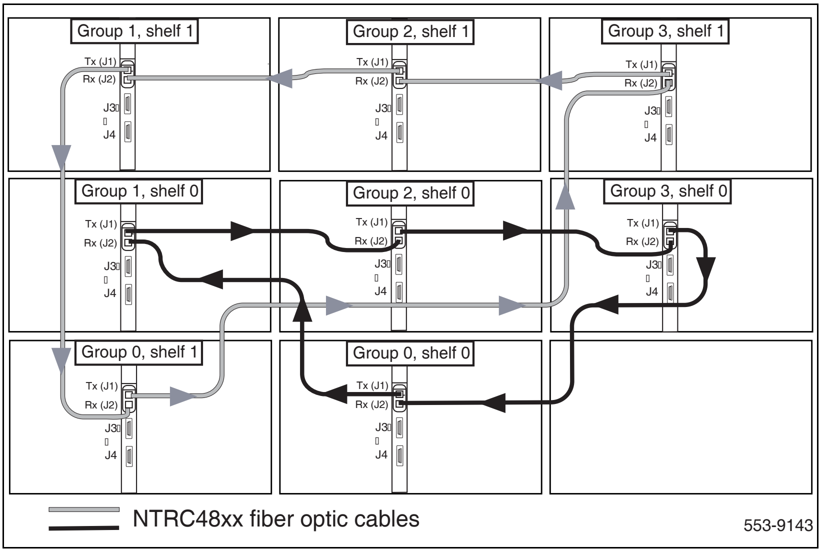
The FIJI cards in the Network modules are connected to form a Dual Ring Fiber Network. This allows calls to be routed between Network groups.

The Fiber Network consists of two separate rings: one ring connects all the Network Shelf 0s while the second ring connects all the Network Shelf 1s

(Figure 95 on page 229). Four steps are required to configure the Fiber Network:

- “Installing the Shelf 0 fiber optic ring (ascending)” on page 236.
- “Installing the Shelf 1 fiber optic ring (descending)” on page 237.
- “FIJI to FIJI cabling” on page 239.
- “Connecting the Clock Controller cables” on page 240.

Figure 95
Dual Ring Fiber Network



Required cards

Table 30 on page 230 outlines the number of circuit cards required by each system depends on system configuration.

Table 30
Fiber Network required cards

Quantity	Order code	Description
1 for each Network module	NTRB33	Fiber Junctor Interface (FIJI) card
1 for each Network module, as needed	NTRE39	Optical Cable Management Card (OCMC)
8 for each system (4 for each Core), as needed	NT4N65	Compact Core Network Interface (cCNI-2) cards
2 for each system	NTRB53	Global Clock Controller cards

The CS 1000M MG and Meridian 1 PBX 81C CP PIV support a Fiber Network Fabric network system with a Fiber Junctor Interface (FIJI) card. The double-slot FIJI (NTRB33AF) card resides in slots 8 and 9 on the Net side of the Core/Net module. The single-slot FIJI (NTRB33BBE5) card resides in slot 9 on the Net side of the Core/Net module. The double-slot FIJI (NTRB33AF) card resides in slots 2 and 3 on the Network module. The single-slot FIJI (NTRB33BBE5) card resides in slot 2 on the Network module.

Required cables

Table 31 on page 231 outlines the required cables. Cable lengths will vary depending on system configuration.

Table 31
Required cables

Cable type	Quantity	Order Code	Description
Fiber Ring cable	1 per FIJI card	NTRC48AB	1.8 m (6 ft) fiber optic cable
		NTRC48BB	3 m (10 ft) fiber optic cable
		NTRC48CB	3.6 m (12 ft) fiber optic cable
		NTRC48DA	4.25 m (14 ft) fiber optic cable
		NTRC48EA	5.8 m (19 ft) fiber optic cable
		NTRC48FA	7.9 m (26 ft) fiber optic cable
Clock to FIJI	2 per system	NTRC46AB	1.2 m to 4.1 m (4 ft to 13.5 ft)*
		NTRC46BB	1.65 m to 2.4 m (5.5 ft. to 8 ft)*
		NTRC46CB	6.7 m (22 ft)*
Clock to Clock	1 per system	NTRC49AA	1.8 m (6 ft)
		NTRC49BA	6 m (20 ft)
FIJI to FIJI Sync	1 per network group	NTRC47AA	1.5 m (5 ft)
* Indicates the lengths of the two “Y” terminations.			

WARNING

The shortest Fiber Cable must always be used.

The cables from Group 0 to Group 1 must always be the same length as the cables from the last group back to Group 0

The delta between the lengths of each fiber ring from Group 0 to any other group must not exceed 15 m (50 ft). Rings are directional. Ring 0 is ascending and Ring 1 is descending.

FIJI card cabling

Fiber Network is enabled by the installation of one NTRB33 Fiber Junctor Interface (FIJI) card in each Core/Net or Network module (see Figure 96 on page 233 and Figure 97 on page 234). Double-slot FIJI (NTRB33AF) cards require two slots and install in slots 2 and 3 of each Network module, or in slots 8 and 9 of each Core/Net module. Single-slot FIJI (NTRB33BBE5) cards require one slot and install in slot 2 of each Network module, or in slot 9 of each Core/Net module. The LCD display shows the Network group and shelf. If an error occurs, an Alarm code appears in this window.

Class 1 LED Device

DANGER

The fiber-optic interface product used in the Large 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 can 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.

Figure 96
Double slot FIJI card faceplate

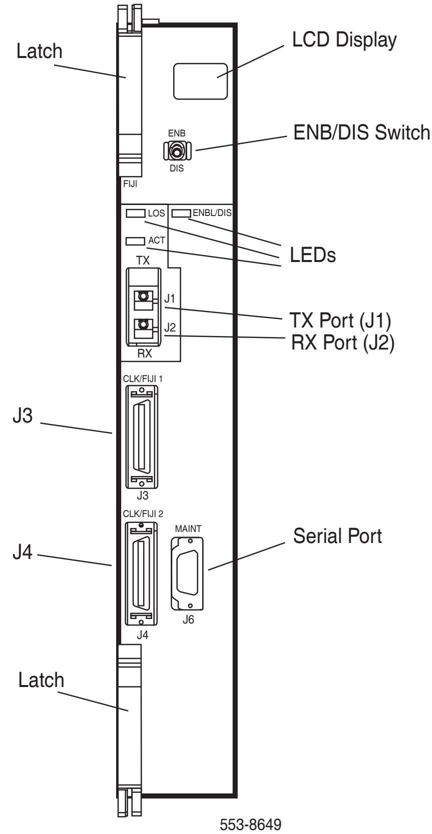
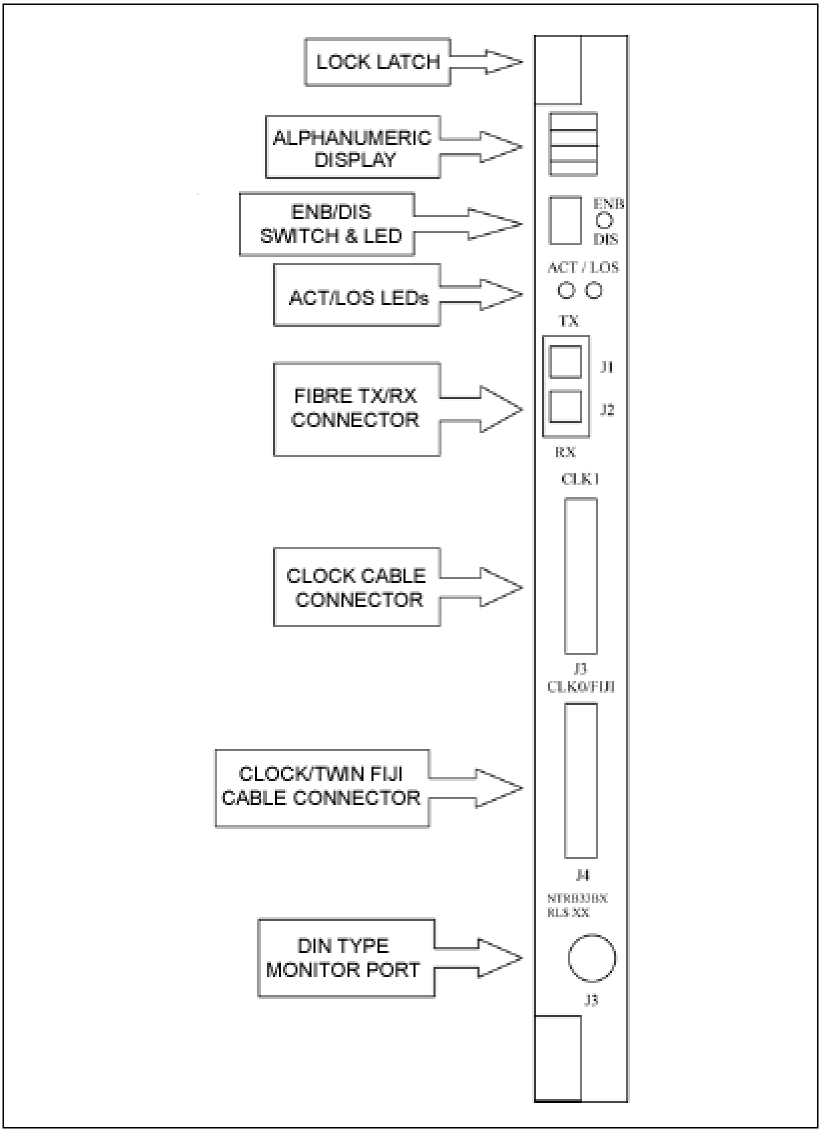


Figure 97
Single slot FIJI card faceplate



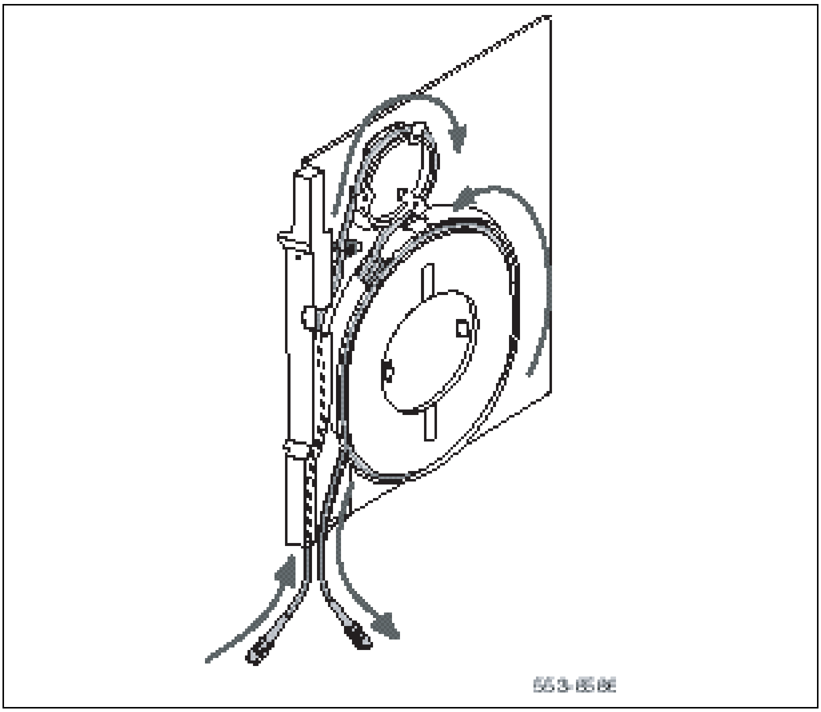
Optical Cable Management Card (OCMC)

Because fiber optic cables are easily damaged if bent, the NTRE39 Optical Cable Management Card (OCMC) is installed in Network modules to store and protect excess cable length. The OCMC card ensures that the fiber cable is not bent beyond a a 30 mm (1 1/5 in.) bend radius (Figure 98 on page 235).

The OCMC contains no electronic components and is not powered by the backplane. This card is used primarily in upgrades where the intergroup cable distances vary greatly.

OCMC is a single width card installed between the Power supply and slot 1 of a Network module.

Figure 98
OCMC: the Optical Cable Management Card



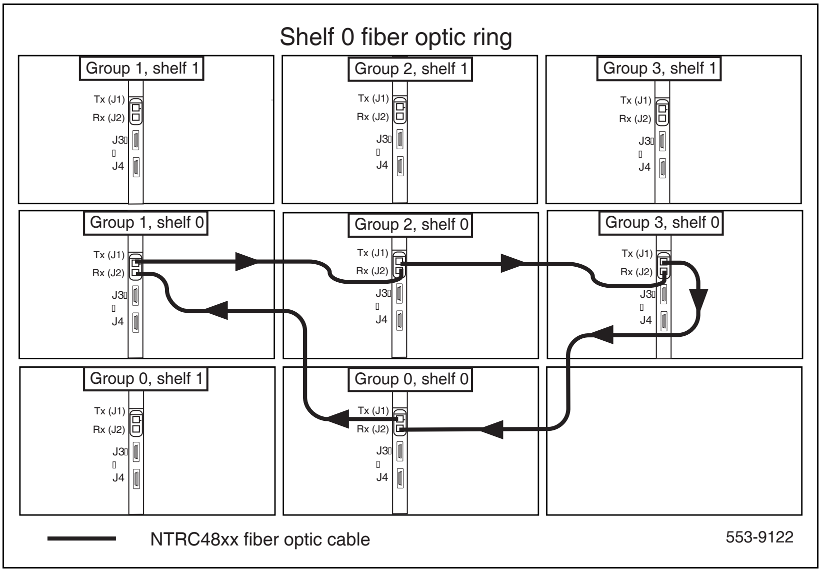
Installing the Shelf 0 fiber optic ring (ascending)

To create the Shelf 0 fiber optic loop, connect the FIJI cards in each Network Shelf 0 in *ascending* order (Figure 99 on page 237).

Procedure 34
Installing the Shelf 0 fiber optic ring (ascending)

1. Start with the Tx (J1) port in Group 0, Shelf 0.
2. Connect a NTRC48xx FIJI Fiber Ring Cable of the appropriate length from the Tx (J1) port of the FIJI card in Group 0, Shelf 0 to the Rx (J2) port of the FIJI card in Group 1, Shelf 0.
3. Connect a NTRC48xx FIJI Fiber Ring Cable of the appropriate length from the Tx (J1) port of the FIJI card in Group 1, Shelf 0 to the Rx (J2) port of the FIJI card in Group 2, Shelf 0.
4. Continue to connect NTRC48xx FIJI Fiber Ring Cables of the appropriate length from the Tx (J1) port to the Rx (J2) port in Shelf 0 of each Network group. Connect these cables in ascending order of Network groups.
5. To complete the ring, connect a final cable from the Tx (J1) port in the highest number group back to the Rx (J2) port in Group 0, Shelf 0.

Figure 99
Shelf 0 fiber optic ring on a 4 group machine



End of Procedure

Installing the Shelf 1 fiber optic ring (descending)

To create the Shelf 1 fiber optic loop, connect the FIJI cards in each Network Shelf 1 in *descending* order (Figure 100 on page 238).

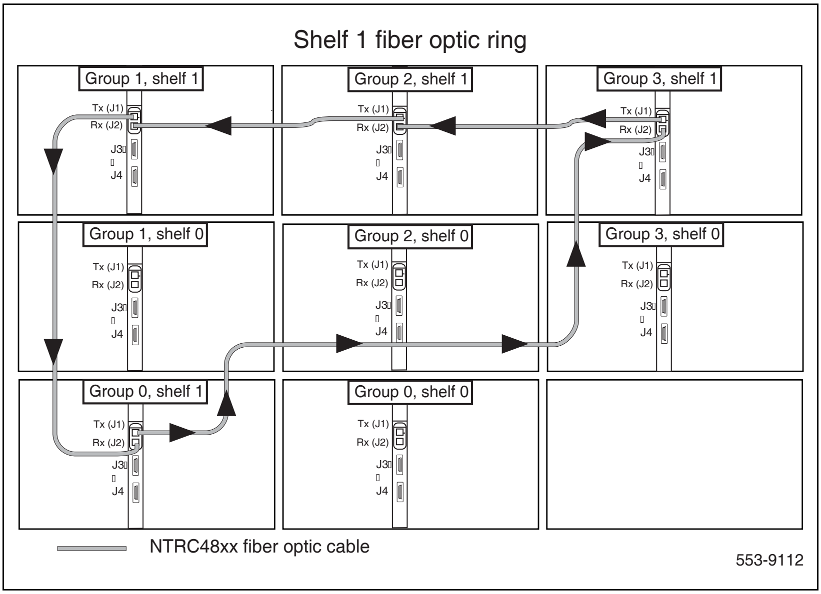
Procedure 35
Installing the Shelf 1 fiber optic ring

1. Start with the Tx (J1) port in Group 0, Shelf 1.
2. Connect a NTRC48xx FIJI Fiber Ring Cable of the appropriate length from the Tx (J1) port of the FIJI card in Group 0, Shelf 1 to the Rx (J2) port of the FIJI card in the highest Network group, Shelf 1. This is the longest NTRC48xx cable that came with the shipment.
3. Connect a NTRC48xx cable from the Tx (J1) port of the FIJI card from the Tx (J1) port in the highest Network group, Shelf 1 to the Rx (J2) port in the second highest Network group, Shelf 1.

4 Continue to connect NTRC48xx FIJI Fiber Ring Cables of the appropriate length from the Tx (J1) port to the Rx (J2) port in Shelf 1 of each Network group. Connect these cables in descending order of Network groups.

5 To complete the ring, connect a final cable from Tx in Group 1, Shelf 1 to Rx in Group 0, Shelf 1.

Figure 100
Shelf 1 fiber optic ring on a 4 group machine



End of Procedure

FIJI to FIJI cabling

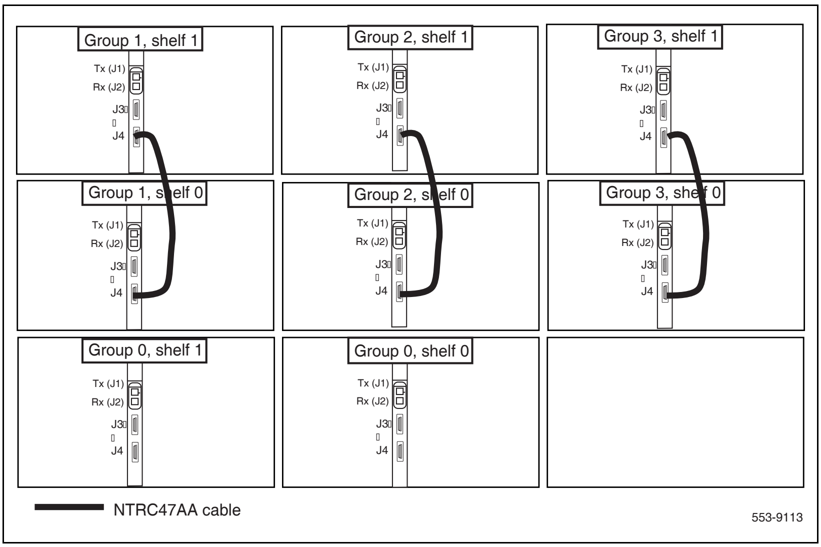
The FIJI cards in Shelf 0 and Shelf 1 of each Network group (except Group 0) must be directly connected with a NTRC47AA FIJI to FIJI Synch Cable cable.

Procedure 36
Connecting the FIJI to FIJI cables

1 Connect a NTRC47AA cable from J4 to J4 of the FIJI cards in each Network group, except Group 0 (Figure 101 on page 239).

2 **Do NOT connect a cable in Group 0.** The FIJI to FIJI connection in Group 0 is made as part of the Clock Controller connections described on page 240.

Figure 101
FIJI Shelf 0 to FIJI Shelf 1 connections



End of Procedure

Connecting the Clock Controller cables

Two Clock Controller cards are required in each system. These cards synchronize Large System functions. Figure 102 on page 241 shows the two Clock Controllers installed in a two-column system.

The Clock Controllers Cards must be installed as directed in the following three rules.

1 Two Clock Controller cards must be installed in each system. The Clocks must be connected to each other and to the FIJI cards in Network Group 0.

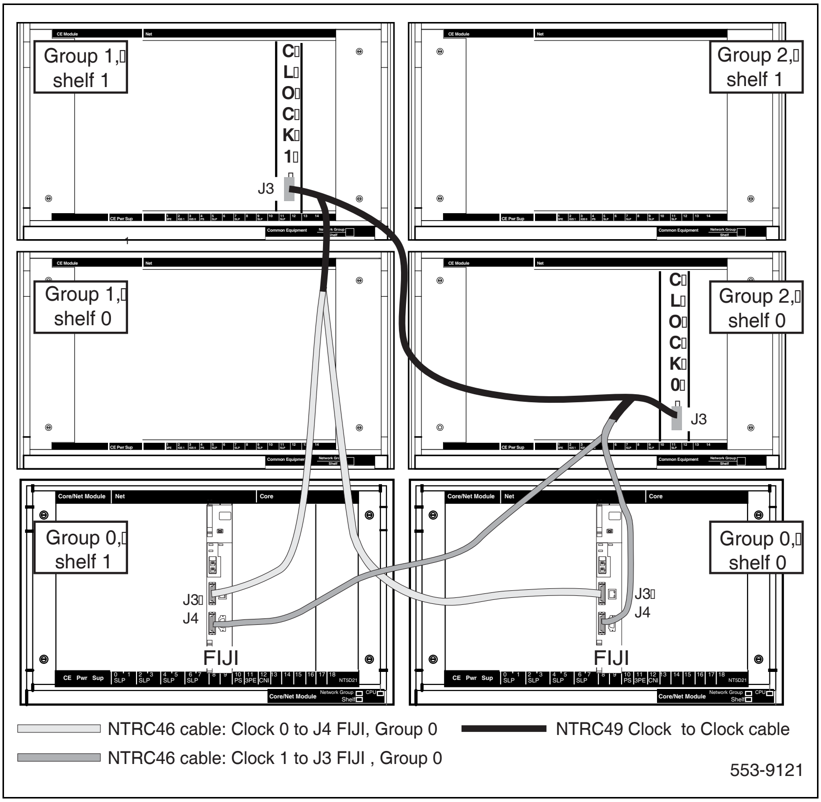
2 One Clock Controller must be installed in Network Shelf 0, slot 13. A second Clock Controller must be installed in Network Shelf 1, slot 13.

3 Clock Controllers should be installed in different Network groups if possible.

IMPORTANT!

The Clock Controller cannot be installed in the Core/Net shelf.

Figure 102
Clock Controller placement



Connect the cables to the Clock Controllers as shown in Figure 103 on page 243.

Procedure 37
Connecting the Clock Controller cables

1 Connect the Clock to Clock cable:

   a. Connect P1 of the NTND49 cable to port J3 of Clock Controller 0.

   b. Connect P2 of the NTND49 cable to port J3 of Clock Controller 1.

2 Connect the Clock to Clock and Clock to FIJI cables:

a. At Clock 0: Connect the “J1 Clock” end of a Clock to FIJI cable (NTRC46Ax) to the J1 end of the Clock to Clock cable.

b. At Clock 1: Connect the “J1 Clock“ end of a second Clock to FIJI cable (NTRC46Ax) to the J2 end of the Clock to Clock cable.

3 Connect the Clock 0 to FIJI cable:

a. Connect P1 of the NTRC46 cable from Clock 0 to J4 of the FIJI card in Group 0, Shelf 0.

b. Connect P2 of the NTRC46 cable from Clock 0 to J4 of the FIJI card in Group 0, Shelf 1.

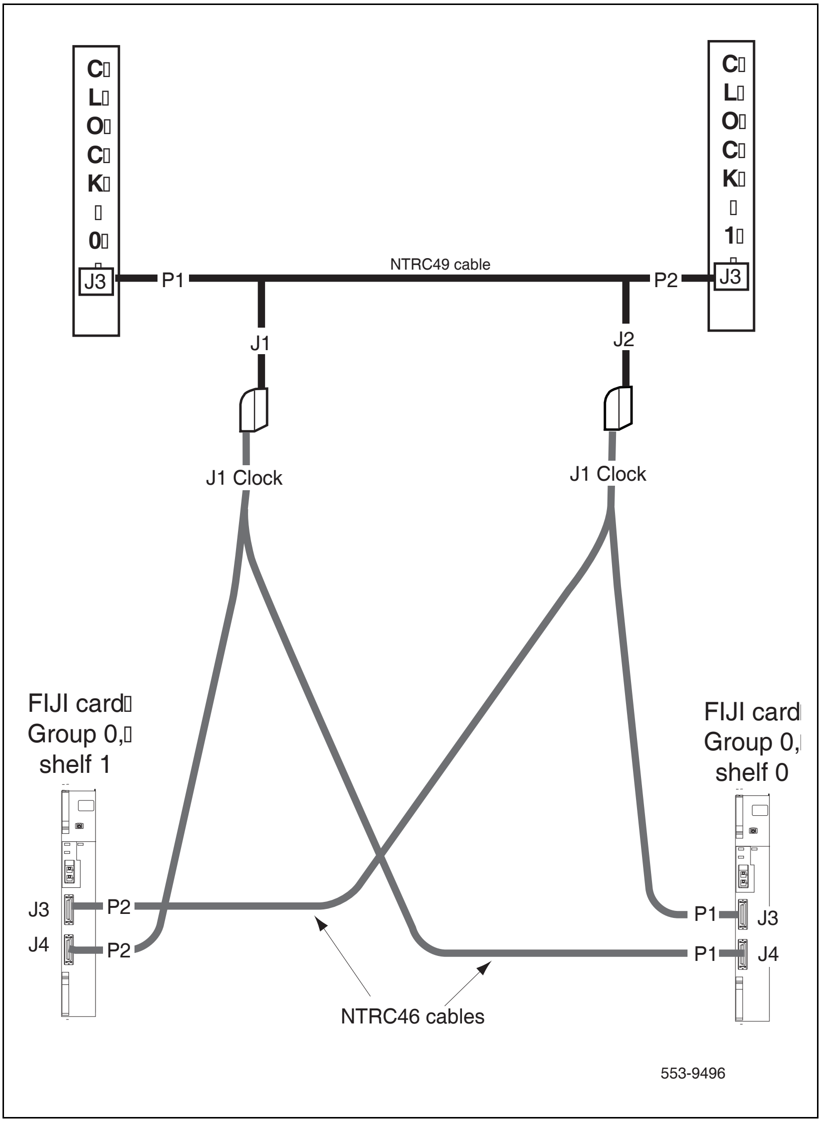
4 Connect a Clock 1 to FIJI cable:

a. Connect P1 of the NTRC46 cable from Clock 1 to J3 of the FIJI card in Group 0, Shelf 0.

b. Connect P2 of the NTRC46 cable from Clock 1 to J3 of the FIJI card in Group 0, Shelf 1.

End of Procedure

Figure 103
Clock Controller cable configuration



Cabling lines and trunks

Contents

This chapter contains information about the following topics:

Overview

Cables are designated by the letter of the I/O panel cutout (A, B, C, and so on) where the 50-pin cable connector is attached. Each cable has three 20-pin connectors (16 positions are used), designated 1, 2, and 3, that attach to the backplane. Using the designations described, the backplane ends of the first cable are referred to as A-1, A-2, and A-3.

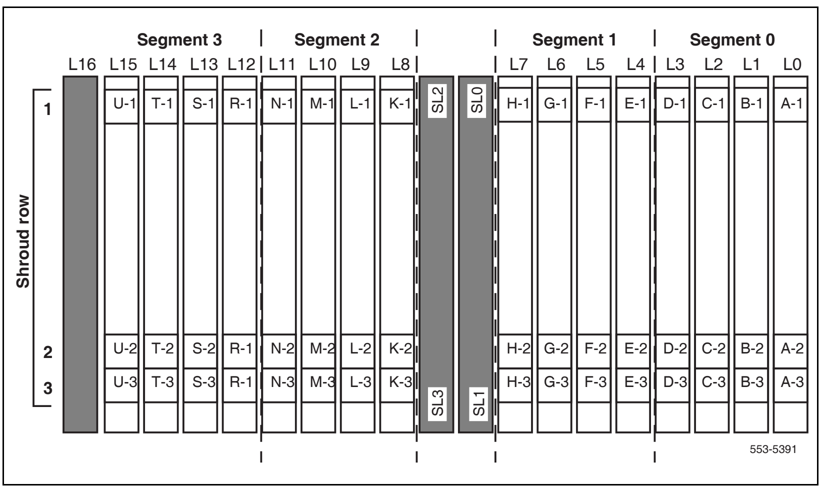
The locations of the cable connectors on the backplane are designated by the slot number (L0 through L15 for NT8D37) and the shroud row (1, 2, and 3). Using these designations, the slot positions in the first slot are referred to as L0-1, L0-2, and L0-3.

In NT8D37BA and NT8D37EC (and later vintage) IPE Modules, all 16 IPE card slots support 25-pair cable connections. Table 32 on page 246 shows the cable connections from the backplane to the inside of the I/O panel. Figure 104 on page 246 shows the designations for the backplane end of the cables, the backplane slot designations for the cable connections, and the associated network segments for the backplane slots.

Table 32
NT8D37 cable connections

Backplane slots–shroud rows	I/O panel/cable designation
L0–1, 2, 3	A
L1–1, 2, 3	B
L2–1, 2, 3	C
L3–1, 2, 3	D
L4–1, 2, 3	E
L5–1, 2, 3	F
L6–1, 2, 3	G
L7–1, 2, 3	H
L8–1, 2, 3	K
L9–1, 2, 3	L
L10–1, 2, 3	M
L11–1, 2, 3	N
L12–1, 2, 3	R
L13–1, 2, 3	S
L14–1, 2, 3	T
L15–1, 2, 3	U

Figure 104
NT8D37 backplane cable designations



Media Gateway cabling requirements

Media Gateways require the following:

- Each Media Gateway and Media Gateway Expander requires up to four 25-pair cables:
  - one 25-pair cable for each slot that is equipped with a trunk or line circuit card
  - one 25-pair cable for each NTAK03 or NTAK02 card not using the NTAK19EC 2-port SDI cable
- When Ethernet connections are used instead of traditional cabling, use the Media Card Input/Output Adapter.
- For the NTAK09 1.5 Mbit DTI/PRI circuit card, use the NTBK04 cable.
- For the NTAK10 2.0 Mbit DTI circuit card, NTAK79 2.0 Mbit PRI circuit card, and NTBK50 2.0 Mbit PRI circuit card, use the NTBK05 cable.
- Certain COT and DDI trunk cards also require a surge-suppression cable (700502846) to prevent transient voltages from damaging the equipment. For a list of cards requiring the surge-suppression cable and for installation isntructions, see *Circuit Card: Description and Installation* (NN43001-311).

Cabling an IPE Module or Media Gateway

Follow Procedure 38 to cable IPE Modules (NT8D37), Media Gateways, or Media Gateway Expanders.

> ***Note:*** The corner vertical channels in the rear of the IPE module are outside of the EMI shield. Cables in those vertical channels must be shielded, and must enter and exit the EMI-shielded area through I/O panels and adapters.

DANGER OF ELECTRIC SHOCK

Tip, ring, A, B, E, M, ESC, and ESCG connections may be considered to be Telecommunication Network Voltages (TNV).

Procedure 38
Cabling an IPE Module (NT8D37) or Media Gateway

1 Select an appropriate number of NE-A25B (or equivalent) cables long enough to run from the I/O panels on the rear of the module or backplanes of the Media Gateway or Expander, to the MDF.

Figure 105 on page 249 shows the I/O panels on the NT8D37 IPE Module.

2 To both ends of each cable, attach a tag that shows the module or chassis number and the I/O or backplane connector designation.

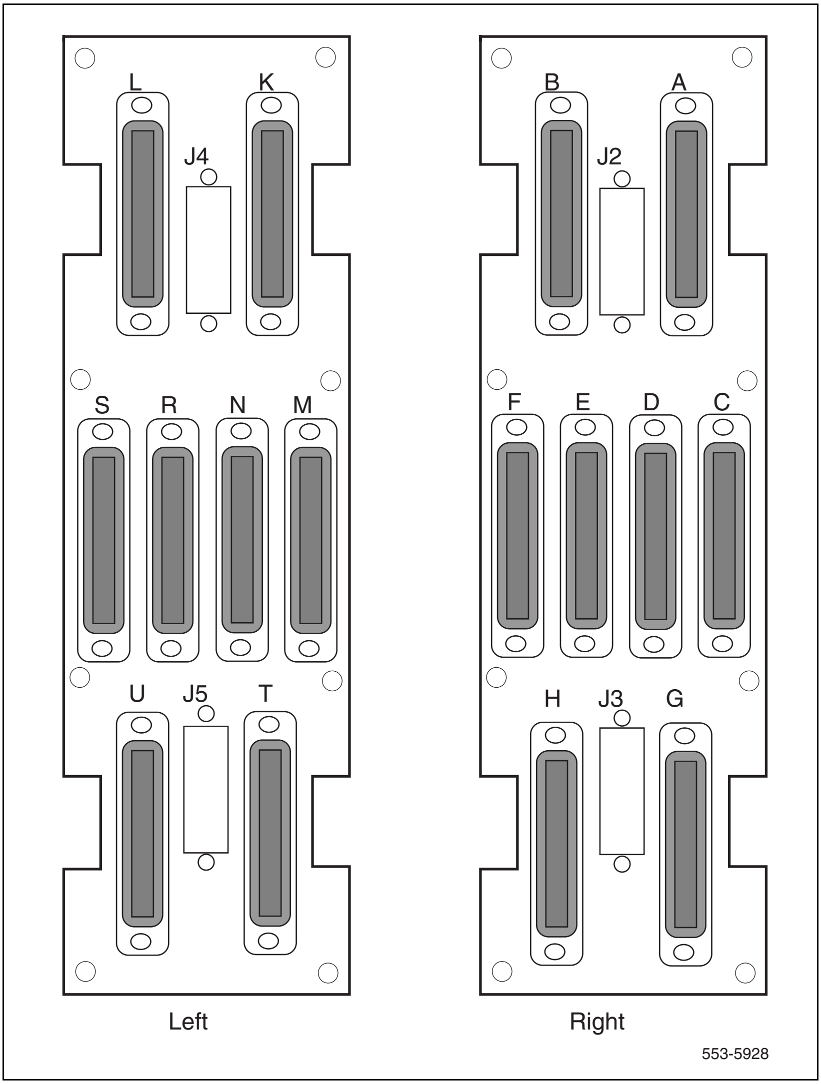
3 Connect each cable to the appropriate connector on the I/O panel or backplane, and run the cables to the MDF.

4 Terminate each cable on the cross-connect block designated with the appropriate module or chassis number.

Note: For information about the MDF layout see “Planning and designating a Main Distribution Frame” on page 137.

5 Make sure all cables are neatly run, properly seated, and secured with cable ties.

Figure 105
NT8D37 IPE Module I/O panels



End of Procedure

Connecting lines and trunks

Follow Procedure 39 to connect lines and trunks. Ensure that wiring is not reversed and is on the proper terminals. Allow enough slack in the wiring to allow tracing and to reconnect wires if they break at the terminal.

Procedure 39
Connecting lines and trunks

1 Extend incoming wiring (such as cables from the central office or wiring from a recorded announcement machine) to the MDF and terminate them on separate connecting blocks.

2 Assign and record terminal numbers (TN) for each line or trunk. Determine the location of the line or trunk connection and its assigned TN from the work order or assignment records.

3 Connect each line and trunk to the TN using cross-connecting wire (typically 24 AWG type-Z wire). Table 33 on page 251 lists pair-termination tables for line and trunk cards in NT8D37 IPE Modules.

4 Cross-connect incoming wiring and lines and trunks at the MDF.

End of Procedure

Table 33
Line and trunk pair-termination tables

NT8D37 IPE Module	
Line cards	Table 34 on page 251
Trunk cards	NT8D14 Universal Trunk Card: Table 35 on page 253 NT8D15 E&M Trunk Card: Table 36 on page 254 through to Table 38 on page 255 NT5K17 DDI Trunk Card: Table 40 on page 258 through toTable 42 on page 261 NT5K18 Flexible Central Office Trunk card: Table 43 on page 263 through to Table 45 on page 267 NT5K19 Flexible E&M Trunk card: Table 46 on page 269 through to Table 58 on page 282

Table 34
NT8D37 IPE Module: line card pair-terminations (Part 1 of 2)

Pair	Pin numbers	Pair color	Unit 24/card
1T/1R	26/1	W-BL/BL-W	0
2T/2R	27/2	W-O/O-W	1
3T/3R	28/3	W-G/G-W	2
4T/4R	29/4	W-BR/BR-W	3
5T/5R	30/5	W-S/S-W	4
6T/6R	31/6	R-BL/BL-R	5
7T/7R	32/7	R-O/O-R	6
8T/8R	33/8	R-G/G-R	7
9T/9R	34/9	R-BR/BR-R	8
10T/10R	35/10	R-S/S-R	9
11T/11R	36/11	BK-BL/BL-BK	10
12T/12R	37/12	BK-O/O-BK	11
13T/13R	38/13	BK-G/G-BK	12

Table 34
NT8D37 IPE Module: line card pair-terminations (Part 2 of 2)

Pair	Pin numbers	Pair color	Unit 24/card
14T/14R	39/14	BK-BR/BK-BR	13
15T/15R	40/15	BK-S/S-BK	14
16T/16R	41/16	Y-BL/BL-Y	15
17T/17R	42/17	Y-O/O-Y	16
18T/18R	43/18	Y-G/G-Y	17
19T/19R	44/19	Y-BR/BR-Y	18
20T/20R	45/20	Y-S/S-Y	19
21T/21R	46/21	V-BL/BL-V	20
22T/22R	47/22	V-O/V-O	21
23T/23R	48/23	V-G/G-V	22
24T/24R	49/24	V-BR/BR-V	23
25T/25R	50/25	V-S/S-V	Spare

Note: Each of the following I/O panel connectors is cabled as shown above: connectors A, B, C, D, E, F, G, H, K, L, M, N, R, S, T, and U. These connectors are associated with backplane slots 0 through 15, sequentially.

Table 35
NT8D37 IPE Module: NT8D14 Universal Trunk Card pair-terminations

Lead designations					
RAN mode	**Paging mode**	**Other modes**	**Pin numbers**	**Pair color**	**Unit**
0T/0R CP/MB	0T/0R A/PG	0T/0R	26/1 27/2	W-BL/BL-W W-O/O-W	0
1T/1R CP/MB	1T/1R A/PG	1T/1R	28/3 29/4	W-G/G-W W-BR/BR-W	1
2T/2R CP/MB	2T/2R A/PG	2T/2R	30/5 31/6	W-S/S-W R-BL/BL-R	2
3T/3R CP/MB	3T/3R A/PG	3T/3R	32/7 33/8	R-O/O-R R-G/G-R	3
4T/4R CP/MB	4T/4R A/PG	4T/4R	34/9 35/10	R-BR/BR-R R-S/S-R	4
5T/5R CP/MB	5T/5R A/PG	5T/5R	36/11 37/12	BK-BL/BL-BK BK-O/O-BK	5
6T/6R CP/MB	6T/6R A/PG	6T/6R	38/13 39/14	BK-G/G-BK BK-BR/BK-BR	6
7T/7R CP/MB	7T/7R A/PG	7T/7R	40/15 41/16	BK-S/S-BK Y-BL/BL-Y	7

Note 1: Each of the following I/O panel connectors is cabled as shown above: connectors A, B, C, D, E, F, G, H, K, L, M, N, R, S, T, and U. These connectors are associated with backplane slots 0 through 15, sequentially.

Note 2: Use LD 14 to select trunk termination impedance (600 ohm or 900 ohm). For more information about LD 15, see the *Software Input/ Output: Administration* (NN43001-611).

Table 36
NT8D37 IPE Module: NT8D15 E&M Trunk Card 2-wire paging mode pair-terminations

Pair	Pin numbers	Pair color	Unit
0T/0R A/PG	26/1 29/4	W-BL/BL-W W-BR/BR-W	0
1T/1R A/PG	30/5 33/8	W-S/S-W R-G/G-R	1
2T/2R A/PG	34/9 37/12	R-BR/BR-R BK-O/O-BK	2
3T/3R A/PG	38/13 41/16	BK-G/G-BK Y-BL/BL-Y	3
Note: Each of the following I/O panel connectors is cabled as shown above: connectors A, B, C, D, E, F, G, H, K, L, M, N, R, S, T, and U. These connectors are associated with backplane slots 0 through 15, sequentially.			

Table 37
NT8D37 IPE Module: NT8D15 E&M Trunk Card 2-wire type 1 mode pair-terminations (Part 1 of 2)

Pair	Pin numbers	Pair color	Unit
0T/0R E/M	26/1 28/3	W-BL/BL-W W-G/G-W	0
1T/1R E/M	30/5 32/7	W-S/S-W R-O/O-R	1
2T/2R E/M	34/9 36/11	R-BR/BR-R BK-BL/BL-BK	2

Table 37
NT8D37 IPE Module: NT8D15 E&M Trunk Card 2-wire type 1 mode pair-terminations (Part 2 of 2)

Pair	Pin numbers	Pair color	Unit
3T/3R E/M	38/13 40/15	BK-G/G-BK BK-S/S-BK	3
Note: Each of the following I/O panel connectors is cabled as shown above: connectors A, B, C, D, E, F, G, H, K, L, M, N, R, S, T, and U. These connectors are associated with backplane slots 0 through 15, sequentially.			

Table 38
NT8D37 IPE Module: NT8D15 E&M Trunk Card 4-wire type 1 and type 2 mode pair-terminations (Part 1 of 2)

Lead designations				
Type 1	**Type 2**	**Pin numbers**	**Pair color**	**Unit**
TA/TB RA/RB E/M ESC/ESCG	TA/TB RA/RB EA/EB MA/MB	26/1 27/2 28/3 29/4	W-BL/BL-W W-O/O-W W-G/G-W W-BR/BR-W	0
TA/TB RA/RB E/M ESC/ESCG	TA/TB RA/RB EA/EB MA/MB	30/5 31/6 32/7 33/8	W-S/S-W R-BL/BL-R R-O/O-R R-G/G-R	1
TA/TB RA/RB E/M ESC/ESCG	TA/TB RA/RB EA/EB MA/MB	34/9 35/10 36/11 37/12	R-BR/BR-R R-S/S-R BK-BL/BL-BK BK-O/O-BK	2

Table 38
NT8D37 IPE Module: NT8D15 E&M Trunk Card 4-wire type 1 and type 2 mode pair-terminations (Part 2 of 2)

Lead designations				
Type 1	**Type 2**	**Pin numbers**	**Pair color**	**Unit**
TA/TB RA/RB E/M ESC/ESCG	TA/TB RA/RB EA/EB MA/MB	38/13 39/14 40/15 41/16	BK-G/G-BK BK-BR/BR-BK BK-S/S-BK Y-BL/BL-Y	3

Note 1: Each of the following I/O panel connectors is cabled as shown above: connectors A, B, C, D, E, F, G, H, K, L, M, N, R, S, T, and U. These connectors are associated with backplane slots 0 through 15, sequentially.

Note 2: TA/TB is the transmit pair; RA/RB is the receive pair.

Table 39
NT8D37 IPE Module: NT8D15 E&M Trunk Card 4-wire type 1 and type 2 mode pair-terminations (Part 1 of 2)

Lead designations				
Type 1	**Type 2**	**Pin numbers**	**Pair color**	**Unit**
TA/TB RA/RB E/M ESC/ESCG	TA/TB RA/RB EA/EB MA/MB	26/1 27/2 28/3 29/4	W-BL/BL-W W-O/O-W W-G/G-W W-BR/BR-W	0
TA/TB RA/RB E/M ESC/ESCG	TA/TB RA/RB EA/EB MA/MB	30/5 31/6 32/7 33/8	W-S/S-W R-BL/BL-R R-O/O-R R-G/G-R	1

Table 39
NT8D37 IPE Module: NT8D15 E&M Trunk Card 4-wire type 1 and type 2 mode pair-terminations (Part 2 of 2)

Lead designations				
Type 1	**Type 2**	**Pin numbers**	**Pair color**	**Unit**
TA/TB RA/RB E/M ESC/ESCG	TA/TB RA/RB EA/EB MA/MB	34/9 35/10 36/11 37/12	R-BR/BR-R R-S/S-R BK-BL/BL-BK BK-O/O-BK	2
TA/TB RA/RB E/M ESC/ESCG	TA/TB RA/RB EA/EB MA/MB	38/13 39/14 40/15 41/16	BK-G/G-BK BK-BR/BR-BK BK-S/S-BK Y-BL/BL-Y	3

Note 1: Each of the following I/O panel connectors is cabled as shown above: connectors A, B, C, D, E, F, G, H, K, L, M, N, R, S, T, and U. These connectors are associated with backplane slots 0 through 15, sequentially.

Note 2: TA/TB is the transmit pair; RA/RB is the receive pair.

Table 40
NT5K17 Direct Dial Inward Trunk connections for NT8D37 I/O panel connectors A, E, K, R (Part 1 of 2)

Lead designations			I/O panel connectors				Unit number
DDI Mode	Pins	Pair color	A	E	K	R	
T0 R0	26 1 27 2	W-BL BL-W W-O O-W	Slot 0	Slot 4	Slot 8	Slot 12	Unit 0
T1 R1	28 3 29 4	W-G G-W W-BR BR-W	Slot 0	Slot 4	Slot 8	Slot 12	Unit 1
T2 R2	30 5 31 6	W-S S-W R-BL BL-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 2
T3 R3	32 7 33 8	R-O O-R R-G G-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 3
T4 R4	34 9 35 10	R-BR BR-R R-S S-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 4
T5 R5	36 11 37 12	BK-BL BL-BK BK-O O-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 5

Table 40
NT5K17 Direct Dial Inward Trunk connections for NT8D37 I/O panel connectors A, E, K, R (Part 2 of 2)

Lead designations			I/O panel connectors				Unit number
DDI Mode	Pins	Pair color	A	E	K	R	
T6 R6	38 13 39 14	BK-G G-BK BK-BR BR-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 6
T7 R7	40 15 41 16	BK-S S-BK Y-BL BL-Y	Slot 0	Slot 4	Slot 8	Slot 12	Unit 7

Table 41
NT5K17 Direct Dial Inward Trunk connections for NT8D37 I/O panel connectors B, F, L, S (Part 1 of 3)

Lead designations			I/O panel connectors				Unit number
DDI Mode	Pins	Pair color	B	F	L	S	
T0 R0	26 1 27 2	W-BL BL-W W-O O-W	Slot 1	Slot 5	Slot 9	Slot 13	Unit 0
T1 R1	28 3 29 4	W-G G-W W-BR BR-W	Slot 1	Slot 5	Slot 9	Slot 13	Unit 1
T2 R2	30 5 31 6	W-S S-W R-BL BL-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 2

Table 41
NT5K17 Direct Dial Inward Trunk connections for NT8D37 I/O panel connectors B, F, L, S (Part 2 of 3)

Lead designations			I/O panel connectors				Unit number
DDI Mode	Pins	Pair color	B	F	L	S	
T3 R3	32 7 33 8	R-O O-R R-G G-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 3
T4 R4	34 9 35 10	R-BR BR-R R-S S-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 4
T5 R5	36 11 37 12	BK-BL BL-BK BK-O O-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 5
T6 R6	38 13 39 14	BK-G G-BK BK-BR BR-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 6
T7 R7	40 15 41 16	BK-S S-BK Y-BL BL-Y	Slot 1	Slot 5	Slot 9	Slot 13	Unit 7
T0 R0	42 17 43 18	Y-O O-Y Y-G G-Y	Slot 2	Slot 6	Slot 10	Slot 14	Unit 0
T1 R1	44 19 45 20	Y-BR BR-Y Y-S S-Y	Slot 2	Slot 6	Slot 10	Slot 14	Unit 1

Table 41
NT5K17 Direct Dial Inward Trunk connections for NT8D37 I/O panel connectors B, F, L, S (Part 3 of 3)

Lead designations			I/O panel connectors				Unit number
DDI Mode	Pins	Pair color	B	F	L	S	
T2 R2	46 21 47 22	V-BL BL-V V-O O-V	Slot 2	Slot 6	Slot 10	Slot 14	Unit 2
T3 R3	48 23 49 24	V-G G-V V-BR BR-V	Slot 2	Slot 6	Slot 10	Slot 14	Unit 3

Table 42
NT5K17 Direct Dial Inward Trunk connections for NT8D37 I/O panel connectors C, G, M, T (Part 1 of 3)

Lead designations			I/O panel connectors				Unit number
DDI Mode	Pins	Pair color	C	G	M	T	
T4 R4	26 1 27 2	W-BL BL-W W-O O-W	Slot 2	Slot 6	Slot 10	Slot 14	Unit 4
T5 R5	28 3 29 4	W-G G-W W-BR BR-W	Slot 2	Slot 6	Slot 10	Slot 14	Unit 5
T6 R6	30 5 31 6	W-S S-W R-BL BL-R	Slot 2	Slot 6	Slot 10	Slot 14	Unit 6

Table 42
NT5K17 Direct Dial Inward Trunk connections for NT8D37 I/O panel connectors C, G, M, T (Part 2 of 3)

Lead designations			I/O panel connectors				Unit number
DDI Mode	Pins	Pair color	C	G	M	T	
T7 R7	32 7 33 8	R-O O-R R-G G-R	Slot 2	Slot 6	Slot 10	Slot 14	Unit 7
T0 R0	34 9 35 10	R-BR BR-R R-S S-R	Slot 3	Slot 7	Slot 11	Slot 15	Unit 0
T1 R1	36 11 37 12	BK-BL BL-BK BK-O O-BK	Slot 3	Slot 7	Slot 11	Slot 15	Unit 1
T2 R2	38 13 39 14	BK-G G-BK BK-BR BR-BK	Slot 3	Slot 7	Slot 11	Slot 15	Unit 2
T3 R3	40 15 41 16	BK-S S-BK Y-BL BL-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 3
T4 R4	42 17 43 18	Y-O O-Y Y-G G-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 4
T5 R5	44 19 45 20	Y-BR BR-Y Y-S S-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 5

Table 42
NT5K17 Direct Dial Inward Trunk connections for NT8D37 I/O panel connectors C, G, M, T (Part 3 of 3)

Lead designations			I/O panel connectors				Unit number
DDI Mode	Pins	Pair color	C	G	M	T	
T6 R6	46 21 47 22	V-BL BL-V V-O O-V	Slot 3	Slot 7	Slot 11	Slot 15	Unit 6
T7 R7	48 23 49 24	V-G G-V V-BR BR-V	Slot 3	Slot 7	Slot 11	Slot 15	Unit 7

Table 43
NT5K18 Flexible Central Office Trunk connections for NT8D37 I/O panel connectors A, E, K, R (Part 1 of 2)

Lead designations			I/O panel connectors				Unit number
COT	Pins	Pair color	A	E	K	R	
T0 R0	26 1 27 2	W-BL BL-W W-O O-W	Slot 0	Slot 4	Slot 8	Slot 12	Unit 0
T1 R1	28 3 29 4	W-G G-W W-BR BR-W	Slot 0	Slot 4	Slot 8	Slot 12	Unit 1
T2 R2	30 5 31 6	W-S S-W R-BL BL-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 2

Table 43
NT5K18 Flexible Central Office Trunk connections for NT8D37 I/O panel connectors A, E, K, R (Part 2 of 2)

Lead designations			I/O panel connectors				Unit number
COT	Pins	Pair color	A	E	K	R	
T3 R3	32 7 33 8	R-O O-R R-G G-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 3
T4 R4	34 9 35 10	R-BR BR-R R-S S-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 4
T5 R5	36 11 37 12	BK-BL BL-BK BK-O O-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 5
T6 R6	38 13 39 14	BK-G G-BK BK-BR BR-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 6
T7 R7	40 15 41 16	BK-S S-BK Y-BL BL-Y	Slot 0	Slot 4	Slot 8	Slot 12	Unit 7

Table 44
NT5K18 Flexible Central Office Trunk connections for NT8D37 I/O panel connectors B, F, L, S (Part 1 of 2)

Lead designations			I/O panel connectors				Unit number
COT	**Pins**	**Pair color**	**B**	**F**	**L**	**S**	
T0 R0	26 1 27 2	W-BL BL-W W-O O-W	Slot 1	Slot 5	Slot 9	Slot 13	Unit 0
T1 R1	28 3 29 4	W-G G-W W-BR BR-W	Slot 1	Slot 5	Slot 9	Slot 13	Unit 1
T2 R2	30 5 31 6	W-S S-W R-BL BL-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 2
T3 R3	32 7 33 8	R-O O-R R-G G-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 3
T4 R4	34 9 35 10	R-BR BR-R R-S S-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 4
T5 R5	36 11 37 12	BK-BL BL-BK BK-O O-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 5
T6 R6	38 13 39 14	BK-G G-BK BK-BR BR-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 6

Table 44
NT5K18 Flexible Central Office Trunk connections for NT8D37 I/O panel connectors B, F, L, S (Part 2 of 2)

Lead designations			I/O panel connectors				Unit number
COT	**Pins**	**Pair color**	**B**	**F**	**L**	**S**	
T7 R7	40 15 41 16	BK-S S-BK Y-BL BL-Y	Slot 1	Slot 5	Slot 9	Slot 13	Unit 7
T0 R0	42 17 43 18	Y-O O-Y Y-G G-Y	Slot 2	Slot 6	Slot 10	Slot 14	Unit 0
T1 R1	44 19 45 20	Y-BR BR-Y Y-S S-Y	Slot 2	Slot 6	Slot 10	Slot 14	Unit 1
T2 R2	46 21 47 22	V-BL BL-V V-O O-V	Slot 2	Slot 6	Slot 10	Slot 14	Unit 2
T3 R3	48 23 49 24	V-G G-V V-BR BR-V	Slot 2	Slot 6	Slot 10	Slot 14	Unit 3

Table 45
NT5K18 Flexible Central Office Trunk connections for NT8D37 I/O panel connectors C, G, M, T (Part 1 of 2)

Lead designations			I/O panel connectors				Unit number
COT	Pins	Pair color	C	G	M	T	
T4 R4	26 1 27 2	W-BL BL-W W-O O-W	Slot 2	Slot 6	Slot 10	Slot 14	Unit 4
T5 R5	28 3 29 4	W-G G-W W-BR BR-W	Slot 2	Slot 6	Slot 10	Slot 14	Unit 5
T6 R6	30 5 31 6	W-S S-W R-BL BL-R	Slot 2	Slot 6	Slot 10	Slot 14	Unit 6
T7 R7	32 7 33 8	R-O O-R R-G G-R	Slot 2	Slot 6	Slot 10	Slot 14	Unit 7
T0 R0	34 9 35 10	R-BR BR-R R-S S-R	Slot 3	Slot 7	Slot 11	Slot 15	Unit 0
T1 R1	36 11 37 12	BK-BL BL-BK BK-O O-BK	Slot 3	Slot 7	Slot 11	Slot 15	Unit 1
T2 R2	38 13 39 14	BK-G G-BK BK-BR BR-BK	Slot 3	Slot 7	Slot 11	Slot 15	Unit 2

Table 45
NT5K18 Flexible Central Office Trunk connections for NT8D37 I/O panel connectors C, G, M, T (Part 2 of 2)

Lead designations			I/O panel connectors				Unit number
COT	Pins	Pair color	C	G	M	T	
T3 R3	40 15 41 16	BK-S S-BK Y-BL BL-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 3
T4 R4	42 17 43 18	Y-O O-Y Y-G G-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 4
T5 R5	44 19 45 20	Y-BR BR-Y Y-S S-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 5
T6 R6	46 21 47 22	V-BL BL-V V-O O-V	Slot 3	Slot 7	Slot 11	Slot 15	Unit 6
T7 R7	48 23 49 24	V-G G-V V-BR BR-V	Slot 3	Slot 7	Slot 11	Slot 15	Unit 7

Table 46
NT5K19 Flexible E&M 2-Wire Type 1 connections for NT8D37 I/O panel connectors A, E, K, R

Pair	Pins	Pair color	I/O panel connectors				Unit number
			A	E	K	R	
T0 R0 E M	27 2 28 3	W-O O-W W-G G-W	Slot 0	Slot 4	Slot 8	Slot 12	Unit 0
T1 R1 E M	31 6 32 7	R-BL BL-R R-O O-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 1
T2 R2 E M	35 10 36 11	R-S S-R BK-BL BL-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 2
T3 R3 E M	39 14 40 15	BK-BR BR-BK BK-S S-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 3

Table 47
NT5K19 E&M 2-Wire Type 1 connections for NT8D37 I/O panel connectors B, F, L, S

Pair	Pins	Pair color	I/O panel connectors				Unit number
			B	F	L	S	
T0 R0 E M	27 2 28 3	W-O O-W W-G G-W	Slot 1	Slot 5	Slot 9	Slot 13	Unit 0
T1 R1 E M	31 6 32 7	R-BL BL-R R-O O-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 1
T2 R2 E M	35 10 36 11	R-S S-R BK-BL BL-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 2
T3 R3 E M	39 14 40 15	BK-BR BR-BK BK-S S-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 3
T0 R0 E M	43 18 44 19	Y-G G-Y Y-BR BR-Y	Slot 2	Slot 6	Slot 10	Slot 14	Unit 0
T1 R1 E M	47 22 48 23	V-O O-V V-G G-V	Slot 2	Slot 6	Slot 10	Slot 14	Unit 1

Table 48
NT5K19 Flexible E&M 2-Wire Type 1 trunk connections for NT8D37 I/O panel connectors C, G, M, T

Pair	Pins	Pair color	I/O panel connectors				Unit number
			C	G	M	T	
T2 R2 E M	27 2 28 3	W-O O-W W-G G-W	Slot 2	Slot 6	Slot 10	Slot 14	Unit 2
T3 R3 E M	31 6 32 7	R-BL BL-R R-O O-R	Slot 2	Slot 6	Slot 10	Slot 14	Unit 3
T0 R0 E M	35 10 36 11	R-S S-R BK-BL BL-BK	Slot 3	Slot 7	Slot 11	Slot 15	Unit 0
T1 R1 E M	39 14 40 15	BK-BR BR-BK BK-S S-BK	Slot 3	Slot 7	Slot 11	Slot 15	Unit 1
T2 R2 E M	43 18 44 19	Y-G G-Y Y-BR BR-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 2
T3 R3 E M	47 22 48 23	V-O O-V V-G G-V	Slot 3	Slot 7	Slot 11	Slot 15	Unit 3

Table 49
NT5K19 Flexible E&M 2-Wire Paging trunk connections for NT8D37 I/O panel connectors A, E, K, R

Pair	Pins	Pair color	I/O panel connectors				Unit number
			A	E	K	R	
T0 R0 A PG	27 2 29 4	W-O O-W W-BR BR-W	Slot 0	Slot 4	Slot 8	Slot 12	Unit 0
T1 R1 A PG	31 6 33 8	R-BL BL-R R-G G-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 1
T2 R2 A PG	35 10 37 12	R-S S-R BK-O O-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 2
T3 R3 A PG	39 14 41 16	BK-BR BR-BK Y-BL BL-Y	Slot 0	Slot 4	Slot 8	Slot 12	Unit 3

Table 50
NT5K19 Flexible E&M 2-Wire Paging trunk connections for NT8D37 I/O panel connectors B, F, L, S

Pair	Pins	Pair color	I/O panel connectors				Unit number
			B	F	L	S	
T0 R0 A PG	27 2 29 4	W-O O-W W-BR BR-W	Slot 1	Slot 5	Slot 9	Slot 13	Unit 0
T1 R1 A PG	31 6 33 8	R-BL BL-R R-G G-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 1
T2 R2 A PG	35 10 37 12	R-S S-R BK-O O-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 2
T3 R3 A PG	39 14 41 16	BK-BR BR-BK Y-BL BL-Y	Slot 1	Slot 5	Slot 9	Slot 13	Unit 3
T0 R0 A PG	43 18 45 20	Y-G G-Y Y-S S-Y	Slot 2	Slot 6	Slot 10	Slot 14	Unit 0
T1 R1 A PG	47 22 49 24	V-O O-V V-BR BR-V	Slot 2	Slot 6	Slot 10	Slot 14	Unit 1

Table 51
NT5K19 Flexible E&M 2-Wire Paging trunk connections for NT8D37 I/O panel connectors C, G, M, T

Pair	Pins	Pair color	I/O panel connectors				Unit number
			C	G	M	T	
T2 R2 A PG	27 2 29 4	W-O O-W W-BR BR-W	Slot 2	Slot 6	Slot 10	Slot 14	Unit 2
T3 R3 A PG	31 6 33 8	R-BL BL-R R-G G-R	Slot 2	Slot 6	Slot 10	Slot 14	Unit 3
T0 R0 A PG	35 10 37 12	R-S S-R BK-O O-BK	Slot 3	Slot 7	Slot 11	Slot 15	Unit 0
T1 R1 A PG	39 14 41 16	BK-BR BR-BK Y-BL BL-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 1
T2 R2 A PG	43 18 45 20	Y-G G-Y Y-S S-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 2
T3 R3 A PG	47 22 49 24	V-O O-V V-BR BR-V	Slot 3	Slot 7	Slot 11	Slot 15	Unit 3

Table 52
NT5K19 Flexible E&M 2-Wire Recorded Announcement trunk connections for NT8D37 I/O panel connectors A, E, K, R

Pair	Pins	Pair color	I/O panel connectors				Unit number
			A	E	K	R	
T0 R0 SIG B SIG A	26 1 29 4	W-BL BL-W W-BR BR-W	Slot 0	Slot 4	Slot 8	Slot 12	Unit 0
T1 R1 SIG B SIG A	30 5 33 8	W-S S-W R-G G-R	Slot 0	Slot 4	Slot 12	Slot 15	Unit 1
T2 R2 SIG B SIG A	34 9 37 12	R-BR BR-R BK-O O-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 2
T3 R3 SIG B SIG A	38 13 41 16	BK-G G-BK Y-BL BL-Y	Slot 0	Slot 4	Slot 8	Slot 12	Unit 3

Table 53
NT5K19 Flexible E&M 2-Wire Recorded Announcement trunk connections for NT8D37 I/O panel connectors B, F, L, S

Pair	Pins	Pair color	I/O panel connectors				Unit number
			B	F	L	S	
T0 R0 SIG B SIG A	26 1 29 4	W-BL BL-W W-BR BR-W	Slot 1	Slot 5	Slot 9	Slot 13	Unit 0
T1 R1 SIG B SIG A	30 5 33 8	W-S S-W R-G G-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 1
T2 R2 SIG B SIG A	34 9 37 12	R-BR BR-R BK-O O-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 2
T3 R3 SIG B SIG A	38 13 41 16	BK-G G-BK Y-BL BL-Y	Slot 1	Slot 5	Slot 9	Slot 13	Unit 3
T0 R0 SIG B SIG A	42 17 45 20	Y-O O-Y Y-S S-Y	Slot 2	Slot 6	Slot 10	Slot 14	Unit 0
T1 R1 SIG B SIG A	46 21 49 24	V-BL BL-V V-BR BR-V	Slot 2	Slot 6	Slot 10	Slot 14	Unit 1

Table 54
NT5K19 Flexible E&M 2-Wire Recorded Announcement trunk connections for NT8D37 I/O panel connectors C, G, M, T

Pair	Pins	Pair color	I/O panel connectors				Unit number
			C	G	M	T	
T2 R2 SIG B SIG A	26 1 29 4	W-BL BL-W W-BR BR-W	Slot 2	Slot 6	Slot 10	Slot 14	Unit 2
T3 R3 SIG B SIG A	30 5 33 8	W-S S-W R-G G-R	Slot 2	Slot 6	Slot 10	Slot 14	Unit 3
T0 R0 SIG B SIG A	34 9 37 12	R-BR BR-R BK-O O-BK	Slot 3	Slot 7	Slot 11	Slot 15	Unit 0
T1 R1 SIG B SIG A	38 13 41 16	BK-G G-BK Y-BL BL-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 1
T2 R2 SIG B SIG A	42 17 45 20	Y-O O-Y Y-S S-Y	Slot 3	Slot 7	Slot 11	Slot 15	Unit 2
T3 R3 SIG B SIG A	46 21 49 24	V-BL BL-V V-BR BR-V	Slot 3	Slot 7	Slot 11	Slot 15	Unit 3

Table 55
NT5K19 Flexible E&M 4-Wire Type 1 connections for NT8D37 I/O panel connectors A, E, K, R

Lead designations			I/O panel connectors				Unit number
Type 1 mode	Pins	Pair color	A	E	K	R	
TA TB RA RB E M	26 1 27 2 28 3	W-BL BL-W W-O O-W W-G G-W	Slot 0	Slot 4	Slot 8	Slot 12	Unit 0
TA TB RA RB E M	30 5 31 6 32 7	W-S S-W R-BL BL-R R-O O-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 1
TA TB RA RB E M	34 9 35 10 36 11	R-BR BR-R R-S S-R BK-BL BL-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 2
TA TB RA RB E M	38 13 39 14 40 15	BK-G G-BK BK-BR BR-BK BK-S S-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 3

Note: The cable pair designated TA, TB is the transmit pair. The pair designated RA, RB is the receive pair.

Table 56
NT5K19 Flexible E&M 4-Wire Type 1 connections for NT8D37 I/O panel connectors B, F, L, S (Part 1 of 2)

Lead designations			I/O panel connectors				Unit number
Type 1 mode	Pins	Pair color	B	F	L	S	
TA TB RA RB E M	26 1 27 2 28 3	W-BL BL-W W-O O-W W-G G-W	Slot 1	Slot 5	Slot 9	Slot 13	Unit 0
TA TB RA RB E M	30 5 31 6 32 7	W-S S-W R-BL BL-R R-O O-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 1
TA TB RA RB E M	34 9 35 10 36 11	R-BR BR-R R-S S-R BK-BL BL-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 2
TA TB RA RB E M	38 13 39 14 40 15	BK-G G-BK BK-BR BR-BK BK-S S-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 3

Note: The cable pair designated TA, TB is the transmit pair. The pair designated RA, RB is the receive pair.

Table 56
NT5K19 Flexible E&M 4-Wire Type 1 connections for NT8D37 I/O panel connectors B, F, L, S (Part 2 of 2)

Lead designations			I/O panel connectors				Unit number
Type 1 mode	Pins	Pair color	B	F	L	S	
TA TB RA RB E M	42 17 43 18 44 19	Y-O O-Y Y-G G-Y Y-BR BR-Y	Slot 2	Slot 6	Slot 10	Slot 14	Unit 0
TA TB RA RB E M	46 21 47 22 48 23	V-BL BL-V V-O O-V V-G G-V	Slot 2	Slot 6	Slot 10	Slot 14	Unit 1
Note: The cable pair designated TA, TB is the transmit pair. The pair designated RA, RB is the receive pair.							

Table 57
NT5K19 Flexible E&M AC15 trunk connections for NT8D37 I/O panel connectors A, E, K, R

Lead designations			I/O panel connectors				Unit number
Type 1 mode	Pins	Pair color	A	E	K	R	
TA TB RA RB	26 1 27 2	W-BL BL-W W-O O-W	Slot 0	Slot 4	Slot 8	Slot 12	Unit 0
TA TB RA RB	30 5 31 6	W-S S-W R-BL BL-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 1
TA TB RA RB	34 9 35 10	R-BR BR-R R-S S-R	Slot 0	Slot 4	Slot 8	Slot 12	Unit 2
TA TB RA RB	38 13 39 14	BK-G G-BK BK-BR BR-BK	Slot 0	Slot 4	Slot 8	Slot 12	Unit 3

Note: The cable pair designated TA, TB is the transmit pair. The pair designated RA, RB is the receive pair.

Table 58
NT5K19 Flexible E&M AC15 Trunk connections for NT8D37 I/O panel connectors B, F, L, S

Lead designations			I/O panel connectors				Unit number
Type 1 mode	Pins	Pair color	B	F	L	S	
TA TB RA RB	26 1 27 2	W-BL BL-W W-O O-W	Slot 1	Slot 5	Slot 9	Slot 13	Unit 0
TA TB RA RB	30 5 31 6	W-S S-W R-BL BL-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 1
TA TB RA RB	34 9 35 10	R-BR BR-R R-S S-R	Slot 1	Slot 5	Slot 9	Slot 13	Unit 2
TA TB RA RB	38 13 39 14	BK-G G-BK BK-BR BR-BK	Slot 1	Slot 5	Slot 9	Slot 13	Unit 3
TA TB RA RB	42 17 43 18	Y-O O-Y Y-G G-Y	Slot 2	Slot 6	Slot 10	Slot 14	Unit 0
TA TB RA RB	46 21 47 22	V-BL BL-V V-O O-V	Slot 2	Slot 6	Slot 10	Slot 14	Unit 1

Note: The cable pair designated TA, TB is the transmit pair. The pair designated RA, RB is the receive pair.

Powering up the system and initial loading

Contents

This chapter contains information about the following topics:

Overview

This section describes how to power up and initialize a Large System and install new software.

Installing the Security Device

The Security Device (Figure 106 on page 285) resembles a large watch battery and is shipped with the software package. This device, along with the Keycode Installation diskette, enables the features for each individual system.

Procedure 40
Installing the Security Device

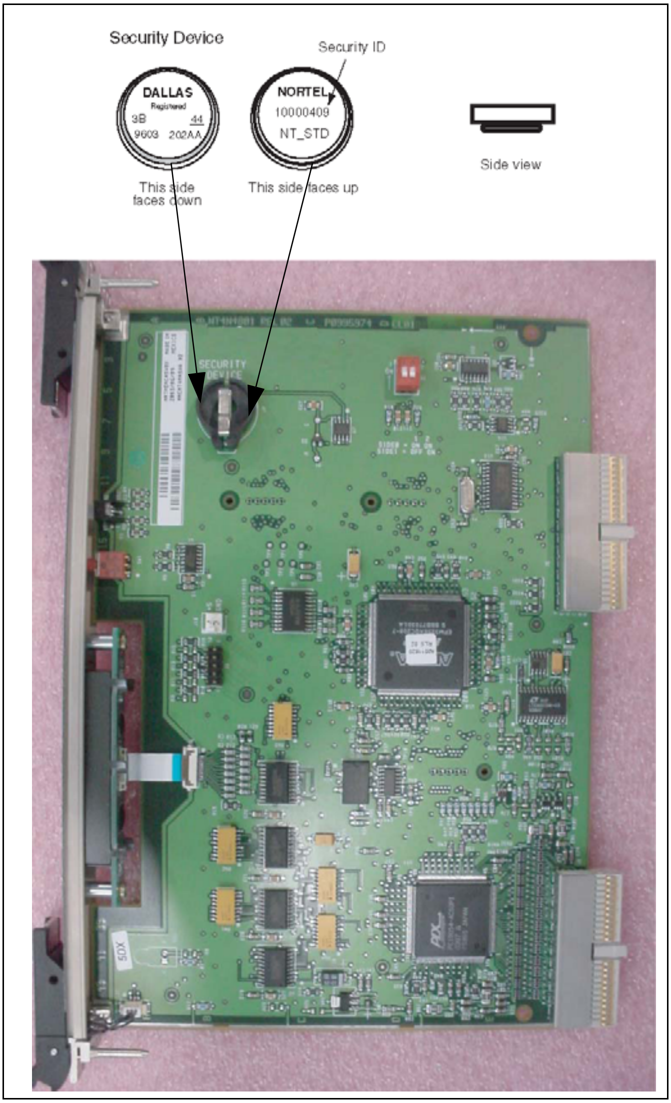
The Security Device fits into the System Utility card (Figure 106 on page 285).

1 Insert the Security Device into the Security Device holder on the System Utility card with the “Avaya” side facing up. Do not bend the clip more than necessary.

2 Check that the Security Device is securely in place.

End of Procedure

Figure 106
Security Device



Preparing to power up – AC

Follow Procedure 41 to prepare to power up a Large System.

CAUTION

Verify that the safety grounds are properly connected.

Procedure 41
Preparing to power up – AC

1 Set the AC service panel circuit breakers OFF.

2 Set the main circuit breakers in the rear of each pedestal OFF.

3 Set the power supply or MPDU switches in each module OFF.

4 Set the ringing generators in each IPE or PE module OFF.

5 Set the blower unit switch in the front of each pedestal OFF.

6 Set all faceplate switches to ENB.

End of Procedure

Connecting the AC power source

To connect a Large System to the AC power source, follow one of the two options below.

Procedure 42
Option 1: Using the installed power plug (recommended)

Each column can be directly connected to the AC power source.

1 Connect the power plug from each column to the AC power respectable.

2 Proceed to “Turning AC power ON” on page 287.

End of Procedure

Procedure 43
Option 2: Hard-wiring the power connections (optional)

Instead of using the power-plug, each column can be hard-wired to the service panel.

1. Route one of each green, white, and black #10 AWG wires through 20 mm (3/4 in.) conduit from the service panel to each Large System column.
2. At the column, connect the wires to the field wiring access block of the PDU according to the following:
   - GND (ground) to the green wire
   - L2 (neutral) to the white wire
   - L1(hot) to the black wire
3. Connect the wires to the hot, neutral, and ground connections at the service panel.
4. Proceed to “Turning AC power ON” on page 287.

End of Procedure

Turning AC power ON

Follow Procedure 44 and Procedure 45 to prepare to power up a Large System.

> **CAUTION — Service Interruption**
>
> **System Failure**
>
> If a problem occurs when a step is performed, resolve that problem before continuing.

Procedure 44
Turning AC power on

1. In the AC power panel, set the circuit breaker for Column 0 to ON.
2. Set the main circuit breaker for Column 0 to ON (rear of the pedestal).

3 Set the blower unit switch for Column 0 to ON. On initial power-up, the blower rotates slowly. As the system heats up, the cooling fans will turn faster.

4 Set the main circuit breaker for Column 0 to ON. The main circuit breaker is located in the rear of the pedestal.

5 Set the power supply switch (or MPDU circuit breaker) in each module to ON. The green light will turn on after a few seconds.

Note: If the module is equipped with a ringing generator, set the breakers or switches for both the power supply and the ringing generator to ON. The green LED on a ringing generator normally takes up to 90 seconds to light.

6 Repeat step 1 through step 5 for each column in the system. Start with Column 1 and continue until power is turned on in all the columns. Make sure the green lights in all the module power supplies are lit before proceeding to the next column.

7 When the green LED lights in all module power supplies and ringing generators are lit, proceed to "Resetting the main circuit breakers (AC power)" on page 288.

End of Procedure

Resetting the main circuit breakers (AC power)

Follow Procedure 45 to reset the main circuit breakers (AC power).

Procedure 45
Resetting the main circuit breakers (AC power)

1 Turn the main circuit breakers in the pedestal of each column OFF again.

2 Wait 30 seconds.

3 Set the main circuit breakers for NON-CORE columns ON. Leave the Core columns OFF.

4 For each non-Core column, verify that:

- The main circuit breaker in the pedestal did not trip OFF.
- The main blower unit in each column is running.
- The ringing generators are lit.
- The red column LEDs in the top cap are lit. These LEDs will remain red until the system reloads.

5 Simultaneously turn the main circuit breakers for the two Core columns ON.

6 For each Core column, verify the following:

- The main circuit breaker in the pedestal did not trip OFF.
- The main blower unit in each column is running.
- The ringing generators are lit.
- The red column LEDs in the top cap are lit. These LEDs will remain red until the system reloads.

7 When the system is running, reattach all covers and panels to the modules and columns. Module covers must be kept on so the air from the pedestal fans will be directed up through all the modules and out the exhaust vents in the top cap. When the module covers are removed, the upper modules are not cooled properly because the air escapes from the open module door.

If the module covers are left off and the system overheats, circuit cards will malfunction and, in extreme cases, melt.

End of Procedure

Preparing to power up – DC

CAUTION

Verify that the safety grounds are properly connected.

Procedure 46
Preparing to power up – DC

1. Set the AC service panel circuit breakers to each rectifier OFF.
2. Remove the DC power distribution fuses or set the distribution circuit breakers OFF.
3. Set all circuit breakers in the rear of each pedestal OFF.
4. Set the power supply switches in each module OFF.
5. Set the ringing generators in each IPE or PE module OFF.
6. Set the blower unit in each pedestal OFF.
7. Set all faceplate switches to ENB.
8. Proceed to “Turning DC power ON” on page 290.

End of Procedure

Turning DC power ON

Follow Procedure 47 to turn the DC power on.

Procedure 47
Turning DC power ON

1 Connect each DC rectifier to its associated AC outlet and set the breakers in the AC power panel to ON.

2 Turn the rectifiers ON one at a time. Wait 10 seconds between each rectifier.

CAUTION — Service Interruption

System Failure

If a problem occurs in any of the following steps, resolve that problem before continuing.

IMPORTANT!

Perform the following tasks for each column

Note: Power up the Core columns last.

3 On the DC power source for each column, replace the distribution fuses or set the distribution breakers to ON. Do the Core columns last.

4 Set the blower unit breaker switch ON (the far left breaker in the rear of the pedestal).

5 Set the blower unit switch in the front of the pedestal to ON. Verify that the fan is running. On initial power-up, the blower rotates slowly. As the system heats up, the cooling fans turn faster.

6 Set the power supply switch in each module to ON. The green light will turn on after a few seconds.

Note: If the module is equipped with a ringing generator, set the breakers or switches for both the power supply and the ringing generator to ON. The green LED on a ringing generator normally takes up to 90 seconds to light.

7 Repeat step 1 through step 5 for each column in the system. Start with Column 2 and continue until power is turned on in all the columns. Do the Core columns last.

8 Make sure the green lights in all the module power supplies are lit before proceeding to the next column. The red LED for each column remains lit until the system reloads.

Once the system is running, reattach all covers and panels to the modules and columns. Module covers must be kept on so the air from the pedestal fans will be directed up through all the modules and out the exhaust vents in the top cap. When the module covers are removed, the upper modules are not cooled properly because the air escapes from the open module door.

If the module covers are left off and the system overheats, circuit cards will malfunction and, in extreme cases, melt.

End of Procedure

Installing software

This section contains information about initial software installation procedures.

Before you begin

Dependency Lists (DepLists) are the Avaya recommended Product Enhancement Packages (PEP) for a software release. As common practice, ensure that you have the latest issue of the DepLists at the time of system installation. The issue and date of the DepLists is shown on the software CD-ROM. For more information about the most recent issue of DepLists for this software release, see the Enterprise Solution PEP Library.

If the software CD-ROM does not contain the most recent issue of the DepLists, download the DepList zip file from the Meridian PEP Library to a PC Card. After you run the Software Installation Program (see Procedure 48 on page 293), use the Matrix DepList and PEPs (MDP) commands to install the Dependency Lists from the zip file.

For more information about accessing and using DepLists, see the *Product Matrix Dependency List User Guide*, available on the Enterprise Solution PEP Library.

Software installation

Follow Procedure 48 to install the software. First install the software on Core/Net 1, and then repeat the process to install the software on Core/Net 0.

Procedure 48
Installing the software

1 Check that a terminal is connected to COM1 on Call Server 1.

2 Insert the RMD into the Compact Flash card slot.

3 Press the manual RESET button on the CP PIV card faceplate

4 Press <CR> at the Install Tool Menu

5 The system attempts to validate and format the FMD partitions. The following format will occur only if the on-board 1 GByte FMD is blank.

```
>Obtaining and checking system configuration ...

>Validate hard disk partitions

        Validate number of hard drive partitions
and size ...

        Number of partitions  0:

        Disk check failed: three partitions
expected

INST0010 Unable to validate Hard disk partition
"/u"

        errNo : 0xd0001


        Please press <CR> when ready ...


INST0010 Unable to validate Hard disk partition
"/p"


        Please press <CR> when ready ...


INST0010 Unable to validate Hard disk partition
"/e"


        Please press <CR> when ready ...
```

```
The Fix Media Device on Core 0 is blank.

       Install  cannot  continue  unless the FMD
is partitioned.

        Note: INSTALL WILL REBOOT AFTER THIS
PROCEDURE AND

              FIX MEDIA WILL BE EMPTY AFTER YOU
PARTITION IT.

              INSTALL REMOVABLE MEDIA MUST BE IN
THE DRIVE AT THIS TIME.

        Please enter:

<CR> -> <a> - Partition the Fix Media Device.

        Enter choice>

>Repartitioning Fix Media Device ...

fdiskPartCreate(0x12d5ff0c, 1, 4, 0x10)

Size in sectors = 0x8000

Low boundary = 0

High boundary = 0x1e8bdf

fdiskPartCreate(0x12d5ff0c, 2, 11, 0x130)

Size in sectors = 0x98000

Low boundary = 0x7fc1

High boundary = 0x1e8bdf

fdiskPartCreate(0x12d5ff0c, 3, 11, 0x130)

Size in sectors = 0x98000

Low boundary = 0x9ffc1

High boundary = 0x1e8bdf

fdiskPartCreate(0x12d5ff0c, 4, 11, 0x130)

Size in sectors = 0x98000
```

```
Low boundary = 0x137fc1

High boundary = 0x1e8bdf

>Fix Media Device repartition completed

>Formatting FMD ...

Mounting msdos fs /boot on /dev/hda1...

fdiskDevCreate(/dev/hda1)

/dev/hda1: partTablePtr = 0x12d5ff0c

Found partition 1, nodePtr = 0x12d30a4c

Partition 1 = type MSDOS FAT16 <= 32MB, cbioPtr =
0x131eb2e8

Initializing new slave device 0x131eb2e8

Retrieved old volume params with %95 confidence:

Volume Parameters: FAT type: FAT16, sectors per
cluster 32

  2 FAT copies, 0 clusters, 245 sectors per FAT

  Sectors reserved 1, hidden 63, FAT sectors 490

  Root dir entries 512, sysId (null)  , serial
number 3b691afd

  Label:"NO NAME    " ...

Disk with 32705 sectors of 512 bytes will be
formatted with:

Volume Parameters: FAT type: FAT16, sectors per
cluster 2

  2 FAT copies, 16240 clusters, 64 sectors per
FAT

  Sectors reserved 1, hidden 63, FAT sectors 128

  Root dir entries 512, sysId VXDOS16 , serial
number 3b691afd
```

```
Label:"           " ...

Mounting msdos fs /p on /dev/hda2...

fdiskDevCreate(/dev/hda2)

/dev/hda2: partTablePtr = 0x12d5ff0c

Found partition 2, nodePtr = 0x12d30a4c

Partition 2 = type Win95 FAT32, cbioPtr =
0x12d26ee8

Initializing new slave device 0x12d26ee8

Retrieved old volume params with %80 confidence:

Volume Parameters: FAT type: FAT16, sectors per
cluster 195

  -61 FAT copies, 0 clusters, 50115 sectors per
FAT

  Sectors reserved -15421, hidden -1010580541,
FAT sectors -3057015

  Root dir entries -15421, sysId (null)  , serial
number cfcfc3c3

  Label:"           " ...

Disk with 622592 sectors of 512 bytes will be
formatted with:

Volume Parameters: FAT type: FAT32, sectors per
cluster 8

  2 FAT copies, 77660 clusters, 608 sectors per
FAT

  Sectors reserved 32, hidden 63, FAT sectors
1216

  Root dir entries 0, sysId VX5DOS32, serial
number cfcfc3c3

  Label:"           " ... 0x12d22e7c
```

```
Mounting msdos fs /d on /dev/hda3...

fdiskDevCreate(/dev/hda3)

/dev/hda3: partTablePtr = 0x12d5ff0c

Found partition 3, nodePtr = 0x12d30a4c

Partition 3 = type Win95 FAT32, cbioPtr =
0x12d22e7c

Initializing new slave device 0x12d22e7c

Retrieved old volume params with %80 confidence:

Volume Parameters: FAT type: FAT16, sectors per
cluster 195

  -61 FAT copies, 0 clusters, 50115 sectors per
FAT

  Sectors reserved -15421, hidden -1010580541,
FAT sectors -3057015

  Root dir entries -15421, sysId (null)  , serial
number cffbc3c3

  Label:"           " ...

;CPP4 reboot automatically

Mounting /cf2
Found /cf2/nvram.sys
Mounting /boot|
Found /boot/nvram.sys

                     Selecting nvram file from 2
sources

Read boot parameters from:
F: Faceplate compact flash
H: Hard Drive

 0 [H]

Reading boot parameters from /boot/nvram.sys

Press any key to stop auto-boot...
```

6 The system then enters the `Main Menu` for keycode authorization.

```
                M A I N   M E N U

The Software Installation Tool will install or
upgrade Communication Server 1000 Software,
Database and the CP-BOOTROM. You will be prompted
throughout the installation and given the
opportunity to quit at any time.

Please enter:

<CR> -> <u> - To Install menu

        <t> - To Tools menu.

        <q> - Quit.

        Enter Choice> <u>
```

The system searches for available keycode files in the "keycode" directory on the RMD. If no keycode file is found, the system displays the following menu:

```
Communication Server 1000 Software/Database/
BOOTROM RMD Install Tool

================================================
====================

No keycode files are available on the removable
media.

Please replace the RMD containing the keycode
file(s).

Please enter:

          <CR> -> <a> - RMD is now in the drive.

          <q> - Quit.

          Enter choice>
```

At this point, either replace the RMD or quit the installation. If you select option “<q> - Quit.”, the system requires confirmation.

```
Communication Server 1000 Software/Database/
BOOTROM RMD Install Tool

================================================
====================

You selected to quit. Please confirm.

Please enter:

        <CR> -> <y> - Yes, quit.

        <n> - No, DON'T quit.

        Enter choice>
```

If “y” (quit) is selected, the system prints “INST0127 Keycode file is corrupted. Check Keycode file.” and returns to the installation main menu.

After accessing the RMD containing the valid keycode(s), press <CR>. The system displays the keycode file(s) available as in the following example:

```
The following keycode files are available on the
removable media:

Name                     Size   Date        Time

--------------------    -------           -----

<CR> -> <1> -keycode.kcd 1114 Jan-17-2005 15:31

<2> - KCport60430m.kcd   1114 Feb-24-2005 13:43

<q> - Quit

Enter choice> 2
```

Note: A maximum of 20 keycode files can be stored under the “keycode” directory on the RMD. The keycode files must have the same extension “.kcd”.

7 Select the keycode to be used on the system.The system validates the selected keycode and displays the software release and machine type authorized.

```
Validating keycode ...

Copying "/cf2/keycode/KCport60430m.kcd" to "/u/
keycode" -

Copy OK: 1114 bytes copied

The provided keycode authorizes the install of
xxxx software (all subissues) for machine type
xxxx (CPP4 processor on xxxx).
```

Note: The software release displayed depends on the keycode file content. The machine type displayed can be one of the following, according to the keycode content:

- 3521 (CP PIV processor on CS 1000M SG) for Meridian 1 Option 61C CP PIV
- 3621 (CP PIV processor on CS 1000M MG) for CS 1000E and Meridian 1 Option 81C CP PIV systems

8 The system requests keycode validation.

```
Communication Server 1000 Software/Database/
BOOTROM RMD Install Tool

================================================

Please confirm that this keycode matches the
System S/W on the RMD.

Please enter:

         <CR> -> <y> - Yes, the keycode matches.
Go on to Install Menu.

         <n> - No, the keycode does not match.
Try another keycode.

Enter choice>
```

9 If the keycode matches, enter <CR> to continue the installation. The system displays the Install Menu.

```
Communication Server 1000 Software/Database/
BOOTROM RMD Install Tool
=================================================

I N S T A L L    M E N U

       The Software Installation Tool will install
or upgrade Succession Enterprise System Software,
Database and the CP-BOOTROM. You will be prompted
throughout the installation and given the
opportunity to quit at any time.

        Please enter:

<CR> -> <a> - To install Software, CP-BOOTROM.

        <b> - To install Software, Database,
CP-BOOTROM.

        <c> - To install Database only.

        <d> - To install CP-BOOTROM only.

        <t> - To go to the Tools menu.

        <k> - To install Keycode only.

               For Feature Expansion, use OVL143.

        <p> - To install 3900 set Languages.

        <q> - Quit.

        Enter Choice> <b>
```

10 Select option “<b> To install Software, Database, CP-BOOTROM.” The system requires the insertion of the RMD containing the software to be installed.

```
Communication Server 1000 Software/Database/
BOOTROM RMD Install Tool

==================================================P
lease insert the Removable Media Device into the
drive on Core 0.

Please enter:

         <CR> -> <a> - RMD is now in drive.
Continue with s/w checking.

         <q> - Quit.

Enter choice> <CR>
```

11 If the RMD containing the software is already in the drive, select option “<a> - RMD is now in drive. Continue with s/w checking.” (or simply press <CR>) to continue. If the RMD is not yet in the drive, insert it and then press <CR>.

12 The system displays the release of the software found on RMD under the "swload" directory and requests confirmation to continue the installation.

```
Communication Server 1000 Software/Database/
BOOTROM RMD Install Tool

=================================================

The RMD contains System S/W version xxxx.

Please enter:

        <CR> -> <y> - Yes, this is the correct
version. Continue.

        <n> - No, this is not the correct version.
Try another RMD or a different keycode.

Enter choice> <CR>
```

Note: If the RMD contains the correct software release, select option "<y> - Yes, this is the correct version. Continue." (or simply press `<CR>`) to continue. If the software release is not correct and you want to replace the RMD, insert the correct RMD in the drive and then press `<CR>`. If you want to replace the keycode, select option "`<n>` - No, this is not the correct version".

13 Choose yes for the Dependency Lists installation.

```
 Do you want to install Dependency Lists?

        Please enter:

<CR> -> <y> - Yes, Do the Dependency Lists
installation

       <n> - No, Continue without Dependency Lists
installation

        Enter choice> n

        Are you sure?

        Please enter:

<CR> -> <n> - No, Go to the Dependency List menu

        <y> - Yes, Go to the next menu

        Enter choice> y

Enable Automatic Centralized Software Upgrade
(CSU) Feature ? (Default - YES)

        Please enter:

<CR> -> <y> - Yes

        <n> - No

        Enter choice> n

>Processing the install control file ...

>Installing release xxxx
```

Note: Avaya CS 1000 Release 7.5 software installations that do not require DepLists, do not prompt for a DepLists installation.

14 The Installation Status Summary appears.

```
INSTALLATION STATUS SUMMARY
-------------------------------------------
=============+========+========+=============
|     Option      |      Choice       | Status |   Comment          |
================+========+========+=========
| SW: RMD to FMD  |    yes         |            | install for rel XXXXX|
=============+========+========+=============
|     Option      |      Choice       | Status |   Comment          |
================+========+========+=========
|  Dependency Lists   |  no        |          |               |
================+========+========+=========
|     Option      |      Choice       | Status |   Comment          |
================+========+========+=========
| AUTO-CSU Feature |  no      |            | AUTO-CSU Disabled |
|     Option      |      Choice       | Status |   Comment          |
================+========+========+=========
|  IPMG Software  |          no |          | install for rel XXXXX
|     Option      |      Choice       | Status |   Comment          |
================+========+========+=========
| DATABASE       |           yes      |          |                  |
|     Option      |      Choice       | Status |   Comment          |
================+========+========+=========
| CP-BOOTROM |           yes         |          |                    |
```

15 Enter <CR> to confirm and continue install.ation.

```
 Please enter:

<CR> -> <y> - Yes, start installation.

        <n> - No, stop installation. Return to the
Main Menu.


        Enter choice>

>Checking system configuration

You selected to install Software release: XXXX on
the new system.

This will  create  all  necessary  directories and
pre-allocate files on the hard disk.

You  may continue  with software  install or quit
now and leave your software unchanged.

Please enter:

<CR> -> <a> - Continue with new system install.

        <q> - Quit.

        Enter choice>
```

16 The PSDL files menu appears. Enter the appropriate choice for the site's geographic location.

```
***********************************************p
SDL INSTALLATION MENU

The PSDL contains the loadware for all downloadable
cards in the system and loadware for M3900 series
sets.

***********************************************
Select ONE of the SEVEN PSDL files:

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, <CR> - default

By default option 1 will be selected.
Enter your choice ->x

>Copying new PSDL ...
```

17 Successful installation confirmation appears, enter <CR> to continue.

```
Communication Server 1000 Software/Database/
BOOTROM RMD Install Tool

=================================================

Software release xxxx was installed successfully
on Core 1.

All files were copied from RMD to FMD.


Please press <CR> when ready ...
```

18 The customer database installation from RMD is employed when upgrading from CP3 and CP4 systems. Select option “<a> - Install CUSTOMER database.” from the database installation main menu.

```
Communication Server 1000 Software/Database/
BOOTROM RMD Install Tool

=================================================

You will now perform the database installation.

Please enter:

        <CR> -> <a> - Install CUSTOMER database.

(The Removable Media Device containing the
customer database must be in the drive.

        <b> - Install DEFAULT database.

(The System S/W media must be in drive.)

        <c> - Transfer the previous system
database.(The floppy disk containing the customer
database must be in the floppy drive of the MMDU
pack.

        <e> - Check the database that exists on the
Fixed Media Device.

        <q> - Quit.

Enter choice> a
```

19 Continue with database installation.

```
Communication Server 1000 Software/Database/
BOOTROM RMD Install Tool

=================================================

You selected to transfer single database from RMD
to FMD on Core 0.

The database will be converted from release xxxx.

If you quit now, the database will be left
unchanged.

Please enter:

          <CR> -> <a> - Continue with database
install.

          <q> - Quit.

Enter choice> a or <CR>
```

The installation summary screen appears. Verify successful installation and enter <CR> when ready.

```
INSTALLATION STATUS SUMMARY
------------------------------------------
=============+========+========+=============
|     Option      |      Choice      | Status |    Comment      |
================+========+========+=========
| SW: RMD to FMD  |     yes          |     ok      | install for rel XXXXX|
=============+========+========+=============
|     Option      |      Choice      | Status |    Comment      |
================+========+========+=========
|   Dependency Lists   |  no         |            |     |
================+========+========+=========
|     Option      |      Choice      | Status |    Comment         |
================+========+========+=========
| AUTO-CSU Feature |   no      |      |  AUTO-CSU Disabled
|     Option      |      Choice      | Status |    Comment          |
================+========+========+=========
|  IPMG Software  |          no |      ok | |
|     Option       |      Choice      | Status |    Comment          |
================+========+========+=========
| DATABASE       |           yes       |     ok |  from default floppy disk |
|     Option      |      Choice      | Status |    Comment           |
================+========+========+=========
| CP-BOOTROM |           yes          |    ok     |                    |
```

20 Upon returning to the main install menu, enter **q** to quit.

```
                I N S T A L L   M E N U

       The Software Installation Tool will install
or upgrade Succession Enterprise System Software,
Database and the CP-BOOTROM. You will be prompted
throughout the installation and given the
opportunity to quit at any time.

        Please enter:

<CR> -> <a> - To install Software, CP-BOOTROM.

        <b> - To install Software, Database,
CP-BOOTROM.

        <c> - To install Database only.

        <d> - To install CP-BOOTROM only.

        <t> - To go to the Tools menu.

        <k> - To install Keycode only.

               For Feature Expansion, use OVL143.

        <p> - To install 3900 set Languages.

        <q> - Quit.

        Enter Choice> q
```

21 The system then prompts you to confirm and reboot. Enter <CR> to quit. Enter <CR> again to reboot.

```
You selected to quit. Please confirm.

    Please enter:

<CR> -> <y> - Yes, quit.

        <n> - No, DON'T quit.


        Enter choice> <CR>

You selected to quit the Install Tool.

You may reboot the system or return to the Main
Menu.



        ------------------------------

        DO NOT REBOOT USING BUTTON!!!


        ------------------------------


        Please enter:

<CR> -> <a> - Reboot the system.

        <m> - Return to the Main menu.

        Enter Choice> <CR>

>Removing temporary file "/u/disk3521.sys"

>Removing temporary file "/u/disk3621.sys"

>Rebooting system ...
```

At this point the system should reload and initialize.

End of Procedure

Testing Core/Net 1 and Core/Net 0

LD 137 modifications

The CMDU/MMDU commands are not applicable to CP PIV. Instead, the following commands are introduced in LD 137.

- STAT FMD
  display text: **Status of both Fixed Media Devices (FMD)**
  command parameter: none
- STAT FMD 0/1
  display text: **Status of the specified Fixed Media Device**
  command parameter: “core #” with values of 0 or 1
- STAT RMD
  display text: **Status of both Removable Media Devices (RMD)**
  command parameter: none
- STAT RMD
  display text: **Status of the specified Removable Media Device**
  command parameter: “core #” with values of 0 or 1

Procedure 49
Testing Core/Net 1

1 Perform a redundancy sanity test:

LD 135	Load program
STAT CPU	Get status of CPU and memory
TEST CPU	Test CPU

2 Check the LCD states:

a. Perform a visual check of the LCDs.

b. Test LCDs:

LD 135	Load program
TEST LCDs	Test LCDs
DSPL ALL	

3 Test the System Utility cards and the cCNI cards:

LD 135	Load program
STAT SUTL	Get the status of the System Utility card
TEST SUTL	Test the System Utility card
STAT CNI c s	Get status of cCNI cards (core, slot)
TEST CNI c s	Test cCNI (core, slot)

4 Test system redundancy:

LD 137	Load program
TEST RDUN	Test redundancy
DATA RDUN	Test database integrity
STAT FMD	Status of one or both Fixed Media Devices (FMD)
STAT RMD	Status of one or both Removable Media Devices (RMD)

5 Install the two system monitors. Test that the system monitors are working:

LD 37	Load program
ENL TTY x	Enable the XMS, where x= system XMS
STAT XSM	Check the system monitors
****	Exit program

6 Clear the display and minor alarms on both Cores:

LD 135	Load program
CDSP	Clear displays on the cores
CMAJ	Clear major alarms
CMIN ALL	Clear minor alarms

7 Test the clocks:

a. Verify that the clock controller is assigned to the *active* Core:

LD 60	Load program
SSCK *x*	Get status of the clock controllers (*x* is “0” or “1” for Clock 0 or Clock 1)
SWCK	Switch the Clock (if necessary)
****	Exit program

8 Verify that the Clock Controllers are switching correctly:

SWCK	Switch Clock
	(Wait 30 seconds)
SWCK	Switch Clock again

9 Check applications.

10 Check dial tone.

End of Procedure

Switch call processing

Procedure 50
Switching call processing

LD 135	Load program
SCPU	Switch call processing from Core/Net 1 to Core/Net 0

Core/Net 0 is now the active call processor.

End of Procedure

Procedure 51
Testing Core/Net 0

From Core/Net 0, perform these tests:

1 Perform a redundancy sanity test:

LD 135	Load program
STAT CPU	Get status of CPU and memory
TEST CPU	Test CPU

2 Check the LCD states:

a. Perform a visual check of the LCDs.

b. Test LCDs:

LD 135	Load program
TEST LCDs	Test LCDs
DSPL ALL	

3 Test the System Utility cards and the cCNI cards:

LD 135	Load program
STAT SUTL	Get the status of the System Utility card
TEST SUTL	Test the System Utility card
STAT CNI c s	Get status of cCNI cards (core, slot)
TEST CNI c s	Test cCNI (core, slot)

4 Test system redundancy:

LD 137	Load program
TEST RDUN	Test redundancy
DATA RDUN	Test database integrity
STAT FMD	Status of one or both Fixed Media Devices (FMD)
STAT RMD	Status of one or both Removable Media Devices (RMD)

5 Install the two system monitors. Test that the system monitors are working:

LD 37	Load program
ENL TTY x	Enable the XMS, where x= system XMS

STAT XSM	Check the system monitors
****	Exit program

6 Clear the display and minor alarms on both Cores:

LD 135	Load program
CDSP	Clear displays on the cores
CMAJ	Clear major alarms
CMIN ALL	Clear minor alarms

7 Test the clocks:

a. Verify that the clock controller is assigned to the *active* Core:

LD 60	Load program
SSCK *x*	Get status of the clock controllers (*x* is "0" or "1" for Clock 0 or Clock 1)
SWCK	Switch the Clock (if necessary)
****	Exit program

8 Verify that the Clock Controllers are switching correctly:

SWCK	Switch Clock
	(Wait 30 seconds)
SWCK	Switch Clock again

9 Check applications.

10 Check dial tone.

End of Procedure

Performing acceptance tests

Contents

This chapter contains information about the following topics:

Acceptance tests

CAUTION

Ensure that the current Dependency Lists are installed.

Perform the following acceptance tests after the system loading is completed.

1 “Testing the module power supply” on page 320

2 “Testing the blower unit and thermal sensor” on page 321

3 “Testing the sysload” on page 323

4 “Testing the system terminal and system monitor” on page 324

5 “Testing the PFTU” on page 325

See *Software Input/Output: Administration* (NN43001-611) for a detailed explanation of software prompts and the *Software Input/Output: System Messages* (NN43001-712) for the meaning of system messages and display codes generated during acceptance tests.

> ***Note:*** If you fail to see an expected display code while performing any test, contact your Avaya support representative.

Testing the module power supply

Use this procedure to test module power supplies and ringing generators and their interface to the system monitor. This procedure should be performed for each power supply at system installation, or whenever a module is installed.

> ***Note:*** Performing these tests on a single CPU system may cause a sysload. Performing these tests on a dual CPU system may cause an initialization. Disregard INI messages during the tests.

Procedure 52
Testing module power supply

1 Verify that the green LED on each power supply is lit and that each red column LED is OFF.

2 Set the power supply to OFF. If there is an MPDU in the module, use the associated circuit breaker on the MPDU. If there is a switch on the power supply, use the switch.

- The green LED on the power supply should go out.
- The red column LED should light.
- The system terminal should display PWR0002 and BSD090.

Note: If the power supply is in an IPE Module, XMI messages may be generated.

- The system terminal should then display BSD000.

3 Set the power supply to ON.

- The green LED on the power supply should light.
- The red column LED should go out.
- The system terminal should display PWR0000.

4 Set the power supply to OFF. Wait until the red column LED lights, then unseat the power supply.

- The red column LED should remain lit.
- The system terminal should display PWR0002 and PWR0003.

5 Make sure the power supply switch is OFF and then push it back into the slot. Set the power supply to ON.

- The green LED on the power supply should light.
- The red column LED should go out.
- The system terminal should display PWR0000.

End of Procedure

Testing the blower unit and thermal sensor

Use this procedure to test the NT8D52 Blower Unit and its interface to the system monitor. This test should be performed on the blower unit when a column is initially installed.

Procedure 53
Testing blower unit and thermal sensor

IMPORTANT!

In the steps below, if you fail to see an expected display code, contact your Avaya support representative.

1 In the front of the pedestal, set the blower unit circuit breaker, or power switch, to OFF.

- The red LED at the top front of the column should light.

Note: Some DC powered blower units such as the NT8D52DD may also display PWR0005.

2 Set the blower unit circuit breaker, or power switch, to ON.

- The column LED should go out.
- The system terminal should display PWR0046.

3 Use a screwdriver to loosen the retaining screws at the front of the blower unit (see Figure 107 on page 323) and pull the unit out until it is disconnected from the pedestal.

Note: Do *not* pull the unit all the way out of the pedestal.

- The column LED should light.

4 Reinstall the blower unit and tighten the retaining screws.

- The column LED should go out.
- The system terminal should display PWR0046.

5 Heat one of the two thermal sensors under the top cap of the column with a hand-held hair dryer or similar heat source.

- The column LED should light.
- Thirty seconds after the thermal sensor detects 70 degrees C (158 degrees F), the main circuit breaker, or the blower unit circuit breaker, at the rear of the pedestal should trip. The system terminal should display PWR0004, PWR0006, and PWR0007.

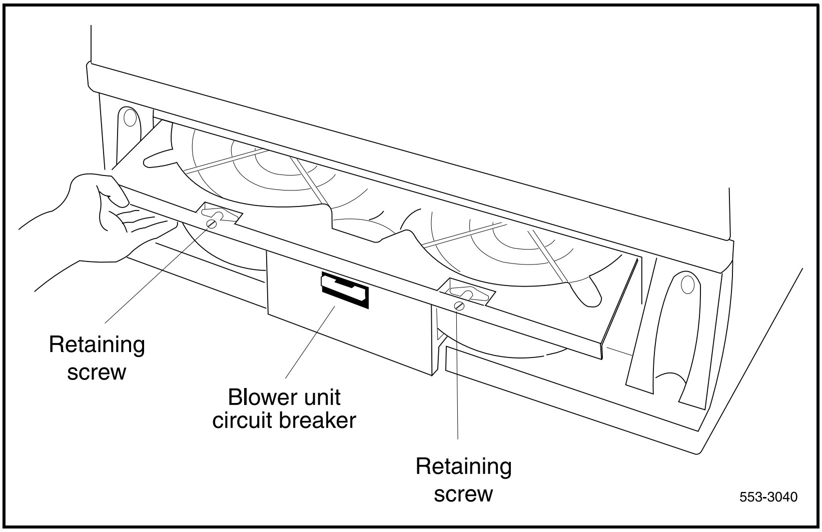
6 Allow the sensor to cool, then reset the circuit breaker in the pedestal. If a sysload occurs, allow it to complete.

- The column LED should go out.
- The system terminal should display PWR0044, PWR0046, and PWR0047.

7 Repeat step 5 and step 6 for the other thermal sensor.

End of Procedure

Figure 107
Blower unit removal



Testing the sysload

Use Procedure 54 to test the sysload (manual reload) function.

Procedure 54
Sysload test

1 Start the sysload:

- Simultaneously press the MAN RST buttons (the bottom buttons) on both Call Processor Cards.

The following functions occur during a sysload:

- The red LED at the top of the CPU column should light.
- The major alarm indication should be displayed on all attendant consoles.

On the LCD displays on the Cards:

- Following the “Selftest Complete” message, watch the LCD for the message “IOP in Slot 17.”
- Watch the LCD for the message “Loading Disk OS.”
- When the sysload is complete, the system terminal displays DONE and the system automatically invokes the initialization program.

The following functions occur when the initialization is complete:

- The column LED should go out.
- The major alarm indication should disappear from all attendant consoles.
- The system automatically runs the programs in the midnight routine.

2 Press the return key on the system terminal to monitor the progress of the midnight routines until the OVL111 BKGD response is received.

End of Procedure

Testing the system terminal and system monitor

Use Procedure 55 to test the system terminals connected to the Large System.

Procedure 55
Testing system terminal and system monitor

1 Log into the system:

LOGI (password)

2 Enter the program and check the status of the system monitor:

LD 37
STAT XSM

3 Test the terminal:

TTY x “x” is the device number assigned to the system terminal

The system terminal should display

ABCDEFGHIJKLM
NOPQRSTUVWXYZ

%*!&()<>=:,.?
READY FOR INPUT

4 Step through the keys on the keyboard one at a time. All keyboard input should be echoed until END is entered.

5 Exit LD 37:
****

End of Procedure

Testing the PFTU

Use Procedure 56 to test a PFTU and its interface with the system monitor.

Procedure 56
Testing the PFTU and its interface

1 Set the line transfer switch on the PFTU to BYPASS. Associated attendant consoles should display a major alarm.

2 Set the line transfer switch on the PFTU to NORMAL.

3 Set the line transfer switch on the attendant console associated with the PFTU to ON. Associated attendant consoles should display a major alarm.

4 Set the line transfer switch on the attendant console associated with the PFTU to OFF. The “major” alarm condition displayed on attendant consoles associated with the PFTU should disappear.

5 Repeat step 2 and step 3 for each attendant console associated with the PFTU.

6 Set the line transfer switch on the PFTU to BYPASS and test the telephones and trunks connected to the PFTU.

- Place an outgoing call from each telephone associated with the PFTU. Each telephone should be connected directly to a trunk.
- Place an incoming call on each trunk associated with the PFTU. Each trunk should be connected directly to a telephone.

7 Set the line transfer switch on the PFTU to NORMAL, and test the telephones and trunks connected to the PFTU. The telephones and trunks associated with the PFTU should return to normal operation.

End of Procedure

Installing earthquake bracing

Contents

This chapter contains information about the following topics:

Seismic-approved applications

Depending on the geographic location, the floor installation method may or may not require seismic bracing. To meet seismic bracing requirements, the installation must meet the Bellcore or the California OSHPD installation specifications. In locations that do not have earthquakes, a non-seismic installation is acceptable.

In certain seismic-approved applications where the pedestal attachment to the floor may be required but Avaya does not offer the appropriate hardware, the installation organization must contact a seismic engineering firm to install the pedestal that meets Bellcore or California OSHPD requirements. This application could include attachment to a raised wood or steel floor.

Universal equipment modules (UEM) are designed to withstand most earthquakes. However, to provide earthquake security, two kits must be installed for each column—a bracing kit provides vertical support to each column of modules and an anchor kit secures each pedestal to the floor.

Installing seismic bracing

Each Avaya Communication Server 1000M Large System and Meridian 1 Large System has been certified to meet two of the most stringent seismic specifications for concrete floor mounting: BELLCORE and CALIFORNIA OSHPD:

- BELLCORE is intended for central-office equipment installations. The requirements are defined in the Network Equipment Building System (NEBS), General Equipment Requirements, TR-EOP-000063 issued by Bell Communications Research (BELLCORE). Each Large System has been certified to meet the maximum severity (Zone 4).
- CALIFORNIA OSHPD, as part of the California building code, requires the anchorage of all fixed hospital equipment to be approved by the California Office of Statewide Health Planning and Development (OSHPD), Division of Facilities Development and Financing. Each Large System has been certified for such installations under anchorage pre-approval number R-0233.

Installing seismic bracing involves:

1 “Selecting the kit” on page 329

2 “Drilling concrete floors” on page 331

3 “Installing Kit A and Kit B anchor plates” on page 333

4 “Installing earthquake rods” on page 335

5 “Positioning and leveling the system” on page 341

Selecting the kit

To select the applicable bracing and anchorage kits for your particular installation, you must first determine the following site requirements:

- Identify system configuration (number of columns and modules per column).
- Identify specification requirements (BELLCORE or CALIFORNIA OSHPD).
- Determine site mounting floor parameters (this information can usually be found in the engineering building drawings):
  - concrete type (hardrock or lightweight aggregate),
  - minimum concrete compressive strength (megapascals or psi),
  - minimum concrete thickness

First, choose the appropriate module bracing kit using Table 59 on page 329. Select a separate kit for each column of modules. For column expansion (when an additional module is added to a column which already contains seismic bracing), use the expansion bracing kit.

Table 59
Seismic Bracing Kits

Seismic Bracing Kit	System configuration
NT8D64CD	1 module
NT8D64CA	2 modules
NT8D64CB	3 modules
NT8D64CC	4 modules
NT8D64BD	expansion

> ***Note:*** The NT8D64CD kit contains neither bracing rods nor tie bars because these are not needed for single-module installations. The NT8D64BD kit does not contain mounting plates as these are not needed for column expansion.

Next, each column must also be secured to the floor. This is accomplished by installing one of two available anchor kits. Select the anchor kit by comparing the site requirements to Table 60 on page 330. This table shows that either anchor kit can be used to meet the CALIFORNIA OSHPD specification, but only Kit B meets the BELLCORE specification. For those installations where neither specification is required, Kit A is recommended due to its shallower concrete requirement.

Both anchor kits can be used in hardrock concrete as long as the compressive strength exceeds 20.7 MPa (3000 psi). Only Kit A can be used in lightweight aggregate concrete with a compressive strength greater than 27.6 MPa (4000 psi). The floor parameters for your installation can usually be found in the engineering building drawings.

Table 60
Seismic Anchor Kit

Kit	Seismic Anchor Kit	BELLCORE	CAL OSHPD	Concrete thk (min)	Light-weight
A	NT8D64BE	No	Yes	90 mm (3.5 in.)	Yes
B	NT8D64CE	Yes	Yes	180 mm (7 in.)	No

The kits listed in Table 60 on page 330 contain commercially available mounting hardware. You have the option of purchasing the contents directly from the manufacturer (using the listing below) or ordering the kits directly from Avaya.

- Kit A (NT8D64BE) contains four of each of the following items:
  - — Hilti HDI 3/4 in., box of 25, manufacturer part # 457564 (Hilti Corporation (918) 252-6000) or Multi-Set II, manufacturer part # RM-34 (ITW Ramset/Redhead, Incorporated (219) 874-4217)
  - — Hex head bolt, 3/4 in. -10 x 1.50” long, steel material, zinc plate finish

- Flat washer, internal diameter = 0.812", outside diameter = 1.469", thickness = 0.120", steel material, zinc plate finish

- Kit B (NT8D64CF) contains four of the following items:
  - Hilti HSL M16/25, box of 10, manufacturer part # 665934 (Hilti Corporation (918) 252-6000)

Finally, to aid installation, four kits have been developed. The seismic anchor hole template kit (NT8D64BH) provides a mylar template to aid floor marking. Only one kit is needed for an installation and this kit is reusable.

Drilling concrete floors

The following tools are required to drill the holes for the anchor bolts.

- dark marking pencil
- center-punch
- rotary hammer drill
- carbide-tip drill bit:
  - 25.4 mm (1 in.) diameter for Kit A, NT8D64BE
  - 24.0 mm (15/16 in.) diameter for Kit B, NT8D64CE
- blowout bulb or compressed air source
- hammer or mallet
- vacuum

DANGER

Wear safety goggles when drilling anchor holes. For all drilling, use the appropriate tools and follow local codes. Make sure to obey all safety and warning precautions provided by the hammer drill and anchor bolt manufacturers.

Procedure 57
Drilling concrete floors

> **IMPORTANT!**
>
> This procedure applies only to installations into concrete floors.

1 Using the equipment room floor plan mark the position of all of the columns.

2 Center-punch each of the hole centers.

3 Using a carbide-tipped drill bit, hammer drill the holes to the size and depth shown in Table 61 on page 332.

Table 61
Anchor hole sizes

Kit	Order Code	Hole diameter	Hole depth
A	NT8D64BE	25.4 mm (1 in.)	78.7 mm (3.1 in.)
B	NT8D64CF	24 mm (15/16 in.)	125 mm (4 15/16 in.)

Note: Special care should be taken in drilling the holes. The holes have to be drilled straight and perpendicular to the floor surface in order for the anchors to be installed correctly. The drill fixture kit can aid this process.

4 Should you hit reinforcing bar or the hole breaks through, abandon that hole and use the secondary hole location indicated in the anchor hole template.

5 Remove any debris from the holes with a blowout bulb or compressed air. Use a vacuum to dispose of the debris.

6 If the mounting plates are not to be installed immediately, cover the anchor holes to prevent debris from falling into them.

End of Procedure

Installing Kit A and Kit B anchor plates

The following tools are required to install the anchors and the anchor plates:

- Kit A
  - — setting tool (Hilti HST 3/4 in., manufacturer part#329821)
  - — 28 mm (1 1/8 in.) open-end wrench
- Kit B
  - — 24.5 mm (1 in.) open-end wrench

Procedure 58
Installing Kit A

1 Insert the anchors into the holes. Use the manufacturer's setting tool to install each anchor flush with the surface of the concrete. The setting tool is required for the Hilti anchor.

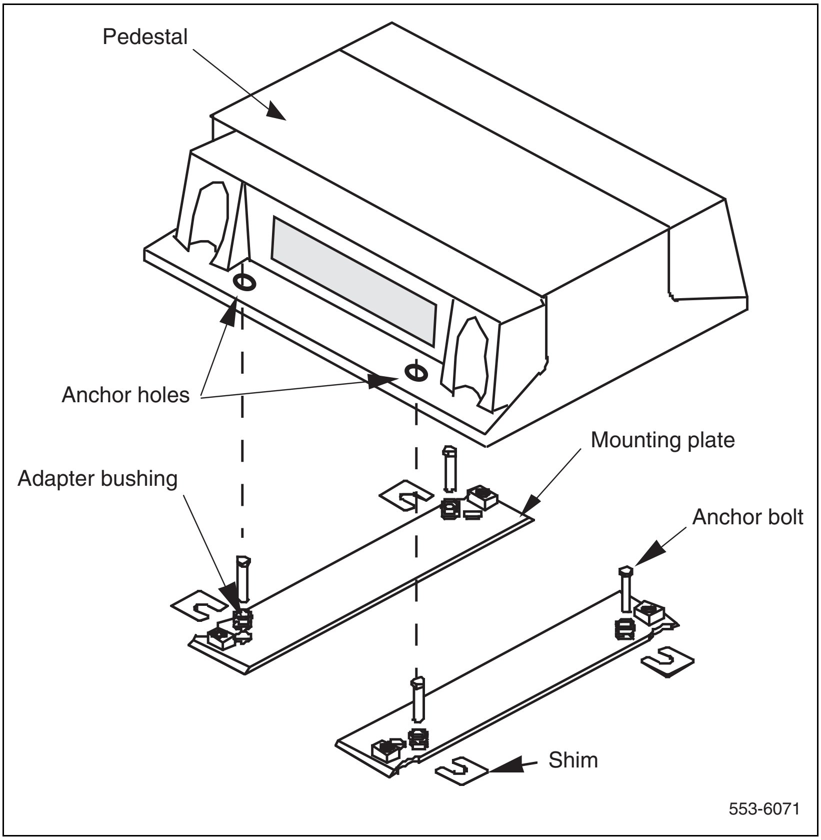
2 Locate the two mounting plates for each column over the anchors. Place an adapter bushing into each of the plate holes and insert a 19 mm (3/4 in.) diameter bolt and flat washer as shown in Figure 108 on page 334.

3 Level the plates with shims. Leave the stack of shims exposed until all leveling has been completed (this will allow the addition or removal of shims if necessary).

4 If the installation must meet CALIFORNIA OSHPD, tension proof load testing is required on 50% of the anchor bolts. These anchors must be tested to 24 020 N (5400 lb) tension and 122 J (90 ft-lb) torque. Any failure requires testing of all remaining anchors.

5 Go to "Installing earthquake rods" on page 335.

Figure 108
Mounting plate installation



End of Procedure

Procedure 59
Installing Kit B

1 Locate the two mounting plates for each column over the anchor holes. Insert the anchors into the holes and tap the anchors into place with a mallet.

2 Level the plates with shims. Leave the stack of shims exposed until all leveling has been completed (this will allow the addition or removal of shims if necessary).

3 If the installation must meet CALIFORNIA OSHPD, tension proof load testing is required on 50% of the anchor bolts. These anchors must be tested to 6230 N (1400 lb) tension and 122 J (90 ft-lb) torque. Any failure requires testing of all remaining anchors.

4 Go to "Installing earthquake rods" on page 335.

End of Procedure

Installing earthquake rods

The following tools are required to install the rods:

- 7.5 mm (5/16 in.) socket wrench
- 12.7 mm (1/2 in.) open-end wrench for rods
- 14.3 mm (9/16 in.) open-end wrench for nuts

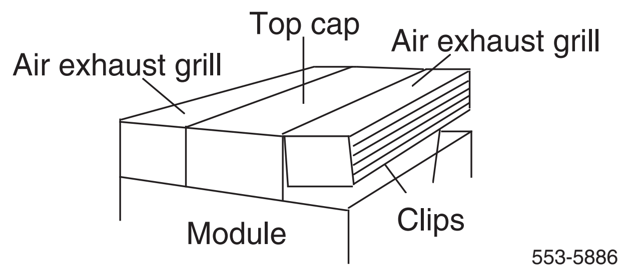
Note: The earthquake rods should be installed before you position the columns.

Procedure 60
Installing earthquake rods

1 Remove the top cap on each column:

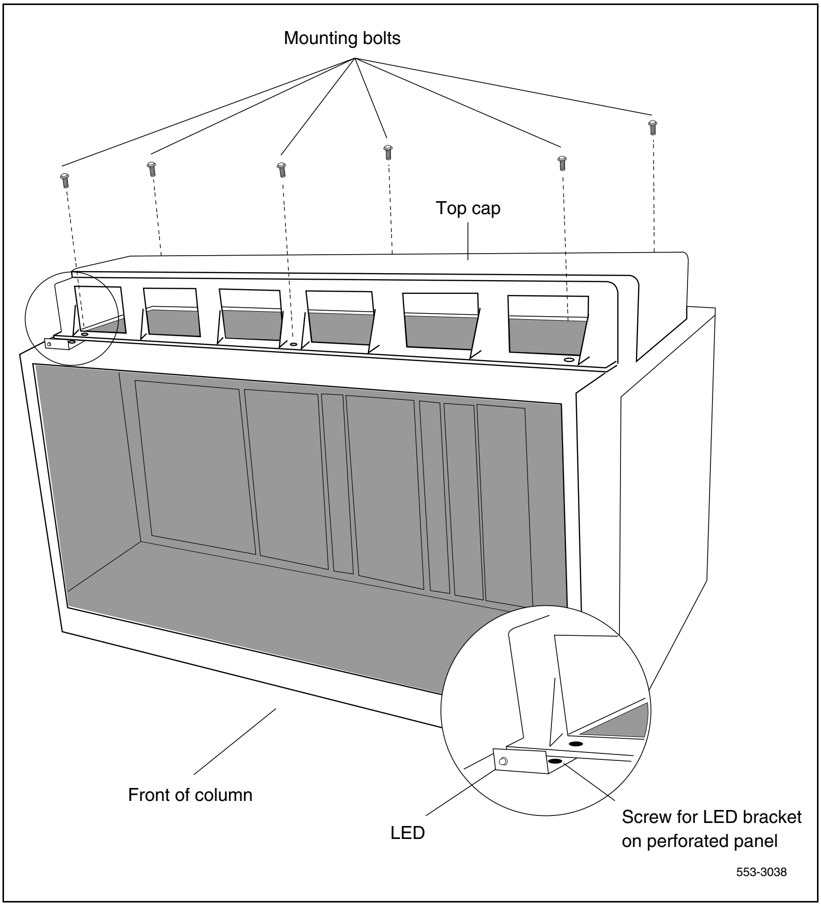
a. Pull forward on the clips underneath the front edge of each air exhaust grill on the top cap. Lift up and remove the grill as illustrated in Figure 109.

Figure 109
Exhaust grill removal



b. Use a 8 mm (5/16 in.) socket wrench to remove the six screws that secure the top cap (see Figure 110 on page 337). Lift the top cap from the column.

Figure 110
Top cap assembly



2 Remove the side panels on the exterior of each module by removing the four bolts that secure the panel.

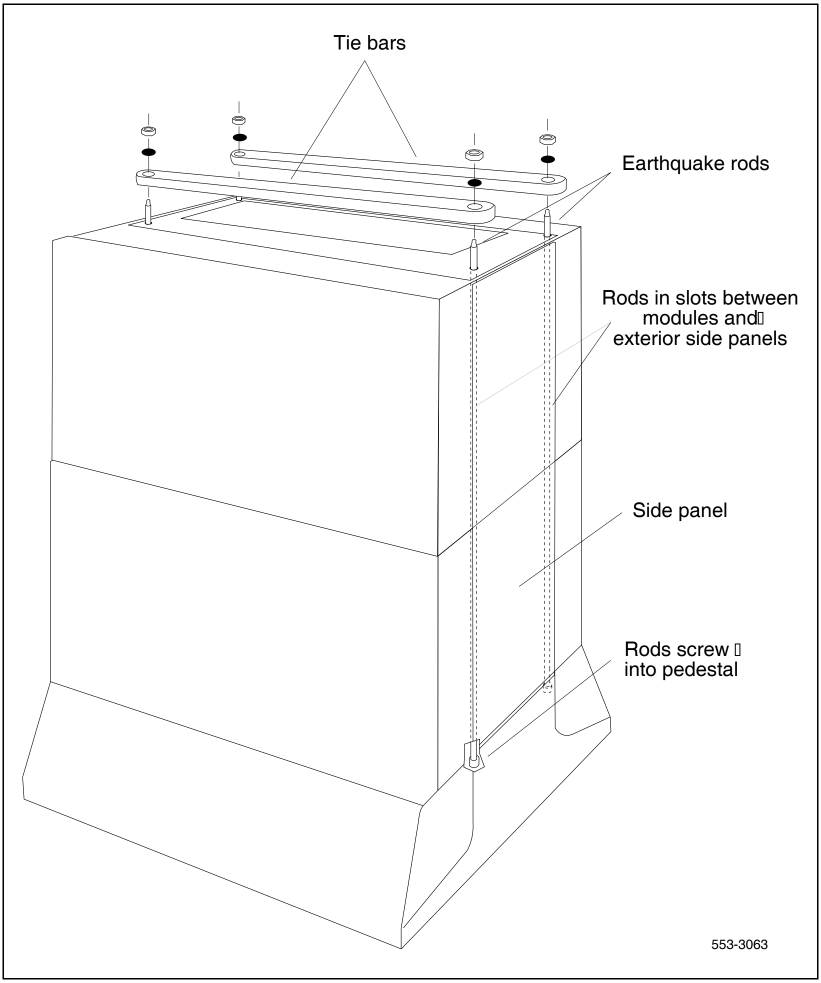
Note: In a two-tier or three-tier column, with adequate ceiling clearance, you may be able to thread the rods down the sides of the column without removing the side panels. Insert each rod into its hole at the top of the column.

3 Install bracing rods:

- Position each rod in one of the vertical slots along the sides of the modules and insert the rods into the threaded holes in the pedestal (see Figure 111 on page 339). Tighten the rods in by hand or snug tight with a 12.7 mm (1/2 in.) open-end wrench.
- Place a tie bar over each pair of rods, from side to side across the top of the module, as shown in Figure 111 on page 339.
- Secure the tie bars with flat washers and hexagon nuts. Torque with 14.3 mm (9/16 in.) wrench to 17.6 J (13.0 ft-lbs).

Note: When installing expansion rods as part of the NT8D64BD bracing kit, the rods are screwed into the previously-installed rods by means of a coupling nut. The resulting two-piece rod should be secured in the same manner as the single rod described above.

Figure 111
Installing bracing rods for column support



4 Reinstall the top cap and grills:

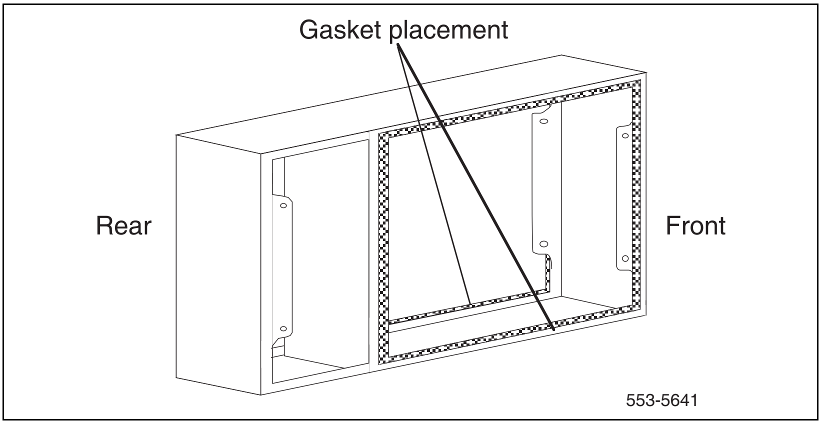
- Position each top cap and install the bolts that secure it.
- Replace the air exhaust grills at the front and rear of each top cap.

5 **For a single-column system**, reinstall the side panels on each module.

6 **For a multiple-column system**, install NT8D49AA Spacer Kits between adjacent columns:

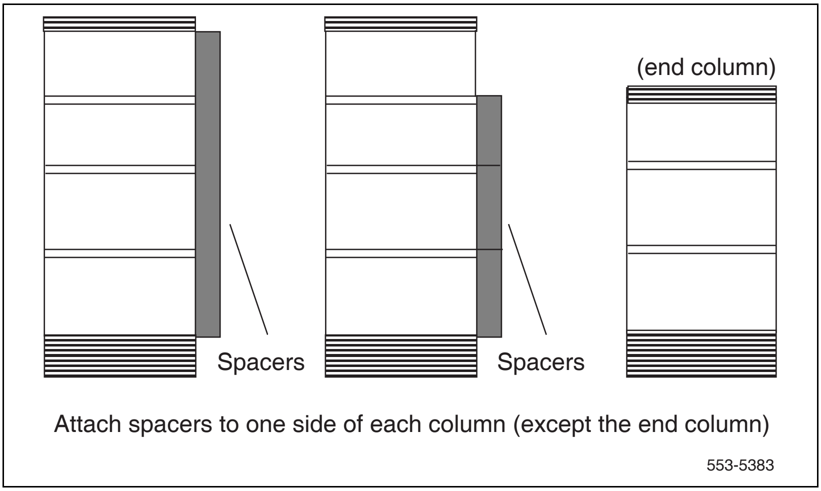
a. Attach gaskets to both sides in the front section of each spacer (see Figure 112 on page 340).

Figure 112
Positioning spacer gaskets



b. Attach a spacer to one side of each module that will be next to another module, except on the end column (see Figure 112 on page 340 and Figure 113 on page 341). Insert the screws through holes in the trim panels.

Figure 113
Adding spacers to columns



7 Go to "Positioning and leveling the system" on page 341.

End of Procedure

Positioning and leveling the system

The following tools are required to position and level the system:

- socket wrench (anchor bolts)
  - 28 mm (1 1/8 in.) for Kit A
  - 24 mm (15/16 in.) for Kit B
- 16 mm (5/8 in.) socket wrench (pedestal bolts)

Procedure 61
Leveling the system

1 Loosen the anchor bolts until the mounting plates are free to move.

2 Starting from one end of the line-up, move a column into position.

3. Loosely install the pedestal mounting hardware (1/2 in. bolts, lock washer, plain washer, and insulating washer), using the plastic insulating washers.
4. Re-level the column, adding or removing shims as needed. Go back and re-level any other columns.
5. Repeat the above steps until all columns have been positioned.
6. Slide shims completely under seismic plates. First tighten the pedestal mounting bolts, torque to 122 J (90 ft-lb). Then, tighten the concrete anchors, torque to 48 J (35 ft-lb).

End of Procedure

Installing non-seismic bracing

In certain applications where earthquakes do not occur, the pedestal attachment to the floor does not have to meet Bellcore or California OSHPD requirements. This application could include attachment to a raised wood or steel floor using the kits described below.

Installing non-seismic bracing involves:

1. "Selecting the kit" on page 342
2. "Installing a non-seismic anchor kit" on page 343

Selecting the kit

If the installation does not have to meet the Bellcore or OSHPD requirements, the installer can design and install an attachment suitable for the particular installation using:

- NT8D64BF Floor Mounting Kit
- NT8D6401 Insulating Washer Kit

NT8D64BF Floor Mounting Kit

The NT8D64BF Floor Mounting Kit provides the hardware required to secure a Large System column to concrete floors for non-seismic installations, that is, for a non-Bellcore or OSHPD approved installation.

The kit provides four sets of hardware, however, a minimum of two anchors must be used diagonally opposite to secure the column pedestal to the floor. The kit also provides four insulating washers that can be used during kit installation.

NT8D6401 Insulating Washer Kit

The NT8D6401 Insulating Washer Kit is used for attaching the Large System to the floor when the installer is using a third party anchor kit instead of the Avaya NT8D64BF Floor Mounting Kit.

In this case, one NT8D6401 Insulating Washer Kit is required for each pedestal to electrically insulate the mounting bolts from the pedestal casting. Each NT8D6401 Insulating Washer Kit provides four insulating washers.

Installing a non-seismic anchor kit

Follow Procedure 62 to install a Floor Mounting Kit (NT8D64BF).

Procedure 62
Installing a Floor Mounting Kit (NT8D64BF)

1. Mark the position of each Meridian 1 column using the equipment room floor plan.
2. Mark the location of all four anchor holes for each column using a dark marking pencil.
3. Center-punch the center of each hole in the concrete.
4. Make the hole in concrete by using a rotary hammer drill to the following size and depth:
    - hole diameter 16 mm (5/8 in.)
    - hole depth 50 mm (2 in.)

5. Abandon the hole if you should hit a reinforcing bar or the hole breaks through. A minimum of two diagonally opposite anchors are required for this application.

6. Remove any debris from the hole with a blowout bulb or compressed air. Use a vacuum cleaner to dispose of the debris.

7. Insert the anchors into the holes. Use the manufacturer's setting tool to install each anchor flush with the surface of the concrete. Use the Hilti HST 12.7 mm (1/2 in.) setting tool, manufacturer part # 000329805 or equivalent.

8. Position each column over the anchors.

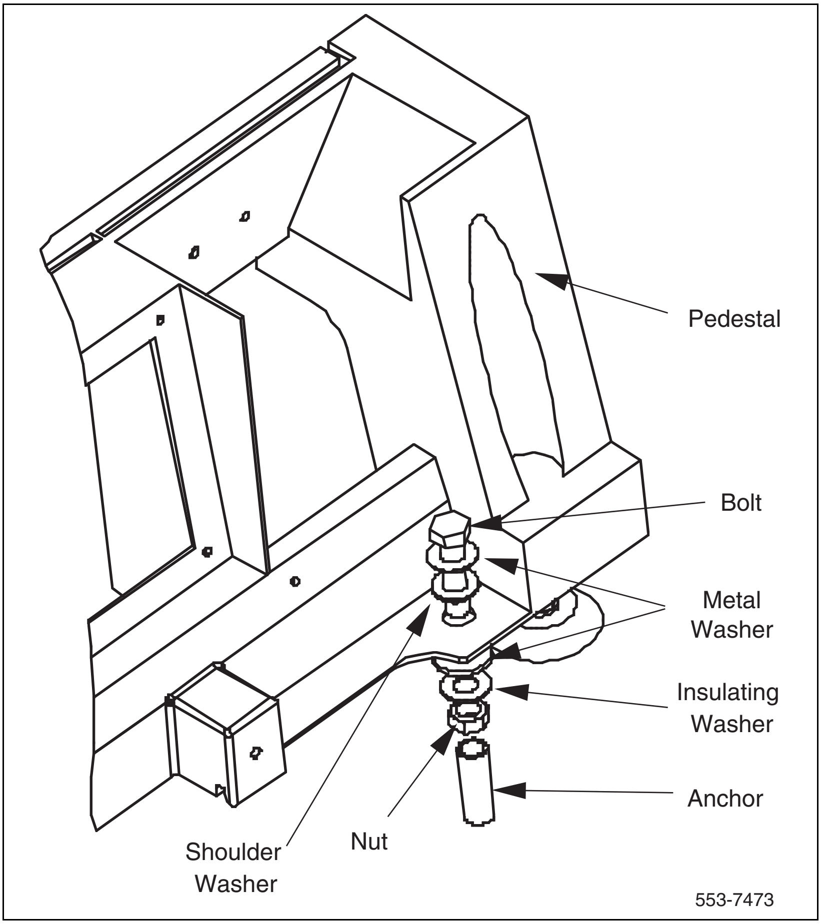
9. Insert bolt, metal washer, and shoulder washer into the pedestal hole, as shown in the Figure 114 on page 345. On the far side of the pedestal flange, thread a plastic washer, a metal washer, and the nut onto the bolt. Insert the bolt into the concrete anchor.

10. Tighten the nut to the pedestal flange and torque it to 34 J (25 ft-lb) using a 20 mm (3/4 in.) socket wrench. Do not overtighten.

11. Repeat steps 8 to 11 for remaining bolts.

End of Procedure

Figure 114
Pedestal mounting flange (rear view)



Adding a module to a column

Contents

This chapter contains information about the following topics:

Overview

The procedures in this chapter apply to adding a module to a column that is fully equipped and powered up. To add a fourth module to a column during initial system installation, see the procedure for placing the fourth module on a column in “Preparing for installation” on page 41.

CAUTION — Service Interruption

Damage to Equipment

A module containing the system CPU (Common Equipment cards) should never be installed at the third or the fourth tier of a column. Modules containing Common Equipment should always be installed in the bottom two tiers of Large System columns. This ensures optimum cooling for the Common Equipment cards.

A module can be added to a column in one of three positions. A specific procedure is provided for each situation.

- "Adding a module to the base of a column" on page 348
- "Adding a module between two other modules" on page 354
- "Adding a module to the top of a column" on page 358

If the column is equipped with earthquake bracing, the column support rods must be removed and longer rods must be installed after the module is added. To change the rods, see "Installing earthquake bracing" on page 327.

WARNING

A fully loaded module weighs approximately 60 kg (130 lbs). More than one person is required to move a module.

DANGER OF ELECTRIC SHOCK

In a DC-powered system, power to the column can remain on during the following procedures. In an AC-powered system, however, power to the entire column *must* be shut down throughout the procedures.

Adding a module to the base of a column

If conduit or other cabling runs through modules that are being moved, you must tag and disconnect the cables, pull them out of the modules, and reroute them after all of the modules are repositioned. The top cap can remain on the module to which it is attached.

Procedure 63
Adding a module to the base of a column

1 Disconnect and remove the NT8D22 System Monitor for the column in the rear of the pedestal (do *not* turn off the blower unit in the front of the pedestals):

a. If the column houses the master system monitor, load LD 37, and software disable the associated SDI port:

LD 37	
DIS TTY x	disable the device associated with the port

b. Disconnect the RJ11 cable to J3, then the cable to J6, then pull the system monitor out of the slot.

2 Set all circuit breakers in the rear of the pedestal to OFF (down).

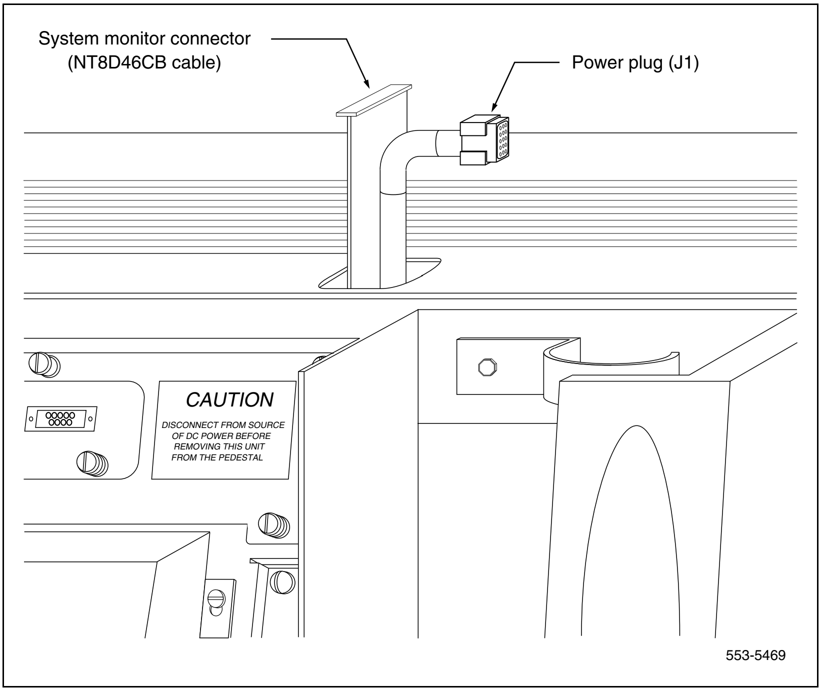
3 Remove the module above the pedestal:

a. Disconnect the power connector to the pedestal (see Figure 115).

Note: You must press a latch trip on the front and rear of the plug. You may need to use a screwdriver blade against the latch trip on the front of the plug.

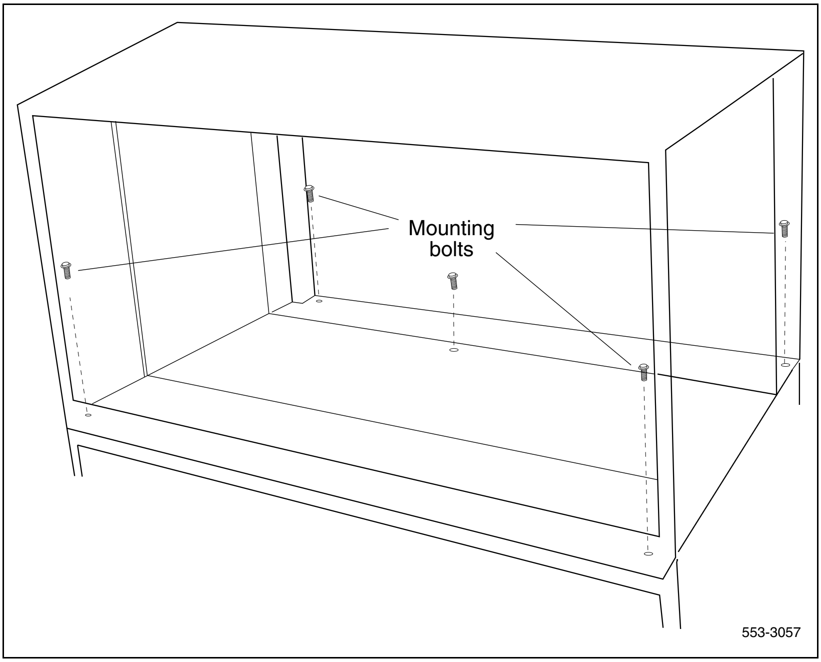
b. Disconnect the system monitor connector to the pedestal (see Figure 115).

Figure 115
NT7D09CA Pedestal – module power and system monitor connections



c. Use a 9/16 in. socket wrench to remove the five mounting bolts that secure the module (see Figure 116) and lift it off the column.

Figure 116
Module mounting bolts



Note: There is an EMI shield (it looks like a brass grill) on the top of each pedestal. Leave this shield on the pedestal. Use a few pieces of tape to hold the shield in position, so the holes for the mounting bolts are aligned with the screw holes on the pedestal. After the module is secured, remove as much of the tape as possible.

4 Position and secure modules:

a. Locate the positioning guides on the pedestal. Make sure the module being added is facing the same direction as the column.

b. Place the module being added on the pedestal and adjust it until it is seated securely on the positioning guides.

c. Secure the mounting bolts for the module.

d. Place the module that was removed onto the top of the module that was added and secure it with the mounting bolts.

5 Connect the power and system monitor cables in the module:

a. Connect the power connectors to the pedestal and to the module above (see Figure 115 on page 350 and Figure 117 on page 353).

b. Attach the frame ground wires to the frame ground post at the base of the module.

c. Connect the system monitor cable from the pedestal to connector J1 on the module being added.

d. Connect the system monitor cable from connector J2 in the module being added to J1 in the module above.

6 Set all circuit breakers in the pedestal to ON.

7 Reinstall the system monitor in the pedestal:

a. Reconnect the RJ11 cable to J6, then the cable to J3. Reinstall the system monitor.

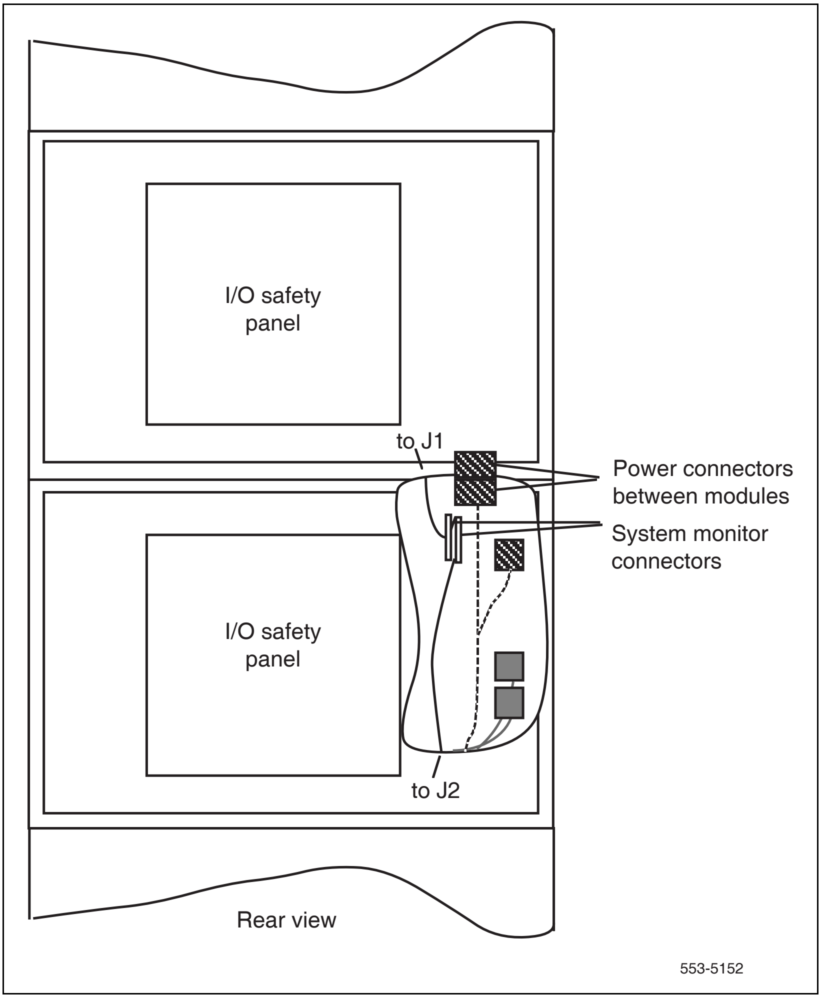
b. If the column houses the master system monitor, load LD 37, and software re-enable the associated SDI port:

LD 37	
ENL TTY x	enable the device associated with the port
****	exit LD 37

8 Replace all module covers and the pedestal grill.

End of Procedure

Figure 117
Module-to-module power and system monitor connections



Adding a module between two other modules

If conduit or other cabling runs through modules that are being moved, you must tag and disconnect the cables, pull them out of the modules, and reroute them after all of the modules are repositioned.

The top cap can remain on the module to which it is attached.

Procedure 64
Adding a module between two other modules

1 Disconnect and remove the NT8D22 System Monitor for the column in the rear of the pedestal (do *not* turn off the blower unit in the front of the pedestals):

a. If the column houses the master system monitor, load LD 37, and software disable the associated SDI port:

LD 37
DIS TTY x disable the device associated with the port

b. Disconnect the RJ11 cable to J3, then the cable to J6, then pull the system monitor out of the slot.

2 Turn off power as necessary:

- With AC power, set the main circuit breaker for the column to OFF (down) in the rear of the pedestal.

> **DANGER OF ELECTRIC SHOCK**
>
> Due to hazardous voltage in AC-powered systems, power to the entire column must be shut down. This shuts down all functions in the column.

- With DC power, set the switch on the module power supply and the circuit breaker in the rear of the pedestal to OFF (down) for any module that will be moved and for the module being added. (All other modules in the column can safely retain power.)

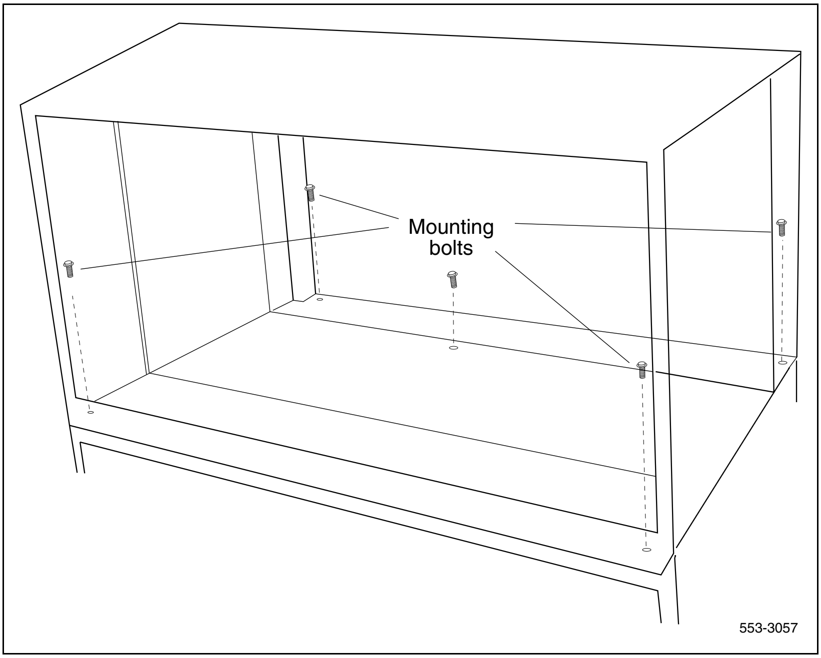
3 Remove the module that will be above the module being added:

a. Disconnect the power connectors between the modules (review Figure 117 on page 353).

b. Disconnect the system monitor cable from connector J1 in the module that will be above the module being added.

c. Use a 14.3 mm (9/16 in.) socket wrench to remove the five mounting bolts that secure the module and lift it off the column (see Figure 118 on page 355).

Figure 118
Module mounting bolt



4 Position and secure modules:

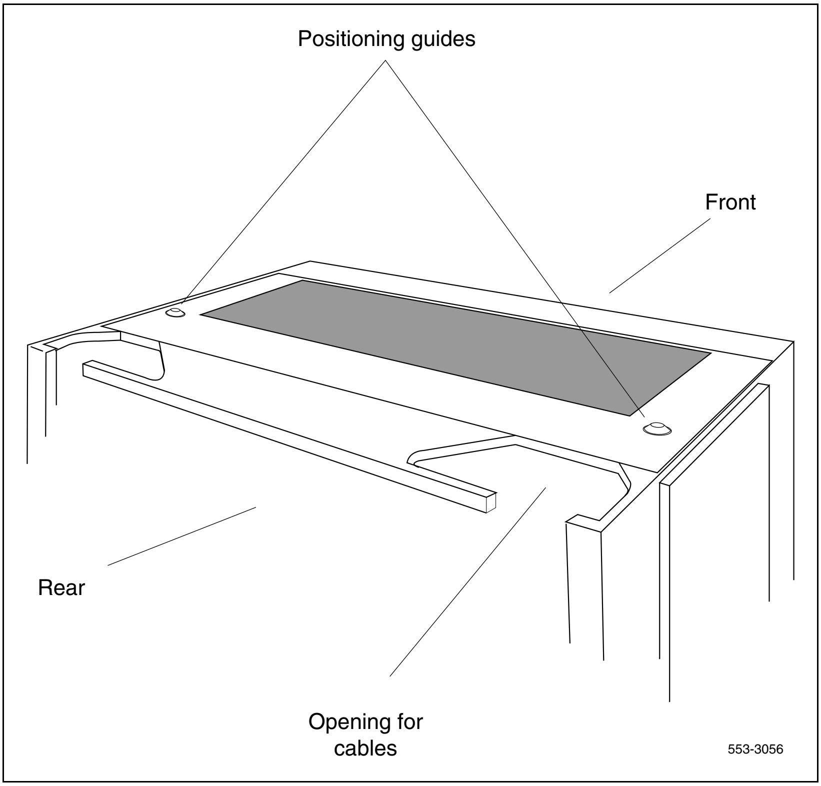
a. Locate the positioning guides on what is now the top module in the column (see Figure 119 on page 356). Make sure the module being added is facing the same direction as the column.

b. Place the module being added on top of the column and adjust it until it is seated securely on the positioning guides.

c. Secure the mounting bolts for the module.

d. Place the module that was removed on top of the module that was added and secure it with the mounting bolts.

Figure 119
Module positioning guides



5 Connect the power and system monitor cables between modules:

a. Connect the power connectors between the module being added and the modules above and below it.

b. Connect the system monitor cable from connector J2 in the module below to J1 in the module being added (review Figure 117 on page 353).

c. Connect the system monitor cable from J2 in the module being added to J1 in the module above.

6 Restore power to the module:

- With AC power, set the main circuit breaker to ON (up) in the rear of the pedestal.
- With DC power, set the circuit breaker in the rear of the pedestal then the module power supply to ON (up) for the module that was added and for any module that was moved.

7 Reinstall the system monitor in the pedestal:

a. Reconnect the RJ11 cable to J6, then the cable to J3. Reinstall the system monitor.

b. If the column houses the master system monitor, load LD 37, and software re-enable the associated SDI port:

LD 37	
ENL TTY x	enable the device associated with the port
****	exit LD 37

8 Replace all module covers and the pedestal grill.

End of Procedure

Adding a module to the top of a column

In a DC-powered system, power to the column can remain on during this procedure.

If conduit or other cabling runs through the top cap, you must tag and disconnect the cables, pull them out of the way, and reroute them after the new module and the top cap are positioned.

Procedure 65
Adding a module to the top of the column

1 Disconnect and remove the NT8D22 System Monitor for the column in the rear of the pedestal (do *not* turn off the blower unit in the front of the pedestals):

- **a.** If the column houses the master system monitor, load LD 37 and software disable the associated SDI port:

  LD 37

  DIS TTY x disable the device associated with the port

- **b.** Disconnect the RJ11 cable to J3, then the cable to J6, then pull the system monitor out of the slot.

2 Turn off power as necessary:

- With AC power, set the main circuit breaker for the column to OFF (down) in the rear of the pedestal.

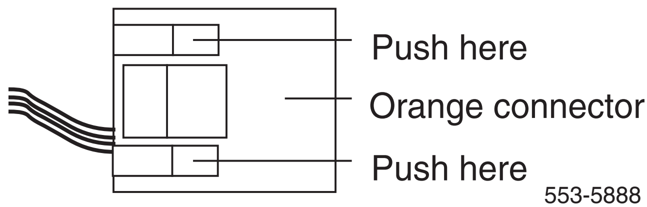
> **DANGER OF ELECTRIC SHOCK**
>
> Due to hazardous voltage in AC-powered systems, power to the entire column must be shut down. This shuts down all functions in the column.

- With DC power, set the switch on the module power supply and the circuit breaker in the rear of the pedestal to OFF (down) for the module being added.

3 Disconnect power connections to the top cap:

a. At the top of the rear of the module, disconnect the orange power connector from the module power harness (see Figure 120 on page 359). Press the four tabs (two on each side) and let the connector fall loose into the module below.

Figure 120
Orange power connector removal tab locations

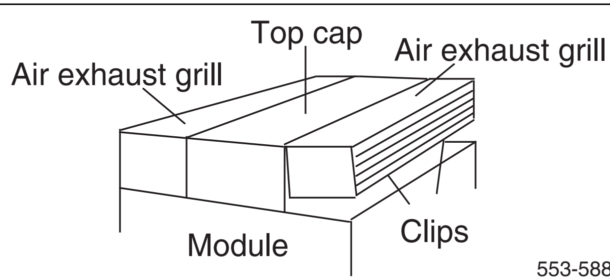


b. Disconnect the system monitor cable at connector J2 on the backplane.

4 Remove the top cap and perforated panel:

- For countries other than the UK, pull forward on the clips underneath the front edge of each air exhaust grill on the top cap. Lift up and remove the grill as illustrated in Figure 121 on page 359).

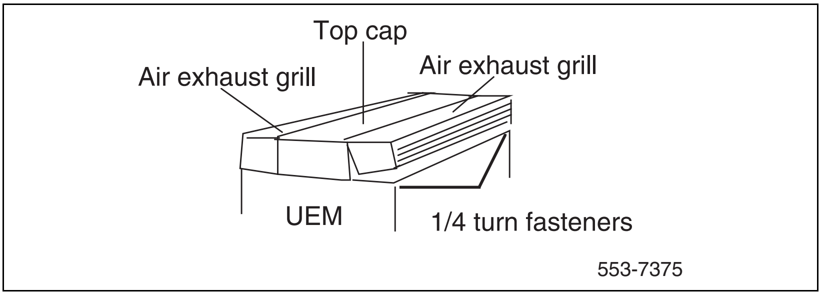
Figure 121
Air exhaust grill removal



- In the UK, the front and rear air exhaust grills are secured by Southco fasteners located underneath the front edge of the grill. Use a #1

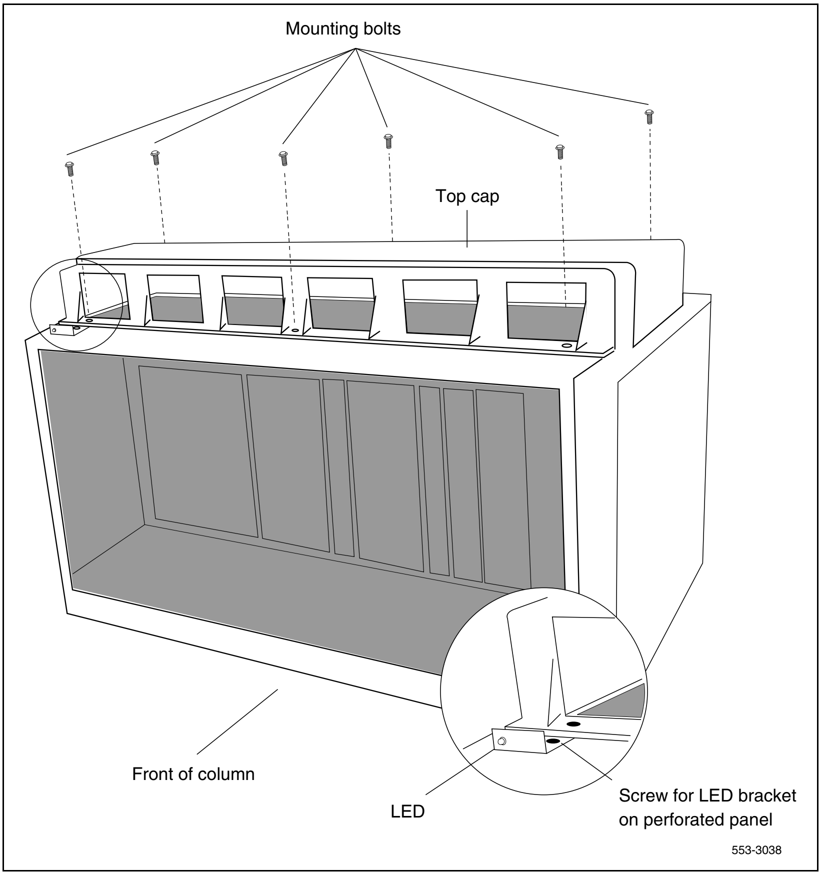
Phillips head screwdriver and turn the fasteners 1/4-turn to release or secure the grill (see Figure 122 on page 360).

Figure 122
UK air exhaust grill removal



- Use a 8 mm (5/16 in.) socket wrench to remove the six bolts that secure the top cap (see Figure 123 on page 361). Remove the top cap from the column.
- Remove the screw that secures the perforated panel and LED bracket. Slide the panel slightly to the left (looking at it from the rear of the column) and remove it.

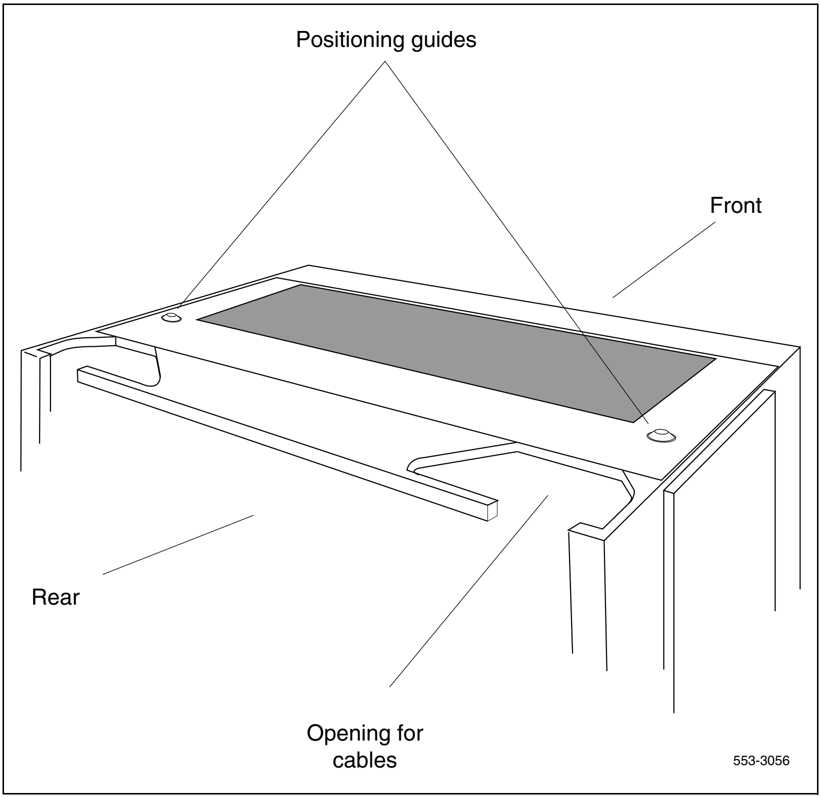
Figure 123
Top cap assembly



5 Position and secure the module being added:

a. Locate the positioning guides on the module in the column (see Figure 124 on page 362). Make sure the module being added is facing the same direction as the column.

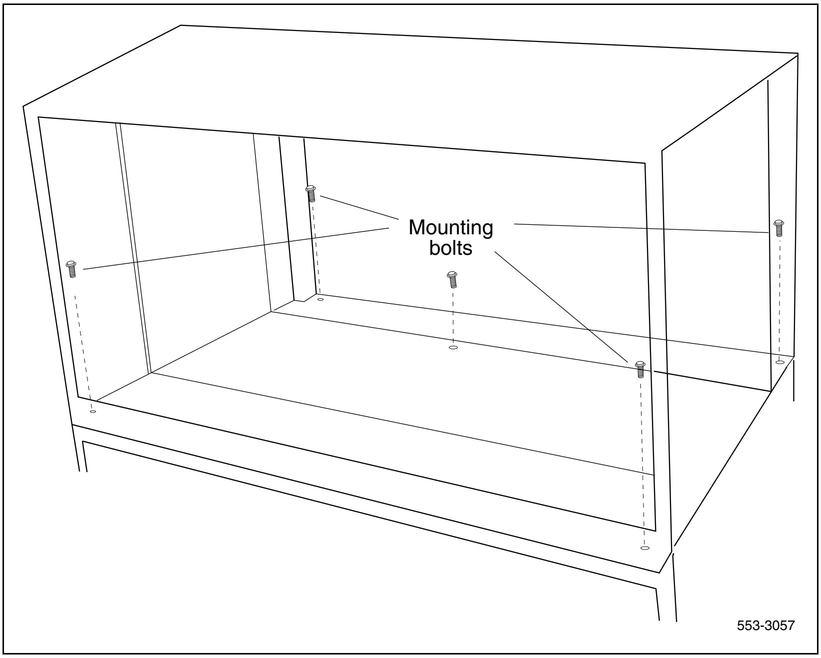
Figure 124
Module positioning guides



b. Place the module being added on top of the column and adjust it until it is seated securely on the positioning guides.

c. Use a 14.3 mm (9/16 in.) socket wrench to secure the module with five mounting bolts (see Figure 125 on page 363).

Figure 125
Module mounting bolts

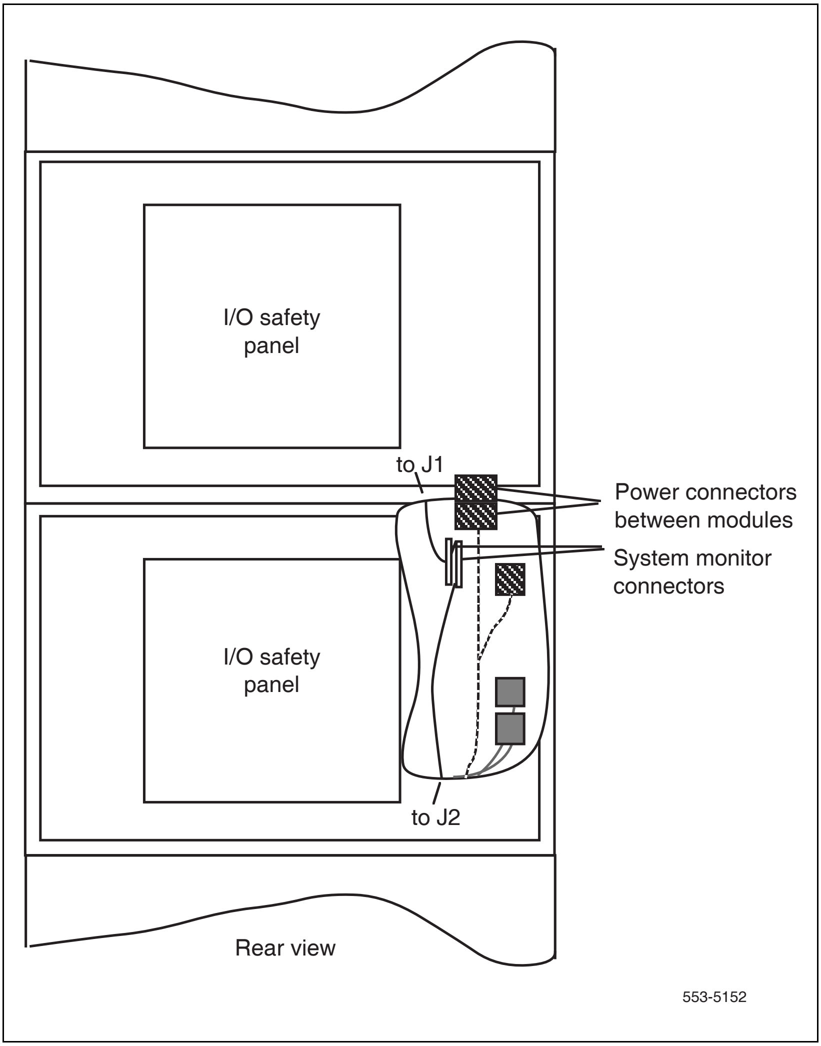


6 Connect the power and system monitor cables between modules:

a. Connect the power connectors between the module being added and the module below it (see Figure 126 on page 364).

b. Connect the system monitor cable from connector J2 in the lower module to J1 in the module being added (see Figure 126 on page 364).

Figure 126
Module-to-module power and system monitor connections

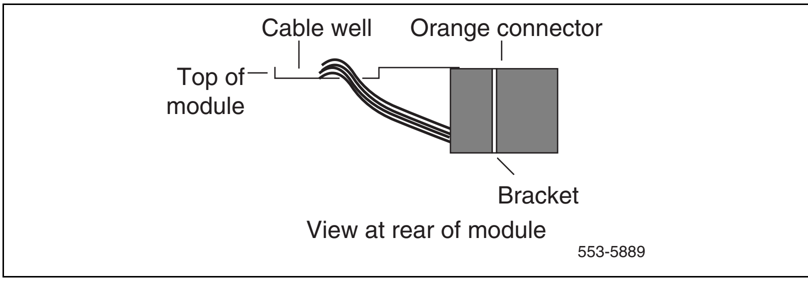


7 Install the perforated panel and top cap on the module being added:

a. Position the perforated panel and slide it slightly to the right (at the rear). Install the screw that secures the panel and LED bracket.

b. Position wiring from the perforated panel so it rests in the cable well located next to the orange power connector at the rear of the module (see Figure 127 on page 365).

Figure 127
Cable well location



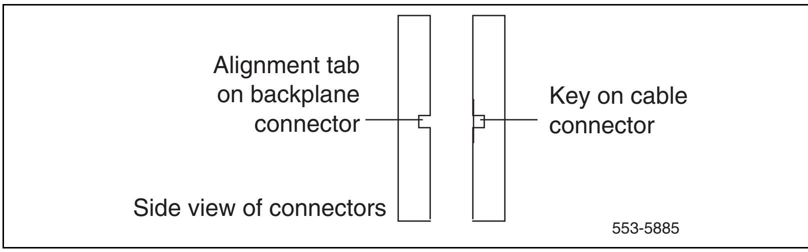
c. Position the top cap and install the bolts that secure it.

d. Replace the air exhaust grills at the front and rear of the top cap.

8 Reconnect power to the top cap:

a. Connect the system monitor cable to J2 on the backplane. Line up the alignment tab on the connector and snap on the pin headers to position the connector correctly (see Figure 128 on page 365).

Figure 128
Monitor cable J2 backplane alignment tab and key alignment



9 Connect the orange power connector to the module power harness. Restore power to the module:

- With AC power, set the main circuit breaker to ON (up) in the rear of the pedestal.
- With DC power, set the circuit breaker in the rear of the pedestal and then set the module power supply to ON (up) for the module that was added.

10 Reinstall the system monitor in the pedestal:

a. Reconnect the RJ11 cable to J6, then the cable to J3. Reinstall the system monitor.

b. If the column houses the master system monitor, load LD 37, and software re-enable the associated SDI port:

LD 37	
ENL TTY x	enable the device associated with the port
****	exit LD 37

11 Replace all module covers and the pedestal grill.

End of Procedure

Cabling network modules and loops

Contents

This chapter contains information about the following topics:

Network-to-network cabling

Cabling between NT8D35 Network Modules interconnects the two half-groups to build a full-network group. The first full-group is located in the Core/Network module together with the CPU. The maximum length of the interconnecting cables between the two modules is 0.6 m (2 ft). The two half-group network modules must therefore be stacked on top of one another. The cables are then routed from the backplane of one module to the backplane of the other through the vertical holes in the rear horizontal cable trough of the modules.

Network module connections

Each multi-group system contains between two and eight Network groups. Group 0 is contained in the Core/Net modules. Groups 1 through 7 are contained in the Network modules. Each Network group is comprised of two Network shelves: Shelf 0 and Shelf 1.

Network Group 0: Shelf 0 to Shelf 1

The Core/Net modules contain Network Group 0: Shelf 0 is in Core/Net 0, Shelf 1 is in Core/Net 1. Shelf 0 must be connected to Shelf 1 for Network Group 0 to operate correctly.

Connecting network Group 0: Shelf 0 to Shelf 1 involves:

1 "Connecting the 3PE faceplates in the Core/Net modules" on page 368

2 "Connecting the Core/Net backplanes" on page 369

Connecting the 3PE faceplates in the Core/Net modules

The 3PE cards in the Core/Net modules must be directly connected with an NT8D80 cable. See Figure 129 on page 369. This connection is only made between the Group 0 shelves (in the Core/Net modules).

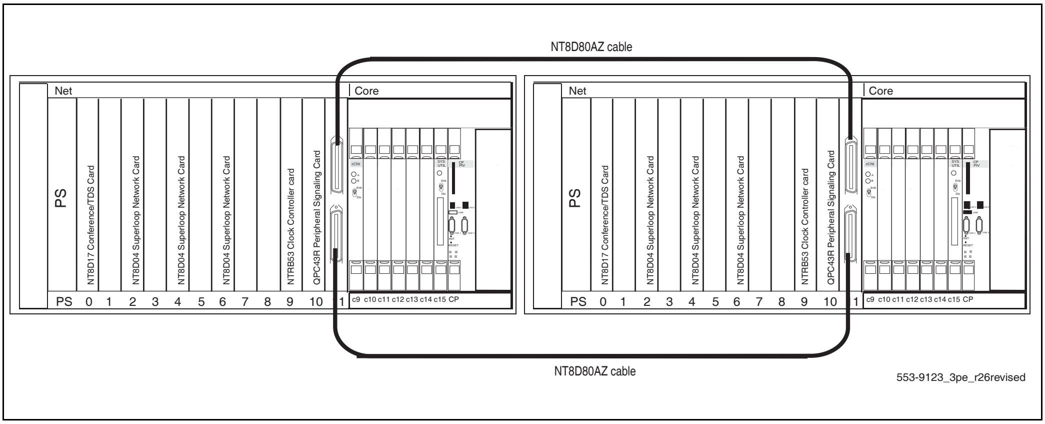
Procedure 66
Connecting the 3PE faceplates in the Core/Net modules

1 Connect a NT8D80 cable from the J4 port in the Core/Net 0 3PE card to J4 port in the Core/Net 1 3PE card.

2 Connect a second NT8D80 cable from the J3 port in Core/Net 0 to the J3 port in Core/Net 1.

Note: The 3PE cards are located in Core/Net slot 11.

Figure 129
3PE faceplate connection between the Core/Net modules



End of Procedure

Connecting the Core/Net backplanes

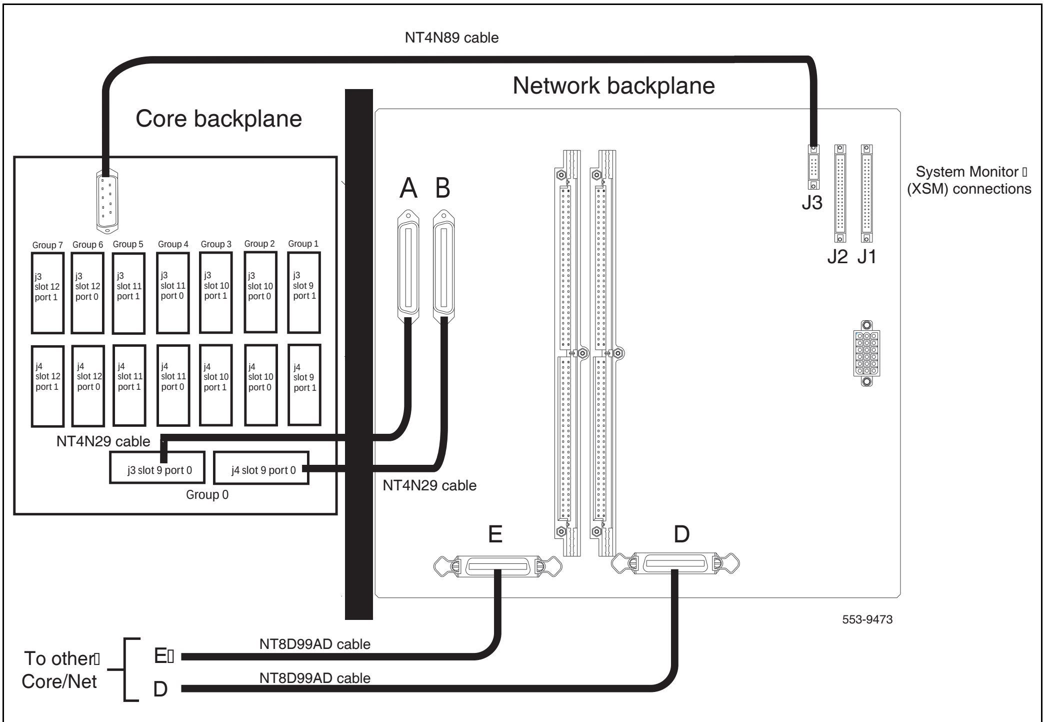
In Group 0 only, the Shelf 0 and Shelf 1 backplanes must be connected with two NT8D99AD cables (Core/Net modules only).

Procedure 67
Connecting the Core/Net backplanes

1 Connect one NT8D99AD cable from the “E” port in Core/Net 0 to the “E” port in Core/Net 1.

2 Connect a second NT8D99AD cable from the “D” port in Core/Net 0 to the “D” port in Core/Net 1. See Figure 130 on page 370.

Figure 130
Network Group 0: Shelf 0 to Shelf 1 backplane connections



End of Procedure

Connecting Groups 1 through 7: Shelf 0 to Shelf 1

On the back of each Network module backplane are five connectors: A, B, C, D and E. See Figure 131 on page 372. The connectors from Shelf 0 of each Network Group 1 through 7 must be connected to the connectors in Shelf 1 of the same Network group.

> ***Note:*** In North American systems, these connections are made in the factory. In shipments outside North America, the Network shelves are shipped separately. These connections must be made in the field.

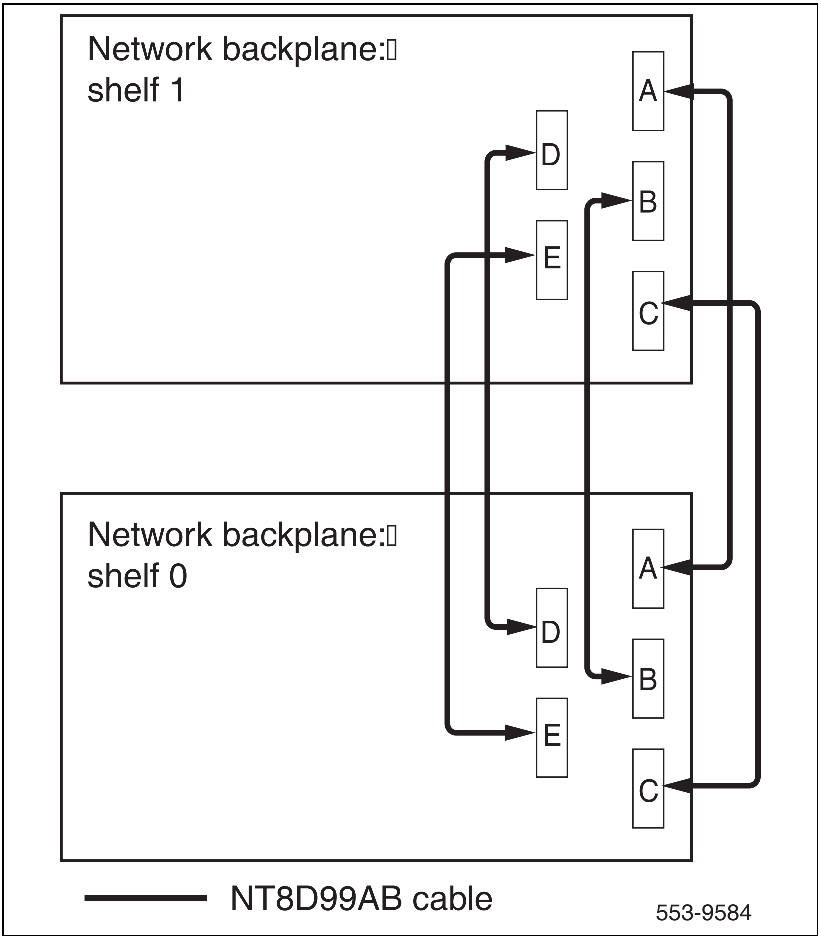
This connection is NOT made for Network Group 0 in the Core/Net modules.

Procedure 68
Connecting Groups 1 through 7: Shelf 0 to Shelf 1

1. Connect an NT8D99AB cable from the **A** connector in Shelf 0 of Network Group 1 to the **A** connector in Shelf 1 Network Group 1.
2. Connect the **B** connector in Shelf 0 to the **B** connector in Shelf 1.
3. Connect the **C** connector in Shelf 0 to the **C** connector in Shelf 1.
4. Connect the **D** connector in Shelf 0 to the **D** connector in Shelf 1.
5. Connect the **E** connector in Shelf 0 to the **E** connector in Shelf 1.
6. Connect the A, B, C, D, and E connectors between Shelf 0 and Shelf 1 for all other Network groups in the system (except Group 0)

   Note: All connections are made with an NT8D99AB cable.

Figure 131
Network Shelf 0 to Shelf 1 backplane connections (Groups 1 through 7)



End of Procedure

Connecting the Network modules to the Core/Net modules

Each Network shelf contains one 3PE card. These 3PE cards are connected to the Fanout panel in the back of the Core/Net shelves.

Figure 132 on page 373, Figure 133 on page 374, and Figure 134 on page 375 show the location of the Fanout panel and 3PE cables on the Core/Net backplane.

Figure 132
3PE Fanout panel in the Core/Net module (top view)

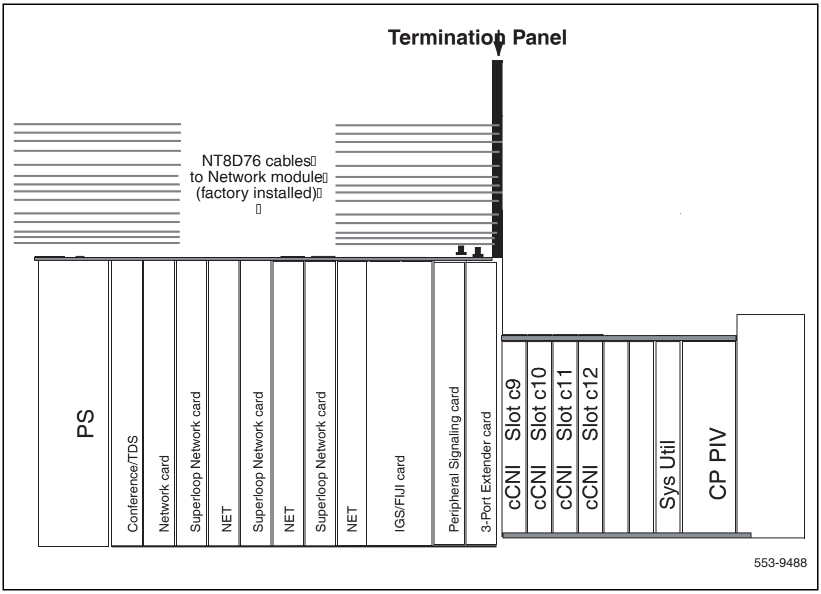


Figure 133
Core/Net backplane (rear view)

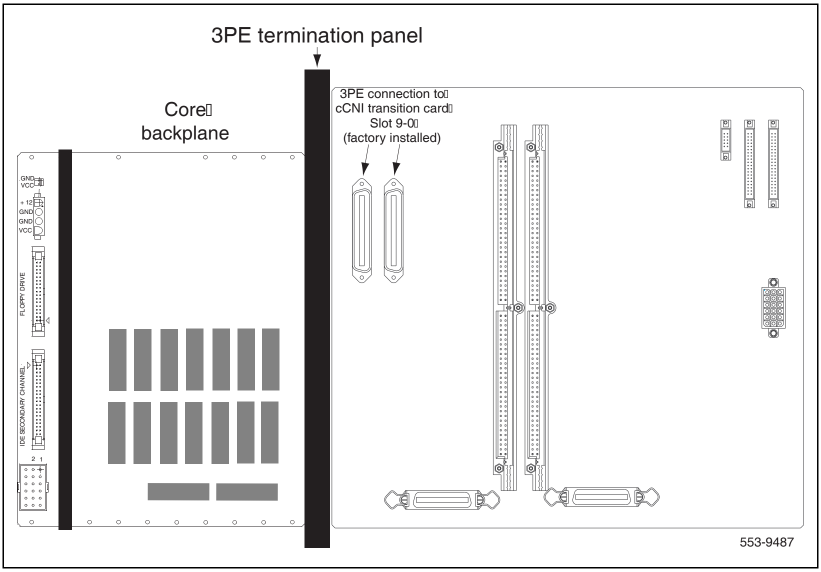
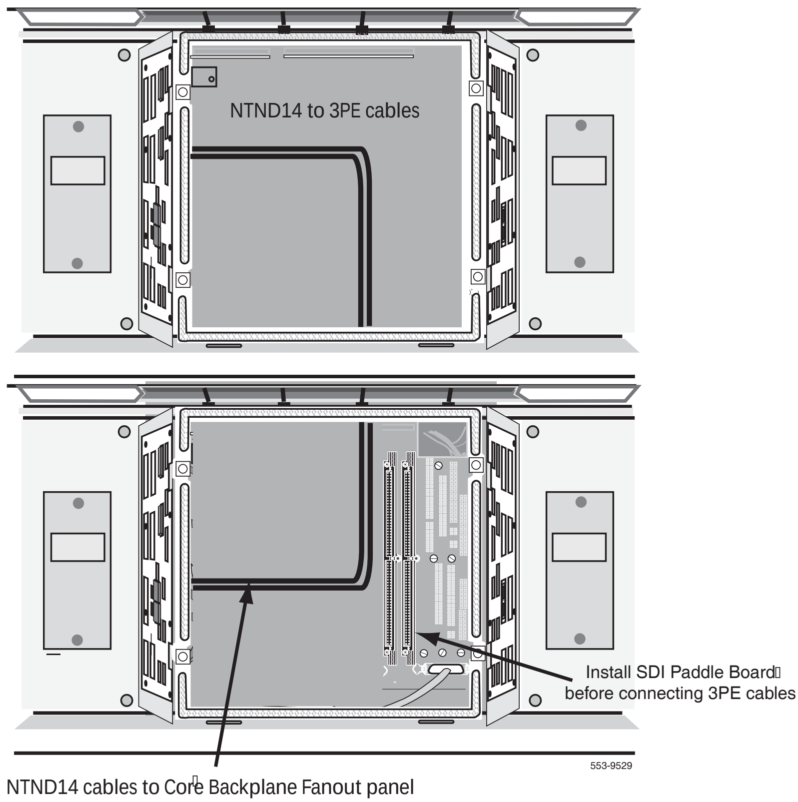


Figure 134
3PE Fanout panel (rear module view)



cCNI slot and port assignments

Each system core shelf contains a minimum of one and a maximum of four cCNI cards. Each cCNI card contains two ports to support up to two Network groups.

cCNI cards are identified by slot and port. Each port is assigned in software to a specific Network group. Use the System Layout Plan to determine the connections for your system.

- Each 3PE card has two faceplate connections: J3 and J4. Two cables are used for each card.
- 3PE cards in Network shelves “0” are connected to the 3PE Fanout panel in Core/Net 0.
- 3PE cards in Network shelves “1” are connected to the 3PE Fanout panel in Core/Net 1.

Table 62 on page 376 specifies the Network group assignments for each cCNI slot and port. These designations cannot be changed in software.

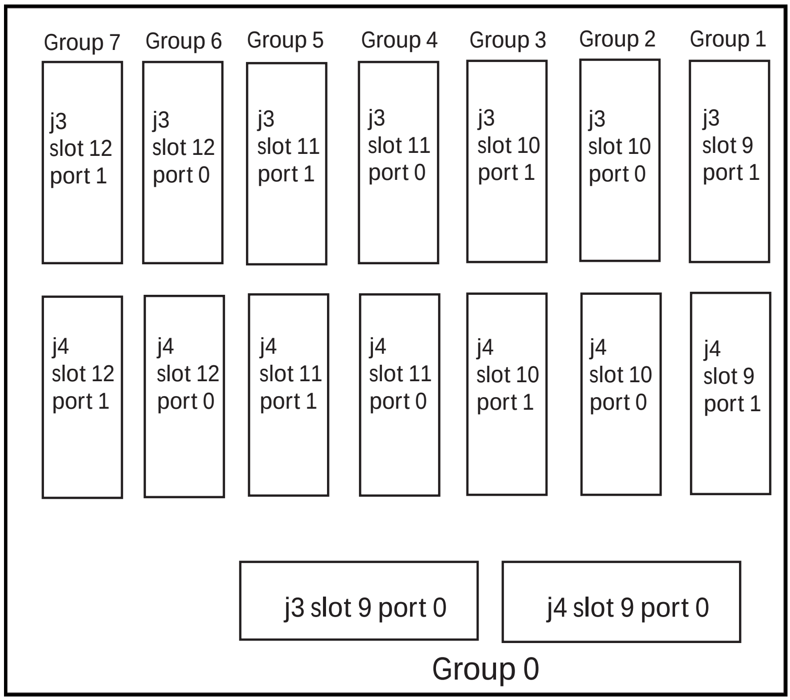
Table 62
cCNI Network group designations

cCNI card slot	cCNI card port	3PE Fanout panel label	Connected to Network group
c9	0	N/A (factory installed directly to the Core/Net backplane)	0
c9	1	Port 9-1	1
c10	0	Port 10-0	2
c10	1	Port 10-1	3
c11	0	Port 11-0	4
c11	1	Port 11-1	5
c12	0	Port 12-0	6
c12	1	Port 12-1	7

cCNI to 3PE Fanout panel cable connections

The cCNI slot and port connections are labeled on the Fanout panel (see Figure 135). Each 3PE card is connected with two cables: one to J3 and one to J4. Table 62 on page 376 specifies the Network group that connects to each slot.

Figure 135
Fanout panel (Core/Net module)



Connecting the 3PE cables to the 3PE fanout panels

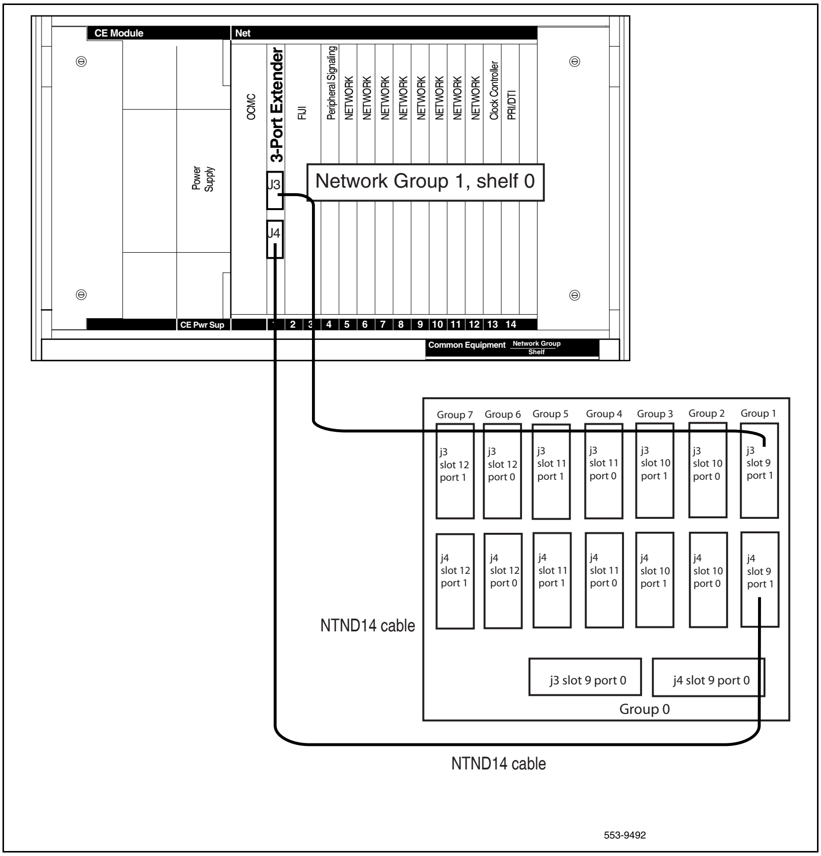
Two NTND14 cables connect from J3 and J4 of each 3PE faceplate to the 3PE Fanout panel. See Figure 136 on page 378.

Connecting network Group 0: Shelf 0 to Shelf 1 involves:

1 "Connecting the Network Shelf 0 3PE cards to Core/Net 0" on page 379.

2 "Connecting the Network Shelf 1 3PE cards to Core/Net 1" on page 379

Figure 136
3PE faceplate to Fanout panel connections – Network Group 1, Shelf 0 example



Refer to Table 62 on page 376 for cCNI port and slot assignments. Connect Shelf 0 3PE cards to the Core/Net 0 panel; connect Shelf 1 3PE cards to the Core/Net 1 panel. The 3PE cables for Network Group 0 are factory installed.

Procedure 69
Connecting the Network Shelf 0 3PE cards to Core/Net 0

1. Connect a NTND14 cable of the appropriate length from J3 on the 3PE card faceplate in Network Group 1, Shelf 0 to the Port 9-1, J3 connection on the 3PE Fanout panel in Core/Net 0.
2. Connect a NTND14 cable of the appropriate length from J4 on the 3PE card faceplate in Network Group 1, Shelf 0 to the Port 9-1, J4 connection on the 3PE Fanout panel in Core/Net 0.
3. Connect a NTND14 cable of the appropriate length from J3 on the 3PE card faceplate in Network Group 2, Shelf 0 to the Port 10-0, J3 connection on the 3PE Fanout panel in Core/Net 0.
4. Connect a NTND14 cable of the appropriate length from J4 on the 3PE card faceplate in Network Group 2, Shelf 0 to the Port 10-0, J4 connection on the 3PE Fanout panel in Core/Net 0.
5. Install the remaining cables according to the assignments in Table 62 on page 376.

End of Procedure

Procedure 70
Connecting the Network Shelf 1 3PE cards to Core/Net 1

1. Connect a NTND14 cable of the appropriate length from J3 on the 3PE card faceplate in Network Group 1, Shelf 1 to the Port 9-1, J3 connection on the 3PE Fanout panel in Core/Net 1.
2. Connect a NTND14 cable of the appropriate length from J4 on the 3PE card faceplate in Network Group 1, Shelf 1 to the Port 9-1, J4 connection on the 3PE Fanout panel in Core/Net 1.
3. Connect a NTND14 cable of the appropriate length from J3 on the 3PE card faceplate in Network Group 2, Shelf 1 to the Port 10-0, J3 connection on the 3PE Fanout panel in Core/Net 1.
4. Connect a NTND14 cable of the appropriate length from J4 on the 3PE card faceplate in Network Group 2, Shelf 1 to the Port 10-0, J4 connection on the 3PE Fanout panel in Core/Net 1.

5 Install the remaining cables according to the assignments in Table 62 on page 376.

End of Procedure

Cabling a Superloop Network Card – single column

If the system is configured in multiple columns, see “Basic cabling for multiple-row network connections” on page 384.

> **CAUTION — Service Interruption**
>
> **System Failure**
>
> Due to the possibility of EMI/RFI noise, do not route cables from front to rear next to the power supply unit.

Procedure 71
Basic cabling for single-row network connections

1 Refer to the work order and the cabling layout shipped with the system to determine:

- each loop number assigned
- the module and slot assignments for the NT8D04 Superloop Network Card associated with each loop
- the location of NT8D37 IPE Modules that contain NT8D01 Controller Cards associated with each loop

2 Set the Enb/Dis switch on each superloop network card to Dis.

3 Cable network loops from the faceplate connector on the superloop network card to the backplane for associated controller cards (see Table 63 on page 382).

- Label both ends of an NT8D91 cable with the loop number, then connect one end of the cable to the superloop network card faceplate connector:
  - — J1 for Shelf 1
  - — J2 for Shelf 0
- On the backplane for the controller card, connect the cable to the SL0, SL1, SL2, or SL3 connector assigned to the loop.

Note: The key (polarizing tab) on the side of the cable connector must be inserted into the keyway on the left side, facing the backplane, of the backplane connector. Blue and white wires should show through the top of the cable connector and, if there is a directional label, the arrow on the cable connector should be located at the top right.

Figure 137 on page 383 shows the superloop network card faceplate connectors, the backplane connectors for the controller card, and the cables required.

4 Seat and secure all connectors.

5 Set the Enb/Dis switch on each network card to Enb.

6 During system software configuration, use the *Software Input/Output: Administration* (NN43001-611) to enter loop assignments.

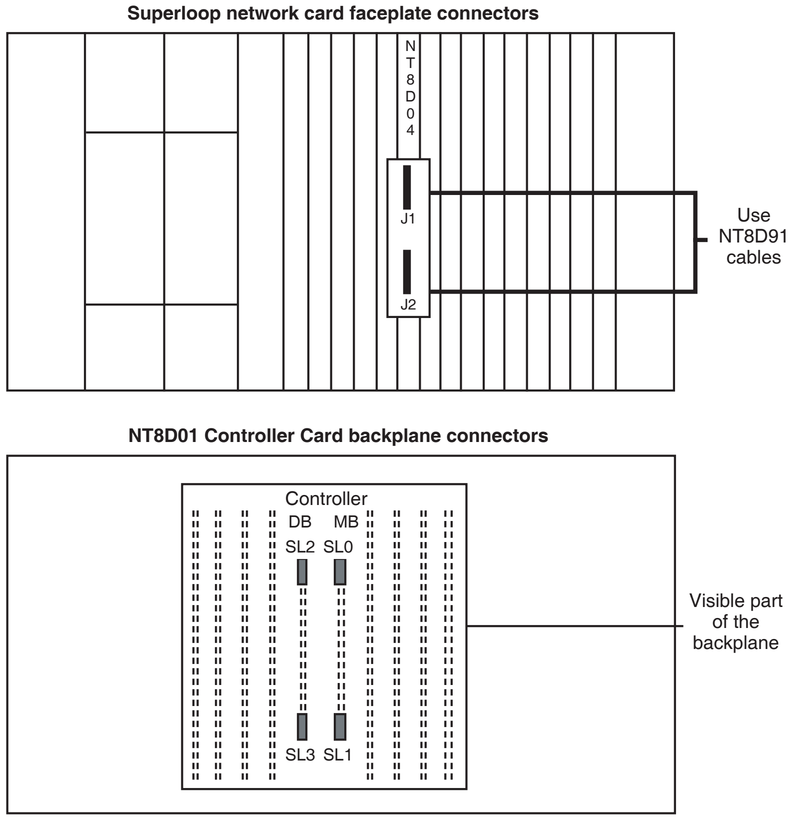
End of Procedure

Table 63
NT8D04 network loop configurations

	FROM		TO	
	Superloop network card	**Faceplate connector**	**Controller card**	**Backplane connector**
One segment per superloop	NT8D04 #1	J2	NT8D01AC #1	SL0
	NT8D04 #2	J2	NT8D01AC #1	SL1
	NT8D04 #3	J2	NT8D01AC #1	SL2
	NT8D04 #4	J2	NT8D01AC #1	SL3
Two segments per superloop	NT8D04 #1	J2	NT8D01AD #1	SL0
	NT8D04 #2	J2	NT8D01AD #1	SL1
Four segments per superloop	NT8D04 #1	J2	NT8D01AD #1	SL0
Eight segments per superloop	NT8D04 #1	J2	NT8D01AD #1	SL0
	NT8D04 #1	J1	NT8D01AD #2	SL0
One segment per superloop/ three segments per another superloop	NT8D04 #1	J2	NT8D01AD #1	SL0
	NT8D04 #2	J2	NT8D01AD #1	SL1
Four segments per superloop/ four segments per another superloop	NT8D04 #1	J2	NT8D01AC #1	SL0
	NT8D04 #2	J2	NT8D01AC #2	SL0
	NT8D04 #2	J1	NT8D01AC #1	SL1

Note: NT8D01AC is a controller-4
NT8D01AD is a controller-2

Figure 137
NT8D04 Superloop Network Card network loops – connectors for single-row connections



Note 1: The NT8D04 Superloop Network Card may be located in any acceptable slot in an NT4N41 Core/Network Module or NT8D35 Network Module.

Note 2: On superloop network cards, connector J1 is used for odd numbered shelves, connector J2 is used for even numbered shelves.

553-5237

Cabling a Superloop Network Card – multiple columns

If the system is configured as a single column“Basic cabling for single-row network connections” on page 380.

> **CAUTION — Service Interruption**
>
> **System Failure**
>
> Due to the possibility of EMI/RFI noise, do not route cables from front to rear next to the power supply unit.

Procedure 72
Basic cabling for multiple-row network connections

1 Refer to the work order and the cabling layout shipped with the system to determine:

- Each loop number assigned
- The module and slot assignments of the NT8D04 Superloop Network Card associated with each loop
- The location of NT8D37 IPE Modules that contain NT8D01 Controller Cards associated with each loop

2 Set the Enb/Dis switch on the faceplate of each network card to Dis.

3 Install NT8D1107 Superloop Adapter Plates on universal I/O panels (P0715058), if required. The superloop adapter plate reduces a QPC414 network loop cutout to the size for a superloop connection.

The recommended order for installing superloop adapter plates is over I/O panel locations J2, J6, J10, J22, J26, J31.

- Position the adapter plate over the QPC414 cutout, and install the screw and washer at the bottom of the plate.
- Position the cable connector on the adapter plate, and install one screw and washer at the top and one screw and washer at the bottom of the connector.

Figure 138 on page 386 shows mounting details for the superloop adapter plate.

4 Cable network loops from the faceplate connector on the network card to the I/O panels on the rear of the Core/Net or Network Module.

- Label both ends of an NT8D88AD cable with the loop number, then connect one end of the cable to the network card faceplate connector:
  - — J1 for Shelf 1
  - — J2 for Shelf 0
- Route the cable around the card cage to the I/O panel and mount the cable connector in one of the cutouts in the panel.

  The recommended order for connections is J16, J17, J37, J38, then, with superloop adapter plates, J2, J6, J10, J22, J26, J31

Figure 139 on page 387 shows the network card faceplate connectors, the I/O panel connectors, and the cables required.

5 Cable the backplane connectors (SL0, SL1, SL2, SL3) for the controller card to the I/O panels on the rear of the IPE Module.

- Label both ends of an NT8D92 cable with the loop number, then connect one end of the cable to the backplane connector.
- Mount the connector on the other end of the cable in one of the cutouts in the I/O panels. The recommended order for connections is:
  - — SL0 to J2
  - — SL1 to J3
  - — SL2 to J4
  - — SL3 to J5

Figure 140 on page 388 shows the controller card backplane connectors and the I/O panels for the IPE Module. Complete the network loop connection (see Table 63 on page 382).

- Connect one end of an NT8D98 cable to the I/O panel connector for the network card.
- Connect the other end of the cable to the I/O panel connector for the associated controller card.

6 Seat and secure all connectors.

7 Set the Enb/Dis switch on each network card to Enb.

8 During system software configuration, use the *Software Input/Output: Administration* (NN43001-611) to enter loop assignments.

End of Procedure

Figure 138
Installing a superloop adapter plate

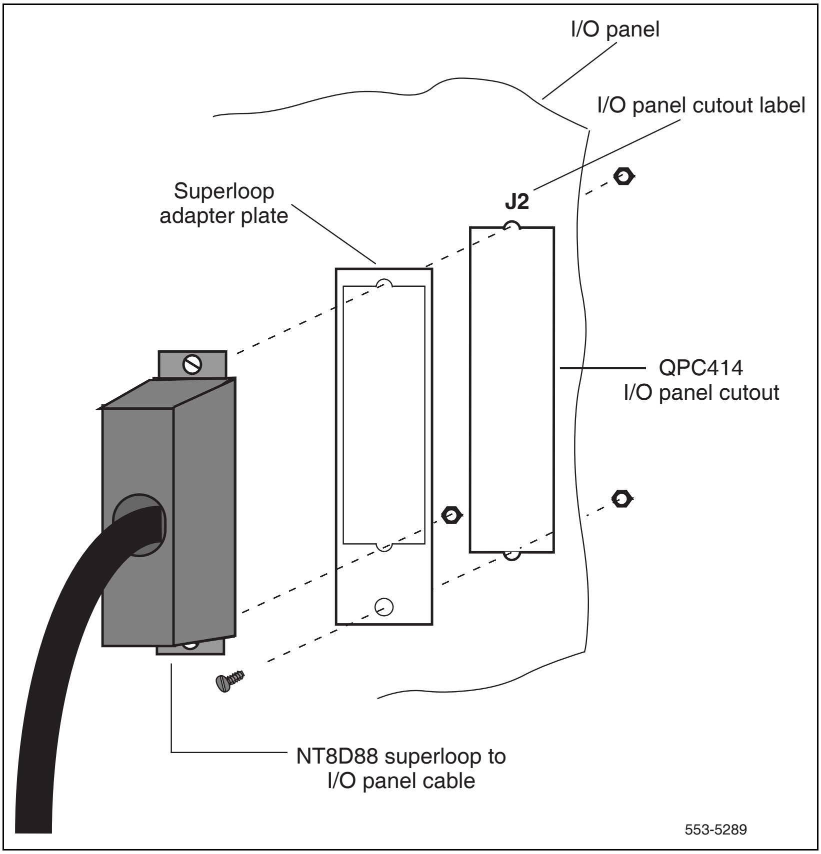


Figure 139
NT8D04 Superloop Network Card network loops – network card to I/O panel connections

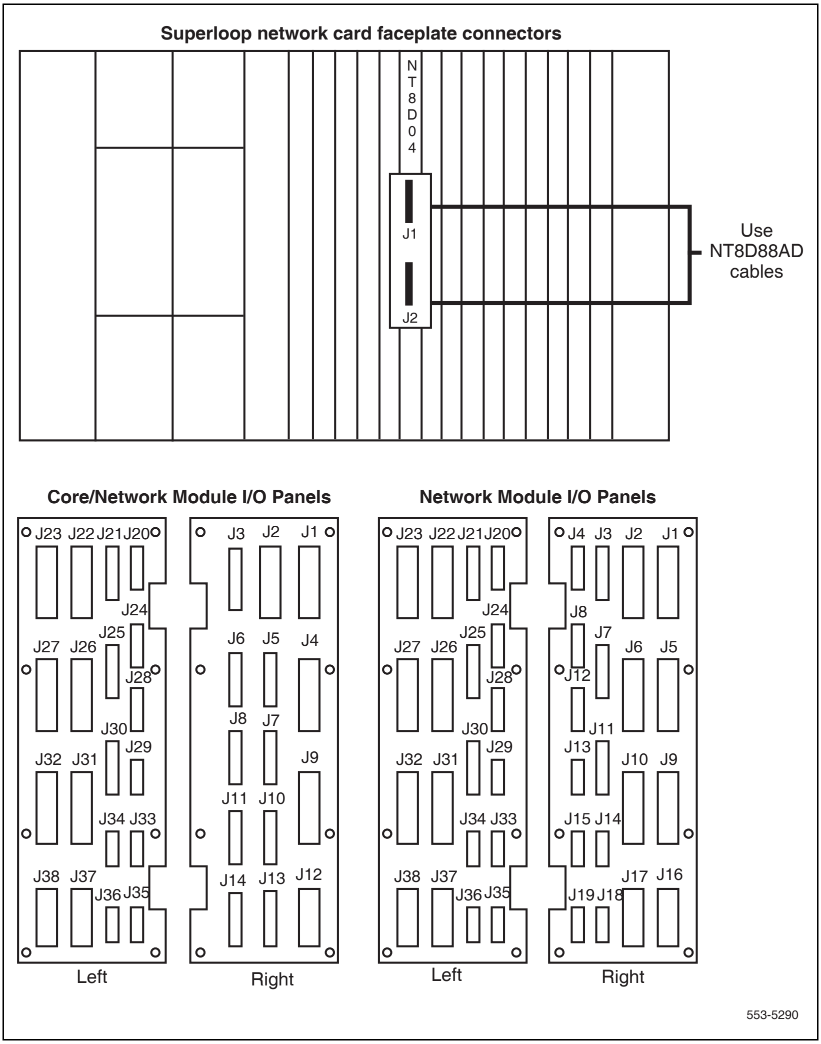
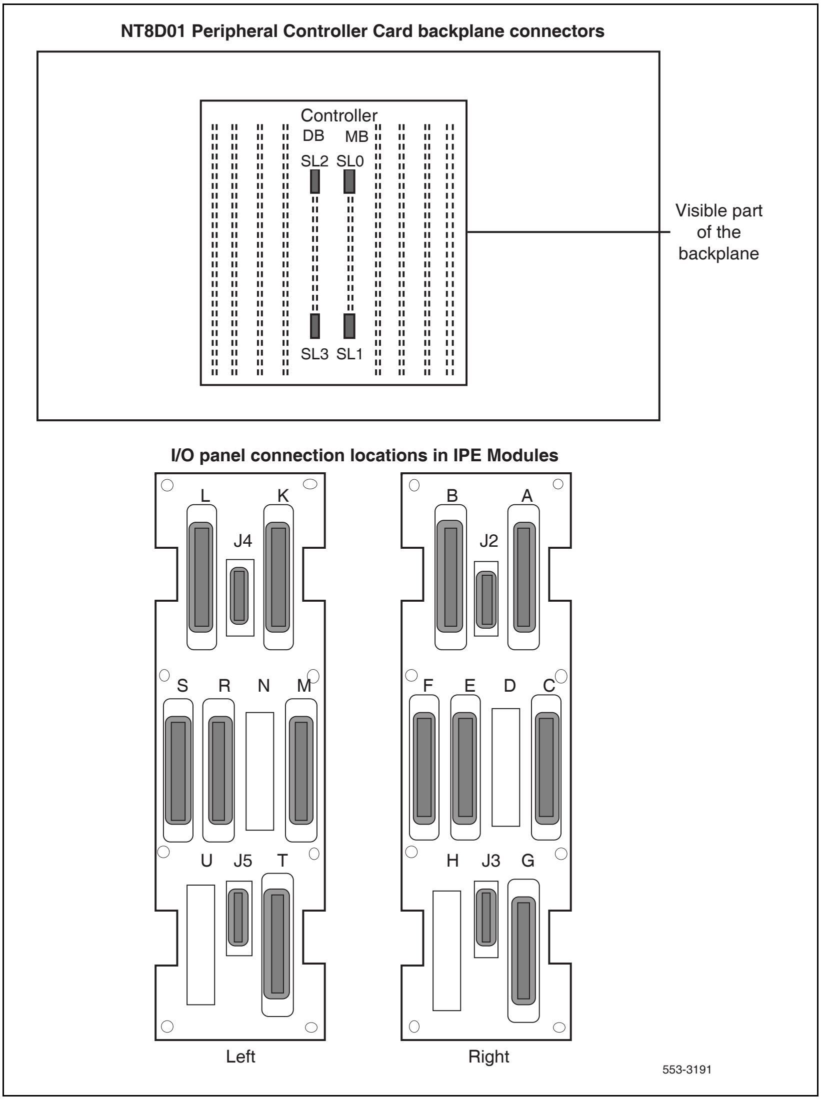


Figure 140
NT8D04 Superloop Network Card network loops – controller card to I/O panel connections



Installing a Signaling Server

Contents

This chapter contains the following topics:

Introduction

This chapter contains general instructions to install and connect Server card hardware. This chapter also contains general instructions to connect Commercial off-the-shelf (COTS) servers.

The Avaya Communication Server 1000M (Avaya CS 1000M) system supports the Common Processor Pentium Mobile (CP PM) card model NTDW66, the Common Processor Dual Core (CP DC) model NTDW54, and the Commercial off-the-shelf (COTS) servers.

A CP PM, CP DC or COTS server that you deploy with Signaling Server applications is referred to as a Signaling Server. A CP PM or COTS server that you deploy with SIP Line can be referred to as a SIP Line Gateway.

> **IMPORTANT!**
>
> Instructions to install an IBM X306m, IBM x3350, or HP DL320-G4, or Dell R300 COTS server are not included in this chapter. Detailed installation instructions are in the IBM xSeries 306m User Guide, IBM x3350 User Guide, HP ProLiant DL320 Generation 4 Server User Guide, or the Dell PowerEdge R300 User Guide shipped with the server.

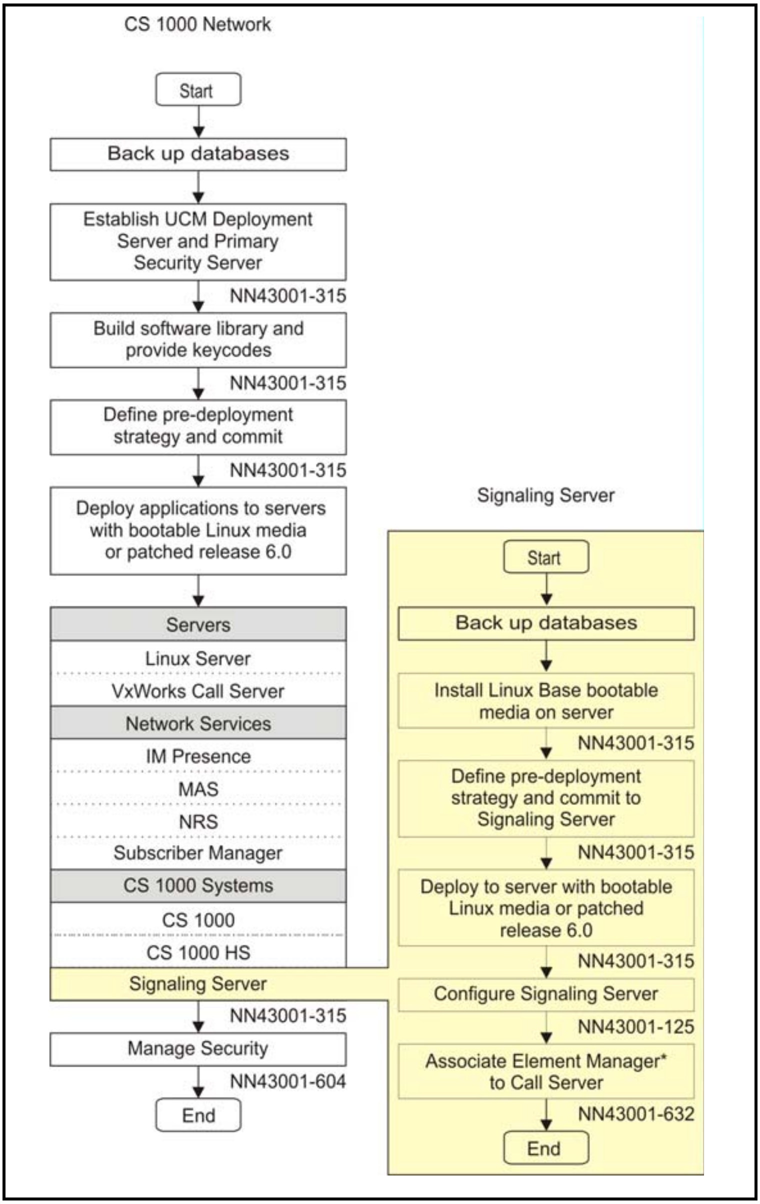
Signaling Server task flow

This section provides a high-level task flow for the installation or upgrade of an Avaya Communication Server 1000 (Avaya CS 1000) system. The task flow indicates the recommended sequence of events to follow when configuring a system and provides the document number that contains the detailed procedures required for the task.

For more information refer to the following documents, which are referenced in Figure 141 on page 391:

- *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315)
- *Avaya Element Manager: System Administration* (NN43001-632)
- *Avaya Signaling Server IP Line Applications Fundamentals* (NN3001-125)

Figure 141
Signaling Server task flow



Readiness checklist

Before installing a Signaling Server in a Communication Server 1000 system, complete the following checklist.

WARNING
Do not modify or use a supplied AC-power cord if it is not the exact type required in the region where you install and use the Signaling Server. Be sure to replace the cord with the correct type.

Table 64
Readiness checklist (Part 1 of 2)

Have you:	
Read all safety instructions in *Communication Server 1000M and Meridian 1 Large System Installation and Commissioning* (NN43021-310), as appropriate for your Communication Server 1000 system?	
Do you have all equipment and peripherals? **For COTS servers:** • installation accessories for rack-mounting the server • AC-power cord • a DTE-DTE null modem cable (supplied) NTE90672: Linux Signaling Server software DVD for COTS servers **For Server cards (NTDW66 CP PM, and NTDW54 CP DC)** • (CP PM only) CP PM Signaling Server Linux Upgrade kit, which includes — Linux OS preloaded hard drive kit (Optional, provided if required) — 2 GB Compact Flash (CF) with Linux software, 2 GB blank CF — CP PM 1 GB DDR SO-DIMM memory upgrade (Optional, provided if required, 2 GB required) — CP DC 2 x 2 GB memory upgrade (4 GB required for Communication Server 1000 Release 7.6) • 2 port SDI Cable assembly kit • Large System Cabling kit • Large System Cabling • a DTE-DTE null modem cable (supplied) ***Note:*** Save the packaging container and packing materials in case you must ship the product.	
Confirmed the area meets all environmental requirements?	

Table 64
Readiness checklist (Part 2 of 2)

Have you:	
Checked for all power requirements?	
Verified the CP PM meets all required specifications (2GB ram, 40GB hard drive, NTDW66AAE6 CP PM BIOS version 18 or higher)?	
Checked for correct grounding facilities?	
Obtained the following • screwdrivers • an ECOS 1023 POW-R-MATE or similar type of multimeter • appropriate cable terminating tools • a computer (maintenance terminal) to connect directly to the Signaling Server, with — teletype terminal (ANSI-W emulation, serial port, 9600 bps) — a Web browser for Element Manager (configure cache settings to check for new Web pages every time the browser is invoked, and to empty the cache when the browser is closed)	
Prepared the network data as suggested in *Converging the Data Network with VoIP* (NN43001-260) or *Communication Server 1000M and Meridian 1 Large System Planning and Engineering* (NN43021-220), as appropriate for your Communication Server 1000 system?	
Read all safety instructions in *Communication Server 1000M and Meridian 1 Large System Installation and Commissioning* (NN43021-310), as appropriate for your Communication Server 1000 system?	

Server card hardware installation

This section contains instructions for installing a Server in a Communication Server 1000M system. The Communication Server 1000M system supports the NTDW66 CP PM card, NTDW54 CP DC card, and Comercial off-the-shelf (COTS) servers.

This section contains only general instructions to install the Server card in Communication Server 1000M systems. For more detailed installation instructions, see *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

IMPORTANT!

There are several switches on CP PM circuit cards. All switch settings must be factory defaults except for the switch labelled S5. Switch S5 must be in position 2 to support the internal hard drive used on the CP PM Signaling Server circuit card.

Installation in a Communication Server 1000M system

For CP PM cards, the first task that you must perform is to install the hard drive shipped with the server or Linux upgrade kit. For instructions, see *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

The NTDW66 CP PM card and NTDW54 CP DC card are double wide faceplate cards designed for use in a CS 1000M Universal Equipment Module (UEM). You can insert the double wide CP PM or CP DC card into any slot of a CS 1000M UEM except slot 7. When upgrading from a CS 1000M system to CS 1000E, the slot next to slot 7 is occupied by the External Peripheral Equipment Controller (XPEC). This prevents the CP PM or CP DC double wide faceplate from seating into slot 7.

The next task that you must perform is to install ELAN and TLAN Ethernet ports on the back of the Communication Server 1000M UEM. These ports are used to connect your Server to the ELAN and TLAN Ethernet subnets of your Communication Server 1000M system.

Use the following procedure to install ELAN and TLAN Ethernet ports on the back of a Communication Server 1000M UEM.

> **IMPORTANT!**
>
> Installing ELAN and TLAN Ethernet ports on the back of a Communication Server 1000M Universal Equipment Module (UEM) disrupts service. You must turn off power to the shelf during this procedure.

Procedure 73
Installing ELAN and TLAN Ethernet ports on the back of a Communication Server 1000M UEM

1 Obtain the special cabling kit (NTDW69AAE5). The NTDW69AAE5 cabling kit includes the items shown in Figure 142.

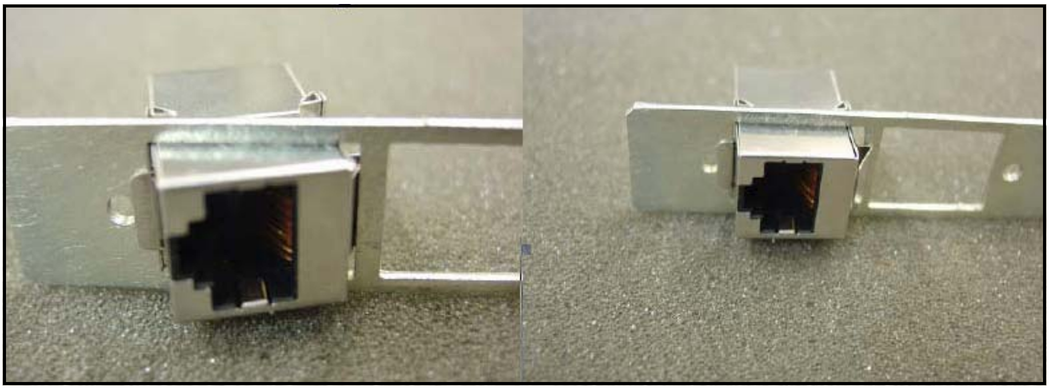
Figure 142
NTDW69AAE5 Cabling Kit contents

The following is a list of items in the NTDW69AAE5 cabling kit:

- two RJ-45 CAT5 Ethernet patch cables
- two Ethernet port couplers
- one Ethernet port adapter plate
- two screws
- two nuts
- two washers
- two ferrite beads

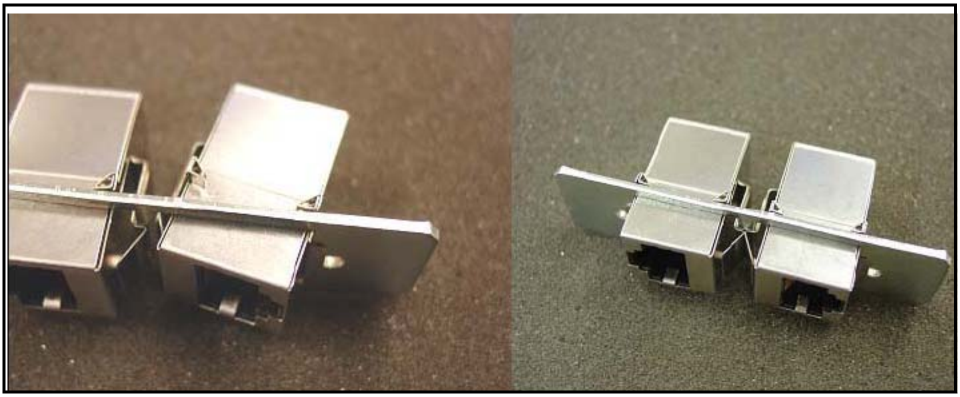
2 Insert an Ethernet port coupler into the adapter plate. See Figure 143.

Figure 143
One Ethernet port coupler in adapter plate



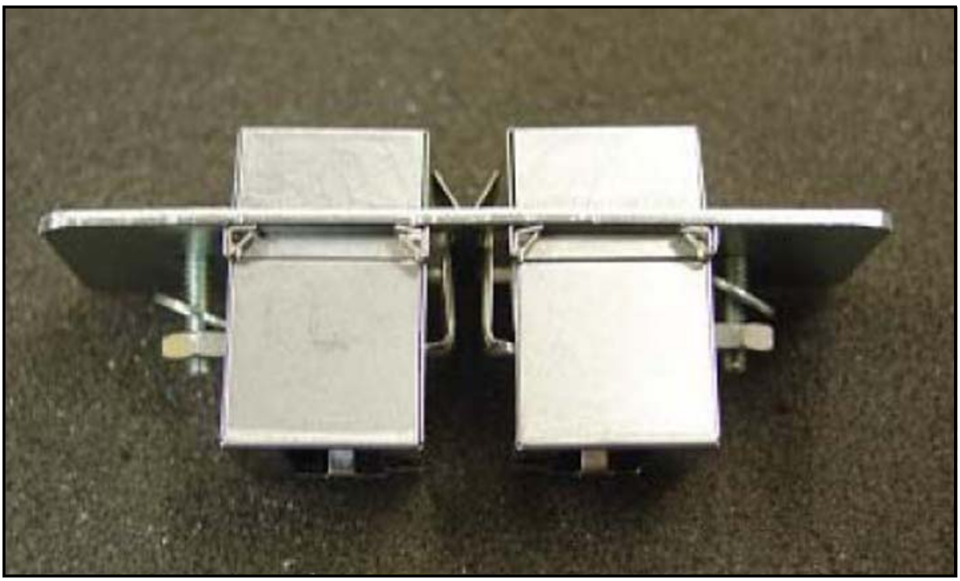
3 Insert the other Ethernet port coupler into the adapter plate. See Figure 144 on page 398.

Figure 144
Two Ethernet port couplers in adapter plate



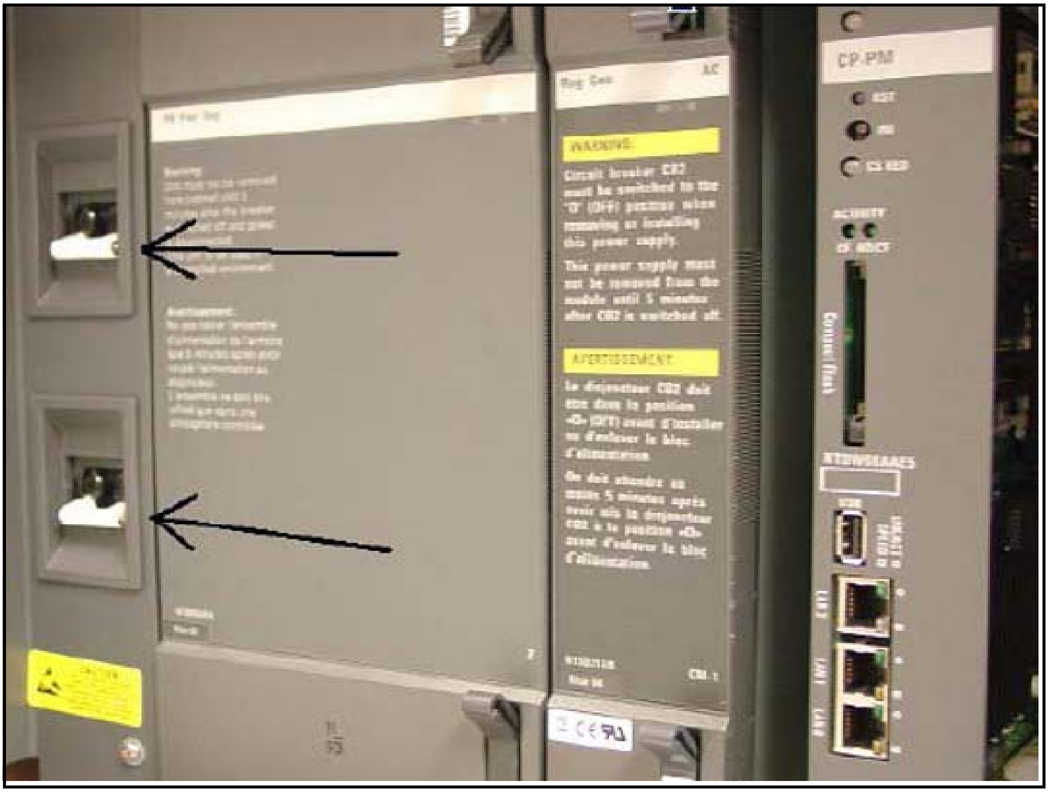
4 Loosely attach screws, washers, and nuts to the Ethernet port adapter plate. See Figure 145.

Figure 145
One Ethernet port coupler in adapter plate



5 Switch off the UEM power supplies. See Figure 146.

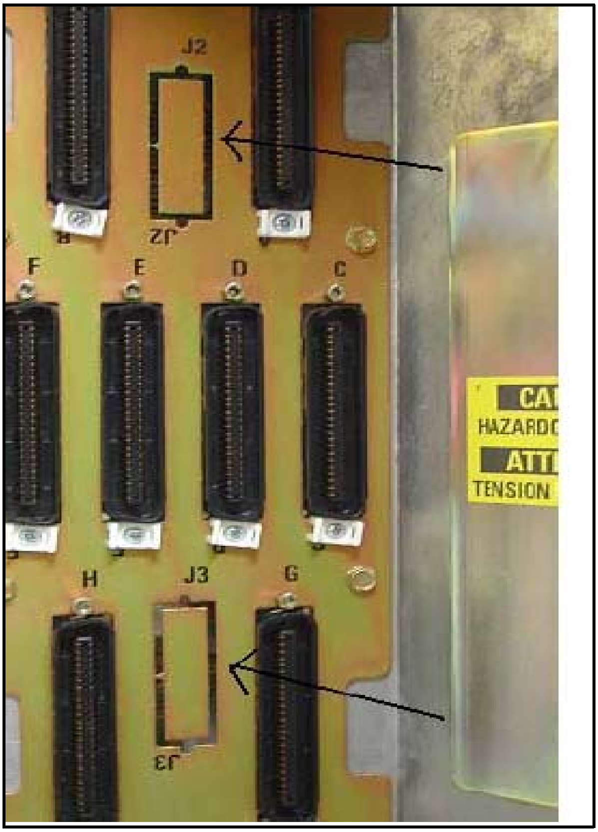
Figure 146
Shut down UEM power supplies



6 Select one of the J2-J5 knock-out plates on the back of the UEM. See Figure 147.

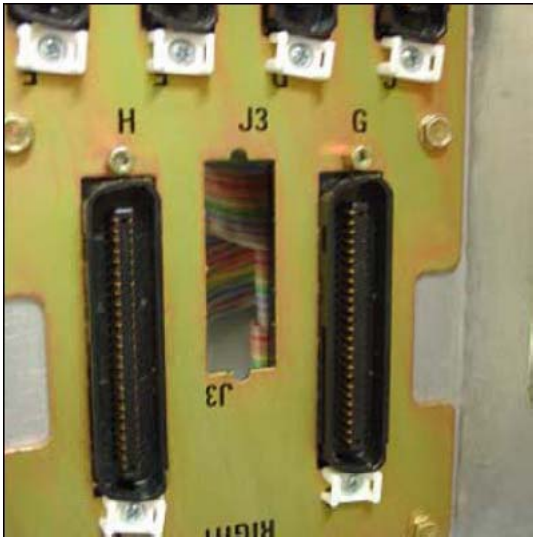
Note: For DC powered systems, turn off the breakers in the pedestal not on the shelf.

Figure 147
J2-J5 plates on back panel of UEM



7 Knock out the metal plate from the selected J2-J5 location to provide a hole through which the Ethernet patch cables are routed and to which the Ethernet port adapter plate is attached. See Figure 148.

Figure 148
Selected J2-J5 plate on back panel of UEM



8 Establish an ELAN port on the back panel of the UEM.

a. Insert the end of one of the RJ-45 CAT5 Ethernet patch cables (supplied) into the ELAN network interface (ELAN port) on the Server faceplate.

b. Route the Ethernet patch cable through the hole you made in the back panel of the UEM.

c. Plug the other end of the Ethernet patch cable into one of the Ethernet port couplers mounted in the Ethernet port adapter plate.

d. Label the Ethernet port coupler as ELAN.

See Figure 149 and Figure 150.

Figure 149
ELAN connection on CP PM faceplate

Figure 150
ELAN connection on Ethernet port coupler

9 Connect the server to the TLAN subnet.

a. Insert one end of the remaining RJ-45 CAT5 Ethernet patch cable (supplied) into the TLAN network interface (TLAN port) on the Server faceplate.

b. Route the Ethernet patch cable through the hole you made in the back panel of the UEM.

c. Plug the other end of the Ethernet patch cable into the remaining Ethernet port coupler mounted in the Ethernet port adapter plate.

d. Label the Ethernet port coupler as TLAN.

See Figure 151 and Figure 152.

Figure 151
TLAN connection on CP PM faceplate

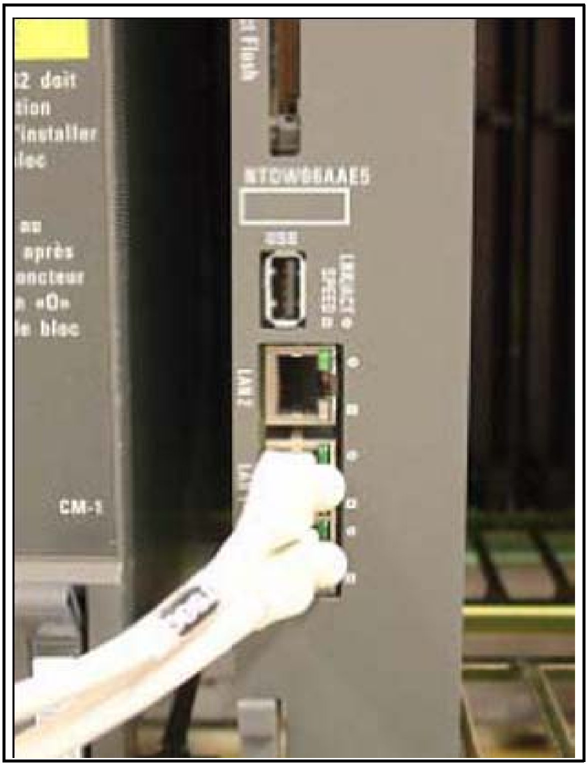


Figure 152
TLAN connection on Ethernet port coupler

10 Fit the Ethernet port adapter plate into the hole on the back of the UEM and tighten the screws. See Figure 153.

Figure 153
Installed Ethernet port adapter plate

11 Attach the ferrite beads to the Ethernet patch cables.See Figure 154.

Figure 154
Attached Ethernet patch cable ferrite beads

End of Procedure

Connections

This section contains information about server connections.

Connection checklist

WARNING

Do not modify or use a supplied AC power cord if it is not the correct type required for the host region.

IMPORTANT!

Server cards are powered through the backplane of the Media Gateway, Universal Equipment Module, or Media Gateway cabinet into which they are installed and do not require a power cord.

Before connecting a Server, ensure that you have the following materials on-hand.

Table 65
Connections checklist

Do you have:	
A serial cable (DTE-DTE null modem cable) to connect the server to a maintenance terminal? The IBM x3350 requires a NTRX26NPE6 9 pin female to 9 pin female null modem cable.	
An NTAK19EC cable for each CP PM or CP DC card? This cable adapts the 50-pin MDF connector on the back of the shelf of the Media Gateway, Universal Equipment Module, or 11C cabinet to a 25-pin DB connector.	
Shielded CAT5 cables (or better) to connect the server to the ELAN and TLAN subnets?	

Connecting a Signaling Server

This section contains instructions for connecting a Server to the ELAN and TLAN subnet of a CS 1000M system. It also contains instructions for connecting a maintenance terminal to the Server.

A Server card is inserted into a slot of a Universal Equipment Module (UEM). UEMs do not have built-in ELAN and TLAN Ethernet ports. You must install Ethernet ports on the back of the UEM to enable the Server to connect to the ELAN and TLAN subnets of your Communication Server 1000 system (see Procedure 73: "Installing ELAN and TLAN Ethernet ports on the back of a Communication Server 1000M UEM" on page 396.)

Perform Procedure 74 to connect a Server card to the ELAN and TLAN subnets of a Communication Server 1000M system.

IMPORTANT!

Connecting a Signaling Server to the ELAN and TLAN subnets of a CS 1000M system causes a service disruption.

Procedure 74
Connecting a Server Card to the ELAN and TLAN subnets of a Communication Server 1000M system

1 Insert the end of an RJ-45 CAT5 Ethernet cable (not supplied) into the ELAN network interface port (ELAN port) on the back of the Communication Server 1000M UEM. (You installed this ELAN port at the back of the UEM when you installed the Signaling Server in the UEM. For more information, see Procedure 73: "Installing ELAN and TLAN Ethernet ports on the back of a Communication Server 1000M UEM" on page 396.

2 Insert the other end of the RJ-45 CAT5 Ethernet cable into an Ethernet port on the ELAN Ethernet switch.

3 Insert the end of another RJ-45 CAT5 Ethernet cable (not supplied) into the TLAN network interface port (TLAN port) on the back of the Communication Server 1000M UEM. (You installed this TLAN port at the back of the UEM when you installed the Signaling Server in the UEM. For more information, see Procedure 73: "Installing ELAN and TLAN Ethernet ports on the back of a Communication Server 1000M UEM" on page 396.

4 Insert the other end of the RJ-45 CAT5 Ethernet cable into an Ethernet port on the TLAN Ethernet switch.

End of Procedure

Verify or change the baud rate

To verify or change the baud rate on an Avaya CP PM Signaling Server, see *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

Connecting an IBM COTS server

In geographic regions that are susceptible to electrical storms, Avaya recommends that you plug the IBM COTS server into an AC surge suppressor.

Figure 155 shows the rear view of the IBM X306m server.

Figure 155
IBM X306m (rear view)

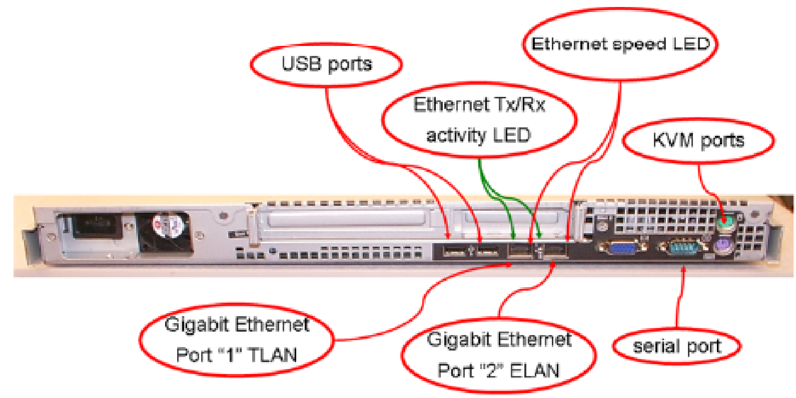
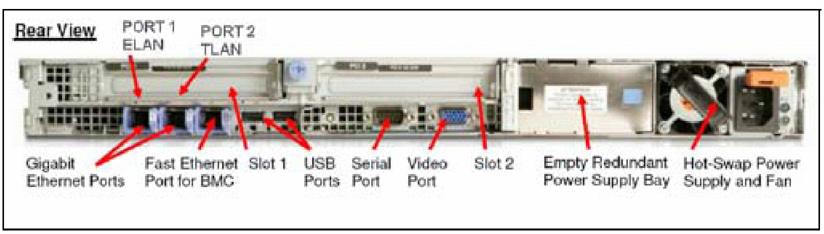


Figure 156 shows the rear view of the IBM x3350 server.

Figure 156
IBM x3350 (rear view)



Note: When you perform Procedure 75, "Connecting an IBM COTS server," on page 412, see Figure 155 or Figure 156.

Procedure 75
Connecting an IBM COTS server

1 Connect the IBM server to the TLAN subnet. Insert the RJ-45 CAT5 (or better) cable into the TLAN Ethernet port on the back of the server. Insert the other end of the cable into the TLAN subnet of the Layer 2 switch.

2 Connect the IBM server to the ELAN subnet. Insert the RJ-45 CAT5 (or better) cable into the ELAN Ethernet port on the back of the server. Insert the other end of the cable into the ELAN subnet of the Layer 2 switch.

3 Connect a DTE–DTE null modem serial cable from the serial port on the back of the server to the serial port on a maintenance terminal. The IBM x3350 requires a NTRX26NPE6 9 pin female to 9 pin female null modem cable.

4 Connect the IBM server power cord.

a. Check that the power cord is the type required in the region where you use the server. Do not modify or use the supplied AC power cord if it is not the correct type.

b. Attach the female end of the power cord to the mating AC power receptacle on the server back panel. Plug the male end of the AC power cord into the AC power source (wall outlet).

5 Set the baud rate for the serial port on the server to 9600 b/ps. See *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

Note: The IBM X306m Signaling Server ships with the serial port configured to 9600 b/ps.

6 Configure the connected maintenance terminal. See *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

7 Press the Power switch.

Note: For more information about operating information, see the IBM User Guide for your IBM server.

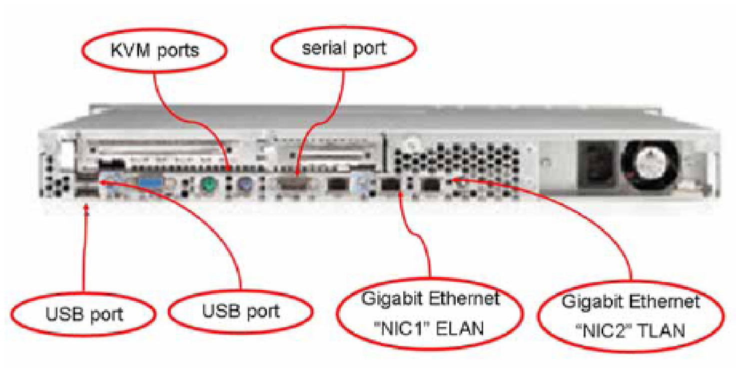
End of Procedure

Connecting an HP COTS server

In geographic regions that are susceptible to electrical storms, Avaya recommends that you plug the HP server into an AC surge suppressor.

Figure 157 shows the rear view of the HP DL320-G4 server.

Figure 157
HP DL320-G4 (rear view)



> ***Note:*** When you perform Procedure 76, "Connecting an HP COTS server," on page 413, see Figure 157.

Procedure 76
Connecting an HP COTS server

1 Connect the HP server to the TLAN subnet. Insert the RJ-45 CAT5 (or better) cable into the TLAN Ethernet port on the back of the server. Insert the other end of the cable into the TLAN subnet of the Layer 2 switch.

2 Connect the HP server to the ELAN subnet. Insert the RJ-45 CAT5 (or better) cable into the ELAN Ethernet port on the back of the server. Insert the other end of the cable into the ELAN subnet of the Layer 2 switch.

3 Connect a DTE–DTE null modem serial cable from the Serial Port on the back of the server to a maintenance terminal.

4 Connect the HP server power cord.

a. Check that the power cord is the type required in the region where you use the server. Do not modify or use the supplied AC power cord if it is not the correct type.

b. Attach the female end of the power cord to the mating AC power receptacle on the right-hand side of the server back panel. Plug the male end of the AC power cord into the AC power source (wall outlet).

5 Configure the COM1 serial port as the communication port for the connected maintenance terminal. Configure the COM 1 baud rate for the serial port on the server to 9600 b/ps. See *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

6 Configure the connected maintenance terminal. See *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

7 Press the Power switch.

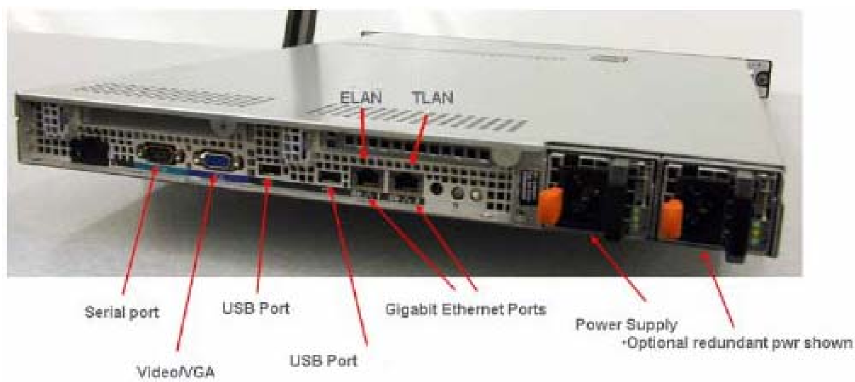
End of Procedure

Connecting a Dell COTS server

In geographic regions that are susceptible to electrical storms, Avaya recommends that you plug the Dell server into an AC surge suppressor.

Figure 158 shows the rear view of the Dell R300 server.

Figure 158
Dell R300 server (rear view)



Note: When you perform Procedure 77, "Connecting a Dell COTS server," on page 415, see Figure 158.

Procedure 77
Connecting a Dell COTS server

1. Connect the Dell server to the TLAN subnet. Insert the RJ-45 CAT5 (or better) cable into the TLAN Ethernet port on the back of the server. Insert the other end of the cable into the TLAN subnet of the Layer 2 switch.
2. Connect the Dell server to the ELAN subnet. Insert the RJ-45 CAT5 (or better) cable into the ELAN Ethernet port on the back of the server. Insert the other end of the cable into the ELAN subnet of the Layer 2 switch.
3. Connect a DTE–DTE null modem serial cable from the Serial Port on the back of the server to a maintenance terminal.
4. Connect the Dell server power cord.

a. Check that the power cord is the type required in the region where you use the server. Do not modify or use the supplied AC power cord if it is not the correct type.

b. Attach the female end of the power cord to the mating AC power receptacle on the right-hand side of the server back panel. Plug the male end of the AC power cord into the AC power source (wall outlet).

5 Configure the COM1 serial port as the communication port for the connected maintenance terminal. Configure the COM 1 baud rate for the serial port on the server to 9600 b/ps. See *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

6 Configure the connected maintenance terminal. See *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

7 Press the Power switch.

End of Procedure

Maintenance terminal configuration parameters

To configure Signaling Server maintenance terminal configuration parameters, see the Maintenance chapter of *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

IP subnet configuration

CS 1000 Release 7.6 Signaling Servers support IPv6 and IPv4 addresses. If the Signaling Server and Call Server reside in different IP subnets, you must manually add a route from Base Manager in order for Element Manager to communicate and interact with the Call Server. For more information, see *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

Upgrading and reconfiguring the software

This section contains information and references for upgrading the Signaling Server software from a previous release to CS 1000 Release 7.5. Signaling Server applications in CS 1000 Release 7.5 require Linux. You must install

CS 1000 Linux Base on your CP PM, CP DC or COTS server before you can install any Signaling Server applications.

CS 1000 Release 7.5 supports the following Signaling Server hardware:

- CP PM server
- CP DC server
- IBM X306m server
- IBM x3350 server
- HP DL320-G4 server
- Dell R300 server

> **IMPORTANT!**
>
> Avaya CS 1000 Release 7.5 does not support the ISP1100 Signaling Server. You must replace the ISP1100 with a CP PM, CP DC, or COTS Signaling Server.

If you are upgrading from a Vxworks Signaling Server, Avaya recommends that you backup your IP Phone database and Network Routing Service (NRS) database on your current software release before upgrading to CS 1000 Linux Base and installing applications. You can restore your IP Phone database and NRS backups after you complete the Signaling Server upgrade.

CS 1000 Release 7.5 requires a Signaling Server to have at least 2 GB of RAM memory, and at least 40 GB of hard drive capacity. You must upgrade Signaling Servers with less than 2GB of RAM before installing CS 1000 Release 7.5 Linux Base and Signaling Server software. For detailed instructions on performing this memory upgrade, see *Avaya Circuit Card: Description and Installation* (NN43001-311).

You can upgrade a CP PM Signaling Server to support the CS 1000 Linux Base and applications for Communication Server 1000 with a CP PM Signaling Server Linux upgrade kit. The upgrade kit includes the following components.

- Linux OS preloaded hard drive kit (optional, provided if required)

- 2 GB Compact Flash (CF) with Linux software, 2 GB blank CF
- 1 GB DDR SO-DIMM memory upgrade (optional, provided if required)

Overview

An upgrade of the Signaling Server software consists of the following steps:

- Back up application databases using Element Manager
- Install CS 1000 Linux Base and configure parameters
- Use Centralized Deployment manager to deploy and install Signaling Server applications
- Configure the system or import backup node files in Element Manager
- Use Element Manager to restore backups of application databases

Avaya recommends that you back up the application databases before performing the upgrade. The application databases consist of the IP Phone database and the NRS database.

If you do not know whether the Signaling Server being upgraded has an NRS, use Procedure 78, “Verifying the presence of an NRS,” on page 419 to make this determination.

If you have an NRS database on the Signaling Server and want to back it up before performing the upgrade, you must use the backup tool in NRS Manager. After the Signaling Server is upgraded, use NRS Manager to restore the NRS database (from your local PC) and activate it for use by the NRS.

For instructions on backing up and restoring an NRS database, see *Avaya Network Routing Service Fundamentals* (NN43001-130).

For instructions on backing up and restoring the IP Phone database, see *Avaya Signaling Server IP Line Applications Fundamentals* (NN3001-125).

Procedure 78
Verifying the presence of an NRS

1 Open the supported Web browser.

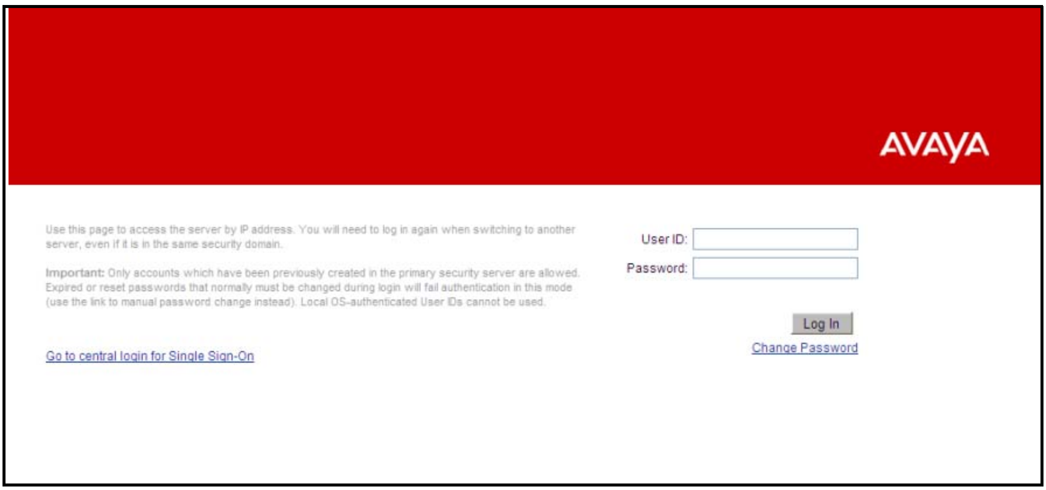
2 Enter the ELAN or TLAN network interface IP Address of the primary Signaling Server as the URL.

Note: Note: Do not assign the same IP address for the Node ID and the TLAN network interface IP address. This must be verified manually. The Node IP address must be on the same subnet as the TLAN network interface IP addresses of the Media Cards. In addition, the TLAN and ELAN network interfaces of the Media Card must reside on separate logical subnets.

If additional configuration parameters were entered during installation, the node IP address can also be used as the URL.

The Element Manager logon web page appears.

Figure 159
Element Manager logon page



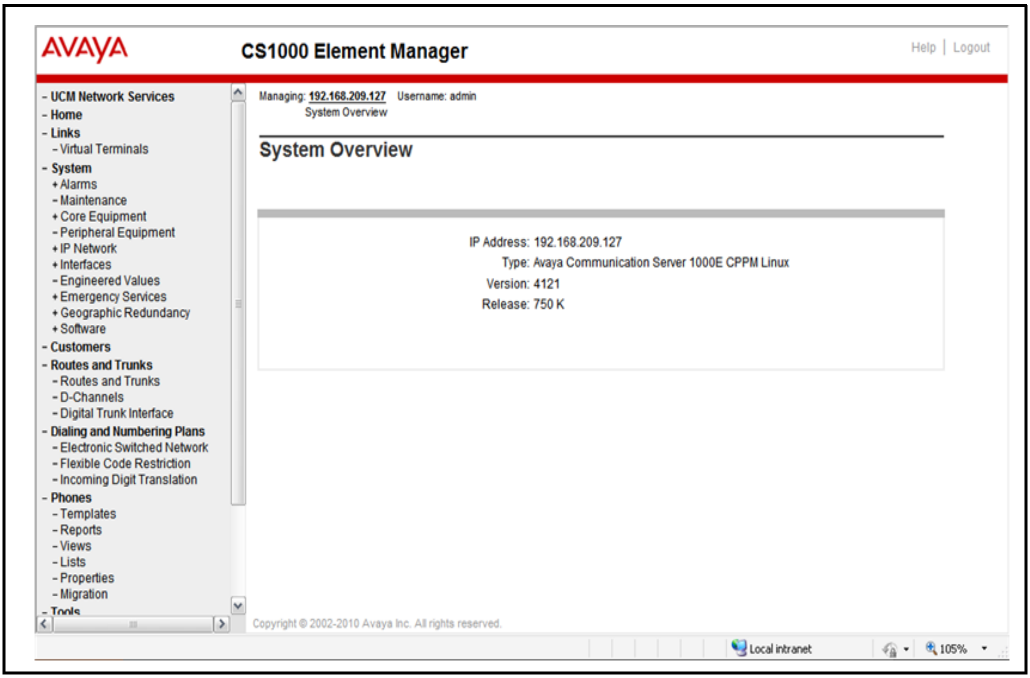
Initially, you can be prompted to enter the Call Server IP address, because the Call Server is used for web logon authorization. The Call Server IP address is a requirement, because unless you entered additional configuration parameters during the Signaling Server installation, the node configuration data file containing the Call Server IP address does not yet exist.

3 Enter a Level 1 or Level 2 user ID and password. If configured, you can also use a Limited Access Password (LAPW) user ID and password.

If this is the first time the Call Server is accessed, the default Level 1 or Level 2 user ID and password must be used.

If the logon is successful, the Element Manager "Home - System Overview" screen appears (see Figure 160 on page 420).

Figure 160
Element manager: Home - System Overview

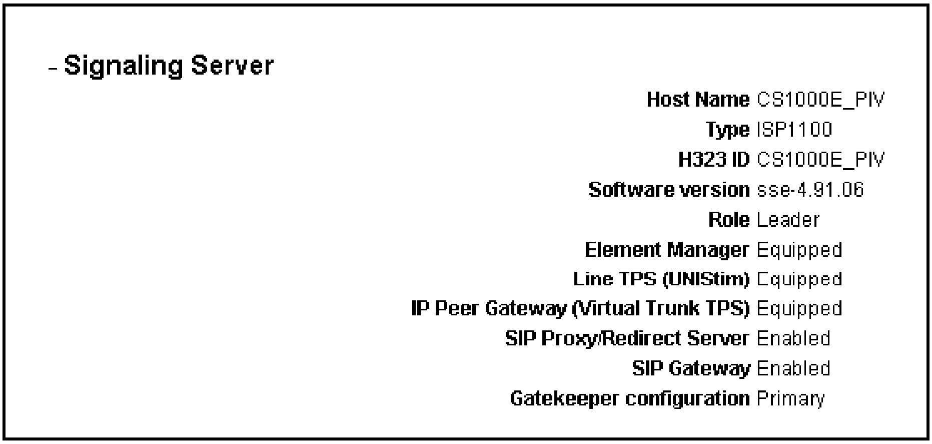


This screen identifies the components of your CS 1000 system.

4 Click the "+" symbol in front of the Signaling Server component.

The Signaling Server component expands to display the properties of the Signaling Server (see Figure 161 on page 421).

Figure 161
Signaling Server properties



5 View the contents of the "Gatekeeper configuration" property.

If the Gatekeeper configuration property indicates Primary (as is the case here), Alternate or Failsafe, the Signaling Server hosts an NRS. If the property indicates nothing, the Signaling Server does not host an NRS.

End of Procedure

Before you begin

Before upgrading the software, you must do the following:

- Connect the Signaling Server. For details, see “Connections” on page 408 or refer to *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).
- Take a precautionary backup of the IP Phones application database.
- Take a precautionary backup of the NRS database.

- Obtain the CS 1000 Release 7.6 version of the Signaling Server Software Install media. For details, see *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).
- Ensure that there is 2 GB of RAM and at least 40 GB of hard drive capacity on your CP PM or COTS Signaling Server.

Upgrade the CP PM BIOS

The NTDW66CAE6 CP PM card (CP PM version 2) does not require a BIOS upgrade. The CP PM version 2 uses an updated design, BIOS, and boot manager. Older NTDW66 CP PM cards (CP PM version 1) might require a BIOS upgrade to support Linux.

The Communication Server 1000 Linux Platform Base installer requires that a CP PM version 1 card runs BIOS version 18 or higher. If the installer detects a lower version on the CP PM card it automatically loads software for you to upgrade the CP PM BIOS. Perform the steps in Procedure 79 to upgrade the CP PM BIOS to version 18.

For information about manually upgrading the CP PM BIOS with VxWorks software, see *Avaya Communications Server 1000E Maintenance* (NN43041-700).

Procedure 79
Upgrading the CP PM BIOS with the CS 1000 Linux Base installer

1. Connect to serial port 1 on the CP PM.
2. Insert the CS 1000 Linux Base installation CF card into the faceplate CF slot.
3. Power on the system.
4. Once the initial boot and memory check completes for a CP PM version 1 card, Figure 162 appears. Press the **F** key to boot from the CS 1000 Linux Base installation faceplate CF card.

   Note: For CP PM version 2 cards, press the **F** key to enter the boot menu, select Faceplate RMD, and press **Enter** to boot from the faceplate CF card.

Figure 162
CP PM faceplate drive boot

```
+------------------------------------------+------------------------------------------
| System CPU              : Pentium M      | Low Memory            : 632KB
| Coprocessor             : Enabled        | Extended Memory       : 1011MB
| Ide 0 Type              : 3              | Serial Ports 1-2      : 03F8 02F8
| Ide 1 Type              : 3              | ROM Shadowing         : Enabled
| Ide 2 Type              : 3              | BIOS Version          : NTDU74AA 14
+------------------------------------------+------------------------------------------

Press F to force board to boot from faceplate drive.
.....................................................

Attempting to boot from faceplate drive.


CPU Frequency = 1400 MHz

V1.6a+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
+++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

5 The welcome screen appears. Press **ENTER** to direct the input and output to COM1.

6 Figure 163 appears if the CP PM card has a BIOS version lower than 18. Enter **yes** to proceed with the automatic upgrade.

CAUTION — Damage to Equipment

Do not interrupt the BIOS upgrade process.

Figure 163
CP PM BIOS automatic upgrade

```
########################################################################
#                                                                      #
#    CP-PM BIOS version is less than 18. BIOS upgrade is required.    #
#                                                                      #
# To complete the upgrade, BIOS settings must be changed to defaults. #
#      Please refer to the documentation for more information.        #
#                                                                      #
########################################################################


Do you want to upgrade BIOS ROM up to the version 18? (yes/no): yes

BIOS ROM upgrade. Please wait...


BIOS ROM upgrade is finished.

Machine will be rebooted right now... Press Enter key to continue
```

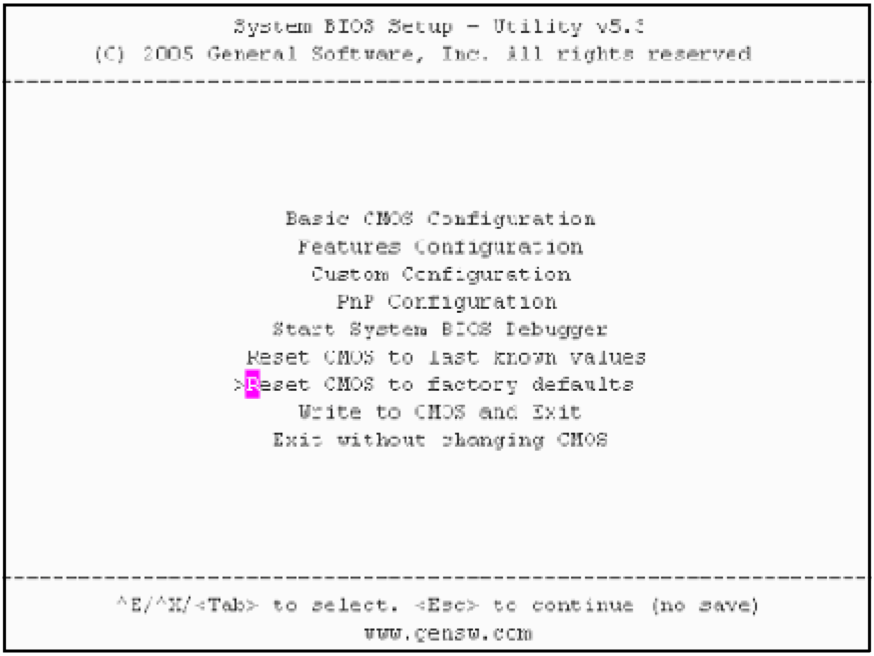
7 Verify that the BIOS upgrade is finished. Press **Enter** to reboot.

8 During the reboot memory check, press **Ctrl c** to access the CP PM BIOS setup menu.

Note: If you miss the timing to press **Ctrl c** you must reboot the system and try again. The Linux Platform Base installation software will display a warning if you do not reset the CP PM BIOS to factory defaults.

9 Figure 164 appears. Select **Reset CMOS to factory defaults** from the menu.

Figure 164
CP PM BIOS setup



10 Figure 165 appears. Press **y** to reset CMOS to factory defaults.

Figure 165
CP PM BIOS reset

```
                  System BIOS Setup - Utility v5.3
        (C) 2005 General Software, Inc. All rights reserved
---------------------------------------------------------------------



                    Basic CMOS Configuration
                     Features Configuration
           +------------------------------------------+
           |  Reset CMOS to factory defaults? (Y/N): y |
           |                                          |
                 Reset CMOS to last known values
                 Reset CMOS to factory defaults
                     Write to CMOS and Exit
                   Exit without changing CMOS



---------------------------------------------------------------------
      ^E/^X/<Tab> to select. <Esc> to continue (no save)
                           www.gensw.com
```

11 The system reboots. After the initial boot, Figure 162 appears and the new BIOS version displays. Verify the BIOS version is 18. You can now press the **F** key to boot from the faceplate CF card and proceed with the Linux Platform Base software installation.

End of Procedure

Installing the CS 1000 Linux Base

You must install CS 1000 Linux Base if your Signaling Server is not running the latest CS 1000 Linux Base software release. The CP PM Linux upgrade kit contains a hard drive with CS 1000 Linux Base preloaded. You can install CS 1000 Linux Base from the command line interface (CLI) using a bootable CF card on CP PM, and using a bootable optical disk on COTS.

Configure the ELAN, TLAN, IP address, Gateway, subnet masks, date, and time settings during the CS 1000 Linux Base installation.

For information about installing or upgrading CS 1000 Linux Base, see *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

Installing Linux applications

Avaya CS 1000 Release 7.5 Signaling Server and SIP line software are Linux applications. Linux applications install on CS 1000 Linux Base and interact with the CS 1000 Linux Base application framework. You can deploy and install Linux applications with the CS 1000 Linux Base Centralized Deployment Manager. You can configure and deploy SIP Line with Element Manager (EM).

For information about Linux applications and Centralized Deployment Manager, see *Avaya Signaling Server IP Line Applications Fundamentals* (NN3001-125) and *Avaya Linux Platform Base and Applications Installation and Commissioning* (NN43001-315).

For information about Element Manager, see *Avaya Element Manager: System Administration* (NN43001-632).

Joining the UCM security domain

The UCM Primary Security Server acts as the RADIUS server that CS 1000 devices use to obtain authentication and access control parameters for CLI access. The UCM Primary Security Server sends RADIUS related parameters to CS 1000 devices using the SSH protocol.

When a device joins the UCM security domain, a mutually-trusted SSH channel is created. You must manually confirm the fingerprint of the public key before the UCM Primary Security Server RSA public key is added to the authorized key file. This verification prevents third-party intercepts.

When a mutually-trusted SSH tunnel establishes a connection to a CS 1000 device, the UCM Primary Security Server can send SSH remote commands to the device using RSA public key-based authentication.

For more information about joining the UCM security domain, see *Avaya Security Management* (NN43001-604).

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