



MAX TNT[®]/DSL TNT[™]

Hardware Installation Guide

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About This Guide

What is in this guide

This guide describes how to install your MAX TNT® or DSLTNT™ unit, including a multishelf system. It also explains how to install cards. After you have finished reading this guide, you can go on to the *APX 8000/MAX TNT/DSLTNT Physical Interface Configuration Guide* to configure your unit. If you experience problems with your unit, or need to perform maintenance on it, see the *APX 8000/MAX TNT/DSLTNT Administration Guide*.

Note: This manual describes the full set of features for the MAX TNT or DSLTNT unit running True Access™ Operating System (TAOS) software version 8.0.2 or later. Some features might not be available with earlier versions or specialty loads of the software.



Warning: Before installing your MAX TNT or DSLTNT unit, be sure to read the safety instructions in the *Access Networks Safety and Compliance Guide*. For information specific to your unit, see Appendix C, “Safety-Related Electrical, Physical, and Environmental Information” in this hardware installation guide.




What you should know

This guide is for the person who configures and maintains a MAX TNT or DSLTNT unit. To configure a unit, you need to understand the following:

- Internet or telecommuting concepts
- Wide Area Network (WAN) concepts
- Local Area Network (LAN) concepts, if applicable

Documentation conventions

Following are all the special characters and typographical conventions used in this manual:

Convention	Meaning
Monospace text	Represents text that appears on your computer's screen, or that could appear on your computer's screen.
Boldface monospace text	Represents characters that you enter exactly as shown (unless the characters are also in <i>italics</i> —see <i>Italics</i> , below). If you could enter the characters but are not specifically instructed to, they do not appear in boldface.
<i>Italics</i>	Represent variable information. Do not enter the words themselves in the command. Enter the information they represent. In ordinary text, italics are used for titles of publications, for some terms that would otherwise be in quotation marks, and to show emphasis.
[]	Square brackets indicate an optional argument you might add to a command. To include such an argument, type only the information inside the brackets. Do not type the brackets unless they appear in bold type.
	Separates command choices that are mutually exclusive.
>	Points to the next level in the path to a parameter or menu item. The item that follows the angle bracket is one of the options that appears when you select the item that precedes the angle bracket.
Key1-Key2	Represents a combination keystroke. To enter a combination keystroke, press the first key and hold it down while you press one or more other keys. Release all the keys at the same time. (For example, Ctrl-H means hold down the Control key and press the H key.)
Press Enter	Means press the Enter, or Return, key or its equivalent on your computer.
Note:	Introduces important additional information.
 Caution:	Warns that a failure to follow the recommended procedure could result in loss of data or damage to equipment.
 Warning:	Warns that a failure to take appropriate safety precautions could result in physical injury.
 Warning:	Warns of danger of electric shock.

Documentation set

The APX 8000/MAX TNT/DSLNT documentation set consists of the following manuals.

- **Read me first:**

- *Access Networks Safety and Compliance Guide*
Contains important safety instructions and country-specific compliance information that you must read before installing a TAOS unit.
- *TAOS Command-Line Interface Guide*
Introduces the TAOS command-line environment and shows how to use the command-line interface effectively. This manual describes keyboard shortcuts and introduces commands, security levels, profile structure, and parameter types.

- **Installation and basic configuration:**

- *APX 8000 Hardware Installation Guide*
Shows how to install APX 8000 hardware and includes APX 8000 technical specifications.
- *MAX TNT/DSLNT Hardware Installation Guide* (this manual)
Shows how to install MAX TNT and DSLNT hardware and includes MAX TNT and DSLNT technical specifications.
- *APX 8000/MAX TNT/DSLNT Physical Interface Configuration Guide*
Shows how to configure the cards installed in a TAOS unit and their line attributes for such functions as framing, signaling, and channel usage. It also describes how calls are routed through the system and includes information about configuring the unit in a Signaling System 7 (SS7) environment. This guide explains shelf controller redundancy for an APX 8000 unit.

- **Configuration:**

- *APX 8000/MAX TNT/DSLNT ATM Configuration Guide*
Describes how to configure Asynchronous Transfer Mode (ATM) operations on a TAOS unit. This guide explains how to configure physical layer attributes and how to create permanent virtual circuit (PVC) and switched virtual circuit (SVC) ATM interfaces. It includes information about ATM direct and ATM-Frame Relay circuits.
- *APX 8000/MAX TNT/DSLNT Frame Relay Configuration Guide*
Describes how to configure Frame Relay operations on a TAOS unit. This guide explains physical layer configuration and restrictions and how to create permanent virtual circuit (PVC) and switched virtual circuit (SVC) interfaces. It includes information about Multilink Frame Relay (MFR) and link management, as well as Frame Relay and Frame Relay direct circuits.
- *APX 8000/MAX TNT/DSLNT WAN, Routing, and Tunneling Configuration Guide*
Shows how to configure LAN and WAN routing for analog and digital dial-in connections on a TAOS unit. This guide includes information about IP routing, Open Shortest Path First (OSPF) routing, Internet Group Management Protocol (IGMP) routing, multiprotocol routers, Virtual Routers (VRouters), and tunneling protocols.
- *MultiVoice for MAX TNT Configuration Guide*
Shows how to configure the MultiVoice application to run on a MAX TNT unit in both Signaling System 7 (SS7) and H.323 Voice over IP (VoIP) configurations.

- **RADIUS:** *TAOS RADIUS Guide and Reference*
Describes how to set up a TAOS unit to use the Remote Authentication Dial-In User Service (RADIUS) server and contains a complete reference to RADIUS attributes.
- **Administration:** *APX 8000/MAX TNT/DSLNT Administration Guide*
Describes how to administer a TAOS unit, including how to monitor the system and cards, troubleshoot the unit, and configure the unit to use the Simple Network Management Protocol (SNMP).
- **Reference:**
 - *APX 8000/MAX TNT/DSLNT Reference*
An alphabetic reference to all commands, profiles, and parameters supported on TAOS units.
 - *TAOS Glossary*
Defines terms used in documentation for TAOS units.

Introduction to the MAX TNT and DSLTNT

1

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This chapter describes the features of the MAX TNT and DSLTNT including a system overview.

MAX TNT features overview

The MAX TNT unit is a WAN access switch or concentrator designed for the multiple, large-scale access requirements of Internet service providers (ISPs), carrier service providers, and major corporations. The unit supports up to 720 DS0 or E0 connections by means of multiple access technologies, and provides voice and data aggregation. It supports switched and leased-line connections and analog and digital transmission. The MAX TNT complies with existing standards for networks, authentication, and Simple Network Management Protocol (SNMP) management.

The following list summarizes the MAX TNT features:

- Carrier-class WAN access switch or concentrator
- High-density traffic capacity:
 - Dial-up—720 sessions
 - ISDN—720 sessions
 - Frame Relay—720 sessions (DS0/E1) or 150 sessions (T1)
 - Asynchronous Transfer Mode (ATM) sessions
- WAN interfaces:
 - Channelized T1 or E1
 - Channelized T3
 - Unchannelized DS3
 - Optical Carrier 3 (OC-3)/Synchronous Transport Module 1 (STM-1)
 - V.35
- Scalable, cost-effective performance

- Reliability:
 - Full-Redundant load-sharing power supplies
 - Hot-swappable cards

MAX TNT system overview

The MAX TNT chassis consists of the following major hardware components:

- Shelf controller
- 16 expansion slots per shelf
- Three shelves per system (maximum)
- Expansion modules
- Power supplies (ac or dc)

Slot cards in the MAX TNT connect to each other via the backplane. The shelf controllers manage the system and interact with the slot cards.

MAX TNT shelf

The MAX TNT chassis is referred to as a *shelf* and brings all components into an operational unit. Each MAX TNT system can be configured from either one, two, or three shelves. The MAX TNT shelf contains one slot for the shelf controller, sixteen slots for the slot cards, and two power supply bays. The MAX TNT backplane contains multiple buses that interconnect all slots.

MAX TNT supported slot cards

Table 1-1 lists the slot cards supported on the MAX TNT and identifies the port speed and port capacity for each card type.

Table 1-1. MAX TNT slot cards and their port speeds and capacity

Card	Port speed	Port capacity
DS3-ATM	44.738Mbps	One active port and one bypass port. Up to four active ports per system.
DS3-ATM2	44.736Mbps	One active port and one bypass port. Up to four active ports per system.
E1	2.048Mbps	Eight channelized ports.
E1 FrameLine	2.048Mbps	10 ports.
Ethernet-2	10/100Mbps	Three 10Mbps ports and one 100Mbps port.

Table 1-1. MAX TNT slot cards and their port speeds and capacity (continued)

Card	Port speed	Port capacity
Ethernet-3	10/100Mbps	One autosensing 10/100Mbps port.
Hybrid Access III	N/A	186 ports.
MultiDSP (48 ports)	N/A	48 voice ports and/or 48 data ports.
MultiDSP (96 ports)	N/A	96 data ports.
OC3-ATM	155.52Mbps	One unchannelized OC-3 port.
Serial WAN (SWAN)	6Mbps to 8Mbps	Four V.35 ports.
Series56 II Digital Modem	56Kbps	48 ports.
Series56 III Digital Modem	56Kbps	48 ports.
Synchronous Transport Module 0 (STM-0)	51.85Mbps	One fiber optic connection.
T1	1.544Mbps	Eight channelized ports.
T1 FrameLine	1.544Mbps	10 ports.
T3 (channelized)	44.736Mbps	One active port and one bypass port. Up to four active ports per system.
Unchannelized DS3	44.736Mbps	One active port. Up to five active ports per system.

DSLNT features overview

The DSLTNT unit is an access concentrator that supports multiple types of digital subscriber lines (xDSL). It was designed for the large-scale DSL requirements of Regional Bell Operating Companies (RBOCs) and Competitive Local Exchange Carriers (CLECs). The unit supports DS3 connections of up to 340 DSL lines by means of multiple access technologies. The DSLTNT complies with existing standards for networks, authentication, and SNMP management.

The following list summarizes the DSLTNT features:

- Layer 2 end-to-end services:
 - Virtual Private Networks (VPNs) for corporations

- VPNs for Internet Service Providers (ISPs)
- High-speed access services:
 - Up to 7.0Mbps downstream transmission and up to 1.0Mbps upstream transmission using rate-adaptive DSL (RADSL) on a single pair of local loop.
 - Up to 1.54Mbps symmetric transmission on two pairs of wires or up to 768Kbps on a single pair of wire using symmetric DSL (SDSL).
 - Up to 128Kbps symmetric transmission on a single pair of wires using ISDN DSL (IDSL).
- High-speed access for multitenant buildings
- Campus connectivity
- Fractional T1 Frame Relay Services
- Reliability:
 - Full-Redundant load-sharing power supplies
 - Hot-swappable cards

DSLNT system overview

The DSLNT chassis consists of the following major hardware components:

- Shelf controller
- 16 expansion slots per shelf
- Three shelves per system (maximum)
- Expansion modules
- Power supplies (ac or dc)

Slot cards in the DSLNT connect to each other via the backplane. The shelf controllers manage the system and interact with the slot cards.

DSLNT shelf

The DSLNT chassis is referred to as a *shelf* and brings all components into an operational unit. Each DSLNT system can be configured from either one, two, or three shelves. The DSLNT shelf contains one slot for the shelf controller, sixteen slots for slot cards, and two power supply bays. The DSLNT backplane contains multiple buses that interconnect all slots.

DSLTNT supported slot cards

Table 1-2 lists the slot cards supported on the DSLTNT and identifies the port speed and port capacity for each card type.

Table 1-2. DSLTNT slot cards and their port speeds and capacity

Card	Port speed	Port capacity
ADSL-CAP	7Mbps (downstream) 1Mbps (upstream)	6 ports per card.
ADSL-DMT	6.14Mbps (downstream) 176Kbps (upstream)	6 ports per card.
DS3-ATM	44.738Mbps	One active port and one bypass port. Up to four active ports per system.
DS3-ATM2	44.736Mbps	One active port and one bypass port. Up to four active ports per system.
E1	2.048Mbps	Eight channelized ports.
E1 FrameLine	2.048Mbps	10 ports.
Ethernet-2	10/100Mbps	Three 10Mbps ports and one 100Mbps port.
Hybrid Access II	N/A	186 ports.
IDS	128Kbps (symmetric)	32 ports per card.
OC3-ATM	155.52Mbps	One unchannelized OC-3 port.
SDSL	768Kbps (symmetric)	24 ports per card.
Serial WAN (SWAN)	Up to 8Mbps	Four V.35 ports.
Synchronous Transport Module 0 (STM-0)	51.85Mbps	One fiber optic connection.
T1	1.544Mbps	Eight channelized ports.
T1 FrameLine	1.54Mbps	10 ports.

Table 1-2. DSLTNT slot cards and their port speeds and capacity (continued)

Card	Port speed	Port capacity
T3 (channelized)	44.736Mbps	One active port and one bypass port. Up to four active ports per system.
Unchannelized DS3	44.736Mbps	One active port. Up to five active ports per system.

Preparing for Installation

Before you begin	2-1
Checking the package contents	2-2
Selecting the installation site	2-3
Required installation tools and equipment	2-3
Understanding the unit back panel	2-4
Understanding the shelf-controller back panel	2-5

Before you begin



Warning: Before installing the MAX TNT or DSLTNT, be sure to read the safety instructions in the *Access Networks Safety and Compliance Guide*. This hardware installation guide provides information specific to your product in Appendix C, “Safety-Related Electrical, Physical, and Environmental Information.”

Before you install a MAX TNT or DSLTNT, make sure you have the following:

- Suitable location with adequate power.
- At least one active T1 or E1 line set up for bidirectional calling. (Bidirectional calling allows you to test the unit hardware by having the MAX TNT or DSLTNT dial out on one channel and answer on another channel.)
- Local PC or workstation with VT100 ASCII terminal-emulation software (You must assign an IP address through a connection to the serial port of the MAX TNT or DSLTNT. Later, you can use Telnet to configure the system.) The PC or workstation must be set to the following values:
 - 9600 bps
 - Direct connection
 - 8 data bits
 - No parity
 - 1 stop bit
 - No flow control

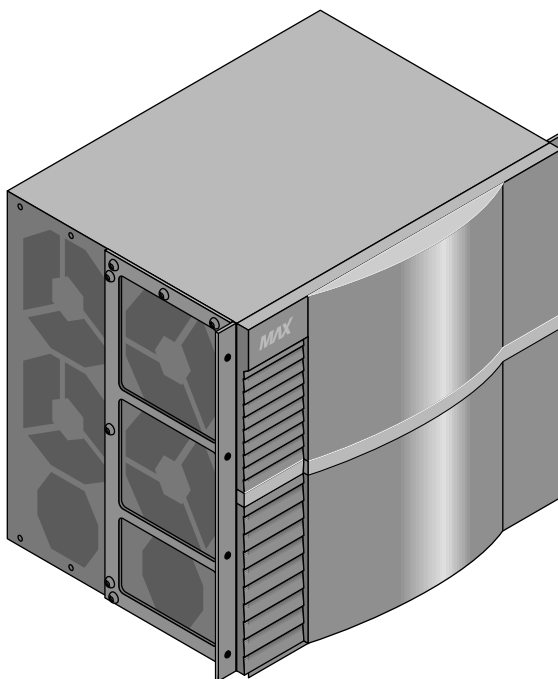
When connected to the shelf-controller SERIAL port, the PC or workstation acts as a console terminal through which you can configure the unit.

- Workstation on a different subnet, from which you can Ping the MAX TNT or DSLTNT to verify the configuration.
- IP address for the MAX TNT or DSLTNT.
- Default gateway for the MAX TNT or DSLTNT, if your setup requires one.
- *(Optional)* Workstation with an Ethernet LAN connection for connecting the unit to the Ethernet.
- Blank single-slot filler cards for any unused slots in the MAX TNT or DSLTNT.

Checking the package contents

The MAX TNT or DSLTNT package contents vary, depending on the base unit and slot cards you order. The first step after opening the package is to verify that you have the system you ordered. Figure 2-1 shows a standalone MAX TNT or DSLTNT shelf. A multishelf system combines multiple interleaved shelves in a chassis.

Figure 2-1. Standalone shelf



Verify that the package also contains the following items:

- Power cable.
- Personal Computer Memory Card International Association (PCMCIA) cards.
- Rack-mounting kit for mounting the MAX TNT or DSLTNT in a 19-inch or 23-inch rack.
- Any slot cards you ordered with the system. If you ordered them separately, check the separate packaging.

If you are missing any items, contact your Lucent reseller.

Selecting the installation site

Before you choose a setup location for a MAX TNT or DSLTNT unit, read and follow the site and electrical requirements defined in Appendix C, “Safety-Related Electrical, Physical, and Environmental Information.”

Select the setup location carefully. Keep in mind that the unit requires proper ventilation and space for current and future cabling requirements. You can rack-mount a MAX TNT or DSLTNT unit in a standard equipment cabinet with a width of 19 or 23 inches (48.26 or 58.42 cm), or place it on a flat surface as a free-standing unit. Refer to Appendix C, “Safety-Related Electrical, Physical, and Environmental Information,” for more information.

Required installation tools and equipment

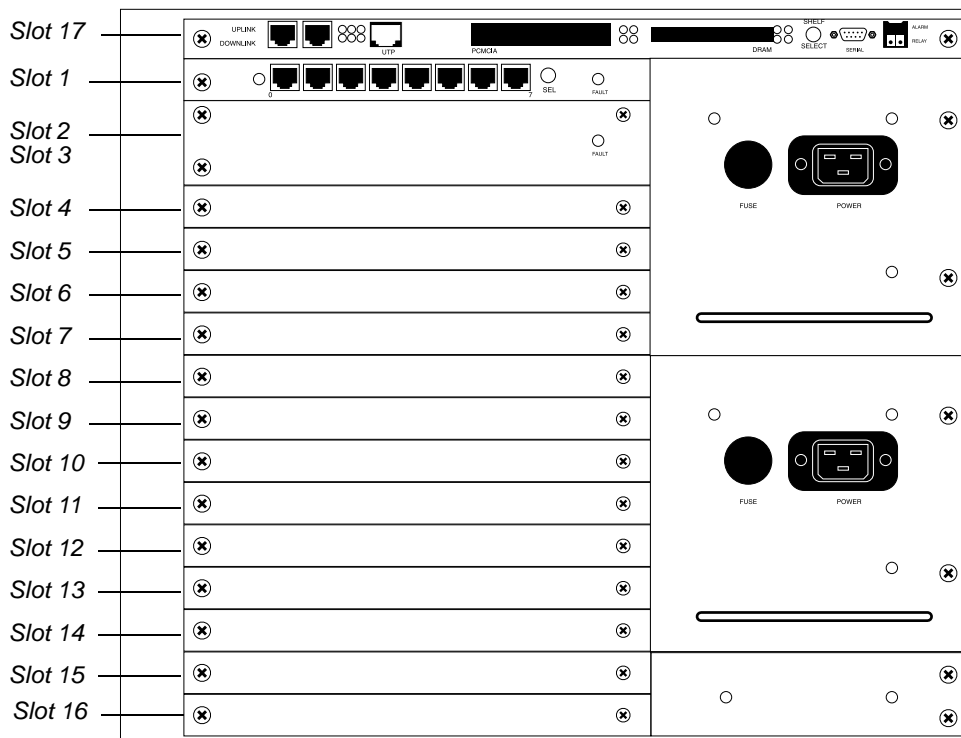
To install MAX TNT or DSLTNT hardware, you need the following tools and equipment:

- RS-232 straight-through modem cable for connecting a PC or workstation to the unit.
- Antistatic wrist strap and mats
- Number 2 Phillips screwdriver.
- 1/8-inch flathead screwdriver.
- 3/16-inch flathead screwdriver.
- 3/8-inch socket wrench.
- *(Recommended)* Mechanical lift.

Understanding the unit back panel

Figure 2-2 shows the back panel of a standalone shelf. The shelf controller is always slot 17. The remaining slots are numbered 1 through 16. For information about installing a slot card in a slot, see Chapter 3, “Installing a MAX TNT or DSLTNT Chassis.”

Figure 2-2. Back panel of the MAX TNT or DSLTNT



Understanding the shelf-controller back panel

Before you begin installing the hardware, you need some understanding of the ports and other items on the MAX TNT or DSLTNT shelf controller. Figure 2-3 shows the location and Table 2-1 describes the function of each element on the shelf controller.

Figure 2-3. MAX TNT or DSLTNT shelf-controller back panel

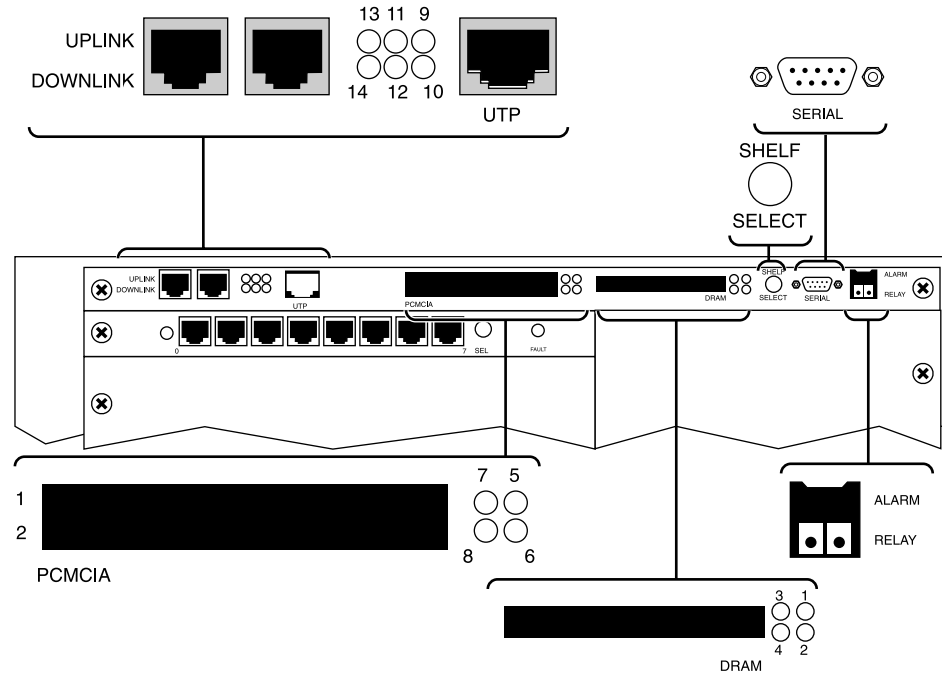


Table 2-1. Description of shelf-controller back panel items

Back panel item	Description
UPLINK or DOWNLINK	Ports for intershell communications.
UTP port	Ethernet port to connect unshielded twisted-pair (UTP) Ethernet LAN cable to the MAX TNT or DSLTNT.
SERIAL port	Serial console port for MAX TNT or DSLTNT management.
PCMCIA slots	Two flash PCMCIA slots, labeled 1 and 2.
DRAM upgrade slot	PCMCIA slot for DRAM upgrades.
SHELF-SELECT rotary switch	Switch used for MAX TNT or DSLTNT multishelf configurations. Each shelf in a multishelf system must have its rotary switch set to a unique number. (For information about configuring a multishelf system, see Chapter 4, "Installing a Multishelf System.")

Status lights on the shelf-controller back panel

The status lights (also called LEDs) on the MAX TNT or DSLTNT back panel can be helpful if you experience a problem, especially if it occurs shortly after power on. Figure 2-4 shows the location of the status lights on the back panel, and Table 2-2 describes them.

Figure 2-4. Location of the MAX TNT or DSLTNT status lights

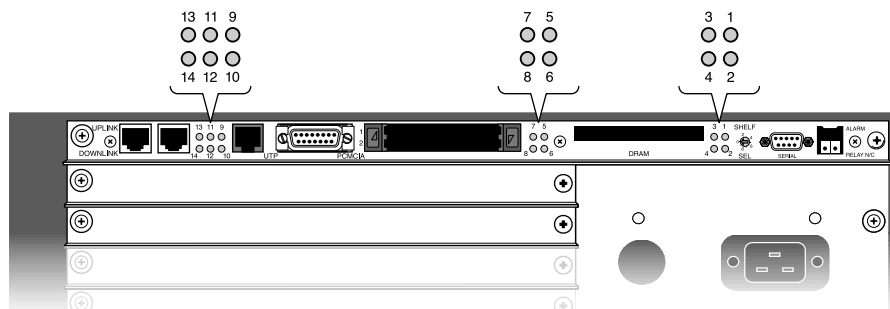


Table 2-2. MAX TNT or DSLTNT status lights

Light	Color	Description
1	Green	On when the unit has power.
2	Green	On for any functioning shelf in a multishelf system, whether it is configured as master or slave.
3	Yellow	Behaves as follows: <ul style="list-style-type: none">On after you reset the unitOff after the unit passes Power-On Self Test (POST) and is runningBlinks if a fatal error has occurred
4	Yellow	This is the multishelf alarm light. If the master shelf stops operating, this light illuminates on each slave shelf for about 9 seconds. It does not illuminate on the master shelf during a multishelf alarm condition.
5	Green	On when power supply A is installed and working.
6	Green	On when power supply B is installed and working.
7	Yellow	On when power supply A is installed and a fault occurs.
8	Yellow	On when power supply B is installed and a fault occurs.
9	Green	On when an Ethernet 10BaseT link has been established.
10	Green	On when an Ethernet AUI link has been established.
11	Green	On when the Ethernet link is active.
12	Green	On when the Ethernet link is active and link integrity has been confirmed.

Table 2-2. MAX TNT or DSLTNT status lights (continued)

Light	Color	Description
13	Green	On when there is Ethernet activity between MAX TNT or DSLTNT shelves.
14	Yellow	On when an Ethernet collision occurs.

Installing a MAX TNT or DSLTNT Chassis

3

Installation overview	3-1
Guidelines for installing units in a rack or cabinet	3-3
Rack-mounting the MAX TNT or DSLTNT	3-4
Installing a MAX TNT or DSLTNT exhaust shield.	3-6
Installing or replacing high-output power supplies	3-8
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Connecting the MAX TNT or DSLTNT dc power supply	3-12
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Verifying the rotary switch setting and PCMCIA card	3-15
Powering on the MAX TNT or DSLTNT	3-16
Installing or replacing slot cards	3-17

Installation overview

This chapter explains how to install a single shelf in a MAX TNT or DSLTNT unit. If you are installing a multishelf system, read this chapter and Chapter 4, “Installing a Multishelf System.”



Warning: Before installing the MAX TNT or DSLTNT, be sure to read the safety instructions in the *Access Networks Safety and Compliance Guide*. This hardware installation guide provides information specific to your product in Appendix C, “Safety-Related Electrical, Physical, and Environmental Information.”

Table 3-1 lists the sections describing installation tasks you might need to perform, and provides a brief description of each.

Installing a MAX TNT or DSLTNT Chassis

Installation overview

Table 3-1. MAX TNT or DSLTNT installation overview

Section	Description
“Guidelines for installing units in a rack or cabinet” on page 3-3	Provides recommendations and requirements for MAX TNT or DSLTNT installation.
“Rack-mounting the MAX TNT or DSLTNT” on page 3-4	Describes how to install the MAX TNT or DSLTNT in a rack.
“Installing a MAX TNT or DSLTNT exhaust shield” on page 3-6	Describes how to install exhaust shields on the MAX TNT or DSLTNT.
“Installing or replacing high-output power supplies” on page 3-8	Explains how to install high output power supplies into the MAX TNT or DSLTNT chassis. If you have Series56 II Digital Modem cards, you might need to install high output power supplies.
“Connecting the MAX TNT or DSLTNT to the LAN” on page 3-13	Explains how to connect the MAX TNT or DSLTNT shelf-controller Ethernet port to the LAN.
“Connecting a workstation to the serial port” on page 3-14	Explains how to connect a PC to MAX TNT or DSLTNT serial port to perform first time configuration. After assigning an IP address and gateway to the MAX TNT or DSLTNT, you can configure it remotely through Telnet.
“Verifying the rotary switch setting and PCMCIA card” on page 3-15	Describes the proper rotary switch settings for the MAX TNT or DSLTNT and installation of PCMCIA card. The PCMCIA card must be installed in order for the unit to boot.
“Powering on the MAX TNT or DSLTNT” on page 3-16	Explains how to power on the MAX TNT or DSLTNT and check the PCMCIA card file system to diagnose potential problems with booting up.
“Installing or replacing slot cards” on page 3-17	Explains how to install a slot card into the MAX TNT or DSLTNT chassis.

Guidelines for installing units in a rack or cabinet

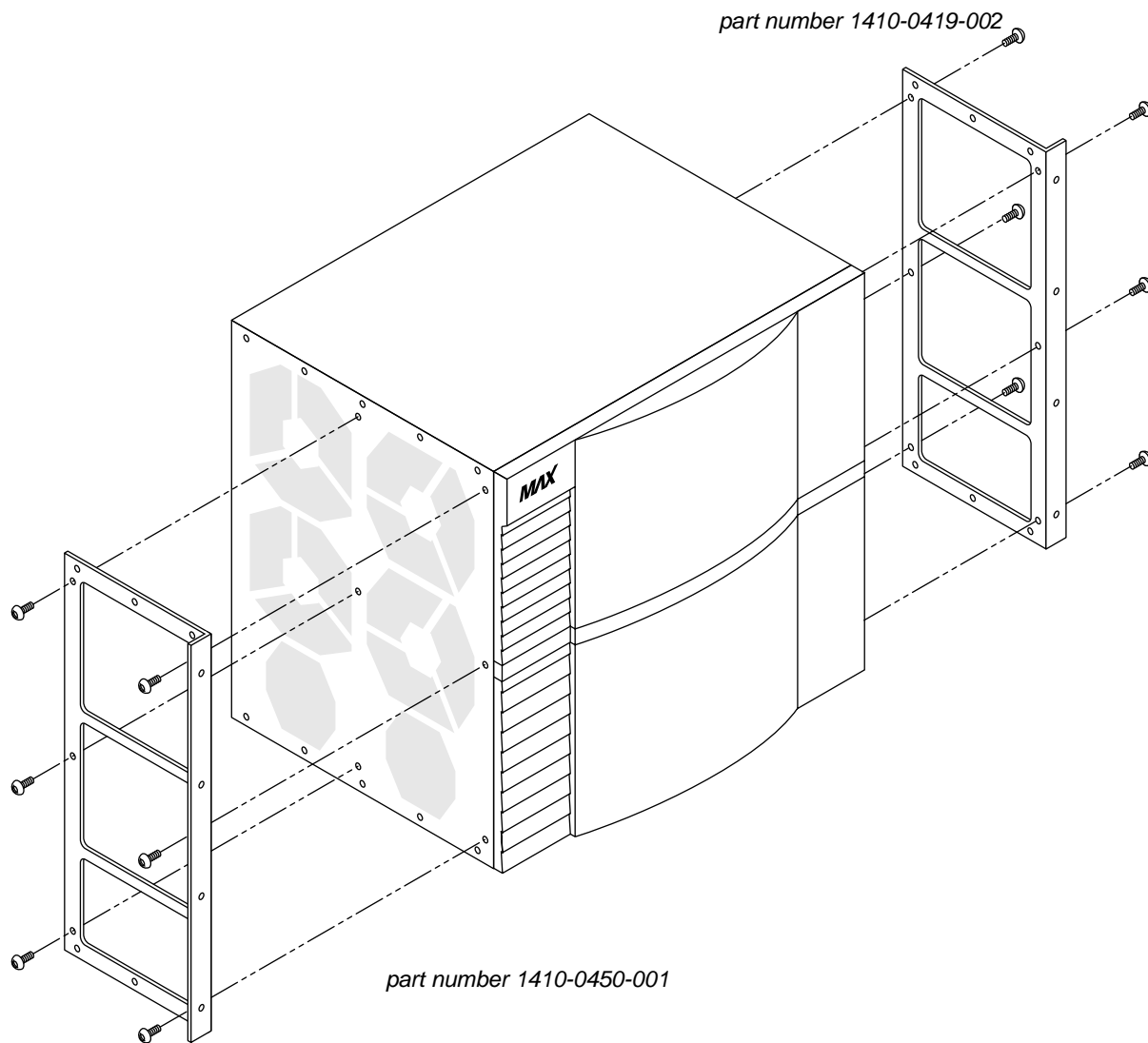
Keep the following information in mind when installing MAX TNT or DSLTNT units in a rack or cabinet:

- You must install an exhaust shield on the exhaust side of the unit to ensure that hot air from one unit is not being blown into adjacent units. The exhaust side is on the left as viewed from the front of the unit. See “Installing a MAX TNT or DSLTNT exhaust shield” on page 3-6.
- Do not concern yourself with air gaps between MAX TNT or DSLTNT shelves on a rack, because the unit’s fans sufficiently cool each shelf.
- Racks with open sides are recommended because the MAX TNT and DSLTNT fans vent on the side of the unit.
- Ensure adequate cooling in the room.
 - The maximum recommended ambient temperature for MAX TNT and DSLTNT models is 104° Fahrenheit (40° Celsius). Take care to allow sufficient air circulation or space between units when the MAX TNT or DSLTNT is installed in a closed or multirack assembly, because the operating ambient temperature of the rack environment might be greater than room ambient temperatures.
 - In enclosed racks, make sure that openings exist in the floor underneath each cabinet to allow the air conditioning up into the cabinet.
 - Exhaust fans at the top of the cabinet are recommended but not required. At a minimum, the cabinets must be ventilated at the top.

Rack-mounting the MAX TNT or DSLTNT

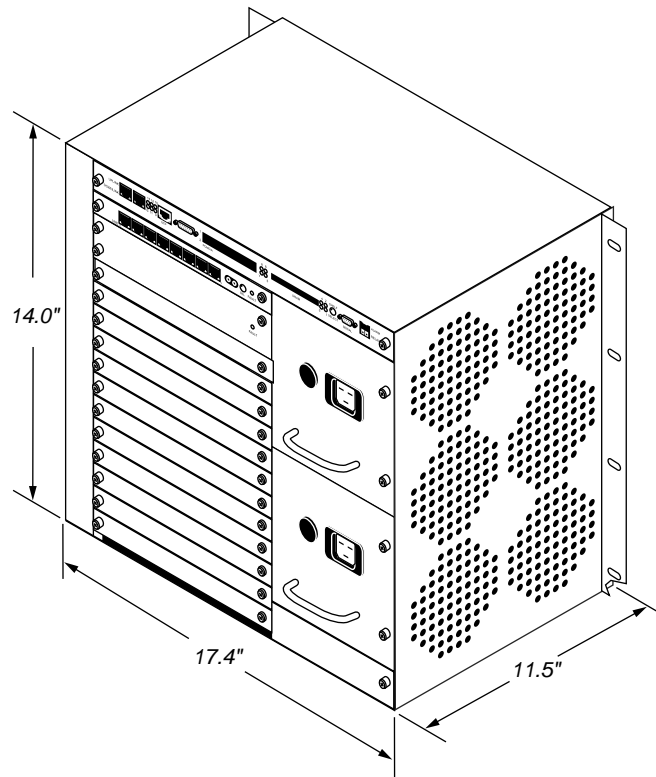
Before installing the unit in a rack, you must install the rack ears as illustrated in Figure 3-1. These rack ears are normally shipped with your unit. If you did not receive them, contact your Lucent reseller. Apply 7 to 8 inch-pounds (0.8 to 0.9 joules) of torque to each screw.

Figure 3-1. Installing the MAX TNT or DSLTNT rack ears



You can mount the MAX TNT or DSLTNT in 19-inch or 23-inch (48.26-cm or 58.42-cm) rack. A single MAX TNT or DSLTNT shelf has the dimensions shown in Figure 3-2.

Figure 3-2. MAX TNT or DSLTNT dimensions



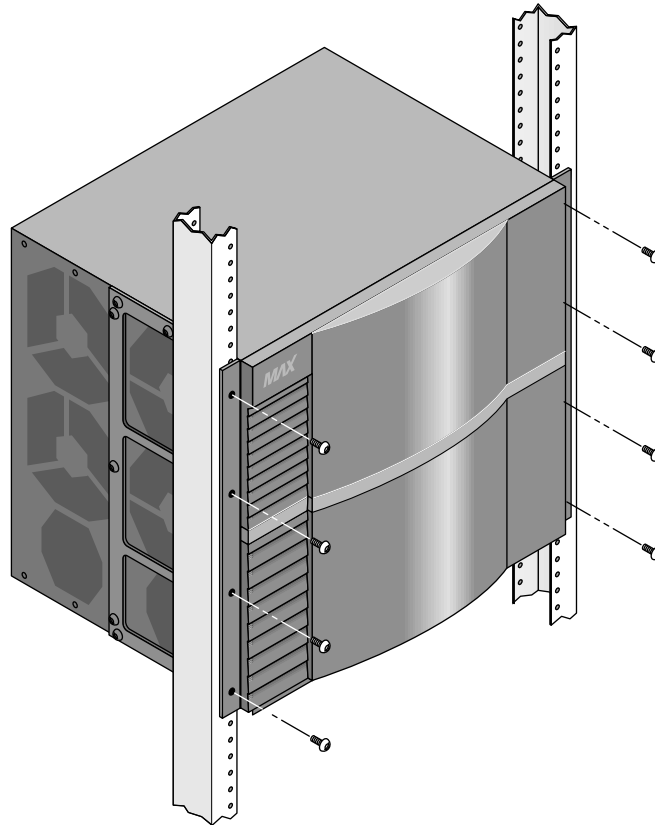
Installing a MAX TNT or DSLTNT Chassis

Installing a MAX TNT or DSLTNT exhaust shield

To install a MAX TNT or DSLTNT unit in a rack, proceed as follows:

- 1 Using a mechanical lift (recommended) or a minimum of two installers, raise the unit to the proper height for installation.
- 2 Insert the unit in the rack and secure it as shown in Figure 3-3. If you need more information, refer to the instructions that came with your rack.

Figure 3-3. Mounting the MAX TNT or DSLTNT in a rack

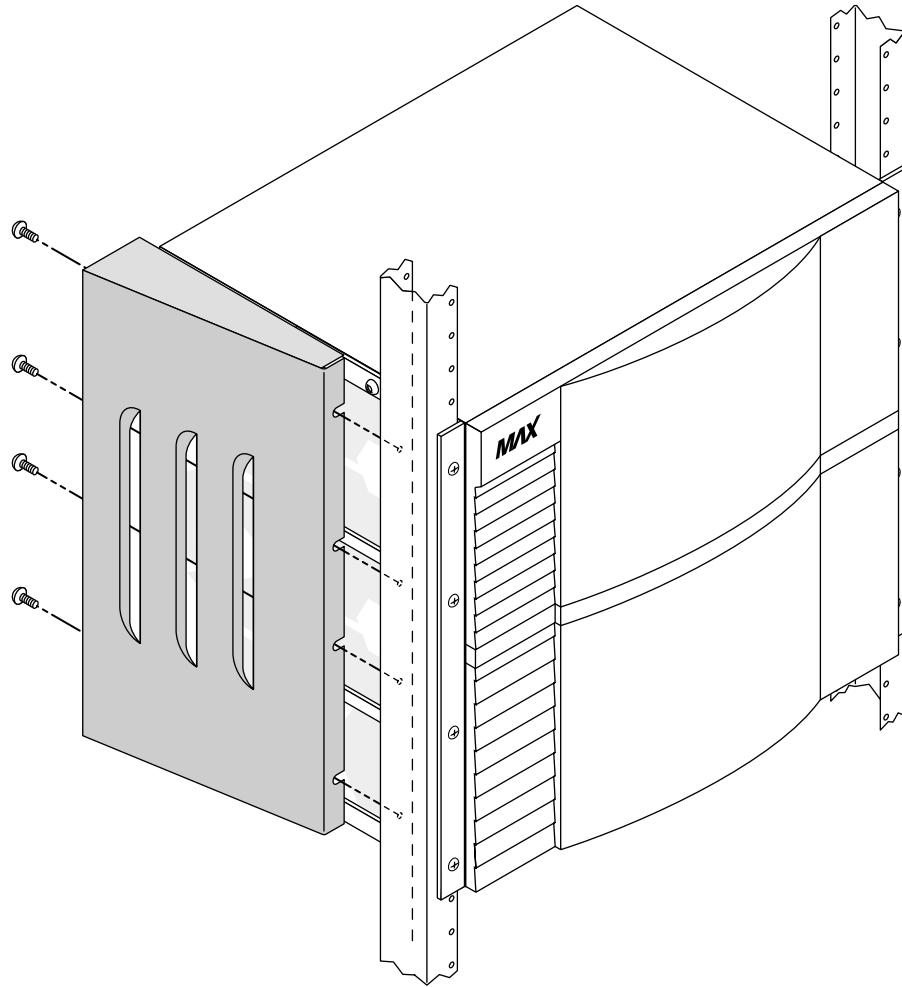


Installing a MAX TNT or DSLTNT exhaust shield

You can install an exhaust shield on a rack-mounted MAX TNT or DSLTNT. The exhaust shield redirects hot air from MAX TNT or DSLTNT units so that it is not being blown into adjacent units. Figure 3-4 illustrates how to install the exhaust shield in a rack.

To order the shield from your Lucent reseller, ask for product code TNT-SP-SHIELD.

Figure 3-4. Exhaust shield installed in a rack



Installing or replacing high-output power supplies

If you have purchased a new MAX TNT or DSLTNT, it includes high-output power supplies. If you have an older unit and want to install Series56 II or Series56 III Digital Modem cards or MultiDSP cards, you might need to replace the existing power supplies with the high-output power supplies.



Caution: Read this section in its entirety before installing Series56 II or Series56 III Digital Modem cards or high-output power supplies. Improper installation of the power supplies can damage the unit.

Before you begin

Before installing the high-output power supply, consider the following:

- The high-output power supply cannot be hot-swapped with existing power supplies. You must power down the unit to replace the power supplies.
- The high-output power supply cannot be used in redundant configurations with existing power supplies. Attempting to mix and match different power supplies will invalidate associated warranties.
- The high-output power supply is 100% plug-in compatible with the existing MAX TNT or DSLTNT power supplies. However, because the high-output power supply is not compatible with the old power supply, new power supplies must be installed in pairs.
- The capacitor card installed beneath the power supplies of older MAX TNT or DSLTNT units provides redundancy to existing power supplies. Although this card is not used for the high-output power supplies, it must be left in place when installing a high-output power supply to direct the airflow and help cool the unit. New MAX TNT or DSLTNT units contain a plate in this space for EMI purposes.

Identifying the high-output power supply

New MAX TNT or DSLTNT units have the high-output power supplies preinstalled. Figure 3-5 shows how to identify the new high-output ac power supply.

Note: Verify that your unit is equipped with high-output power supplies before installing components in the MAX TNT or DSLTNT chassis.

Figure 3-5. Identifying the high-output ac power supply

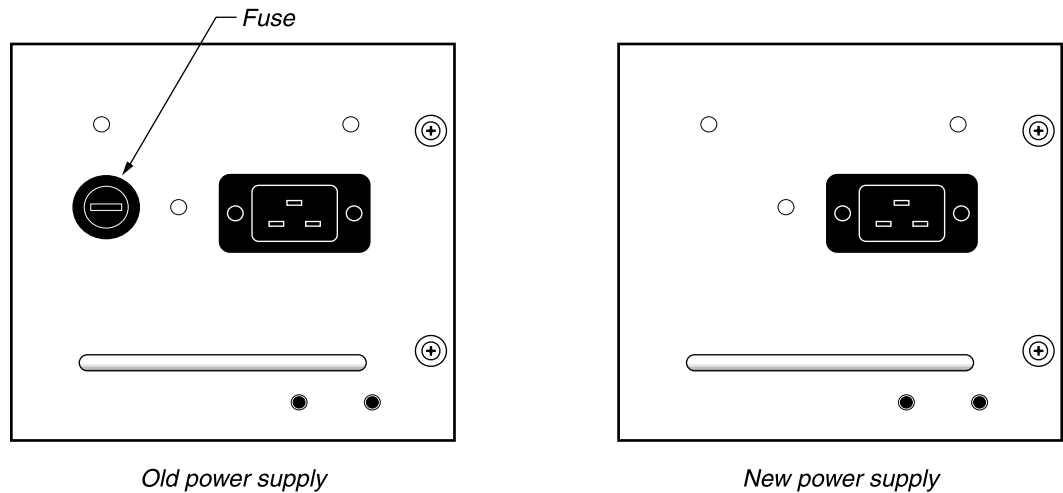
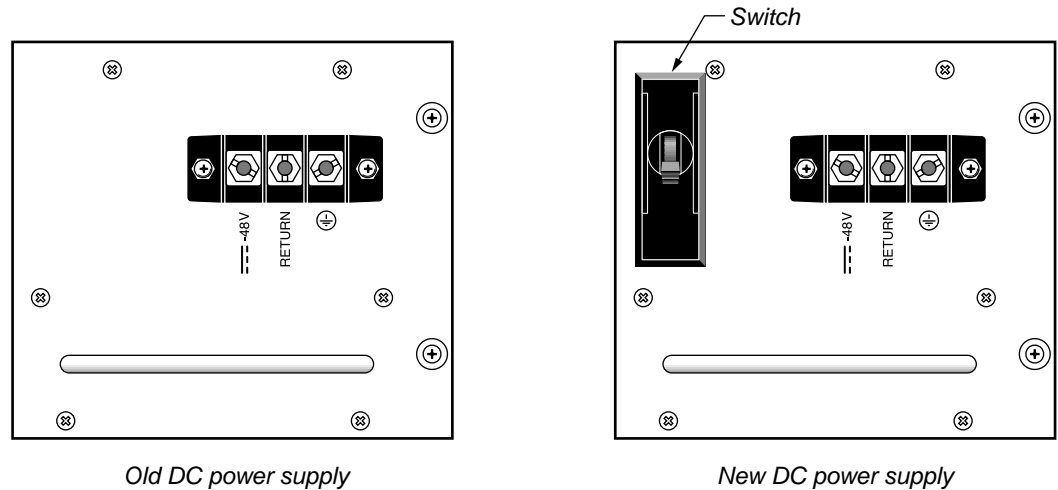


Figure 3-6 shows how to identify the new high-output dc power supply.

Figure 3-6. Identifying the high-output dc power supply

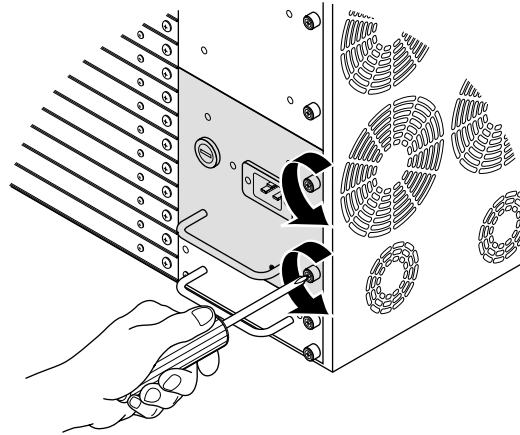


Installing a high-output power supply

To install a high-output power supply, proceed as follows:

- 1 Power down the unit if necessary. For ac power supplies, unplug the power cord. For dc power supplies, remove dc power from the source.
- 2 If you have a dc power supply unit, remove the terminal block wires.
- 3 Unscrew the power supply units from the chassis as shown in Figure 3-7.

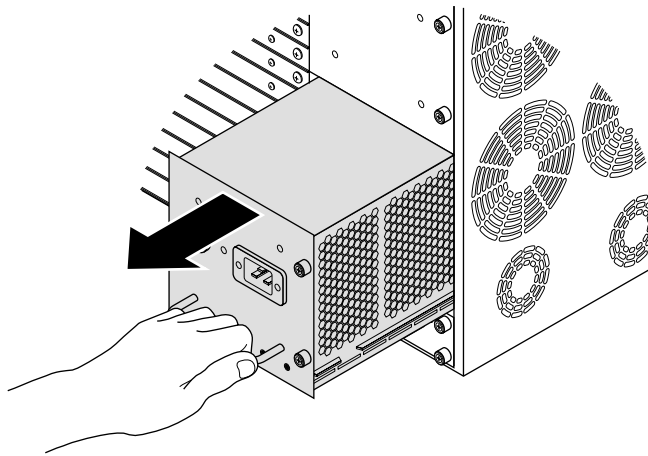
Figure 3-7. Unscrewing the power supply



Warning: Do not remove the power supply capacitor card located below the MAX TNT or DSLTNT power supplies. Doing so will disrupt airflow within the MAX TNT or DSLTNT chassis.

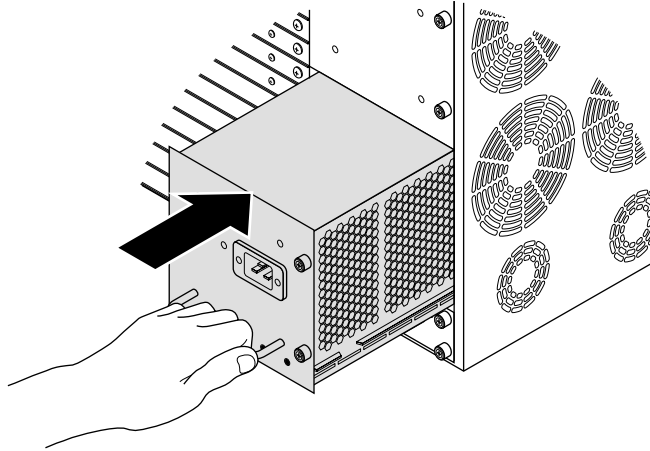
- 4 Remove the existing power supplies as shown in Figure 3-8.

Figure 3-8. Removing the power supply



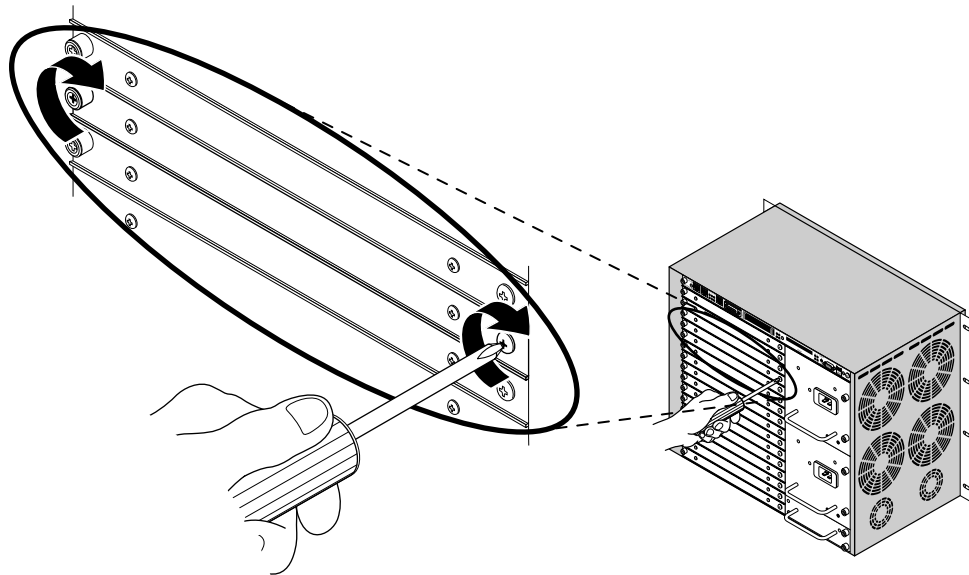
- 5 Gently insert the new power supply as shown in Figure 3-9.

Figure 3-9. Inserting the power supply



- 6 Tighten the power supply lockscrews as shown in Figure 3-10.

Figure 3-10. Tightening the power supply lockscrews



- 7 If you have a redundant power supply, repeat steps 2 through 6 for the remaining power supply.

Connecting the MAX TNT or DSLTNT ac power supply

To connect the ac power supply, plug the power cord into the power supply socket. Plugging in the unit's power supply also applies power to the unit.



Warning: Models with ac power inputs are intended for use with a three-wire grounding type plug (a plug that has a grounding pin). This is a safety feature. Equipment grounding is vital to ensure safe operation. Do not defeat the purpose of the grounding type plug by modifying the plug or using an adapter.

Connecting the MAX TNT or DSLTNT dc power supply

The MAX TNT or DSLTNT dc power supply requires three inputs: -48Vdc, return (-48Vdc return) and earth/chassis ground. -48V and return inputs are isolated from ground.

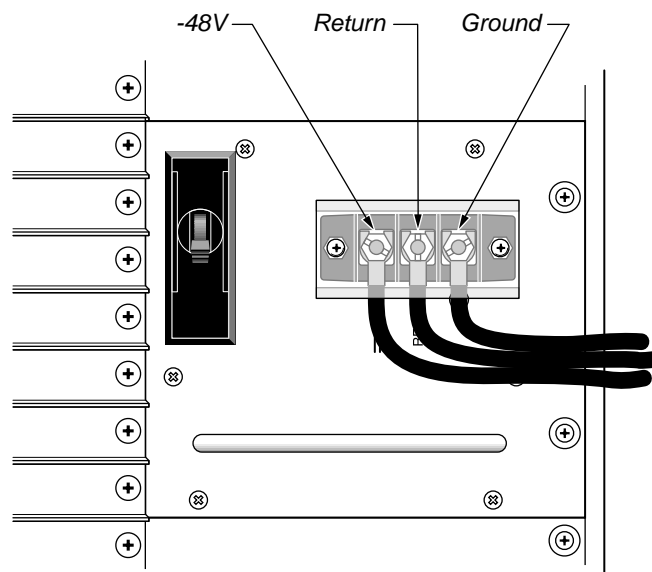
Solid copper wire (12 AWG) must be used to connect the power supply terminal block ground to the facility's ground. If the MAX TNT or DSLTNT is fed from an isolated supply, you must supply a solid ground to earth via copper rods. This ground must have a resistance of less than 5 ohms.

A single drop to all MAX TNT or DSLTNT units on one rack is acceptable. An example of wiring the terminal block is shown in Figure 3-11.



Warning: Before installing wires to the unit's dc power terminal block, verify that these wires are not connected to any power source and that the MAX TNT or DSLTNT power supply switch is in the Off (down) position. Installing live wires (wires connected to a power source) is hazardous.

Figure 3-11. Connecting to dc power



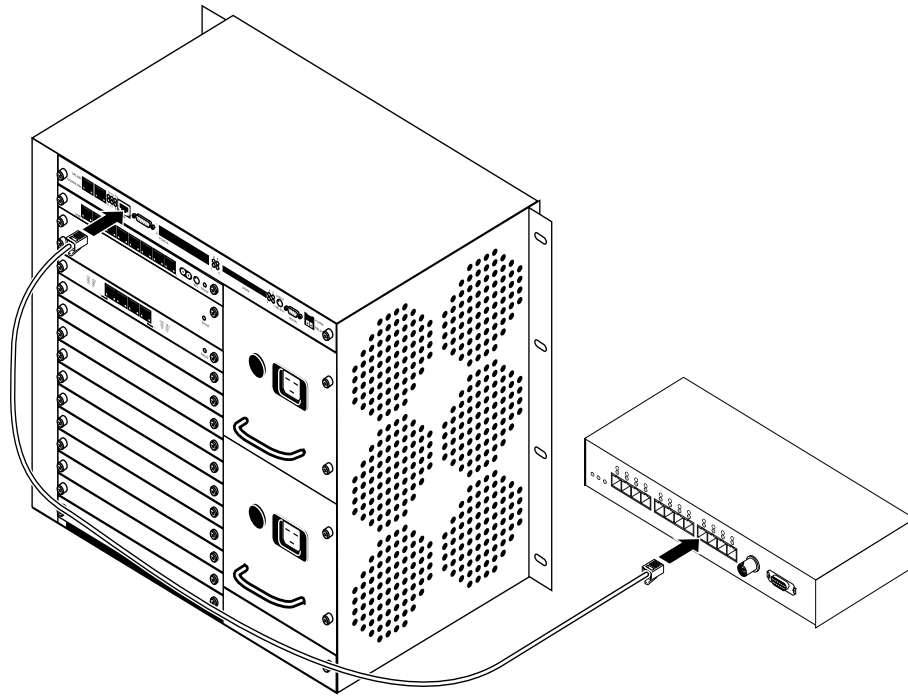
Connecting the MAX TNT or DSLTNT to the LAN

All MAX TNT and DSLTNT systems have an Ethernet port on the shelf controller. This Ethernet port is designed for out-of-band management and light traffic loads. It is not intended to be the primary Ethernet interface for the system. If your MAX TNT or DSLTNT will be routing heavy Ethernet traffic, use an Ethernet card.

If you do not need a LAN interface, skip this section and proceed to “Connecting a workstation to the serial port” on page 3-14.

To connect the unit to your LAN, plug Ethernet LAN cables into one of the unit’s Ethernet ports. Figure 3-12 shows the Ethernet LAN cable connected to the shelf-controller Ethernet interface for out-of-band management.

Figure 3-12. Connecting an Ethernet cable

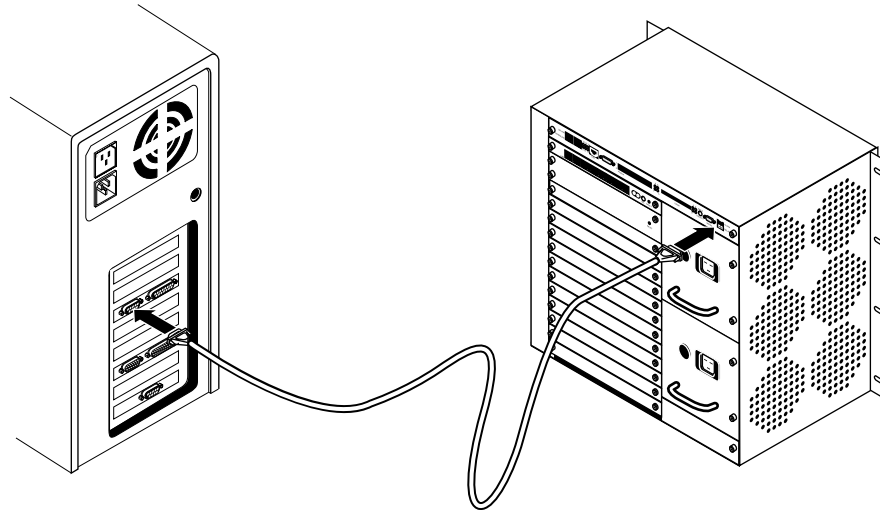


Connecting a workstation to the serial port

To perform the initial configuration of the MAX TNT or DSLTNT, you must connect a cable to the unit's serial port.

- 1 Connect a serial cable from your workstation to the MAX TNT or DSLTNT as shown in Figure 3-13.

Figure 3-13. Connecting a serial cable to the MAX TNT or DSLTNT



- 2 If you have not already done so, set the terminal-emulation package in your communications software as follows:
 - 9600bps
 - Direct connection
 - 8 data bits
 - No parity
 - 1 stop bit
 - No flow control

Verifying the rotary switch setting and PCMCIA card

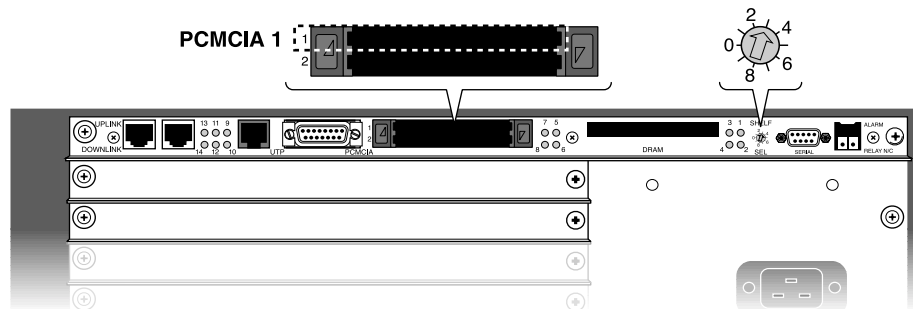
The rotary switch on a shelf controller designates the controller's shelf number. Each MAX TNT or DSLTNT shelf supports up to two PCMCIA flash-memory cards. The system comes with onboard nonvolatile RAM (NVRAM), and each flash card provides its own additional memory.

- 1 Make sure the switch is not set to zero (0). Figure 3-14 shows an acceptable setting. (In a multiself system, each shelf must have a unique setting.)



Caution: If the rotary switch is set to zero (0), the MAX TNT or DSLTNT will not operate correctly.

Figure 3-14. Verifying the rotary switch setting



- 2 Make sure a PCMCIA card is inserted in the top PCMCIA slot, identified as PCMCIA 1 in Figure 3-14.



Caution: Do not remove the PCMCIA flash card while the unit is running. Doing so can damage the card and require its replacement.

For more information about PCMCIA flash cards, see the *APX 8000/MAX TNT/DSLTNT Administration Guide*.

Powering on the MAX TNT or DSLTNT

Note: Before powering on the MAX TNT or DSLTNT, you must connect a display to the unit. Refer to “Connecting a workstation to the serial port” on page 3-14.

To power on the MAX TNT or DSLTNT:

- 1 Position yourself so that you can watch the lights on the back panel while you view the monitor display.
- 2 Turn on the power to the unit. For ac power supplies, plugging in the power cord supplies power. For dc power supplies, flip the power switch to the On (up) position.
- 3 After a few minutes, the terminal emulator displays the following messages. If these messages do not appear, press Ctrl-L to refresh the screen.

```
*** TNT, unconfigured unit***
The system date is: Thu Aug 27 12:34:39 1998
If incorrect, please enter the proper value using this
command:
date yymmddhhmm
Please configure these profiles:
SYSTEM
IP-GLOBAL
IP-INTERFACE
LOG
SERIAL
for your operating environment.
TNT>
```

- 4 Check the PCMCIA flash-card file system to verify that the card and its contents have no errors. Enter the Fdisk command as shown in the following example:

```
admin>fsck 1
ffs check in progress for card 1...
Dir 1 not in use

Dir 2 has magic, version 2, size 16, sequence 0xa
Using dir entry: 2, total data blocks: 0x40, directory size: 16

shelf-controller:(0xfe)

    reg    good    1228008 (0x12bce8) Sep 23 18:08
8t1-card:(0x00)

    reg    good    195368 (0x02fb28) Sep 23 18:08
4ether-card:(0x10)

    reg    good    176597 (0x02b1d5) Sep 23 18:08
48modem-card:(0x01)

    reg    good    690472 (0x0a8928) Sep 23 18:09
t3-card:(0x06)

    reg    good    224620 (0x036d6c) Sep 23 18:09
4swan-card:(0x03)

    reg    good    423878 (0x0677c6) Sep 23 18:09
10-unchan-t1-card:(0x05)
```

```
reg    good    508874 (0x07c3ca) Sep 23 18:09
hdlc2-card:(0x21)
reg    good    637813 (0x09bb75) Sep 23 18:09
csmx-card:(0x31)
reg    good    798139 (0x0c2dbb) Sep 23 18:10
flash card 1 fsck: good.
```

Installing or replacing slot cards

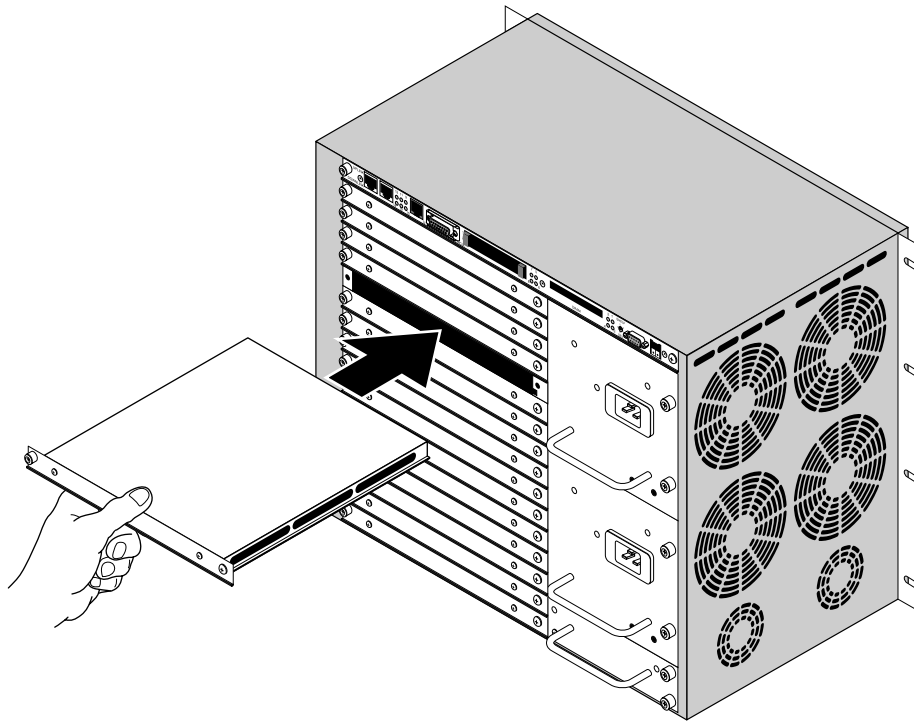
Before installing a slot card, make sure that the software running on the system supports the card. This is particularly important if you have a new card. You must first upgrade your system software, then install the card. If you do not upgrade the system software first, the card may not function properly.

Refer to the release notes for information on software required for a particular slot card and for upgrade instructions. For information about loading software on the MAX TNT or DSLTNT and recovering from a failed slot card installation, see the *APX 8000/MAX TNT/DSLTNT Administration Guide*.

If your package includes slot cards that are not already installed in your unit, insert the cards now. Proceed as follows:

- 1 Hold the slot card with the panel facing you and the lock screw on the left, and insert the card into the open slot as shown in Figure 3-15.

Figure 3-15. Inserting a slot card into a MAX TNT or DSLTNT



- 2 Push the card along the internal card guides until the jackscrew on the right side of the card panel is seated in the hole in the back panel. The panel of the slot card must touch the back panel of the unit.



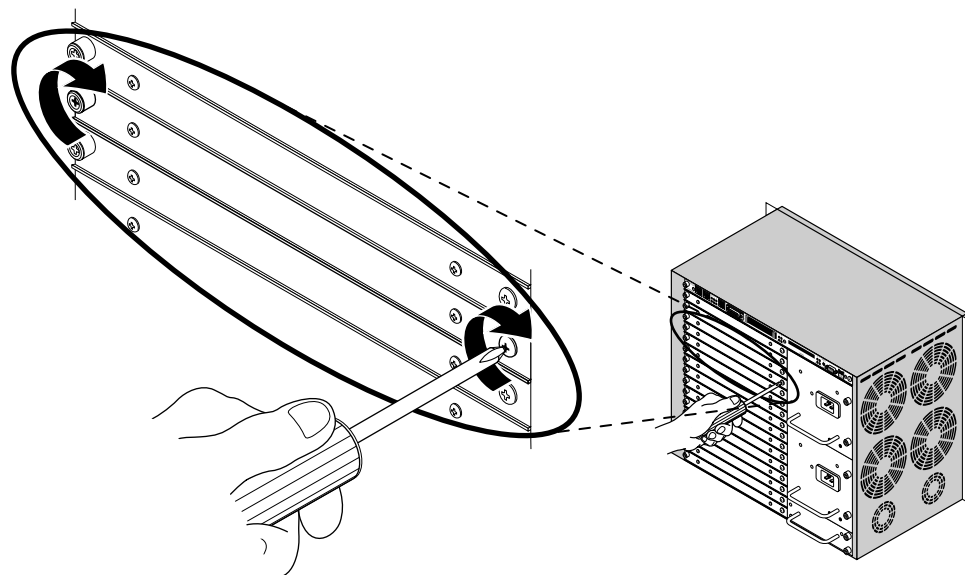
Caution: Do not force the slot card into the slot. Doing so can damage the card or slot connector.

- 3 Using a number 2 Phillips screwdriver, tighten the right-hand jack screw as shown in Figure 3-16 to fully seat the card.
- 4 Loosen the right-hand jack screw one-half turn so that the slot card panel is free to allow the left-hand lock screw to self-align.
- 5 Using a number 2 Phillips screwdriver, tighten the lock screw on the left side of the card as shown in Figure 3-16.
- 6 Finish tightening the jack screw on the right side of the card.

All MAX TNT and DSLTNT slot cards are hot-swappable, meaning that you can safely insert or remove cards while power is on.

Note: Be sure to install blank single-slot filler cards in any unused slots to ensure proper airflow.

Figure 3-16. Tightening slot card lock screws



Installing a Multishelf System

Before you begin	4-1
Setting the rotary switch on each shelf	4-2
Plugging in the multishelf cables	4-2
Designating master and slave shelf controllers	4-3
Resetting the shelves and checking the status lights	4-4

Before you begin

In a MAX TNT or DSLTNT multishelf system, you can connect and configure multiple units to act as a single logical unit. When you configure a MAX TNT or DSLTNT as a multishelf system, you configure one shelf controller as a master shelf controller and the others as slaves. The master shelf controller is responsible for maintaining the routing tables and for managing each slot card in the system. The slave controllers simply forward messages between the slot cards and the master shelf controller. If the master shelf stops operating, so does the entire multishelf system.

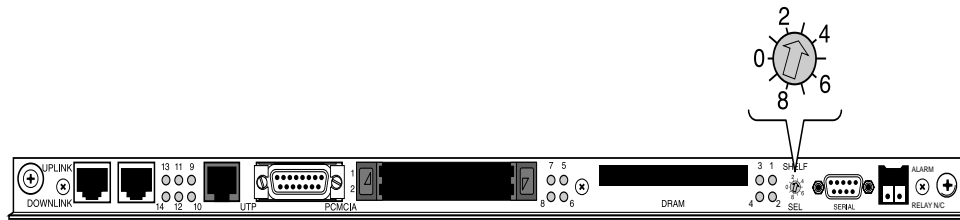
This section explains each of the following general steps required to configure a multishelf system:

- 1 Make sure that the rotary switch on each system is set to a unique number.
- 2 Plug in the multishelf cables.
- 3 Designate master and slave shelf controllers.
- 4 Reset each shelf and check the multishelf lights.

Setting the rotary switch on each shelf

You must set the rotary switch on each shelf to a number between 1 and 9 to designate its shelf number (see Figure 4-1). The number set for each shelf must be unique within the MAX TNT or DSLTNT multishelf system. The numbers you set do not have to be sequential.

Figure 4-1. Setting the rotary switch to a unique number



Caution: Do not select zero as the shelf number. If a shelf is set to zero, it does not work.

Plugging in the multishelf cables

You must use the cable provided by Lucent (part number 2510-0290-xxx, where xxx represents digits subject to change) to connect the multishelf ports in a multishelf system. The multishelf ports are located at the far left of the shelf controller, as shown in Figure 4-2.

Figure 4-2. Multishelf ports

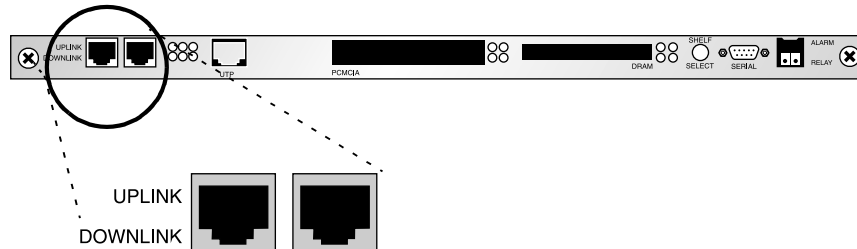
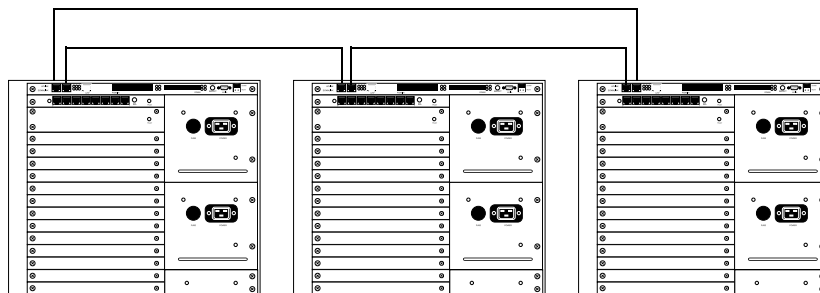


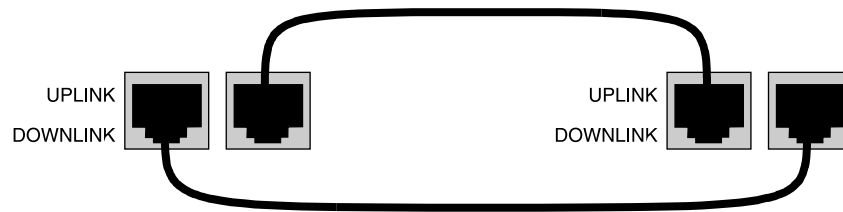
Figure 4-3 shows the correct way to connect the multishelf cables.

Figure 4-3. Cabling a multishelf system



The cables must always connect downlink to uplink and vice versa, as shown in Figure 4-4.

Figure 4-4. Connecting the multishelf ports



Designating master and slave shelf controllers

Multishelf systems require that you designate a single shelf as the master and the rest as slaves. The Master-Shelf-Controller parameter specifies the shelf number designated as master for the multishelf system. This is the number you set on the master shelf's rotary switch (as shown in Figure 4-1). All shelves must agree about which shelf is the master.

The Master-Shelf-Controller parameter is not applicable in a profile in which Shelf-Controller-Type is set to Master. You set this parameter for slave shelves only.

For example, do the following for a three-shelf system in which the master shelf rotary switch is set to 3:

- 1 Configure the System profile for shelf 3 as follows:

```
admin> read system
SYSTEM read
admin> set shelf-controller-type = master
admin> write
SYSTEM written
```

- 2 Configure the System profile for each slave shelf as follows:

```
admin> read system
SYSTEM read
admin> set shelf-controller-type = slave
admin> set master-shelf-controller = 3
admin> write
SYSTEM written
```

Resetting the shelves and checking the status lights

After configuring the master and slave shelf controllers, reset each shelf in the multishelf system as follows.

- 1 Enter the Reset command for each shelf in the system:

```
admin> reset
```

During a reset, the MAX TNT or DSLTNT clears active connections and runs its Power-On Self Test (POST), just as it would if the unit were power-cycled.

- 2 When the shelves come up again, verify that the multishelf status light is lit as shown in Figure 4-5.

Figure 4-5. Multishelf status lights—2, 4, and 13

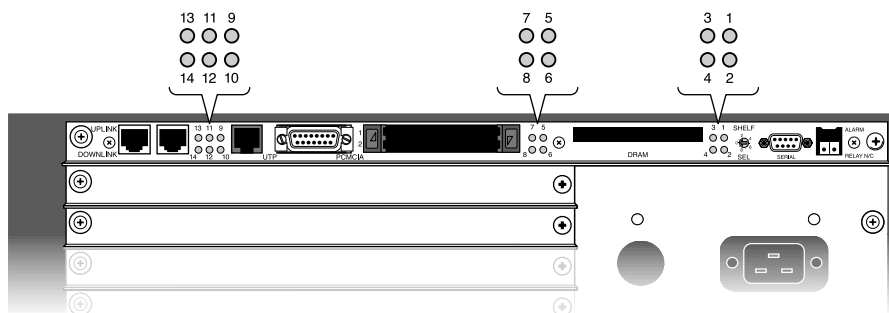


Table 4-1 describes the multishelf status lights. For a complete description of the MAX TNT and DSLTNT status lights, see “Status lights on the shelf-controller back panel” on page 2-6.

Table 4-1. Multishelf status lights

Light	Color	Description
2	Green	On for any functioning shelf in a multishelf system, whether it is configured as master or slave.
4	Yellow	This is the multishelf alarm light. If the master shelf stops operating, this light illuminates on each slave shelf for about 9 seconds. It does not illuminate on the master shelf during a multishelf alarm condition.
13	Green	On when Ethernet activity is occurring between MAX TNT or DSLTNT shelves.

Slot Card Specifications and Connection

A

This appendix provides technical and connection information and specifications for the following MAX TNT and DSLTNT cards:

ADSL-CAP card	A-2
ADSL-DMT card	A-3
DS3-ATM card	A-4
DS3-ATM2 card	A-6
E1 card	A-9
E1 FrameLine card	A-11
Ethernet-2 card	A-12
Ethernet-3 card	A-13
Hybrid Access cards	A-14
IDSL card	A-14
MultiDSP cards	A-15
OC3-ATM card	A-16
SDSL card	A-18
SDSL-HS card	A-19
Series56 Digital Modem cards	A-19
STM-0 card	A-20
SWAN card	A-23
T1 card	A-24
T1 FrameLine card	A-26
T3 card	A-26
Unchannelized DS3 card	A-28

ADSL-CAP card

The ADSL-CAP card—for Carrierless Amplitude Modulation (CAP)—is supported only in DSLTNT units.

Specifications

Table A-1 lists the specifications for the ADSL-CAP card.

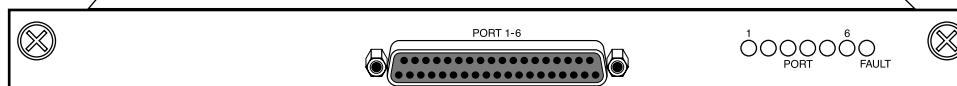
Table A-1. ADSL-CAP card specifications

Transfer rate /transmission distance	7.168Mbps/1.088Mbps up to 10,000 feet (3.05km) 2.560Mbps/1.088Kbps up to 12,000 feet (3.7km) 640Kbps/544Kbps up to 17,000 feet (5.18 km)
Interfaces per card	Six ports per card, up to 15 cards per system
Physical connectors	DC-37F. Cable converts this to a 50-pin telco connector
Connector requirements	Must meet Japanese Industrial Standards (JIS) C 5973
Card dimensions	8.8 inches high x 10.6 inches long (22.35 cm x 26.92cm)
Card weight	~3 pounds (1.37kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Illustration

Figure A-1 shows the ADSL-CAP card.

Figure A-1. ADSL-CAP card



ADSL-DMT card

The ADSL-DMT card—for Discrete Multitone (DMT)—is supported only in DSLTNT units.

Specifications

Table A-2 lists the specifications for the ADSL-DMT card.

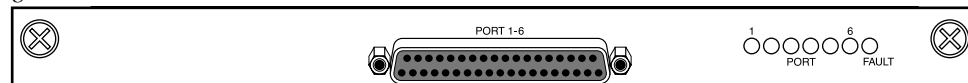
Table A-2. ADSL-DMT card specifications

Transfer rate (upstream/downstream) /transmission distance	9248Kbps/928Kbps up to 10,000 feet (3.05km) 7584Kbps/896Kbps up to 12,000 feet (3.7km) 3040Kbps/704Kbps up to 17,000 feet (5.18km)
Interfaces per card	Six ports per card, up to 15 cards per system
Physical connectors	50-pin telco connectors
Connector requirements	Must meet JIS C 5973 standards
Card dimensions	8.8 inches high x 10.6 inches long (22.35cm x 26.92cm)
Card weight	~3 pounds (1.37kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Illustration

Figure A-2 shows the ADSL-DMT card.

Figure A-2. ADSL-DMT card



DS3-ATM card

The DS3-ATM card enables the MAX TNT or DSLTNT to provide one active and one standby trunk connection at data rates of 44.738Mbps. You can configure each port as one of the following:

- User-to-Network Interface (UNI)
- Interim Inter-Switch Signalling Protocol (IISP) connection
- Direct trunk

The MAX TNT or DSLTNT unit provides a maximum of four DS3 ports per unit (two active ports, two standby ports).

Specifications

Table A-3 lists the specifications for the DS3-ATM card.

Table A-3. DS3-ATM card specifications

Agency approvals	Electromagnetic Emissions Certifications: FCC Part 15 Class A, CISPR Class A
Interface standards	ITU G.703 ANSI T1.102
Other standards supported	ANSI T1E1.1/94-002R1 ANSI T1.107 ANSI T1.107a ANSI T1.403 ATM Forum UNI 3.0/3.1 Bellcore TR-NWT 001112 Bellcore TR-TSY-000499 Bellcore TR-NWT-000820 ITU G.804 RFC 1407 TR54014 (AT&T ACCUNET T45 and T45R)
Physical interfaces	Four (two active, two standby) ATM UNI 3.0/3.1 cell-bearing DS3 ports supporting C-bit/M-framing, PLCP per TR-TSY-000773, and direct cell mapping per G.804 BNC connector per ANSI T1.404
Electrical standards	DSX-3 per ANSI T1.404
Line buildout	0-225 feet (0-68.6m), or 226-450 feet (68.9-137.6m)
Receive equalization	Based on cable length and transmitter
Line code	Bipolar with 8-zero substitution (B3ZS)

Table A-3. DS3-ATM card specifications (continued)

Line rate	44.736Mbps +/- 20ppm
Frame format	Per ANSI T1.107a (C-bit parity)
Alarm signaling	On DS3 Red Alarm, yellow signal sent on the DS3, AIS sent on DS2s On DS2 Red Alarm, AIS sent on DS1s
Connectors	75-ohm BNC coaxial
Interfaces per card	One unchannelized DS3 port with integrated CSU/DSU. Maximum of four cards per chassis.
Card dimensions	5.6 inches high x 10.7 inches long (14.2cm x 27cm)
Card weight	~2 pounds (0.9kg)
Operating humidity	0-90%, non-condensing
Operating temperature	32-104° F (0-40° C)

Status lights

All status lights except LA are lit upon power-up or reset and remain so until the card passes POST. If no status lights are lit, the DS3 interface is disabled or is receiving an Alarm Indication Signal (AIS) or Idle Signal.

Table A-4 explains the DS3-ATM card status lights.

Table A-4. DS3-ATM card status lights

Lights	Color	Description
LA	Green	On indicates the DS3 interface is enabled and has not detected any error conditions.
RA	Red	On indicates the DS3 interface is experiencing loss of receive signal.
LO	Red	On indicates the DS3 interface is out of frame alignment.
YA	Yellow	On indicates the DS3 interface has detected Far End Receive Failure indication transmitted from the other side.
FAULT	Yellow	Behaves as follows: <ul style="list-style-type: none"> On indicates that the unit has been reset. Off indicates that the unit has passed Power-On Self Test (POST) and is running. Blinking indicates that a fatal error has occurred.

Illustration

The DS3-ATM card is illustrated in Figure A-3.

Figure A-3. DS3-ATM card



Connecting the DS3-ATM card to the WAN

Connect the T3 line to the DS3-ATM card LINE RX and LINE TX ports using two 75-ohm coaxial cables (RG 59/U).

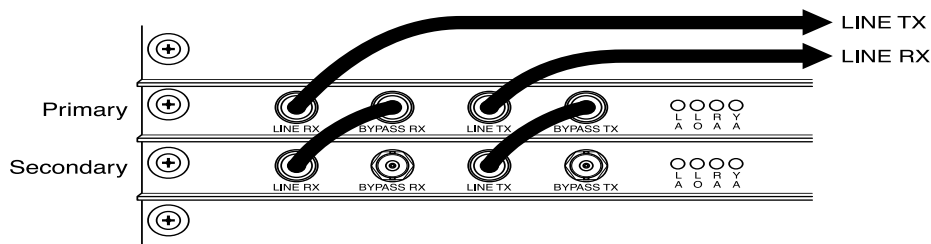
Inform your service provider that the equipment is connected, so they can bring up the line.

Connecting redundant DS3-ATM cards

You can install two DS3-ATM cards to provide for redundancy. After installing the cards, configure line profiles in each card as explained in the *APX 8000/MAX TNT/DSLNT Physical Interface Configuration Guide*.

Figure A-4 illustrates a redundant connection.

Figure A-4. DS3-ATM redundant configuration



DS3-ATM2 card

The DS3-ATM2 card is a routing card designed to insert and extract ATM cells from a DS3 stream in high-bandwidth routing applications of speeds up to 44.736Mbps. The DS3-ATM2 card supports 260 simultaneous receive and transmit virtual circuits (VCs), each of which can be configured as a fully routable point-to-point interface. Features include fast packet performance over nailed connections and OAM/F5 support.

Specifications

See Table A-3 on page A-4.

Status lights

All status lights except ACT are lit upon power-up or reset and remain so until the card passes POST. If no status lights are lit, the DS3 interface is disabled.

Table A-5 explains the DS3-ATM2 card status lights.

Table A-5. DS3-ATM2 status lights

Lights	Color	Description
ACT	Green	On indicates that the DS3-ATM2 card is active and enabled, and has not detected any error conditions.
LOS	Yellow	On indicates that the DS3 interface is experiencing loss of receive signal.
LOF	Yellow	On indicates that the DS3 interface is experiencing loss of framing.
YEL	Yellow	On indicates that the DS3 interface has detected a Far End Receive indication transmitted from the other side.
AIS	Yellow	On indicates that the DS3-ATM2 card is receiving an Alarm Indication Signal (AIS).
FAULT	Yellow	Behaves as follows: <ul style="list-style-type: none"> On after you reset the unit. Off after the unit passes POST and is running. Blinks if a fatal error has occurred.

Illustration

Figure A-5 shows the DS3-ATM2 card.

Figure A-5. DS3-ATM2 card



Connecting the DS3-ATM2 card to the WAN

Connect the T3 line to the DS3-ATM2 card RX-BYP and TX-BYP ports using two 75-ohm coaxial cables (RG 59/U).

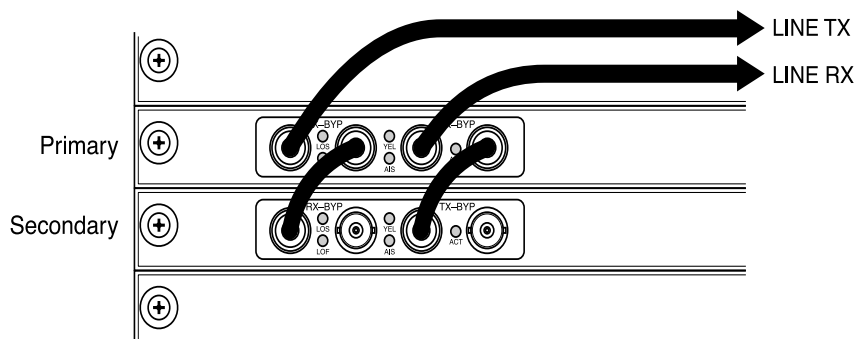
Inform your service provider that the equipment is connected, so that they can bring up the line.

Connecting redundant DS3-ATM2 cards

You can install two DS3-ATM2 cards to provide for redundancy. If the primary card fails, either due to a failure to boot up or because it is in a fault state, the secondary line card takes over. For information about configuring a redundant connection, see the *APX 8000/MAX TNT/DSLNT Physical Interface Configuration Guide*.

Figure A-6 shows a redundant connection.

Figure A-6. DS3-ATM2 redundant connection.



E1 card

The E1 card provides eight E1 lines. An E1 line supports 32 64Kbps channels, each of which can transmit and receive data or digitized voice. The line uses framing and signaling to achieve synchronous and reliable transmission. The most common configurations for E1 lines are ISDN Primary Rate Interface (PRI) and unchannelized.

Specifications

Table A-6 lists the specifications for the E1 card.

Table A-6. E1 card specifications

Interface standards	International Telecommunications Union (ITU) G.703, G.736, G.775, and G.823 European Telecommunications Standards Institute (ETSI) 300-166 and 300-233 AT&T PUB 62411
Electrical standards	Conférence Européenne des Postes et des Télécommunications (CEPT) 2.048Mbps pulse mask per G.703 for twisted pair and coaxial cable
Receive equalization	Short haul (12dB) and long haul (43dB)
Line code	High-density bipolar 3 (HDB3)
Line rate	2.048Mbps +/- 25ppm
Rx sensitivity	0 to -43dB
Frame format	Per G.704 frame alignment signal (FAS) with or without cyclic redundancy check 4 (CRC4) multiframe alignment (MFA). No channel-associated signaling (CAS) MFA used for data.
Alarm Signaling	Red alarm, out of frame (OOF), FAS, alarm indication signal (AIS), and yellow alarm.
Connectors	Eight RJ-45 (120 ohms). Optionally, BNC coaxial 75-ohm connectors with external cable. (This requires that wire jumpers be configured on the card).
Card dimensions	5.6 inches high x 10.7 inches long (14.2cm x 27cm)
Card weight	~2 pounds (0.9kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

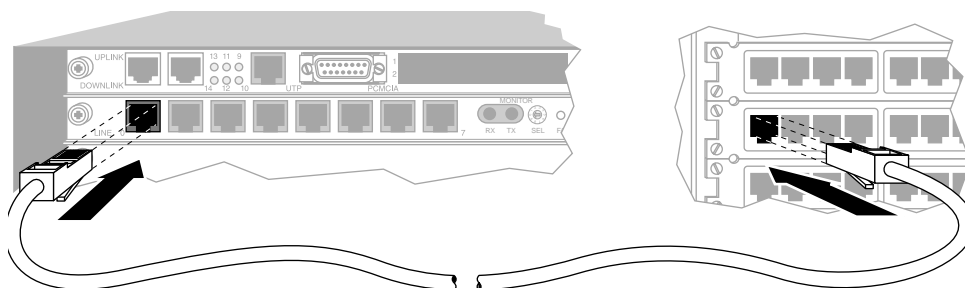
Figure A-7. E1 card



- Use cable that is specifically constructed for transmission of E1/PRI signals (CCITT G700 series recommended).
- The TAOS unit can connect to any DPNSS access point on a PBX or directly to E1 digital services. The TAOS unit can also connect to G.704 framed leased (nonswitching) services for 75-ohm connections.
- When installing the E1 line, the screen of the transmit and receive coaxial cable must be earthed at one end of the line only. Links (jumpers) are provided on the unit to earth the coaxial screens. The default position of the grounding links on the network line interface, when used with coaxial cable adapters, is on the transmit side (Tx) for 1680 Kbps network operations.
- The maximum distance between the E1/PRI WAN interface equipment and the TAOS unit should not introduce attenuation of more than 6 dB, when measured at half the maximum data rate (1024 Kbps). Also, the cable must have a root F characteristic.

Connect the TAOS unit port either directly to the E1 line or through other network interface equipment. See Figure A-8 for an example.

Figure A-8. Connecting the TAOS unit E1 line to the WAN



Monitoring the E1 line with bantam jacks

Each E1 card provides transmit and receive bantam jacks to monitor the status of the E1 lines. The Tx line carries what the TAOS unit transmits to the network. The Rx line carries what the TAOS unit receives from the network. The bantam jacks do not interfere with the signal either coming into or going out of the TAOS unit.

To monitor the E1 lines:

- 1 Select the line to monitor by setting the select switch on the E1 card.
- 2 Plug in bantam jacks.

E1 FrameLine card

Specifications

Table A-7 lists the specifications for the E1 FrameLine card.

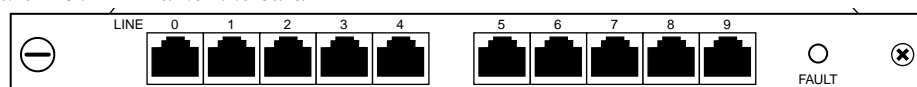
Table A-7. E1 FrameLine card specifications

Electrical	CEPT 2.048Mbps pulse mask per G.703 for twisted pair and coaxial
Receive Equalization	Short haul (12dB) and long haul (43dB)
Line Code	HDB3
Line Rate	2.048Mbps +/- 25ppm
Frame Format	Per G.704 FAS with or without CRC4 multiframe alignment (MFA).
Alarm Signaling	
Connectors	10 RJ-45 (120 ohms) Optionally, BNC coaxial (75 ohms) with external cable. (This requires that jumpers be configured on the card).

Illustration

Figure A-9 shows the E1 FrameLine card.

Figure A-9. E1 FrameLine card



Ethernet-2 card

The Ethernet-2 card has three routed 10BaseT and one routed 100BaseT routed interfaces. Up to four 10/100BaseT cards can be used in a three-shelf MAX TNT or DSLTNT system for a total of up to 16 ports. This Ethernet-2 card provides basic multisegment LAN-to-WAN access.

Specifications

Table A-8 lists the specifications for the Ethernet-2 card.

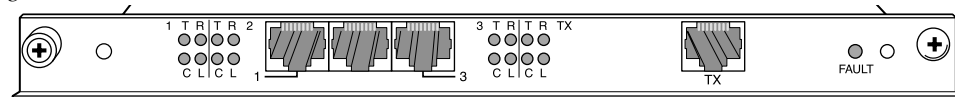
Table A-8. Ethernet-2 card specifications

Power requirements	17W
Interfaces per card	Three 10BaseT ports, one 100BaseT port
Connectors	RJ-45
Connector requirements	Must meet Japanese Industrial Standards (JIS) C 5973.
Card dimensions	8.8 inches high x 10.6 inches long (22.35cm x 26.92cm)
Card weight	3.9 pounds (1.77kg)
Operating humidity	10-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Illustration

Figure A-10 shows the Ethernet-2 card.

Figure A-10. Ethernet-2 card



Ethernet-3 card

The Ethernet-3 card has a full-duplex 10/100Mbps Ethernet port that is designed to have a high packet-per-second throughput to support Voice over IP (VoIP). The Ethernet-3 card autosenses between 10Mbps and 100Mbps, but does not support autonegotiation, in which Ethernet devices negotiate a common speed and duplex mode.

Specifications

Table A-9 lists the specifications for the Ethernet-3 card.

Table A-9. Ethernet-3 card specifications

Power requirements	35W
Interfaces per card	One full-duplex
Connector requirements	Must meet Japanese Industrial Standards (JIS) C 5973.
Card dimensions	5.6 inches high x 10.7 inches long (14.2cm x 27cm)
Card weight	~2 pounds (0.9kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Status indicators

Table A-10 explains the Ethernet-3 card status lights.

Table A-10. Ethernet-3 card status lights

Light	Color	Description
A	Yellow	On indicates activity on 10Mbps link.
B	Yellow	On indicates connection to 10Mbps link.
C	Green	On indicates activity on 100Mbps link.
D	Green	On indicates connection to 100Mbps link.

Hybrid Access cards

Each ISDN call, and each channel of a nailed session, requires a High-Level Data Link Control (HDLC) channel to process the HDLC-encapsulated data received from or sent to a WAN interface. Because the MAX TNT or DSLTNT base system provides no HDLC resources, you might need to install a Hybrid Access slot card in your unit. Keep in mind that the Series56 II and Series56 III cards also provide up to 48 HDLC channels per slot card.

The following cards require HDLC channels:

- Eight-port E1 card
- Eight-port T1 card
- T3 slot card

The following cards do not require HDLC channels:

- DS3-ATM card
- DS3-ATM2 card

IDSL card

Specifications

Table A-11 lists the specifications for the IDSL card.

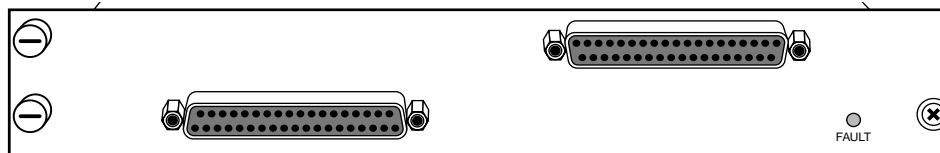
Table A-11. IDSL card specifications

Transfer rate /transmission distance	128Kbps (symmetric)
Interfaces per card	32 ports per card
Physical connectors	Two DB-37 connectors
Card weight	~3 pounds (1.37 kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Illustration

Figure A-11 shows the IDSL card.

Figure A-11. IDSL card



MultiDSP cards

48-port MultiDSP card

The 48-port MultiDSP card supports up to 48 ports of service. When two services are supported by the card, one service must be data and the other can be V.110 PHS or VoIP. The following list displays the possible configurations supported by the 48-port card:

- Data (analog and/or digital) service only
- V.110 service only
- PHS service only
- VoIP service only
- Data and V.110 services
- Data and PHS services
- Data and VoIP services

Downloaded software licenses determine which MultiDSP services are supported by a particular MAX TNT or DSLTNT and 48-port MultiDSP card. For example, if a unit is licensed to run both data and VoIP, the ports on each installed 48-port MultiDSP card can handle data and/or VoIP calls.

96-port MultiDSP card

The 96-port MultiDSP card supports up to 96 ports of service. An MAX TNT or DSLTNT with a 96-port MultiDSP card installed can have software licenses for up to two of the following MultiDSP services: data, V.110. The following list displays the possible configurations supported by the 96-port card:

- Data (analog and/or digital) service only
- V.110 service only
- Data and V.110 services

Downloaded software licenses (hash codes) determine which MultiDSP services are supported by a particular MAX TNT or DSLTNT and 96-port MultiDSP card. For example, if a unit is licensed to run both data and V.110, the ports on each installed 96-port MultiDSP card can handle data and/or V.110 calls.

Illustration

The MultiDSP card is shown in Figure A-12.

Figure A-12. MultiDSP Card



Specifications

Table A-12 lists the specifications for the MultiDSP card.

Table A-12. MultiDSP card specifications

Physical interfaces	48 ports of supported application per 48-port MultiDSP card. 96 ports of supported application per 96-port MultiDSP card.
Power requirements	37W, 7.4A
Card weight	Approximately 1.5 pounds (0.7kg)
Hot swap capability	Yes
LED indicator	Multipurpose fault indicator, one per card
Operating humidity	10-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

OC3-ATM card

The OC3-ATM card can be used to route IP over ATM or perform layer 2 switching between ATM and Frame Relay network.

Note: The MAX TNT or DSLTNT must have software version 7.0.1 or later to support the OC3-ATM card. For information about obtaining and loading software, see the MAX TNT or DSLTNT release notes.

Specifications

Table A-13 lists the specifications for the OC3-ATM card.

Table A-13. OC3-ATM card specifications

Power requirements	35W
Transmission distance	LAN; WAN with use of repeaters
Connectors	Fiber SC-1 or RJ-45 copper
Interfaces per card	One full-duplex OC-3c/STM-1 SONET/SDH
Cable requirements	Single-mode (SM) cables: 9/125-micron optical fiber
Connector requirements	Must meet JIS C 5973 standards
Optical input (avg.)	-32.5dBm minimum, -8dBm maximum (SM) -32.5dBm minimum, -14dBm maximum multimode (MM)

Table A-13. OC3-ATM card specifications (continued)

Optical output (avg.)	-14dBm minimum, -8dBm maximum, 9/125 micron (SM) -19dBm minimum, -14dBm maximum, 62.5/125 micron (MM)
Optical wavelength (avg.)	1261nm minimum, 1320nm typical, 1360nm maximum (SM) 1270nm minimum, 1310nm typical, 1380nm maximum (MM)
TX power	-8dBm maximum, -14dBm minimum, 9/125 micron fiber
RX sensitivity	-8dBm maximum, -32.5dBm minimum, 9/125 micron fiber
Loss Budget	18.5dBm
Card dimensions	5.6 inches high x 10.7 inches long (14.2 cm x 27 cm)
Card weight	~2 pounds (0.9kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Status indicators

All status lights except LA are lit upon power-up or reset and remain so until the card passes POST. If no status lights are lit, the OC3 interface is either disabled or is receiving an Alarm Indication Signal (AIS) or Idle Signal.

Table A-14 explains the OC3-ATM card status lights.

Table A-14. OC3-ATM card status lights

Lights	Description
LOF	Loss of Frame. Indicates the OC3 interface has detected a Far End Receive Failure indication transmitted from the other side.
AIS	Indication Signal. Indicates the local device has received an alarm indication signal.
ACTIVE	Link Active. Indicates the OC3 interface is enabled and has not detected any error conditions.
OOF	Out of Frame. Indicates the OC3 interface is out of frame alignment.
LOS	Loss of Sync. Indicates the OC3 interface is experiencing loss of receive signal.

SDSL-HS card

Specifications

Table A-16 lists the specifications for the SDSL-HS card.

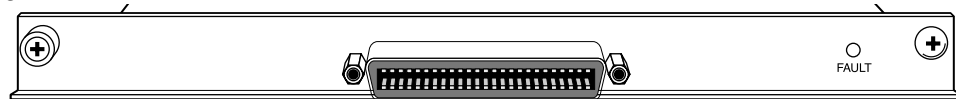
Table A-16. SDSL-HS card specifications

Interfaces per card	24 ports per card
Physical connector	USOC RJ21X 50-pin telco connector
Connector requirements	Must meet JIS C5973 standards.
Card dimensions	8.8 inches (22.35 cm.) in height; 10.6 inches (26.92 cm.) in length
Card weight	Approximately 3 pounds (1.37 kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32 to 104 degrees F (0 to 40 degrees C)

Illustration

Figure A-14 shows the SDSL-HS card.

Figure A-14. SDSL-HS card



Series56 Digital Modem cards

The Series56 II and Series56 III digital modem cards provide 48 modems in a single-height slot card that can terminate both modem and HDLC calls. However, the Series56 II and Series56 III cards can process only calls that use a single DS0. These cards cannot process data streams that span multiple DS0s of the same T1 or E1 interface. For this reason, Frame Relay connections cannot use the Series56 II or Series56 III slot cards, but must use the Hybrid Access cards instead. Series56 II and Series56 III ports appear in the output of both the HDLC and Modem commands.

Specifications

Table A-17 lists the specifications for the Series56 II and Series56 III digital modem cards.

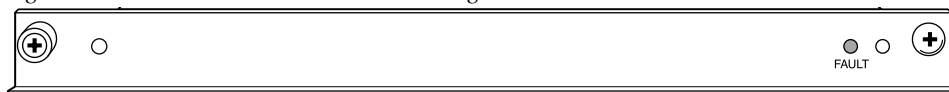
Table A-17. Series56 II and Series56 III digital modem card specifications

Power requirements	17W
Aggregate data rate	56Kbps analog, 64Kbps digital
Interfaces per card	No external interfaces
Connectors	N/A
Card dimensions	8.8 inches high x 10.6 inches long (22.35cm x 26.92cm)
Card weight	3.9 pounds (1.77kg)
Operating humidity	10-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Illustration

Figure A-15 illustrates the Series56 II and Series56 III digital modem card.

Figure A-15. Series56 II and Series56 III digital modem cards



STM-0 card

The Synchronous Transport Module 0 (STM-0) card is an optical 51.85Mbps communication circuit designed to be used with the appropriate signaling gateway. Each of its 28 T1 lines can be configured as Signaling System 7 (SS7) data trunks. When configured as an SS7 data trunk, the signaling gateway takes control of the data trunks, instructing the MAX TNT or DSLTNT when to bring calls up or down.

The STM-0 card does not support Call-Routing profiles, PRI signaling, or inband signaling.

Specifications

Table A-18 lists the specifications for the STM-0 card.

Table A-18. STM-0 card specifications

Line rate	51.85Mbps +/- 20ppm
Frame format	STM-0 with VC-3, tributary unit group 2 (TUG-2), and VC-11 mapping.

Table A-18. STM-0 card specifications (continued)

Alarm signaling	Receive line: reception of bad frame (REC) or AIS Generate line: backward AIS (BAIS) Receive line: VC-3 REC or AIS Generate line: VC-3 BAIS Receive line: VC-11 REC or AIS Generate line: VC-11 BAIS Receive line: HG REC or AIS Generate line: HG BAIS
Connectors	Fiber SC-1
Interfaces per card	One full-duplex STM-0 Synchronous Optical Network/Synchronous Digital Hierarchy (SONET/SDH)
Cable requirements	Single-mode cables: 9/125-micron (μm) optical fiber
Connector requirements	Must meet JIS C 5973 standards
Minimum bend radius	3 inches (7.62cm)
Optical input (average)	-32.5dBm minimum, -8dBm maximum for single mode (SM) -32.5dBm minimum, -14dBm maximum for multimode (MM)
Optical output (average)	-14dBm minimum, -8dBm maximum, 9/125μm (SM) -19dBm minimum, -14dBm maximum, 62.5/125μm (MM)
Optical wavelength (average)	1261nm minimum, 1320nm typical, 1360nm maximum (SM) 1270nm minimum, 1310nm typical, 1380nm maximum (MM)
TX power	-8dBm maximum, -14dBm minimum, 9/125μm fiber
RX sensitivity	-8dBm maximum, -32.5dBm minimum, 9/12μm fiber
Loss Budget	18.5dBm
Card dimensions	5.6 inches high x 10.7 inches long (14.2cm x 27cm)
Card weight	~2 pounds (0.9kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Status indicators

All status lights except HG_SYNC are lit when power is applied to the unit or the unit is reset, and remain so until the card passes POST. During normal operation, only the HG_SYNC remains lit.

Table A-19 explains the STM-0 card status lights.

Table A-19. STM-0 card status lights

Light	Color	Description
RALM	Red	On indicates all path alarms. It can mean any of the following: <ul style="list-style-type: none">• Path loss of pointer (LOP)• Path alarm indication signal (AIS)• Path remote defect indication (RDI)• Loss of multiframe (LOM)
LRDI	Red	On is a line remote defect indication. The STM-0 slot card received an alarm from an upstream device that detected the alarm.
LAIS	Red	On is a line alarm indication signal. The STM-0 slot card received an alarm from a downstream device that detected the failure.
LOS	Red	On indicates a loss-of-signal condition on the STM line. The STM slot card has detected all zeros on the line.
LOF	Red	On indicates a loss-of-frame condition on the STM-0 line. The STM-0 slot card has detected the absence of valid framing pattern on the line for 3ms or more
OOF	Red	On indicates an out-of-frame condition on the STM-0 line. The STM-0 slot card has detected absence of a valid framing pattern on the line.

SWAN card

The Serial WAN (SWAN) card has four high-speed V.35 ports, each of which supports data rates of up to 8Mbps. This card provides direct connections to routers or packet switches (Frame Relay). Hardware-based Stac compression is included on this card. Up to six serial cards can be used in a MAX TNT or DSLTNT shelf for a total of up to 24 ports.

Specifications

Table A-20 lists the specifications for the SWAN card.

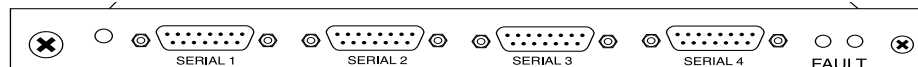
Table A-20. SWAN card specifications

Interface standard	V.35
Power requirements	N/A
Interfaces per card	Four V.35 ports per card, six cards per shelf
Connector requirements	Must meet Japanese Industrial Standards (JIS) C 5973.
Card dimensions	8.8 inches high x 10.6 inches long (22.35cm x 26.92cm)
Card weight	3.9 pounds (1.77kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Illustration

Figure A-16 shows the SWAN card.

Figure A-16. SWAN card



Connecting the SWAN card line to the WAN

To connect the SWAN card to the WAN:

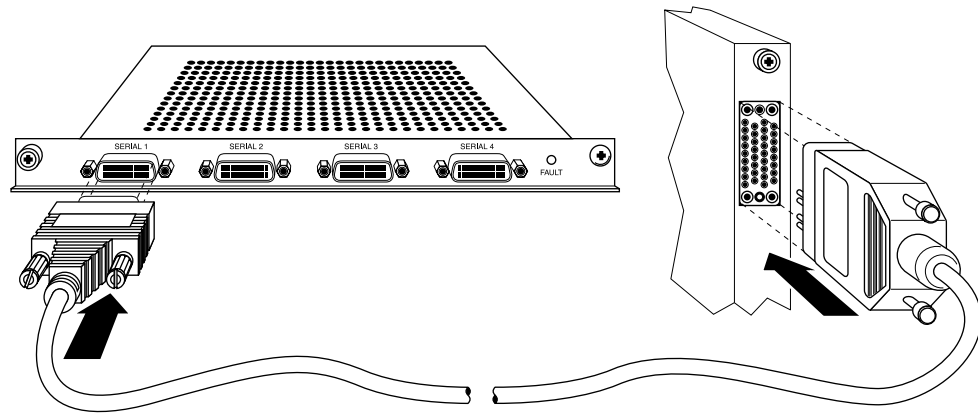
- 1 Using the Lucent Serial WAN cable, connect the 60 pin D connector to the SWAN card.

Slot Card Specifications and Connection

T1 card

- 2 Connect the other end to the V.35 port on a Frame Relay switch or to your WAN interface.

Figure A-17. Connecting the SWAN card to the WAN



Inform your service provider that the equipment is connected, so they can bring up the line.

T1 card

A T1 line supports 24 64Kbps channels, each of which can transmit and receive data or digitized voice. The line uses framing and signaling to achieve synchronous and reliable transmission. The most common configurations for T1 lines are ISDN Primary Rate Interface (PRI) and nailed or unchannelized T1, including fractional T1.

Specifications

Table A-21 lists the specifications for the T1 card.

Table A-21. T1 card specifications

Interface standards	American National Standards Institute (ANSI) T1.403 and T1.408 ETSI 300-166 and 300-233 AT&T PUB 62411
Electrical standards	DSX-1 per ANSI T1.102 (DSX) DS1 per ANSI T1.403, Pub 62411 (CSU)
Line buildout	0dB, -7.5dB, -15dB or -22.5dB (CSU) 0-133 feet (0-40.54m), 133-266 feet (40.54 -81.1m), 266-399 feet (81.1-121.62m), 399-533 feet (121.62-162.46m), 533-655 (162.46-199.64m) feet (DSX)
Receive equalization	Based on cable length and transmitter
Rx sensitivity	0 to -36dB
Line code	Alternate mark inversion (AMI) and bipolar 8-zero substitution (B8ZS)
Line rate	1.544Mbps +/- 32ppm

Table A-21. T1 card specifications (continued)

Frame format	Per ANSI T1.107a
Alarm signaling	Red alarm and yellow alarm
Connectors	Eight RJ-45 (100 ohm line)
Card dimensions	5.6 inches high x 10.7 inches long (14.2cm x 27cm)
Card weight	~2 pounds (0.9kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Illustration

The T1 card is illustrated in Figure A-18.

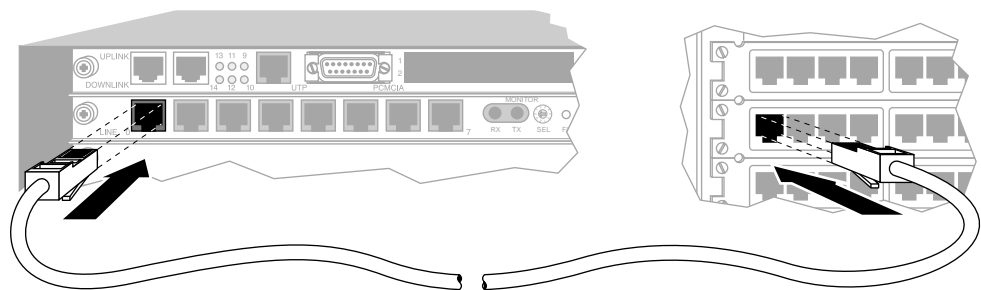
Figure A-18.T1 Slot Card



Connecting the TAOS unit T1 line to the WAN

If your TAOS unit T1/PRI ports have internal channel service units (CSUs), connect them to the demarcation point, which is where the T1/PRI line's metallic interface connects to other equipment. Otherwise, you must install external CSUs or other network (WAN) interface equipment between the TAOS unit and the demarcation point.

Figure A-19.Connecting the TAOS unit T1 line to the WAN



Inform your service provider that the equipment is connected, so they can bring up the line.

Monitoring the T1 line with bantam jacks

Each T1 card provides transmit and receive bantam jacks to monitor the status of the T1 lines. The Tx line carries what the TAOS unit transmits to the network. The Rx line carries what the TAOS unit receives from the network. The bantam jacks do not interfere with the signal either coming into or going out of the TAOS unit.

To monitor the T1 lines:

- 1 Select the line to monitor by setting the select switch on the T1 card.
- 2 Plug in bantam jacks.

T1 FrameLine card

Specifications

Table A-22 lists the specifications for the T1 FrameLine card.

Table A-22. T1 FrameLine card specifications

Electrical	DSX-1 per ANSI T1.102 (DSX) DS1 per ANSI T1.403, Pub 62411 (CSU)
Line buildout	0dB, -7.5dB, -15dB or -22.5dB (CSU) 0-133 feet (0-40.54m), 133-266 feet (40.54 -81.1m), 266-399 feet (81.1-121.62m), 399-533 feet (121.62-162.46m), 533-655 (162.46-199.64m) feet (DSX)
Receive equalization	Based on cable length and transmitter
Line code	AMI, B8ZS
Line rate	1.544Mbps +/- 32ppm
Frame format	Per ANSI T1.107a (M23 or C-bit parity)
Alarm signaling	Red Alarm, yellow signal
Connectors	10 RJ-45 (100-ohm line)

T3 card

The T3 card is a communications circuit composed of seven DS2s, each of which includes four DS1s, each of which in turn is composed of 24 DS0s, for a total of 672 DS0 channels.

Specifications

Table A-23 lists the specifications for the T3 card.

Table A-23. T3 card specifications

Electrical standards	DSX-3 per ANSI T1.404
Line buildout	0-225 feet (0-68.58m), or 226-450 feet (68.88-137.6m)
Receive equalization	Based on cable length and transmitter
Line code	Bipolar 3-zero substitution (B3ZS)
Line rate	44.736Mbps +/- 20ppm
Frame format	Per ANSI T1.107a (M23 or C-bit parity)

Table A-23. T3 card specifications (continued)

Alarm signaling	When a DS3 red alarm occurs, a yellow alarm is sent on the DS3 line and an AIS is sent on DS2 lines. On a DS2 Red Alarm, AIS is sent on DS1s.
Connectors	Four 75-ohm BNC coaxial (two lines and two backup lines)

Status indicators

All status lights except LA are lit upon power-up or reset and remain so until the card passes POST. If no LEDs are lit, the T3 interface is either disabled or is receiving an Alarm Indication Signal (AIS) or Idle Signal.

Table A-24 explains the T3 card status lights.

Table A-24. T3 slot card status lights

Light	Color	Description
LA	Green	On indicates the T3 interface is enabled and has not detected any error conditions.
RA	Red	On indicates the T3 interface is experiencing loss of receive signal.
LO	Red	On indicates the T3 interface is out of frame alignment.
YA	Yellow	On indicates the T3 interface has detected Far End Receive Failure indication transmitted from the other side.
FAULT	Yellow	Behaves as follows: <ul style="list-style-type: none"> On indicates that the unit has been reset. Off indicates that the unit has passed Power-On Self Test (POST) and is running. Blinking indicates that a fatal error has occurred.

Illustration

The T3 slot card is illustrated in Figure A-20.

Figure A-20. T3 Card



Connecting the T3 card to the WAN

Connect the T3 line to the T3 card with two 75-ohm coaxial cables (RG 59/U). To provide for redundant operation, the T3 card has a second pair of BNC jacks that can be used to connect to a second T3 card or other Data Terminal Equipment (DTE).

When the T3 card is not powered or is in the reset state, the Line Rx and Line Tx signals are electrically connected to the Bypass Rx and Bypass Tx jacks, respectively. When the T3 card passes POST, a relay switch connects the Line jacks to the card's T3 transceiver.

Inform your service provider that the equipment is connected, so they can bring up the line.

Unchannelized DS3 card

Specifications

Table A-25 lists the specifications for the unchannelized DS3 card.

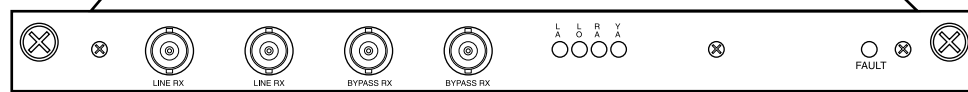
Table A-25. Unchannelized DS3 card specifications

Electrical	DSX-3 per ANSI T1.404
Line buildout	0 to 225 feet (0-68.58m) 226 to 450 feet (68.8-137.6m)
Receive equalization	Based on cable length and transmitter
Line code	B3ZS
Line rate	44.736Mbps +/- 20ppm
Frame format	Per ANSI T1.107a (C-bit parity)
Alarm signaling	On a DS3 Red Alarm, a yellow signal is sent on the DS3 and an AIS is sent on DS2s. On a DS2 Red Alarm, an AIS sent on DS1s.
Connectors	75-ohm BNC coaxial (two line, two backup)
Interfaces per card	One port per card, up to five cards per system
Card dimensions	5.6 inches high x 10.7 inches long (14.2cm x 27cm)
Card weight	~2 pounds (0.9 kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Illustration

Figure A-21 shows the unchannelized DS3 card

Figure A-21. Unchannelized DS3 card



Connecting the unchannelized DS3 card to the WAN

Connect the T3 line to the unchannelized DS3 card with two 75-ohm coaxial cables (RG 59/U). To provide for redundant operation, the unchannelized DS3 card has a second pair of BNC jacks that can be used to connect to a second unchannelized DS3 card or other Data Terminal Equipment (DTE).

When the unchannelized DS3 card is not powered or is in the reset state, the Line RX and Line TX signals are electrically connected to the Bypass RX and Bypass TX jacks, respectively. When the UDS3 card passes POST, a relay switch connects the Line jacks to the card's T3 transceiver.

Inform your service provider that the equipment is connected, so they can bring up the line.

Cabling and Connector Specifications

B

Serial port specifications	B-1
Ethernet interface specifications	B-2
T1/PRI interface specifications	B-3
E1/PRI interface specifications	B-11
Serial WAN (SWAN) cable specifications	B-16
IDSL cable specifications	B-21
ADSL cable specifications	B-26
SDSL cable specifications	B-29

Serial port specifications

The serial port uses a standard DE-9 female connector that conforms to the EIA RS-232 standard for serial interfaces. All MAX TNT or DSLTNT models use the RS-232 pinouts listed in Table B-1.

Table B-1. Serial port and cabling pinouts

DE-9 pin number	RS-232 signal name	Function	I/O
1	DCD	Data Carrier Detect	O
2	RD	Serial Receive Data	O
3	SD	Serial Transmit Data	I
4	DTR	Data Terminal Ready	I
5	GND	Signal Ground	
6	DSR	Data Set Ready	O
7	RTS	Request to Send	I
8	CTS	Clear to Send	O

Table B-1. Serial port and cabling pinouts (continued)

DE-9 pin number	RS-232 signal name	Function	I/O
*9	*RI	*Ring Indicator	*O

*Pin 9 is not active (Ring Indication signal not supplied).

Ethernet interface specifications

The MAX TNT or DSLTNT Ethernet interfaces support the physical specifications of IEEE 1802.3 with Ethernet 2 (Ethernet/DIX) framing.

Supported Ethernet types

The MAX TNT or DSLTNT can support any of the following Ethernet interface types:

- Coax (coaxial): Thin Ethernet and IEEE 802.3 (10Base-2) with a BNC connector.
Note: The MAX TNT or DSLTNT is not equipped with a coax Ethernet interface.
- 10BaseT (unshielded twisted pair): Twisted-pair Ethernet and IEEE 802.3 (10BaseT) with an RJ-45 connector.
- 100BaseT (unshielded twisted pair): Twisted-pair Ethernet and IEEE 802.3u (100BaseT) with an RJ-45 connector.
- AUI (attachment unit interface): Standard Ethernet and IEEE (10Base5) with a 15-pin AUI connector.

Required equipment

To install an Ethernet interface, you must have the equipment described in the following sections.

Coax

For a coax connection, you need a BNC T-connector. If your connection is at the end of a cable segment, you need a 50-ohm terminator as well.

To install, attach a LAN BNC T-connector to the BNC port on the back of the MAX TNT or DSLTNT. Use a standard 10Base-250-ohm cable, such as RG-58 A/U or RG-58 C/U.



Caution: Breaking the LAN's continuity by inserting a cable segment or removing either of the 50-ohm terminations disrupts and disables the Ethernet.

10BaseT/100BaseT

For a 10BaseT or 100BaseT connection, you need a twisted-pair Ethernet cable terminated with RJ-45 modular jacks.

Use an EIA/TIA 568 or IEEE 802.3 10Base-T cable. Some installations require a crossover cable (for example, when connecting directly to the Ethernet port of a PC).

AUI

For an AUI interface, you need the appropriate transceiver and transceiver cable.

T1/PRI interface specifications

This section provides the specifications for the MAX TNT or DSLTNT T1/PRI interface and covers cabling requirements.

T1/PRI CSU requirements

Your T1/PRI requirements depend on whether a T1/PRI port on the MAX TNT or DSLTNT is equipped with an internal Channel Service Unit (CSU).

Port with internal CSU

If a T1/PRI port on the MAX TNT or DSLTNT has an internal CSU, you can connect the port directly to the metallic interface of the WAN. To avoid harming the WAN, you must contact your carrier for approval before installation. Once you install the MAX TNT or DSLTNT units, you must notify the carrier before disconnecting the MAX TNT or DSLTNT from the WAN. If you disconnect or turn off the unit without prior notification, the carrier might temporarily discontinue your T1/PRI service.

MAX TNT or DSLTNT internal CSUs are compatible with wet-loop and dry-loop T1/PRI lines and with span-powered or wet-loop powered T1/PRI lines.

Port without internal CSU

A T1/PRI port of the MAX TNT or DSLTNT that does not have an internal CSU cannot connect directly to the WAN. You must connect the port to other equipment that provides the interface to the WAN (for example, an external CSU). Your carrier determines the correct value for the line buildout setting of the CSU. You configure this parameter during installation. (For more information, see the *APX 8000/MAX TNT/DSLTNT Reference*.)

Table B-2 lists CSU specifications.

Table B-2. CSU specifications

Information	Value
CSU registration	2CZUSA-74421-DE-N
Critical circuitry power source	Dry loop from local AC power source
Line capture frequency	1.544Mbps +/- 200bps
Line code	AMI or B8ZS

Table B-2. CSU specifications (continued)

Information	Value
Line framing	D4 or ESF
Line input/output impedance	100 ohms +/- 5%
Received signal level range	DSX-1 level to -36dB
Transmitted signal level	DSX-1 level into 100 ohms
Line buildout	0.0, -7.5, -15.0, or -22.5dB
Pulse density and consecutive zeros enforcement	In accordance with requirements of AT&T Pub 62411
Line loopback (LLB) set inband code	(10000) repeating binary pattern
Line loopback (LLB) reset inband code	(100) repeating binary pattern

T1/PRI cable specifications

The maximum cable distance between the T1/PRI WAN interface equipment and a MAX TNT or DSLTNT without CSUs should not exceed 655 feet (200m). Measure the line length and record it when you install the MAX TNT or DSLTNT. You must specify this length when you configure the parameters in the line's profile. (For more information, see the *APX 8000/MAX TNT/DSLTNT Reference*.)

Use only cables specifically constructed for transmission of T1/PRI signals. The cables must meet standard T1 attenuation and transmission requirements. The following specifications are recommended:

- 100 ohm
- Two twisted pairs, Category 3 or better

The WAN interface cables and plugs described in the following sections are available for the MAX TNT and DSLTNT WAN interfaces.

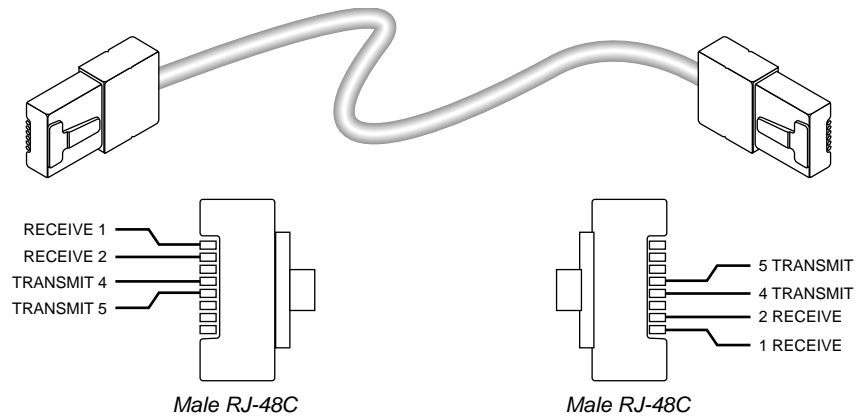
T1/PRI crossover cable: RJ-48C/RJ-48C

Install the RJ-48C/RJ-48C cable when the WAN transmits on pins 5 and 4 and receives on pins 2 and 1. Table B-3 and Figure B-1 show the pinouts.

Table B-3. RJ-48C/RJ-48C crossover cable specifications

Pair #	Signal	Male RJ-48C	Male RJ-48C
1	Receive	2 1	5 4
2	Transmit	5 4	2 1

Figure B-1. RJ-48C/RJ-48C crossover cable



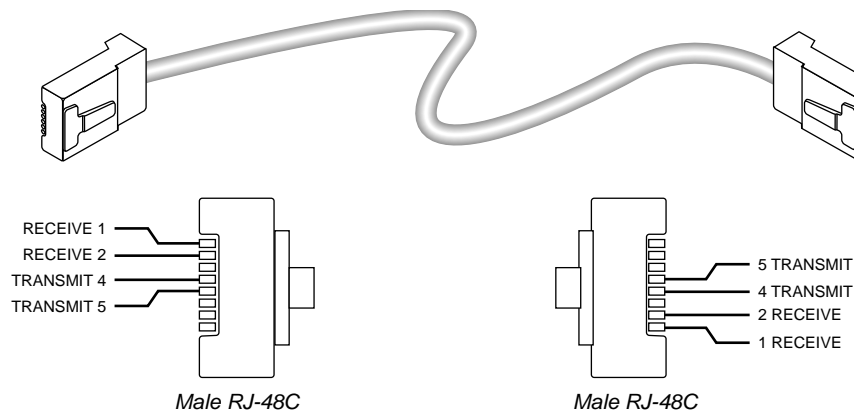
T1/PRI straight-through cable: RJ-48C/RJ-48C

Before installing the RJ-48C/RJ-48C straight-through cable, verify that the WAN transmits on pins 5 and 4 and receives on pins 2 and 1. Table B-4 and Figure B-2 show the pinouts.

Table B-4. RJ-48C/RJ-48C straight-through cable specifications

Pair #	Signal	Male RJ-48C	Male RJ-48C
1	Receive	1 2	1 2
2	Transmit	5 4	5 4

Figure B-2. RJ-48C/RJ-48C straight-through cable



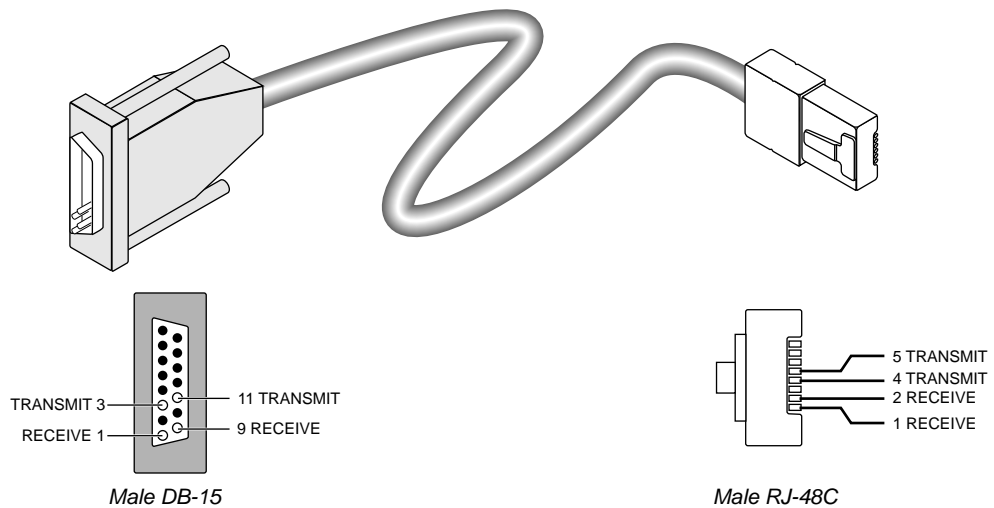
T1/PRI straight-through cable: RJ-48C/DB-15

Before installing the RJ-48C/DB-15 straight-through cable, verify that the WAN transmits on pins 3 and 11 and receives on pins 1 and 9. Table B-5 and Figure B-3 shows the pinouts.

Table B-5. RJ-48C/DB-15 straight-through cable specifications

Pair #	Signal	Male RJ-48C	Male DB-15
1	Receive	1 2	3 11
2	Transmit	5 4	1 9

Figure B-3. RJ-48C/DB-15 straight-through cable



Cabling and Connector Specifications

T1/PRI interface specifications

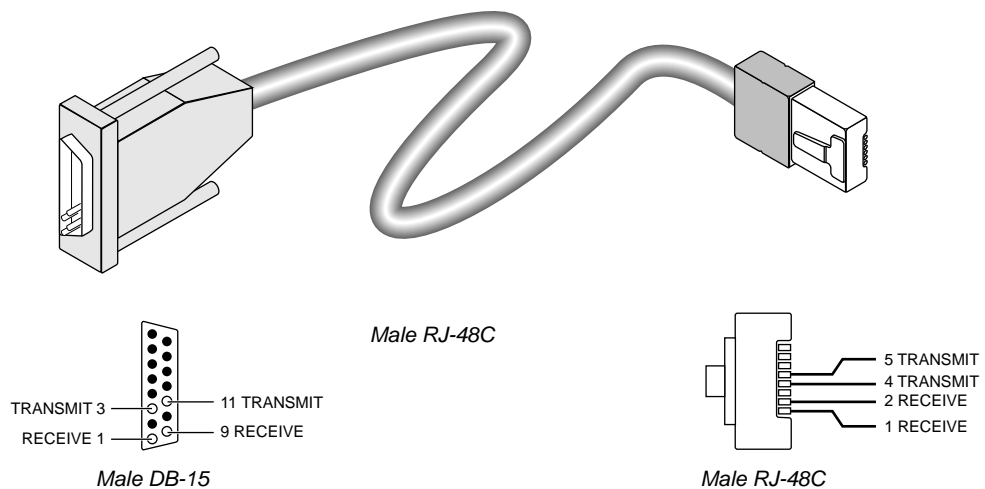
T1/PRI crossover cable: RJ-48C/DB-15

Before installing the RJ-48C/DB-15 cable, verify that the WAN transmits on pins 1 and 9 and receives on pins 3 and 11. Table B-6 and Figure B-4 show the pinouts.

Table B-6. RJ-48C/DB-15 crossover cable specifications

Pair #	Signal	Male RJ-48C	Male DB-15P
1	Receive	1 2	1 9
2	Transmit	5 4	3 11

Figure B-4. RJ-48C/DB-15 crossover cable



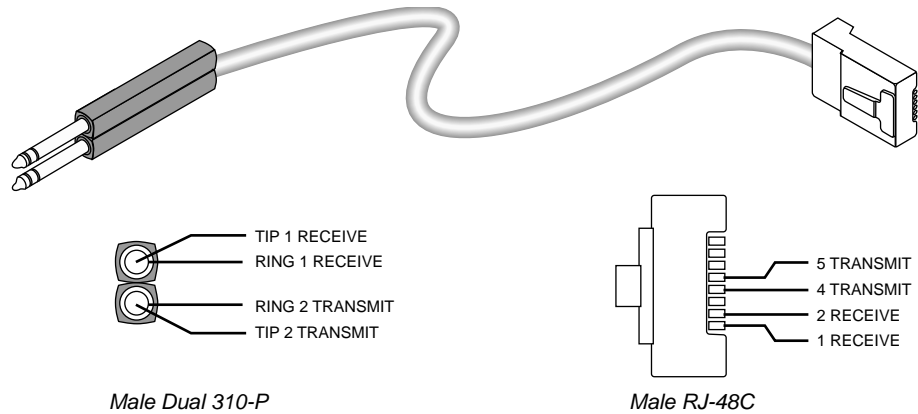
T1/PRI straight-through cable: RJ-48C/Bantam

The WAN side of the RJ-48C/Bantam straight-through cable connects to dual bantam jacks. Table B-7 and Figure B-5 show the pinouts.

Table B-7. RJ-48C/Bantam straight-through cable specifications

Pair #	Signal	Male RJ-48	Male Dual 310-P
1	Receive	1 2	Tip 1 Ring 1
2	Transmit	5 4	Tip 2 Ring 2

Figure B-5. RJ-48C/Bantam straight-through cable



T1 RJ-48C-Loopback plug

The RJ-48C-Loopback plug loops the transmit signal back to the MAX TNT or DSLTNT. Table B-8 shows the pinouts.

Table B-8. RJ-48C-Loopback plug specifications

Pair #	Signal	Male RJ-48C
1	Receive	1 (connects to 5) 2 (connects to 4)
2	Transmit	5 (connects to 1) 4 (connects to 2)

T1/PRI WAN connectors

Table B-9 lists the pins on the T1/PRI WAN port used for Transmit and Receive. The remaining pins are not connected.

Table B-9. Transmit and Receive pins

MAX TNT or DSLTNT T1/PRI interface	RJ-48C DTE
Receive (input) pair, Tip (T1) Receive (input) pair, Ring (R1)	Position 2 Position 1
Transmit (output) pair, Tip (T) Transmit (output) pair, Ring (R)	Position 5 Position 4

WAN switched services available to the MAX TNT or DSLTNT

The MAX TNT or DSLTNT is compatible with both AT&T and Northern Telecom central office switches, and can access all T1/PRI switched digital services offered by AT&T's ACCUNET Switched Digital Services:

- MCI 56Kbps and 64Kbps services
- Sprint Switched 56Kbps and 64Kbps services
- MultiRate and GloBanD (and GVPN in CCITT countries) PRI network services

Note: The MAX TNT or DSLTNT can only access Switched-56Kbps services on a T1 access line or a Switched-56 line.

For a listing of the compatible switch types, see the Switch Type parameter in the *APX 8000/MAX TNT/DSLNT Reference*. In addition to connecting to switched circuits, the MAX TNT or DSLTNT can connect to nailed-up circuits and to aggregate nailed-up and switched circuits.

E1/PRI interface specifications

This section provides the specifications for the MAX TNT or DSLTNT E1/PRI interface and cable requirements.

E1/PRI cable specifications

The WAN interface cables and plugs described in this section are available for the unit's WAN interfaces. Use only the cable specifically constructed for transmission.

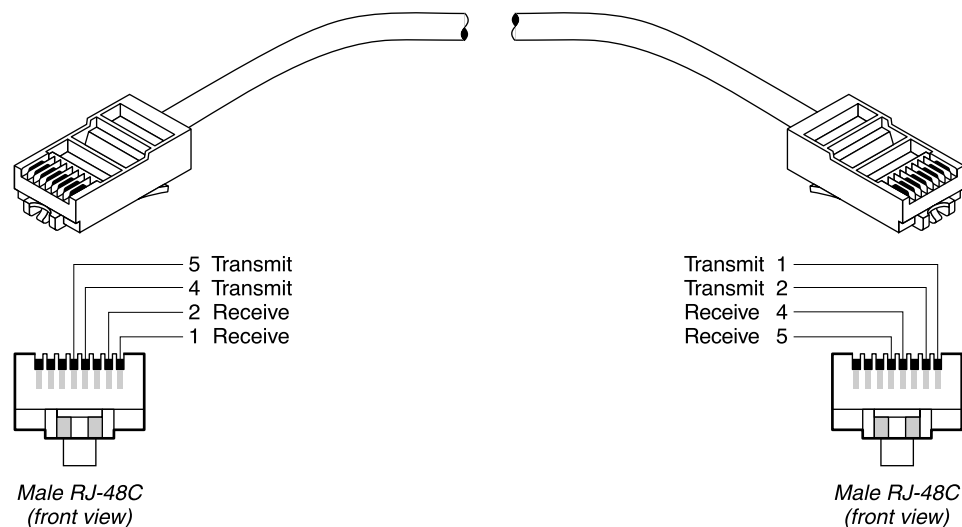
E1/PRI crossover cable: RJ-48C/RJ-48C

Install the RJ-48C/RJ-48C crossover cable when the WAN interface transmits on pins 5 and 4 and receives on pins 2 and 1. Table B-10 and Figure B-6 show the pinouts.

Table B-10. RJ-48C/RJ-48C crossover cable

Model number RJ-48C-X Part number 2510-0059/0323-001			
Pair #	Signal	Male RJ-48C	Male RJ-48C (remote)
1	Receive	2	5
		1	4
2	Transmit	5	2
		4	1

Figure B-6. RJ-48C/RJ-48C crossover cable



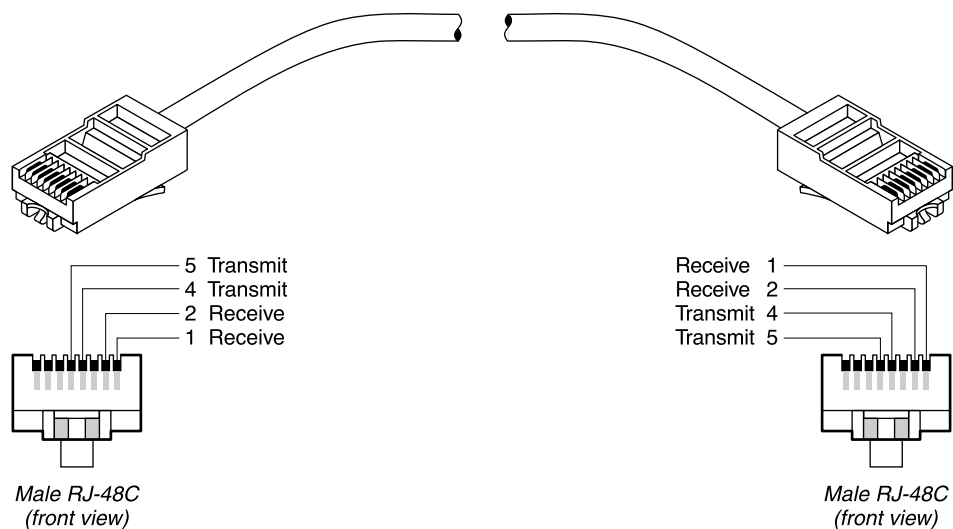
E1/PRI straight-through cable: RJ-48C/RJ-48C

Before installing the RJ-48C/RJ-48C straight-through cable, verify that the WAN interface transmits on pins 2 and 1 and receives on pins 5 and 4. Table B-11 and Figure B-7 show the pinouts.

Table B-11. RJ-48C/RJ-48C straight-through cable specifications

Model number RJ-48C-S Part number 2510-0064-001			
Pair #	Signal (MAX TNT or DSL TNT)	Male RJ-48C (MAX TNT or DSL TNT)	Male RJ-48C (remote)
1	Receive	1 2	1 2
2	Transmit	5 4	5 4

Figure B-7. RJ-48C/RJ-48C straight-through cable



E1/PRI straight-through cable: RJ-48C/DA-15

Before installing the RJ-48C/DA-15 straight-through cable, verify that the WAN interface transmits on pins 3 and 11 and receives on pins 1 and 9. Figure B-8 and Table B-12 show the pinouts.

Figure B-8. RJ-48C/DA-15 straight-through cable

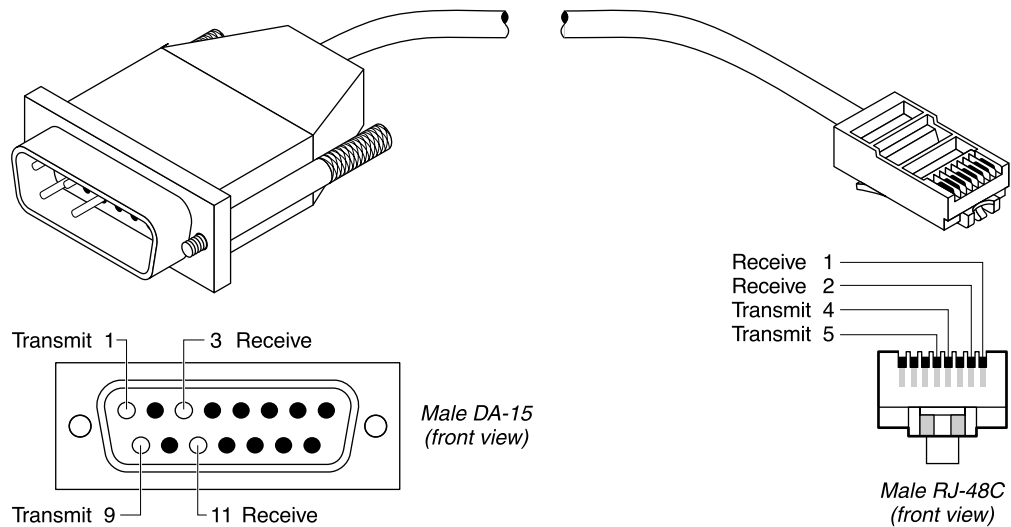


Table B-12. RJ-48C/DA-15 straight-through cable specifications

Model number DA15-X Part number 2510-0082-001			
Pair #	Signal	Male RJ-48C	Male DA-15 (remote)
1	Receive	1 2	3 11
2	Transmit	5 4	1 9

E1/PRI crossover cable: RJ-48C/DA

Before installing the RJ-48C/DA cable, verify that the WAN interface transmits on pins 1 and 9 and receives on pins 3 and 11. Figure B-9 and Table B-13 show the pinouts.

Figure B-9. RJ-48C/DA crossover cable

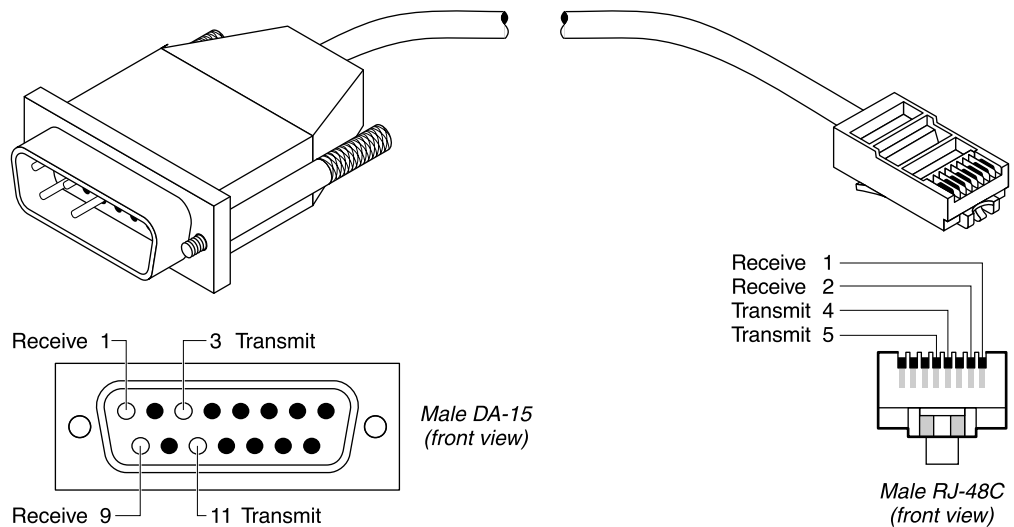


Table B-13. RJ-48C/DA crossover cable specifications

Model number DA15-S Part number 2510-0065-001			
Pair #	Signal	Male RJ-48C	Male DA-15P (remote)
1	Receive	1	1
		2	9
2	Transmit	5	3
		4	11

E1/PRI straight-through cable: RJ-48C/Bantam

The WAN side of the RJ-48C/Bantam straight-through cable connects to dual bantam jacks. Figure B-10 and Table B-14 show the pinouts.

Figure B-10. RJ-48C/Bantam straight-through cable

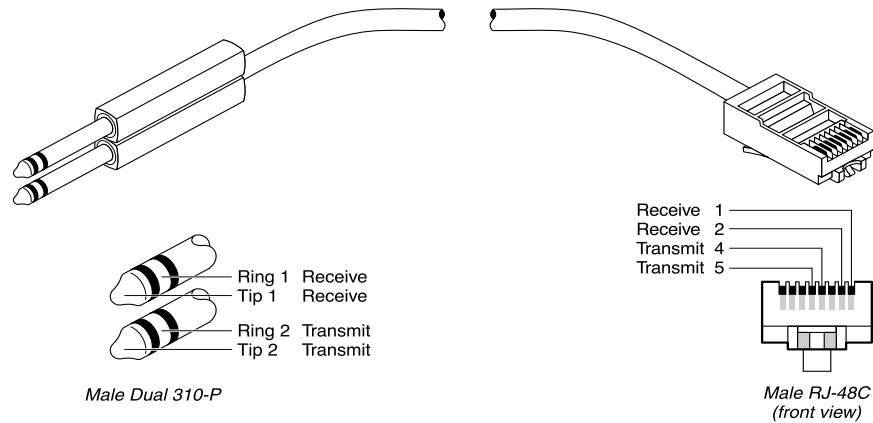


Table B-14. RJ-48C/Bantam straight-through cable specifications

Model number DBNT-RJ-48C Part number 2510-0066-001			
Pair #	Signal	Male RJ-48	Male Dual-310-P (remote)
1	Receive	1	Tip 1
		2	Ring 1
2	Transmit	5	Tip 2
		4	Ring 2

E1/PRI WAN ports

Table B-15 lists the pins on RJ-48C sockets used for E1/PRI WAN interface on the MAX TNT or DSLTNT. Only pins 1, 2, 4, and 5 are used. The remaining pins are not connected.

Table B-15. Transmit and Receive pins

MAX TNT or DSLTNT E1/PRI interface	RJ-48C DTE
Receive (input) pair, Tip (T1)	Position 2
Receive (input) pair, Ring (R1)	Position 1
Transmit (output) pair, Tip (T)	Position 5
Transmit (output) pair, Ring (R)	Position 4

Note: E1/PRI models are also equipped with BNC connectors.

Serial WAN (SWAN) cable specifications

The MAX TNT or DSLTNT unit's serial WAN (SWAN) interface supports nailed-up connections to the WAN. Data packets from the MAX TNT or DSLTNT bridge or router module can use this interface, but bit streams from devices connected to the unit's serial host ports cannot.

The MAX TNT or DSLTNT serial WAN port is compatible with the following two electrical standards:

- V.35
- RS-449/422

In the cable wiring tables that follow, the MAX TNT or DSLTNT unit is the Data Terminal Equipment (DTE) that connects to a Data Circuit-Terminating Equipment (DCE) device through its serial WAN port. The unit receives the Send Timing and Receive Timing clocks from the DCE device.

V.35 cable to WAN

You can connect a V.35 cable (TNT-CAB-v35) to the V.35 port of a DCE device. The V.35 cable has the pinouts described in Table B-16.

Table B-16. V.35 cable pinouts

Pair #	Signal	MAX TNT or DSLTNT male DB-44	Host male V.35
1	FGND RI	1 8	A J
2	SD+ SD-	39 40	P S
3	RD+ RD-	30 29	R T
4	ST+ ST-	41 42	Y AA
5	RT+ RT-	32 31	V X
6	TT+ TT-	38 37	U W
7	DTR DSR	6 11	H E
8	DCD SGND	9 25	F B
9	CTS RTS	7 36	D C

RS-449 cable to WAN

You can connect an RS-449 cable (TNT-CAB-449) to the RS-449 port of a DCE device. The RS-449 cable has the pinouts described in Table B-17.

Table B-17. RS-449 cable pinouts

Pair #	Signal	MAX TNT or DSLTNT male DB-44	Host female DB-37
1	FGND RI	1 8	1 15
2	SD+ SD-	39 40	4 22
3	RD+ RD-	30 29	6 24
4	ST+ ST-	41 42	5 23
5	RT+ RT-	32 31	8 26
9	TT+ TT-	38 37	17 35
8	DTR DSR	6 11	12 11
6	DCD SGND	9 25	13 19, 20, 37*
7	CTS RTS	7 36	9 7

* Pin positions separated by commas are jumped to each other.

Serial WAN cable

Figure B-11 and Table B-18 show the pinouts for the V.35 serial WAN (SWAN) cable.

Figure B-11. Serial WAN cable

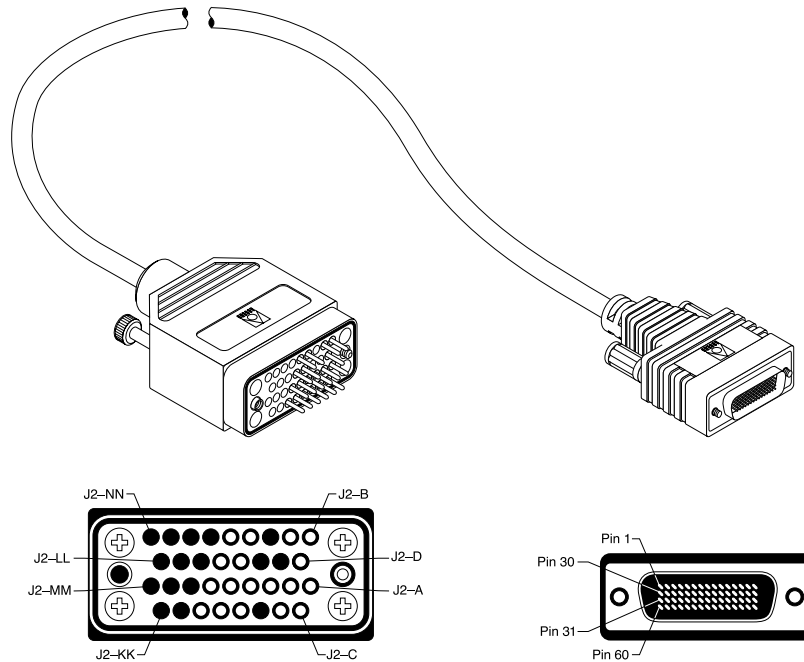


Table B-18. Serial WAN cable pinouts

J1 Pin	J2 Pin
46	A
42	D
43	E
35	C
34	H
33	F
16	B
44	K
16	B

Table B-18. Serial WAN cable pinouts (continued)

J1 Pin	J2 Pin
18	T
17	R
28	S
27	P
20	X
19	V
26	W
25	U
24	Y
23	AA

IDSL cable specifications

Figure B-12 and Table B-19 show the pinouts for the dual 50-pin telco-to-triple DB-37 IDSL cable.

Figure B-12. HDSL dual 50-pin telco-to-triple-DB37 cable

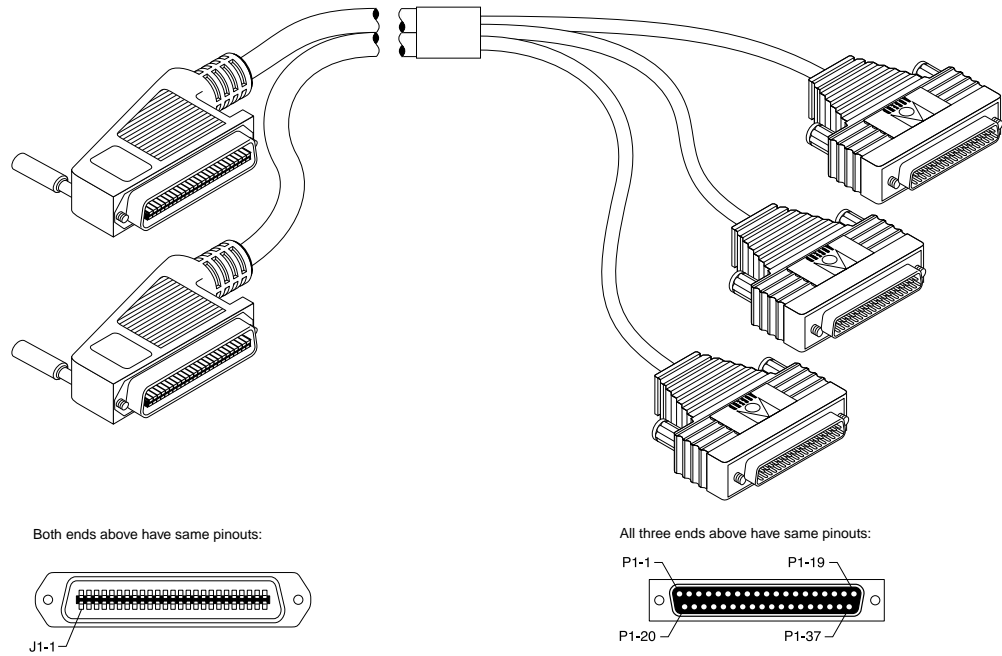


Table B-19. IDSL cable pinouts

Pair	P1 Pin	P2 Pin	P3 Pin	J1 Pin	J2 Pin	Signal
1	36			1		Tip1
1	37			26		Ring 1
2	18			2		Tip 2
2	19			27		Ring 2
3	16			3		Tip 3
3	17			28		Ring 3
4	14			4		Tip 4
4	15			29		Ring 4

Table B-19. IDSL cable pinouts (continued)

Pair	P1 Pin	P2 Pin	P3 Pin	J1 Pin	J2 Pin	Signal
5	12			5		Tip 5
5	13			30		Ring 5
6	10			6		Tip 6
6	11			31		Ring 6
7	8			7		Tip 7
7	9			32		Ring 7
8	6			8		Tip 8
8	7			33		Ring 8
9	4			9		Tip 9
9	5			34		Ring 9
10	2			10		Tip 10
10	3			35		Ring 10
11	1			11		Tip 11
11	20			36		Ring 11
12	21			12		Tip 12
12	22			37		Ring 12
13	23			13		Tip 13
13	24			38		Ring 13
14	25			14		Tip 14
14	26			39		Ring 14
15	32			15		Tip 15
15	33			40		Ring 15
16	34			16		Tip 16
16	35			41		Ring 16
17		36		17		Tip 17
17		37		42		Ring 17

Table B-19. IDSL cable pinouts (continued)

Pair	P1 Pin	P2 Pin	P3 Pin	J1 Pin	J2 Pin	Signal
18		18		18		Tip 18
18		19		43		Ring 18
19		16		19		Tip19
19		17		44		Ring 19
20		14		20		Tip 20
20		15		45		Ring 20
21		12		21		Tip 21
21		13		46		Ring 21
22		10		22		Tip 22
22		11		47		Ring 22
23		8		23		Tip 23
23		9		48		Ring 23
24		6		24		Tip 24
24		7		49		Tip 24
1		4			1	Tip1
1		5			26	Ring 1
2		2			2	Tip 2
2		3			27	Ring 2
3		1			3	Tip 3
3		20			28	Ring 3
4		21			4	Tip 4
4		22			29	Ring 4
5		23			5	Tip 5
5		24			30	Ring 5
6		25			6	Tip 6
6		26			31	Ring 6

Table B-19. IDSL cable pinouts (continued)

Pair	P1 Pin	P2 Pin	P3 Pin	J1 Pin	J2 Pin	Signal
7		32			7	Tip 7
7		33			32	Ring 7
8		34			8	Tip 8
8		35			33	Ring 8
9			36		9	Tip 9
9			37		34	Ring 9
10			18		10	Tip 10
10			19		35	Ring 10
11			16		11	Tip 11
11			17		36	Ring 11
12			14		12	Tip 12
12			15		37	Ring 12
13			12		13	Tip 13
13			13		38	Ring 13
14			10		14	Tip 14
14			11		39	Ring 14
15			8		15	Tip 15
15			9		40	Ring 15
16			6		16	Tip 16
16			7		41	Ring 16
17			4		17	Tip 17
17			5		42	Ring 17
18			2		18	Tip 18
18			3		43	Ring 18
19			1		19	Tip 19
19			20		44	Ring 19

Table B-19. IDSL cable pinouts (continued)

Pair	P1 Pin	P2 Pin	P3 Pin	J1 Pin	J2 Pin	Signal
20			21		20	Tip 20
20			22		45	Ring 20
21			23		21	Tip 21
21			24		46	Ring 21
22			25		22	Tip 22
22			26		47	Ring 22
23			32		23	Tip 23
23			33		48	Ring 23
24			34		24	Tip 24
24			35		49	Tip 24

ADSL cable specifications

Figure B-13 and Table B-20 show the pinouts for the 50-pin telco-to-quadruple DB-37 ADSL cable.

Figure B-13. ADSL 50-pin telco-to-quadruple DB-37 cable

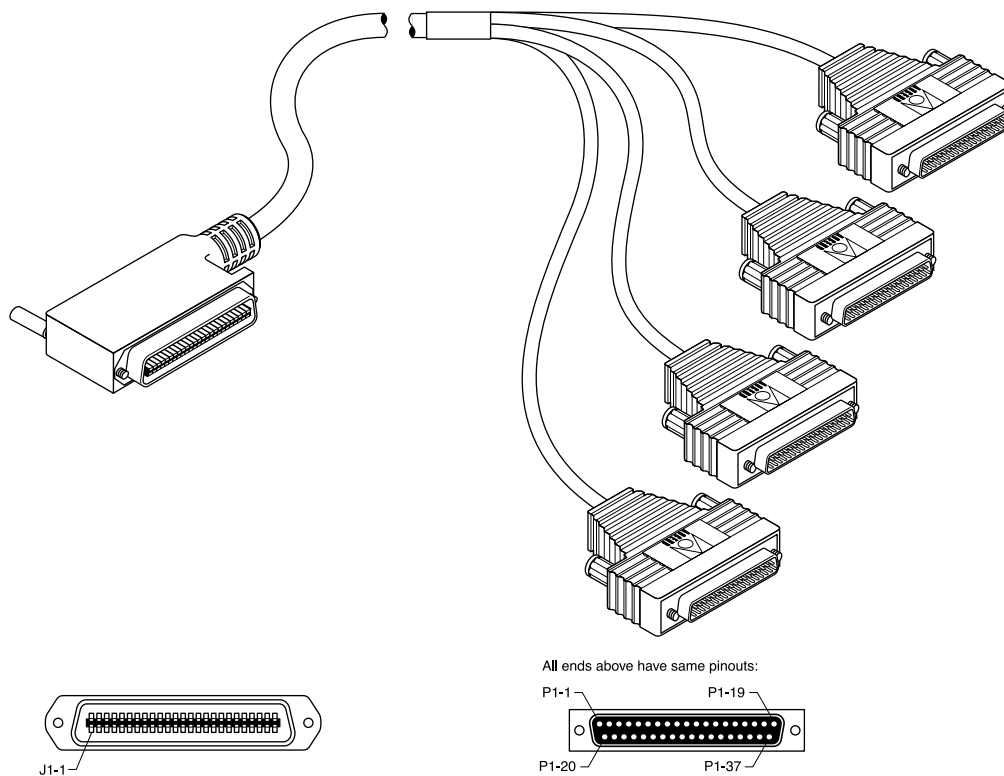


Table B-20. ADSL cable pinouts

Pair	P1 Pin	P2 Pin	P3 Pin	P4 Pin	J1 Pin	Signal
1	36				1	Tip 1
1	37				26	Ring 1
2	18				2	Tip 2
2	19				27	Ring 2
3	16				3	Tip 3
3	17				28	Ring 3
4	14				4	Tip 4
4	15				29	Ring 4

Table B-20. ADSL cable pinouts (continued)

Pair	P1 Pin	P2 Pin	P3 Pin	P4 Pin	J1 Pin	Signal
5	12				5	Tip 5
5	13				30	Ring 5
6	10				6	Tip 6
6	11				31	Ring 6
7		36			7	Tip 7
7		37			32	Ring 7
8		18			8	Tip 8
8		19			33	Ring 8
9		16			9	Tip 9
9		17			34	Ring 9
10		14			10	Tip 10
10		15			35	Ring 10
11		12			11	Tip 11
11		13			36	Ring 11
12		10			12	Tip 12
12		11			37	Ring 12
13			36		13	Tip 13
13			37		38	Ring 13
14			18		14	Tip 14
14			19		39	Ring 14
15			16		15	Tip 15
15			17		40	Ring 15
16			14		16	Tip 16
16			15		41	Ring 16
17			12		17	Tip 17
17			13		42	Ring 17

Table B-20. ADSL cable pinouts (continued)

Pair	P1 Pin	P2 Pin	P3 Pin	P4 Pin	J1 Pin	Signal
18			10		18	Tip 18
18			11		43	Ring 18
19				39	19	Tip19
19				37	44	Ring 19
20				18	20	Tip 20
20				19	45	Ring 20
21				16	21	Tip 21
21				17	46	Ring 21
22				14	22	Tip 22
22				15	47	Ring 22
23				12	23	Tip 23
23				13	48	Ring 23
24				10	24	Tip 24
24				11	49	Tip 24

SDSL cable specifications

Figure B-14 and Table B-21 show the pinouts for the 50-pin telco-to-dual-DB-37 SDSL cable.

Figure B-14.SDSL 50-pin telco-to-dual-DB-37 cable

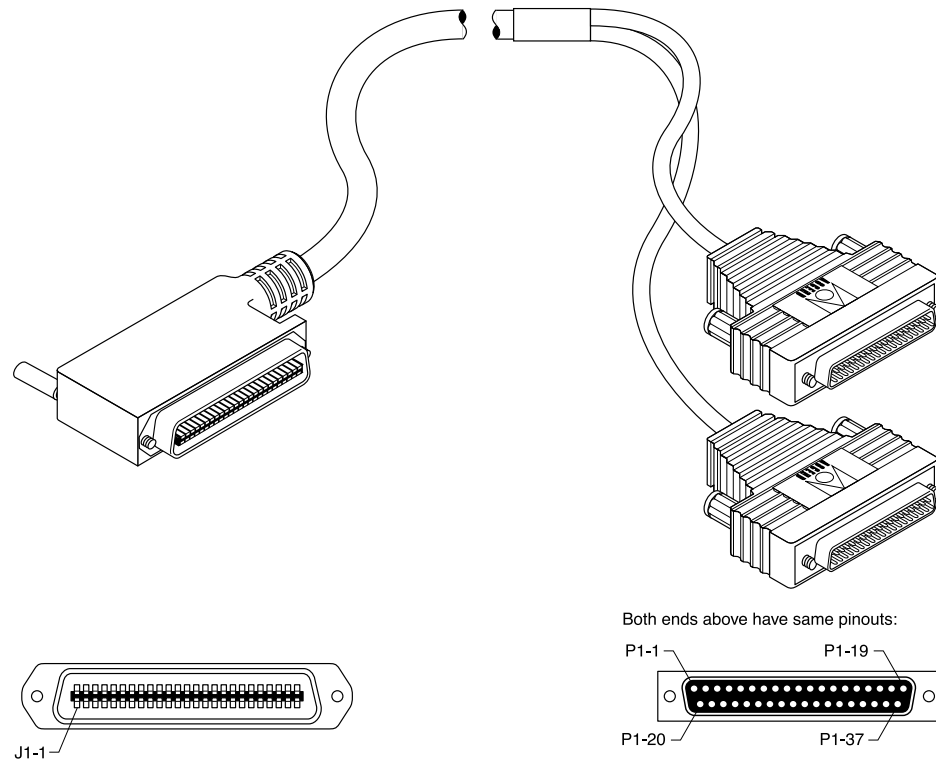


Table B-21. SDSL cable pinouts

Pair	P1 Pin	P2 Pin	J1 Pin	Signal
1	36		1	Tip1
1	37		26	Ring 1
2	18		2	Tip 2
2	19		27	Ring 2
3	16		3	Tip 3
3	17		28	Ring 3
4	14		4	Tip 4

Table B-21. SDSL cable pinouts (continued)

Pair	P1 Pin	P2 Pin	J1 Pin	Signal
4	15		29	Ring 4
5	12		5	Tip 5
5	13		30	Ring 5
6	10		6	Tip 6
6	11		31	Ring 6
7	8		7	Tip 7
7	9		32	Ring 7
8	6		8	Tip 8
8	7		33	Ring 8
9	4		9	Tip 9
9	5		34	Ring 9
10	2		10	Tip 10
10	3		35	Ring 10
11	1		11	Tip 11
11	20		36	Ring 11
12	21		12	Tip 12
12	22		37	Ring 12
13		36	13	Tip 13
13		37	38	Ring 13
14		18	14	Tip 14
14		19	39	Ring 14
15		16	15	Tip 15
15		17	40	Ring 15
16		14	16	Tip 16
16		15	41	Ring 16
17		12	17	Tip 17

Table B-21. SDSL cable pinouts (continued)

Pair	P1 Pin	P2 Pin	J1 Pin	Signal
17		13	42	Ring 17
18		10	18	Tip 18
18		11	43	Ring 18
19		8	19	Tip19
19		9	44	Ring 19
20		6	20	Tip 20
20		7	45	Ring 20
21		4	21	Tip 21
21		5	46	Ring 21
22		2	22	Tip 22
22		3	47	Ring 22
23		1	23	Tip 23
23		20	48	Ring 23
24		21	24	Tip 24
24		22	49	Tip 24

The high-performance SDSL data card uses a universal service order code (USOC) RJ-21X 50-pin telco connector. Cable pinouts are shown in Table B-22.

Table B-22. Cable pinouts for the 50-pin telco connector

	Signal	Pin	Signal
1	1R (channel 1 ring)	26	1T (channel 1 tip)
2	2R	27	2T
3	3R	28	3T
4	4R	29	4T
5	5R	30	5T
6	6R	31	6T
7	7R	32	7T

Table B-22. Cable pinouts for the 50-pin telco connector (continued)

	Signal	Pin	Signal
8	8R	33	8T
9	9R	34	9T
10	10R	35	10T
11	11R	36	11T
12	12R	37	12T
13	13R	38	13T
14	14R	39	14T
15	15R	40	15T
16	16R	41	16T
17	17R	42	17T
18	18R	43	18T
19	19R	44	19T
20	20R	45	20T
21	21R	46	21T
22	22R	47	22T
23	23R	48	23T
24	24R	49	24T
25	-48v (return)	50	-48v

Pins 25 and 50 are used only to provide sealing current. To run sealing current, a 48V battery is connected between pins 25 and 50.

Safety-Related Electrical, Physical, and Environmental Information

C

Electronic and electrical specifications C-1

Physical specifications C-3

Environmental specifications C-4

See the *Access Networks Safety and Compliance Guide* for safety instructions and country-specific information.



Warning: Before installing the MAX TNT or DSLTNT, be sure to read the safety instructions in the *Access Networks Safety and Compliance Guide*.

Electronic and electrical specifications

Battery

The MAX TNT or DSLTNT shelf controller contains an internal 3V lithium battery. The normal operating life of this battery exceeds five years.

Make sure that only trained engineers authorized by Lucent open the MAX TNT or DSLTNT shelf controller for testing, maintenance, installation, or any other purpose. Furthermore, ensure that only trained should replace MAX TNT or DSLTNT components.



Warning: The battery can explode if incorrectly replaced. Replace the battery only with one of the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer’s instructions.

Power requirements

Table C-1 lists the MAX TNT or DSLTNT source-power requirements.

Table C-1. MAX TNT or DSLTNT source-power requirements

Element	Value
Voltage	90–240Vac; -40 to -60Vdc
Phase	Single
Frequency	47–63Hz
Power	200W (nominal)–1200W (maximum)
AC Fuse (5 x 20 mm)	16A
DC Fuse (0.25 x 1.25 inches)	25A
Maximum AC current	16A at 115 Vac. At power up, for approximately 0.1 seconds, the MAX TNT or DSLTNT power supply has an in-rush current of approximately 260A at 240Vac or 130A at 115Vac.
Maximum DC current	25A

The maximum allowable delay between a power cutoff and supplying power from a second source is 20msec (0.020 seconds).

Because the MAX TNT and DSLTNT configuration profiles are stored in NVRAM, they are not lost when the unit is turned off.

Note: Use a protected ac power source, or add surge protection between the power source and the unit.

Ground wire size

Table C-2 lists the ground wire specifications for the MAX TNT or DSLTNT.

Table C-2. Ground wire size

Product	AWG Size	Cross-sectional area (mm ²)
MAX TNT (ac)	12.0	2.5
MAX TNT (dc)	10.0	4.0
DSLTNT (ac)	12	2.5
DSLTNT (dc)	10	4.0

Electromagnetic interference (EMI) class

The MAX TNT and DSLTNT belong to EMI Class A.

Alarm-relay operating specifications

The MAX TNT or DSLTNT unit is equipped with an alarm relay whose contacts are brought out onto the back panel's alarm-relay terminal block. The alarm-relay contacts close during loss of power, during hardware failure, or whenever the unit is being reset, such as during its power-on self test (POST). During normal operation, the alarm-relay contacts remain open.

The gauge of the wire you use to connect to the unit's alarm relay must be based on the current flow of the circuit that the relay is attached to and the capacity of the alarm relay. Because the MAX TNT or DSLTNT alarm relay can carry a maximum of 2A, 18–20 AWG wire is adequate.

The alarm relay has the following characteristics:

- 1A at 30 Vdc
- 0.3A at 110 Vdc
- 0.3A at 125 Vac

Physical specifications

The MAX TNT or DSLTNT base system (empty with no power supplies) weighs 27.2 pounds (12.34kg). A fully loaded system with 672 modems (single power supply) weighs 130 pounds (58.97kg). The unit has the following dimensions: 14 inches x 17.4 inches x 11.5 inches (35.6cm x 44.2cm x 29.2cm).

Environmental specifications

For best results, house the MAX TNT or DSLTNT in a room with constant temperature and humidity. In general, cooler environments are better. Humidity must be high enough to prevent accumulation of static electricity, but low enough to prevent condensation.

An operating temperature of 32° to 104° Fahrenheit (0° to 40° Celsius) is recommended. Storage temperatures of -40° to 176° Fahrenheit (-40° to 24° Celsius) are acceptable.

An operating relative humidity of up to 90% is acceptable.

You can operate the unit at altitudes of 0 to 14800 feet (0-4500m).

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