

Lucent Technologies
Bell Labs Innovations



DSL Terminator

Hardware Installation Guide

Part Number: 7820-0771-002
For software version 8.0
April 2000

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About This Guide

How to use this guide

This guide explains how to install and test the DSL Terminator hardware. It also explains how to navigate the user interface. When you finish with the instructions in this guide, you will be ready to configure the DSL Terminator.

Following is a chapter-by-chapter description of the topics in this guide:

- “Chapter 1, “Introduction to the DSL Terminator,” describes the main features of the DSL Terminator and provides a list of package contents.
- “Chapter 2, “Installing the DSL Terminator,” explains how to install and test the DSL Terminator hardware.
- Chapter 3, “Navigating and Securing the Interface,” tells you how to navigate the DSL Terminator user interfaces.
- Appendix A, “Provisioning the Switch,” gives you information that your T1 or E1 service provider needs to properly provision the Central Office switch.
- Appendix B, “DSL Terminator Technical Specifications,” lists the technical specifications of the DSL Terminator.
- Appendix C, “Cables and Connectors,” lists the technical specifications for the DSL Terminator cables and the pin assignments for each interface.
- Appendix D, “FCC and Canadian Notices,” shows the FCC and Canadian Notices and Warnings.
- Appendix E, “Warranties,” provides the warranty terms.

The guide also includes an index.



What you should know

This guide is for the person who configures and maintains the DSL Terminator. To configure the DSL Terminator, you need to understand the following:

- 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 mono-space 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.

In a menu-item path, include a space before and after each ">" character.

DSL Terminator documentation set

The DSL Terminator documentation set consists of the following manuals:

- *DSL Terminator Administration Guide*
- *DSL Terminator Hardware Installation Guide*

- *DSL Terminator Network Configuration Guide*
- *DSL Terminator Reference Guide*
- *DSL Terminator RADIUS Configuration Guide*
- *TAOS Glossary*

Related publications

This guide and documentation set do not provide a detailed explanation of products, architectures, or standards developed by other companies or organizations. Following are some publications that you may find useful:

- *The Guide to T1 Networking*, William A. Flanagan
- *Data Link Protocols*, Uyles Black
- *The Basic Book of ISDN*, Motorola University Press
- *ISDN*, Gary C. Kessler
- *TCP/IP Illustrated*, W. Richard Stevens
- *Firewalls and Internet Security*, William R. Cheswick and Steven M. Bellovin

Introduction to the DSL Terminator

The DSL Terminator is a high-performance Layer-3 device that terminates sessions transported over T1 lines using ATM or Frame Relay. It gives service providers and carriers a cost-effective method of aggregating and terminating high numbers of virtual circuits. It also features integrated Layer-3 capabilities and subscriber management features that enable service providers to perform routing, authentication, billing and service selection capabilities.

The DSL Terminator occupies 1U of standard Telco rack space and is lightweight enough for desktop use. The unit is very easy to expand and customize, enabling it to grow with your network. A robust design featuring optional power supply redundancy ensures high service.

This chapter covers the following topics:

The DSL Terminator package	1-1
The base unit	1-1
Interfaces on the base unit	1-2
DSL Terminator slot cards	1-4

The DSL Terminator package

All DSL Terminator models ship with the same set of accessories. Slot cards might be preinstalled or packaged separately, depending on how you ordered them. The following might be included in your order, depending on how you specified your order.

- DSL Terminator unit
- Console Cable (null modem)
- Two adapters
- Power cable
- Rack-mounting kit
- Separately packaged slot cards, (if you ordered them separately)

If you are missing any items, contact your DSL Terminator distributor

The base unit

Open the shipping package and make sure you have received the base DSL Terminator unit that you ordered. Figure 1-1 shows an example ac DSL Terminator base unit.

Figure 1-1. DSL Terminator ac base unit

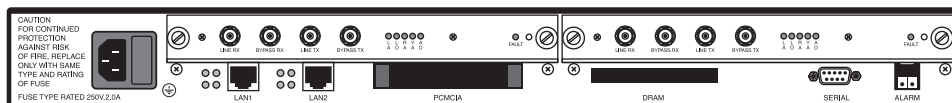
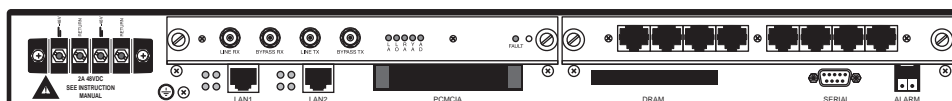


Figure 1-2 shows the dc DSL Terminator base unit.

Figure 1-2. DSL Terminator dc base unit



Both the single dc power supply DSL Terminator and the redundant dc power supply have two sets of terminal block inputs. On the single dc power supply model, only the terminal inputs on the left are active. On a redundant power supply, the inputs on the left are for the primary power supply, while inputs on the right are for the secondary power supply.

Interfaces on the base unit

Figure 1-1 shows the physical interfaces on the DSL Terminator base unit.

POWER

The DSL Terminator accepts ac or dc power, depending upon which unit you have specified.

CONTROL

The control port connects to a VT100 terminal or a modem to provide the menu-driven user interface to the DSL Terminator. The interface runs at 9600 bps (configurable through the user interface), 8 bits per character, no parity, no flow control, 1 stop bit. (For details about cables that connect to this port, see “Control port and cabling pinouts for the control monitor” on page C-1.)

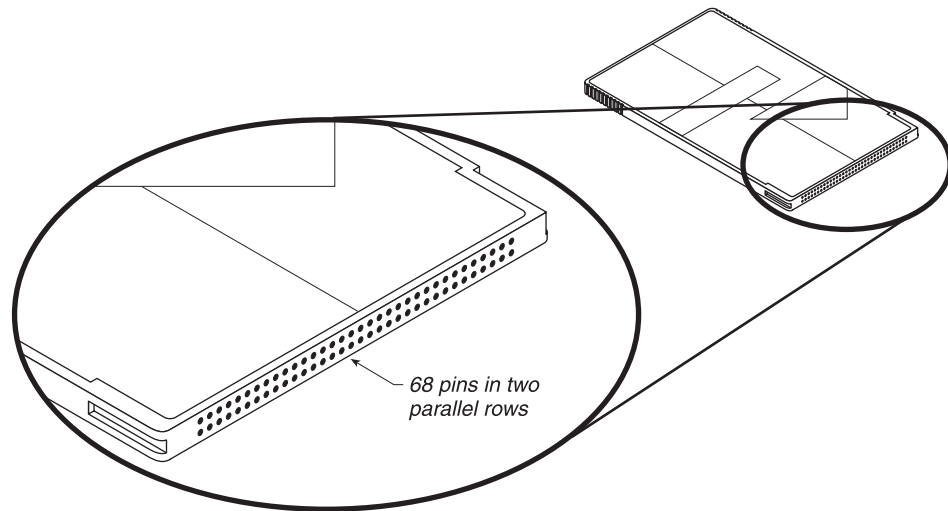
LAN UTP

The two LAN UTP ports connect the DSL Terminator to unshielded twisted pair 10/100 Base-T (UTP) LANs. (For details about cables that connect to these ports, see “Ethernet interface specifications” on page C-2.)

PCMCIA

The PCMCIA interface accepts a plug-in PCMCIA card. The PCMCIA flash card (Figure 1-3) is a standard card that extends existing flash memory.

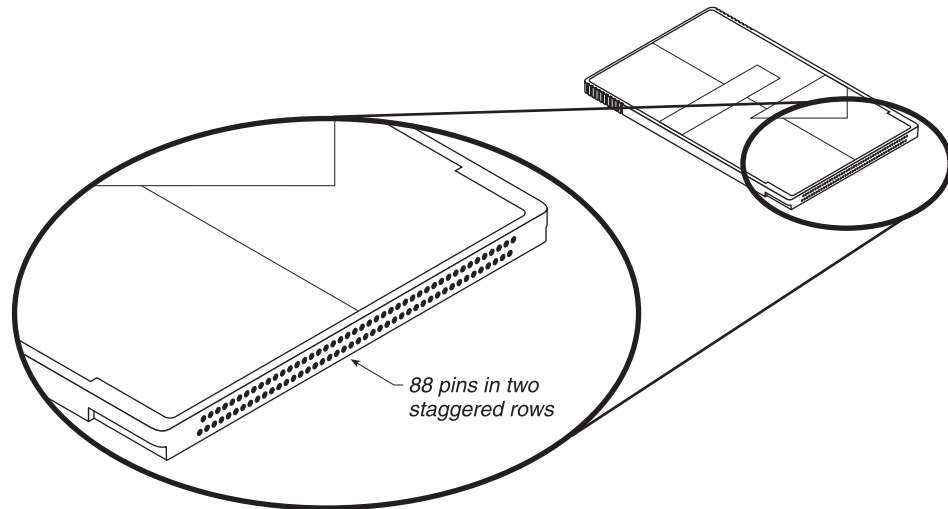
Figure 1-3. PCMCIA card



DRAM

The DRAM card is a proprietary Lucent card (Figure 1-4). It is *not* hot-swappable and should not be removed while the DSL Terminator is running. The DRAM card attaches directly to the CPU bus, and damage might occur if you attempt to remove while running.

Figure 1-4. DRAM card



ALARM

The Alarm interface is a two-connector terminal block that warns of alarm conditions. (For further information about the alarm relay, see Appendix B, "DSL Terminator Technical Specifications.")

DSL Terminator slot cards

The DSL Terminator accommodates two WAN slot cards, two PC cards, and one DRAM card. The figures in this section help you to identify your slot cards. For information about configuring the slot cards, see the *DSL Terminator Network Configuration Guide*.

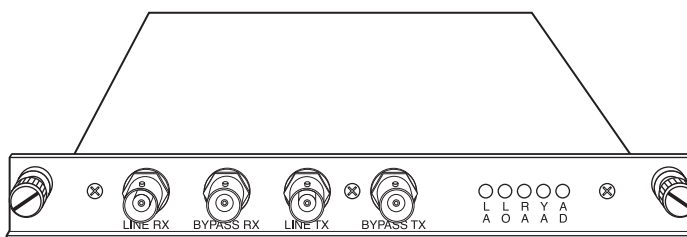
DS3-ATM card

The DSL Terminator DS3-ATM card (Figure 1-5) is a 44.736 Mbps communications circuit that can be used to route IP traffic over ATM.

The following list summarizes the capabilities of the DS3-ATM card:

- One unchannelized DS3 port with integrated CSU/DSU
- BNC coaxial physical interface
- Layer 2 PVC switching between ATM and Frame Relay networks
- Layer 3 routing between ATM networks
- Support for RFC 1483 (Multiprotocol Encapsulation over ATM Adaptation Layer 5)
- Support for RFC 2364 (PPP over ATM AAL5)
- ATM Forum UNI 3.1 support
- Operations, Administration, and Maintenance (OAM) F4/F5 support
- No interim link management interface (ILMI) support

Figure 1-5. DS3-ATM card



OC3-ATM card

The DSL Terminator OC3-ATM card (Figure 1-5) is a 155.52 Mbps or 51.84 Mbps communications circuit that can be used to route IP traffic over ATM.

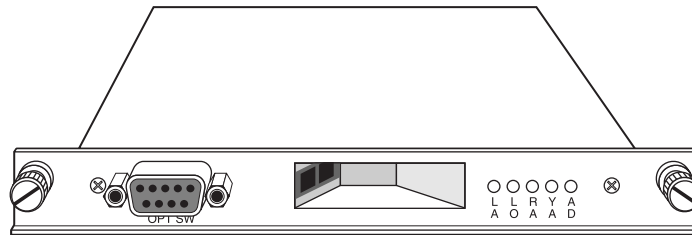
The following list summarizes the capabilities of the OC3-ATM card:

- One unchannelized OC3 port
- Fiber SC-1 interface or copper RJ-45 physical interface, single mode, are available for interfacing with either of these media.
- Layer 2 PVC switching between ATM and Frame Relay networks
- Support for RFC 1483 (Multiprotocol Encapsulation over ATM Adaptation Layer 5)
- Support for RFC 2364 (PPP over ATM AAL5)
- Protocol conversion between ATM (RFC 1483) and Frame Relay (RFC 2427) data

- ATM Forum UNI 3.1 support
- Frame Relay Forum FRF.8 PVC mapping between ATM and Frame Relay networks
- Operations, Administration, and Maintenance (OAM) F4/F5 support
- No interim link management interface (ILMI) support

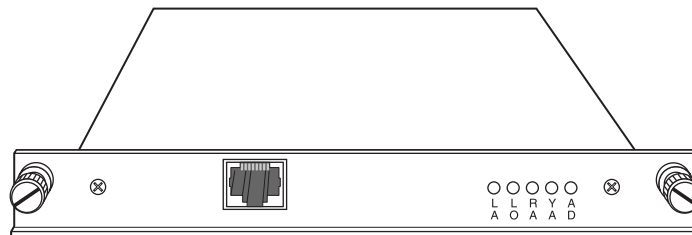
The OC3-ATM card with the fiber interface is illustrated in Figure 1-6.

Figure 1-6. OC3-ATM card with fiber interface



The OC3-ATM card with the copper interface is illustrated in Figure 1-7.

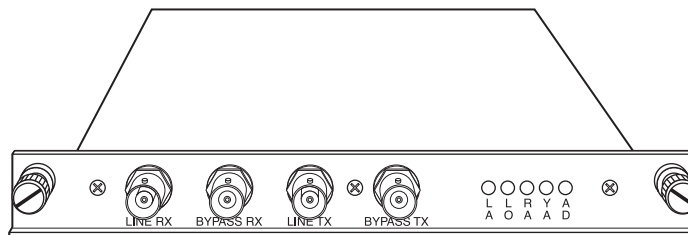
Figure 1-7. OC3-ATM card with copper interface



Unchannelized DS3 (UDS3) card

The DSL Terminator UDS3 card (Figure 1-8) is a 44.736 Mbps communications circuit that concentrates incoming traffic and directs it to a Frame Relay switch.

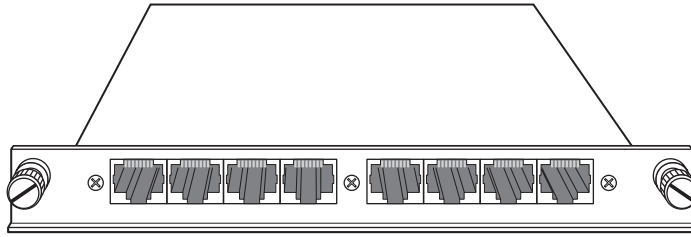
Figure 1-8. UDS3 card



T1 (or E1) card

The T1 (or E1) card provides eight unchannelized lines, which can be used for nailed connections such as to a Frame Relay network. In nailed connections the configuration is static, and the DSL Terminator treats the line as if it were a single connection at a fixed speed, without individual channels.

Figure 1-9. T1/E1 card



Installing the DSL Terminator

Installing the DSL Terminator includes explaining what you need in the way of tools and power, and then giving you step by step directions to assemble the base unit, rack-mount it, and connect all power and communication lines. Finally directions are given to power up the DSL Terminator and then check the lights to be sure it is working properly.

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Installation overview

Table 2-1 lists the sections describing installation tasks you might need to perform, and provides a brief description of each.

Table 2-1. DSL Terminator installation overview

Section	Description
“Before you begin” on page 2-2	Explains what you need before installing the DSL Terminator.
“Understanding the back panel” on page 2-3	Describes the elements of the DSL Terminator back panel.
“Rack mounting the DSL Terminator” on page 2-5	Describes how to install the DSL Terminator in a rack.

Installing the DSL Terminator

Before you begin

Table 2-1. DSL Terminator installation overview (continued)

Section	Description
“Installing a slot card” on page 2-3	Explains how to install a slot card into the DSL Terminator chassis.
“Connecting the DSL Terminator to the LAN” on page 2-6	Explains how to connect the DSL Terminator Ethernet port to the LAN.
“Connecting a workstation to the serial port” on page 2-7	Explains how to connect a PC to DSL Terminator serial port to perform first time configuration. After assigning an IP address and gateway to the DSL Terminator, you can configure it remotely through Telnet.
“Starting the DSL Terminator” on page 2-9	Explains how to power on the DSL Terminator.

Before you begin

Before you install the DSL Terminator, make sure you check the shipping package contents as described in “The DSL Terminator package” on page 1-1. Then make sure you have the following:

- Phillips-head screwdriver to install the DSL Terminator slot cards.
- Antistatic wrist straps and mats.
- Suitable location with adequate power.
- Local workstation with VT100 terminal-emulation software. (You must assign an IP address through a connection to the serial port of the DSL Terminator. Later, you can use Telnet to configure the system.)
- Workstation on a different subnet, from which you can Ping the DSL Terminator to verify the configuration.
- IP address for the DSL Terminator.
- Default gateway for the DSL Terminator, if your setup requires one.

Power requirements

Use the following information to help determine your power requirements:

- Maximum power consumed by any of the DSL Terminator cards is 6.5 watts. A fully loaded DSL Terminator consumes 38 watts maximum.
-
- For ac power, provide power via two dedicated 120 Vac 20 A outlets with a dedicated ground.

Understanding the back panel

Before you begin installing the hardware, you need some understanding of the ports and other items on the DSL Terminator ac back panel. Figure 2-1 shows the location and Table 2-2 describes the function of each element on the back panel of the ac power supply.

Figure 2-1. DSL Terminator ac back panel

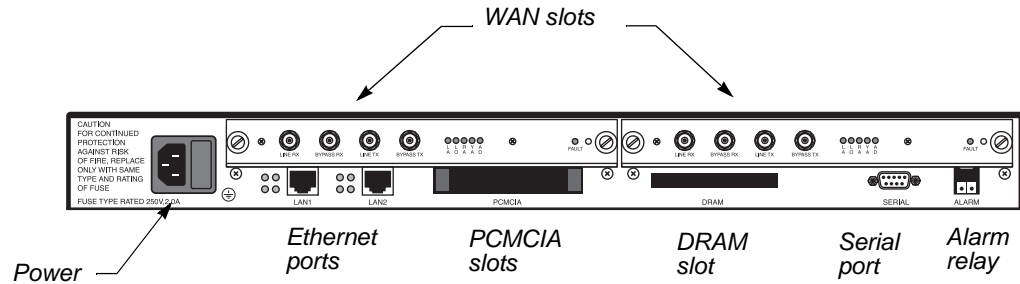


Table 2-2. Description of back panel items

Back panel item	Description
Power	Either an ac power plug or a dc power supply terminal block.
LAN1, LAN2 port	Ethernet ports to connect Unshielded Twisted-Pair (UTP) Ethernet LAN cables to the DSL Terminator.
PCMCIA slots	Two flash PCMCIA slots, labeled 1 and 2. Do not remove the PCMCIA flash card while the DSL Terminator is running. Doing so can damage the card and require its replacement.
DRAM upgrade slot	PCMCIA slot for DRAM upgrades.
Serial port	Serial console port for DSL Terminator management.
Alarm	The Alarm interface, a two-connector terminal block that provides indication of alarm conditions. For more information about the alarm relay, see Appendix B, "DSL Terminator Technical Specifications."

If you ordered DSL Terminator slot cards separately, continue with the next section. If all of your slot cards are preinstalled, skip to "Rack mounting the DSL Terminator" on page 2-5.

Installing a slot card

Note: All DSL Terminator slot cards are supported *only* in DSL Terminator units. You must only install a DSL Terminator slot card in a DSL Terminator unit that supports that specific slot card.

Installing the DSL Terminator

Installing a slot card

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 might not function properly.



Caution: When installing any slot card, be sure to follow proper procedures (such as using a grounding mat and a wrist strap) to prevent buildup of static electricity. Refer to the *Access Networks Safety and Compliance Guide*.

If your DSL Terminator package includes slot modules that are not already installed in your DSL Terminator, insert the modules now. Perform the following steps:

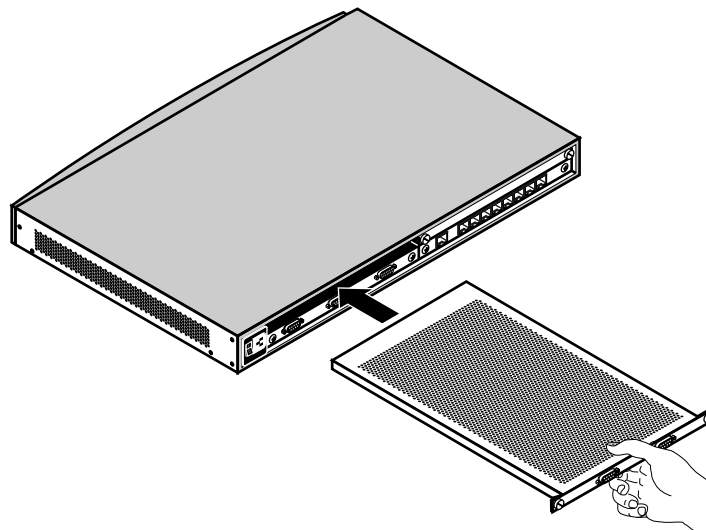
- 1 Make sure the DSL Terminator power is off and the power cord is unplugged.



Warning: Failure to turn off the DSL Terminator power and unplug the power cord could result in bodily injury.

- 2 Hold the slot card with the network ports facing you, and insert the card into a back panel slot as shown in Figure 2-2. Do not handle the slot cards from both ends. Be sure when you insert the card that the guides that are on the same plane.

Figure 2-2. Inserting a slot card into a DSL Terminator slot



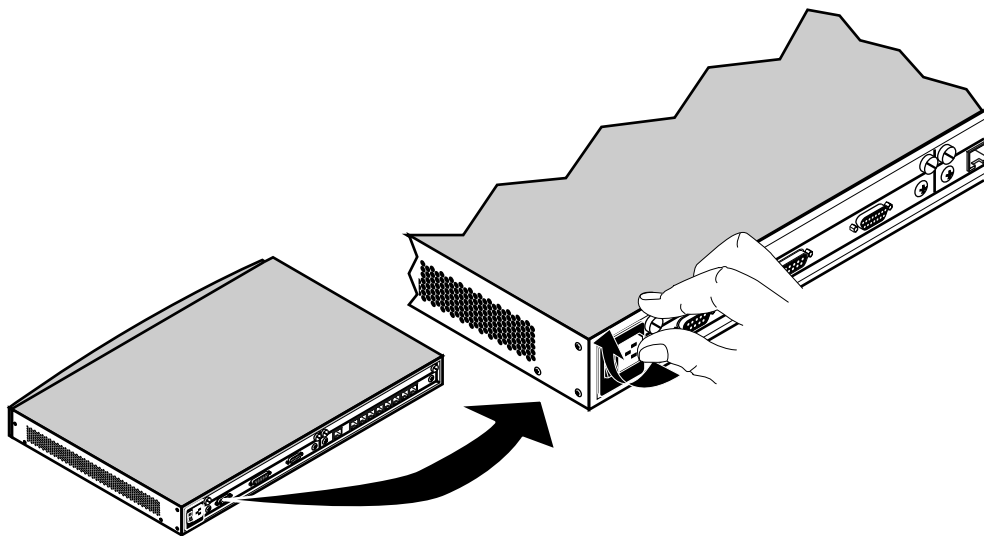
- 3 Push the card along the internal guides until it is secure. The face plate of the slot card should touch the back-panel of the DSL Terminator.



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

- 4 Tighten the screws on either side of the module as shown in Figure 2-3. Now you are ready to set up the hardware.

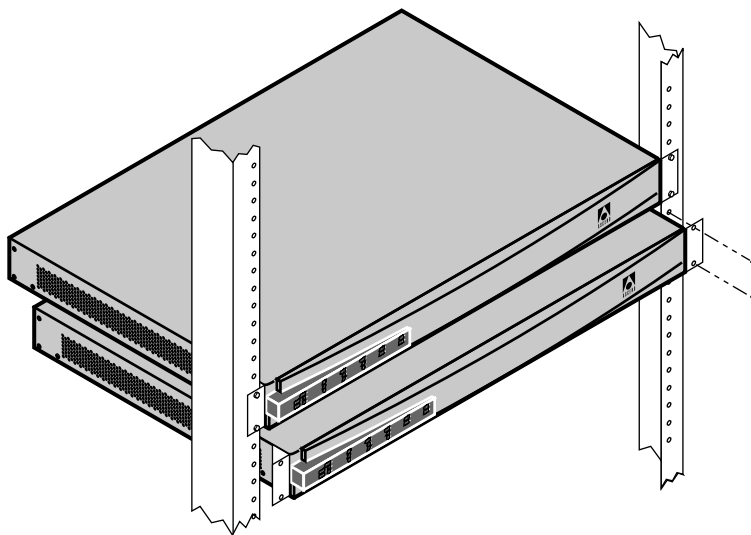
Figure 2-3. Tightening slot card thumbscrews



Rack mounting the DSL Terminator

Figure 2-4 shows an example of DSL Terminator units installed in a rack.

Figure 2-4. DSL Terminator units installed in a rack



Keep the following information in mind when installing DSL Terminator units in a rack or cabinet.

- The rack should safely support the combined weight of all equipment it contains. The DSL Terminator base system weighs 10 lbs (4.6 kg).
- Installation of the DSL Terminator in a rack without sufficient air flow can be unsafe.
- Lucent Technologies recommends racks with open sides because the DSL Terminator fans vent on the side of the unit.

Installing the DSL Terminator

Connecting the DSL Terminator to the LAN

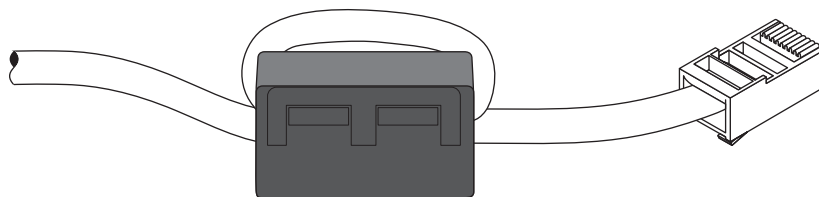
- Slots and openings in the cabinet are provided for ventilation. To ensure reliable operation of the product and to protect it from overheating, these slots and openings must not be blocked or covered.
- Ensure adequate cooling in the room.
 - The maximum recommended ambient temperature for DSL Terminator models is 104° Fahrenheit (40° Celsius). Take care to allow sufficient air circulation or space between units when the DSL Terminator is installed in a closed or multitrack assembly, because the operating ambient temperature of the rack environment might be greater than room ambient.
 - In enclosed racks, make sure there are openings in the floor underneath each cabinet to allow the air conditioning up into the cabinet.
 - Lucent Technologies recommends exhaust fans at the top of the cabinet, but they are not required. At a minimum the cabinets must be ventilated at the top.

Connecting the DSL Terminator to the LAN

To connect the DSL Terminator to your LAN, plug Ethernet LAN cables into the unit's Ethernet ports.

To pass the CISPR EMI suppression requirement, attach a ferrite bead to the end of the Ethernet cable that is closest to the DSL Terminator. Loop the cable through the ferrite bead as illustrated in Figure 2-5.

Figure 2-5. Installing the ferrite bead on the Ethernet cable



A suitable ferrite bead is manufactured by Fair-Rite Inc., part number 0443167251.

Connecting the DSL Terminator to the WAN

How you connect the DSL Terminator to the WAN depends on the type of slot card you have purchased.

Connecting the UDS3 card to the WAN

Connect the T3 line to the UDS3 card with two 75-ohm coaxial cables (RG 59/U). To provide for redundant operation, the UDS3 card has a second pair of BNC jacks that can be used to connect to a second UDS3 card or other Data Terminal Equipment (DTE).

When the UDS3 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.

Connecting the ATM DS3 card to the WAN

Connect the DS3 line to the ATM DS3 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 the ATM OC3 card to the WAN

Connect the OC3 line to the fiber interface ATM OC3 card using a 1300 nM single-mode fiber cable.

Connect the OC3 line to the copper interface ATM OC3 card using a Category 5 cable.

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

Connecting the unchannelized T1 card to the WAN

Connect your DSL Terminator T1 ports to the demarcation point, which is where the T1 line's metallic interface connects to other equipment.

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

Connecting a workstation to the serial port

To perform the initial configuration of the DSL Terminator, you must connect a cable to the DSL Terminator serial port.

Set the terminal-emulation package in your communications software as follows:

- 9600 bps
- Direct connection
- 8 data bits
- No parity
- 1 stop bit
- No flow control

Connecting to input power

Your power sources can be ac or dc. (For power requirements, see Appendix B, "DSL Terminator Technical Specifications.")

Connecting the DSL Terminator ac power supply

To connect the ac power supply, plug the ac source into an outlet, then plug the power cord into the DSL Terminator power supply socket.



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 DSL Terminator dc power supply

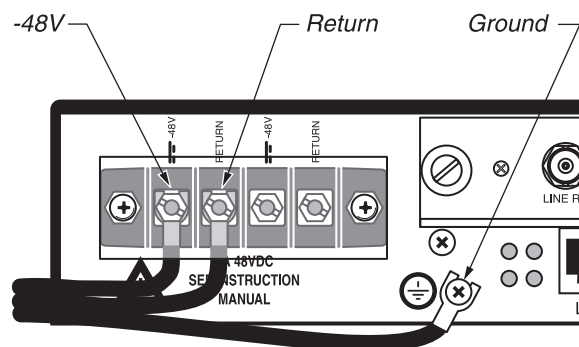
The DSL Terminator dc power supply requires two input connections: -48 Vdc and Return (-48 Vdc return). These two inputs are isolated from the ground.

If the power supply is fed from a power source with no ground path, connect the DSL Terminator chassis stud to the dc power supply chassis ground using a solid copper 12 AWG wire.

If the power supply is fed from an isolated power source, the chassis ground must be connected directly to earth using a solid copper 12 AWG wire. A single drop to all DSL Terminator units on one rack is acceptable.

An example of wiring the terminal block is shown in Figure 2-6. As shown in, the dc power source on the DSL Terminator or the redundant DSL Terminator has a terminal block with two separate input sources. The input power is identical for both terminal columns. Connect to two different sources if you want source redundancy. (If one source fails, the other backs up the power and the DSL Terminator unit has no interruption in functioning.)

Figure 2-6. Connecting to dc power



Following are descriptions of the terminal block connectors:

Connectors	Use for
-48 Vdc	Connection to a source (or sources).
-48 V Return	Return connection to a source.



Warning: Before installing wires to the DSL Terminator unit's dc power terminal block, verify that these wires are not connected to any power source. Installing live wires (that is, wires connected to a power source) is hazardous.

(For power requirements, see Appendix B, "DSL Terminator Technical Specifications.")

Starting the DSL Terminator

To start up the DSL Terminator, perform the following steps:

- 1 Make sure you have attached a workstation to the DSL Terminator serial port as explained in "Connecting a workstation to the serial port" on page 2-7.
- 2 Make sure that you can see the status lights on the front-panel of the DSL Terminator while you view the VT100 interface.
- 3 After turning the power on, the Power-On Self-Test (POST) begins and finishes within one minute.
- 4 While the POST is running, watch the status lights.
If the Power status light is on and the Fault status light is off, the DSL Terminator is operating properly. You can continue with the next step.
If either the Power status light is off or the Fault status light is on, remove the power cord and do not continue. Contact your Lucent distributor or Sales Partner.
- 5 Watch the VT100 display during the POST. If the POST is successful, a screen appears indicating POST was successful.
- 6 Press any key.
- 7 Press any key again to display the DSL Terminator Main Edit menu. An example is shown below.

```
Main Edit Menu
>00-000 System
 10-000 ATM-DS3
 20-000 UDS3
 30-000 Ethernet
```

Interpreting the status lights

The DSL Terminator status lights indicate what is happening in the unit and can be used to diagnose problems. Figure 2-7 shows the location of status lights on the DSL Terminator front panel.

DSL Terminator front panel

Figure 2-7. Location of the DSL Terminator status lights

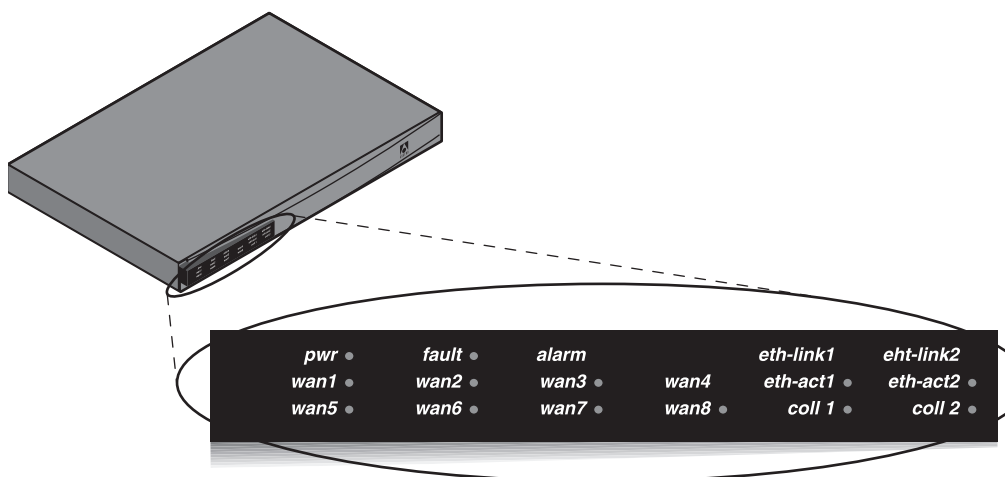


Table 2-3 describes the function each status light indicates on the DSL Terminator.

Table 2-3. DSL Terminator front-panel status lights

Status light	Description
Power	On when the DSL Terminator power is on.
Fault	On in one of two cases: A hardware self-test in progress or a hardware failure has been detected. At system start-up, when the DSL Terminator performs its Power On Self Test (POST), the Fault status light is on. If any type of hardware failure occurs, the status light flashes. Note: If the failure is isolated to a slot card, the DSL Terminator might continue to function without the card.
Alarm	On when <ul style="list-style-type: none"> the ambient temperature inside the unit exceeds 65° C. a WAN alarm or a trunk is out of service (for example, during line loopback diagnostics.) WAN alarms include Loss of Sync, Red Alarm, Yellow Alarm, and All Ones (or AIS).
Eth-Link1	On when the DSL Terminator detects activity (network traffic) on its first Ethernet interface.
Eth-Link2	On when the DSL Terminator detects activity (network traffic) on its second Ethernet interface.
Wan <i>n</i>	On during POST. Off during normal operation.

Table 2-3. DSL Terminator front-panel status lights (continued)

Status light	Description
Eth-Act1	On when there is activity on the first Ethernet link.
Eth-Act2	On when there is activity on the second Ethernet link.
Coll 1	On if there are collisions on the first Ethernet link.
Coll 2	On if there are collisions on the second Ethernet link.

DSL Terminator back panel

Table 2-4 describes the DSL Terminator back panel status lights, which display the status of the Ethernet interface. For an illustration see Figure 2-1 on page 2-3.

Table 2-4. DSL Terminator back panel status lights

Status light	Description
Eth-Link1	On when the DSL Terminator detects activity (network traffic) on its first Ethernet interface.
Eth-Link2	On when the DSL Terminator detects activity (network traffic) on its second Ethernet interface.
Wan <i>n</i>	On during POST. Off during normal operation.
Eth-Act1	On when there is activity on the first Ethernet link.
Eth-Act2	On when there is activity on the second Ethernet link.

Interpreting status lights on the slot cards

Each installed card includes status lights which appear on the upper tier of the back panel. Status lights on each card differ.

ATM DS3 card status lights

All status lights on the ATM DS3 card, except LA, light up when the power is turned on or reset and remain so until the card passes POST. If no status lights are lit, the DS3 interface is

either disabled or is receiving an Alarm Indication Signal (AIS) or Idle Signal. Table 2-5 explains the ATM DS3 card status lights.

Table 2-5. ATM-DS3 card status lights

Lights	Description
LA	Green. Indicates the DS3 interface is enabled and has not detected any error conditions.
LO	Red. Indicates the DS3 interface is out of frame alignment.
RA	Red. Indicates the DS3 interface is experiencing loss of receive signal.
YA	Yellow. Indicates the DS3 interface has detected Far End Receive Failure indication transmitted from the other side.
AD	Alarm Indication Signal. Indicates the local device has received an alarm indication signal. Also known as a blue alarm.

ATM OC3 card status lights

All status lights on the ATM OC3 card, except LA, light up when the power is turned or reset and remain so until the card passes POST. If no LEDs are lit, the OC3 interface is disabled. Table 2-5 explains the ATM OC3 card status lights.

Table 2-6. ATM-OC3 card status lights

Lights	Description
LA	Green. Indicates the OC3 interface is enabled and has not detected any error conditions.
LO	Red. Indicates the OC3 interface is out of frame alignment.
RA	Red. Indicates the OC3 interface is experiencing loss of receive signal.
YA	Yellow. Indicates the OC3 interface has detected Far End Receive Failure indication transmitted from the other side.
AD	Alarm Indication Signal. Indicates the local device has received an alarm indication signal. Also known as a blue alarm.

UDS3 card's status lights

All status lights on the UDS3 card, except LA, light up when the power is turned or reset and remain so until the card passes POST. If no status lights are lit, the DS3 interface is either

disabled or is receiving an Alarm Indication Signal (AIS) or Idle Signal. Table 2-7 explains the UDS3 card status lights.

Table 2-7. UDS3 card status lights

Lights	Description
LA	Green. Indicates the DS3 interface is enabled and has not detected any error conditions.
LO	Red. Indicates the DS3 interface is out of frame alignment.
RA	Red. Indicates the DS3 interface is experiencing loss of receive signal.
YA	Yellow. Indicates the DS3 interface has detected Far End Receive Failure indication transmitted from the other side.

Navigating and Securing the Interface

To operate and control your DSL Terminator from a terminal, knowledge of the menus and their arrangement is needed. You must also know how to use the special keys, set parameters and then save your settings. Finally it is important to establish an appropriate security profile before proceeding to the configuration of the unit.:

Configuration menus	3-1
Security profiles	3-4
Special display characters and keys	3-6

Configuration menus

You can access the DSL Terminator configuration menus in a VT100 emulation window from a computer connected to the control port, as described in “Connecting a workstation to the serial port” on page 2-7. When you establish the VT100 console session, the Main Edit Menu and eight status windows appear.

You can also establish a console session from any Telnet workstation by opening a Telnet session with the DSL Terminator. In a Telnet session you can perform all of the configuration, diagnostic, management, and other functions that could be performed from a computer connected to the DSL Terminator control port.

In either case, access is controlled by Security profiles. To configure the Security profiles, see “Security profiles” on page 3-4.

The Main Edit Menu

The configuration interface consists of the Main Edit Menu and eight status windows. You can configure the DSL Terminator with the Main Edit Menu which is located on the left side of the screen. The items listed in the Main Edit Menu differ depending on the system configuration of your unit. The Empty items in the menu represent expansion slots that do not contain cards.

Figure 3-1. DSL Terminator configuration menus

```
Main Edit Menu
>00-000 System
 10-000 Net/8T1
 20-000 Net/DS3-ATM
 30-000 Ethernet

10-100 1234567890
L1/RA .....
12345678901234
.....

20-100 DS3-ATM
ACT OOF RED YEL AIS
* - - - -

30-100 Sessions
> 1 Active
0 pppoe12

00-200 15:31:26
>M31 Line Ch
Assigned to port

30-300 WAN Stat
>Rx Pkt: 14072^
Tx Pkt: 14007
CRC: 0v

30-400 Ether Stat
>Rx0 Pkt: 63589^
Tx0 Pkt: 17046
Col: 0v

00-100 Sys Option
>Security Prof: 1 ^
Software +7.10.1 +
S/N: 74 v|

Main Status Menu
>00-000 System ^
10-000 Net/8T1
20-000 Net/DS3-ATMv
```

Press Ctrl-n to move cursor to the next menu item. Press return to select it.
Press Tab to move to another window --- thick border indicates active window.

For an organizational overview of the DSL Terminator menus and profiles, see the *DSL Terminator Reference*.

Making a menu or status window active

You can interact with only one window at a time. The active window has a thick, double-line border on the left, right, and top sides.

When you press the Tab key, the thick double lines move to 00-200, the next screen to the right. If you continue pressing the Tab key, you successively activate each window from left to right and down, until you reach the last window in the lower right-hand corner. Back-Tab or Ctrl-O moves you in the opposite direction.

Opening menus and profiles

The Main Edit Menu contains a list of menus, each of which can contain profiles and submenus. In the menu that is currently open, the cursor character (>) points to one item in the menu. For example, in the following Main Edit Menu, the cursor points to as DS3-ATM menu item.

```
Main Edit Menu
 00-000 System
 >10-000 DS3-ATM
 20-000 UDS3
 30-000 Ethernet
```

To move the cursor down, press Ctrl-N (next). To move it up, press Ctrl-P (previous). Depending on your VT100 emulator, you might be able to press the Down-Arrow key instead of Ctrl-N and the Up-Arrow key instead of Ctrl-P. (For a complete list of key combinations to navigate the interface, see Table 3-1 on page 3-6.)

To open a menu, move the cursor to the menu's name and press Enter. For example, press Ctrl-N until the cursor points to 30-000 Ethernet, then press Enter. The Ethernet menu appears:

```
30-000 Ethernet
  30-100 Connections
  30-200 Names/Passwords
  30-300 Bridge Adrs
  30-400 Static Rtes
  30-500 Filters
  30-600 Firewalls
  30-700 Frame Relay
  30-800 Answer
  30-900 SNMP Traps
  30-A00 Mod Config
```

The Ethernet menu contains submenus and profiles related to network functions, such as bridging, routing, and WAN connections. The last menu item opens the Mod Config profile which configures the Ethernet interface itself. Not all of the Mod Config profile appears at the same time. Following is the initial display.

```
30-A00 Mod Config
  Module Name=
  Ether1 options...
  Ether2 options...
  WAN options...
  SNMP options...
  Route Pref...
  TServ options...
  Bridging=No
  Shared Prof=No
  Telnet Security=Global
  Telnet PW=
  RIP Policy=Poison Rvrs
  RIP Summary=Yes
  RIP Trigger=Yes
  ICMP Redirects=Accept
  BOOTP Relay...
```

Note: With the exception of parameters designated N/A (not applicable), you can edit all parameters in any profile. A profile is a group of parameters listed under a particular menu entry. N/A means that a parameter does not apply, given the setting of some other parameter(s) or profile(s).

Opening edit fields

To open an edit field for a text-based parameter (such as a password):

- 1 Press Ctrl-N (next) or the Down-Arrow key and move the cursor to the parameter you want to edit (for example, Telnet PW).
- 2 Press Enter.

An edit field opens, delimited by brackets, as shown in the following example using the Telnet PW parameter :

```
90-A00 Mod Config
  Module Name=
  Ether1 options...
```

```
Ether2 options...
WAN options...
SNMP options...
Route Pref...
TServ options...
Bridging=No
Shared Prof=No
Telnet Security=Global
Telnet PW:
[ ]

RIP Trigger=Yes
ICMP Redirects=Accept
BOOTP Relay...
```

A blinking text cursor within the brackets indicates that you can start typing text. If the field already contains text, it is cleared when you type a character.

- 3 To modify only a few characters of existing text, use the arrow keys to position the cursor, then delete or overwrite the characters. To close the edit field and accept the new text, press Enter.

Levels of security in editing is discussed in “Security profiles” on page 3-4.

Setting enumerated parameters

An enumerated parameter has a set of predefined values. You modify it by simply placing the cursor beside the parameter and pressing the Enter, Return, or the Right-Arrow key until the proper value appears.

Saving your changes

When you exit a profile after changing any of its settings, a message prompt asks if you want to save the changes.

```
EXIT?
>0=ESC (Don't exit)
1=Exit and discard
2=Exit and accept
```

You can save the profile values by choosing the Exit and Accept option and pressing Enter, or by pressing the 2 key.

Security profiles

The DSL Terminator has nine security profiles, which you can configure to provide up to nine levels of security. When you first receive your DSL Terminator, none of the profiles implements any restrictions.

To see the list of Security profiles:

- 1 From the Main Edit Menu, move the cursor to the System menu and press Enter.

- 2 Move the cursor to Security and press Enter.

The Security menu appears:

```
00-300 Security
>00-301 Default
00-302
00-303
00-304
00-305
00-306
00-307
00-308
00-309 Full Access
```

Assigning privileges

Turning the the DSL Terminator power on activates the Default profile, which is the first Security profile in the Security menu. Default profile has no password. As an administrator, you should reset the privileges in the Default profile to restrict the functions for users accessing the DSL Terminator configuration menus. You should also change the password of the Full Access profile. Do not change any other settings in the Full Access profile. Proceed as follows:

- 1 Open the Default profile.
- 2 Select Operations and set this privilege to No.
- 3 Press the Left-Arrow or Escape key to save your change.
- 4 Press 2 (Exit and Accept).
A confirmation message appears.
- 5 Press the Enter key.
- 6 Move the cursor to Full Access in the Security profile menu and press enter.
- 7 Select the password parameter, and enter a new password.
- 8 Press the Left-Arrow or Escape key to save your change.
- 9 Press 2 (Exit and Accept).
A confirmation message appears.
- 10 Press the Enter key.
- 11 Proceed to configuring the DSL Terminator.
- 12 Reset or power-cycle the DSL Terminator to activate the new, restrictive Default profile.
Make sure that you remember the password for the Full Access profile, and that you have not restricted any privileges in that profile.

You can also assign various levels of access to the as yet unnamed Security profile. For detailed information about modifying Security profiles and assigning passwords, see the *DSL Terminator Network Configuration Guide*.

Activating the Full Access Security Profile

You have to activate and supply the password for the Full Access profile. To perform configuration tasks, the default password for the Full Access profile is Ascend.

To activate the Full Access Security profile:

- 1 Press Ctrl-D.

The DO menu, a context-sensitive menu, appears:

```
30-A00 Mod Config
DO...
>0=Esc
P=Password
C=Close TELNET
E=Termsrv
D=Diagnostics
```

- 2 In the DO menu, press P (or select P=Password).

The list of Security profiles appears.

- 3 Select Full Access and press Enter.

The DSL Terminator prompts for that profile's password:

```
00-300 Security
Enter Password:
[]
Press > to accept
```

- 4 Type the password and press Enter to accept it.

Note: You should modify the Full Access profile to assign a password other than the default (Ascend) as soon as possible.

A message states that the password was accepted and the DSL Terminator is using the new security level. Or, if the password you entered is incorrect, you are prompted again to enter the password.

Note: For a console session established through Telnet, the caller must first supply the Telnet password to establish a Telnet session that uses the Default security level. To configure the DSL Terminator, the Telnet user must then activate the appropriate Security profile.

Special display characters and keys

The following characters have special meaning within the displays:

- The plus character (+) indicates that an input entry is too long to fit onto one line, and that the DSL Terminator is truncating it for display purposes.
- An ellipsis (...) means that a submenu displays the details of a menu option.
The DSL Terminator displays the submenu when you select the menu option.

Table 3-1 lists the special-purpose keys and key combinations you can use in the control-monitor displays.

Table 3-1. Special keys for control-monitor displays

Control-monitor	Operation
Right-Arrow, Return, Enter, Ctrl-Z, Ctrl-F	Enumerated parameter: Select the next value. String value: Move one character to the right or enter the current input. Menu: Open the current selection.

Table 3-1. Special keys for control-monitor displays (continued)

Control-monitor	Operation
Left-Arrow, Ctrl-X, Ctrl-B	Enumerated parameter: Select the previous value. String value: Move left one character or exit the current input. Menu: Close the current selection.
Down-Arrow, Ctrl-N	Move down to the next selection.
Up-Arrow, Ctrl-U, Ctrl-P	Move up to the previous selection.
Ctrl-V	Move to the next page of the list.
Tab, Ctrl-I	Move to the next window.
Back-Tab, Ctrl-O	Move to the previous window.
N/A	Toggle to a status menu from the edit menu and vice versa.
Delete	Delete the character under the cursor.
Backspace	Delete the character to the left of the cursor.
N/A	Overwrite the character under the cursor with a space.
Ctrl-D	Open the DO menu.
Ctrl-L	Refresh the VT100 screen.
D	Dial from the currently selected profile.

Note: You always use the Control and Shift keys in combination with other keys. This document represents key combinations as two characters separated by a hyphen, such as Shift-T, which types the capital letter T.

Provisioning the Switch

This appendix provides the information necessary for properly provisioning a switch for T1 access or E1 access to the WAN. This appendix covers the following topics:

Information you need from your T1 service provider	A-1
Information you need from your E1 service provider	A-1
Provisioning ATM DS3 lines	A-1
Provisioning UDS3 lines	A-2

Information you need from your T1 service provider

You need the following information from your T1 service provider:

- Whether the line uses B8ZS or AMI line encoding.
- Whether the line uses ESF or D4 framing.
- The number of nailed-up channels.
- The number of unused channels, if any.
- The first and last DS-0 in the line.

Keep the following additional information in mind:

- In general, ESF framing and B8ZS line encoding are both recommended for T1-based applications.

Information you need from your E1 service provider

You need the following information from your E1 service provider:

- Whether the line use G.703 or 2DS (a variant of G.703) framing.
- The number of nailed-up channels.
- The number of unused channels, if any.

Provisioning ATM DS3 lines

The ATM DS3 card only supports C-Bit-PLCP framing and Static activation.

Provisioning UDS3 lines

The UDS3 card only supports C-Bit-Parity framing and B3ZS encoding.

DSL Terminator Technical Specifications

B

This appendix covers the following topics:

Battery	B-1
Power requirements	B-2
Environmental requirements	B-2
Alarm relay operating specifications	B-3
ATM DS3 card specifications	B-3
ATM OC3 card specifications	B-4
E1 card specifications	B-5
T1 card specifications	B-5
Unchannelized DS3 card specifications.....	B-6

Battery

The DSL Terminator contains an internal 3V lithium battery. The normal operating life of the battery exceeds five years.

Only trained engineers authorized by Lucent should open the DSL Terminator unit's case for testing, maintenance, installation, or any other purpose. Furthermore, only trained engineers should replace DSL Terminator components.



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

ATTENTION: IL Y A DANGER D'EXPLOSION S'IL Y A REMPLACEMENT INCORRECT DE LA BATTERIE. REMPLACER UNIQUEMENT AVEC UNE BATTERIE DU MÊME TYPE OU D'UN TYPE RECOMMANDÉ PAR LE CONSTRUCTEUR. METTRE AU RÉBUT LES BATTERIES USAGÉES CONFORMÉMENT AUX INSTRUCTIONS DU FABRICANT.

Power requirements

Maximum power consumed by any of the DSL Terminator cards is 6.5 watts. A fully loaded DSL Terminator consumes 38 watts maximum.

Table B-1 describes the ac source power requirements for the DSL Terminator .

Table B-1. DSL Terminator ac source power requirements

Element	Value
Input voltage	90-260 Vac
Input power	115 Vac 108 watts maximum 240 Vac 113 watts maximum
Fuse	2A, 250V T type
Frequency	50/60 Hz
Input current	115 Vac 1.4A (rms) 240 Vac 0.7A (rms)
Inrush current	115 Vac 15A maximum 240 Vac 30A maximum

Table B-2 describes the dc source power requirements for the DSL Terminator.

Table B-2. DSL Terminator dc source power requirements

Element	Value
Input voltage	36-72 Vdc
Input power	75 watts maximum
Input current	2.37A maximum

The DSL Terminator stores its configuration profiles in battery-protected memory. When you power off the unit, the profiles remain intact.

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

Environmental requirements

For best results, you should house the DSL Terminator in a room with constant temperature and humidity. In general, cooler environments are better. An operating temperature of 32° to

104° Fahrenheit (0° to 40° Celsius) is recommended. Storage temperatures of -40° to 176° Fahrenheit (-71.4° to 80° Celsius) are acceptable.

Humidity should be high enough to prevent accumulation of static electricity, but low enough to prevent condensation. An operating relative humidity from 5% to 90% is acceptable.

You can operate the DSL Terminator at altitudes of 0 to 14800 ft. (0-4500 m).

The DSL Terminator base system weighs 10 lbs (4.6 kg). The DSL Terminator has the following dimensions: 1.75" x 17" x 12" (4.5 cm x 43.2 cm x 30.5 cm).

Alarm relay operating specifications

On the back panel of the DSL Terminator unit is a pair of alarm-relay terminal-block contacts that remain open during normal operation. The contacts close during loss of power, hardware failure, reset, or when the ambient temperature inside the unit exceeds 65 C.

The maximum rated load for the alarm relay is:

- 1 amp at 30 Vdc
- 0.6 amp at 60 Vdc
- 0.6 amp at 60 Vac



Caution: To reduce the risk of electric shock, do not connect the alarm circuit to a device with an output exceeding 30 Vrms, 42.4 Vpeak, or 60 Vdc.

ATM DS3 card specifications

Table B-3 lists the specifications for the DSL Terminator ATM DS3 card.

Table B-3. ATM DS3 card specifications

Electrical	DSX-3 per ANSI T1.404
Line Build Out	0 to 225 feet, or 226 to 450 feet
Receive Equalization	Based on cable length and transmitter
Line Code	B3ZS
Line Rate	44.736 Mbps +/- 20 ppm
Frame Format	Per ANSI T1.107a (C-Bit Parity)
Alarm Signaling	DS3 Red Alarm
Connectors	75 ohm BNC coaxial
Interfaces per card	One unchannelized DS3 port with integrated CSU/DSU. Maximum of two cards per chassis (redundant configuration)

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

Card dimensions	5.6 in high x 10.7 in long (14.2 cm x 27 cm)
Card weight	approximately 2 pounds (0.9 kg)
Operating humidity	0-90%, non-condensing
Operating temperature	32-104° F (0-40° C)

ATM OC3 card specifications

Table B-4 lists the specifications for the DSL Terminator ATM OC3 card.

Table B-4. ATM OC3 card specifications

Power requirements	35 W
Connectors	Fiber SC-1 or RJ-45 copper
Interfaces per card	1 full-duplex OC-3c/STM-1 SONET/SDH
Cable requirements	Single-mode cables: 9/125 micron optical fiber
Connector requirements	Must meet JIS C 5973 standards
Optical input (avg.)	-32.5 dBm minimum, -8 dBm maximum (SM) -32.5 dBm minimum, -14 dBm maximum (MM)
Optical output (avg.)	-14 dBm minimum, -8 dBm maximum, 9/125 um (SM) -19 dBm minimum, -14 dBm maximum, 62.5/125 um (MM)
Optical wavelength (avg.)	1261 nm minimum, 1320 nm typical, 1360 nm maximum (SM) 1270 nm minimum, 1310 nm typical, 1380 nm maximum (MM)
TX power	-8 dBm maximum, -14 dBm minimum, 9/125 um fiber
RX sensitivity	-8 dBm maximum, -32.5 dBm minimum, 9/125 um fiber
Loss Budget	18.5 dBm
Card dimensions	5.6 in high x 10.7 in long (14.2 cm x 27 cm)
Card weight	approximately 2 pounds (0.9 kg)
Operating humidity	0-90%, non-condensing
Operating temperature	32-104° F (0-40° C)

E1 card specifications

Table B-5 lists the specifications for the DSL Terminator E1 card.

Table B-5. E1 card specifications

Electrical	CEPT 2.048Mbps pulse mask per G.703 for twisted pair and coax.
Receive Equalization	Short haul (12dB) and long haul (43dB).
Line Code	HDB3
Line Rate	2.048 Mbps +/- 25ppm
Frame Format	Per G.704 FAS with or without CRC4 Multi Frame Alignment (MFA). No CAS MFA used for data.
Alarm Signaling	Red Alarm, OOF (FAS), AIS, remote alarm.
Connectors	8 RJ45 (120 ohm). Optionally, BNC COAX (75 ohm) with external cable. (This requires that wire jumpers be configured on the card).
Card dimensions	5.6 in high x 10.7 in long (14.2 cm x 27 cm)
Card weight	approximately 2 pounds (0.9 kg)
Operating humidity	0-90%, non-condensing
Operating temperature	32-104° F (0-40° C)

T1 card specifications

Table B-6 lists the specifications for the DSL Terminator T1 card.

Table B-6. T1 card specifications

Electrical	DSX-1 per ANSI T1.102 (DSX) DS1 per ANSI T1.403, Pub 62411 (CSU)
Line Build Out	0dB, -7.5dB, -15dB, -22.5dB (CSU) 0-133 ft, 133-266 ft, 266-399 ft, 399-533 ft, 533-655 ft (DSX)
Receive Equalization	Based on cable length and transmitter
Line Code	AMI, B8ZS
Line Rate	1.544 Mbps +/- 32 ppm
Frame Format	Per ANSI T1.107a
Alarm Signaling	Red Alarm, yellow signal
Connectors	8 RJ45 (100 ohm line)

Table B-6. T1 card specifications (continued)

Card dimensions	5.6 in high x 10.7 in long (14.2 cm x 27 cm)
Card weight	approximately 2 pounds (0.9 kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Unchannelized DS3 card specifications

Table B-7 lists the specifications for the DSL Terminator UDS3 card.

Table B-7. UDS3 card specifications

Electrical	DSX-3 per ANSI T1.404
Line Build Out	0 to 225 feet, or 226 to 450 feet
Receive Equalization	Based on cable length and transmitter
Line Code	B3ZS
Line Rate	44.736 Mbps +/- 20ppm
Frame Format	Per ANSI T1.107a (C-Bit Parity)
Alarm Signaling	DS3 Red Alarm
Connectors	75 ohm BNC coaxial (2 line, 2 backup)
Interfaces per card	1 port per card, up to 5 cards per system
Card dimensions	5.6 in high x 10.7 in long (14.2 cm x 27 cm)
Card weight	approximately 2 pounds (0.9 kg)
Operating humidity	0-90%, noncondensing
Operating temperature	32-104° F (0-40° C)

Cables and Connectors

There are different specifications for various facets of the DSL Terminator, requiring different cabling requirements. This appendix covers the following topics:

Control port and cabling pinouts for the control monitor	C-1
Ethernet interface specifications	C-2
T1 interface specifications	C-2
E1 interface specifications	C-10

Control port and cabling pinouts for the control monitor

The control port uses a standard DE-9 female connector that conforms to the EIA RS-232 standard for serial interfaces. Table C-1 applies to all DSL Terminator models that use the RS-232 pinouts.

Table C-1. Control 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
9 (pin not active)	RI	Ring Indicator (signal not supplied)	O

Ethernet interface specifications

The base unit of a DSL Terminator has an Ethernet interface that supports the physical specifications of IEEE 802.3 and IEEE 802.14 with Ethernet 2 (Ethernet/DIX) framing. The unit provides a single Ethernet interface that autosenses the Ethernet type to which it is connected. It supports the following types of Ethernet interfaces:

- 10Base-T (Unshielded Twisted Pair): Twisted pair Ethernet and IEEE 802.3 (10Base-T) with an RJ-45 connector, labeled LAN UTP.
- 100 Base-T: 100 Mbps Baseband Modulation on Twisted Pair

The Ethernet address used to identify the Ethernet interface resides in the DSL Terminator unit's motherboard.

To install the Ethernet interface, you must have the cables described in either of the following two sections.

10Base-T cables

To install a 10Base-T interface, you need a twisted-pair Ethernet cable and a dual twisted-pair cable terminated with RJ-45 modular jacks.

Use an EIA/TIA 568 or IEEE 802.3 10Base-T cable.

100Base-T cables

To install a 100Base-T interface, you need a twisted-pair Ethernet cable and a dual twisted-pair cable terminated with RJ-45 modular jacks.

Use one of the following cables: 100Base-T2, 100Base-T4 (not very popular), 100BASE-TX, or 100Base-FX.

T1 interface specifications

Specifications for the DSL Terminator unit's T1 interface include Channel Service Unit (CSU) requirements, specifications for the cables and plugs available for the unit's WAN interfaces, the pins to be used on the WAN ports, and the WAN switched services that are available to the DSL Terminator.

T1 CSU requirements

CSU requirements depend on whether or not you enable the internal CSU on each T1 port on the DSL Terminator. To enable the internal CSU, set the Net/T1 > Line Config > *slot* Line *N* > Front End parameter to CSU. To disable the internal CSU set Front End to DSX.

Port with internal CSU

If you enable the internal CSU on a T1 port, 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 DSL Terminator, you must notify the carrier before disconnecting the DSL Terminator from the WAN. If you disconnect or turn off the DSL Terminator without prior notification, the carrier might temporarily discontinue your T1 service. The DSL Terminator unit's internal CSUs are compatible with dry-loop T1 lines, and with span-powered or wet-loop powered T1 lines.

Port without internal CSU

If you disable the internal CSU on a T1 port, you 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 detailed information about each parameter, see the *DSL Terminator Reference Guide*.)

Table C-2 lists CSU specifications.

Table C-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	1.544 Mbps +/- 200 bps
Line Code	AMI or B8ZS
Line Framing	D4 or ESF
Line Input/Output Impedance	100 Ohms +/- 5%
Received Signal Level Range	DSX-1 level to -27.5 dB
Transmitted Signal Level	DSX-1 level into 100 ohms
Line Buildout	0.0, 7.5, 15.0, or 22.5 dB
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

Note: During loss of power or whenever the DSL Terminator restarts, a relay closure returns the T1 signal to the WAN. That is, the T1 line is looped back.

T1 cable specifications

The maximum cable distance between the T1 WAN interface equipment and the DSL Terminator should not exceed 655 feet (200 m) for a DSL Terminator without CSUs. Measure the line length and record it when you install the DSL Terminator. You must specify this length when you configure the Line *N* profile parameters. (For detailed information about parameters, see the *Reference Guide* for the DSL Terminator.)

Use only cables specifically constructed for transmission of T1 signals. The cables should 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 DSL Terminator unit's WAN interfaces.

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

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. Figure C-1 and Table C-3 show the pinouts.

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

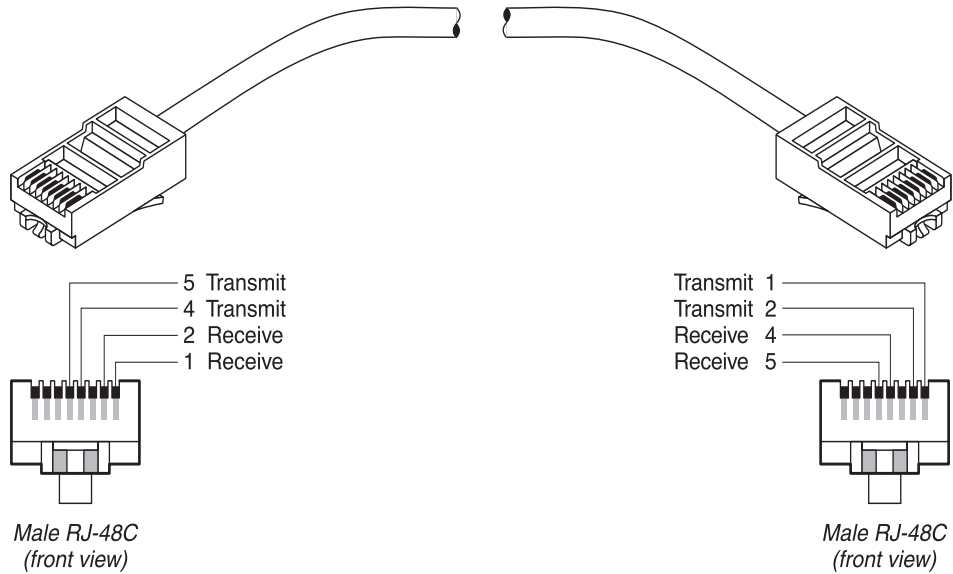


Table C-3. RJ-48C/RJ-48C crossover cable specifications

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

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

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. Figure C-2 and Table C-4 show the pinouts.

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

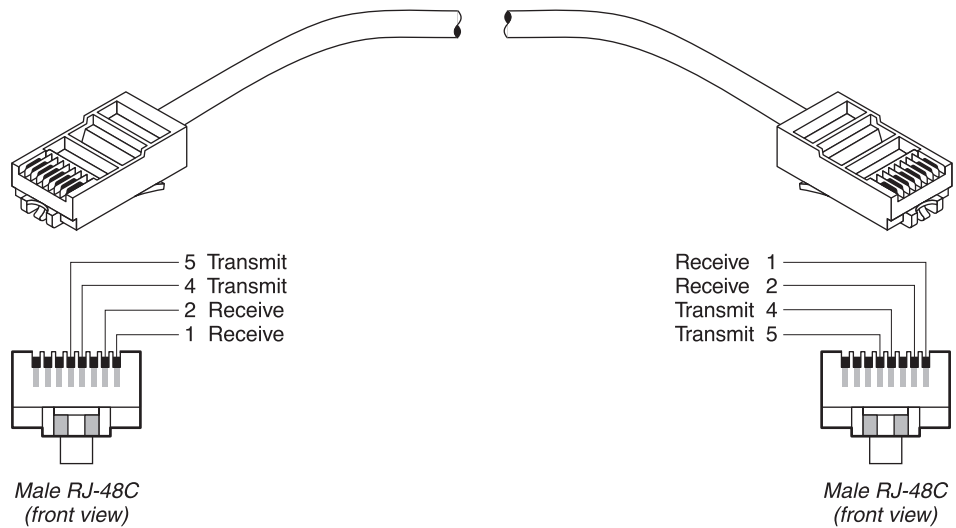


Table C-4. RJ-48C/RJ-48C straight-through cable specifications

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

RJ-48C/DA-15 T1 straight-through cable

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 C-3 and Table C-5 show the pinouts.

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

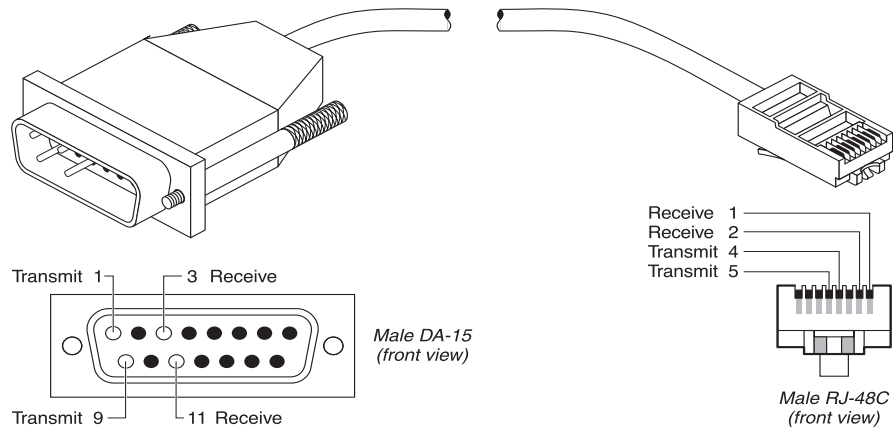


Table C-5. RJ-48C/DA-15 straight-through cable specifications

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

RJ-48C/DA T1 crossover cable

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

Figure C-4. RJ-48C/DA crossover cable

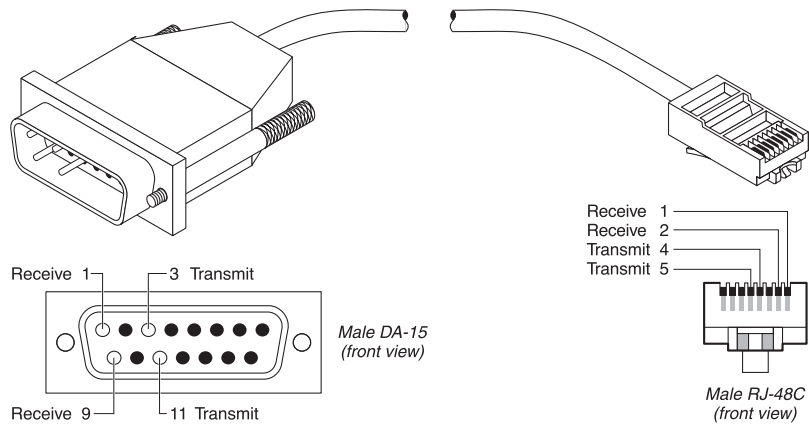


Table C-6. RJ-48C/DA crossover cable specifications

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

RJ-48C/Bantam T1 straight-through cable

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

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

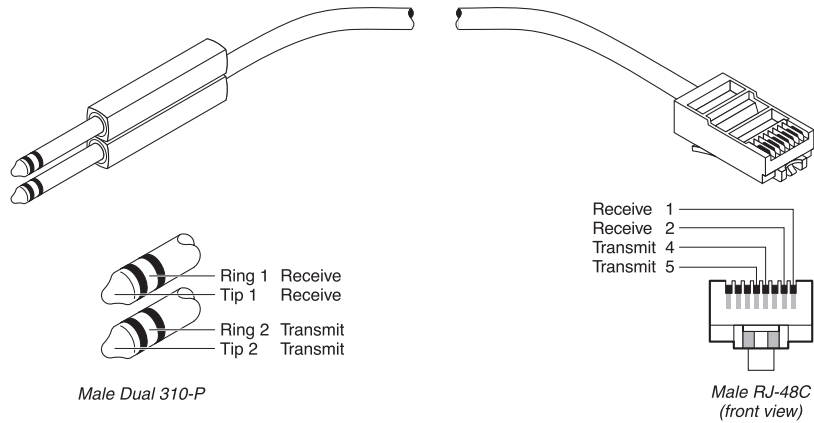


Table C-7. RJ-48C/Bantam straight-through cable specifications

Model number DBNT-RJ45 Part number 2510-0066-001			
Pair #	Signal (DSL Terminator)	Male RJ-48 (DSL Terminator)	Male Dual-310- P (remote)
1	Receive	1	Tip 1
		2	Ring 1
2	Transmit	5	Tip 2
		4	Ring 2

T1 RJ-48C-Loopback plug

This plug loops the transmit signal back to the DSL Terminator.

Table C-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 WAN ports

Table C-9 lists the pins on RJ-48C sockets on the DSL Terminator used for T1 WAN interface. Only pins 1, 2, 4, and 5 are used. The remaining pins are not connected.

Table C-9. Transmit and Receive pins

DSL Terminator T1 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

E1 interface specifications

The DSL Terminator unit's E1 interface has cabling and port specifications. During loss of power or whenever the DSL Terminator restarts, a relay closure returns the E1 signal to the WAN. That is, the E1 line is looped back. However, if you configure the DSL Terminator for framing-compatible drop-and-insert functionality, all channels of line #1 are passed to line #2. Note that line #1 and line #2 of a DSL Terminator Net/E1 expansion module always loop back upon loss of power, regardless of how they are configured.

E1 cable specifications

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

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

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

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

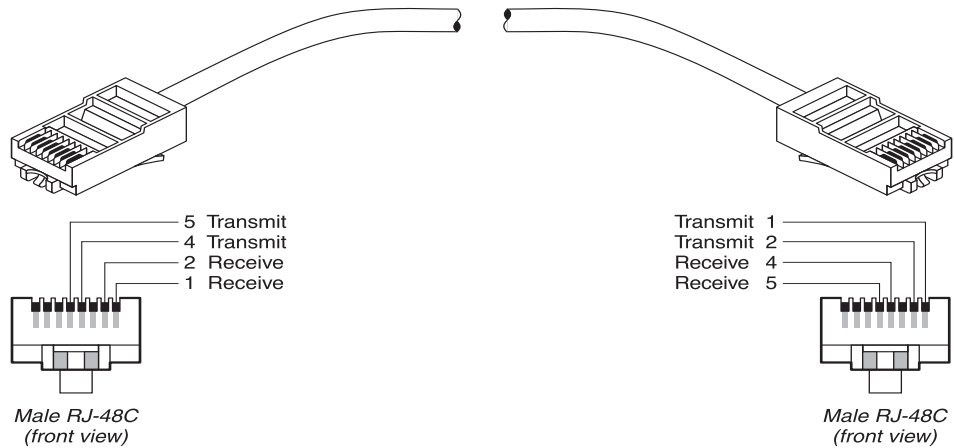


Table C-10. RJ-48C/RJ-48C crossover cable specifications

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

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

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. Figure C-7 and Table C-11 show the pinouts.

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

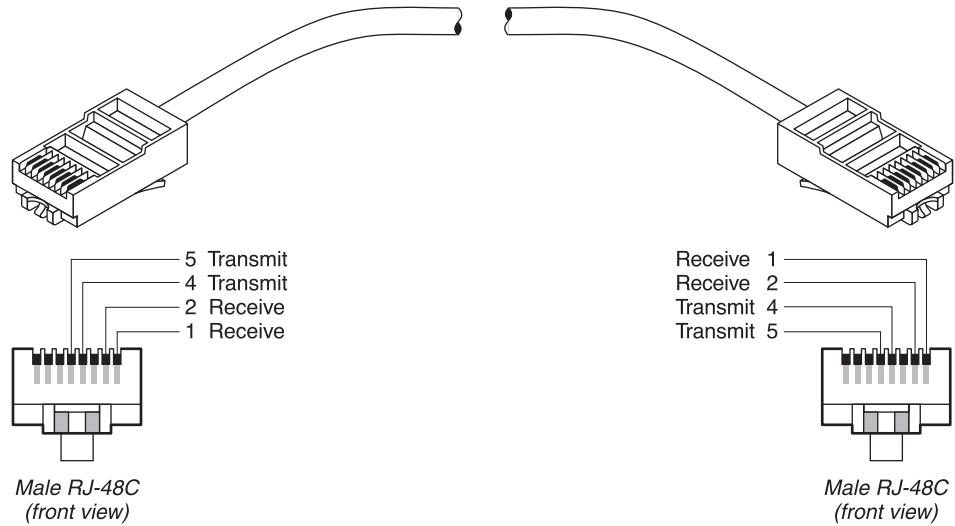


Table C-11. RJ-48C/RJ-48C straight-through cable specifications

Model number RJ48C-S Part number 2510-0064-001			
Pair #	Signal (DSL Terminator)	Male RJ-48C (DSL Terminator)	Male RJ-48C (remote)
1	Receive	1 2	1 2
2	Transmit	5 4	5 4

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

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 C-8 and Table C-12 show the pinouts.

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

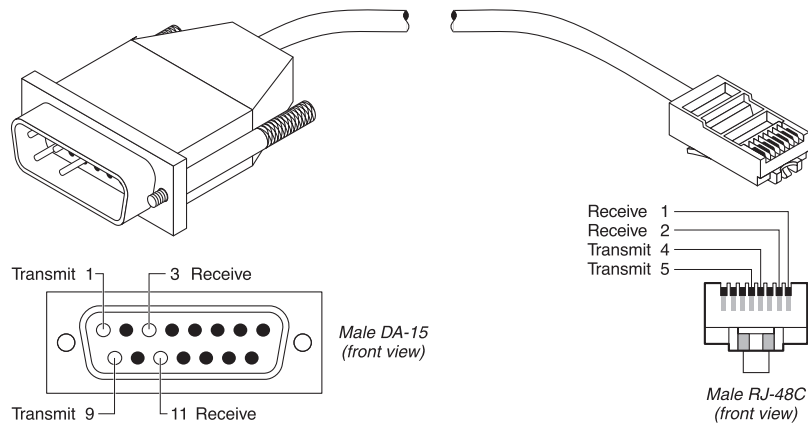


Table C-12. RJ-48C/DA-15 straight-through cable specifications

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

RJ-48C/DA E1 crossover cable

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 C-9 and Table C-13 show the pinouts.

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

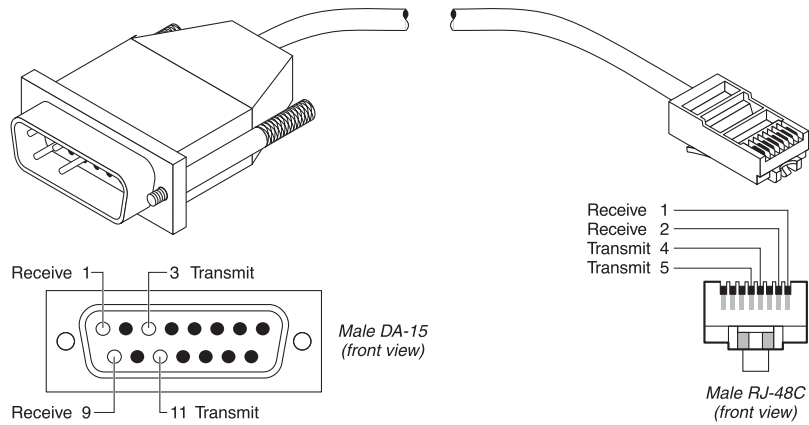


Table C-13. RJ-48C/DA crossover cable specifications

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

RJ-48C/Bantam E1 straight-through cable

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

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

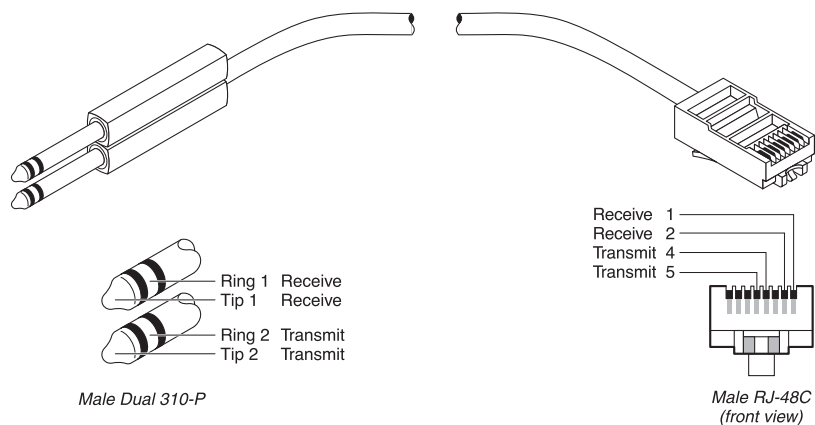


Table C-14. RJ-48C/Bantam straight-through cable specifications

Model number DBNT-RJ-45 Part number 2510-0066-001			
Pair #	Signal (DSL Terminator)	Male RJ-48 (DSL Terminator)	Male Dual-310-P (remote)
1	Receive	1	Tip 1
		2	Ring 1
2	Transmit	5	Tip 2
		4	Ring 2

DSL Terminator BNC to RJ-48C straight-through cable for E1

The DSL Terminator BNC to RJ-48C cable adapts a modular E1 port on the DSL Terminator to coaxial cable E1 lines. You must also set the jumpers within the DSL Terminator for 50 ohm service. Figure C-11 and Table C-15 show the pinouts.

Figure C-11. DSL Terminator BNC to RJ-48C straight-through cable

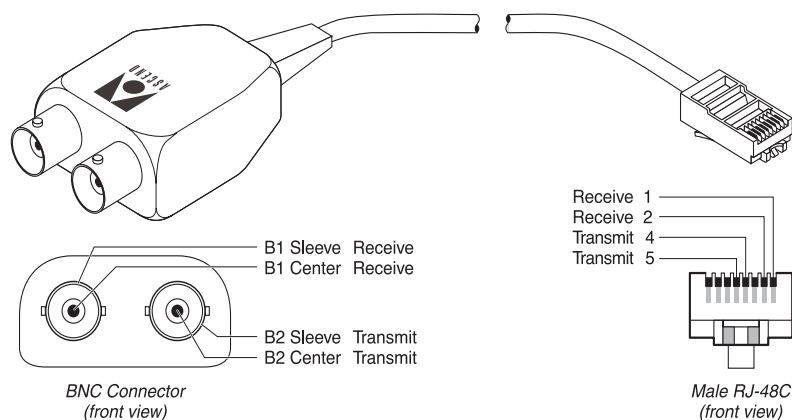


Table C-15. DSL Terminator BNC to RJ-48C straight-through cable specifications

Part number 2510-0272-001			
Pair #	Signal (DSL Terminator)	Male RJ-48C (DSL Terminator)	Male Dual-BNC (remote)
1	Transmit	4 5	B1 Sleeve B1 Center
2	Receive	1 2	B2 Sleeve B2 Center

E1 WAN ports

Table C-16 lists the pins on RJ-48C sockets on the DSL Terminator used for E1 WAN interface. Only pins 1, 2, 4, and 5 are used. The remaining pins are not connected.

Table C-16. Transmit and Receive pins

DSL Terminator E1 interface	RJ-48C DTE
Receive (input) pair, Tip (T1)	Position 2
Receive (input) pair, Ring (R1)	Position 1

Table C-16. Transmit and Receive pins (continued)

DSL Terminator E1 interface	RJ-48C DTE
Transmit (output) pair, Tip (T)	Position 5
Transmit (output) pair, Ring (R)	Position 4

E1 models are also equipped with BNC connectors. (This requires that wire jumpers be configured on the card).

Safety-related Electrical, Environmental, and Physical Specifications



Warning: Before installing the DSL Terminator, be sure to read the safety instructions in the *Access Networks Safety and Compliance Guide* for safety instructions and country-specific information.

Electrical specifications	D-19
Environmental requirements	D-21
Physical Specifications	D-21

Electrical specifications

Battery

The DSL Terminator contains an internal 3V lithium battery. The normal operating life of the battery exceeds five years.

Only trained engineers authorized by Lucent should open the DSL Terminator unit's case for testing, maintenance, installation, or any other purpose. Furthermore, only trained engineers should replace DSL Terminator components. Disposal of discarded batteries should be done in accordance with the instructions of the manufacturer.

Power requirements

Maximum power consumed by any of the DSL Terminator cards is 6.5 watts. A fully loaded DSL Terminator consumes 38 watts maximum.

Table D-1 describes the ac source power requirements for the DSL Terminator .

Table D-1. DSL Terminator ac source power requirements

Element	Value
Input voltage	90-260 Vac
Input power	115 Vac 108 watts maximum 240 Vac 113 watts maximum
Fuse	2A, 250V T type
Frequency	50/60 Hz
Input current	115 Vac 1.4A (rms) 240 Vac 0.7A (rms)
Inrush current	115 Vac 15A maximum 240 Vac 30A maximum

Table D-2 describes the dc source power requirements for the DSL Terminator.

Table D-2. DSL Terminator dc source power requirements

Element	Value
Input voltage	36-72 Vdc
Input power	75 watts maximum
Input current	2.37A maximum

The DSL Terminator stores its configuration profiles in battery-protected memory. When you power off the unit, the profiles remain intact.

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

Alarm relay operating specifications

On the back panel of the DSL Terminator unit is a pair of alarm-relay terminal-block contacts that remain open during normal operation. The contacts close during loss of power, hardware failure, reset, or when the ambient temperature inside the unit exceeds 65 C.

The maximum rated load for the alarm relay is:

- 1 amp at 30 Vdc
- 0.6 amp at 60 Vdc
- 0.6 amp at 60 Vac



Caution: To reduce the risk of electric shock, do not connect the alarm circuit to a device with an output exceeding 30 Vrms, 42.4 Vpeak, or 60 Vdc.

Ground wire size

Minimal ground wire size for the DSL Terminator is 18 American Wire Gauge (AWG), (0.75 mm² cross sectional area).

Environmental requirements

For best results, you should house the DSL Terminator in a room with constant temperature and humidity. In general, cooler environments are better. An operating temperature of 32° to 104° Fahrenheit (0° to 40° Celsius) is recommended. Storage temperatures of -40° to 176° Fahrenheit (-71.4° to 80° Celsius) are acceptable.

Humidity should be high enough to prevent accumulation of static electricity, but low enough to prevent condensation. An operating relative humidity from 5% to 90% is acceptable.

You can operate the DSL Terminator at altitudes of 0 to 14800 ft. (0-4500 m).

Physical Specifications

The DSL Terminator base system weighs 10 lbs (4.6 kg). The DSL Terminator has the following dimensions: 1.75" x 17" x 12" (4.5 cm x 43.2 cm x 30.5 cm).

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