MAX 6000 Series
Getting Started

Ascend Communications, Inc.
Part Number: 7820-0539-002
For software version 6.0.0

Ascend Customer Service

You can request assistance or additional information by telephone, email, fax, or modem, or over the Internet.

Obtaining Technical Assistance

If you need technical assistance, first gather the information that Ascend Customer Service will need for diagnosing your problem. Then select the most convenient method of contacting Ascend Customer Service.

Information you will need

Before contacting Ascend Customer Service, gather the following information:

- Product name and model
- Software and hardware options
- Software version
- Service Profile Identifiers (SPIDs) associated with your product
- Your local telephone company's switch type and operating mode, such as AT&T 5ESS Custom or Northern Telecom National ISDN-1
- Whether you are routing or bridging with your Ascend product
- Type of computer you are using
- Description of the problem

How to contact Ascend Customer Service

After you gather the necessary information, contact Ascend in one of the following ways:

Telephone in the United States	800-ASCEND-4 (800-272-3634)
Telephone outside the United States	510-769-8027 (800-697-4772)
Austria/Germany/Switzerland	(+33) 492 96 5672
Benelux	(+33) 492 96 5674
France	(+33) 492 96 5673
Italy	(+33) 492 96 5676
Japan	(+81) 3 5325 7397
Middle East/Africa	(+33) 492 96 5679
Scandinavia	(+33) 492 96 5677
Spain/Portugal	(+33) 492 96 5675
UK	(+33) 492 96 5671
Email	support@ascend.com
Email (outside US)	EMEAsupport@ascend.com

Facsimile (FAX)	510-814-2312
Customer Support BBS by modem	510-814-2302

You can also contact the Ascend main office by dialing 510-769-6001, or you can write to Ascend at the following address:

Ascend Communications
1701 Harbor Bay Parkway
Alameda, CA 94502

Need information about new features and products?

Ascend is committed to constant product improvement. You can find out about new features and other improvements as follows:

- For the latest information about the Ascend product line, visit our site on the World Wide Web:

  `http://www.ascend.com`

- For software upgrades, release notes, and addenda to this manual, visit our FTP site:

  `ftp.ascend.com`

Important safety instructions

The following safety instructions apply to the MAX:

1 Read and follow all warning notices and instructions marked on the product or included in the manual.

2 The maximum recommended ambient temperature for MAX models is 104° Fahrenheit (40° Celsius). Care should be given to allow sufficient air circulation or space between units when the MAX is installed in a closed or multi-unit rack assembly, because the operating ambient temperature of the rack environment might be greater than room ambient.

3 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.

4 Ensure proper procedures for static electricity, such as using a grounding mat and a wrist strap.

5 Installation of the MAX in a rack without sufficient air flow can be unsafe.

6 If installed in a rack, the rack should safely support the combined weight of all equipment it supports. A fully loaded redundant-power MAX weighs 56 lbs (25.5 kg). A fully loaded single-power MAX weighs 30 lbs (13.6 kg).

7 The connections and equipment that supply power to the MAX should be capable of operating safely with the maximum power requirements of the MAX. In the event of a power overload, the supply circuits and supply wiring should not become hazardous. The input rating of the MAX is printed on its nameplate.

8 Models with AC power inputs are intended to be used with a three-wire grounding type plug - a plug which 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.

9 Before installation, use an outlet tester or a voltmeter to check the AC receptacle for the presence of earth ground. If the receptacle is not properly grounded, the installation must not continue until a qualified electrician has corrected the problem. Similarly, in the case of DC input power, check the DC ground (s).

10 If a three-wire grounding type power source is not available, consult a qualified electrician to determine another method of grounding the equipment.

11 Models with DC power inputs must be connected to an earth ground through the terminal block Earth/Chassis Ground connectors. This is a safety feature. Equipment grounding is vital to ensure safe operation.

12 Before installing wires to the MAX 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.

13 Connect the equipment to a 48 VDC supply source that is electrically isolated from the AC source. The 48VDC source should be reliably connect to earth.

14 Install only in restricted access areas in accordance with Articles 110-16, 110-17, and 110-18 of the National Electrical Code, ANSI/NFPA 70.

15 Do not allow anything to rest on the power cord and do not locate the product where persons will walk on the power cord.

16 Do not attempt to service this product yourself, as opening or removing covers may expose you to dangerous high voltage points or other risks. Refer all servicing to qualified service personnel.

17 General purpose cables are provided with this product. Special cables, which may be required by the regulatory inspection authority for the installation site, are the responsibility of the customer.

18 When installed in the final configuration, the product must comply with the applicable Safety Standards and regulatory requirements of the country in which it is installed. If necessary, consult with the appropriate regulatory agencies and inspection authorities to ensure compliance.

19 A rare phenomenon can create a voltage potential between the earth grounds of two or more buildings. If products installed in separate buildings are *interconnected*, the voltage potential may cause a hazardous condition. Consult a qualified electrical consultant to determine whether or not this phenomenon exists and, if necessary, implement corrective action prior to interconnecting the products.

In addition, if the equipment is to be used with telecommunications circuits, take the following precautions:

- Never install telephone wiring during a lightning storm.
- Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using equipment connected to telephone lines (other than a cordless telephone) during an electrical storm. There is a remote risk of electric shock from lightning.

- Do not use a telephone or other equipment connected to telephone lines to report a gas leak in the vicinity of the leak.

Warning: To reduce the risk of fire, communication cable conductors must be 26 AWG or larger.

Attention: Afin de reduire les risques d'incendie, les fils conducteurs du cable de communication doivent etre d'un calibre minimum de 26 AWG (American Wire Gauge), cest-a-dire d'un minimum de 0,404 mm.

Warnung: Um Feuerrisiken zu reduzieren, müssen die Kommunikationskabel-Anschlüße 26 AWG oder größer sein.

Contents

Figures

Tables

About This Guide

How to use this guide

This guide explains how to install and test the MAX 6000 series (referred to as the MAX) 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 MAX.

This guide contains:

- “Chapter 1, “Getting Acquainted with the MAX,” describes the main features and provides a list of package contents.
- “Chapter 2, “Setting Up and Testing the MAX Hardware,” explains install and test the MAX hardware.
- Chapter 3, “Quickstart,” explains how to perform a basic configuration of your MAX.
- Chapter 4, “Navigating the User Interface,” tells you how to navigate the MAX user interfaces.
- Appendix A, “Provisioning the Switch,” gives you information that your T1, E1, or BRI service provider needs to properly provision the Central Office switch.
- Appendix B, “MAX Technical Specifications,” lists the technical specifications of the MAX and the pin assignments for each interface.
- Appendix C, “Cables and Connectors,” describes specifications for different facets of the MAX, and discusses cabling requirements.
- Appendix D, “FCC and Canadian Notices,” shows the FCC and Canadian Notices and Warnings.
- Appendix E, “Warranty,” 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 MAX. To configure the MAX, you need to understand the following:

- Wide area network (WAN) concepts
- Local area network (LAN) concepts, if applicable

Documentation conventions

This section explains all the special characters and typographical conventions 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 ***`italics`***—see *Italics*, below). If you could enter the characters, but are not specifically instructed to, they do not appear in boldface.
Italics	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. The parameter that follows the angle bracket is one of the options that appears when you select the parameter 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.

Manual set

The MAX 6000 Series Documentation Set consists of the following manuals:

- *Getting Started* (this guide)
- *ISP and Telecommuting Configuration Guide*
- *MIF Supplement*
- *RADIUS Configuration Guide*

- *Reference Guide*
- *Security Supplement*

Related publications

This guide and documentation set do not provide a detailed explanation of products, architectures, or standards developed by other companies or organizations.

Here are some related publications that you may find useful:

- *The Guide to T1 Networking*, William A. Flanagan
- *Data Link Protocols*, Uyless Black
- *The Basics 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

Getting Acquainted with the MAX

1

This chapter covers these topics:

What is the MAX?

The MAX is a WAN access router designed for central site remote access applications. It has these main features:

- Supports digital WAN access for numerous WAN services
- Allows digital and analog modems to dial in over channelized T1/PRI and E1/PRI access lines
- Provides IP and IPX routing, bridging, and terminal server functions
- Aggregates multiple calls for Bandwidth-on-Demand
- Supports multiple security methods
- Has various management and control features

What items are included in your package?

The MAX package contents vary, depending on the base unit and expansion cards you order. This section helps you confirm the items in your package.

Checking the MAX base unit

Open the shipping package and make sure you have received the base MAX unit that you ordered. Figure 1-1 displays the AC MAX base unit, Figure 1-2 displays the AC Redundant MAX base unit and Figure 1-3 displays the DC MAX base unit (with a DC power source).

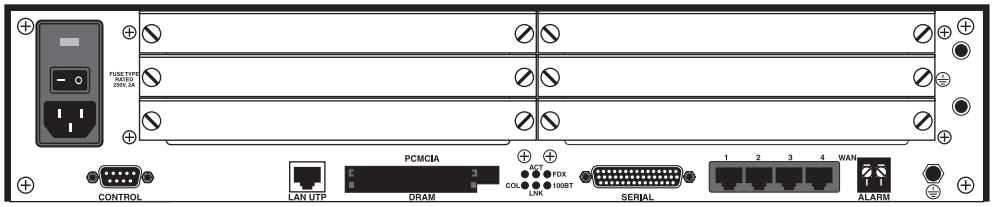


Figure 1-1. MAX base unit

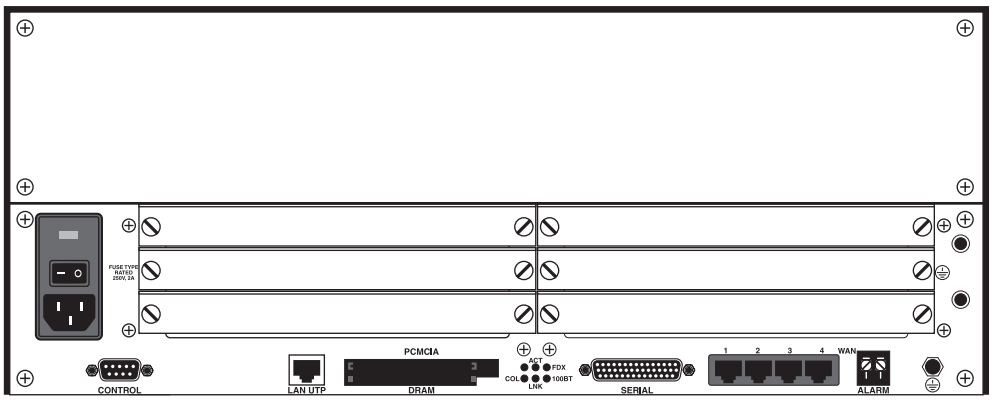


Figure 1-2. Redundant MAX base unit

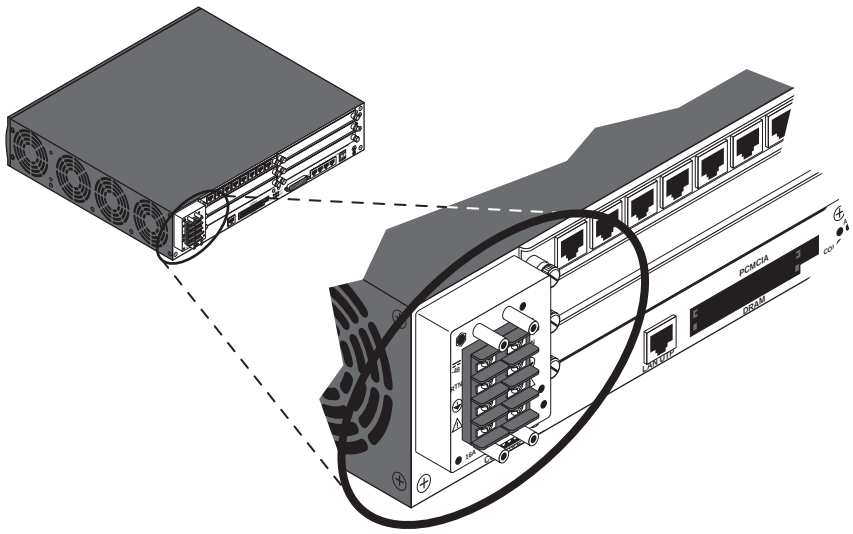


Figure 1-3. DC power source on the MAX 6000 and the Redundant MAX 6000

Checking other package contents

After you verify that you have received the right base unit, make sure your package contains these items:

- A console cable (null-modem)
- Two adapters
- A power cable
- A rack-mounting kit
- Separately packaged expansion modules, if you ordered them separately

If you are missing any items, contact your MAX distributor.

Checking the expansion cards

The MAX can accommodate up to six expansion cards (also referred to as expansion modules or slot cards). Use this section to identify your expansion cards.

Digital modem card

The digital modem card provides eight, twelve, or sixteen V.34/V.42 digital modems. You can install a maximum of 72 digital modem in the MAX. See Figure 1-4.

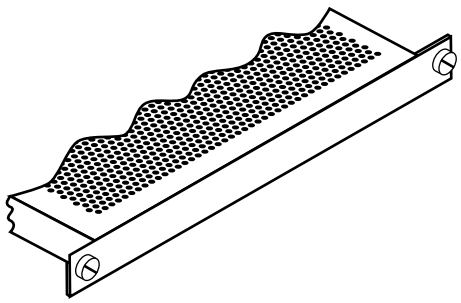


Figure 1-4. Digital modem card

Host/6 card

The Host/6 card, also known as the AIM/6 card, supports up to 32 online channels. You can install a maximum of two Host/6 cards in the MAX. See Figure 1-5.

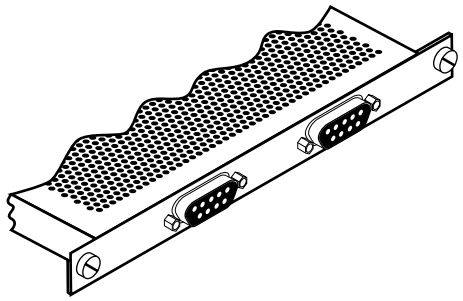


Figure 1-5. Host/6 card

ISDN BRI Network interface and terminal interface cards

The ISDN BRI network interface card and ISDN terminal interface cards have eight ISDN BRI ports. You can install a maximum of four ISDN BRI network interface cards in the MAX. See Figure 1-6.

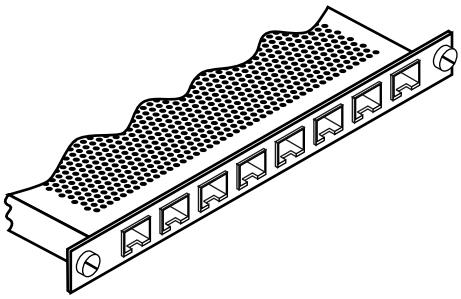


Figure 1-6. ISDN BRI network interface or terminal interface cards

Multiband inverse multiplexing card

The Multiband inverse multiplexing card has two or six user-selectable RS-449, V.35, or X.21 serial host ports with inverse multiplexing and RS-366 capability, V.25bis, or control-lead signaling. Figure 1-7 shows the two-port card.

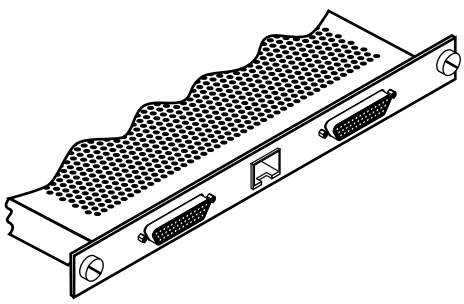


Figure 1-7. Multiband inverse multiplexing two-port card

Series56 digital modem card

The Series56 digital modem card provides eight, twelve, or sixteen digital modems per card. You can install a maximum of 72 digital modems in the MAX. See Figure 1-8.

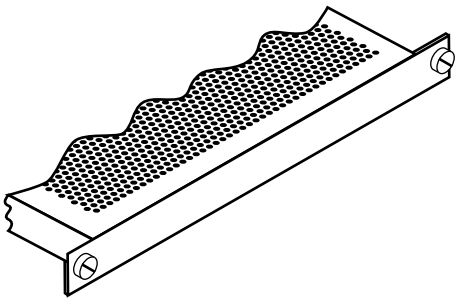


Figure 1-8. Series56 Digital modem card

V.110 card

The V.110 card provides up to eight V.110 WAN sessions. You can install a maximum of two V.110 cards in the MAX. See Figure 1-9.

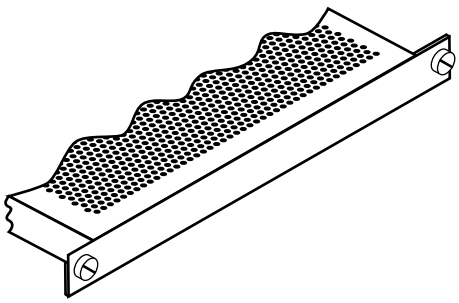


Figure 1-9. V.110 card

PIFSA-16 card

The PIFSA-16 card provides up to 16 PIFSA WAN sessions. You can install a maximum of six PIFSA-16 cards in the MAX.

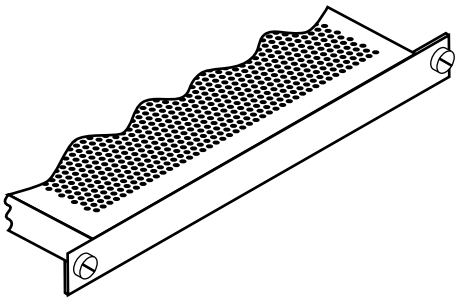


Figure 1-10. PIFSA card

IDSL card

Ascend's ISDN Digital Subscriber Line (IDSL) card (displayed as BRI/LT in the vt100 menu screen) supports incoming and outgoing voice calls. To support outgoing voice calls, the connected TE (Terminal Equipment) must send digits to the MAX using Q.931 en-bloc dialing (sends all dialed digits to the MAX in one block (the ISDN Call Setup message) rather than one digit at a time).

The MAX receives outgoing call requests from attached ISDN TE and routes voice calls to the PSTN (Public Switched Telephone Network) over a T1 line or ISDN PRI line. The MAX receives incoming voice calls and routes them to TEs connected to IDSL cards based on DNIS (Dialed Number Identification Service). See Figure 1-11.

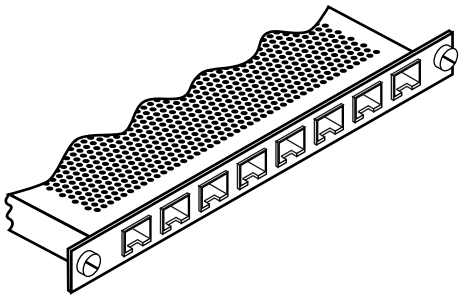


Figure 1-11. IDSL card

DRAM card

This is a proprietary Ascend card. It is *not* hot-swappable and should not be removed while the MAX is running. The DRAM card attaches directly to the CPU bus and damage might occur if you attempt to remove it.

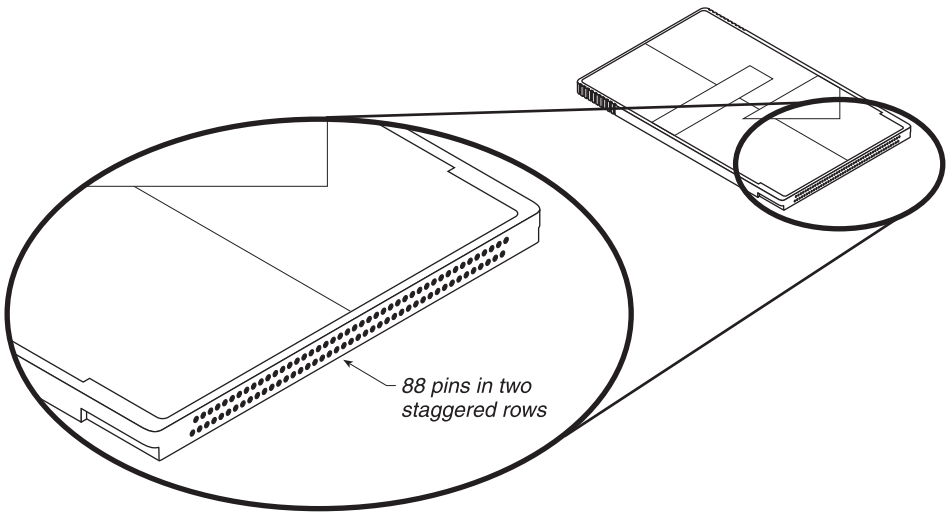


Figure 1-12. DRAM card

PCMCIA flash card

This is a standard card that extends existing flash memory.

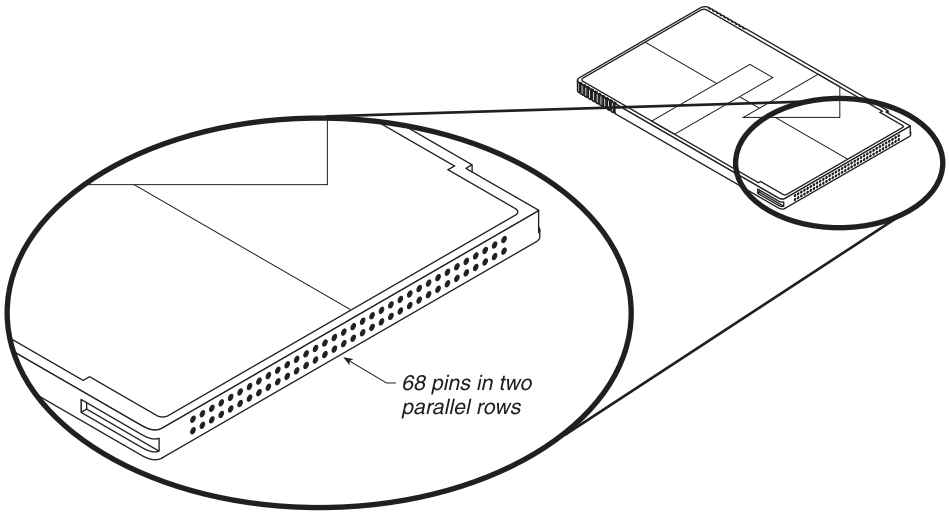


Figure 1-13. PCMCIA card

Interfaces

Read this section to learn the names and descriptions of the types of physical interfaces on the MAX.

Interfaces on the base unit

Figure 1-1 on page 1-2 and Figure 1-2 on page 1-2 show the physical interfaces on the MAX base unit.

POWER

The power interface on the MAX accepts AC or DC power depending on the model you purchased. Figure 1-1 on page 1-2 and Figure 1-2 on page 1-2 show AC power sockets. Figure 1-3 on page 1-2 shows the DC power socket. See Appendix B, “MAX Technical Specifications” for further details.

CONTROL

The Control port connects to a VT-100 terminal or modem to access and provides the menu-driven user interface to the MAX. It runs at 9600 bit/s (configurable through the user interface), 8 bits per character, no parity, no flow control, 1 stop bit. See Appendix C, “Cables and Connectors,”section “User interface specifications” for details on cables that connect to this port.

LAN UTP

The LAN UTP port connects the MAX to a UTP (unshielded twisted pair 10/100 BaseT) LAN. See Appendix C, “Cables and Connectors,”section “Ethernet interface specifications” for details on cables that connect to this port.

PCMCIA

The PCMCIA interface accepts a plug-in PCMCIA card. See Figure 1-13 on page 1-7.

DRAM

The DRAM interface accepts a plug-in DRAM card. See Figure 1-12 on page 1-6.

SERIAL V.35 DTE Port

The Serial V.35 DTE port provides a point-to-point connection between the MAX and another device. This port is called the Serial WAN port in these manuals. See Appendix C, “Cables and Connectors,”section “Serial WAN cabling specifications” for details on cables that connect to this port.

WAN (1 to 4)

The WAN ports are either a group of four T1 or four E1 ports providing point-to-point T1/E1 connections between the MAX and other devices. These ports are called Net/T1 and Net/E1 ports in these manuals. See Appendix C, “Cables and Connectors,”sections “T1/PRI interface specifications” and “E1/PRI interface specifications” for details on cables that connect to these ports.

ALARM

The Alarm interface is a two-connector terminal block that provides indication of alarm conditions. See Appendix B, “MAX Technical Specifications” for further information on the alarm relay.

Interfaces on expansion cards

AIM/BONDING

The DCE interfaces in Figure 1-5 on page 1-4 and Figure 1-7 on page 1-4 provide AIM/ BONDING inverse multiplexing services to devices connected to them. See Appendix C, “Cables and Connectors,” section “Serial host interface specifications” for details on cables that connect to these ports.

PALMTOP

A port that connects to a hand-held *palmtop* control terminal, although it can also connect to a VT-100 terminal. (See Figure 1-7 on page 1-4.) The Palmtop port provides access to the menu-driven user interface of the MAX. It runs at 9600 bit/s (configurable through the user interface), 8 bits per character, no parity, no flow control, 1 stop bit. See Appendix C, “Cables

and Connectors," section "User interface specifications" for details on cables that connect to these ports.

ISDN BRI

ISDN BRI ports are either a group of eight DTE or eight DCE ports providing point-to-point ISDN BRI connections between the MAX and other devices. (See Figure 1-6 on page 1-4.) These ports are called the Net/BRI and Host/BRI ports in these manuals for the DTE and DCE interfaces, respectively. From the point of view of the MAX pins 3 and 6 transmit on the Net/BRI interface while they receive on the Host/BRI interface. Pins 4 and 5 receive on the Net/BRI interface and transmit on the Host/BRI interface. See Appendix C, "Cables and Connectors," section "ISDN BRI interface specifications" for details on cables that connect to these ports.

IDSL

The IDSL ports are a group of eight DCE ports providing point-to-point IDSL connections between the MAX and other devices. (See Figure 1-11 on page 1-6.) An IDSL port has the same pinouts as a Host/BRI port. See Appendix C, "Cables and Connectors," section "IDSL specifications" for further information.

Setting Up and Testing the MAX Hardware 2

This chapter covers these topics:

Planning the hardware installation

This section explains what you need before you install the MAX hardware.

What you need before you start

Before you install the MAX, make sure have these items:

- A suitable location to install the MAX hardware.
- If you are rack-mounting the MAX hardware, make sure you have a one-unit air gap for cooling (approximately 4 inches) between the MAX and other rack-mount hardware.
- One or more active line(s), with at least one line set for bidirectional calling.

  Bidirectional calling allows you to test the MAX hardware, by having the MAX dial out on one channel and answer on another channel.
- If applicable, one or more active BRI lines.
- If you have an Ethernet interface, you need the appropriate cables and connectors to set up and test your Ethernet LAN connection.
- A locally-connected host or workstation that can PING or TELNET the MAX.
- A VT100 terminal or a communications package that supports VT100 emulation installed on your workstation and an Ethernet interface.
- A remote Ascend or compatible unit to which you can PING or TELNET over a dial-up Point-to-Point Protocol (PPP) connection.

- If applicable, expansion modules that were shipped separately.
- If applicable, a hand-held Palmtop terminal and associated cable less than 10 feet (3 meters) in length.

Guidelines for installing digital modems

- The Series56 architecture requires that all modem modules within a MAX chassis be homogeneous. That is, Series56 modules may not be mixed with non-Series56 digital modem modules.
- The Series56 architecture also requires that the modem density be homogeneous. Modem modules with mixed densities (for example, 8-port and 12-port modem modules) cannot be combined in a single chassis.
- The MAX can support a total of 72 digital modems.

Guidelines for installing MAX units in a rack

This section provides installation guidelines for installing MAX units in a rack. Figure 2-1 illustrates an example installation.

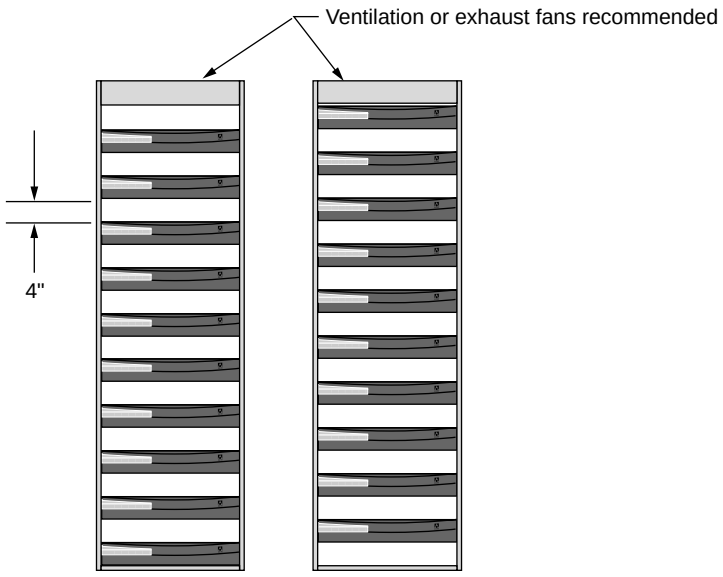


Figure 2-1. Installing MAX units in a rack.

- Leave approximately 4" vertical space between MAX units. This allows for air flow between units and leaves room for handling the MAX units if they need to be removed.
- Leave approximately 1 foot between the racks of MAX units for air flow dissipation.
- Stair step MAX in adjacent open racks.

  The MAX intake fans are on the right (as viewed from the front); the exhaust fans on the left. Stair-stepping the MAX units in the racks ensure that hot air from one MAX is not being blown into adjacent MAX units.
- Ensure adequate cooling in the room.
  - Racks with open sides are recommended because the MAX fans vent on the side of the unit.

– In enclosed racks make sure there are openings 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.

If you ordered MAX expansion cards separately, continue with the next section. If all of your expansion cards are preinstalled, skip to the section "Setting up the hardware" on page 2-4.

Inserting an expansion card

Warning: When installing any equipment, make sure to use proper procedures for static electricity, such as using a grounding mat and a wrist strap.

If your MAX package includes expansion modules that are not already installed in your MAX, insert the modules now. Follow these steps:

1 Make sure the MAX power is off and the power cord is unplugged.

Warning: Failure to turn off the MAX power and unplug the power cord could result in injury to you.

2 Hold the expansion card with the network ports facing you and insert the card into a back panel slot as shown in Figure 2-2. Do not grab the slot cards from both ends. Make sure you insert the card into the guides within the same plane.

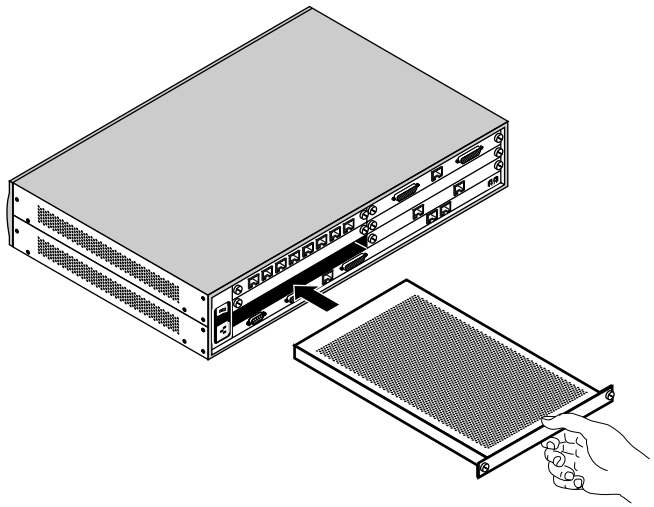


Figure 2-2. Inserting an expansion card into a MAX slot

3 Push the card along the internal guides until the it is secure. The face plate of the expansion card should touch the back panel of the MAX.

Caution: Do not force the expansion 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 the following figure.

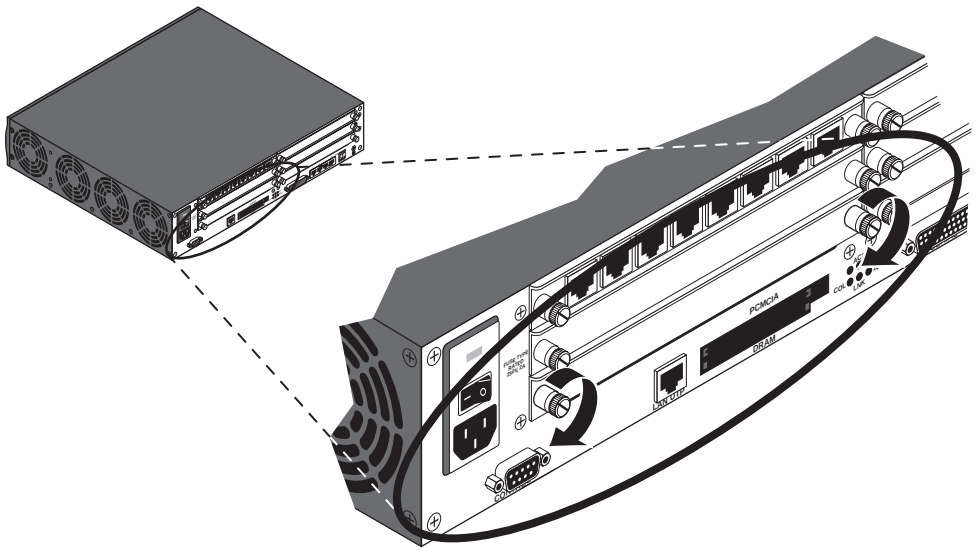


Figure 2-3. Tightening slot card thumbscrews

Now you are ready to set up the hardware.

Setting up the hardware

Before you set up the MAX hardware, you need to make sure you have the appropriate space. You can install the MAX in a 19-inch or 23-inch rack.

The following illustrations show the dimensions of both base MAX units—the single power supply unit and the redundant power supply unit.

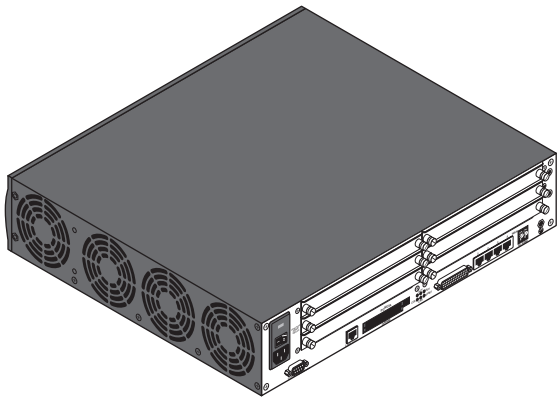


Figure 2-4. Dimensions of the single power supply unit

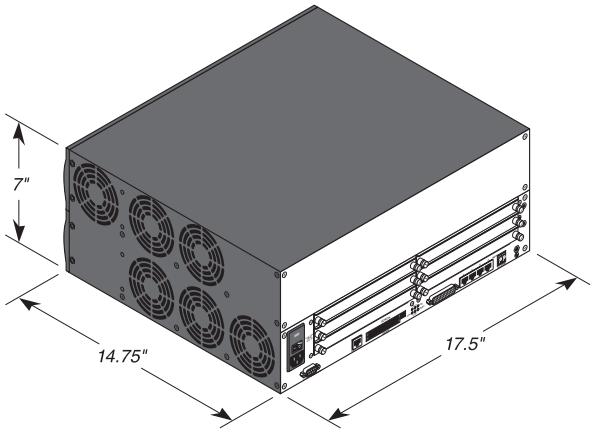


Figure 2-5. Dimensions of the redundant power supply unit

To set up the MAX hardware, follow these steps:

1 If you are installing the MAX in a rack, insert the unit in the rack and secure it. See Figure 2-6.

If you are not rack-mounting the MAX, place it where you can have full access to the front and back panels.

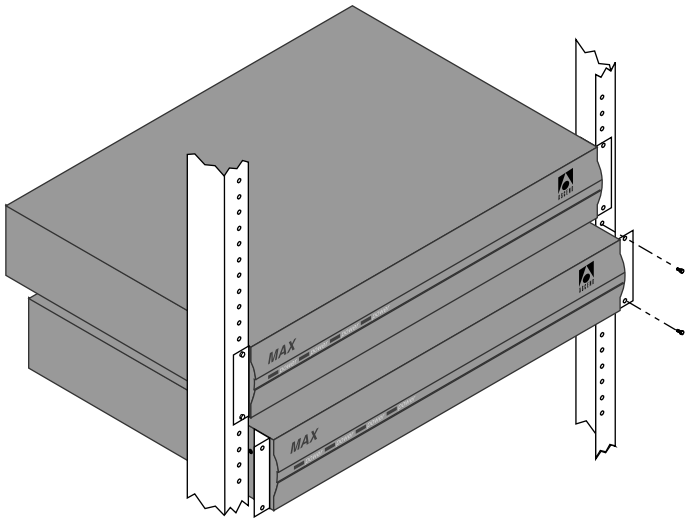


Figure 2-6. Mounting the MAX in a rack

2 Connect your VT100 terminal or workstation with VT100 terminal emulation software to the MAX Control port, using the null-modem cable provided in your package.

3 If applicable, connect your hand-held Palmtop terminal to the Palmtop port.

Connecting to input power

1. Plug your power cord into your AC or DC power source. (Figure 1-1 and Figure 1-3 display the power sources and Appendix B, “MAX Technical Specifications” lists input power requirements.)

Connecting to the LAN

To connect to the LAN:

1. Connect your Ethernet LAN cable to the Ethernet interface on the MAX.
2. The MAX 6000 supplies a 10Base-T Ethernet port. You will need as adapter if you have another type of Ethernet LAN.

Connecting the MAX to the T1 Line

To connect your MAX to the T1 line:

1. Connect the MAX either directly to the T1/PRI line or through other network interface equipment.

   Note: To connect to the demarcation point, where the T1/PRI line’s metallic interface connects to other equipment, the MAX T1/PRI ports must be equipped with internal CSUs. Otherwise, external CSUs or other network (WAN) interface equipment must be installed between the MAX and the demarcation point.
2. Inform your T1/PRI service provider that your equipment is connected, so they can bring up the line.

Now that you have connected the MAX, you are ready to learn about the LEDs. Refer to “Interpreting the MAX LEDs” on page 2-7.

Connecting the MAX to the E1 Line

To connect your MAX to the E1 line:

1. Use a cable that is specifically constructed for transmission of E1/PRI signals (CCITT G700 series recommended).
2. The MAX can connect to any DPNSS access point on a Private Branch Exchange (PBX) or directly to E1 digital services. The MAX can also connect to G.704 framed leased (non-switching) services for 75 Ohm. (Use cable 2510-0272-001 with 75 Ohm E1 lines.)

   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) inside the MAX chassis are provided on the MAX to earth the coaxial screens. The default position of the grounding links on

the network line interface, when used with coaxial cable adapter, is on the transmit side (Tx) for 1680 kbps network operations.

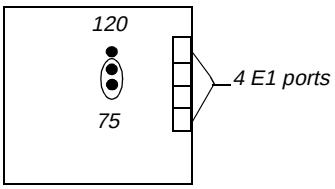


Figure 2-7. One set of links for each E1 port

For a daisy chain connection of the MAX E1/PRI unit, only line 1 needs an earth link (jumper), as line 1 is the only port connected to the telecommunications network.

3 Connect your MAX to the E1 PRI network interface (TA) equipment supplied by your PTT.

The maximum distance between the E1/PRI WAN interface equipment and the MAX should not introduce attentuation of more than 6db, when measured at half the maximum data rate (1024 kbps). Also, the cable must have a root F characteristic.

Now that you have connected the MAX, you are ready to learn about the LEDs.

Interpreting the MAX LEDs

Before you start up the MAX, you need to understand the LEDs on the MAX. Figure 2-8 shows the location of LEDs on the front panel, Figure 2-9 shows the location of the LEDs on the redundant MAX front panel and Figure 2-10 shows the Ethernet interface LEDs on the MAX back panel.

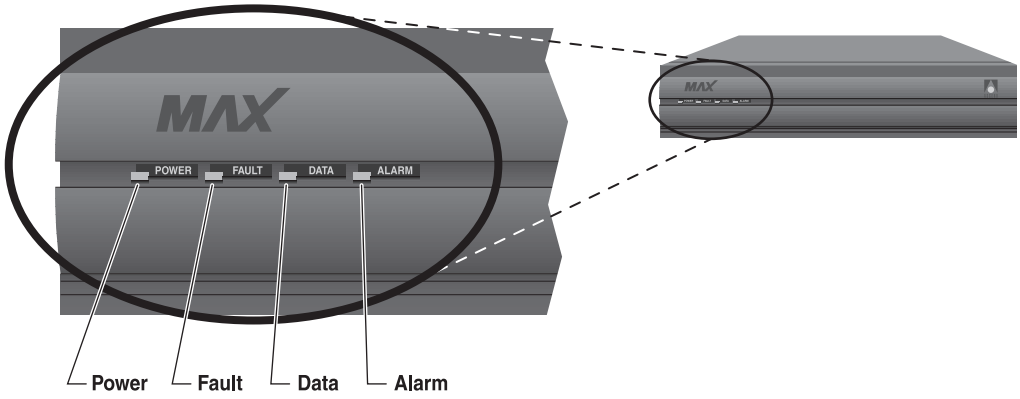


Figure 2-8. Location of the MAX LEDs

Table 2-1 lists and describes each LED.

Table 2-1. MAX LEDs

LED	Description
Power	This LED is on when the MAX power is on.
Fault	This LED is on in one of two cases—either a hardware self-test is in progress or there is a hardware failure. When a hardware self-test is in progress, the LED is on. If any type of hardware failure occurs, the LED flashes. If the failure is isolated to a expansion card, the MAX may continue functioning without the expansion card.
Data	This LED is on when calls are active.
Alarm	This LED is on when there is a WAN alarm or a trunk is out of service, such as during line loopback diagnostics. WAN alarms include Loss of Sync, Red Alarm, Yellow Alarm, and All Ones (or AIS).

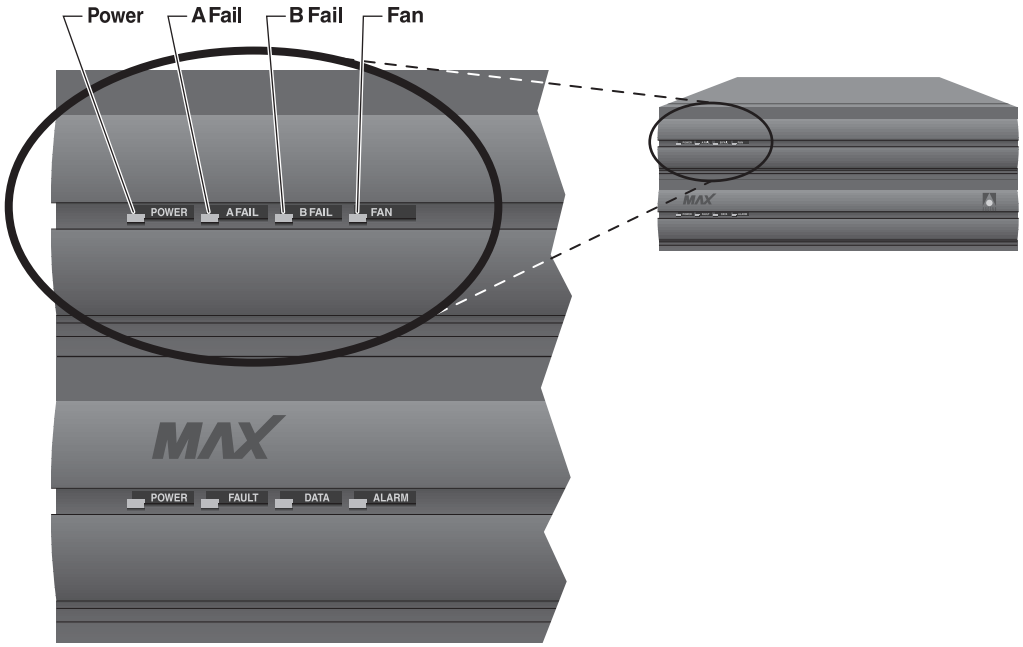


Figure 2-9. Location of the MAX LEDs on the redundant MAX

Table 2-2 lists and describes each LED.

Table 2-2. Redundant MAX LEDs

LED	Description
Power	This LED is on when the redundant MAX power supply is on.
A Fail	This LED is on only when there is a failure on power supply A, (if one or more of the voltages on the A side has failed: +5, +3.3, +12, -12, -5.)
B Fail	This LED is on only when there is a failure on power supply B, (if one or more of the voltages on the B side has failed: +5, +3.3, +12, -12, -5.)
Fan	This LED is on when the fans are functioning properly (if +12 VDC from either A or B is good.) This LED is off when there is a fan failure.

MAX back panel

The MAX back panel includes the following LEDs that display the status of the Ethernet interface:

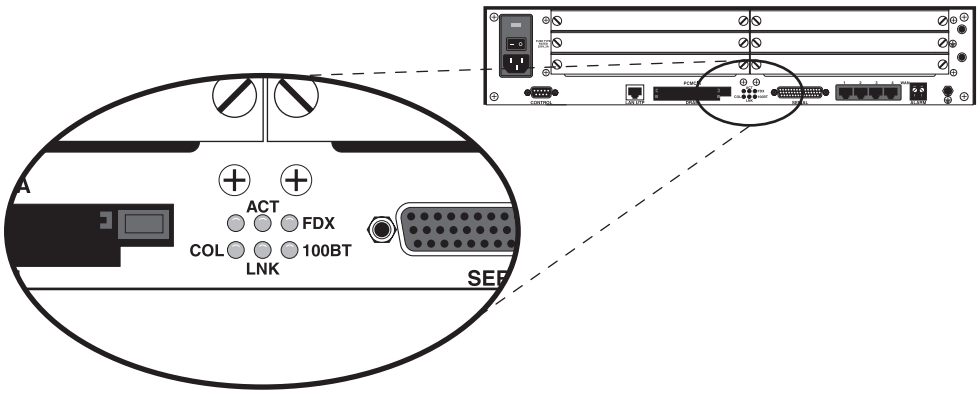


Figure 2-10. Ethernet interface LEDs on MAX back panel

Note: The Classic MAX back panel shows similar LEDs on the Ethernet expansion card if one is installed. On the Classic MAX, there is one LED for each possible Ethernet interface (10BaseT, and COAX (10Base2), which are lit when the interface is in use. The ACT and COL LEDs are the same as those on the MAX 6000 (Table 2-3).

The Ethernet interface LEDs are described in Table 2-3.

Table 2-3. Ethernet interface LEDs on back panel

LED	Description
ACT (Activity)	This LED is on when the MAX is detecting activity (network traffic) on its Ethernet interface.
COL (Collisions)	This LED is on when the MAX detects packet collisions on the Ethernet.
FDX	When this LED is on it indicates full duplex on the Ethernet.
100ST	When this LED is on, it indicates 100BT; when it is off, it indicates 10BT.
LINK (Link integrity)	This LED is on when the Ethernet interface is functional.

Now that you are familiar with the MAX LEDs, you are ready to start up the MAX.

Starting up the MAX

To start up the MAX, follow these steps:

1 If you are using a PC, set your terminal emulation package in your communications software as follows:

- 9600 bps
- 8 data bits
- No parity
- 1 stop bit
- Direct connect

2 Position yourself so you can watch the LEDs on the front panel, while you view the VT100 or Palmtop display.

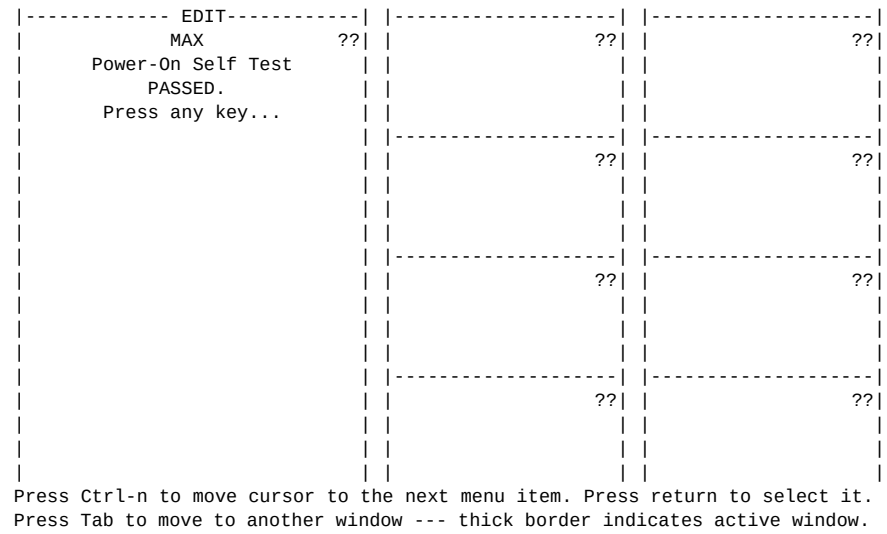
3 Connect one end of the AC power cord to a power source and the other end to the MAX.

The power-on self-test (POST) starts and finishes within one minute. While the POST is running watch the LEDs, and the VT100 or Palmtop display.

If the Power LED is on and the Fault LED is OFF the MAX is operating properly. You can continue with the next step.

If either LED is incorrect, remove the power cord and do not continue. Contact your Ascend distributor.

Also, notice the VT100 or Palmtop display during the POST. When the POST is successful, this screen appears:



4 Press any key. This reminder screen appears, instructing you to edit your line configuration before you dial:

```
Edit Line Config
before dialing
Press any key...
```

```
Press any key again to display the MAX Main Edit menu as shown.
```

```
Main Edit Menu
  >00-000 System
  10-000 Net/T1
  20-000 Host/Dual
  30-000 Ethernet
  40-000 Empty
  50-000 Empty
  60-000 Host/Dual
  70-000 Empty
  80-000 Empty
```

Continue with Chapter 3, “Quickstart,” to get your MAX up and running with a basic configuration.

Continue with Chapter 4, “Navigating the User Interface,” to learn how to navigate the MAX user interface before performing more advanced configuration as explained in MAX *6000 Series ISP & Telecommuting Configuration Guide.*

Quickstart

3

This chapter explains how to perform a basic configuration of your MAX. This chapter covers these topics

Quickstart for T1 MAX units

With this Quickstart, you will be able to perform a basic configuration of your MAX. It explains how to:

- Configure your MAX for the local Ethernet
- Configure your T1 line for either inband signaling or ISDN D-channel signaling
- Test your T1 line by performing a self test
- Telnet to the MAX from a workstation to verify it is accessible over the Ethernet

- Create a Connection profile on the MAX for a remote device (such as an Ascend Pipeline) dialing in with its own IP address or for a remote device (such as a modem) that accepts a dynamically assigned address
- Provision your line for T1, PRI, or BRI access

This Quickstart does not cover more detailed configuration such as security, RADIUS, or advanced WAN or LAN protocols. Refer to the MAX *6000 Series ISP & Telecommuting Configuration Guide* to perform more advanced configuration of your MAX.

Setting up your hardware

Before beginning, make sure you have:

- Installed the MAX as explained in the Chapter 2, "Setting Up and Testing the MAX Hardware."
- One or more active and installed T1 lines accessible from the MAX. These lines must provide switched data service on at least two channels.

  Refer to the "Provisioning the Switch" on page A-1 for information on correctly provisioning your T1 line.
- An active Ethernet LAN with appropriate cables and connectors.
- A remote unit (an Ascend Communications, Inc. unit or other compatible equipment) to which you can Ping or Telnet over a dial-up PPP encapsulated link across the WAN.
- A local host or workstation on the same subnet as the MAX that can Ping or Telnet to the MAX.

Figure 3-1 illustrates the hardware set up you must have to use this Quickstart.

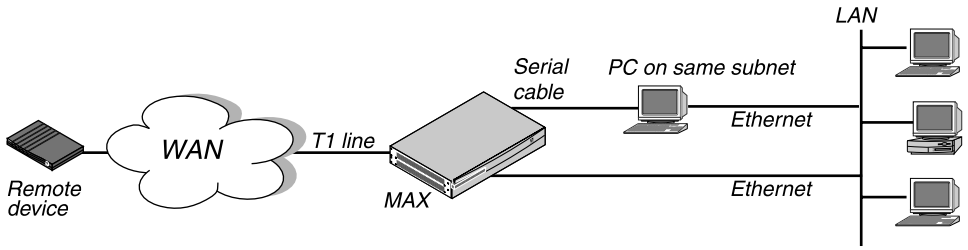


Figure 3-1. Quickstart set up

Overview of T1 line configuration

Figure 3-2 has two hunt groups—one for digital calls and one for analog calls. If you are using inband signaling, the example hunt group contains 12 channels. Analog callers call in using the phone number 555-1111 and are routed to the digital modems in slot 5. Digital callers call in using the phone number 555-2222 and are routed to the MAX bridge/router module in slot 9. This requires that you configure the Ch n slot parameter in the T1 Line profile.

Inband signaling is less flexible than ISDN D-channel signaling because you must pre-allocate the number of T1 channels used for voice and data calls. If 12 analog callers are dialed in,

subsequent analog callers are rejected because there are no more channels available for analog calls, even though there are 12 unused channels.

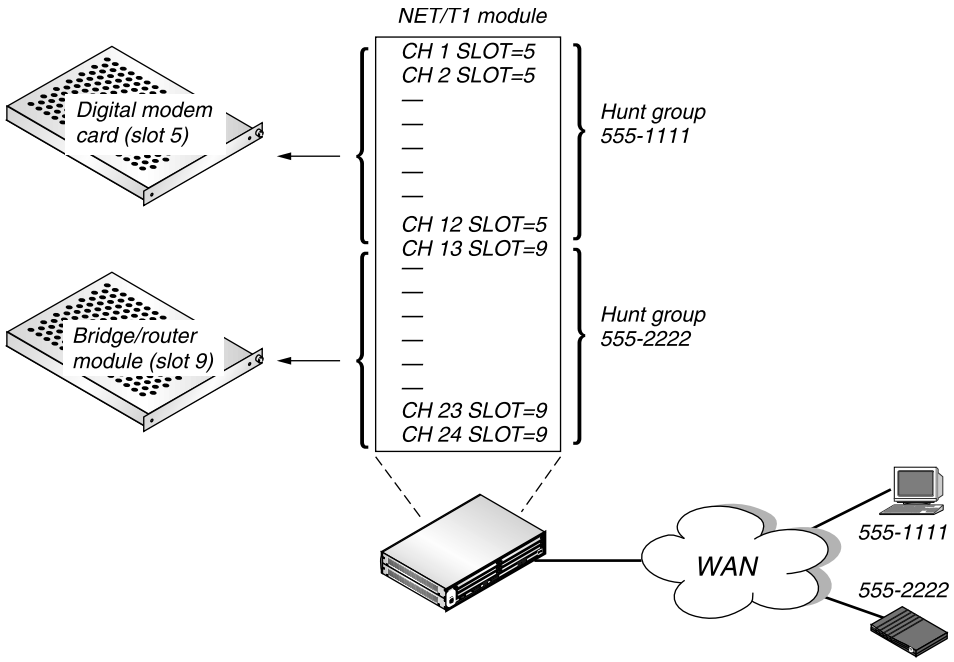


Figure 3-2. Incoming call routing using inband signaling and hunt groups

If you are using ISDN D-channel signaling (Figure 3-3) the example hunt group contains 24 channels. Analog callers call in using the phone number 555-1111 and are routed to the digital modems in slot 5. Digital callers call in using the phone number 555-2222 and are routed to the MAX bridge/router module in slot 9. This requires that you configure the Ans# parameter in the Modem profile and in the Ethernet Mod Config profile.

Incoming ISDN calls contain information about whether the call is an analog voice call (from a modem) or a digital data call. The MAX can automatically route calls to the digital modem card if the call is a voice call, or to the bridge/router module if the call is a digital call.

With ISDN signaling the hunt groups *overlap* the T1 channels, allowing each channel to answer either voice calls or data calls.

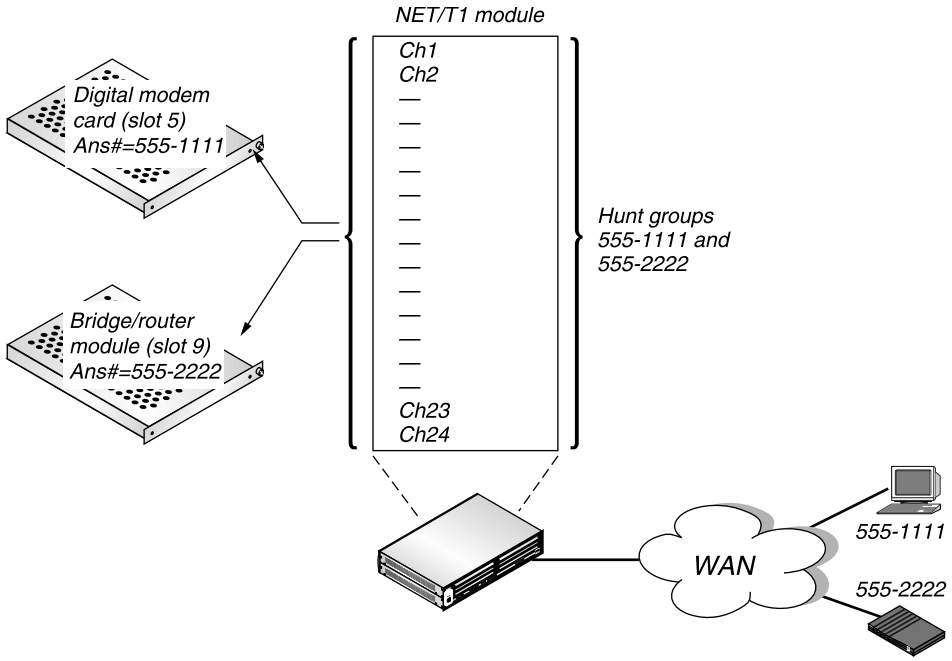


Figure 3-3. Incoming call routing using ISDN signaling and hunt groups

Gathering configuration information

In addition to the hardware set up, you must gather this configuration information about your network set up:

- "T1 line information" on page 3-4
- "Connection profile information" on page 3-5
- "Ethernet profile information" on page 3-7

T1 line information

Use information in Table 3-1 to configure the MAX T1 line. You can leave all other parameters in the Line Config profile at their default values for the purposes of this Quickstart Guide.

Refer to the MAX *6000 Series Reference Guide* for detailed information on the parameters in the following table.

Table 3-1. T1 line configuration information

NET/T1>Line Config>Line profile parameters	Your setting	Comments
Sig Mode		Enter the type of signaling your line uses: • inband • ISDN • ISDN_NFAS Get this information from your service provider.
Rob Ctl		For every line using inband signaling, enter the robbed-bit call control mechanism. Get this information from your service provider.
Switch Type		For each line using ISDN signaling, enter the type of switch that provides the ISDN service. Get this information from your service provider.
Framing Mode		For each line enter D4 or ESF. Get this information from your service provider.
Encoding		For each line enter AMI or B8ZS. Get this information from your service provider.
FDL		For each line using ISDN signaling, enter the Facilities Data Link (FDL) protocol the MAX uses. Get this information from your service provider.
Length		If your MAX does not have an internal CSU, enter the cable length from the CSU or other network interface to the MAX.
Buildout		If your MAX has an internal CSU, enter the amount of attenuation the MAX should apply to the line's network interface to match the cable length from the MAX to the next repeater. Get this information from your service provider.

Connection profile information

The MAX uses Connection profiles to allow access to remote devices. For this test you can set up two kinds of connections:

- A Connection profile for a remote device (such as an Ascend Pipeline) dialing in with its own IP address
- A Connection profile for a remote device (such as a modem) that accepts a dynamically assigned address

Use information in Table 3-2 to create a connection to a remote device. You can leave all other parameters in the Connection profile at their default values for the purposes of this Quickstart Guide. Refer to the MAX *6000 Series Reference Guide* for detailed information on the parameters in the following table.

Table 3-2. Connection profile configuration information

Ethernet>Connections >Connection profile parameters	**Your setting**	**Explanation**
Station		The name of the remote device. This is required if you are going to require authentication of remote callers.
Encaps		The type of encapsulation used on this remote connection.
PRI # Type		The type of PRI service your MAX uses.
Dial #		Dial number used to reach the remote unit.
Encaps options > Send Auth		The type of authentication required for this connection. This must match the Recv Auth parameter in the Answer profile.
Encaps options > Send PW		The password for this connection.
IP options > LAN Adrs		The IP address of the remote device. Not required if you are assigning addresses dynamically.
IP options > WAN Alias		The IP address of the link's remote interface to the WAN. This parameter applies only if the remote end of a link uses a PPP implementation that requires that both ends of a WAN connection be on the same subnet.
IP options > IF Adrs		The IP address of the device at the near end of a link. This is used only if you want to use interface-based routing.

Ethernet profile information

Use information in Table 3-3 to configure the MAX for your Ethernet LAN. You can leave all other parameters in the Ethernet > Mod Config profile at their default values for the purposes of this Quickstart Guide. Refer to the MAX *6000 Series Reference Guide* for detailed information on the parameters in the following table.

Table 3-3. Ethernet configuration

Ethernet>Mod Config parameters	**Your setting**	**Explanation**
Ether options > IP Adrs/subnet mask		IP address and subnet mask of the MAX. Ascend uses a slash (/) to indicate the number of network bits in the address. For example, 198.5.248.40/29 indicates that 29 bits of the IP address will be interpreted as network bits.
WAN options > Pool#1 start (For dynamic IP addressing)		The first IP address in an IP address pool. The MAX chooses an address from the pool and assigns it to an incoming call when Assign Adrs=Yes in the Answer profile (the default) or when the calling station requests an address assignment.
WAN options > Pool#1 count (For dynamic IP addressing)		The number of IP addresses in the IP address pools. The MAX chooses an address from these pools and assigns it to an incoming call when Assign Adrs=Yes in the Answer profile (the default) or when the calling station requests an address assignment.
WAN options > Pool only (For dynamic IP addressing)		Whether the MAX requires the calling station to accept an IP address from an IP address pool.

Using the MAX VT-100 interface

This section briefly introduces the MAX configuration interface. Refer to the Chapter 4, “Navigating the User Interface,” for complete information on using this interface.

To perform the initial configuration of the MAX, connect a serial cable to the MAX control port and set your terminal emulation package in your communications software as follows:

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

- Direct connect

After communication has been established, the Control Monitor screen appears (see Figure 3-4). This interface consists of an Edit menu and eight status displays. The Edit menu allows you to configure the MAX; the status windows allow you to monitor the MAX status.

Note that the items listed in the Main Edit menu differ depending on the system configuration.

```
|-------- MAX EDIT ------------ |--------------------| |--------------------|
|Main Edit Menu                | |10-100 1234567890   | |10-200 1234567890   |
| 00-000 System                | | L1/LA nnnnnnnnnn   | | L2/RA ..........   |
| 10-000 Net/T1                | |   12345678901234   | |   12345678901234   |
| 20-000 Net/T1                | |   nnnnnnnnnnnnn    | |   ..............   |
| 30-000 LAN Modem             | |--------------------| l--------------------|
| 40-000 Host/BRI              | |90-100 Sessions     | |00-200 15:10:34     |
| 50-000 Host/Dual             | |>  1 Active         | |>M31  Line    Ch    |
| 60-000 Empty                 | | O slc-lab-236      | | LAN session up     |
| 70-000 Empty                 | |                    | | slc-lab-236        |
| 80-000 V.34 Modem            | |--------------------| |--------------------|
|>90-000 Ethernet              | |90-300 WAN Stat     | |90-400 Ether Stat   |
| A0-000 Ether Data            | |>Rx Pkt:     184318^| |>Rx Pkt:    3486092 |
| B0-000 Reserved              | | Tx Pkt:     159232 | | Tx Pkt:      10056 |
|                              | |    CRC:          0v| |    Col:       3530 |
|                              | |--------------------| |--------------------|
|                              | |00-100 Sys Option   | |Main Status Menu    |
|                              | |>Security Prof: 1  ^| |>00-000 System     ^|
|                              | | Software +5.0A+    | | 10-000 Net/T1      |
|                              | | S/N: 5210003      v| | 20-000 Net/T1     v|
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.
```

Figure 3-4. MAX configuration interface

The table below provides a quick reference for navigating the MAX user interface.

Table 3-4. Navigating the MAX user interface

If you want to...	Do this
Make a menu or status window active.	Press the Tab key until the window has a thick double line around it. Back-Tab or Ctrl-O moves you in the opposite direction.
Select a menu or a text field.	Press Down-Arrow (or Control-N) or Up-Arrow (or Control-P).
Open a menu or a text field.	Press Enter or Right-Arrow.
Exit a menu or a text field.	Press Left-Arrow or Escape.
Refresh the screen display.	Press Ctrl-L.
Access the Do menu to change your security level or dial a connection.	Press Control-D.

Configuring the MAX

The following configuration establishes enough functionality to verify that the MAX is up and running, connected, and can perform basic functions. You must perform the tasks in the order they are presented in this section.

The Quickstart configuration involves modifying the following profiles:

- Line profile

  Parameters that apply to the T1/PRI lines.
- Ethernet profile

  Parameters that apply to the MAX unit's Ethernet address and protocols.
- Connection profile

  Parameters that apply to the establishment of a WAN link and to the routing and bridging of data packets across that link.
- Answer profile

  Parameters that apply to all incoming calls. The MAX uses the parameters in the Answer profile to determine what to do with incoming calls. Note that similar parameters that appear in Connection profiles take precedence over Answer profile parameters.

This procedure assumes you have not yet configured the MAX; therefore, all parameters initially are at their factory default settings. Do not turn the MAX off during this procedure.

Note: The question marks (??) that may appear in the upper right-hand corner of the Edit screens and status windows indicate that there is no link to the T1/PRI line. Once you have configured the T1/PRI line these question marks will disappear.

Configuring the T1/PRI lines

To configure a T1 line with the information you gathered in Table 3-1 on page 3-5:

1 From the Main Edit Menu, select the slot that contains your Net/T1 card, for example, 10-000.

```
10-000 Net/T1
  >10-100 Line Config
  10-200 Line Diag
```

2 Select Line Config.

```
10-100 Line Config
  >10-1** Factory
  10-102
  10-103
  10-104
```

3 Select the currently active Line profile, 10-1** Factory.

```
10-1** Factory
  >Name=
  1st Line=Trunk
  2nd Line=Disabled
  Line 1...
  Line 2...
```

4 Select Line 1.

```
10-1** Factory
  Line 1...
    >Sig Mode=Inband ^
     NFAS ID num=N/A
     Rob Ctl=Wink-Start
     Switch Type=N/A
     Framing Mode=D4
     Encoding=AMI
     FDL=N/A
     Length=N/A
     Buildout=0 dB
     Clock Source=Yes
     Pbx Type=N/A
     Delete Digits=N/A
     Add Number=N/A
     Call-by-Call=N/A
     Ans #=N/A
```

5 Set the appropriate signaling mode for Sig Mode parameter:

- ISDN
- ISDN_NFAS
- Inband

6 If you selected ISDN_NFAS above, enter the NFAS ID for your line.

7 If you selected Inband above, select the type of robbed bit control for the ROB Ctl. parameter.

- N/A: This parameter is not applicable whenever the Sig Mode=ISDN.
- Wink-Start
- Idle-Start
- Inc-W-200
- Inc-W-400
- Loop-Start

8 If you selected ISDN above, select the WAN switch type at the lines' point-of-presence.

- N/A: This parameter is not applicable whenever Sig Mode=Inband.
- AT&T
- NTI
- NI-2
- GloBanD
- Japan

9 Select the type of framing this line uses:

- D4
- ESF

10 Select the encoding used on this line:

- None: This is identical to AMI, but without density enforcement.

- AMI
- B8ZS

11 Select the FDL (Facility Data Link) used on this line:

- N/A: This parameter is not applicable whenever Framing Mode=D4.
- None
- AT&T
- ANSI
- Sprint

12 Select the cable distance between MAX and the WAN interface equipment.

- N/A: This parameter is N/A if the MAX has an internal CSU.
- Otherwise: Select the correct cable distance in feet between MAX and the CSU or other network (WAN) interface unit to which it is connected. The default is 1-133.

13 Select the amount of attenuation to add to the line's network interface:

- N/A: This parameter is N/A if the MAX does not have an internal CSU.
- Otherwise: Select the Buildout value to provide the proper line attenuation. The default is 0db.

14 If your channels are not switched (the default), specify how the MAX uses the T1 channels using the Ch n parameter:

- Switched (the default)
- Nailed (dedicated)
- Unused (not in service)

Note: To test the line later, you must have at least two switched channels. If you plan to use a channel for drop-and-insert (D&I), you can enter it as Switched for the Quickstart and then change it to D&I for the final installation.

15 If you using inband signaling, configure incoming call routing for the T1 line by setting the following parameters:

- For each Ch n # parameter, enter the rightmost unique digits of the phone number used to reach this channel.

  For example, if your line is set up as illustrated in Figure 3-2 on page 3-3, enter 1111 for the first 12 channels (the analog call hunt group), and 2222 for the last 12 channels (the digital call hunt group).

- For each T1 channel that will answer analog calls, set the Ch n Slot parameters to the number of the slot that contains the modem card.

  For example, if the modem card is in slot 5, set Ch 1 Slot=5, Ch 2 Slot=5, and so on, up to the total number of analog calls you want the MAX to accept on this T1 line. This tells the MAX to route incoming analog calls to the digital modem card.

- For each T1 channel that will answer digital calls, set the Ch n Slot parameters to 9, the default number of the slot that contains the MAX unit's bridge/router module. This tells the MAX to route incoming digital calls to the bridge/router module to be bridged or routed to their destination.

16 Press Left-Arrow or Escape to exit the current Line profile.

17 In the Confirmation menu, press 2 to save and exit.

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

If you using ISDN signaling, you must perform these additional steps to configure incoming call routing:

1 To tell the MAX how to route incoming digital calls, from the main Edit menu select the slot that contains the digital modem cards. For example, 50-000 V.34 Modem.

```
50-000 V.34 Modem
50-100 Mod Config
50-200 Modem Diag
```

2 Select Mod Config.

```
50-000 Mod Config
  Module Name=
  Ans 1#=
  Ans 2#=
  Ans 3#=
  Ans 4#=
```

3 In the Ans n# parameters enter the rightmost unique digits of the telephone numbers used by callers using analog devices.

For example, set Ans 1#=1111

This tells the MAX to route all calls coming in from phone number 555-1111 (the hunt group for analog callers) to the digital modems.

4 Press Left-Arrow or Escape to exit the current Modem profile.

In the Confirmation menu, press 2 to save and exit.

5 Press Left-Arrow or Escape to return to the main Edit menu.

6 To tell the MAX how to route incoming digital calls, from the main Edit menu select Ethernet > Mod Config > WAN Options.

```
90-C00 Mod Config
  WAN options...
    Dial Plan=N/A
    Ans 1#=
    Ans 2#=
    Ans 3#=
    Ans 4#=
    Pool#1 start=0.0.0.0
    Pool#1 count=0
    Pool#2 start=0.0.0.0
    Pool#2 count=0
    Pool only=No
    Pool Summary=No
```

7 In the Ans n# parameters enter the rightmost unique digits of the telephone numbers used by callers using analog devices.

For example, set Ans 1#=2222.

This tells the MAX to route all calls coming in from phone number 555-2222 (the hunt group for digital callers) to the MAX Ethernet module.

8 If you are going to dynamically assign addresses to incoming callers, set the following parameters:

- Pool#1 Start. The first IP address in the pool.
- Pool#1 Count. The number of IP addresses in the pool.

9 Press Left-Arrow or Escape to exit the Ethernet Mod Config profile.
In the Confirmation menu, press 2 to save and exit.

Those are all the parameters necessary for your T1 line configuration.

After the T1/PRI provider has established service, observe the MAX unit's front panel LEDs (Figure 3-5).

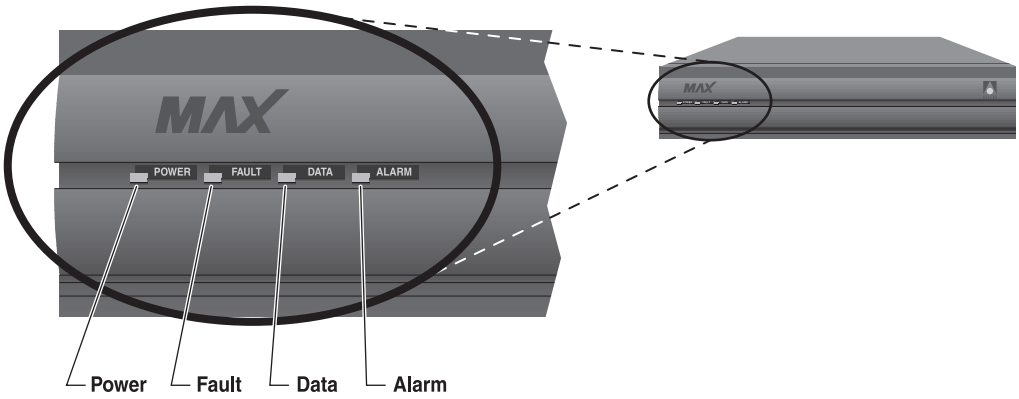


Figure 3-5. Front Panel LEDs

Is the Power LED on and the Fault, Data, and Alarm off?

- If Yes: Continue on to "Configuring the Ethernet profile."
- If No: The connection to the T1/PRI line has failed. If the Alarm LED is on, check your cabling. Also verify with your T1/PRI line provider that you have the correct Framing Mode, Encoding, Length, and Buildout values.

Note: If you must re-enter the parameters for your T1 line, first return all parameter values to their defaults as listed in the MAX *6000 Series Reference Guide*.

Configuring the Ethernet profile

To configure the Ethernet profile:

1 From the Main Edit Menu, select Ethernet > Mod Config.

```
90-B00 Mod Config
  Module Name=
  Ether options...
  WAN options...
  SNMP options...
  OSPF options...
  OSPF global options...
  Route Pref...
  TServ options...
  Bridging=No
```

```
  Shared Prof=No
  Telnet PW=
  RIP Policy=Poison Rvrs
  RIP Summary=Yes
  ICMP Redirects=Accept
  BOOTP Relay...
  DNS...
```

2 Select Ether options. The following list of parameters appears:

```
90-C00 Mod Config
  >IP Adrs=10.9.8.7
  2nd Adrs=0.0.0.0/0
  RIP Recv-v1
  Ignore Def Rt=Yes
  Proxy Mode=Off
  Filter=0
  IPX Frame=None
  IPX Enet#=N/A
  IPX Pool#=N/A
  IPX SAP Filter=N/A
  Handle IPX Type20=N/A
```

3 Enter the IP address /subnet mask of this MAX using the IP Adrs parameter.

4 Press Enter to return to the list of parameters.

5 Specify how you want the MAX to handle RIP packets on its Ethernet interface using the RIP parameter:

- Off (the default) specifies that the MAX does not transmit or receive RIP updates.
- Recv-v1: The MAX receives RIP-v1 updates, but does not transmit RIP updates.
- Send-v1: The MAX transmits RIP-v1 updates, but does not receive RIP updates.
- Both-v1: The MAX transmits and receives RIP-v1 updates.
- Send-v2: The MAX transmits RIP-v2 updates, but does not receive RIP updates.
- Recv-v2: The MAX receives RIP-v2 updates, but does not transmit RIP updates.
- Both-v2: The MAX transmits and receives RIP-v2 updates.

6 Press Left-Arrow or Escape to exit Ether options submenu.

7 At the Confirmation menu, press 2 to save your changes.

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

8 Press Escape until you return to the Main Edit Menu.

Configuring the Answer profile

The MAX uses the parameters in the Answer profile to build incoming calls. Note that settings in Connection profiles take precedence over the same settings in the Answer profile.

1 From the Main Edit Menu, select Ethernet > Answer.

```
90-800 Mod Config
  >Use Answer as Default=No
```

```
  Force 56=No
  Profile Reqd=Yes
  Clid Auth=Ignore
  Assign Adrs=No
  Encaps...
  Ip options...
  PPP options...
  COMB options...
  V.120 options...
  Session options...
  DHCP options...
```

2 To be able to dynamically assign addresses to incoming callers, make sure Assign Adrs=Yes.

3 Select PPP options.

```
90-700 Answer
  PPP options...
  Route IP=Yes
  Route IPX=No
  Bridge=Yes
  Recv Auth=CHAP
  MRU=1524
  LQM=No
  LQM Min=600
  LQM Max=600
  Link Comp=Stac
  VJ Comp=Yes
  Dyn Alg=Quadratic
  Sec History=15
  Add Pers=5
  Sub Pers=10
  Min Ch Count=1
  Max Ch Count=1
```

4 Make sure Route IP=Yes.

5 Set the Recv Auth parameter to the authentication you are going to require for incoming calls:

- None (the default) specifies that the MAX does not use an authentication protocol to validate incoming calls.
- PAP specifies the Password Authentication Protocol, a PPP authentication protocol.
- CHAP specifies the Challenge Handshake Authentication Protocol, a more secure PPP authentication protocol.
- MS-CHAP specifies the MAX.
- Either specifies that the MAX can use either CHAP, PAP, or MS-CHAP. The MAX first requests authentication using CHAP. If the dial-in call rejects the request (or does not acknowledge it), the MAX then requests PAP authentication, then MS-CHAP.

6 Press Escape or Left-Arrow until the Confirmation menu appears. Press 2 to save your changes.

7 Press Left-Arrow or Escape until you return to the Main Edit Menu.

Creating Connection profiles

Connection profiles define remote users to the MAX.

To create a Connection profile:

1 From the Main Edit Menu, select Ethernet > Connections.

```
90-100 Connections
90-101
90-102
90-103
90-104
90-105
90-106
90-107
90-108
90-109
90-110
90-111
90-111
```

2 Select the first profile. A list of parameters appears:

```
90-101
  Station=
  Active=No
  Encaps=MPP
  PRI # Type=National
  Dial #=
  Calling #=
  Called #=
  Route IP=Yes
  Route IPX=N/A
  Bridge=N/A
  Dial brdcast=
  Encaps options...
  Ip options...
  Ipx options...
  Session options...
  Telco options...
```

3 Select and modify the following parameters:

- Station. Enter a name such as “Remote-Call.” This acts as the login name of the remote user.
- Active=Yes.
- Encaps. Set the encapsulation method you want to use for this connection. We recommend you select MPP for this test. If the remote device does not support MPP, the MAX will attempt to negotiate an MP session. If the remote device does not support MP, the MAX will attempt to negotiate a PPP session.
- Route IP=Yes.

4 Select Encaps options.

```
90-101
Encaps options...
  Send Auth=None
```

```
  Send PW=N/A
  Aux Send PW=N/A
  Recv PW=
  DBA Monitor=Transmit
  Base Ch Count=1
  Min Ch Count=2
  Inc Ch Count=1
  Dec Ch Count=1
  MRU=1524
  LQM=No
  LQM Min=600
  LQM Min=600
  Link Comp=Stac
```

5 Select Ip options.

```
90-101
 Ip options...
  LAN Adrs=0.0.0.0/0
  WAN Alias=0.0.0.0/0
  IF Adrs=0.0.0.0/0
  Preference=100
  Metric=7
  Private=No
  RIP=Off
  Pool=0
  Multicast Client=No
  Multicast Rate Limit=100
  Client Pri DNS-0.0.0.0
  Client Sec DNS=0.0.0.0
  Client Assign DNS=Yes
```

6 If you are configuring a Connection profile for a device with its own IP address, set the following parameters:

- LAN Adrs. Enter the IP address / subnet mask of the remote unit, then press Enter to return to the list of parameters.
- WAN Alias. If the far-end device is non-Ascend and requires numbered interfaces with PPP encapsulation, in WAN Alias enter the IP address of the remote unit's WAN interface (not its Ethernet interface), then press Enter to return to the list of parameters.
- IF Adrs. If you are implementing interfaced-based routing on the MAX enter the IP address of the port on the MAX side of the link.

7 If you are configuring a Connection profile for dynamic address assignment, set the following parameter:

- Pool. The IP address pool from which you want to assign this client an address. IP address pools are configured in the Ethernet > Mod Config > WAN options submenu.

8 Using the RIP parameter, specify how you want the MAX to handle RIP packets on this WAN interface:

- Off (the default) specifies that the MAX does not transmit or receive RIP updates.
- Recv-v1: The MAX receives RIP-v1 updates, but does not transmit RIP updates.
- Send-v1: The MAX transmits RIP-v1 updates, but does not receive RIP updates.
- Both-v1: The MAX transmits and receives RIP-v1 updates.

- Send-v2: The MAX transmits RIP-v2 updates, but does not receive RIP updates.
- Recv-v2: The MAX receives RIP-v2 updates, but does not transmit RIP updates.
- Both-v2: The MAX transmits and receives RIP-v2 updates.

9 Press Escape or Left-Arrow until the Confirmation menu appears. Press 2 to save your changes.

10 Press Left-Arrow until you return to the Main Edit Menu.

Testing the connections

Testing the connections assumes you have successfully configured the MAX in the previous section. The following tests are involved:

- Testing the LAN connection
  Ping or Telnet to your MAX from a workstation or host on the same LAN as the unit.
- Testing the T1/PRI line
  Place and answer a test call from MAX to itself over the T1/PRI interface. This tests the T1 lines to verify they are active and the phone numbers are correct.
- Testing the WAN connection
  Ping or Telnet a remote unit from a workstation or host on the same LAN as the MAX. This also tests the processing of data packets through the MAX.

Testing the LAN connection

This test requires that can run Ping or Telnet from a host or workstation on the same subnet as your MAX.

The following illustration shows how to test the Ethernet interface of your MAX by Pinging or Telneting to it from a station on the same LAN.

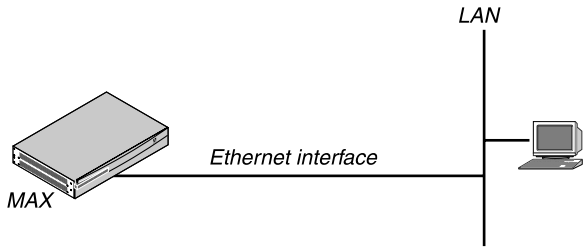


Figure 3-6. Testing the LAN Interface with Telnet or Ping

1 From a host or workstation, on the same subnet as MAX, Telnet to or Ping the MAX.

- If you are running Telnet, the MAX user interface display should appear. The default Telnet password for an unconfigured MAX is null (a carriage return).
- If you are running Ping, you should get the message that you are immediately receiving a return packet for every packet you are sending to the MAX. If you are not getting the proper response, this procedure has failed. It might be because of a problem with the LAN, because you entered the wrong IP address, or because of misconfiguration of either the subnet mask or IP Adrs parameter in the Ethernet profile.

2 Terminate the Telnet or Ping sessions.

Testing the T1/PRI line

To test whether the MAX line is functioning normally, use the Test command from the MAX terminal server. This command causes the MAX to place a call to itself over the WAN, and to send a number of packets over the connection. This tests the MAX unit's ability to initiate and receive calls, and diagnoses whether the connection over the digital access line is functional.

Note: The terminal server Test command uses one channel to dial out and another channel to answer as in the following illustration. This requires that the T1/PRI line is set for bidirectional calling.

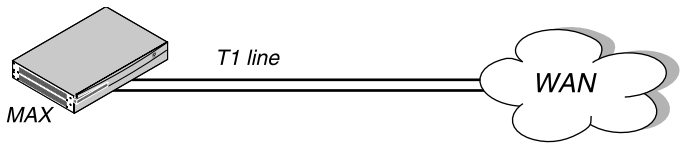


Figure 3-7. Testing the WAN interface by placing a call to yourself

To perform a self test:

1 From the Main Edit Menu, select System:

```
00-200 System
  00-100 Sys Config
  >00-200 Sys Diag
  00-300 Security
  00-400 Destinations
  00-500 Dial Plan
```

2 Select Sys Diag.

```
00-200 Sys Diag
  >00-201 Restore Cfg
  00-202 Save Config
  00-203 Use MIF
  00-204 Sys Reset
  00-205 Term Serv
  00-206 Upd Rem Cfg
```

3 Select Term Serv.

The Terminal Server screen appears:

** Ascend Pipeline Terminal Server **

```
ascend%
```

4 Type test *phone-number*

where *phone-number* is the phone number of the MAX T1 line.

The most frequent cause for failing to connect is incorrect phone numbers.

- Did the test complete successfully?
  - If Yes: Congratulations. You have successfully completed a test call through the WAN to yourself.
  - If No: This procedure has failed. Verify that you have entered all the T1 line parameters correctly and that your line is correctly provisioned as explained in Appendix A, "Provisioning the Switch."

5 Enter quit to exit the terminal server interface.

6 Press the Left-Arrow or the Escape key to return to the Main Edit Menu.

Testing the WAN connection

This procedure assumes:

- You can run Telnet or Ping from a host or workstation on the same LAN segment as MAX.
- There is a remote unit (MAX-compatible) to which you can route data packets over a dial-up link.

Note: The remote unit should be configured for the route back to your MAX; otherwise you might bring up the connection and send packets, but fail to receive anything back.

You test your MAX installation by using Ping or Telnet to and from the remote unit over a dial-up connection as illustrated in Figure 3-8.

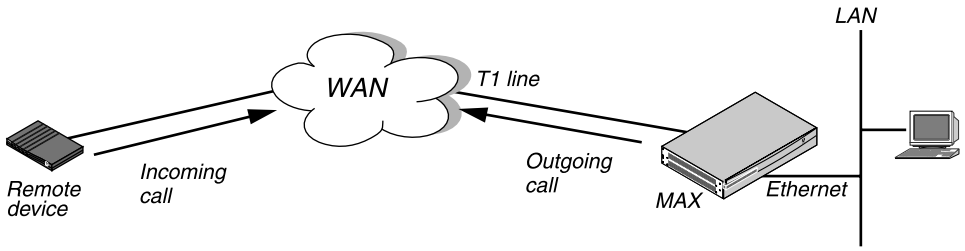


Figure 3-8. Testing the WAN by dialing into and out from the MAX

1 Configure the routes of a host on the same LAN as your MAX so that your MAX is the gateway to the remote unit.

The most common method is to add static routes to the remote unit using your MAX as a gateway. You can also make your MAX the default router.

For example, if the remote unit address is 167.34.9.23, and the your MAX address is 165.3.45.8, the gateway configuration on the remote unit would be:

– Address (remote unit) address 167.34.9.23

– Gateway (your local unit) address 165.3.45.8

2 From the local host, enter the Telnet or Ping command for the remote unit.

– If you are running Telnet, the remote unit's user interface display should appear.

Congratulations. You have successfully completed the Quickstart configuration for your MAX.

– If you are running Ping, you should get the message that you are immediately receiving a return packet for every packet you are sending to the remote unit. Continue with the next step.

If you are not getting the proper response, this procedure has failed. It might be because of a problem with the LAN, or because of misconfiguration. Verify the configuration of the Ethernet profile.

3 Terminate the Telnet or Ping sessions.

Where to go next

Table 3-10 explains where to find further information about configuring and operating your MAX.

Table 3-5. Where to go next

To do this...	Go to this document...
Read the MAX technical specifications	*MAX 6000 Series Getting Started*
Change the MAX hardware configuration	*MAX 6000 Series Getting Started*
Configure the MAX WAN interfaces	*MAX 6000 Series ISP & Telecommuting Configuration Guide*
Configure the MAX networking protocols	*MAX 6000 Series ISP & Telecommuting Configuration Guide*
Administer the MAX	*MAX 6000 Series ISP & Telecommuting Configuration Guide*
Define and apply filters	*MAX 6000 Series ISP & Telecommuting Configuration Guide*
Configure Connections profiles and frame relay connections	*MAX 6000 Series ISP & Telecommuting Configuration Guide*
Get detailed reference information on the MAX parameters and status windows	*MAX 6000 Series Reference Guide*
Configure MAX security	*MAX Security Supplement*
Configure RADIUS profiles	*MAX RADIUS Configuration Guide*
Use MIF	*Ascend MIF Supplement*

Quickstart for E1 MAX units

With this Quickstart, you will be able to perform a basic configuration of your MAX. It explains how to:

- Configure your MAX for the local Ethernet
- Configure your E1 line for either R2 signaling, DPNSS/DASS-2, or ISDN D-channel signaling.
- Test your E1 line by performing a self test
- Telnet to the MAX from a workstation to verify it is accessible over the Ethernet

- Create a Connection profile on the MAX for a remote device (such as an Ascend Pipeline) dialing in with its own IP address or for a remote device (such as a modem) that accepts a dynamically assigned address

This Quickstart does not cover more detailed configuration such as security, RADIUS, or advanced WAN or LAN protocols. Refer to the MAX *6000 Series ISP & Telecommuting Configuration Guide* to perform more advanced configuration of your MAX.

Setting up your hardware

Before beginning, make sure you have:

- Installed the MAX as explained in the Chapter 2, "Setting Up and Testing the MAX Hardware."
- One or more active and installed E1 lines accessible from the MAX. These lines must provide switched data service on at least two channels.

  Refer to the "Provisioning the Switch" on page A-1 for information on correctly provisioning your E1 line.
- An active Ethernet LAN with appropriate cables and connectors.
- A remote unit (an Ascend Communications, Inc. unit or other compatible equipment) to which you can Ping or Telnet over a dial-up PPP encapsulated link across the WAN.
- A local host or workstation on the same subnet as the MAX that can Ping or Telnet to the MAX.

Figure 3-9 illustrates the hardware set up you must have to use this Quickstart.

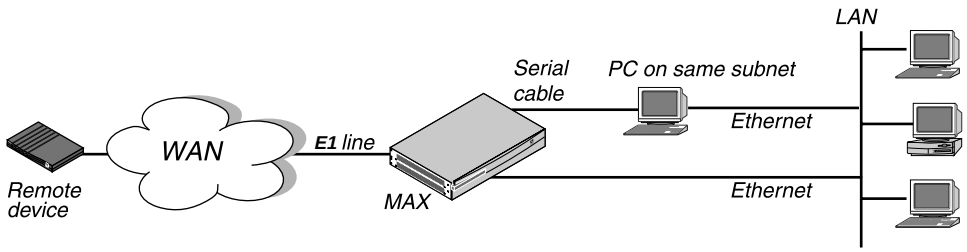


Figure 3-9. Quickstart set up

Overview of E1 line configuration

Figure 3-10 displays two hunt groups—one for digital calls and one for analog calls. If you are using R2 signaling (Figure 3-2), the example hunt group contains 12 channels. Analog callers call in using the phone number 555-1111 and are routed to the digital modems in slot 5. Digital callers call in using the phone number 555-2222 and are routed to the MAX bridge/router module in slot 9. This requires that you configure the Ch n slot parameter in the E1 Line profile.

R2 signaling is less flexible than ISDN D-channel signaling because you must pre-allocate the number of E1channels used for voice and data calls. If 12 analog callers are dialed in,

subsequent analog callers are rejected because there are no more channels available for analog calls, even though there are 12 unused channels.

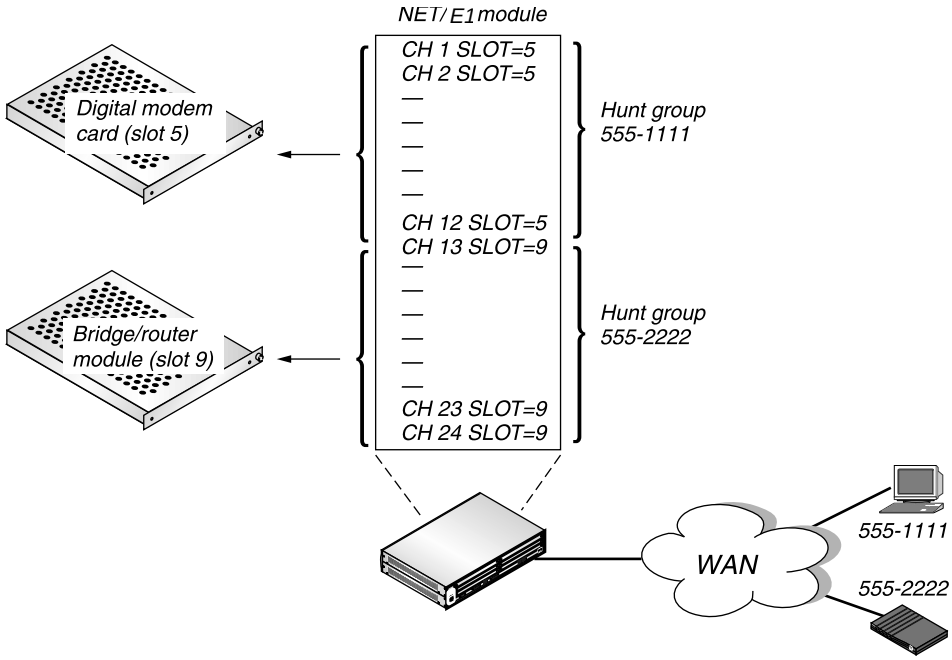


Figure 3-10. Incoming call routing using R2 signaling and hunt groups

If you are using ISDN D-channel signaling (Figure 3-11) the example hunt group contains 24 channels. Analog callers call in using the phone number 555-1111 and are routed to the digital modems in slot 5. Digital callers call in using the phone number 555-2222 and are routed to the MAX bridge/router module in slot 9. This requires that you configure the Ans# parameter in the Modem profile and in the Ethernet Mod Config profile.

Incoming ISDN calls contain information about whether the call is an analog voice call (from a modem) or a digital data call. The MAX can automatically route calls to the digital modem card if the call is a voice call, or to the bridge/router module if the call is a digital call.

With ISDN signaling the hunt groups *overlap* the E1 channels, allowing each channel to answer either voice calls or data calls.

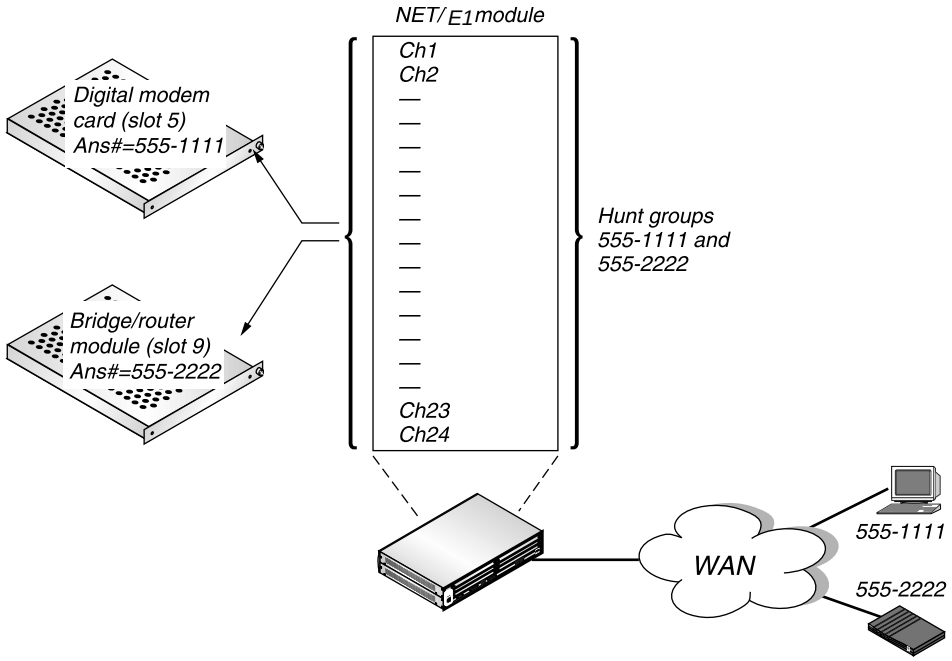


Figure 3-11. Incoming call routing using ISDN signaling and hunt groups

Gathering configuration information

In addition to the hardware set up, you must gather this configuration information about your network set up:

- "E1 line information" on page 3-24
- "Connection profile information" on page 3-27
- "Ethernet profile information" on page 3-28

E1 line information

Use information in Table 3-6 to configure the MAX E1 line. You can leave all other parameters in the Line Config profile at their default values for the purposes of this Quickstart Guide.

Refer to the MAX *6000 Series Reference Guide* for detailed information on the parameters in the following table.

Table 3-6. E1 line configuration information

NET/E1>Line Config>Line profile parameters	Your setting	Comments
Sig Mode		Enter the type of signaling your line uses: • None indicates a leased line. • ISDN signaling using the D channel. The 32nd channel of the E1 line must be designated as the D channel. • DPNSS indicates that the interface supports DPNSS or DASS 2 signaling. • R2 indicates R2 signaling. • Metered indicates metered R2 signaling protocol, used in Brazil and South Africa. • Chinese indicates a version of the R2 signaling protocol specified for use in China. Get this information from your service provider.

Table 3-6. E1 line configuration information (continued)

NET/E1>Line Config>Line profile parameters	Your setting	Comments
Switch Type		In a Net/T1 profile, specify one of the following values: • AT&T (the default) • NT1 (Northern Telecommunications, Inc.) • Japan • GloBanD (Q.931W GloBanD data service) Although GloBanD can appear in the list of switch types available under ISDN, it is currently not supported on any T1 PRI switches in the U.S. However, some T1 PRI switches do support MultiRate, which is a service like GloBanD that allows data service bandwidths higher than 64 kbps. Contact your T1 PRI service provider for specific information. • NI-2 (National ISDN-2) In a Net/E1 profile, specify one of the following values: • GloBanD (Q.931W GloBanD data service) • NI-1 (National IDSN-1) • Net 5 (Euro ISDN services in Belgium, the Netherlands, Switzerland, Sweden, Denmark, and Singapore) • DASS 2 (U.K. only) • ISLX (DPNSS switch type) • ISDX (DPNSS switch type) • Mercury (DPNSS switch type) • Australian (Australia only) • French (VN3 ISDN PRI) • German (1TR6) • CAS (New Zealand) Get this information from your service provider.
Framing Mode		For each line, enter G.703 (default) or 2DS. Get this information from your service provider.

Table 3-6. E1 line configuration information (continued)

NET/E1>Line Config>Line profile parameters	Your setting	Comments
Length ?		If your MAX does not have an internal CSU, enter the cable length from the CSU or other network interface to the MAX.

Connection profile information

The MAX uses Connection profiles to allow access to remote devices. For this test you can set up two kinds of connections:

- A Connection profile for a remote device (such as an Ascend Pipeline) dialing in with its own IP address
- A Connection profile for a remote device (such as a modem) that accepts a dynamically assigned address

Use information in Table 3-7 to create a connection to a remote device. You can leave all other parameters in the Connection profile at their default values for the purposes of this Quickstart Guide. Refer to the MAX *6000 Series Reference Guide* for detailed information on the parameters in the following table.

Table 3-7. Connection profile configuration information

Ethernet>Connections >Connection profile parameters	Your setting	Explanation
Station		The name of the remote device. This is required if you are going to require authentication of remote callers.
Encaps		The type of encapsulation used on this remote connection.
Dial #		Dial number used to reach the remote unit.
Encaps options > Send Auth		The type of authentication required for this connection. This must match the Recv Auth parameter in the Answer profile.
Encaps options > Send PW		The password for this connection.
IP options > LAN Adrs		The IP address of the remote device. Not required if you are assigning addresses dynamically.

Table 3-7. Connection profile configuration information (continued)

Ethernet>Connections >Connection profile parameters	Your setting	Explanation
IP options > WAN Alias		The IP address of the link's remote interface to the WAN. This parameter applies only if the remote end of a link uses a PPP implementation that requires that both ends of a WAN connection be on the same subnet.
IP options > IF Adrs		The IP address of the device at the near end of a link. This is used only if you want to use interface-based routing.

Ethernet profile information

Use information in Table 3-8 to configure the MAX for your Ethernet LAN. You can leave all other parameters in the Ethernet > Mod Config profile at their default values for the purposes of this Quickstart Guide. Refer to the MAX *6000 Series Reference Guide* for detailed information on the parameters in the following table.

Table 3-8. Ethernet configuration

Ethernet>Mod Config parameters	Your setting	Explanation
Ether options > IP Adrs/subnet mask		IP address and subnet mask of the MAX. Ascend uses a slash (/) to indicate the number of network bits in the address. For example, 198.5.248.40/29 indicates that 29 bits of the IP address will be interpreted as network bits.
WAN options > Pool#1 start (For dynamic IP addressing)		The first IP address in an IP address pool. The MAX chooses an address from the pool and assigns it to an incoming call when Assign Adrs=Yes in the Answer profile (the default) or when the calling station requests an address assignment.
WAN options > Pool#1 count (For dynamic IP addressing)		The number of IP addresses in the IP address pools. The MAX chooses an address from these pools and assigns it to an incoming call when Assign Adrs=Yes in the Answer profile (the default) or when the calling station requests an address assignment.
WAN options > Pool only (For dynamic IP addressing)		Whether the MAX requires the calling station to accept an IP address from an IP address pool.

Using the MAX VT-100 interface

This section briefly introduces the MAX configuration interface. Refer to the Chapter 4, "Navigating the User Interface," for complete information on using this interface.

To perform the initial configuration of the MAX, connect a serial cable to the MAX control port and set your terminal emulation package in your communications software as follows:

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

After communication has been established, the Control Monitor screen appears (see Figure 3-12). This interface consists of an Edit menu and eight status displays. The Edit menu allows you to configure the MAX; the status windows allow you to monitor the MAX status.

Note that the items listed in the Main Edit menu differ depending on the system configuration.

```
|-------- MAX EDIT ------------- |--------------------| |--------------------|
|Main Edit Menu                 | |10-100 1234567890   | |10-200 1234567890   |
| 00-000 System                 | | L1/LA nnnnnnnnnn   | | L2/RA ..........   |
| 10-000 Net/E1                 | |   12345678901234   | |   12345678901234   |
| 20-000 Net/E1                 | |   nnnnnnnnnnnnnn   | |   ..............   |
| 30-000 LAN Modem              | |--------------------| l--------------------|
| 40-000 Host/BRI               | |90-100 Sessions     | |00-200 15:10:34     |
| 50-000 Host/Dual              | |>  1 Active         | |>M31  Line    Ch    |
| 60-000 Empty                  | | O slc-lab-236      | | LAN session up     |
| 70-000 Empty                  | |                    | | slc-lab-236        |
| 80-000 V.34 Modem             | |--------------------| |--------------------|
|>90-000 Ethernet               | |90-300 WAN Stat     | |90-400 Ether Stat   |
| A0-000 Ether Data             | |>Rx Pkt:     184318^| |>Rx Pkt:    3486092 |
| B0-000 Reserved               | | Tx Pkt:     159232 | | Tx Pkt:      10056 |
|                               | |    CRC:          0v| |    Col:       3530 |
|                               | |--------------------| |--------------------|
|                               | |00-100 Sys Option   | |Main Status Menu    |
|                               | |>Security Prof: 1  ^| |>00-000 System     ^|
|                               | | Software +5.0A+    | | 10-000 Net/E1 |
|                               | | S/N: 5210003      v| | 20-000 Net/E1 v|
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.
```

Figure 3-12. MAX configuration interface

The table below provides a quick reference for navigating the MAX user interface.

Table 3-9. Navigating the MAX user interface

If you want to...	Do this
Make a menu or status window active.	Press the Tab key until the window has a thick double line around it. Back-Tab or Ctrl-O moves you in the opposite direction.

Table 3-9. Navigating the MAX user interface (continued)

If you want to...	Do this
Select a menu or a text field.	Press Down-Arrow (or Control-N) or Up-Arrow (or Control-P).
Open a menu or a text field.	Press Enter or Right-Arrow.
Exit a menu or a text field.	Press Left-Arrow or Escape.
Refresh the screen display.	Press Ctrl-L.
Access the Do menu to change your security level or dial a connection.	Press Control-D.

Configuring the MAX

The following configuration establishes enough functionality to verify that the MAX is up and running, connected, and can perform basic functions. You must perform the tasks in the order they are presented in this section.

The Quickstart configuration involves modifying the following profiles:

- Line profile

  Parameters that apply to the E1/PRI lines.

- Ethernet profile

  Parameters that apply to the MAX unit's Ethernet address and protocols.

- Connection profile

  Parameters that apply to the establishment of a WAN link and to the routing and bridging of data packets across that link.

- Answer profile

  Parameters that apply to all incoming calls. The MAX uses the parameters in the Answer profile to determine what to do with incoming calls. Note that similar parameters that appear in Connection profiles take precedence over Answer profile parameters.

This procedure assumes you have not yet configured the MAX; therefore, all parameters initially are at their factory default settings. Do not turn the MAX off during this procedure.

Note: The question marks (??) that may appear in the upper right-hand corner of the Edit screens and status windows indicate that there is no link to the E1/PRI line. Once you have configured the E1/PRI line these question marks will disappear.

Configuring the E1/PRI lines

To configure a E1 line with the information you gathered in Table 3-6 on page 3-25:

1 From the Main Edit Menu, select the slot that contains your Net/E1 card, for example, 10-000.

```
10-000 Net/E1
  >10-100 Line Config
  10-200 Line Diag
```

2 Select Line Config.

```
10-100 Line Config
  >10-1** Factory
  10-102
  10-103
  10-104
```

3 Select the currently active Line profile, 10-1** Factory.

```
10-1** Factory
  >Name=
  1st Line=Trunk
  2nd Line=Disabled
  Line 1...
  Line 2...
```

4 Select Line 1.

```
10-1** Factory
  Line 1...
    >Sig Mode=Inband ^
     NFAS ID num=N/A
     Rob Ctl=Wink-Start
     Switch Type=N/A
     Framing Mode=D4
     Encoding=AMI
     FDL=N/A
     Length=N/A
     Buildout=0 dB
     Clock Source=Yes
     Pbx Type=N/A
     Delete Digits=N/A
     Add Number=N/A
     Call-by-Call=N/A
     Ans #=N/A
```

5 Set the appropriate signaling mode for Sig Mode parameter:

- None indicates a leased line.
- ISDN signaling using the D channel. The 32nd channel of the E1 line must be designated as the D channel.
- DPNSS indicates that the interface supports DPNSS or DASS 2 signaling.
- R2 indicates R2 signaling.
- Metered indicates metered R2 signaling protocol, used in Brazil and South Africa.
- Chinese indicates a version of the R2 signaling protocol specified for use in China.

6 If you selected ISDN above, select the WAN switch type at the lines' point-of-presence.

- N/A: This parameter is not applicable whenever Sig Mode=Inband.
- AT&T
- NTI
- NI-2

- GloBanD
- Japan

7 Select the type of framing this line uses:

- G.703
- 2DS

8 Select the encoding used on this line:

- None: This is identical to AMI, but without density enforcement.
- AMI
- B8ZS

9 Select the FDL (Facility Data Link) used on this line:

- N/A: This parameter is not applicable whenever Framing Mode=D4.
- None
- AT&T
- ANSI
- Sprint

10 Select the cable distance between MAX and the WAN interface equipment.

- N/A: This parameter is N/A if the MAX has an internal CSU.
- Otherwise: Select the correct cable distance in feet between MAX and the CSU or other network (WAN) interface unit to which it is connected. The default is 1-133.

11 Select the amount of attenuation to add to the line's network interface:

- N/A: This parameter is N/A if the MAX does not have an internal CSU.
- Otherwise: Select the Buildout value to provide the proper line attenuation. The default is 0db.

12 If your channels are not switched (the default), specify how the MAX uses the E1 channels using the Ch n parameter:

- Switched (the default)
- Nailed (dedicated)
- Unused (not in service)

Note: To test the line later, you must have at least two switched channels. If you plan to use a channel for drop-and-insert (D&I), you can enter it as Switched for the Quickstart and then change it to D&I for the final installation.

13 If you using R2 signaling, configure incoming call routing for the E1 line by setting the following parameters:

- For each Ch n # parameter, enter the rightmost unique digits of the phone number used to reach this channel.

  For example, if your line is set up as illustrated in Figure 3-10 on page 3-23, enter 1111 for the first 12 channels (the analog call hunt group), and 2222 for the last 12 channels (the digital call hunt group).

– For each E1 channel that will answer analog calls, set the Ch n Slot parameters to the number of the slot that contains the modem card.

  For example, if the modem card is in slot 5, set Ch 1 Slot=5, Ch 2 Slot=5, and so on, up to the total number of analog calls you want the MAX to accept on this E1 line. This tells the MAX to route incoming analog calls to the digital modem card.

– For each E1 channel that will answer digital calls, set the Ch n Slot parameters to 9, the default number of the slot that contains the MAX unit's bridge/router module. This tells the MAX to route incoming digital calls to the bridge/router module to be bridged or routed to their destination.

14 Press Left-Arrow or Escape to exit the current Line profile.

15 In the Confirmation menu, press 2 to save and exit.

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

If you are using ISDN signaling, you must perform these additional steps to configure incoming call routing:

1 To tell the MAX how to route incoming digital calls, from the main Edit menu select the slot that contains the digital modem cards. For example, 50-000 V.34 Modem.

```
50-000 V.34 Modem
50-100 Mod Config
50-200 Modem Diag
```

2 Select Mod Config.

```
50-000 Mod Config
  Module Name=
  Ans 1#=
  Ans 2#=
  Ans 3#=
  Ans 4#=
```

3 In the Ans n# parameters enter the rightmost unique digits of the telephone numbers used by callers using analog devices.

For example, set Ans 1#=1111

This tells the MAX to route all calls coming in from phone number 555-1111 (the hunt group for analog callers) to the digital modems.

4 Press Left-Arrow or Escape to exit the current Modem profile.

In the Confirmation menu, press 2 to save and exit.

5 Press Left-Arrow or Escape to return to the main Edit menu.

6 To tell the MAX how to route incoming digital calls, from the main Edit menu select Ethernet > Mod Config > WAN Options.

```
90-C00 Mod Config
  WAN options...
    Dial Plan=N/A
    Ans 1#=
    Ans 2#=
    Ans 3#=
    Ans 4#=
    Pool#1 start=0.0.0.0
    Pool#1 count=0
```

```
Pool#2 start=0.0.0.0
Pool#2 count=0
Pool only=No
Pool Summary=No
```

7 In the Ans n# parameters enter the rightmost unique digits of the telephone numbers used by callers using analog devices.

For example, set Ans 1#=2222.

This tells the MAX to route all calls coming in from phone number 555-2222 (the hunt group for digital callers) to the MAX Ethernet module.

8 If you are going to dynamically assign addresses to incoming callers, set the following parameters:

- Pool#1 Start. The first IP address in the pool.
- Pool#1 Count. The number of IP addresses in the pool.

9 Press Left-Arrow or Escape to exit the Ethernet Mod Config profile.

In the Confirmation menu, press 2 to save and exit.

Those are all the parameters necessary for your E1 line configuration.

After the E1/PRI provider has established service, observe the MAX unit's front panel LEDs (Figure 3-13).

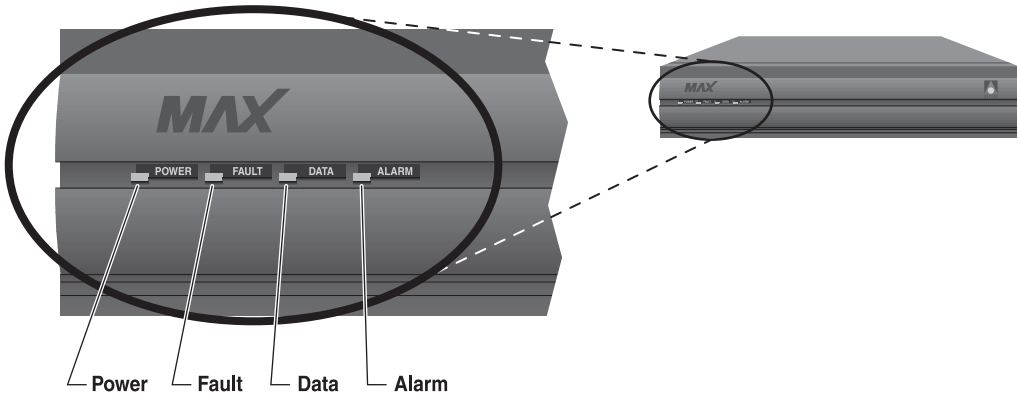


Figure 3-13. Front Panel LEDs

Is the Power LED on and the Fault, Data, and Alarm off?

- If Yes: Continue on to "Configuring the Ethernet profile."
- If No: The connection to the E1/PRI line has failed. If the Alarm LED is on, check your cabling. Also verify with your E1/PRI line provider that you have the correct Framing Mode, Encoding, Length, and Buildout values.

Note: If you must re-enter the parameters for your E1 line, first return all parameter values to their defaults as listed in the MAX *6000 Series Reference Guide*.

Configuring the Ethernet profile

To configure the Ethernet profile:

1 From the Main Edit Menu, select Ethernet > Mod Config.

```
90-B00 Mod Config
  Module Name=
  Ether options...
  WAN options...
  SNMP options...
  OSPF options...
  OSPF global options...
  Route Pref...
  TServ options...
  Bridging=No
  Shared Prof=No
  Telnet PW=
  RIP Policy=Poison Rvrs
  RIP Summary=Yes
  ICMP Redirects=Accept
  BOOTP Relay...
  DNS...
```

2 Select Ether options. The following list of parameters appears:

```
90-C00 Mod Config
  >IP Adrs=10.9.8.7
  2nd Adrs=0.0.0.0/0
  RIP Recv-v1
  Ignore Def Rt=Yes
  Proxy Mode=Off
  Filter=0
  IPX Frame=None
  IPX Enet#=N/A
  IPX Pool#=N/A
  IPX SAP Filter=N/A
  Handle IPX Type20=N/A
```

3 Enter the IP address /subnet mask of this MAX using the IP Adrs parameter.

4 Press Enter to return to the list of parameters.

5 Specify how you want the MAX to handle RIP packets on its Ethernet interface using the RIP parameter:

- Off (the default) specifies that the MAX does not transmit or receive RIP updates.
- Recv-v1: The MAX receives RIP-v1 updates, but does not transmit RIP updates.
- Send-v1: The MAX transmits RIP-v1 updates, but does not receive RIP updates.
- Both-v1: The MAX transmits and receives RIP-v1 updates.
- Send-v2: The MAX transmits RIP-v2 updates, but does not receive RIP updates.
- Recv-v2: The MAX receives RIP-v2 updates, but does not transmit RIP updates.
- Both-v2: The MAX transmits and receives RIP-v2 updates.

6 Press Left-Arrow or Escape to exit Ether options submenu.

7 At the Confirmation menu, press 2 to save your changes.

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

8 Press Escape until you return to the Main Edit Menu.

Configuring the Answer profile

The MAX uses the parameters in the Answer profile to build incoming calls. Note that settings in Connection profiles take precedence over the same settings in the Answer profile.

1 From the Main Edit Menu, select Ethernet > Answer.

```
90-800 Mod Config
  >Use Answer as Default=No
  Force 56=No
  Profile Reqd=Yes
  Clid Auth=Ignore
  Assign Adrs=No
  Encaps...
  Ip options...
  PPP options...
  COMB options...
  V.120 options...
  Session options...
  DHCP options...
```

2 To be able to dynamically assign addresses to incoming callers, make sure Assign Adrs=Yes.

3 Select PPP options.

```
90-700 Answer
  PPP options...
  Route IP=Yes
  Route IPX=No
  Bridge=Yes
  Recv Auth=CHAP
  MRU=1524
  LQM=No
  LQM Min=600
  LQM Max=600
  Link Comp=Stac
  VJ Comp=Yes
  Dyn Alg=Quadratic
  Sec History=15
  Add Pers=5
  Sub Pers=10
  Min Ch Count=1
  Max Ch Count=1
```

4 Make sure Route IP=Yes.

5 Set the Recv Auth parameter to the authentication you are going to require for incoming calls:

- None (the default) specifies that the MAX does not use an authentication protocol to validate incoming calls.
- PAP specifies the Password Authentication Protocol, a PPP authentication protocol.
- CHAP specifies the Challenge Handshake Authentication Protocol, a more secure PPP authentication protocol.
- MS-CHAP specifies the MAX.

– Either specifies that the MAX can use either CHAP, PAP, or MS-CHAP. The MAX first requests authentication using CHAP. If the dial-in call rejects the request (or does not acknowledge it), the MAX then requests PAP authentication, then MS-CHAP.

6 Press Escape or Left-Arrow until the Confirmation menu appears. Press 2 to save your changes.

7 Press Left-Arrow or Escape until you return to the Main Edit Menu.

Creating Connection profiles

Connection profiles define remote users to the MAX.

To create a Connection profile:

1 From the Main Edit Menu, select Ethernet > Connections.

```
90-100 Connections
90-101
90-102
90-103
90-104
90-105
90-106
90-107
90-108
90-109
90-110
90-111
90-111
```

2 Select the first profile. A list of parameters appears:

```
90-101
  Station=
  Active=No
  Encaps=MPP
  PRI # Type=National
  Dial #=
  Calling #=
  Called #=
  Route IP=Yes
  Route IPX=N/A
  Bridge=N/A
  Dial brdcast=
  Encaps options...
  Ip options...
  Ipx options...
  Session options...
  Telco options...
```

3 Select and modify the following parameters:

– Station. Enter a name such as “Remote-Call.” This acts as the login name of the remote user.

– Active=Yes.

– Encaps. Set the encapsulation method you want to use for this connection. We recommend you select MPP for this test. If the remote device does not support MPP,

the MAX will attempt to negotiate an MP session. If the remote device does not support MP, the MAX will attempt to negotiate a PPP session.

– Route IP=Yes.

4 Select Encaps options.

```
90-101
Encaps options...
  Send Auth=None
  Send PW=N/A
  Aux Send PW=N/A
  Recv PW=
  DBA Monitor=Transmit
  Base Ch Count=1
  Min Ch Count=2
  Inc Ch Count=1
  Dec Ch Count=1
  MRU=1524
  LQM=No
  LQM Min=600
  LQM Min=600
  Link Comp=Stac
```

5 Select Ip options.

```
90-101
 Ip options...
  LAN Adrs=0.0.0.0/0
  WAN Alias=0.0.0.0/0
  IF Adrs=0.0.0.0/0
  Preference=100
  Metric=7
  Private=No
  RIP=Off
  Pool=0
  Multicast Client=No
  Multicast Rate Limit=100
  Client Pri DNS-0.0.0.0
  Client Sec DNS=0.0.0.0
  Client Assign DNS=Yes
```

6 If you are configuring a Connection profile for a device with its own IP address, set the following parameters:

– LAN Adrs. Enter the IP address / subnet mask of the remote unit, then press Enter to return to the list of parameters.

– WAN Alias. If the far-end device is non-Ascend and requires numbered interfaces with PPP encapsulation, in WAN Alias enter the IP address of the remote unit's WAN interface (not its Ethernet interface), then press Enter to return to the list of parameters.

– IF Adrs. If you are implementing interfaced-based routing on the MAX enter the IP address of the port on the MAX side of the link.

7 If you are configuring a Connection profile for dynamic address assignment, set the following parameter:

– Pool. The IP address pool from which you want to assign this client an address. IP address pools are configured in the Ethernet > Mod Config > WAN options submenu.

8 Using the RIP parameter, specify how you want the MAX to handle RIP packets on this WAN interface:

- Off (the default) specifies that the MAX does not transmit or receive RIP updates.
- Recv-v1: The MAX receives RIP-v1 updates, but does not transmit RIP updates.
- Send-v1: The MAX transmits RIP-v1 updates, but does not receive RIP updates.
- Both-v1: The MAX transmits and receives RIP-v1 updates.
- Send-v2: The MAX transmits RIP-v2 updates, but does not receive RIP updates.
- Recv-v2: The MAX receives RIP-v2 updates, but does not transmit RIP updates.
- Both-v2: The MAX transmits and receives RIP-v2 updates.

9 Press Escape or Left-Arrow until the Confirmation menu appears. Press 2 to save your changes.

10 Press Left-Arrow until you return to the Main Edit Menu.

Testing the connections

Testing the connections assumes you have successfully configured the MAX in the previous section. The following tests are involved:

- Testing the LAN connection

  Ping or Telnet to your MAX from a workstation or host on the same LAN as the unit.
- Testing the T1/PRI line

  Place and answer a test call from MAX to itself over the E1/PRI interface. This tests the E1 lines to verify they are active and the phone numbers are correct.
- Testing the WAN connection

  Ping or Telnet a remote unit from a workstation or host on the same LAN as the MAX. This also tests the processing of data packets through the MAX.

Testing the LAN connection

This test requires that can run Ping or Telnet from a host or workstation on the same subnet as your MAX.

The following illustration shows how to test the Ethernet interface of your MAX by Pinging or Telneting to it from a station on the same LAN.

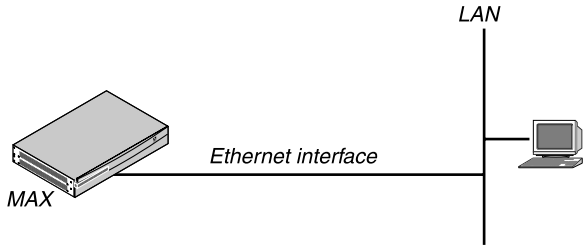


Figure 3-14. Testing the LAN Interface with Telnet or Ping

1 From a host or workstation, on the same subnet as MAX, Telnet to or Ping the MAX.

- If you are running Telnet, the MAX user interface display should appear. The default Telnet password for an unconfigured MAX is null (a carriage return).
- If you are running Ping, you should get the message that you are immediately receiving a return packet for every packet you are sending to the MAX. If you are not getting the proper response, this procedure has failed. It might be because of a problem with the LAN, because you entered the wrong IP address, or because of misconfiguration of either the subnet mask or IP Adrs parameter in the Ethernet profile.

2 Terminate the Telnet or Ping sessions.

Testing the E1/PRI line

To test whether the MAX line is functioning normally, use the Test command from the MAX terminal server. This command causes the MAX to place a call to itself over the WAN, and to send a number of packets over the connection. This tests the MAX unit's ability to initiate and receive calls, and diagnoses whether the connection over the digital access line is functional.

Note: The terminal server Test command uses one channel to dial out and another channel to answer as in the following illustration. This requires that the E1/PRI line is set for bidirectional calling.

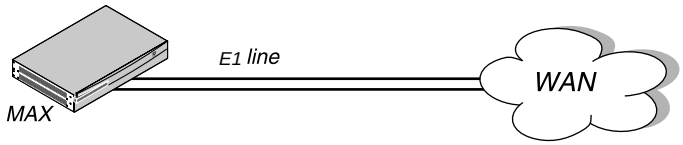


Figure 3-15. Testing the WAN interface by placing a call to yourself

To perform a self test:

1 From the Main Edit Menu, select System:

```
00-200 System
  00-100 Sys Config
  >00-200 Sys Diag
  00-300 Security
  00-400 Destinations
  00-500 Dial Plan
```

2 Select Sys Diag.

```
00-200 Sys Diag
  >00-201 Restore Cfg
  00-202 Save Config
  00-203 Use MIF
  00-204 Sys Reset
  00-205 Term Serv
  00-206 Upd Rem Cfg
```

3 Select Term Serv.

The Terminal Server screen appears:

** Ascend Pipeline Terminal Server **

```
ascend%
```

4 Type test *phone-number*

where *phone-number* is the phone number of the MAX E1 line.

The most frequent cause for failing to connect is incorrect phone numbers.

- Did the test complete successfully?
  - If Yes: Congratulations. You have successfully completed a test call through the WAN to yourself.
  - If No: This procedure has failed. Verify that you have entered all the E1 line parameters correctly and that your line is correctly provisioned as explained in Appendix A, “Provisioning the Switch.”

5 Enter quit to exit the terminal server interface.

6 Press the Left-Arrow or the Escape key to return to the Main Edit Menu.

Testing the WAN connection

This procedure assumes:

- You can run Telnet or Ping from a host or workstation on the same LAN segment as MAX.
- There is a remote unit (MAX-compatible) to which you can route data packets over a dial-up link.

Note: The remote unit should be configured for the route back to your MAX; otherwise you might bring up the connection and send packets, but fail to receive anything back.

You test your MAX installation by using Ping or Telnet to and from the remote unit over a dial-up connection as illustrated in Figure 3-16.

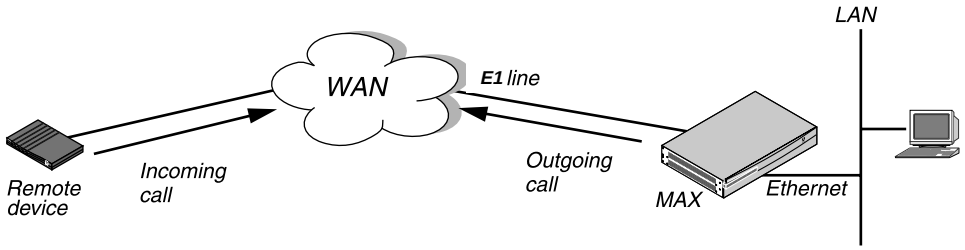


Figure 3-16. Testing the WAN by dialing into and out from the MAX

1 Configure the routes of a host on the same LAN as your MAX so that your MAX is the gateway to the remote unit.

The most common method is to add static routes to the remote unit using your MAX as a gateway. You can also make your MAX the default router.

For example, if the remote unit address is 167.34.9.23, and the your MAX address is 165.3.45.8, the gateway configuration on the remote unit would be:

- Address (remote unit) address 167.34.9.23
- Gateway (your local unit) address 165.3.45.8

2 From the local host, enter the Telnet or Ping command for the remote unit.

- If you are running Telnet, the remote unit’s user interface display should appear.

  Congratulations. You have successfully completed the Quickstart configuration for your MAX.

– If you are running Ping, you should get the message that you are immediately receiving a return packet for every packet you are sending to the remote unit. Continue with the next step.

If you are not getting the proper response, this procedure has failed. It might be because of a problem with the LAN, or because of misconfiguration. Verify the configuration of the Ethernet profile.

3 Terminate the Telnet or Ping sessions.

Where to go next

Table 3-10 explains where to find further information about configuring and operating your MAX.

Table 3-10.Where to go next

To do this...	Go to this document...
Read the MAX technical specifications	*MAX 6000 Series Getting Started*
Change the MAX hardware configuration	*MAX 6000 Series Getting Started*
Configure the MAX WAN interfaces	*MAX 6000 Series ISP & Telecommuting Configuration Guide*
Configure the MAX networking protocols	*MAX 6000 Series ISP & Telecommuting Configuration Guide*
Administer the MAX	*MAX 6000 Series ISP & Telecommuting Configuration Guide*
Define and apply filters	*MAX 6000 Series ISP & Telecommuting Configuration Guide*
Configure Connections profiles and frame relay connections	*MAX 6000 Series ISP & Telecommuting Configuration Guide*
Get detailed reference information on the MAX parameters and status windows	*MAX 6000 Series Reference Guide*
Configure MAX security	*MAX Security Supplement*
Configure RADIUS profiles	*MAX RADIUS Configuration Guide*
Use MIF	*Ascend MIF Supplement*

Navigating the User Interface

4

This chapter covers these topics:

Using the configuration menus

You can access the MAX configuration menus in a VT100 emulation window from a computer connected to the Control port, or from a Palmtop Controller, as described in “Starting up the MAX” on page 2-10. When you see the configuration menus, you have established a Console session.

You can also establish a Console session from any Telnet workstation by opening a Telnet session with the MAX. From 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 MAX Control port. See “About MAX passwords” on page 4-5 for related information.

You can also use the Rem Mgmt command to enable a caller at the far end of an AIM or MPP call to access the MAX configuration menus.

The main edit menu

The configuration interface consist the Main Edit Menu and eight status windows. The left part of the screen is the Main Edit Menu, which is used to configure the MAX. The items listed in the Main Edit Menu differ depending on the system configuration. The Empty items represent expansion slots that do not contain a card. See “Understanding menu numbers” on page 4-8 for related information.

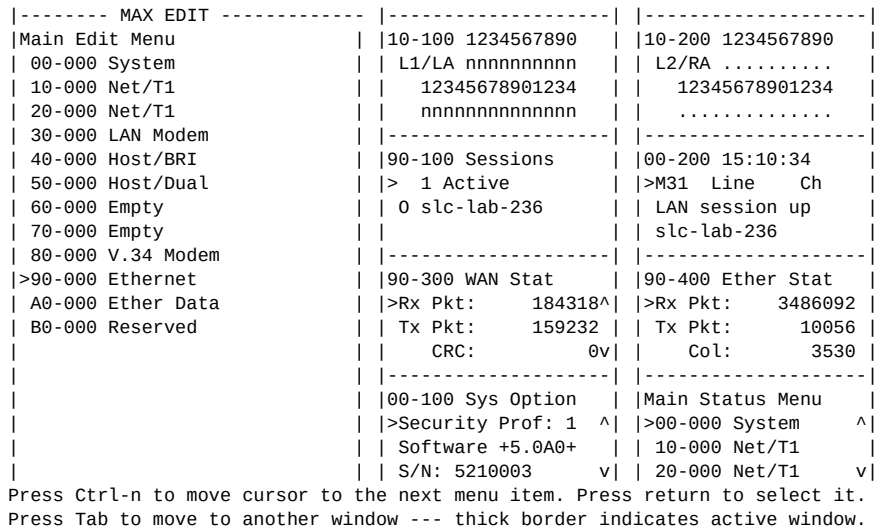


Figure 4-1. MAX 6000 series configuration menus

Note: For an overview of how the MAX menus and profiles are organized, see the MAX *Reference Guide*.

Making a menu or status window active

You can interact with only one display at a time. The active display has a thick double line border on the left, right, and top sides. In Figure 4-1, the 10-100 status display is active (near the top-middle of the screen).

If 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 activate each window from left to right and down, until you reach the last display 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. To move the cursor down, press Ctrl-N (next) or the down-arrow key. To move it up, press Ctrl-P (previous) or the up-arrow key. (Some VT100 emulators do not support the use of arrow keys.) For a complete list of key combinations used to navigate the interface, see Table 4-1 on page 4-7.

```
Main Edit Menu
     00-000 System
     >10-000 Net/T1
     20-000 Net/T1
     30-000 Empty
     40-000 Empty
     50-000 V.34 Modem
     60-000 V.34 Modem
     70-000 Net/T1
```

```
80-000 V.34 Modem
90-000 Ethernet
A0-000 Ether Data
b0-000 Serial WAN
```

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 90-000 Ethernet, and press Enter. The Ethernet menu opens.

```
90-000 Ethernet
90-100 Connections
90-200 Names/Passwords
90-300 Bridge Adrs
90-400 Static Rtes
90-500 Filters
90-600 Firewalls
90-700 Frame Relay
90-800 Answer
90-900 SNMP Traps
90-A00 IPX Routes
90-B00 IPX SAP Filters
90-C00 Mod Config
```

The Ethernet menu contains submenus and profiles related to network functionality, such as bridging, routing, WAN connections, and so forth. The Mod Config Profile in this menu relates to the configuration of the Ethernet interface itself, as shown next.

```
90-B00 Mod Config
  Module Name=
  Ether options...
  WAN options...
  SNMP options...
  OSPF options...
  OSPF global options...
  Route Pref...
  TServ options...
  Bridging=No
  Shared Prof=No
  Telnet PW=
  RIP Policy=Poison Rvrs
  RIP Summary=Yes
  ICMP Redirects=Accept
  BOOTP Relay...
  DNS...
```

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 that means a parameter does not apply within the context of how some other parameter(s) or profile has been set.

Opening edit fields

To open an edit field for a text-based parameter (such as a password, for example), move the cursor to that parameter and press Enter. An edit field opens, delimited by brackets, as shown for the Telnet PW parameter, next.

```
90-B00 Mod Config
  Module Name=
  Ether options...
  WAN options...
  SNMP options...
  OSPF options...
  OSPF global options...
  Route Pref...
  TServ options...
  Bridging=No
  Shared Prof=No
  Telnet PW:
  [ ]

  ICMP Redirects=Accept
  BOOTP Relay...
  DNS...
```

Note: See “About MAX passwords” on page 4-5 for related information.

A blinking text cursor appears in the brackets, indicating that you can start typing text. If the field already contains text, it is cleared when you type a character. To modify only a few characters of existing text, use the arrow keys to position the cursor and then delete or overwrite the characters.

To close the edit field and accept the new text, press Enter.

Setting enumerated parameters

An enumerated parameter is one for which there is a set of predefined values.You modify it by simply placing the cursor beside the parameter and typing the Enter, Return, or the Right-Arrow key until the proper value appears.

Saving your changes

When you exit a profile, you are prompted to confirm that you want to save 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 Save option and pressing Enter, or by pressing 2.

Using the Palmtop Controller

If you have a standard MAX unit, or if you purchased the Palmtop Controller expansion card for the MAX 4000, you can plug in the 4-line LCD display called the Palmtop Controller to establish a Console Session.

In the Palmtop Controller, each menu displays only four lines, and each line displays a maximum of 20 characters. The Palmtop Controller screen contains a single display.

```
Main Edit Menu
>00-000 System
 10-000 Net/...
 20-000 Host/...
```

The process of editing from the Palmtop Controller is nearly identical to the process of editing from the Control Monitor, except that the Right-Arrow key replaces the functions of the Enter/Return key. That is, after you position the cursor (>) in front of a parameter, you must press the Right-Arrow key to begin to edit. In the window shown immediately below, the cursor is in front of the Name parameter:

```
21-101 Albuquerque+ O
>Name=Mark
 Dial #=555-1212
 Call Type=AIM
```

When you press the Right-arrow key, an edit field opens, and the current value is shown within the brackets:

```
21-101 Albuquerque+ O
Name:
 [Mark]
```

See “Opening edit fields” on page 4-3 for more details about how to enter text.

About MAX passwords

The MAX has up to nine security levels, each of which is defined in a Security Profile. When shipped from the factory, all nine levels are wide open, with no defined restrictions. To see the list of Security Profiles, open the System menu in the Main Edit Menu, and then select Security and press Enter.

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

Whenever the MAX is powered on, it activates the first Security Profile in this list, which is always named Default and always has no password. One of the first thing most administrators do is to reset the privileges in the Default profile to restrict what can be done by anyone accessing the MAX configuration menus. This is an important four-step process:

1 Open the Default Security Profile and set the Operations privilege to No.

2 Assign a password to the Full Access Security Profile. (Do not restrict privileges in the Full Access Profile.)

3 Activate the Full Access Security Profile and proceed to configure the MAX.

See the MAX *Security Supplement* for full details on modifying Security Profiles and assigning passwords.

Caution: If you reset or power-cycle the MAX, it activates the new, restrictive Default profile. You will not be able to perform any configuration tasks until you activate and supply the password for the Full Access Profile, described next. The default password for the Full Access Profile is Ascend.

To activate the Full Access Security Profile, press Ctrl-D. A context-sensitive menu, called the DO menu, is displayed.

```
90-C00 Mod Config
DO...
  >0=Esc
  P=Password
  C=Close TELNET
  E=Termsrv
  D=Diagnostics
```

In the DO menu, press P (or select P=Password). The list of Security Profiles will be displayed. Select Full Access and press Enter. The MAX prompts for that profile's password.

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

Type the password and press Enter to accept it. (We recommend that you 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 MAX 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 via Telnet, the caller must first supply the Telnet password to establish a Telnet session. Then, the Default security level is set for that session. To configure the MAX via Telnet, the caller must 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 MAX is truncating it for display purposes.
- Ellipses (...) mean that a submenu displays the details of a menu option.
  The MAX displays the submenu when you select the menu option.

The following table lists the special-purpose keys and key combinations you can use in the Control Monitor and Palmtop Controller displays.

Table 4-1. Special keys for Control Monitor and Palmtop Controller displays

Palmtop Controller	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.
<	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.
v	Down-Arrow, Ctrl-N	Move down to the next selection.
^	Up-Arrow, Ctrl-U, Ctrl-P	Move up to the previous selection.
N/A	Ctrl-V	Move to the next page of the list.
N/A	Tab, Ctrl-I	Move to the next window.
	Back-Tab, Ctrl-O	Move to the previous window.
TOGGLE STAT	N/A	Toggle to a status menu from the edit menu and vice versa.
Shift->	Delete	Delete the character under the cursor.
Shift-<	Backspace	Delete the character to the left of the cursor.
Shift-^	none	Overwrite the character under the cursor with a space.
DO	Ctrl-D	Open the DO menu.
N/A	Ctrl-T	Return from or go to the Simplified Menus.
N/A	Ctrl-L	Refresh the vt-100 screen.
N/A	Ctrl-C	Return from the MIF to the normal menus.
D	D	Dial 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. On the Palmtop Controller, the main character associated with the key is large and white, and the Shift- character associated with the key is small and yellow.

Understanding menu numbers

The MAX has with four built-in T1 or E1 lines and a V.35 serial port for WAN access. It also has eight expansion slots, which can support additional bandwidth (BRI lines), AIM ports modules to support videoconferencing, or digital modems to support analog modem connections over digital lines.

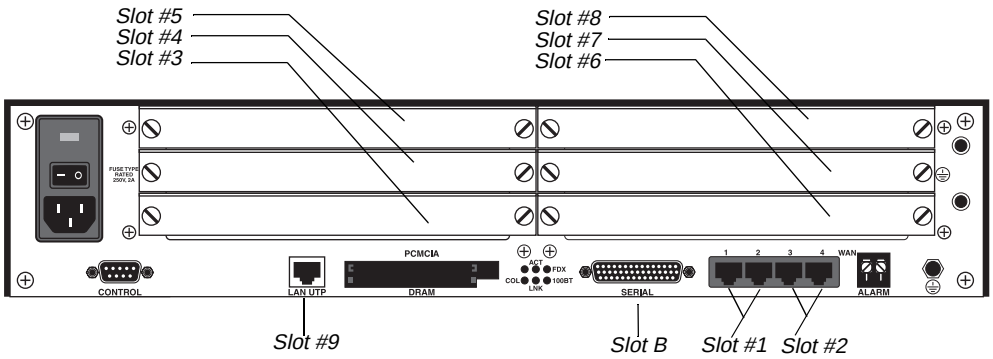


Figure 4-2. Slot and port numbering in the MAX 6000 series

The numbers in the vt100 menus relate to slot numbers in the MAX unit, which may be an actual expansion slot or *virtual* slot on the MAX unit's motherboard.

- The system itself is assigned slot number 0 (menu 00-000).

  The System menu contains these profiles and submenus, which are all related to system-wide configuration and maintenance:

```
00-000 System
   00-100 Sys Config
   00-200 Sys Diag
   00-300 Security
   00-400 Destinations
   00-500 Dial Plan
```

- The built-in T1 or E1 lines are slot 1 and slot 2 (menu 10-000 and 20-000).

  Each T1 or E1 slot contains two lines. The menus for configuring and testing the lines are organized like this:

```
10-000 Net/T1 (Net/E1)
   10-100 Line Config
   10-200 Line Diag

20-000 Net/T1 (Net/E1)
   20-100 Line Config
   20-200 Line Diag
```

- The six expansion slots are slots 3 through 8 (menus 30-000 through 80-000), with the numbering shown in Figure 4-2.
- The Ethernet is slot 9 (menu 90-000). The Ethernet menu contains submenus and profiles related to the local network, routing and bridging, and WAN connections.
- EtherData is slot A (menu A0-000). For the MAX with built-in Ethernet, this menu is not applicable.
- The serial WAN port is slot B (menu B0-000).

This is an example Main Edit Menu at the top level, which shows expansion modules installed in slots 3 through 8. (Note that slot A is not applicable to the MAX with built-in Ethernet.)

```
Main Edit Menu
   00-000 System
   10-000 Net/T1
   20-000 Net/T1
   30-000 Host/Dual
   40-000 Host/BRI
   50-000 Net/BRI
   60-000 BRI/LT
   70-000 V.34 Modem
   80-000 V.110
   90-000 Ethernet
   A0-000 Ether Data
   B0-000 Serial WAN
```

Now that you understand the MAX user interface, proceed to the MAX *ISP & Telecommuting Configuration Guide*.

Provisioning the Switch

A

This appendix provides the information necessary for properly provisioning a switch for T1 access, T1 PRI access, E1 access, E1 PRI access and ISDN BRI access to the WAN. This appendix covers these topics:

Provisioning the switch for T1 access

If you use an inband signaling line, the T1 circuit at the Point-of-Presence (POP) must support the translations listed in Table A-1 for compatibility with the MAX.

Table A-1. T1 access provisioning information

Translation	**Optional or required**
Two-state DTMF (Dual-Tone Multifrequency) dialing	Required
Outgoing wink start	Required
Incoming Immediate seizure	Optional for a switch Does not apply on T1 lines to a PBX
Incoming wink start	Optional for a switch Required on T1 lines to a PBX
Incoming digits suppressed	Required, except when a PBX is connected to T1 line supplied by the MAX through PRI-to-T1 conversion
Answer supervision	Required

Table A-1. T1 access provisioning information (continued)

Translation	Optional or required
Switched data	Required No voice/digital loss plan is allowed, but the drop-and-insert channels to a PBX and the channels to digital modems can be voice channels

Four-state A bit signaling, four-state B bit signaling, and pulse dialing are not supported; however, lines using these types of signaling are passed through transparently when the MAX performs drop-and-insert between lines #1 and #2.

For further information on wink-start and inband signaling, see the description of the Rob Ctl parameter in the MAX *Reference Guide.*

Provisioning the switch for T1 PRI access

Request the following information from your WAN provider about your WAN interface:

- Whether the line uses inband or ISDN D-channel signaling
- Whether the line uses B8ZS or AMI line encoding
- Whether the line uses ESF or D4 framing
- Each phone number assigned to the line on a channel-by-channel or service-by-service basis
- The number of nailed-up channels, if any
- The number of unused channels, if any
- The types of call-by-call services (also called NSF identifiers) on the switched channels
- Whether the line uses B channel, H0 channel, or H11 channel provisioning
- The D-channel assignment
- The NFAS ID number (if the T1 PRI line is provisioned for NFAS)

Keep this additional information in mind:

- In general, ESF framing and B8ZS line encoding are both recommended for T1 PRI-based applications; in addition, channel 24 must be the D channel, except for applications using Non-Facility Associated signaling (NFAS).
- Applications that require NFAS must be connected to an AT&T or Northern Telecom switch provisioned with NFAS.

  The service provider supplies guidelines for NFAS ID assignments and D-channel assignments. Note that the MAX must have D-channel signaling functionality and at least two WAN ports to use NFAS.
- The MAX can receive multichannel calls using Combinet or MP encapsulation only if all channels of the call share a common phone number (namely, a hunt group).

  You can request that your service provider supply you with a hunt group.

What you need from your E1/PRI service provider

You need the following information from your E1/PRI service provider:

- The phone numbers assigned to your E1/PRI interface, channel-by-channel
- Nailed-up channels (also called private WAN), if any
- Unused channels, if any
- Switch type (or emulation)—DPNSS only
- Switch layers 2 and 3 configuration—DASS 2 and DPNSS only (A/B end, X/Y end)
- Rate adaption protocol—DASS 2 and DPNSS only (X.30 and V.110)

Note: The MAX can receive multichannel calls using Combinet or MP encapsulation only if all channels of the call share a common phone number (namely, a hunt group). You can request that your service provider supply you with a hunt group.

Supported WAN switched services

The MAX E1 PRI supports the following WAN switched services:

- 56 kbps and 64 kbps data services
- GloBanD (and GVPN in CCITT countries) PRI network services—multiples of 64 kbps

When ordering a data service, make sure it is available end-to-end. Otherwise, the data carried by the call will be corrupted or the carrier will reject the call. For example, a GloBanD 512 kbps call made at a PRI interface is rejected when the called end is BRI, because GloBanD does not support BRI.

Provisioning the switch for ISDN BRI access

The tables that follow supply provisioning information for the ISDN BRI interface when a Net/BRI module (MX-SL-8BRIN) is installed. These requirements vary by switch type. Table A-2 provides information for AT&T 5ESS® switches operating in Point-to-Point (PTP), Multi-Point (MP), or National ISDN-1 (NI-1) mode.

Table A-2. AT&T 5ESS provisioning information

Element	Value	Comments
Terminal Type	A	
Number of CSD (circuit switched data)	2	Except when it handles calls to digital modems, the MAX is a data device, and you can substitute voice service for data service only if end-to-end data integrity is guaranteed. Voice service is required if digital modems are installed.

Table A-2. AT&T 5ESS provisioning information (continued)

Element	Value	Comments
Number of CSV (circuit switched voice)	1	Except when it handles calls to digital modems, the MAX is a data device, and you can substitute voice service for data service only if end-to-end data integrity is guaranteed. Voice service is required if digital modems are installed.
Number of Call Appearances	1	This value is not relevant for proper operation of the MAX.
Ringing/Idle Call Appearances	Idle	This value is the default for Terminal Type A.
Autohold is Y/N	No	This value is the default for Terminal Type A.
Onetouch is Y/N	No	This value is the default for Terminal Type A.

Table A-3 provides provisioning information for Northern Telecom switches.

Table A-3. Northern Telecom provisioning information

Element	Value	Comments
Signaling	Functional	
Protocol version control (PVC)	1 or 2	1 is NTI custom. 2 is NI-1 (National ISDN-1), which requires a TID to be assigned as a suffix to the SPID.
TEI assignment	Dynamic	
Release Key	No	This value is not relevant for proper operation of the MAX.
Ringing Indicator	No	This value is not relevant for proper operation of the MAX.
EKTS (electronic key telephone system)	off	

Note: The MAX can receive multichannel calls using Combinet or MP encapsulation only if all channels of the call share a common phone number (namely, a hunt group). You can request that your service provider supply you with a hunt group.

Information required from the ISDN BRI provider

If a Net/BRI module (MX-SL-8BRIN) is installed, your ISDN BRI provider must provide you with the following information:

- The phone number assigned to your ISDN BRI line.
- The SPIDs assigned to your ISDN BRI line (for lines running in any mode other than AT&T Point-to-Point)
- Which channels are nailed up or unused, if any

SPIDs for AT&T 5ESS switches

If your ISDN BRI line comes from an AT&T 5ESS switch operating in Multi-Point (MP) or National ISDN-1 (NI-1) mode, each SPID has the following format:

```
01 NNNNNNN 0 TT
```

- *NNNNNNN* is the 7-digit phone number of the ISDN BRI line.
- *TT* is the 2-digit TID (required only for NI-1).

  The TID can be a value from 00 to 62. It is assigned by your carrier. Ascend recommends that you use 00 as the TID for all SPIDs.

For example, suppose that 555-1212 is the 7-digit phone number of an ISDN BRI line using Multi-Point mode. The telephone company gives you the following SPID:

```
0155512120
```

Now, suppose that 555-6001 and 555-6002 are the 7-digit phone numbers of an ISDN BRI line using NI-1 mode. You choose TID=00 for both numbers and the telephone company gives you the following SPIDs:

```
017696001000
```

```
017696002000
```

If your ISDN BRI line operates in Point-to-Point (PTP) mode, SPIDs are not required.

SPIDs for Northern Telecom DMS-100 switches

If your ISDN BRI line comes from a Northern Telecom (NTI DMS-100) switch, each SPID has the following format:

```
AAANNNNNNN SS TT
```

- *AAA* is the 3-digit area code of your ISDN BRI line.
- *NNNNNNN* is the 7-digit phone number of your ISDN BRI line.
- *SS* is the SPID suffix, which can contain zero, one, or two digits as follows:
  - Empty
  - 1 and 2 for each ISDN BRI line
  - 01 and 02 for each ISDN BRI line
- *TT* is the 2-digit TID (required only for NI-1 [PVC=2])

  The TID can be a value from 00 to 62. It is assigned by your carrier. Ascend recommends you use 00 as the TID for all SPIDs.

For example, suppose you are using Northern Telecom in NTI Custom mode [PVC=1]). 415-555-1212 is the phone number of your ISDN BRI line, including the area code. The telephone company gives you the following SPID:

```
415555121201
```

Now, suppose you are using Northern Telecom in NI-1 mode [PVC=2]). 510-555-6001 and 510-555-6002 are the phone numbers of your ISDN BRI line. You choose TID=00 for both numbers and the telephone company gives you the following SPIDs:

```
5107690010100
5107690020200
```

MAX Technical Specifications

B

This appendix describes specifications for different facets of the MAX, and discusses cabling requirements.

General specifications

Battery

The MAX contains an internal 3V lithium battery. The normal operating life of this battery exceeds five years.

Only trained engineers authorized by Ascend should open the MAX unit's case for testing, maintenance, installation, or any other purpose. Furthermore, only trained engineers should replace MAX 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 MÉME TYPE OU D'UN TYPE RECOMMANDEÉ PAR LE CONSTRUCTEUR. METTRE AU RÉBUT LES BATTERIES USAGÉES CONFORMÉMENT AUX INSTRUCTIONS DU FABRICANT.

Power requirements

The MAX unit's source power requirements are listed in Table B-1.

Table B-1. MAX source power requirements

Element	Value
Voltage	90-240 VAC
Phase	Single
Frequency	47-63 Hz

The power requirements for the redundant power standard MAX are listed in Table B-2.

Table B-2. Redundant power standard MAX requirements

Element	Value
Voltage	90-135 VAC/180-270 VAC
Phase	Single
Frequency	47-63 Hz
Input Power	MAX 6000: 80W (nominal)-200W (maximum) Standard MAX: 80W (nominal)-120W (maximum)
Fuse	5 Amp slow-blow for 120 VAC input 2.5 Amp slow-blow for 240 VAC input

The redundant power requirements for the MAX 6000 are listed in Table B-3.

Table B-3. Redundant power MAX 6000 requirements

Element	Value
Voltage	-43 to -60 VDC
Input Power	MAX 6000: 80W (nominal)-200W (maximum) Standard MAX: 80W (nominal)-120W (maximum)
Fuses	7.5 Amp GMT (two fuses)

The MAX unit's configuration profiles are stored in battery-protected memory. When the MAX is turned off, the profiles are not lost.

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

Environmental requirements

For best results, you should house the MAX in a room with constant temperature and humidity. In general, cooler environments are better, and 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 of up to 90% is acceptable.

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

The MAX base system weighs 15 lbs (6.81 kg); a fully loaded system weighs 30 lbs (13.6 kg). The MAX has these dimensions: 3.0" x 17" x 12" (8.9 cm x 43.2 cm x 30.5 cm).

The base system of a redundant power standard MAX or MAX 6000 weighs 41 lbs (18.6 kg); a fully loaded system weighs 56 lbs (25.5 kg). The redundant power MAX has the dimensions 7.0" x 17.5" x 12" (17.8 cm x 44.5 cm x 30.5 cm).

Alarm relay operating specifications

On the back panel of the Ascend unit is a pair of alarm-relay terminal-block contacts that remains open during normal operation. The contacts close during loss of power, hardware failure, or reset.

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.

Cables and Connectors

C

This appendix describes specifications for different facets of the MAX, and discusses cabling requirements. This appendix covers these topics:

User interface specifications

This section covers cabling pinouts for the Control Monitor, Palmtop Controller, and MIF interfaces.

Control port and cabling pinouts for the Control Monitor and MIF

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

Table C-1. Control Monitor and MIF 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	*RI	*Ring Indicator	*O

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

Pinouts for the Palmtop Controller

Table C-2 specifies the pins and corresponding functions of the Palmtop Controller jacks.

Table C-2. Palmtop Controller pinouts

MAX RJ12 pin	Function	I/O
1	Power to Palmtop, +5V	O
2	Control Out	O
3	Control In	I
4	Serial Transmit Data	O
5	Serial Receive Data	I
6	Ground	

Note: O is Out (from the MAX toward the Palmtop).

Palmtop port cabling pinouts for a Control Monitor

Table C-3 lists the specifications you need to adapt the Palmtop port for use as a Control Monitor or MIF interface through a vt-100 terminal.

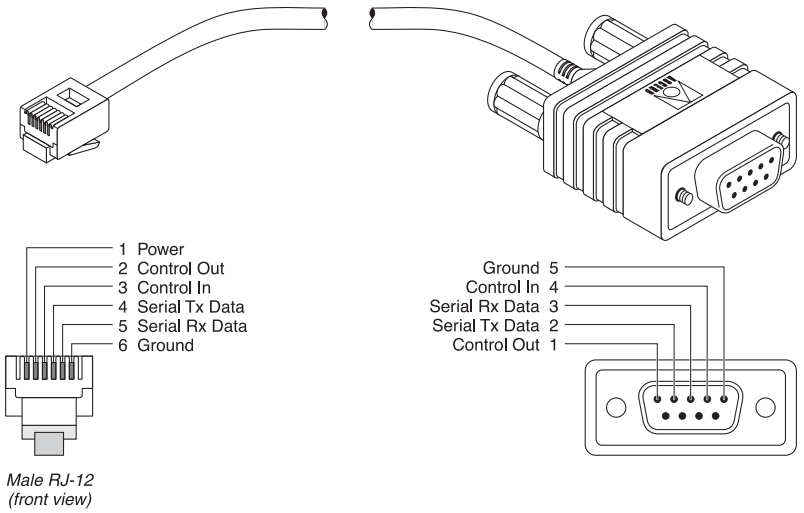


Figure C-1. Control Monitor and MIF Palmtop port and cable

Table C-3. Control Monitor and MIF Palmtop port and cabling pinouts

Model number HHT-VT-100 **Part number 2510-0088-001**		
Signal (MAX)	**MAX RJ12 pin number**	**VT-100 female DE-9 pin number**
Power (+5V)	1	not connected
Control Out	2	1
Control In	3	4
Serial Transmit Data	4	2
Serial Receive Data	5	3
Ground	6	5

Ethernet interface specifications

The base unit of a MAX has an Ethernet interface that supports the physical specifications of IEEE 802.3 and IEEE 802.14 with Ethernet 2 (Ethernet/DIX) framing. It provides a single Ethernet interface that auto-senses the Ethernet type to which it is connected. The following types are supported:

- 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 Mbits/s Baseband Modulation on Twisted Pair

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

Required equipment

To install the Ethernet interface, you must have either of the equipment described in the sections below.

10Base-T

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

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/PRI interface specifications

This section provides the specifications for the MAX unit's T1/PRI interface and covers cabling requirements.

T1/PRI CSU requirements

Your requirements differ depending on whether a T1/PRI port on the MAX is equipped with an internal Channel Service Unit (CSU).

- If a T1/PRI port on the MAX 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, you must notify the carrier before disconnecting the MAX from the WAN. If you disconnect or turn off the MAX without prior notification, the carrier might temporarily discontinue your T1/PRI service.

  The MAX unit's internal CSUs are compatible with dry-loop T1/PRI lines, and with span-powered or wet-loop powered T1/PRI lines.

- A T1/PRI port of the MAX 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, such as an external CSU. Your carrier determines the correct setting for the line buildout setting of the CSU. You configure this parameter during installation. For more information, see the *MAX Reference Guide*.

Table C-4 lists CSU specifications.

Table C-4. 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 Mb/s +/- 200 b/s
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 MAX restarts, a relay closure returns the T1 PRI signal to the WAN; that is, the T1 PRI line is looped back. However, if the MAX is configured 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 MAX expansion module always loop back on loss of power, regardless of how they are configured.

T1/PRI cable specifications

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

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

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

The WAN interface cables and plugs described in the following sections are available for the MAX unit's WAN interfaces.

T1/PRI crossover cable: RJ48C/RJ48C

Install this cable when the WAN interface transmits on pins 5 and 4 and receives on pins 2 and 1. Refer to Figure C-2 and Table C-5.

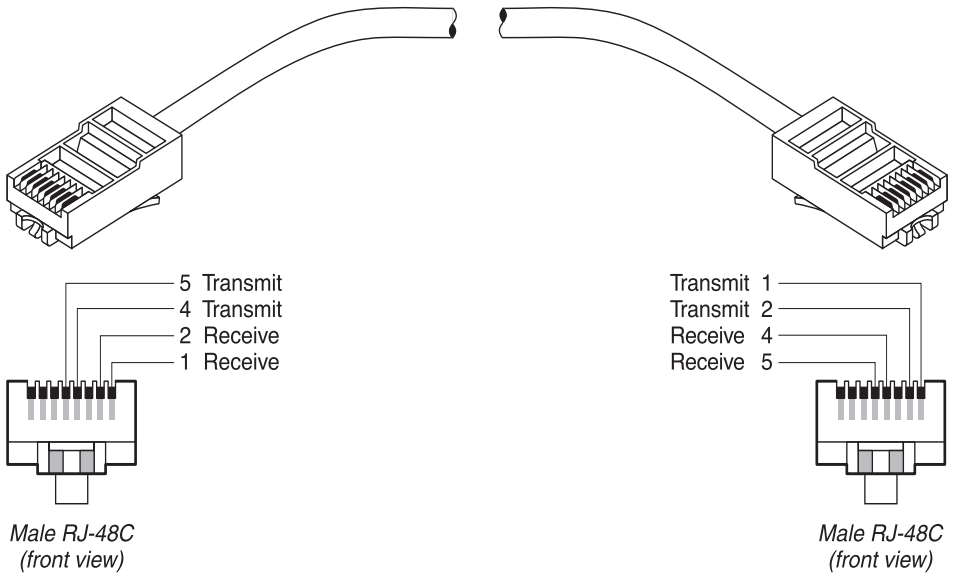


Figure C-2. RJ48C/RJ48C crossover cable

Table C-5. RJ48C/RJ48C crossover cable specifications

Model number RJ48C-X **Part number 2510-0059/0323-001**			
Pair #	**Signal (MAX)**	**Male RJ48C (MAX)**	**Male RJ48C (remote)**
1	Receive	2 1	5 4
2	Transmit	5 4	2 1

T1/PRI straight-through cable: RJ48C/RJ48C

Before installing this cable, verify that the WAN interface transmits on pins 2 and 1 and receives on pins 5 and 4. Refer to Figure C-3 and Table C-6.

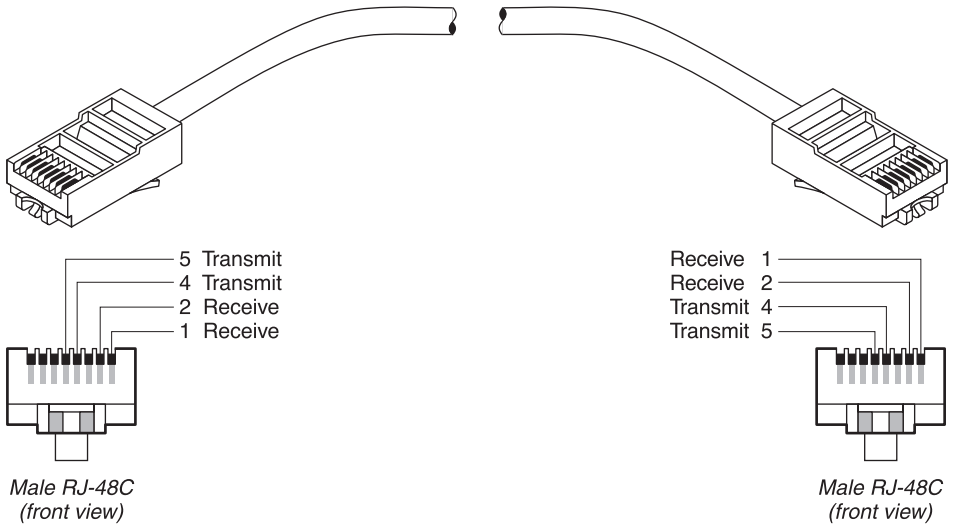


Figure C-3. RJ48C/RJ48C straight-through cable specifications

Table C-6. RJ48C/RJ48C straight-through cable specifications

Model number RJ48C-S **Part number 2510-0064-001**			
Pair #	**Signal (MAX)**	**Male RJ48C (MAX)**	**Male RJ48C (remote)**
1	Receive	1 2	1 2
2	Transmit	5 4	5 4

T1/PRI straight-through cable: RJ48C/DA-15

Before installing this cable, verify that the WAN interface transmits on pins 3 and 11 and receives on pins 1 and 9. Refer to Figure C-4 and Table C-7.

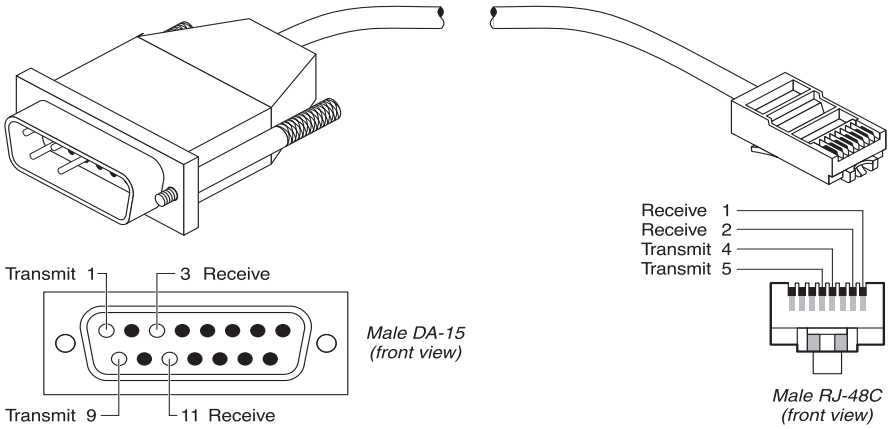


Figure C-4. RJ48C/DA-15 straight-through cable

Table C-7. RJ48C/DA-15 straight-through cable specifications

Model number DA15-X Part number 2510-0082-001			
Pair #	**Signal (MAX)**	**Male RJ48C (MAX)**	**Male DA-15P (remote)**
1	Receive	1 2	3 11
2	Transmit	5 4	1 9

T1/PRI crossover cable: RJ48C/DA

Before installing this cable, verify that the WAN interface transmits on pins 1 and 9 and receives on pins 3 and 11. Refer to Figure C-5 and Table C-8.

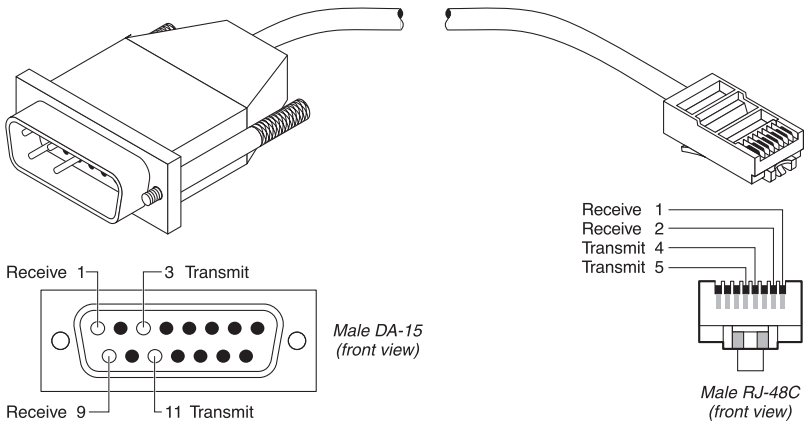


Figure C-5. RJ48C/DA crossover cable

Table C-8. RJ48C/DA crossover cable specifications

Model number DA15-S **Part number 2510-0065-001**			
Pair #	**Signal (MAX)**	**Male RJ48C (MAX)**	**Male DA-15P (remote)**
1	Receive	1 2	1 9
2	Transmit	5 4	3 11

T1/PRI straight-through cable: RJ48C/Bantam

The WAN side of the cable connects to dual bantam jacks. Refer to Figure C-6 and Table C-9.

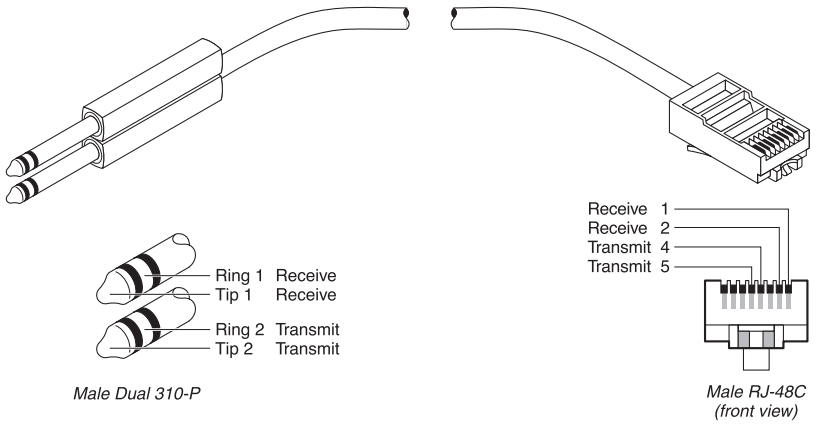


Figure C-6. RJ48C/Bantam straight-through cable

Table C-9. RJ48C/Bantam straight-through cable specifications

Model number DBNT-RJ45 Part number 2510-0066-001			
Pair #	**Signal (MAX)**	**Male RJ48 (MAX)**	**Male Dual - 310P (remote)**
1	Receive	1 2	Tip 1 Ring 1
2	Transmit	5 4	Tip 2 Ring 2

T1 RJ48C-Loopback plug

This plug loops the transmit signal back to the MAX.

Table C-10.RJ48C-Loopback plug specifications

Pair #	Signal	Male RJ48C
1	Receive	1 (connects to 5) 2 (connects to 4)
2	Transmit	5 (connects to 1) 4 (connects to 2)

T1/PRI WAN ports

Table C-11 lists the pins on RJ48C sockets on the MAX used for T1/PRI WAN interface. Only pins 1, 2, 4, and 5 are used. The remaining pins are not connected.

Table C-11.Transmit and Receive pins

MAX T1/PRI interface	RJ48C 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

The MAX 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 56 kbps and 64 kbps services
- Sprint Switched 56 kbps and 64 kbps services
- MultiRate and GloBanD (and GVPN in CCITT countries) PRI network services

Note: The MAX can access only Switched-56 kbps 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 MAX Reference Guide*. In addition to switched circuits, the MAX 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 unit's E1/PRI interface and covers cabling requirements.

During loss of power or whenever the MAX restarts, a relay closure returns the E1 PRI signal to the WAN; that is, the E1 PRI line is looped back. However, if the MAX is configured 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 MAX Net/E1 expansion module always loop back on loss of power, regardless of how they are configured.

E1/PRI cable specifications

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

E1/PRI crossover cable: RJ48C/RJ48C

Install this cable when the WAN interface transmits on pins 5 and 4 and receives on pins 2 and 1. Refer to Figure C-7 and Table C-12.

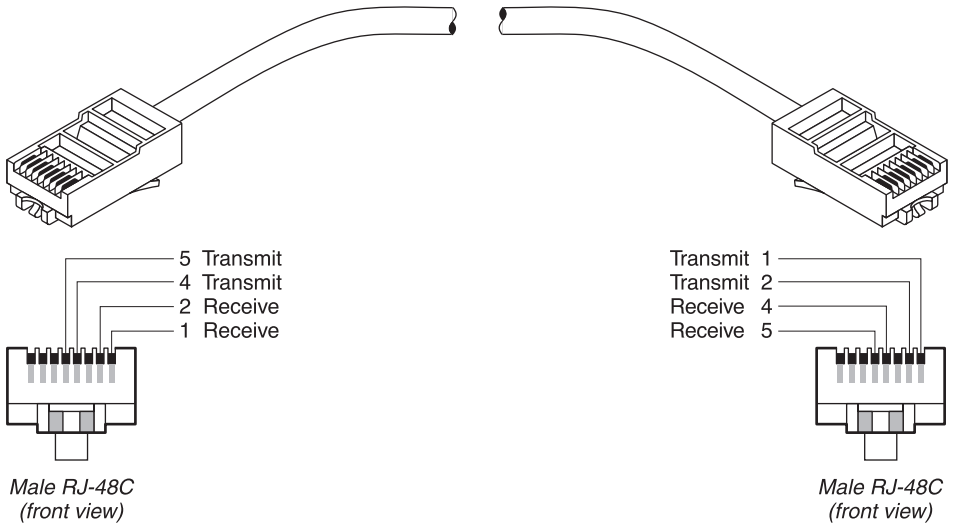


Figure C-7. RJ48C/RJ48C crossover cable.

Table C-12.RJ48C/RJ48C crossover cable specifications

Model number RJ48C-X **Part number 2510-0059/0323-001**			
Pair #	**Signal (MAX)**	**Male RJ48C (MAX)**	**Male RJ48C (remote)**
1	Receive	2 1	5 4
2	Transmit	5 4	2 1

E1/PRI straight-through cable: RJ48C/RJ48C

Before installing this cable, verify that the WAN interface transmits on pins 2 and 1 and receives on pins 5 and 4. Refer to Figure C-8 and Table C-13.

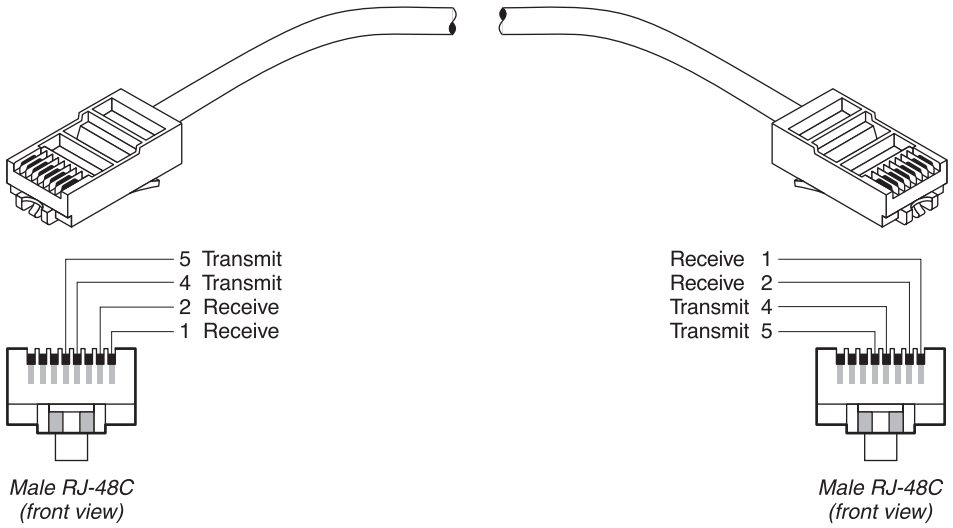


Figure C-8. RJ48C/RJ48C straight-through cable specifications

Table C-13.RJ48C/RJ48C straight-through cable specifications

Model number RJ48C-S **Part number 2510-0064-001**			
Pair #	**Signal (MAX)**	**Male RJ48C (MAX)**	**Male RJ48C (remote)**
1	Receive	1 2	1 2
2	Transmit	5 4	5 4

E1/PRI straight-through cable: RJ48C/DA-15

Before installing this cable, verify that the WAN interface transmits on pins 3 and 11 and receives on pins 1 and 9. Refer to Figure C-9 and Table C-14.

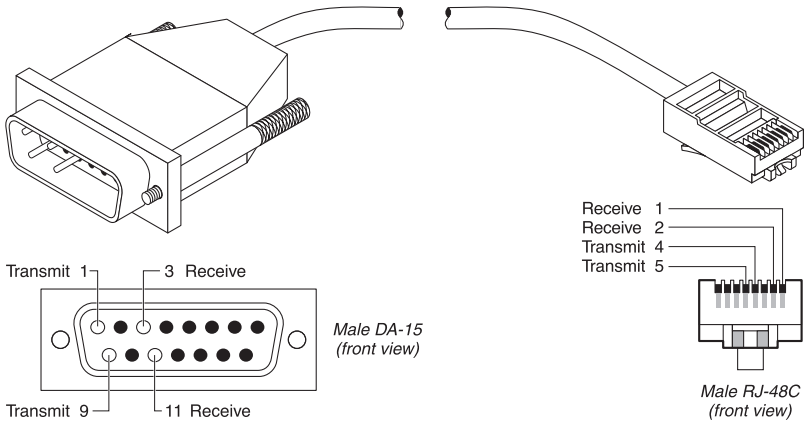


Figure C-9. RJ48C/DA-15 straight-through cable

Table C-14.RJ48C/DA-15 straight-through cable specifications

Model number DA15-X Part number 2510-0082-001			
Pair #	**Signal (MAX)**	**Male RJ48C (MAX)**	**Male DA-15P (remote)**
1	Receive	1 2	3 11
2	Transmit	5 4	1 9

E1/PRI crossover cable: RJ48C/DA

Before installing this cable, verify that the WAN interface transmits on pins 1 and 9 and receives on pins 3 and 11. Refer to Figure C-10 and Table C-15.

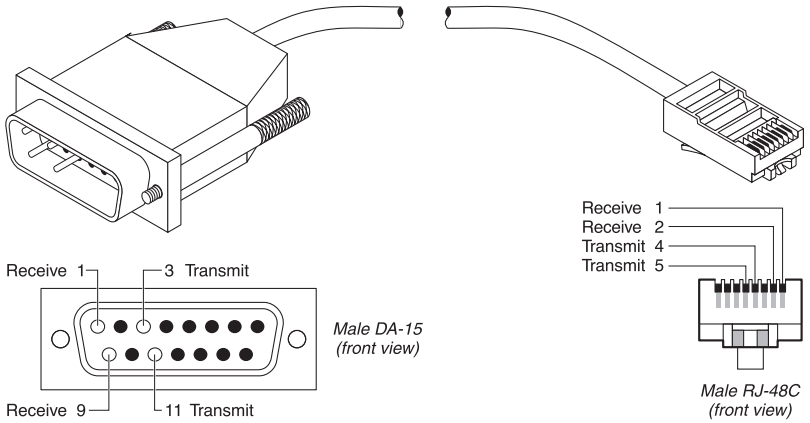


Figure C-10.RJ48C/DA crossover cable

Table C-15.RJ48C/DA crossover cable specifications

Model number DA15-S **Part number 2510-0065-001**			
Pair #	**Signal (MAX)**	**Male RJ48C (MAX)**	**Male DA-15P (remote)**
1	Receive	1 2	1 9
2	Transmit	5 4	3 11

E1/PRI straight-through cable: RJ48C/Bantam

The WAN side of the cable connects to dual bantam jacks. Refer to Figure C-11 and Table C-16.

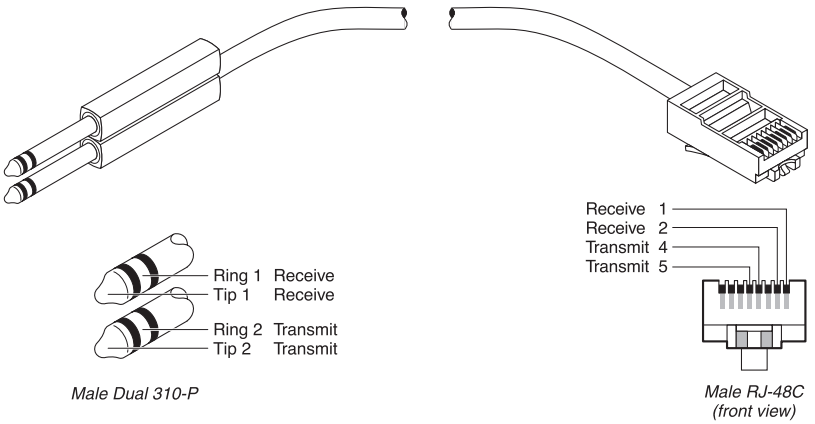


Figure C-11.RJ48C/Bantam straight-through cable

Table C-16.RJ48C/Bantam straight-through cable specifications

Model number DBNT-RJ45 Part number 2510-0066-001			
Pair #	**Signal (MAX)**	**Male RJ48 (MAX)**	**Male Dual - 310P (remote)**
1	Receive	1 2	Tip 1 Ring 1
2	Transmit	5 4	Tip 2 Ring 2

E1/PRI straight-through cable: MAX 6000 BNC to RJ-48C

This cable adapts a modular E1 port on the MAX to coaxial cable E1 lines. You must also set the jumpers within the MAX for 50 Ohm service. Refer to Figure C-12 and Table C-17.

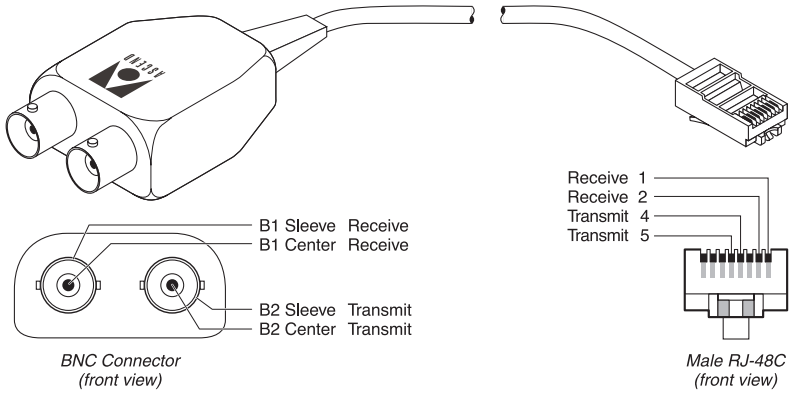


Figure C-12.MAX 6000 BNC to RJ-48C straight-through cable

Table C-17.MAX 6000 BNC to RJ-48C straight-through cable specifications

Part number 2510-0272-001			
Pair #	**Signal (MAX)**	**Male RJ48-C (MAX)**	**Male Dual - BNC (remote)**
1	Transmit	4 5	B1 Sleeve B1 Center
2	Receive	1 2	B2 Sleeve B2 Center

E1/PRI WAN ports

Table C-18 lists the pins on RJ48C sockets on the MAX used for E1/PRI WAN interface. Only pins 1, 2, 4, and 5 are used. The remaining pins are not connected.

Table C-18.Transmit and Receive pins

MAX E1/PRI interface	RJ48C 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.

ISDN BRI interface specifications

This section provides the specifications for the MAX unit's ISDN BRI interface.

Warning: To reduce the risk of fire, communication cable conductors must be 26 AWG or larger.

Attention: Afin de reduire les risques d'incendie, les fils conducteurs du cable de communication doivent etre d'un calibre minimum de 26 AWG (American Wire Gauge), c'est-a-dire d'un minimum de 0,404 mm.

Warnung: Um Feuerrisiken zu reduzieren, müssen die Kommunikationskabel-Anschlüße 26 AWG oder größer sein.

For the Net/BRI module

The Net/BRI module (MX-SL-8BRIN) connects to the WAN through a network termination (NT1) device. You must install a cable from the NT1 that ends in a 100Ω termination. The maximum distance between the NT1 and its termination is 3280 feet (1000 m). You can install the Net/BRI module anywhere along the length of the cable. Use only cable specifically constructed for ISDN BRI interfaces.

Note: In Belgium, install 10 m of cable between the Net/BRI module and the NT1. Significant data errors can result from using shorter cables.

For the Host/BRI module

Each ISDN BRI line provided by the Host/BRI module (MX-SL-8BRIT) must end in a 100Ω termination. The maximum cable distance between the Host/BRI and its termination is 3280

feet (1000 m). You can install the local ISDN BRI device anywhere along the length of the cable. Use only cable specifically constructed for ISDN BRI “S” interfaces.

Serial host interface specifications

This section describes the cabling requirements, timing requirements, and interface types for the serial host ports on the MAX.

The MAX unit’s serial host ports are compatible with the following three electrical standards:

- RS-449/422
- V.35
- X.21

The MAX also supports the following dialing/answering protocols at any of its serial host ports:

- V.25 bis
- RS-366
- X.21

Selection of the proper cable between a serial host port and the serial device ensures:

- The proper mapping of pinouts from the MAX to the application equipment
- Proper voltage levels

In the cable wiring tables that follow, the MAX is the DCE (Data Circuit-Terminating Equipment) device, while the host equipment is the DTE (Data Terminal Equipment) device. The serial host interface cabling tables use the abbreviations listed in Table C-19. Note that the Send timing and Receive timing clocks are supplied to the host by the MAX.

Table C-19.Serial host interface cabling abbreviations

Abbreviation	Explanation
FGND	Chassis Ground
SGND	Receive Common Ground
SD+	Send Data +
SD-	Send Data -
RD+	Receive Data +
RD-	Receive Data -
ST+	Send Timing +
ST-	Send Timing -
RT+	Receive Timing +

Table C-19.Serial host interface cabling abbreviations (continued)

Abbreviation	Explanation
RT-	Receive Timing -
TT+	Terminal Timing +
TT-	Terminal Timing -
DSR	Data Set Ready
DCD (CD)	Data Carrier Detect
RTS	Request to Send
RI	Ring Indicate
DTR	Data Terminal Ready
DPR	RS-366 Call Digit or Tone
ACR	Abandon Call/Retry
CRQ	Call Request
PND	Present Next Digit
DLO	Data Line Occupied
NB1	RS-366 Call Digit or Tone
NB2	RS-366 Call Digit or Tone
NB4	RS-366 Call Digit or Tone
NB8	RS-366 Call Digit or Tone
RX/SEL	Select Interface Jumper (not a signal to or from host)

V.35 cabling

The sections that follow list the pinouts for different types of V.35 cabling.

V.35/V.25 bis cable to Cisco

This cable connects the MAX to the V.35 port of a Cisco router that uses V.25 bis dialing. Figure C-13 and Table C-20 list the V.35/V.25 bis cable pinouts.

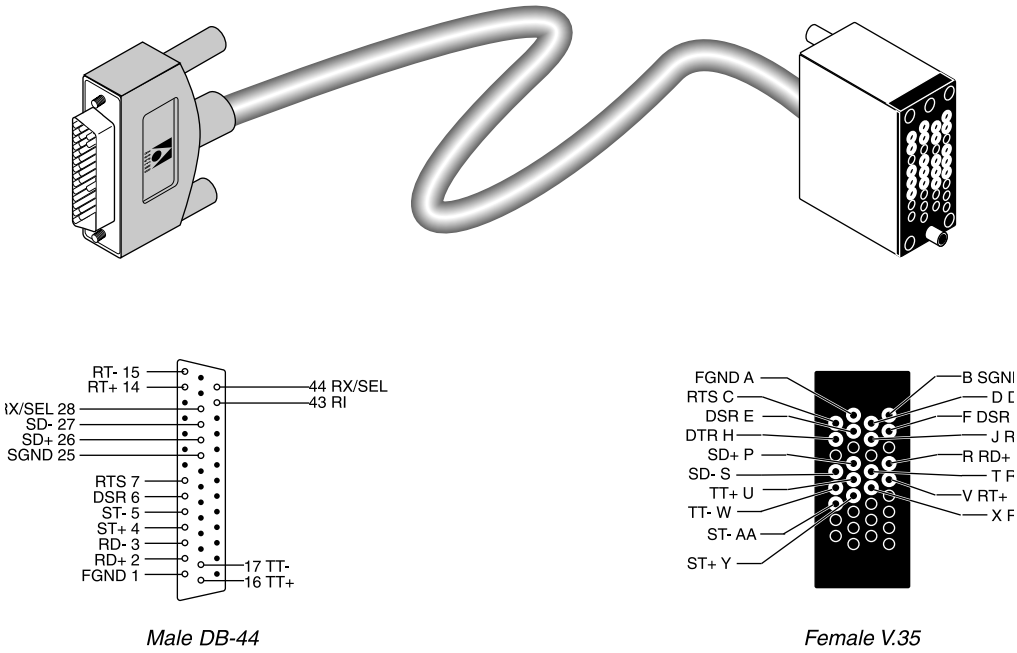


Figure C-13.V.35/V.25 bis cable to Cisco

Table C-20.V.35/V.25 bis cable to Cisco pinouts

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host female V.35
1	FGND	1	A
2	SD+ SD-	26 27	P S
3	RD+ RD-	2 3	R T
4	ST+ ST-	4 5	Y AA
5	RT+ RT-	14 15	V X
6	DSR DCD	6 36	E, F* D

Table C-20.V.35/V.25 bis cable to Cisco pinouts (continued)

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host female V.35
7	RTS RI	7 43	C J
8	DTR SGND	8 25	H B
9	TT+ TT-	16 17	U W
10	RX/SEL	28, 44*	

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

V.35 cable to generic serial host

This cable connects the MAX to the V.35 ports of a wide variety of equipment. A female-to-male V.35 gender changer is included when you order the cable. Table C-21 lists the V.35 cable pinouts.

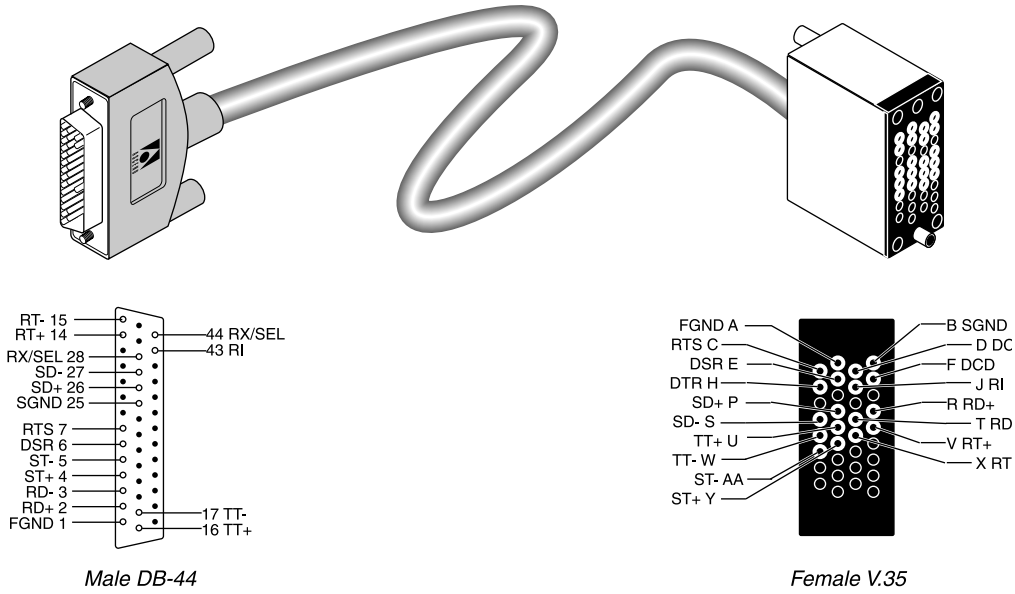


Figure C-14.V.35 cable to generic serial host

Table C-21.V.35 cable to generic serial host pinouts

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host female V.35
1	FGND	1	A
2	SD+ SD-	26 27	P S
3	RD+ RD-	2 3	R T
4	ST+ ST-	4 5	Y AA
5	RT+ RT-	14 15	V X
6	DSR DCD	6 36	E D, F*
7	RTS RI	7 43	C J

Table C-21.V.35 cable to generic serial host pinouts (continued)

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host female V.35
8	DTR SGND	8 25	H B
9	TT+ TT-	16 17	U W
10	RX/SEL	28, 44*	

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

V.35/RS-366 cable to generic serial host

This cable connects the MAX to the V.35 ports of a wide variety of equipment using RS-366 dialing. A female-to-male V.35 gender changer is included when you order the cable. Figure C-15 and Table C-22 list the V.35/RS-366 cable pinouts.

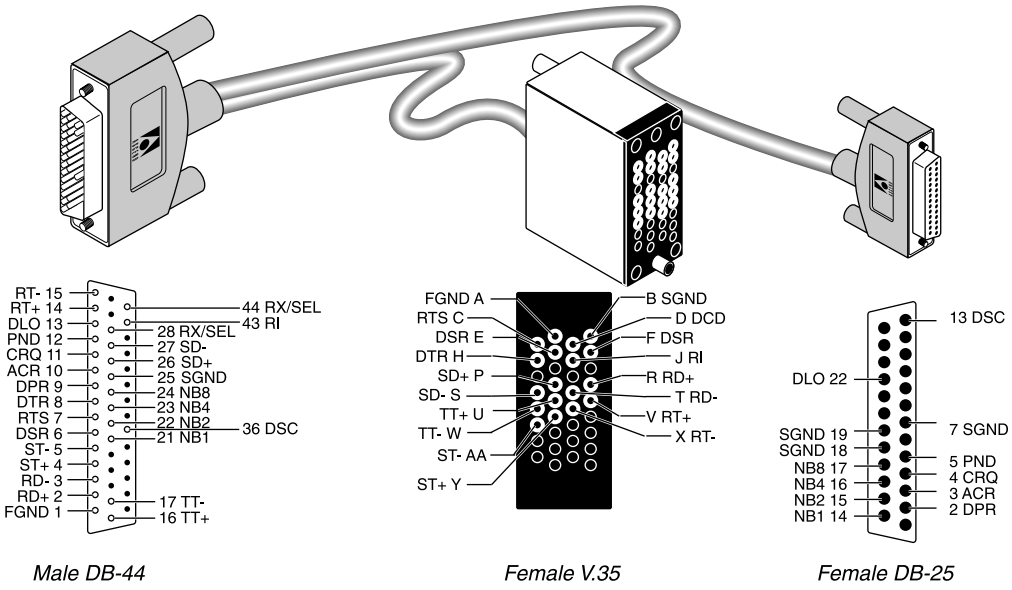


Figure C-15.V.35/RS-366 cable to generic serial host

Table C-22.V.35/RS-366 cable to generic serial host pinouts

Model number MBHD-V35-366 Part number 2510-0077-001				
Pair #	**Signal (MAX)**	**MAX male DB-44 (MAX)**	**Host female V.35**	**RS-366 Female DB-25**
1	FGND	1	A	
2	SD+ SD-	26 27	P S	
3	RD+ RD-	2 3	R T	
4	ST+ ST-	4 5	Y AA	
5	RT+ RT-	14 15	V X	

Table C-22.V.35/RS-366 cable to generic serial host pinouts (continued)

Model number MBHD-V35-366 Part number 2510-0077-001				
Pair #	**Signal (MAX)**	**MAX male DB-44 (MAX)**	**Host female V.35**	**RS-366 Female DB-25**
6	DSR DCD/CTS	6 36	E D, F*	
7	RTS RI	7 43	C J	
8	DTR SGND	8 25	H B	
9	TT+ TT-	16 17	U W	
10	DPR ACR	9 10		2 3
11	CRQ PND	11 12		4 5
12	DLO SGND	13 25		22 7, 18, 19*
13	NB1 NB2	21 22		14 15
14	NB4 NB8	23 24		16 17
15	DSC	36		13
16	RX/SEL	28, 44*		

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

V.35/RS-366 cable to CLI

This cable connects the MAX to the V.35 port of the Compression Labs Rembrandt II codec with support for RS-366 dialing. Figure C-16 and Table C-23 list the V.35/RS-366 cable pinouts.

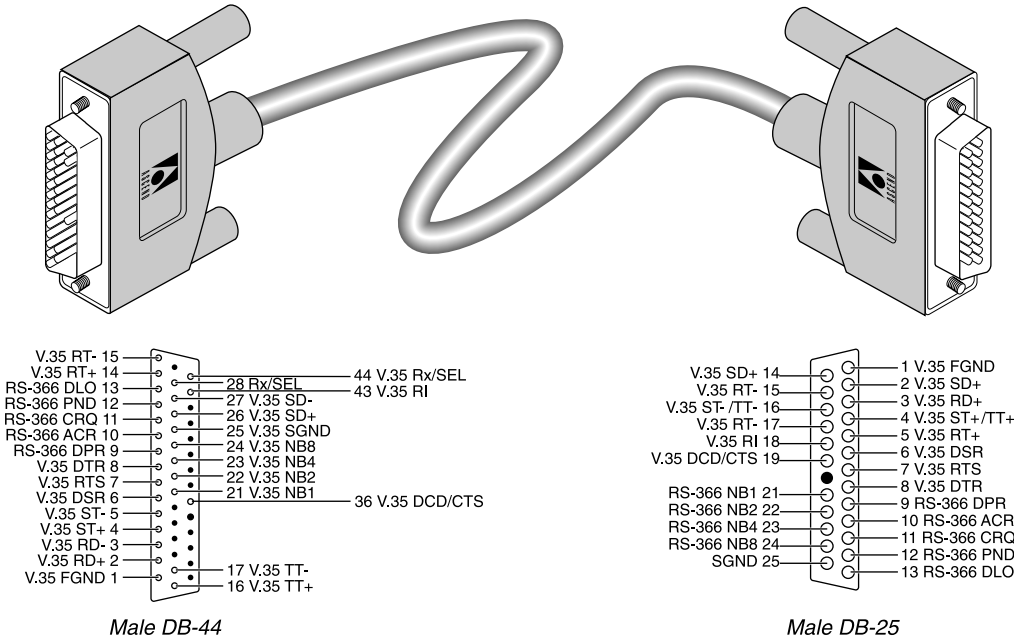


Figure C-16.V.35/RS-366 cable to CLI codec

Table C-23.V.35/RS-366 cable to CLI pinouts

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host V.35/RS-366 male DB-25
1	V.35 FGND V.35 DTR	1 8	1 8
2	V.35 SD+ V.35 SD-	26 27	2 14
3	V.35 RD+ V.35 RD-	2 3	3 15
4	V.35 ST+ V.35 ST-	4 5	4 16
5	V.35 RT+ V.35 RT-	14 15	5 17

Table C-23.V.35/RS-366 cable to CLI pinouts (continued)

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host V.35/RS-366 male DB-25
6	V.35 DSR V.35 DCD/CTS	6 36	6 19
7	V.35 RTS V.35 RI	7 43	7 18
8	V.35 TT+ V.35 TT-	16 17	4 16
9	RS-366 DPR RS-366 ACR	9 10	9 10
10	RS-366 CRQ RS-366 PND	11 12	11 12
11	RS-366 DLO SGND	13 25	13 25
12	RS-366 NB1 RS-366 NB2	21 22	21 22
13	RS-366 NB4 RS-366 NB8	23 24	23 24
14	RX/SEL	28, 44*	

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

V.35/RS-366 cable to PictureTel

This cable connects the MAX to the V.35 port of the PictureTel codec with support for RS-366 dialing. Figure C-17 and Table C-24 list the V.35/RS-366 cable pinouts.

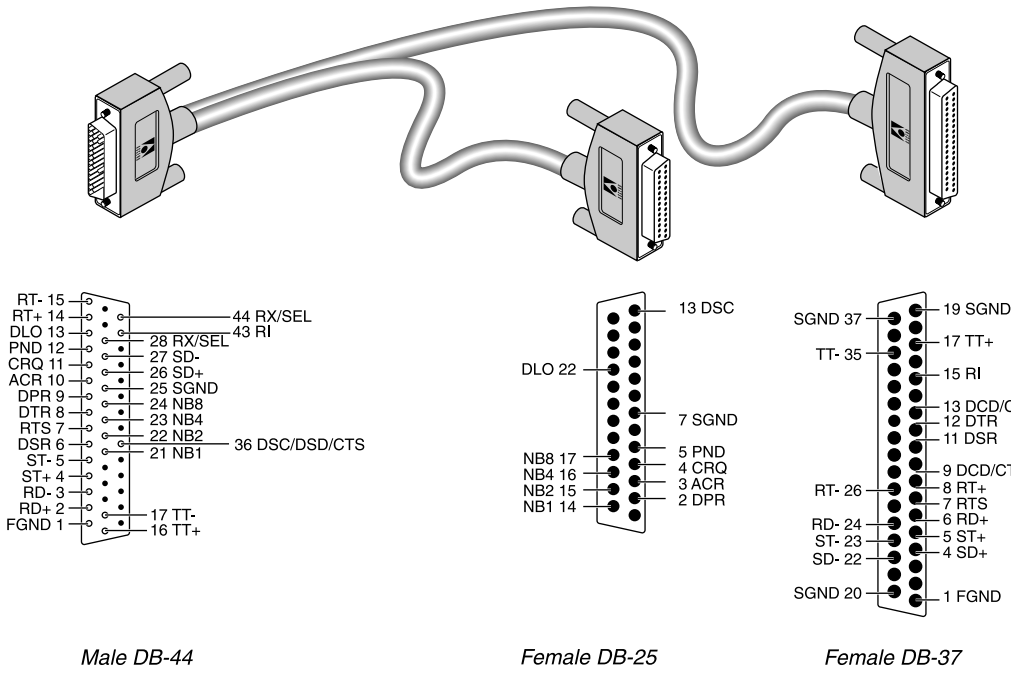


Figure C-17.V.35/RS-366 cable to PictureTel

Table C-24.V.35/RS-366 cable to PictureTel pinouts

Model number MBHD-449PT Part number 2510-0093-001				
Pair #	**Signal (MAX)**	**MAX male DB-44 (MAX)**	**Host female DB-37**	**RS-366 Female DB-25**
1	FGND	1	1	
2	SD+ SD-	26 27	4 22	
3	RD+ RD-	2 3	6 24	
4	ST+ ST-	4 5	5 23	
5	RT+ RT-	14 15	8 26	

Table C-24.V.35/RS-366 cable to PictureTel pinouts (continued)

Model number MBHD-449PT Part number 2510-0093-001				
Pair #	**Signal (MAX)**	**MAX male DB-44 (MAX)**	**Host female DB-37**	**RS-366 Female DB-25**
6	DSR DCD/CTS	6 36	11 9, 13*	
7	RTS RI	7 43	7 15	
8	DTR SGND	8 25	12 19, 20, 37*	
9	TT+ TT-	16 17	17 35	
10	DPR ACR	9 10		2 3
11	CRQ PND	11 12		4 5
12	DLO SGND	13 25		22 7
13	NB1 NB2	21 22		14 15
14	NB4 NB8	23 24		16 17
15	DSC	36		13
16	RX/SEL	28, 44*		

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

RS-366 cabling

Ascend supplies a variety of RS-366 cables. The sections that follow list the pinouts for different types of RS-366 cabling.

RS-449 / RS-366 / DB-37 cable to Video Telecom

This cable connects the MAX to the RS-449 port of a Video Telecom codec with support for RS-366 dialing. Figure C-18 and Table C-25 list the RS-449 / RS-366 / DB-37 cable pinouts.

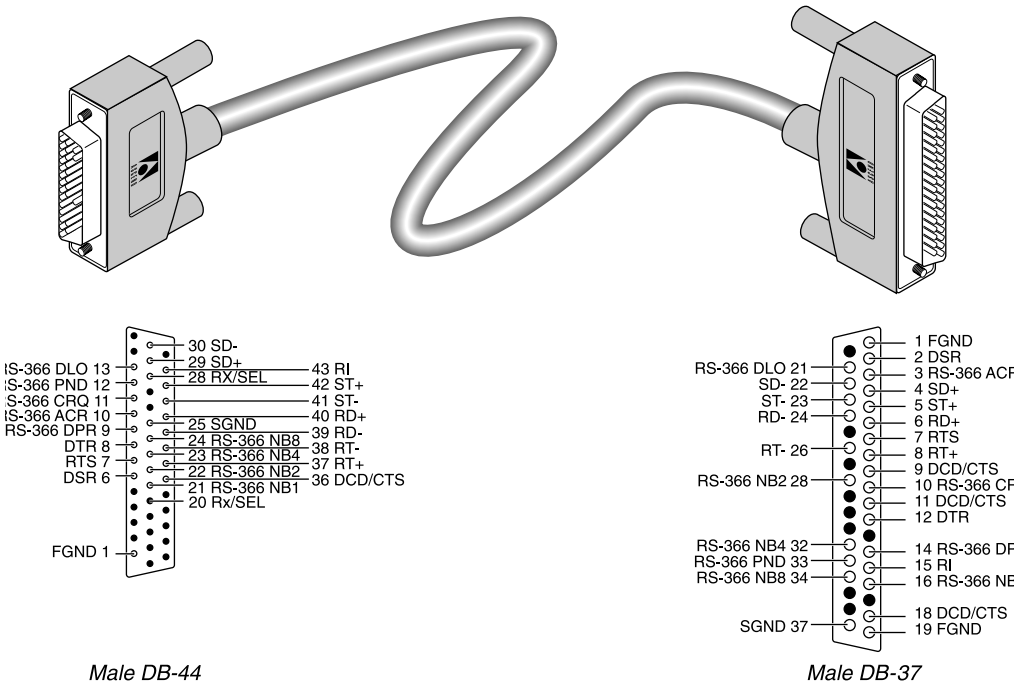


Figure C-18.RS-449/RS-366/DB-37 cable to Video Telecom codec

Table C-25.RS-449 / RS-366 / DB-37 cable to VTC pinouts

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host RS-449/RS-366 male DB-37
1	FGND FGND	1 1	1 19
2	SD+ SD-	29 30	4 22
3	RD+ RD-	40 39	6 24
4	ST+ ST-	42 41	5 23
5	RT+ RT-	37 38	8 26

Table C-25.RS-449 / RS-366 / DB-37 cable to VTC pinouts (continued)

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host RS-449/RS-366 male DB-37
6	DSR DCD/CTS	6 36	2 9, 11, 18*
7	RTS RI	7 43	7 15
8	DTR SGND	8 25	12 37
9	RS-366 DPR RS-366 ACR	9 10	14 3
10	RS-366 CRQ RS-366 PND	11 12	10 33
11	RS-366 DLO	13	21
12	RS-366 NB1 RS-366 NB2	21 22	16 28
13	RS-366 NB4 RS-366 NB8	23 24	32 34
14	RX/SEL	20, 28*	

Note: * Pin positions separated by commas are jumped to each other. This cable does not support terminal timing.

RS-449/RS-366 cable to generic serial host

This cable connects the MAX to the RS-449 ports of a wide variety of equipment using RS-366 dialing. A female-to-male DB-37 gender changer is included when you order the cable. Figure C-19 and Table C-26 list the RS-449/RS-366 cable pinouts.

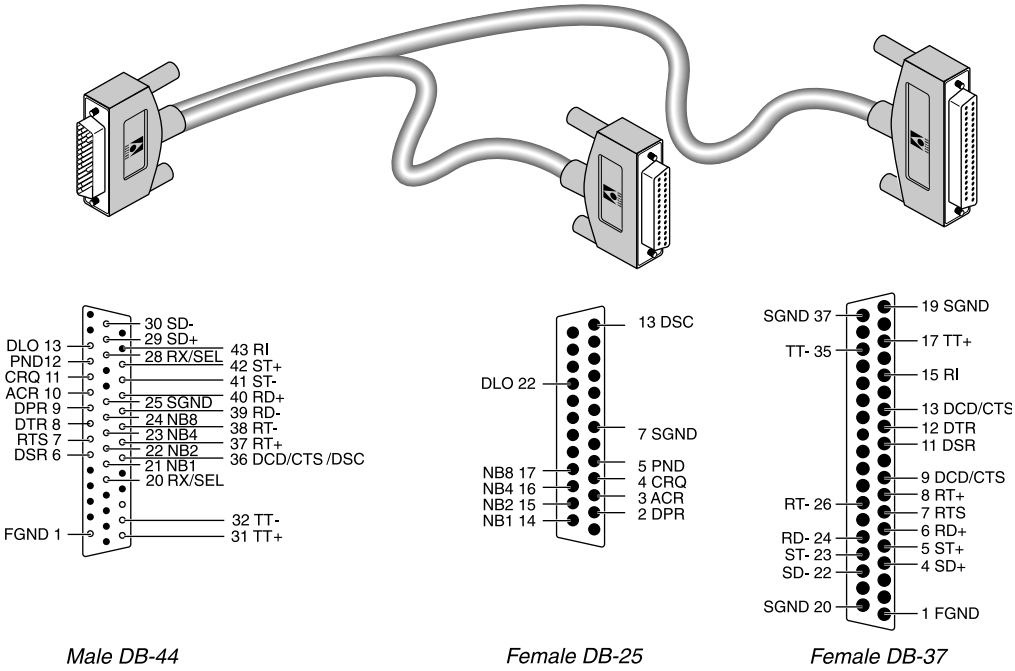


Figure C-19.RS-449/RS-366 cable to generic serial host

Table C-26.RS-449/RS-366 cable to generic serial host pinouts

Model number MBHD-449-366 **Part number 2510-0078-001**				
Pair #	**Signal (MAX)**	**MAX male DB-44 (MAX)**	**Host female DB-37**	**RS-366 Female DB-25**
1	FGND	1	1	
2	SD+ SD-	29 30	4 22	
3	RD+ RD-	40 39	6 24	
4	ST+ ST-	42 41	5 23	
5	RT+ RT-	37 38	8 26	

Table C-26.RS-449/RS-366 cable to generic serial host pinouts (continued)

Model number MBHD-449-366 Part number 2510-0078-001				
Pair #	**Signal (MAX)**	**MAX male DB-44 (MAX)**	**Host female DB-37**	**RS-366 Female DB-25**
6	DSR DCD/CTS	6 36	11 9, 13*	
7	RTS RI	7 43	7 15	
8	DTR SGND	8 25	12 19, 20, 37*	
9	TT+ TT-	31 32	17 35	
10	DPR ACR	9 10		2 3
11	CRQ PND	11 12		4 5
12	DLO SGND	13 25		22 7
13	NB1 NB2	21 22		14 15
14	NB4 NB8	23 24		16 17
15	DSC	36		13
16	RX/SEL	20, 28*		

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

RS-449 cable to generic serial host

This cable connects the MAX to the RS-449 ports of a wide variety of equipment. A female-to-male DB-37 gender changer is included when you order the cable. Table C-27 lists the RS-449 cable pinouts.

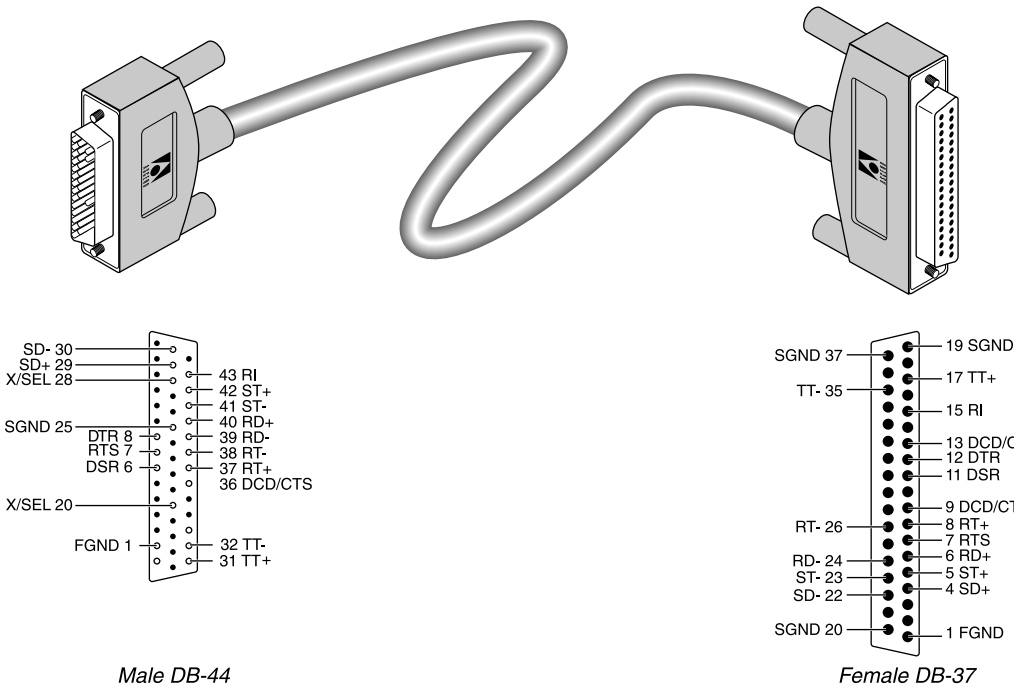


Figure C-20.RS-449 cable to generic serial host.

Table C-27.RS-449 cable to generic serial host pinouts

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host female DB-37
1	FGND	1	1
2	SD+ SD-	29 30	4 22
3	RD+ RD-	40 39	6 24
4	ST+ ST-	42 41	5 23
5	RT+ RT-	37 38	8 26

Table C-27.RS-449 cable to generic serial host pinouts (continued)

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host female DB-37
6	DSR DCD/CTS	6 36	11 9, 13*
7	RTS RI	7 43	7 15
8	DTR SGND	8 25	12 19, 20, 37*
9	TT+ TT-	31 32	17 35
10	RX/SEL	20, 28*	

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

Note: To manufacture an RS-449 cable for Cisco routers, use the above wiring list and connect the following DB-37 pins to SGND:

- DSR- (pin 29)
- CD- (pin 31)
- CTS- (pin 27).

X.21 cabling

Ascend supplies a single X.21 cable.

X.21 cable to generic serial host

If your host is equipped with an X.21 interface, Figure C-21 and Table C-28 list the pinouts for the host cable.

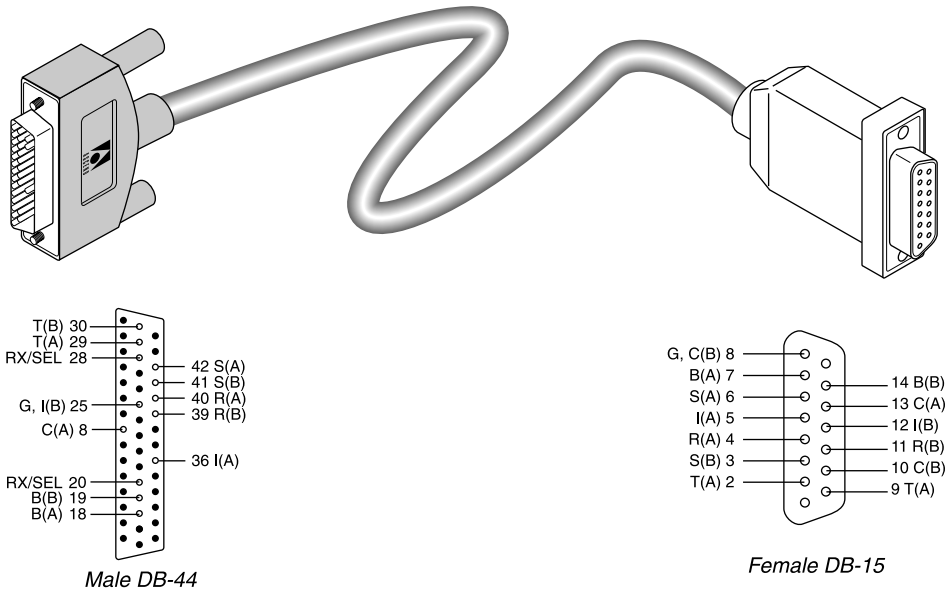


Figure C-21.X.21 cable to generic serial host

Table C-28.X.21 cable to generic serial host pinouts

Model Number MBHD-X21 **Part number 2510-0098-001**				
Pair #	**X.21 signal name (MAX)**	**Equivalent V.35/RS-449 signal name (MAX)**	**MAX male DB-44 (MAX)**	**Host Female DA-15**
1	G*	SGND*	25*	8
2	T(A) T(B)	SD+ SD-	29 30	2 9
3	R(A) R(B)	RD+ RD-	40 39	4 11
4	S(A) S(B)	ST+ ST-	42 41	6 13
5	C(A) I(A)	DTR DCD	8 36	3 5
6	RX/SEL I(B)*	RX/SEL SGND*	20, 28** 25***	12***

Table C-28.X.21 cable to generic serial host pinouts (continued)

Model Number MBHD-X21 Part number 2510-0098-001				
Pair #	**X.21 signal name (MAX)**	**Equivalent V.35/RS-449 signal name (MAX)**	**MAX male DB-44 (MAX)**	**Host Female DA-15**
7	B(A) B(B)	BT+ BT-	18 19	7 14
8	C(B)			8, 10****

Note:

Both I(B) and G connect to SGND, pin 25 on DB-44.

Pins 20 and 28 on the DB-44 interface are jumped together.

Connect pin 25 (DB-44) to pin 12 (DA-15) through a 200 Ohm resistor.

Connect pin 8 (DA-15) to pin 10 (DA-15) through a 200 Ohm resistor.

Cable length requirements

Table C-29 specifies the recommended maximum length of the cable between the MAX and the serial host equipment. Longer distances at the specified data rates are possible when you use terminal timing, and still longer distances are supported by the installation of the Ascend RPM, a hardware device that provides an extended distance high-speed link between the MAX and the serial host equipment.

Table C-29.Cable length requirements

Max cable length	**Serial data rate**
25 feet	3 Mbps
75 feet	2 Mbps
150 feet	512 kbps

Serial WAN cabling specifications

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

The MAX unit's 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 is the DTE (Data Terminal Equipment) that connects to a DCE (Data Circuit-Terminating Equipment) device through its serial WAN port. The MAX receives the Send timing and Receive timing clocks from the DCE device.

V.35 cable to WAN

You connect a V.35 cable to the V.35 port of a DCE device. Table C-30 describes the V.35 cable pinouts.

Table C-30.V.35 cable pinouts

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	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

Table C-30.V.35 cable pinouts (continued)

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	Host male V.35
9	CTS RTS	7 36	D C

RS-449 cable to WAN

You can connect an RS-449 cable to the RS-449 port of a DCE device. The RS-449 cable has the pinouts described in Table C-31.

Table C-31.RS-449 cable pinouts

Pair #	Signal (MAX)	MAX male DB-44 (MAX)	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

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

IDSL specifications

Voice Channels	2
Transfer rate	128 Kbps (symmetric)
Transmission distance	18,000 feet
Interfaces per card	8 ports per card, up to 6 cards per system
Physical connectors	RJ45
Connector requirements	Must meet JIS C 5973 standards
Card dimensions	5.6 in high x 10.7 in long (14.2 cm x 27 cm)
Card weight	~2 pounds (0.9 kg)
Operating humdity	0-90%, non-condensing
Operating temperature	32-104× F (0-40× C)

Features

Network Interface Specifications

- 18,000 feet over twisted copper pair
- AT&T Point-to-Point
- 2B1Q signaling compatible
- data only at 128 Kbps (symmetric)

Compatible with:

- ANSI T1.601-1991
- CNET specification technique ST/LAA/ELR/DNP/822
- ETSI DTR/TM 3002
- Recommendation CCITT G961
- most of the commercially available 2B1Q band ISDN BRI terminal adapters, bridges and routers

Loopback Testing

- Line loopback test
- corrupt CRC test
- request corrupt CRC test
- monitoring

FCC and Canadian Notices

D

This appendix covers these topics:

FCC Part 15 Notice

Warning: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy, and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his or her own expense.

The authority to operate this equipment is conditioned by the requirement that no modifications will be made to the equipment unless the changes or modifications are expressly approved by Ascend Communications, Inc.

FCC Part 68 Notice

Ascend Communications MAX models: MAX-DSX/DSX, MAX-CSU/CSU, and MAX-CSU/DSX, have been tested to comply with Part 68 of FCC Rules. Please note the following:

1 Upon request of the telephone company, you should provide the FCC registration number of the equipment that is connected to your line. The MAX unit's registration number for the CSU interface(s) of the MAX-CS/DSU and MAX CSU/DSX is 2CZUSA-74422-XD-N. The MAX unit's registration number for the DSX interface(s) of the MAX DSX/DSX and MAX-CSU/DSX models is 2CZUSA-74421-DE-N.

2 The MAX operates with a 1.544 Mbps digital channel, using RJ48 USOC jacks. The service code is 6.0N. The Facility Interface Code is 04DU9-BN for lines using the Superframe Format (SF); 04DU9-DN for lines using the SF with B8ZS; 04DU9-1SN for lines using Extended Superframe Format (ESF) with B8ZS; and 04DU9-1KN for lines using ESF format with AMI. The MAX connects to the network using eight-pin modular plugs, wired per FCC Part 68, USOC RJ48C.

3 The telephone company must be notified before removal of a MAX connected to 1.544 Mbps digital service. If the telephone company notes a problem, they may temporarily discontinue service and will notify you of this disconnection. (If advance notice is not feasible, you will be notified as soon as possible.) When you are notified, you will be given the opportunity to correct the problem and informed of your right to file a complaint with the FCC.

If trouble is experienced with this equipment, please contact:

Ascend Communications, Inc.
1701 Harbor Bay Parkway
Alameda, CA 94502

If the trouble is causing harm to the telephone network, the telephone company may request you to remove the equipment from the network until the problem is resolved.

It is recommended that the customer install an AC surge arrestor in the AC outlet to which this device is connected. This is to avoid damage to the equipment caused by local lightening strikes and other electrical surges.

This equipment uses the following USOC jacks and codes:

Model Name	Facility Interface Code	Service Order Code	Jack Type
MAX 6000 T1	04DU9-BN	6.0N	RJ48C
MAX 6000 T1	04DU9-DN	6.0N	RJ48C
MAX 6000 T1	04DU9-1KN	6.0N	RJ48C
MAX 6000 T1	04DU9-1SN	6.0N	RJ48C
MAX 6000 T1	04DU9-1ZN	6.0N	RJ48C

IC CS-03 Notice

The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The Department does not guarantee the equipment will operate to the user's satisfaction.

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

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important to rural areas.

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

Canadian Notice

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

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situation.

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

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

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

The *Load Number (LN)* assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device, to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the Load Numbers of all the devices does not exceed 100.

This equipment does not support line loopbacks.

Warning: THE DIGITAL APPARATUS DOES NOT EXCEED THE CLASS A LIMITS FOR RADIO NOISE EMISSIONS FROM DIGITAL APPARATUS SET OUT IN THE RADIO INTERFERENCE REGULATIONS OF THE CANADIAN DEPARTMENT OF COMMUNICATIONS.

LE PRESENT APPAREIL NUMERIQUE N'EMET PAS DE BRUITS RADIOELECTRIQUES DEPASSANT LES LIMITES APPLICABLES AUX APPAREILS NUMERIQUES DE LA CLASSE A PRESCRITES DANS LE REGLEMENT SUR LE BROUILLAGE RADIOELECTRIQUE EDICTE PAR LE MINISTERE DES COMMUNICATIONS DU CANADA.

Warranty

E

This appendix contains warranty information.

Product warranty

1. Ascend warrants that the MAX will be free from defects in material and workmanship for a period of twelve (12) months from date of shipment.
2. Ascend shall incur no liability under this warranty if
   - the allegedly defective goods are not returned prepaid to Ascend within thirty (30) days of the discovery of the alleged defect and in accordance with Ascend's repair procedures; or
   - Ascend's tests disclose that the alleged defect is not due to defects in material or workmanship.
3. Ascend's liability shall be limited to either repair or replacement of the defective goods, at Ascend's option.
4. Ascend MAKES NO EXPRESS OR IMPLIED WARRANTIES REGARDING THE QUALITY, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE BEYOND THOSE THAT APPEAR IN THE APPLICABLE Ascend USER'S DOCUMENTATION. Ascend SHALL NOT BE RESPONSIBLE FOR CONSEQUENTIAL, INCIDENTAL, OR PUNITIVE DAMAGE, INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS OR DAMAGES TO BUSINESS OR BUSINESS RELATIONS. THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES.

Warranty repair

1. During the first three (3) months of ownership, Ascend will repair or replace a defective product covered under warranty within twenty-four (24) hours of receipt of the product. During the fourth (4th) through twelfth (12th) months of ownership, Ascend will repair or replace a defective product covered under warranty within ten (10) days of receipt of the product. The warranty period for the replaced product shall be ninety (90) days or the remainder of the warranty period of the original unit, whichever is greater. Ascend will ship surface freight. Expedited freight is at customer's expense.
2. The customer must return the defective product to Ascend within fourteen (14) days after the request for replacement. If the defective product is not returned within this time period, Ascend will bill the customer for the product at list price.

Out-of warranty repair

Ascend will either repair or, at its option, replace a defective product not covered under warranty within ten (10) working days of its receipt. Repair charges are available from the

Repair Facility upon request. The warranty on a serviced product is thirty (30) days measured from date of service. Out-of-warranty repair charges are based upon the prices in effect at the time of return.

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