

# **Remote Annex 4000**

## **Hardware Installation Guide**

Part No. 166-024-151 Rev. C  
March 1996



**Bay Networks**

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## *Revision Level History*

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Revision	Description
A	Initial release.
B	Added new rear panel, ISDN support, new illustrations.
C	Removed ISDN information; ISDN is not supported in RA 4000. Updated operational image file name (oper.46.enet). Chapter 3: Added information regarding error codes that reflect an Ethernet problem during the boot sequence.

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- *Revision Level History*
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This guide describes how to install a Remote Annex 4000 Series on a local area network (LAN).





See the software installation notes that come with your Remote Annex 4000 for a description of the software installation. See the *Remote Annex Administrator's Guide for UNIX* for configuration information.

## About this Guide

This guide includes the following chapters and appendices:

- |                  |                                                                                                                                                                                                        |
|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Chapter 1</b> | <b>Introduction</b><br>This chapter contains an overview of the Remote Annex 4000; it describes the hardware features and firmware functions.                                                          |
| <b>Chapter 2</b> | <b>Installing the Remote Annex 4000</b><br>This chapter contains a description of how to install the Remote Annex 4000 on a LAN, and how to confirm its operating status.                              |
| <b>Chapter 3</b> | <b>ROM Monitor Commands</b><br>This chapter contains a description of the ROM Monitor commands that modify specific configuration parameters, perform diagnostic tests, and load the operational code. |
| <b>Chapter 4</b> | <b>Troubleshooting Procedures</b><br>This chapter provides troubleshooting and verification procedures.                                                                                                |



Convention:	Represents:
[ ]	In command dialogue, square brackets indicate default values. Pressing  selects this value. Square brackets appearing in command syntax indicate optional arguments.
{ }	In command syntax, braces indicate that one, and only one, of the enclosed value must be entered.
	In command syntax, this character separates the different options available for a parameter.
	Notes give you important information.
	Warnings inform you about conditions that can have adverse effects on processing.
	Cautions notify you about dangerous conditions.

## Related Documents

Each Remote Annex hardware platform ships with the appropriate hardware guide. The remaining documentation is included with the software.



• *Preface*  
•



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- ❑ Customize the listing of cases according to a variety of criteria, including date, severity, status, and case ID.
- ❑ Log notes to existing open cases.
- ❑ Create new cases for rapid, efficient handling of noncritical network situations.
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To use InfoFACTS in the United States or Canada, call toll-free 1-800-786-3228. Outside North America, toll calls can be made to 1-408-764-1002. In Europe, toll-free numbers are also available for contacting both InfoFACTS and CompuServe. Please check our Web page for the listing in your country.



The Remote Annex 4000 is a multi-purpose network server. The Remote Annex 4000 is used for:

- ❑ *Remote Network Access.*
- ❑ *Dial-up Routing.*
- ❑ *Terminal, Printer, and Communications Access.*

## Remote Network Access

The Remote Annex 4000 is a multi-protocol, remote access server that provides remote network access to the following networks:

- ❑ Novell Netware.
- ❑ TCP/IP.
- ❑ AppleTalk.

[Figure 1-1](#) shows how the Remote Annex 4000 is used for remote access.

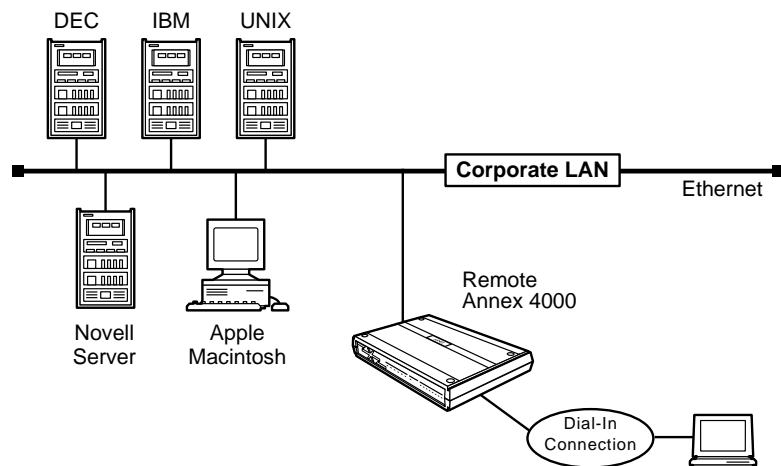


Figure 1-1. The Remote Annex 4000 as a Remote Access Server

# Dial-up Routing

The Remote Annex 4000 provides dial-up routing support for UNIX and Novell networks. Using a Remote Annex 4000, network administrators can connect two or more local area networks (LANs) over a wide area network (WAN) using a standard telephone line.

[Figure 1-2](#) shows how the Remote Annex 4000 is used for dial-up routing.

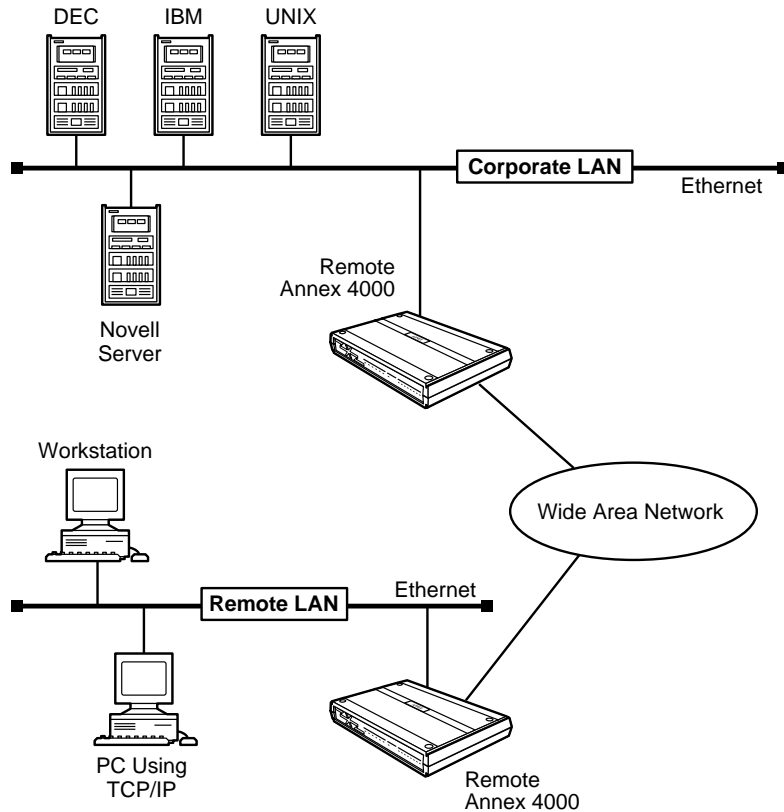


Figure 1-2. The Remote Annex 4000 as a Dial-up Router



## Terminal, Printer, and Communications Access

The Remote Annex 4000 provides terminal, printer, and communications access to users on a local area network.

[Figure 1-3](#) shows how the Remote Annex 4000 is used as a terminal and communications server.

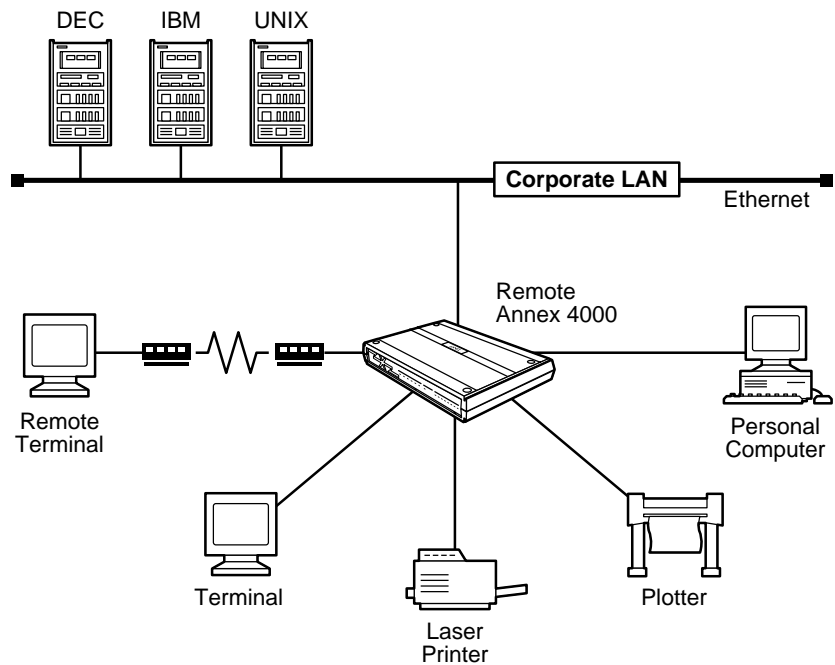


Figure 1-3. Remote Annex 4000 as a Terminal, Printer, and Communications Server

## Remote Annex 4000 Description

The Remote Annex 4000 contains two or three 32-bit processors, a main logic board (MLB), and one or two Serial Line Controllers (SLCs). Figure 1-4 illustrates a Remote Annex 4000.

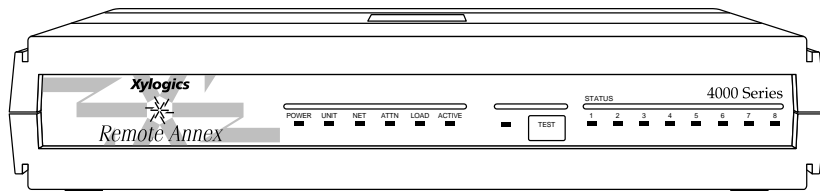


Figure 1-4. Remote Annex 4000 Series

The Remote Annex 4000 complies with the Ethernet Revision 2.0 or the IEEE 802.3 specifications using standard Ethernet 10Base2 (Thin), 10Base5 (Thick), and 10BaseT (twisted pair) as the physical medium.

The Remote Annex 4000 also provides a parallel printer port for attaching printers with either a Centronics or Dataproducts interface.

## Main Logic Board

Processor	The Remote Annex 4000 main logic board (MLB) comes with the Intel 80486 SXLC2 clock-doubled processor.
Ethernet Connector	The MLB supports an integrated 10Base2, 10Base5, and 10BaseT auto sense Ethernet connector.

## Memory

The MLB can be configured with 1 to 8 megabytes of on-board memory. One megabyte is permanent with two slots for either 1- or 4-megabyte SIMMs. The Remote Annex 4000 supports a total of 8 megabytes of memory.



By default, the Remote Annex 4000 comes with 3 megabytes of memory on the MLB and 1.5 megabytes of memory on the SLC.

## Flash Memory

The MLB supports 2 megabytes of optional flash memory.

## Serial Line Controllers

The Remote Annex 4000 can have either one or two SLCs that support asynchronous communications. Using both SLCs, the Remote Annex 4000 can support up to 72 ports.

[Table 1-1](#) illustrates the available Remote Annex 4000 configurations including the SLC, PBX connectors, and ports associated with each configuration.

Table 1-1. Remote Annex 4000 Configurations

SLC Type	Number of PBX Connectors	Number of Ports	Port Count	Port Numbers
Asynchronous	3 or 6 asynch	18 or 36	18 or 36	1-18 or 36

The Remote Annex 4000 connects from 1 to 72 devices to host computers on a local area network (LAN) through its serial line controllers (SLCs). Each SLC comes with an intel 80486 SLC processor and 1.5 megabytes of memory.

## Asynchronous SLC

The Remote Annex 4000 can be purchased with asynchronous SLCs. The SLC types available are:

- ❑ 18-port SLC
- ❑ 36-port SLC

Figure 1-6 illustrates a 72-port Remote Annex 4000 that contains two 36-port asynchronous SLCs. The Remote Annex 4000 has its dress panel cover removed to expose the connectors. Each PBX connector supports six serial ports. [Appendix B](#) describes the Remote Annex 4000's asynchronous serial device cable (fan-out cable).

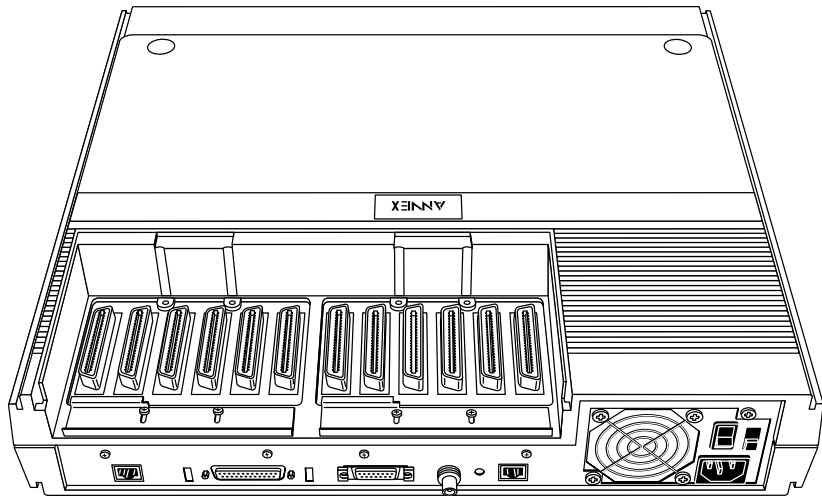


Figure 1-5. Remote Annex 4000 with Two Asynchronous SLCs

## Asynchronous Ports

Each asynchronous port has seven active pins, plus ground, to provide the following standard RS232 asynchronous signals for modem and flow control:

- ❑ Transmit Data (TxD, transmitted).
- ❑ Receive Data (RxD, received).
- ❑ Data Terminal Ready (DTR, transmitted).
- ❑ Clear To Send (CTS, received).
- ❑ Data Set Ready (DSR, received).
- ❑ Request to Send (RTS, transmitted).
- ❑ Carrier Detect (DCD, received).

## Firmware and Software

### Firmware

The Remote Annex 4000's ROM contains firmware for performing power-up self-tests and loading operational code. A non-volatile EEPROM stores the configuration parameters.

The Remote Annex 4000 can have a boot image in Flash ROM (optional) or can receive its image from a device on the network. This image is used to boot the Remote Annex 4000.

### ROM Monitor

When the Remote Annex 4000 is first booted, the console displays the ROM monitor prompt. The ROM monitor is an interactive command interpreter that is used to define configuration parameters. All of the information that the Remote Annex 4000 needs to boot an operational image is defined using the ROM monitor and its command set. ROM Monitor commands are issued from a console terminal connected to the console port on the Remote Annex 4000's rear panel.

Using the ROM Monitor commands (see Chapter 3), you can:

- ❑ Modify and display a set of configuration parameters stored in EEPROM.
- ❑ Execute interactive diagnostic tests.
- ❑ Receive information and statistics for the hardware configuration and the network.
- ❑ Boot the Remote Annex 4000 manually.

Once the Remote Annex 4000 has obtained a boot image and is booted, the console leaves the ROM monitor and displays the console monitor. Refer to Chapter 2 for information on the console monitor.

Supported Configurations

The Remote Annex 4000 can obtain full operational code over the network from one of the following devices:

- ❑ Novell server.
- ❑ UNIX host.
- ❑ VMS host.
- ❑ Remote Annex 4000 Series configured as a load server.

You can also boot a Remote Annex 4000 from the Flash ROM (self-booting).

Watchdog Timer

The Remote Annex 4000 has a watchdog timer that its software resets at regular intervals. The watchdog timer reboots the Remote Annex 4000 in the unlikely event of an internal software error. This feature enables the Remote Annex 4000 to run for long periods of time without intervention.

## Front Panel

The Remote Annex 4000's front panel consists of:

- ❑ *Six system LEDs.*
- ❑ *One test LED.*
- ❑ *One test button.*
- ❑ *Eight status LEDs.*

[Figure 1-6](#) illustrates the Remote Annex 4000's front panel. [Table 1-2](#) describes the panel's system LEDs.

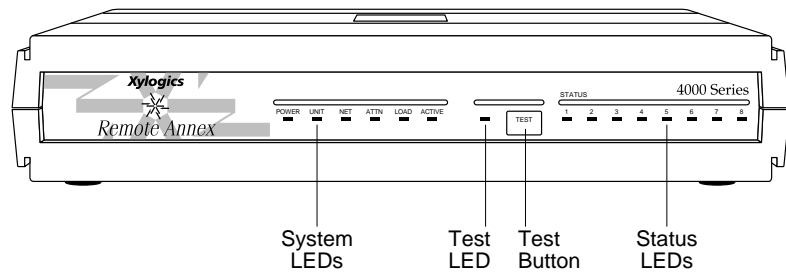


Figure 1-6. Remote Annex 4000 Front Panel

## Front Panel Components

### System LEDs

There are six System LEDs on the front of the Remote Annex 4000. The LEDs turn on or off to describe the Remote Annex 4000's state. [Table 1-2](#) describes the LEDs.

Table 1-2. Front Panel System LEDs

LED	Definition
POWER	On when the unit is receiving AC power and the internal DC power supply is working properly.
UNIT	On after the unit successfully passes its self-test.
NET	On when the unit successfully transmits test data to, and receives test data from, the network.
ATTN	On when the unit requires operator attention; flashing when the unit encounters a problem.
LOAD	On when the unit is loading or dumping; flashing when the unit is trying to initiate a load.
ACTIVE	Flashing when the unit is transmitting data to, and receiving data from the network; flashing during diagnostics.

### Test LED

The **Test LED** is on the front of the Remote Annex 4000 and lights when the Remote Annex 4000 is in test mode.



### Test Button

The **Test** Button allows you to change the operational mode of the Remote Annex 4000 from normal to test. It also functions as a Reset button (see following Note). The Remote Annex 4000 automatically powers up in normal mode. To enter test mode, press the **Test** button within 30 seconds of powering-up or resetting the unit. When the **Test** LED lights, the Remote Annex 4000 is in test mode.



Holding the **Test** button for longer than three seconds resets the unit.

### Status LEDs

The eight Status LEDs, numbered one through eight, display serial port activity during normal operations. When the Remote Annex 4000 encounters a problem during power up self test, these LEDs display error information. Technical support personnel can use this information to diagnose problems.

## Rear Panel

[Figure 1-7](#) shows the Remote Annex 4000's rear panel with the following connectors and switches ([Appendix A](#) lists the connectors' signal/pin allocations):

- ❑ *Console Port.*
- ❑ *Diagnostic Jumper.*
- ❑ *Printer Port.*
- ❑ *Mode Jumper.*
- ❑ *Network Interface Connector.*
- ❑ *Power Switch.*
- ❑ *Power Select Switch.*
- ❑ *AC Line Socket.*

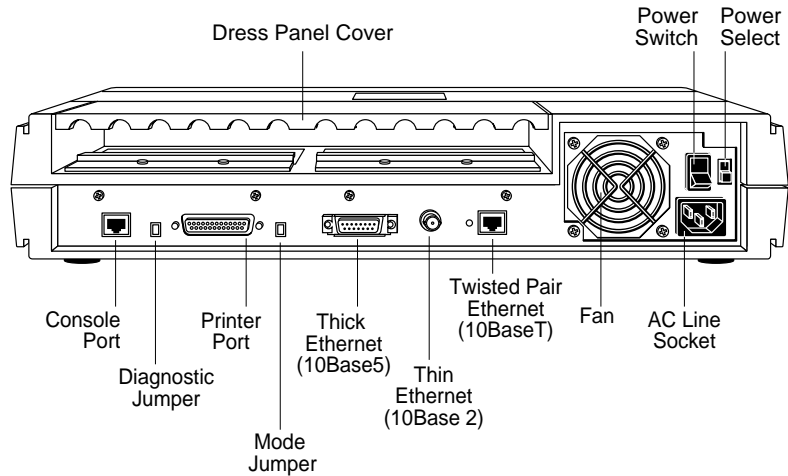


Figure 1-7. Remote Annex 4000 Rear Panel

## Rear Panel Components

### Console Port

The Remote Annex 4000 has a separate console port with an 8-pin, RJ-45 connector for attaching the console. The console port provides access to the ROM Monitor commands when the Remote Annex 4000 is in test mode.

### Diagnostic Jumper

This jumper is for Xylogics internal use only.

### Printer Port

The Remote Annex 4000 provides a printer port with a 25-pin, female connector. This port is software-programmable to support a standard Centronics or Dataproducts parallel printer interface.

## Mode Jumper

The Mode Jumper is used to configure the Remote Annex 4000 properly to ensure compatibility with the operational image. The Mode Jumper setting is checked by the PROMs only at power-up or reset time.



The jumper must be installed when running images prior to Release 9.3. When running Release 9.3 or newer images, this jumper should be removed.

## Network Interface Connectors

The Remote Annex 4000 comes with an integrated 10Base2, 10Base5, and 10BaseT auto sense Ethernet connector. Connect to your LAN using one of the following:

- ❑ 10Base2 (Thin Ethernet) Ethernet port with a BNC connector.
- ❑ 10Base5 (Thick Ethernet) Ethernet transceiver port with a DB15 connector.
- ❑ 10BaseT (Twisted Pair Ethernet) Ethernet port with an RJ-45 connector.

A Link Indicator LED is provided. This LED is green when an active 10BaseT segment is attached.



Connect only one interface at a time.

The Remote Annex must be reset when changing network interface connections.

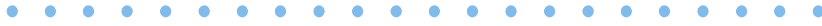
Power Switch	The Power Switch disconnects AC power without disconnecting the Remote Annex 4000 from the power source.
Power Select Switch	The Power Select Switch selects the operational voltage range. The Remote Annex 2000 automatically selects the operational voltage range. The 110V position allows operation in the 90 to 130 VAC range; the 220V position allows operation in the 180 to 260 VAC range.
AC Line Socket	The AC line socket supplies power to the Remote Annex 4000 through the AC power cord. The AC power cord is plugged into this socket.

## Physical Characteristics

The Remote Annex 4000 enclosure has the following characteristics:

- ❑ **Dimensions:**  
Height: 3.5 in. (89 mm).  
Width: 17.5 in. (445 mm).  
Depth: 15.5 in. (394 mm).
- ❑ **Weight:**  
16 lbs (7.3 kg).
- ❑ **Power:**  
Internal supply.  
90–130 VAC, 1.5A.  
180–260 VAC, 0.75A.  
47–63 Hz, 165W, 563 BTU/hr.

- ❑ **Environment:**
  - ❑ Operating temperature: 0° to 50°C.
  - ❑ Non-operating temperature: -25° to 65°C.
  - ❑ Operating humidity: 5% to 95% relative humidity, non-condensing.
  - ❑ Non-operating humidity: 5% to 95% relative humidity, non-condensing.
  - ❑ Operating shock: 10G peak 1/2 sine wave, 11 ms duration.
  - ❑ Operating vibration: random vibration  $1.2 * 10^{-3} G^2/Hz$ , 12 to 198 Hz.
  - ❑ Audible noise: A-Weighted Sound Pressure level less than 36 dB @ 1 meter from all 6 surfaces.
  - ❑ Operating altitude: 0 to 4,000 meters.
  - ❑ Storage altitude: 0 to 15,000 meters.
  - ❑ Transportation vibration and shock: NSTA project 1A standard in shipping container.
- ❑ **Approvals:**
  - ❑ Meets safety requirements of ETL UL 478, 5th Edition; CSA C22.2 No. 220-M1986; and EN60950 (1992).
  - ❑ Meets EMI requirements of FCC Class A and EN55022 Class A with shielded and unshielded cables. Meets EMI requirements of EN55022 Class B with shielded cables.
  - ❑ Meets EMC requirements of EN50082-1.



- ❑ **MTBF:**  
68,000 hrs (72 ports), calculated @ 25°C (Mil Std 217).
- ❑ **Rear clearance requirement (for connectors and cables):**  
6 in. (15 cm).

This chapter contains a description of how to install your Remote Annex 4000 hardware on your Ethernet network. Installing the Remote Annex 4000 consists of:

- ❑ *Connecting a LAN.*
- ❑ *Connecting a Console Terminal.*
- ❑ *Connecting Serial Devices.*
- ❑ *Connecting a Parallel Printer.*
- ❑ *Powering Up and Testing the Remote Annex 4000.*
- ❑ *Installing the Software and Loading the Operational Image.*
- ❑ *Auto-initializing the ROMs.*
- ❑ *Self-booting the Remote Annex 4000.*
- ❑ *Invoking a Console Monitor.*

## Before you Begin

The Remote Annex 4000's software and operational image can be installed on four different devices. [Table 2-1](#) outlines the different configurations the Remote Annex 4000 supports.

Table 2-1. Remote Annex 4000 Configuration Options

Device on which the Operational Software and Image is installed	Remote Annex 4000 Must be Connected to the Network	Input Device used to Enter Installation Parameters
Novell Server	Yes	PC on the network or Console
UNIX Load Host	No	Console
VAX VMS Load Host	Yes	Console
Self-Boot Unit (contains Flash)	No	Console

Connecting the Remote Annex to a LAN requires the following equipment:

- ❑ The appropriate network cable (e.g., Ethernet transceiver cable) for connecting to a LAN or an Ethernet loopback connector.
- ❑ The console port cable (supplied with software) and a console terminal.
- ❑ A PC on the network (Novell boot).

Connecting devices to the Remote Annex 4000 requires:

- ❑ Remote Annex 4000 fan-out cables for asynchronous communications.
- ❑ One parallel printer cable with a 25-pin female connector.

## Connecting a LAN Using Ethernet

The Remote Annex 4000 supports three types of Ethernet connections: Thin Ethernet, Thick Ethernet, or Twisted Pair (see Figure 2-1).

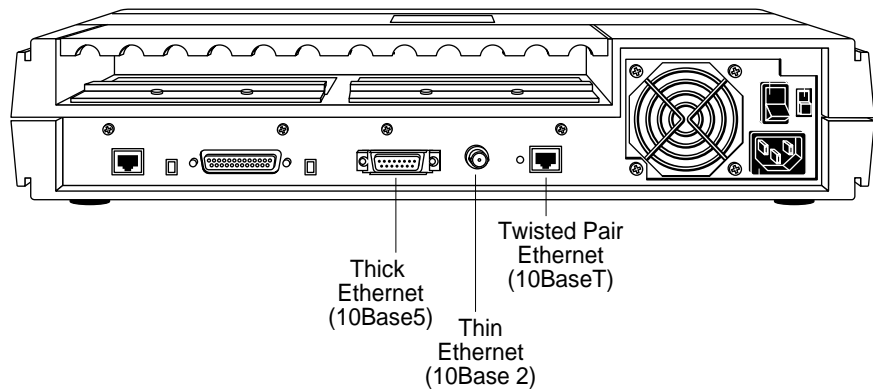


Figure 2-1. Remote Annex 4000 Ethernet Connections



Each connection type requires a different connection procedure described in the following sections. Connect only one type of Ethernet cabling at one time.



Make sure the Remote Annex 4000 is powered off before disconnecting or connecting the Ethernet cabling.

The following subsections contain a description of how to connect your Remote Annex 4000 to:

- ❑ *Thin Ethernet (10Base2).*
- ❑ *Thick Ethernet (10Base5).*
- ❑ *Twisted Pair (10BaseT).*

## Connecting Thin Ethernet (10Base2) Cable

To connect Thin Ethernet (10Base2) or equivalent cable, you must use a T-connector. The T-connector is installed in your Ethernet network cable. Follow these steps to connect the Remote Annex 4000 to a Thin Ethernet cable (see [Figure 2-2](#)):

- 1 Verify that both sides of the T-connector are connected to the Thin Ethernet cable.

If the Remote Annex 4000 is the last device on the Thin Ethernet segment, make sure that one side of the T-connector is connected to the cable and the other side is connected to a network terminator.

- 2 Plug the T-connector on the Thin Ethernet cable (RG-58 coaxial cable) into the 10Base2 Ethernet connector located on the rear panel of the Remote Annex 4000.

- 3 Twist the sleeve on the T-connector clockwise to lock the connection in place.

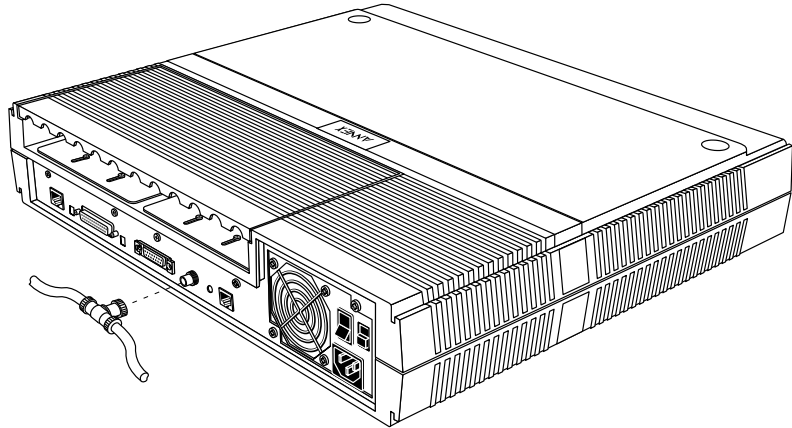


Figure 2-2. Connecting Thin Ethernet Cable

## Connecting Thick Ethernet (10Base5) Cable

To connect Thick Ethernet (10Base5) or equivalent transceiver cable, you must have already installed a 10Base5 Ethernet network cable. Follow these steps to connect the Remote Annex 4000 to a Thick Ethernet cable (see [Figure 2-3](#)):

- 1 Make sure the transceiver cable is plugged into the Ethernet network.
- 2 Push the slide mechanism on the Remote Annex 4000's Thick Ethernet connector to the right and plug in the transceiver cable.

- 3 Push the slide mechanism to the left to secure the connection.

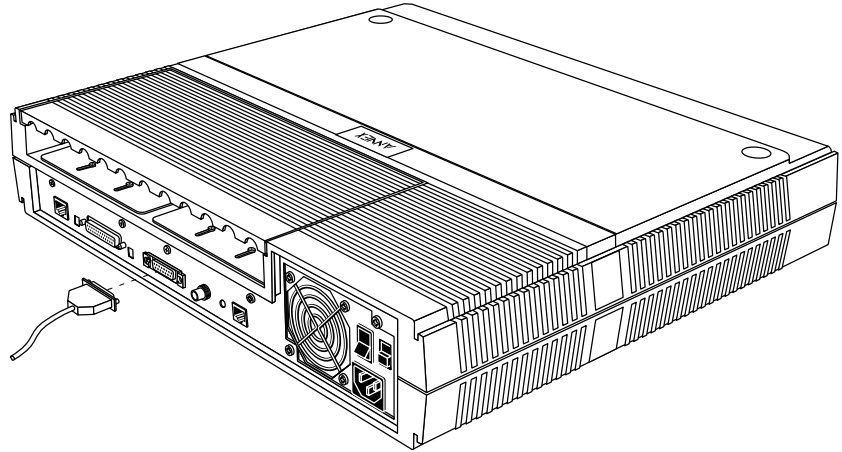


Figure 2-3. Connecting Thick Ethernet Cable

## Connecting Twisted Pair Ethernet (10BaseT) Cable

Follow the steps in this section to connect Twisted Pair (10BaseT) Ethernet cable to the Remote Annex 4000 (see [Figure 2-4](#)):

- 1 Insert the RJ-45 connector located on the Twisted Pair Ethernet cable into the 10BaseT connector on the rear panel of the Remote Annex.
- 2 When the connector clicks into place, the connection is secure.

- 3 Verify that the Link Indicator is green.

The green link indicator LED next to the 10BaseT connector goes on when power is applied and an active 10BaseT network segment is plugged in.



Do not confuse this connector with the console port RJ-45 connector.

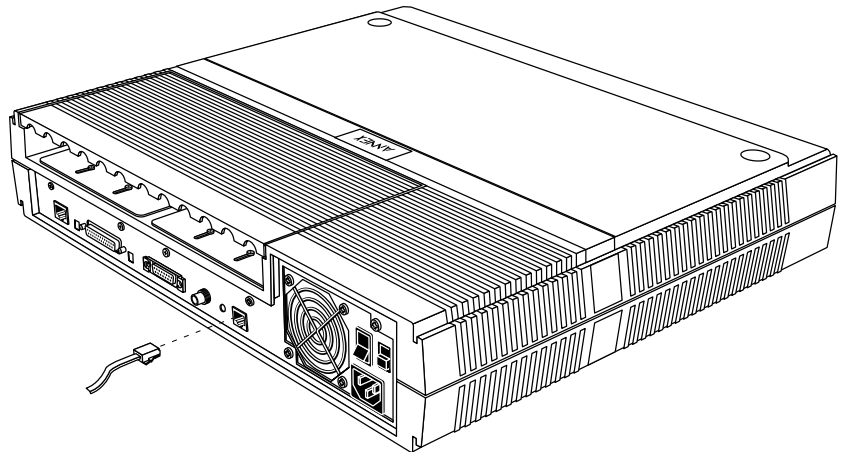


Figure 2-4. Connecting Twisted Pair Ethernet Cable

## Connecting a Console Terminal

A console terminal is used to access the ROM Monitor and boot the Remote Annex 4000 for the first time. Follow the steps in this section to connect a console terminal to the console port located on the rear panel of the Remote Annex 4000.

- 1 Connect the Console Terminal's I/O connector to the RJ-45 cable (the accessory kit includes a cable) using a Telco RJ wire to a DB-25 DTE drop adapter (see [Figure 2-5](#)).

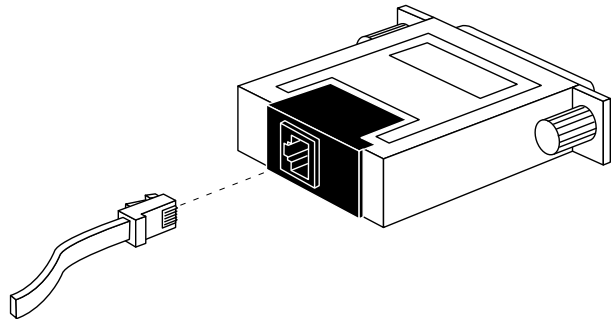


Figure 2-5. Connecting the RJ-45 Cable to the DB-25 DTE Drop Adapter

- 2 Plug the RJ-45 connector into the console port located on the back panel of the Remote Annex 4000 ([Figure 2-6](#)).

When the connector clicks into place, the connection is secure. Appendix A describes the console port's signal/pin allocation.

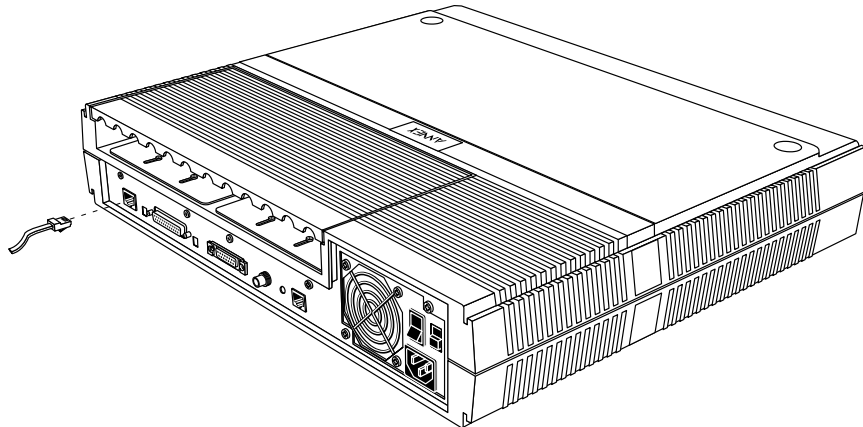


Figure 2-6. Connecting to a Console Terminal

- 3 Turn on the Console Terminal and set the terminal to 9600 baud, eight data bits, no parity, one stop bit, and XON/XOFF flow control. The ROM Monitor assumes that this terminal is CRT-based and displays the backspace (BS) character accordingly. See [Chapter 3](#) for information on invoking the ROM monitor.

After the Remote Annex 4000 boots, you can invoke a console monitor by pressing `Return`. At the console monitor prompt, entering **help** displays the available options. See [Chapter 3](#) for information on the ROM Monitor commands.

## Connecting Serial Devices

The Remote Annex 4000 provides three to twelve 50-pin PBX connectors (depending on the port configuration) for attaching 1 to 72 devices using Remote Annex 4000 asynchronous (fan-out) cables. To attach the cables:

- 1 Remove the dress panel cover by sliding it forward. This cover is located on the top rear of the Remote Annex 4000 (see [Figure 2-7](#)).

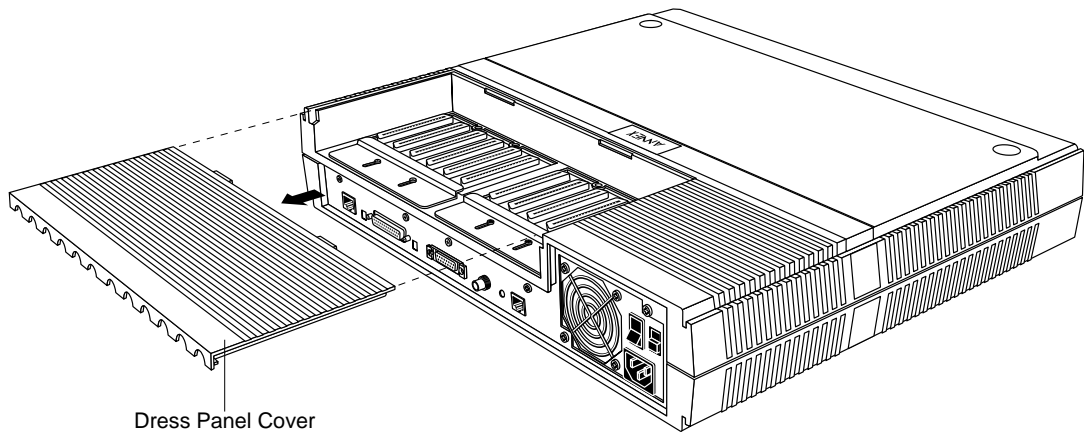


Figure 2-7. Removing the Remote Annex 4000 Dress Panel Cover

- 2 Loosen the screws that secure the cable retainer and slide the cable retainer back to allow room for the cable (see [Figure 2-8](#)).

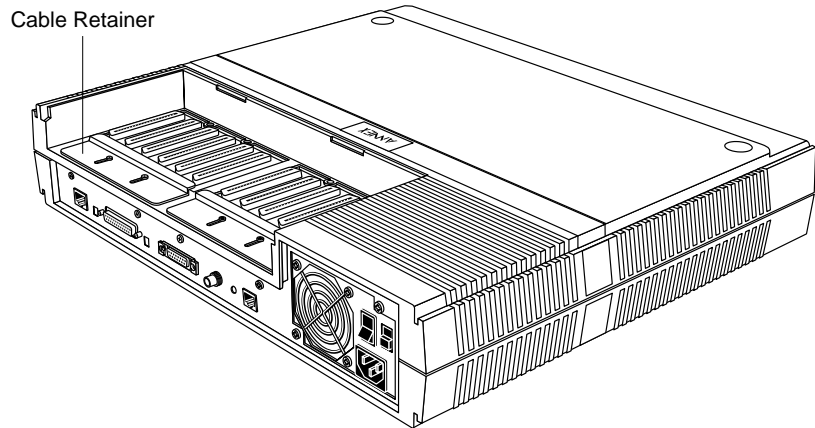


Figure 2-8. Moving the Cable Retainer to Make Room for the Cable

- 3 Attach the PBX end of the fan-out cable to the PBX connector (see [Figure 2-9](#)).

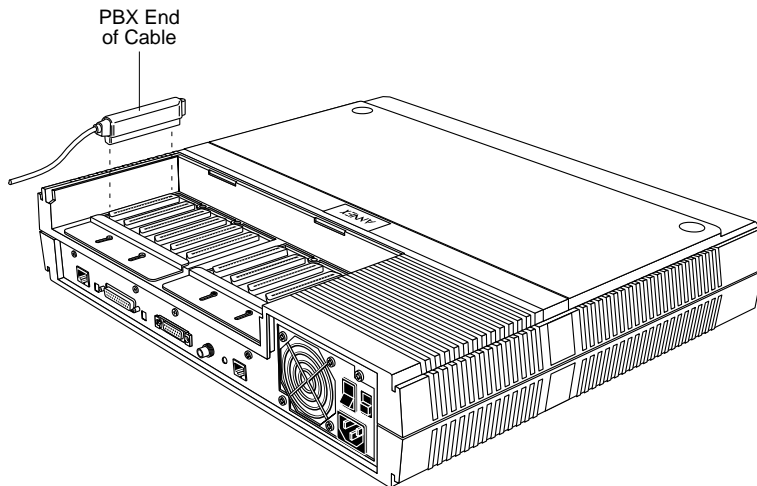


Figure 2-9. Attaching the Cable to the PBX Connector



- 4 Tighten the screw on the PBX end of the cable (see [Figure 2-10](#)).

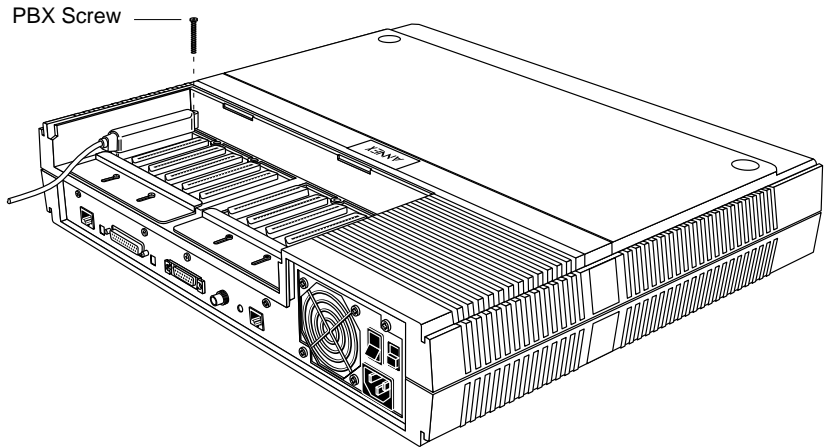


Figure 2-10. Securing the PBX Cable

- 5 Slide the cable retainer forward, making sure that the lip of the retainer secures the connector (see [Figure 2-11](#)).
- 6 Tighten the screws that secure the cable retainer.

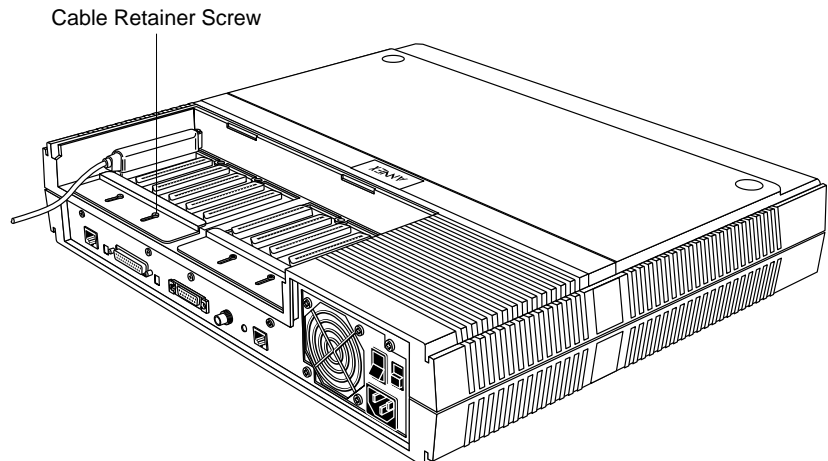


Figure 2-11. Securing the PBX Connector

- 7 Slide the dress panel cover back to its original position by sliding it toward the front of the Remote Annex 4000 (see [Figure 2-12](#)).

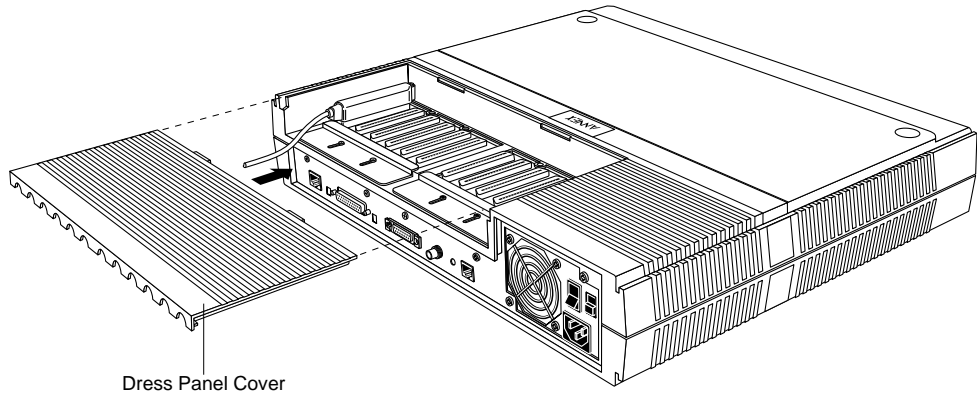


Figure 2-12. Securing the Dress Panel Cover

If the cables are shielded (metal), the cable retainers may obstruct the PBX end, preventing you from securing the dress panel cover. You may need to remove the cable retainers.

- 8 Connect the Remote Annex 4000 fan-out cables to your serial devices.

See [Appendix B](#) for a description of the fan-out cable.



Shielded cables are required for compliance with VDE EMI limits.

## Remote Annex 4000 Serial Cables

The Remote Annex 4000 asynchronous serial interfaces conform to RS232 specifications. However, it is possible to exceed the specifications' cable limits given good quality cables that are run in an electrically quiet environment. Xylogics only guarantees operation with the cable lengths recommended below (see [Table 2-2](#)).



The Remote Annex 4000 can incur damage if the cables are hit by lightning.

Table 2-2. Recommended Cable Lengths

Line Speed: bps	Cable Length: Feet	Meters
50–19,200	250	75
38,400	200	60
57,600	100	30
115,200	50	15



If you exceed these recommended cable lengths, you must compensate for any resulting electrical problems. Exceed these distances at your own risk.

## Connecting a Parallel Printer

The Remote Annex 4000 supports parallel printer interface cables from Dataproducts and Centronics. Connect the Remote Annex 4000 to your parallel printer as follows:

- 1 Connect one end of the Dataproducts or Centronics parallel printer cable to the Remote Annex 4000's 25-pin printer port (see [Figure 2-13](#)).

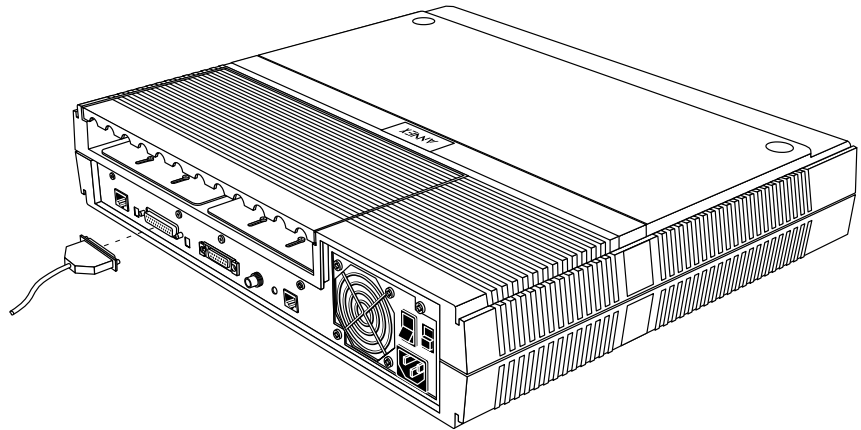


Figure 2-13. Connecting the Parallel Printer Cable to the Remote Annex 4000

- 2 Secure the connection by tightening the screws that connect the cable to the printer port.
- 3 Connect the other end of the Dataproducts or Centronics parallel printer cable to your printer.

[Appendix A](#) details the printer port's signal/pin allocations.



Dataproducts printers do not use standard cables. [Appendix B](#) describes the cables for the Remote Annex 4000.

## Powering Up and Testing the Remote Annex 4000

Power-up and test your Remote Annex 4000 as follows:

- 1 Verify the Remote Annex 4000's operational power range.  
Check that the power select switch is set to the 110V position for operation in the 90 to 130 VAC range, or to the 220V position for operation in the 180 to 260 VAC range (see [Figure 2-14](#)).

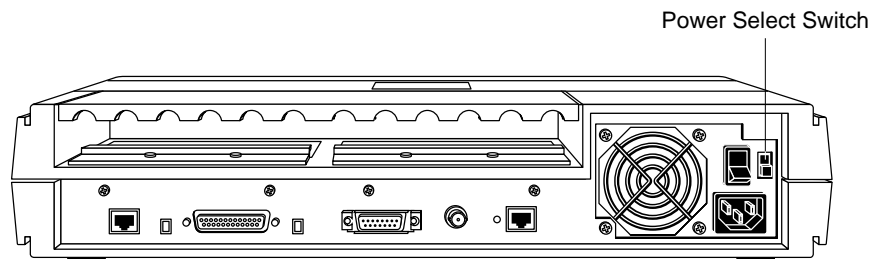


Figure 2-14. Verifying the Remote Annex 4000 Operational Power Range



Setting the power select switch incorrectly can damage the Remote Annex 4000.

2 Apply power.

Connect the female end of the power cord to the AC line socket. Connect the male end to an active AC line outlet (see [Figure 2-15](#)). Turn the **Power** switch on.

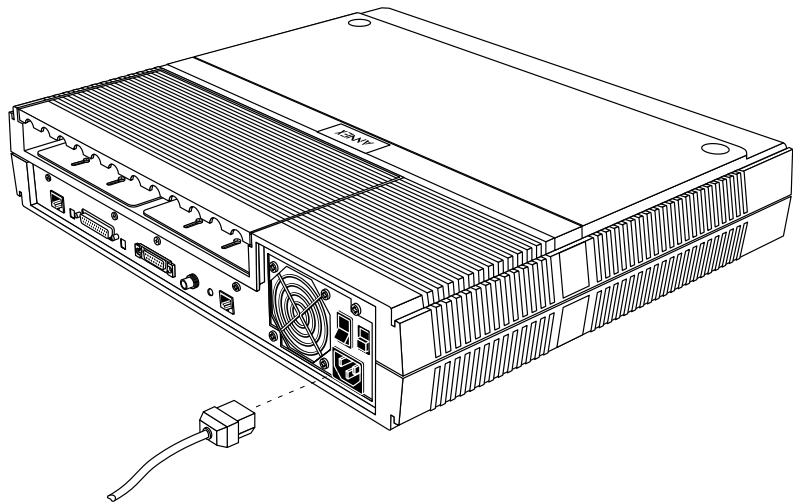


Figure 2-15. Connecting the Power Cord

The Remote Annex 4000 now runs its ROM-resident power-up diagnostics. The LEDs light and then turn off, except for the **Power** and some status LEDs.

### 3 Set the Remote Annex 4000 to Test Mode.



Pressing the **Test** button within 3 seconds of powering up puts the Remote Annex 4000 into test mode. To enter test mode when the Annex is already running, hold down the **Test** button until the **Power** LED blinks rapidly, then release the **Test** button and press it again within 3 seconds. This second method resets the Remote Annex, so warn users before you do it.

Press the **Test** button located on the Remote Annex 4000 front panel. The Test LED lights when the unit enters Test Mode (see Figure 2-19).

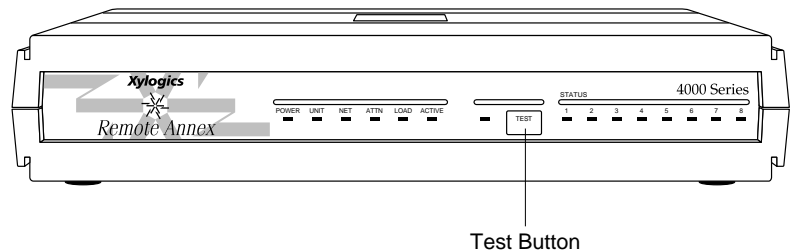


Figure 2-16. Setting the Remote Annex 4000 to Test Mode

Next, the Remote Annex 4000 runs diagnostic tests, causing the **Active** LED to flash. If the diagnostics complete successfully, the **Unit**, **Net**, and **Attn** LEDs light. If a terminal is connected to the console port, the ROM Monitor prompt appears on the terminal.

If the **Unit**, **Net**, and **Attn** LEDs do not light within one minute, one of the following failures has occurred:

- ❑ Remote Annex 4000 hardware failure: **Unit** and **Attn** LEDs flash. Contact technical support.
- ❑ Network or network interface failure: **Net** and **Active** LEDs flash; error message displays on the console.

If a network or network interface failure occurs, typing **q** accesses the ROM Monitor prompt. Check the network connection (also, see [net](#) on page 3-22). [Chapter 4](#) provides additional troubleshooting information.

- 4 Verify the Remote Annex 4000's hardware configuration.

At the monitor prompt on the console, type **config** and press **Return**. The screen display looks like this:

```

monitor:: config

  1-6   7-12  13-18  19-24  25-30  31-36  |  37-42  43-48  49-54
  RS232 RS232 RS232 RS232 RS232 RS232  |  RS232 RS232 RS232

Number of Ports = 36 Number of Ports = 18
Amount of Memory = 1.5 MegAmount of Memory = 1.5 Meg
SLC 1 Type = VFSLC   SLC 2 Type = VFSLC
Max Speed = 115.2   Max Speed = 115.2
-----
                REVISION/CONFIGURATION INFORMATION
ROM Software Rev: 0901   Ethernet Add:00-80-2D-00-B5-9D
Board ID: 46           Major HW Rev: 4
MLB Type: Enhanced Ext MLB CPU Type: 486SXLC2
Amount of memory: 6 Meg EEPROM size: 65504
FLASH PROM size: 2 Meg MFG IDs: (8989,8989)
Available Interfaces (* = selected):*ThinNet ThinNet
                                         Twisted Pair
  
```



- 5 Record the Remote Annex 4000's Ethernet address for future reference.

At the monitor prompt, type **addr -d** and press **Return**. The screen display looks like this:

```
monitor:: addr -d
Ethernet address (hex): 00-80-2D-00-18-B6
Internet address: <uninitialized>
Subnet mask: 255.255.0.0
Broadcast address: 0.0.0.0
Preferred Load Host address: <any host>
Preferred Dump Host address: 0.0.0.0
Load/Dump Gateway address: 0.0.0.0
Type of IP packet encapsulation: <ethernet>
Load Broadcast: Y
```

## Installing the Operational Software and Loading the Image

Use this section if you have successfully connected the Remote Annex 4000 to your LAN.

This section describes:

- ❑ How to install the Remote Annex 4000's operational software and image on a device that resides on a network accessible to the Remote Annex 4000.
- ❑ How to download the operational image from the network device to the Remote Annex 4000.

This section contains the following subsections:

- ❑ *Installing to and Loading from a Novell Server.*
- ❑ *Installing to and Loading from a UNIX Host.*
- ❑ *Installing to and Loading from a VAX VMS Host.*

## Installing to and Loading from a Novell Server

This section contains a description of what you need to do to install the Remote Annex 4000's operational software and image to a Novell Server. Proceed as follows:

- 1 Log into your Novell server as SUPERVISOR or equivalent.
- 2 Insert the Network Administrator Program Install Disk into your PC's floppy drive.
- 3 Change to your PC's floppy drive (usually drive A or B).
- 4 Display or print the README.TXT file for updated information about the current version of Annex Manager for DOS software.
- 5 Type INSTALL and press .

A list of your PC's available drives appears.

- 6 Select a network drive that is accessible to all users on the network and press .
- 7 Enter the name of the directory where you want to copy the files or select the default \PUBLIC directory and press .

The installation program copies each file from the Administrator's Install Disks to the network drive and directory you specified in Steps 5 and 6. The installation program then decompresses and verifies each file being copied. See the *Annex Manager for DOS Administrator's Guide for the PC* for a list and description of the Administrator's files.

- 8 Power up or reset the Remote Annex 4000. Do not enter test mode.

- 9 Run the Annex Installation Utility. At the prompt, start the Annex Installation Utility by typing:

AMINSTAL

A window appears with selections for installing or upgrading the software.

- 10 Select Install and press  .

The Annex Installation utility automatically lists any uninstalled Annexes in the Uninstalled Annexes window.

- 11 Use the arrow keys or the mouse to highlight the Annex(es) to be installed and select OK.

A list of available servers appears.



To install several Remote Annexes, select each Remote Annex and press .

- 12 Choose the server that contains the operational code that will be downloaded to the Annex(es) and select OK.

A message appears when the installation is complete. If any errors occur during the process, an error message window appears.

- 13 Now you can run the Annex Manager, which configures the Annex(es) and security. See the *Annex Manager for DOS Administrator's Guide for the PC* for information about Annex Manager.



If a Remote Annex 4000 boots from a Novell server, the Remote Annex is available for IPX dial-in and dial-out only. Other Remote Annex 4000 features such as PPP, SLIP, ARAP, and CLI are not supported.

## Installing to and Loading from a UNIX Host

This section contains a description of what you need to do to install the Remote Annex 4000's operational software and image to a UNIX host (see the *Remote Annex Administrator's Guide for UNIX* for additional information). Proceed as follows:

- 1 Install the image on a UNIX host. The software installation notes describe how to do that.



If you have a BOOTP server, boot the Remote Annex 4000. Otherwise, continue to the next step.

- 2 Execute the ROM Monitor `addr` command:
  - ❑ Enter the Remote Annex 4000's Internet address.
  - ❑ Modify any other parameters that the Remote Annex 4000 may require for the initial boot, i.e., the preferred load host's Internet address and the subnet mask (see [addr](#) on page 3-5).
- 3 If you are booting the Remote Annex 4000 using a Serial Line Internet Protocol (SLIP) network interface, you must:
  - ❑ Use the ROM Monitor `slip` command to modify the port parameters for the SLIP network interface (see [slip](#) on page 3-31).
  - ❑ Use the ROM Monitor `sequence` command to list the SLIP network interface in the load/dump interface list (see [sequence](#) on page 3-29).
- 4 Execute the `boot` command (see [boot](#) on page 3-8).

After successful execution of the `boot` command, the Remote Annex 4000 is up and running.

## Installing to and Loading from a VAX VMS Host

This section contains a description of what you need to do to install the Remote Annex 4000's operational software and image on a VAX VMS Load Host. Refer to the *Annex Interface for VMS Environments Administrator's Guide* and the *Annex Interface for VMS Environments User's Guide* for additional information.

This product cannot be installed on an AXP system. This section contains the following subsections:

- ❑ *Installing the Operational Software and Image on a VAX VMS Load Host.*
- ❑ *Configuring NCP for Downloading.*
- ❑ *Configuring for Crash Dump Support.*
- ❑ *Customizing for Multiple Remote Annex Images.*

### Installing the Operational Software and Image on a VAX VMS Load Host

#### Prerequisites

The following should be in place before you install the software and image on your load host.

- ❑ Your load host must be running VMS 5.5 (or higher).
- ❑ Your load host must be running DECnet VAX™.
- ❑ The Ethernet controller must be on the same Ethernet as the Annex.
- ❑ The CMKRNL and SYSPRIV privileges must be enabled.

- ❑ The load host has at least 4000 blocks of available disk space (on any disk), and up to an additional 17,000 blocks available (depending on the amount of memory installed in the Annex) if dumps are to be supported.



In a VMS environment, dumps do not overwrite each other, as VMS allows multiple versions of the same file. Therefore, up to 17,000 blocks of memory must be available for each Remote Annex 4000 dump.

- ❑ The system is backed up before installing the software.
- ❑ The software medium is mounted on an appropriate device drive, unless you are installing from save sets copied from another load host.

## Installation

Perform the following steps to install the software and image on your system load host. To stop the installation at any time, press CTRL-Y (^Y).

- 1 Log into the system manager account.
- 2 Enter @SYS\$UPDATE:VMSINSTAL to start VMINSTAL.  
VMINSTAL lists any active processes and asks if you want to continue.
- 3 Enter yes and continue the installation.
- 4 Enter yes if you have backed up your system disk.
- 5 Enter the device on which your distribution medium is loaded.
- 6 Enter \* for the products to be processed.
- 7 Press  to indicate none for installation options.
- 8 Enter yes if you've mounted the software medium on the appropriate device.



The Remote Annex parameter **disabled\_modules** *disables* specified software modules and frees memory space for use by the system.

The default Remote Annex setting for **disabled\_modules** includes **vci** which disables the Remote Annex interface for VMS environments along with the following commands: **backwards**, **change**, **clear**, **crash**, **define**, **disconnect**, **forward**, **list**, **logout**, **resume**, **set**, and **show**.

Booting the Remote Annex 4000 from a VAX VMS load host automatically enables **vci**. The following message appears in the syslog file: *MOP Booting, vci enabled*. On subsequent boots (regardless of the type of load host; e.g., VMS or UNIX), **vci** remains enabled. To disable **vci**, you must re-enter it in the **disabled\_modules** parameter (for more details, see the *Remote Annex Administrator's Guide for UNIX*).

If the **disabled\_modules** parameter is set to **vci**, even if the **cli\_interface** parameter is set to **vci**, none of the VMS-specific commands will be available, the *Local >* prompt will not be displayed, and the *Username>* prompt will not appear upon port reset.

### Configuring NCP for Downloading

The operational image now resides in the directory to which the logical MOM\$LOAD points. You must now enable downline loading of the image on the appropriate circuit using NCP.

- 1 To find the appropriate circuit, type the following command:

```
$MCR NCP SHOW KNOWN CIRCUITS
```

The system responds:

```
Known Circuit Volatile Summary as of 25-May-1993
Circuit      State      Loopback   Adjacent
              Name       Routing Node
SVA-0        on
```

- 2 Go back into NCP and enable that circuit to honor service requests by issuing the following NCP commands:

```
$MCR NCP SET CIRCUIT SVA-0 STATE OFF
$MCR NCP SET CIRCUIT SVA-0 SERVICE ENABLED
$MCR NCP DEF CIRCUIT SVA-0 SERVICE ENABLED
$MCR NCP SET CIRCUIT SVA-0 STATE ON
```

## Configuring for Crash Dump Support

The VAX VMS load host can be set up to accept crash dumps from the Remote Annex at any time. To enable this feature, you must assign a DECnet node name and address to your Remote Annex and set up NCP to point to a directory that will receive the crash dumps. You will need the Remote Annex's Ethernet address before you can execute these commands. The **show server** command displays the Remote Annex's Ethernet address. See the *Annex Interface for VMS Environments Administrator's Guide* for more information about this command.



To enable your VAX VMS load host to accept crash dumps:

- 1 Assign a DECnet node number to your Remote Annex. You can pick any node number or name as long as it does not conflict with any node or address already defined within NCP.

For example:

```
$MCR NCP SET NODE 2.69 NAME BINGO
```

- 2 Assign a directory and file to receive the crash dump.

For example:

```
$MCR NCP SET NODE BINGO DUMP FILE\  
DKA200:[ZETKIN.ANNEX_CRASH]BINGO.DMP
```

- 3 Assign the Remote Annex's hardware address to the node name.

For example:

```
$MCR NCP SET NODE BINGO\  
HARDWARE ADDRESS 00-80-2D-00-1A-DE
```

- 4 Issue the equivalent define commands so this crash dump support continues when your VMS load host is restored.

The VMS load host now supports crash dumps.

### Customizing for Multiple Remote Annex Images

The Remote Annex operational code is installed in MOM\$LOAD as OPER\_46\_ENET.SYS. The Remote Annex does not require that this be the exact file name and you may want to keep multiple versions of the Remote Annex software.

You can rename Remote Annex operational images, but they must remain in MOMSLOAD. If you do change the operational image name from OPER\_46\_ENET.SYS to some other name, the new file name plus the extension can be no longer than 16 characters total. This is due to a MOP restriction of 16 characters in passing the load file name field.

## Auto-initializing the ROMs

The Remote Annex 4000 is distributed without an IP address or preferred load host (UNIX/IP, IPX, or MOP) defined in ROM. When the device is booted, the Remote Annex 4000 attempts to auto-initialize its ROMs using BOOTP (bootstrap protocol) and RARP (Reverse Address Resolution Protocol).

The Remote Annex 4000 supports the BOOTP and RARP protocols. Use these protocols to automatically obtain boot information from a UNIX host without requiring any manual set-up on the Remote Annex 4000.

- ❑ BOOTP allows a diskless client to determine its IP address, the IP address of the server, and the name of the file to be loaded into memory.
- ❑ RARP maps a hardware address into an IP address.

The ROMs invoke this system of acquiring boot information when a boot is initiated and the Remote Annex 4000 is not initialized. Under this condition, the Remote Annex 4000 first tries to get boot information via BOOTP or RARP.

If BOOTP and RARP fail, the Remote Annex 4000 attempts to load an image by transmitting an IPX advertisement request for service and a MOP multicast boot request.

If all requests fail, the Remote Annex 4000 will return to the ROM monitor (if in Test mode) or continue the auto-initializing procedure indefinitely (if in normal mode).

## BOOTP

For a successful BOOTP retrieval, a **bootpd** must be running on a host on the same network as the Remote Annex 4000 and must have the appropriate information in the **bootptab** file. The Remote Annex 4000's BOOTP implementation adheres to rfc951, rfc1048, and rfc1084. A sample **bootptab** file entry used to initialize the Remote Annex 4000 named *terminator* looks like this:

```
remoteannexdefault:\
    :sm=255.255.255.0:gw=132.245.22.66:\
    :hn:vm=auto:to=-18000:
terminator:\
    :ht=1:ha=00802d004879:ip=132.245.22.226:\
    :tc=remoteannexdefault:
```

In the previous example:

- ❑ *sm* is the subnet mask.
- ❑ *gw* is the load/dump gateway address.
- ❑ *vm* is the Vendor Magic Cookie.
- ❑ *ht* is host type (1=Ethernet).
- ❑ *ha* is the Remote Annex 4000's hardware address (Ethernet Address).
- ❑ *ip* is the Remote Annex 4000's Internet Address.

When the Remote Annex 4000 receives a BOOTP response with the *sm*, *gw*, and *ip* set, it sets the respective parameters: **subnet\_mask**, **load\_dump\_gateway**, and **inet\_addr**. The Vendor Magic Cookie must be set to **auto**. This indicates that **bootpd** should respond to the client (Remote Annex 4000 in this case) with whatever format the client requests; the Remote Annex 4000 (client) always makes requests in the decimal dot notation format (e.g., 99.130.83.99).

The **bootpd** adds the address of the host on which it is running as the *Server Address* in the **bootp** response message. The ROMs use the *Server Address* as the preferred load host and store it in the **pref\_load\_addr** parameter.



The **bootpd** must be running on the Remote Annex 4000's preferred load host.

## RARP

If the Remote Annex 4000 does not receive a successful BOOTP response, it uses RARP to get the boot information. For a successful RARP retrieval, TCP/IP must be running on a host that is on the same network as the Remote Annex 4000, and the host's ARP table must be initialized with the Remote Annex 4000's Internet and Ethernet addresses (see the **arp** man page, **arp -s**).

The only boot information that RARP provides is the Remote Annex 4000's Internet address. The ROMs save this information in the **inet\_addr** parameter. The ROMs use default information for the subnet mask and preferred load host. This means the ROMs will broadcast their requests.

The host serving the Remote Annex 4000 its boot information must be running on the same network as the Remote Annex 4000 because the Remote Annex 4000 only broadcasts BOOTP and RARP queries.

If BOOTP and RARP fail, the Remote Annex 2000 transmits an IPX Advertisement Request for Service and a MOP Multicast boot request.

If all requests fail, the Remote Annex 4000 returns to the ROM monitor (if in Test mode) or continues the auto-initializing procedure indefinitely (if in normal mode).

## Self-booting the Remote Annex 4000

If you purchased a Remote Annex 4000 with Flash ROM, your device already contains an operational image. You can check your Remote Annex 4000's configuration by entering the **config** command at the monitor prompt. The **config** command displays the current configuration information and revision levels. If your device has Flash ROM installed, the line *FLASH PROM size:* will appear under the *REVISION/CONFIGURATION INFORMATION* section.

This section describes how to boot your Remote Annex 4000 from Flash ROM. Proceed as follows:

- 1 Enter the ROM Monitor prompt from the Console.
- 2 Set the Internet address to a valid IP address and the subnet mask to a valid mask using the `addr` command.
- 3 Set the interface sequence to *self* using the `sequence` command.
- 4 Boot the Annex.

## Invoking the Console Monitor

After the image boots, you can invoke a Console Monitor by pressing `(Return)` on the console. At the Console Monitor prompt, entering **help** or **?** displays the available options:

- ❑ **dump** (from the Remote Annex to the host and reboots).
- ❑ **help** or **?** (displays the available options).
- ❑ **info** (displays configuration information for the Remote Annex).
- ❑ **leds** (displays the current front panel LED status).
- ❑ **quit** (exit the Console Monitor, e.g., *quiet* the console).
- ❑ **reboot filename** (reboots the Remote Annex).
- ❑ **rom** (returns the Remote Annex to the ROM Monitor).
- ❑ **syslog** (displays syslog messages).





• Chapter 2 *Installing the Remote Annex 4000*



This chapter describes the ROM Monitor commands. Access these commands through a terminal connected to the console port when the Remote Annex 4000 is in test mode.



Pressing the **Test** button within 3 seconds of powering up puts the Remote Annex 4000 into test mode. To enter test mode when the Annex is already running, hold down the **Test** button until the **Power** LED blinks rapidly, then release the **Test** button and press it again within 3 seconds. This second method resets the Annex, so warn users before you do it.

If you try to access the ROM monitor and receive a password prompt, contact your system administrator. The ROM monitor is password protected.

The ROM Monitor commands allow you to set a subset of the configuration (EEPROM) parameters. Some of these parameters, like the unit's IP address, are required for booting the Remote Annex 4000; some parameters, like the broadcast address, are required if the network configuration differs from the supplied defaults. Table 3-1 lists the ROM Monitor commands.

Other parameters, although not required, are recommended for the Remote Annex 4000's initial boot. Setting these parameters, rather than using the assigned defaults, minimizes errors during the initial boot. For example, setting the parameter that defines the preferred load host enables the Remote Annex 4000 to load by requesting assistance from a specific host, rather than by broadcasting that request to all hosts on the subnet.

After the Remote Annex has booted, you can define the same parameters you defined using the ROM monitor, by using the **na** utility, the local CLI **admin** command, or SNMP (for more details, see the *Remote Annex Administrator's Guide for UNIX*).

ROM Monitor commands generally provide data about a subset of current configuration (EEPROM) parameters. When appropriate, they also display a prompt that allows the operator to change those parameters. Default or current values for parameters are displayed in brackets. For example:

```
Enter broadcast address [132.245.6.255]:
```

At the prompt, enter a different value, or press **Return** to leave the displayed value unchanged.

You can use unique abbreviations for all ROM Monitor commands except **erase**. For example, enter **boot** as **bo**, and enter **net** as **n**. If you enter an abbreviation that is not unique, an error message describing the command as ambiguous is displayed on the console terminal.

## Command Descriptions

[Table 3-1](#) lists the ROM Monitor commands; the following subsections describe them.

Table 3-1. ROM Monitor Commands

Command	Description	Use
<b>addr [-d]</b>	Displays and sets EEPROM values relevant to IP network addressing, including the unit's IP address.	Changing IP configuration parameters.
<b>boot [-v] [&lt;file&gt;]</b>	Manually boots and loads the unit's operating code.	Changing the address of the boot image.

*(continued on next page)*

Table 3-1. ROM Monitor Commands (continued)

Command	Description	Use
<b>boot [-l] [<i>file</i>]</b>	Erases the existing Flash memory and copies a new image to Flash.	Upgrading or replacing the Flash image.
<b>config</b>	Displays the current hardware configuration and revision levels.	Identifying your hardware, memory, and ROM versions.
<b>console-baud</b>	Changes the console port's baud rate.	Configuring the console port for remote maintenance.
<b>erase</b>	Erases non-volatile memory.	Loading a new image and need to erase the old image.
<b>help</b>	Displays the list of ROM Monitor commands.	Referencing the ROM monitor commands.
<b>image [-d   <i>file</i>]</b>	Displays and/or sets the load image and <b>tftp</b> load dump names.	Loading an image that differs from the default.
<b>ipx [-d]</b>	Displays and sets EEPROM values relevant to Novell/IPX network addressing, including the IPX load/dump file server.	Changing Novell/IPX configuration parameters.
<b>lat_key [-d]</b>	Sets the LAT key.	Connecting to a DEC VMS host.

(continued on next page)

Table 3-1. ROM Monitor Commands (continued)

Command	Description	Use
<b>mop [-d]</b>	Displays and sets EEPROM values relevant to VAX/VMS network addressing, including the MOP load/dump address.	Loading software from a DEC VMS host.
<b>net</b>	Executes an Ethernet transceiver loopback test.	Checking your Ethernet connection.
<b>option_key [-d]</b>	Sets or displays the option key.	Checking your option key setting.
<b>ping</b>	Sends ICMP ECHO_REQUEST datagram to a host or gateway.	Checking to see if a host or gateway can be reached.
<b>ports [-d]</b>	Shows the current status of all ports.	Checking a port.
<b>sequence [-d   &lt;list&gt;]</b>	Displays and edits the load/dump interface list.	Checking or changing the load/dump interface list.
<b>slip [-d] [&lt;port&gt;]</b>	Defines a serial port as a Serial Line Internet Protocol (SLIP) network interface.	Checking or changing a serial port's settings.
<b>stats [-slip]</b>	Displays current network statistics gathered by the ROM.	Checking the network resources.

## addr

The **addr** command displays and sets several Remote Annex 2000 operating parameters (EEPROM values) relevant to IP network addressing:

- ❑ Internet address.
- ❑ Subnet mask.
- ❑ Broadcast address.
- ❑ Preferred Load Host address.
- ❑ Preferred Dump Host address.
- ❑ Load/Dump Gateway address.
- ❑ Type of IP Packet encapsulation.
- ❑ Load Broadcast

The **addr -d** command displays the unit's ROM-resident Ethernet address in hexadecimal notation. (For a description of Internet addresses, see the *Remote Annex Administrator's Guide for UNIX*.) The command syntax is:

### **addr [-d]**

If you enter the **addr** command without the **-d** argument, the console prompts you for each Internet address. Enter Internet addresses using the standard decimal dot (.) notation.

The **addr -d** command displays the Remote Annex 4000's Ethernet address, IP address, subnet mask, broadcast address, preferred load host address, preferred dump host address, load/dump gateway address, IP encapsulation type, and Load Broadcast. The **addr -d** command cannot be used to make changes to any of the displayed parameters.

The **addr** command display looks like this:

```
monitor:: addr
Enter Internet address [<uninitialized>]:: 192.9.200.214
      Internet address: 192.9.200.214
Enter Subnet mask [255.255.0.0]::
Enter Broadcast address [0.0.0.0]:: 192.9.200.0
      Broadcast address: 192.9.200.0
Enter Preferred Load Host address [<any host>]::
192.9.200.88
      Preferred Load Host address: 192.9.200.88
Enter Preferred Dump Host address [0.0.0.0]::
192.9.200.88
      Preferred Dump Host address: 192.9.200.88
Enter Load/Dump Gateway address [<uninitialized>]::
192.9.200.10
Load/Dump Gateway address: 192.9.200.88
Select type of IP packet encapsulation (ieee802/ethernet)
[<ethernet>]::
Load Broadcast Y/N [Y]::
```

The **addr -d** command display looks like this:

```
monitor:: addr -d
Ethernet address (hex): 00-80-2D-00-18-B6
Internet address: 192.9.200.214
Subnet mask: 255.255.0.0
Broadcast address: 192.9.200.0
Preferred Load Host address: 192.9.200.88
Preferred Dump Host address: 192.9.200.88
Load/Dump Gateway address: 192.9.200.10
Type of IP packet encapsulation: <ethernet>
Load Broadcast: Y
```

The Remote Annex 4000 must have an Internet (IP) address in its memory before it can load its operational image across the Ethernet via the IP protocol. Therefore, you *must* enter the IP address before booting the Remote Annex 4000 from a UNIX load host. If you do not define a subnet mask, the Remote Annex 4000 uses the generic mask for the specified IP address.

The Remote Annex 4000 tries to boot from a preferred UNIX load host. If you do not define a preferred load host, the Remote Annex 4000 broadcasts its load request and loads software from the first host that responds.

If the part of the IP address containing the network address differs from that of the preferred load or dump host, the host must be reached through a gateway. The **addr** command prompts you for this gateway's IP address.

The Remote Annex 4000 uses the broadcast address parameter when loading a file. If this parameter contains a specific address (for example, 132.245.6.255), the Remote Annex 4000 uses only that address for broadcast. If the value is all zeroes (0.0.0.0), the ROM Monitor tries various combinations of broadcast addresses and subnet or network broadcasts. The Remote Annex 4000 broadcasts its request three times for each possible combination of broadcast addresses.

You can specify the IP encapsulation type as either **ethernet** for Ethernet, or **ieee802** for IEEE 802.2/802.3. The default IP encapsulation is **ethernet**. Many systems have hardware Ethernet interfaces that are IEEE 802.3 compliant, but very few actually do 802.3 IP packet encapsulation.



Do not change this parameter unless you know absolutely that your Ethernet does 802.2/802.3 IP packet encapsulation. An incorrect IP encapsulation type prevents your Remote Annex from booting.

## boot

The **boot** command requests the loading of appropriate Remote Annex 4000 operating software from a cooperating host. The command syntax is:

**boot** [-lv | *filename*]



The **boot -l** command is supported only if the self-boot option (Flash) is installed.

Typing the letter **q** or **Control-C** interrupts the boot.

If you try to boot with a non-existent image file name, the Annex will hang as it searches for the image. You must press the **Reset** button to recover.

A successful boot disables the ROM Monitor.

The **boot** command accepts a file name for the Remote Annex 4000's image. If the file name is not specified, **boot** displays the default file name and prompts for one. If you do not provide a file name, or have not defined one for the Remote Annex 4000, **boot** requests the default **oper.46.enet** file. Optionally, you can enter a file name using the **image** command.

The Remote Annex 4000 boots from the defined preferred load host (UNIX/IP, Novell/IPX, or VAX VMS/MOP). If the preferred load host is not defined or does not respond, the Remote Annex 4000 broadcasts on the Ethernet and loads from the first host that responds.

To initiate loading, the Remote Annex 4000 sends a load request message to the selected host. After receiving a response, the Remote Annex 4000 loads its operational code to RAM. When loading is complete, it transfers control to the newly-loaded program. The Remote Annex 4000 displays a symbol on the console for each data block received during the boot.



When the Remote Annex 4000 begins to boot, it displays the load server host's Internet address. If the unit does not boot successfully after several attempts, it displays a *boot attempt failed* message; if the unit has opened the boot file and an error occurs during the boot process, it displays a boot error report on the console and returns to the ROM Monitor. The boot error report can help determine the cause of the boot failure (see *Boot Error Report* in Chapter 4).

During a boot, the console may display four possible status symbols: "." indicates received data blocks, "?" indicates unanswered requests, "\*" indicates transmission errors, and "! ~XXXX~" is a status word from the Ethernet chip on the Annex indicating a gross problem with the Ethernet connection (if this symbol appears in your **boot** command display, contact technical support).

The status word "! ~XXXX~", where XXXX are four hexadecimal digits, decodes as follows:

- 8000 = Command complete
- 4000 = Chip is busy
- 2000 = Command completed without error
- 1000 = Command aborted issuance of an ABORT command
- 800 = Late collision detected
- 400 = Carrier lost
- 200 = CTS lost
- 100 = DMA underrun
- 80 = Transmission deferred because link was busy
- 40 = Collision detected during interframe spacing (SQE/Heartbeat detected)
- 20 = Excessive collisions
- 10 = Reserved

The lowest nibble (bits 3 to 0) are a count of collisions during this transmission. For example:

- ~8802~ = Complete, Late collision, 2 collisions
- ~8841~ = Complete, Late Collision, SQE detected, 1 collision

The **boot** command display (using **bfs**) looks like this:

```
monitor:: boot
Enter boot file name[(ip) "oper.46.enet", \
(mop) "OPER_46_ENET.SYS"]::
Requesting default boot file "OPER_46_ENET.SYS" for MOP/VM
loads and "oper.46.enet" for all other protocols.
Unanswered requests shown as '?', transmission errors as '*'
Requesting boot from 192.9.200.88 via Ethernet...
Booting BFS file using open delay of 8
Booting BFS file from 192.9.200.88
Header received OK. Received data blocks shown as '..'.
. . . . .
. . . . .
. . . . . ? . . . . .
. . . . . * . . . . .
. . . . . * . . . . .
. . . . .
. . ? . . . . . EOF
```

The next example shows a boot using **tftp**. The Remote Annex 4000 always tries to open a file using **bfs** first. If unsuccessful, the Remote Annex uses **tftp** to open the file.

```
monitor:: boot
Enter boot file name [(ip) "oper.46.enet", \
(mop) "OPER_46_ENET.SYS"]::
Requesting default boot file "OPER_46_ENET.SYS" for MOP/VM
loads and "oper.46.enet" for all other protocols.
Unanswered requests shown as '?', transmission errors as '*'
Requesting boot from 192.9.200.88 via Ethernet...
Booting BFS file using open delay of 8
?
Booting TFTP file using open delay of 8
Booting TFTP file from 192.9.200.88
Header received OK. Received data blocks shown as '..'.
. . . . .
. . . . . ? . . . . .
. . . . . * . . . . .
. . . . . * . . . . .
. . ? . . . . . EOF
```





## config

The **config** command displays the current configuration information and revision levels. For each serial line controller (SLC), **config** displays the port configuration as the number of PBX Champ connectors, the range of port numbers for each champ, and the amount of memory on the SLC. The **config** command display contains information describing whether or not Flash ROM is installed. The command syntax is:

### config

The **config** command display for a Remote Annex 4000 with two SLCs looks like this:

```

monitor:: config

  1-6   7-12  13-18  19-24  25-30  31-36  |  37-42  43-48  49-54
  RS232 RS232 RS232 RS232 RS232 RS232  |  RS232 RS232 RS232

Number of Ports = 36 Number of Ports = 18
Amount of Memory = 1.5 MegAmount of Memory = 1.5 Meg
SLC 1 Type = VFSLC   SLC 2 Type = VFSLC
Max Speed = 115.2   Max Speed = 115.2

-----
          REVISION/CONFIGURATION INFORMATION
ROM Software Rev: 0901   Ethernet Add:00-80-2D-00-B5-9D
Board ID: 46            Major HW Rev: 4
MLB Type: Enhanced Ext  MLB CPU Type: 486SXLC2
Amount of memory: 6 Meg  EEPROM size: 65504
FLASH PROM size: 2 Meg   MFG IDs: (8989,8989)
Available Interfaces (* = selected):*ThickNet ThinNet
                                         Twisted Pair
  
```

## console-baud

The **console-baud** command changes the console port's baud rate. Thus, the console port can interface with any modem to which it is connected. When the baud rate is entered as *auto*, the Remote Annex 4000 detects the baud rate of the incoming line and adjusts its baud rate accordingly. This command provides support for remote troubleshooting. The command syntax is:

### console-baud

The command display looks like this:

```
monitor:: console-baud
Remote Diagnostic Test Mode
In order to use the remote diagnostic functionality, you
must first connect a modem to the console port of the Anne
The modem should be configured such that DTR is forced on,
carrier detect and DSR are set normal, and auto-answer is
enabled. Once this is done, contact your service
representative for remote diagnostic maintenance.
To enter "Autobaud Mode", please type "Auto". To "manually
configure the Annex console port, please type in the
desired baud rate. To return to the "monitor::"
prompt strike the "carriage return <CR>" key.

[Baudrate Range: 50-9600 BAUD]
Select Baudrate []:
```



This command has no effect on the port's baud rate after the Remote Annex 4000 is booted.

### To provide remote access to the Remote Annex 4000 ROMs:

- 1 From a site local to the Remote Annex 4000:
  - Put the Remote Annex in test mode so the monitor prompt appears on the console.
  - Set the modem to auto-answer mode.
- 2 From the Remote Annex 4000 console port:
  - At the monitor prompt, enter **console-baud**.
  - At the Select Baud Rate prompt, enter the appropriate baud rate or auto.
  - Connect the modem to the Remote Annex's console port.
- 3 From the remote site:
  - Dial into the modem connected to the Remote Annex.
  - Press the Return key until the monitor prompt appears.

## erase

The **erase** command erases the contents of non-volatile memory, including the Remote Annex 4000's Internet address. This command also restores the parameters to their factory defaults. The command syntax is:

### **erase**

If the self-boot option is installed, the **erase** command prompts for the non-volatile memory to erase: EEPROM or FLASH. Entering 1 at the prompt causes the Remote Annex 4000 to erase the EEPROM memory (configuration information); entering 2 at the prompt causes the Remote Annex 4000 to erase the Flash memory (self-boot image).



The **erase** command does not erase the Ethernet address.

Since the **erase** command erases the IP address, you *must* use the **addr** command to re-enter the Remote Annex's IP address before reloading any software.

The **erase** command display looks like this:

```
monitor:: erase
  1) EEPROM (i.e. Configuration information)
  2) FLASH (i.e. S
Enter 1 or 2:: 1
Erase all non-volatile EEPROM memory? (y/n) [n]:: y
Erasing <65504 or 8160 bytes> of non-volatile memory. Please
wait...
................................................................................ 16K->|Data 0xff
................................................................................
................................................................................ 16K->|Data 0x0
................................................................................
Initialized checksum record installed
.
.
.
```



If the self-boot option is not installed, the command display looks like this:

```
monitor:: erase
Erase all non-volatile EEPROM memory? (y/n) [n]:: y
Erasing <65504 or 8160 bytes> of non-volatile memory. Please
wait...
................................................................................16K->|Data 0xff
................................................................................16K->|Data 0x0
................................................................................
Initialized checksum record installed
Erasing <65504 or 8160 bytes> of non-volatile EEPROM memory
```

## help

Entering **help**, or **?**, displays brief descriptions of the Remote Annex 4000 ROM Monitor commands.

## image

The **image** command sets and displays the name of the image file containing the Remote Annex 4000's software. The syntax is:

**image** [-d | *filename*]

The *filename* argument permits up to 100 characters. To return the image name to its default, enter a pair of double-quote characters (""). The default image name is **oper.46.enet**. The **image** command display looks like this:

```
monitor:: image
Enter Image name: [(ip)"oper.46.enet", \
(mop) "OPER_46_ENET.SYS"]::
Enter TFTP Load Directory [""]::
Enter TFTP Dump path/filename ["dump.192.9.200.88"]::
```

The **image -d** command display looks like this:

```
monitor:: image -d
Image name:Default (ip): "oper.46.enet"
Default (mop):"OPER_46_ENET.SYS"
TFTP Load Directory: ""
TFTP Dump path/filename: "dump.192.9.200.88"
SELF image name: "oper.46.enet"
```



The *SELF image name* appears only if the self-boot image is loaded.

If the **image** file name contains more than 16 characters, it is truncated when MOP is attempted.

## ipx

The **ipx** command sets several parameters associated with IPX booting and dumping. This is useful when loading the Remote Annex 4000's operational image from a Novell file server. The syntax is:

### **ipx [-d]**

The **ipx** command display looks like this:

```
monitor:: ipx
Enter IPX file server name [<uninitialized>]:: mars
Enter Frame type, 0=802.3 1=Ethernet II 2=802.2 3=SNAP\
[802.3]::
Enter IPX dump user name [<uninitialized>]:: susans
Enter IPX dump password [<uninitialized>]:: *****
Verify IPX dump password []: *****
Enter IPX dump path [<uninitialized>]:: SYS:\user\susans\
```

The **ipx -d** command displays the current settings for all of the entries. The command display looks like this:

```
monitor:: ipx -d
IPX preferred load file server: "MARS"
IPX frame type: "802.3"
IPX dump user name: "SUSANS"
IPX dump password: <SET>
IPX dump path name: "SYS:\user\susans\"
```

## lat\_key

The **lat\_key** command allows you to set the LAT key from the ROM monitor.



The **lat\_key** is optional and may be purchased separately.

The command syntax is:

**lat\_key [-d]**

The **lat\_key** command display looks like this:

```
monitor:: lat_key
Enter LAT KEY [<uninitialized>]::
```

The **lat\_key -d** command displays the current LAT key setting:

```
monitor:: lat_key -d
Enter LAT KEY [<uninitialized>]::
```

## mop

The **mop** command sets the MOP load/dump address. This is useful when the loading the Remote Annex 4000's operational image from a VAX VMS load host. The command syntax is:

### **mop [-d]**

The **mop** command display looks like this:

```
monitor:: mop  
Enter preferred MOP load/dump address [<uninitialized>]::  
Load Broadcast Y/N [Y]::
```

The **mop -d** command displays the current MOP settings:

```
monitor:: mop -d  
MOP preferred load/dump address: <uninitialized>  
Load Broadcast: Y
```

## net

The **net** command executes an Ethernet transceiver loopback test on the local area network. The command syntax is:

### net

The **net** command display looks like this:

```
monitor:: net
Network test - PASSED
```

This transceiver loopback test sends out a short test packet from the Remote Annex 4000 through the transceiver to test the integrity of the network. The test can be executed either by attaching the Remote Annex 4000 to the Ethernet or by attaching an Ethernet loopback connector to the network port.

For the 10Base2 and 10Base5 network interfaces, the preferred method for running an Ethernet transceiver loopback test is to attach the loopback connector to the network port because short test packets can interfere with normal network traffic. The accessory kit supplies Ethernet loopback connectors for these interfaces.

The 10BaseT network interface does not require a loopback connector because it provides a Link Integrity LED next to the RJ45 connector. This LED verifies that the receive circuit to the wiring concentrator is operating correctly. If this LED is not lit, link LED impulses are not present on the receive line due to a disconnected cable or some other link failure.

The Ethernet transceiver loopback test causes the **Net** LED to turn off. If the unit passes this test, the **Net** LED turns on and the console displays *PASSED*. If the Remote Annex 4000 fails, the **Net** LED remains off, and the console displays an error message.

Failing this test indicates that either the Remote Annex 4000, its transceiver cable, its transceiver, or the Ethernet, is bad. Isolate the failure by using this test and the Ethernet loopback connector. Any of the following conditions can cause these test failures:

- 1 The Remote Annex 4000 has faulty Ethernet port electronics.  
To test for this condition, connect the Ethernet loopback connector directly into the network connector. Run the **net** test again. If errors still occur or the +12-volt LED on the 10Base5's loopback connector fails to light, the problem is with the Remote Annex 4000. Call technical support.
- 2 The Remote Annex 4000 transceiver cable is defective or disconnected (this problem occurs only with the 10Base5 interface).  
To test for this condition, connect the 10Base5's loopback connector to the transceiver end of the transceiver cable (while the cable is connected to the Ethernet port) and run the **net** test. If errors did not occur during the first test run, but do occur during this test, the cable is faulty and should be replaced.
- 3 The transceiver at the end of the transceiver cable is defective or improperly connected to the Ethernet.  
If the cable is free of faults (tested as described above) and other devices on the Ethernet are not experiencing difficulties, the problem is in the transceiver. If you have already ruled out the transceiver, contact technical support.
- 4 The Ethernet cable is shorted or improperly terminated.  
Other devices on the net should show evidence of problems.

## option\_key

The **option\_key** command loads an option key from the ROM monitor. The command syntax is:

**option\_key [-d]**

The **option\_key** command display looks like this:

```
monitor:: option_key
Enter option_key [<uninitialized>]::
```

The **option\_key -d** command displays the current settings:

```
monitor:: option_key -d
option_key: <uninitialized>
```



## ping

The **ping** command sends an Internet Control Message Protocol (ICMP) mandatory ECHO\_REQUEST datagram to elicit an ICMP ECHO\_RESPONSE from a host or gateway. ECHO\_REQUEST datagrams (**pings**) have an IP and ICMP header, followed by a structured time value and an arbitrary number of pad bytes that fill out the packet. The syntax for this command is:

**ping** *host\_ip\_address* [*data\_size*] [*npackets*]

- ❑ The *host\_ip\_address* entry is the Internet address of the host or gateway from which you wish to elicit a response.
- ❑ The optional *data\_size* entry is the number of bytes sent in a datagram packet. The default value is 64 and the maximum value is 1024.
- ❑ The optional *npackets* entry is the number of packets to transmit. If you specify *npackets*, then you must also specify a *data\_size*.

The **ping** command display looks something like this:

```
monitor:: ping 132.245.33.69
        PING 132.245.33.69: 64 data bytes
```

If you enter the **ping** command without specifying an IP address, the display looks like this:

```
monitor:: ping
        IP address required, ie: ping 132.245.33.69\
        [data bytes] [npackets]
```

To exit out of **ping** either wait for *npackets* to be transmitted or, at any point, type **q**. The **ping** statistics display upon exit.

## ports

The **ports** command tests serial line ports, exercising both the data lines and the control lines for each serial port specified. The syntax for this command is:

### **ports [-d]**

Each serial port to be tested must be looped-back with a PBX loopback plug to test both the data lines and the control lines (the accessory kit provides a PBX loopback plug). Attach this plug to the PBX connector on the rear panel of the Remote Annex 4000 that corresponds to the port to be tested.



Do not run the **ports** command for a port to which a device is connected. The test will transmit data to the device and toggle its control lines.

When invoked, the command displays a menu of options. The following sample screen display is for a Remote Annex 4000 with 72 asynchronous serial ports and a printer port.

```
monitor:: ports
Individual Port Tests (Data And Control Lines)
Some important notes:
- All Serial Ports (1-72) which are to be tested require
a loopback plug in order to pass the Data Line and Control
Line loopback tests.
WARNING. If there is a device instead of a loopback plug
connected to the port being tested, the device will have
data transmitted to it and its Control Line toggled.
- The Printer Port does not require a loopback plug.
1) Async Serial Ports
2) Printer Port
Selection (Return to exit):: 1
```

*(continued on next page)*

```

You may enter a list of ports to test, separated by spaces
or commas. You may also enter ranges of ports, such as 1-72.
Ports with faulty Control Lines:
Ports with faulty Data Lines:
Enter port number or range of ports to test (Return to
exit)::3
Enter the number of times to loop on this test [1]::
Testing data lines on channel 3
ERROR -- Data line loopback failure on port 3
Testing modem signals on channel 3
ERROR -- No RTS/CTS turning (ON) loopback interrupt sensed
on chan 3!
1 pass(es) with 2 failure(s)

```

A display for the printer port looks like this:

```

monitor:: ports
Individual Port Tests (Data And Control Lines)
Some important notes:
- All Serial Ports (1-72) which are to be tested require
a loopback plug in order to pass the Data Line and Control
Line loopback tests.
WARNING. If there is a device instead of a loopback plug
connected to the port being tested, the device will have
data transmitted to it and its Control Line toggled.
- The Printer Port does not require a loopback plug.
1) Async Serial Ports
2) Printer Port
Selection (Return to exit):: 2
Ports with faulty Data Lines:
Enter the number of times to loop on this test [1] ::
Printer Port Test
Testing Centronics printer port...OK.
Testing Dataproducts printer port...OK.
1 pass(es) with 0 failure(s)
1) Async Serial Ports
2) Printer Port
Selection (Return to exit)::

```

Pressing `(Return)` after the prompt *Selection (Return to exit)* returns you to the *monitor* prompt.

If you enter the **ports -d** command, only the data lines are tested. The outgoing control lines are asserted during this test.

```
monitor:: ports -d
Individual Port Tests (Data Lines)
Some important notes:
- All Serial Ports (1-72) which are to be tested require
a loopback plug in order to pass the Data Line loopback
tests. WARNING. If there is a device instead of a loopback
plug connected to the port being tested, the device will
have data transmitted to it.
- The Printer Port does not require a loopback plug.
1) Async Serial Ports
2) Printer Port
Selection (Return to exit)::
```

## sequence

The **sequence** command edits the load/dump interface list. This list determines the order of the network interfaces, and either the local area network (LAN) or the SLIP interface the Remote Annex 4000 will use for loading and dumping. The default, **net**, uses the LAN interface. The list can contain up to four interfaces. If the Remote Annex 4000 fails to boot using the first interface, it will try the next, and then the next interface, and then repeat the sequence. The command syntax is:

```
sequence [-d] | [interface[,interface] . . .]
```

Specify the LAN interface by selecting **net**; specify each SLIP interface as **slnn**, where *nn* is a port number; and specify self-boot by selecting **self**. Separate each interface with a comma or a space. Enter the interface list as an argument to the command, otherwise the console displays a list of available interfaces and prompts for a new list.

In the following example, interfaces are assigned to the load/dump sequence list. Ports 2, 4, and 5 can be added to the list because they were configured earlier as SLIP interfaces:

```
monitor:: sequence
Enter a list of 1 to 4 interfaces to attempt to use for
downloading code or upline dumping. Enter them in the order
they should be tried, separated by commas or spaces.
Possible interfaces are:
    Ethernet: net
    SL/IP:s12,s14,s15
    SELF: self
Enter interface sequence [net]:: s12, net
Interface sequence: s12,net
```



The SELF option appears only if the self-boot image is loaded.

The **sequence -d** command displays the current load/dump interface list. You cannot specify both the **-d** argument and the interface list with the same command. The command display looks like this:

```
monitor:: sequence -d
      Interface sequence: sl2,net
```

Entering a number for a port that has not been properly configured for SLIP causes the *Port nn is not configured for SLIP* message to display, where *nn* is the port number.

## slip

The **slip** command defines a serial port as a Serial Line Internet Protocol (SLIP) interface. The command automatically sets the number of data bits to 8 for all SLIP interfaces. The number of data bits does not include the start, stop, or parity bits. [Table 3-2](#) lists the information for which the **slip** command prompts. The syntax is:

**slip** [-d] [port]

The **slip -d** command displays all of the current settings.

After entering the **slip** command, you are prompted for each parameter. The *port* is the number of the serial port to be configured with this command. If you do not enter a port number, you are prompted for one. The **slip** command display looks like this:

```
monitor:: slip
Line number (1-16)::6
Allow SL/IP on this port? (y/n) [n]::y
Enter local endpoint address [0.0.0.0]::192.9.200.214
Local endpoint address: 192.9.200.214
Enter subnet mask [255.0.0.0]::
Constructed new subnet mask.
Enter remote endpoint address [0.0.0.0]::192.9.200.0
Remote endpoint address: 192.9.200.0
Enter remote load/dump host address [default
192.9.200.88]::
Remote load/dump host address: 192.9.200.88
Should this interface be used for memory dumps? (y/n) [y]::
Enter the baud rate [9600]::
Enter the number of stop bits (1,1.5,2) [1]::
Enter the parity (none,even,odd) [none]::
```



Pressing **Control-C** interrupts the **slip** command; the parameters remain unchanged until the command completes normally.

Table 3-2. The slip Command Prompts

Prompt	Description
Allow SLIP on this port	Modifies the port's mode. A <b>y</b> response changes the port to a SLIP interface. An <b>n</b> response changes the port's mode to CLI. The port is not available as a SLIP interface and the SLIP parameters are ignored. The default is <b>n</b> .
Enter local endpoint address	Specifies the Remote Annex 4000 Internet address for this SLIP interface. The Remote Annex 4000 boots over the SLIP interface only if this address is set.
Enter remote endpoint address	Specifies the Internet address of the remote end of the SLIP interface.
Enter remote load/dump host address	Specifies the Internet address of the remote host to which load and dump requests are sent. This address is required only if the remote host is a gateway and not the load host. By default, this is the same as the remote end-point address.
Should this interface be used for memory dumps	Enables the Remote Annex 4000 to use a SLIP interface for memory dumps. The default is <b>y</b> .
Enter the baud rate	Specifies the baud rate of the serial interface. The default is 9600.
Enter the number of stop bits	Pressing <input type="button" value="Return"/> accepts the default (one). Generally, SLIP implementations require the default.
Enter the parity	Pressing <input type="button" value="Return"/> accepts the default (none). Generally, SLIP implementations require the default.



## stats

The **stats** command displays current network statistics gathered by the ROM. Use **stats** along with the **boot** command to help isolate problems. [Table 3-3](#) describes the network statistics displayed by the **stats** command. The syntax is:

**stats** [-slip]

The **stats** command display looks like this:

```
monitor:: stats
Ethernet Statistics
Frames Received:    398    Frames Sent:           3
CRC Errors:        0      Carrier Sense Losses: 0
Alignment Errors   0      Clear to Send Losses: 0
Resource Drops:    0      Collisions Detected:   0
Bus Wait Drops:    0      Excessive Collision Losses: 0
Bad Types/Lengths: 0
```

Table 3-3. Network Statistics

Statistic	Description
Frames Received	The number of frames received.
CRC Errors	The number of CRC checksum errors detected.
Alignment Errors	The number of frames received misaligned with a CRC error.
Resource Drops	The number of packets dropped because the ROM code could not buffer them quickly enough. The ROM code cannot always handle back-to-back incoming packets. The Remote Annex 4000 accepts the first response it receives and drops all others. Dropped packets are normal.

*(continued on next page)*

Table 3-3. Network Statistics (continued)

Statistic	Description
Bus Wait Drops	The number of packets dropped due to waiting too long for a bus to become available.
Bad Types/ Lengths	The number of unknown packet types if Ethernet IP encapsulation is being used. The number of packets with illegal lengths if IEEE 802.2/802.3 IP encapsulation is being used.
Frames Sent	The number of frames sent.
Carrier Sense Losses	The number of times packets could not be transmitted because the Remote Annex 4000 lost the Carrier Sense signal – usually the result of excessive traffic on the Ethernet.
Clear to Send Losses	The number of times packets could not be transmitted because the Remote Annex 4000 lost the Clear to Send signal – usually the result of excessive traffic.
Collisions Detected	The number of times the Remote Annex 4000 had to retry transmissions automatically – usually the result of normal Ethernet traffic. These retries do not cause the <b>boot</b> command to display “*.”
Excessive Collision Losses	The number of times the Remote Annex 4000 could not transmit packets because there were too many collisions – usually the result of excessive traffic on the Ethernet. The <b>boot</b> command displays these retries as “*.”

The Remote Annex 4000's front panel has six system LEDs, a **Test** LED, and status LEDs. The system LEDs are labeled **Power**, **Unit**, **Net**, **Attn**, **Load**, and **Active**. The status LEDs are numbered one through eight.

The system LEDs provide information about normal operations and about problems that occur. Use these LEDs and the ROM Monitor commands to diagnose problems.

The status LEDs display port activity during normal operations; each LED supports nine ports. When the Remote Annex 4000 encounters a problem or an internal error condition, these LEDs display error information.



If an error occurs, save the status of these LEDs. Technical support personnel can use this information to diagnose problems.

During power-up and booting, it is more complicated to diagnose problems because they can originate in the Remote Annex 4000, the transceiver, the Ethernet, or the load server host. However, the LEDs provide both a progress report and an error display to assist you in troubleshooting.

This chapter describes power-up and booting, troubleshooting during booting, and the file created from a Remote Annex 4000 dump.

## Power-up and Boot Procedures

The Remote Annex 4000 has two modes of operation: normal and test. Normal mode is the standard operational mode. Test mode provides access to the ROM Monitor commands. Pressing the **Test** switch on the front panel, within 30 seconds of either powering-up or a system reset, puts the Remote Annex 4000 into test mode. When the Remote Annex 4000 is in test mode, the Test button's LED lights.

[Figure 1-6 on page 1-9](#) illustrates the Remote Annex 4000's front panel.

During the power-up and boot sequence, the Remote Annex 4000 runs a set of diagnostics. The system LEDs display the diagnostics' status; the status LEDs light in sequence. The Remote Annex 4000 stops when it detects one of four error conditions (see [Table 4-2](#)). The pattern of the system LEDs identifies the error condition.

### Normal Mode Diagnostics

Following power-up or reset, the Remote Annex 4000 enters normal mode. The following subsections describe both the possible error and error-free conditions that can occur during power-up and booting in normal mode.

## Normal Mode Error-free Sequences

[Table 4-1](#) summarizes the LED display states during error-free power-up in normal mode. The following subsections describe these states.

Table 4-1. Normal Mode Error-free LED States

Activity	Power Green	Unit Green	Net Green	Attn Amber	Load Green	Active Green
N1: LEDs OK	●	×	×	×	×	×
N2: Hardware OK	●	●	×	×	×	■
N3: Network OK	●	●	●	×	×	■
N4: Looking for boot file	●	●	●	×	◆	■
N5: Loading code	●	●	●	×	●	■
N6: Running operational code	●	●	●	×	×	■

Key:

- On continuously.
- × Off.
- Flashing irregularly.
- ◆ Flashing regularly (about 1Hz).

Activity N1: Testing LEDs

All front panel LEDs light for a few seconds, then all but the **Power** LED turn off, confirming that all LEDs are operational.

Activity N2: Testing the Hardware

During the power-up sequence, the Remote Annex 4000 runs a series of self-test diagnostics. These diagnostics test internal hardware functions. The **Power** LED lights for a few seconds, then the **Unit** and **Active** LEDs flash during the power-up self-tests. After the self-tests complete, only the **Unit** and **Power** LEDs remain on.

Activity N3: Testing the Network

The Remote Annex 4000 sends a short packet addressed to itself through the transceiver to test the transceiver and its cable. After passing this test, the **Net** LED flashes and remains on.

Activity N4: Looking for the Boot File

The **Load** LED flashes while the Remote Annex 4000 waits for a load server host to respond to its load request.

Activity N5: Loading the Code

The **Load** LED lights while the Remote Annex 4000 loads its operational code from a load server host.



If a port is set up for *syslogging*, the associated LED will flash when data is output on the port, thus interfering with the normal LED sequence.

Activity N6: Running the Operational Code

The **Load** LED turns off when the proper image is loaded. The operational code has control, and the Remote Annex 4000 is ready.

## Normal Mode Error Sequences

[Table 4-2](#) shows the state of the LEDs when an error occurs at given stages of the start-up process. For example, if the Remote Annex 4000 fails during the testing hardware state (N2), the error condition is hardware failure NE2. A description of possible causes and solutions for each error condition follows [Table 4-2](#).

Table 4-2. Normal Mode Error LED States

Activity	Power Green	Unit Green	Net Green	Attn Amber	Load Green	Active Green
NE2: Hardware failure	●	◆	×	◆	×	×
NE3: Network test failure	●	●	◆	◆	×	■
NE4: No IP address or gateway	●	●	●	◆	◆	×
NE5: Booted wrong image	●	●	●	◆	×	×

Key:

- On continuously.
- × Off.
- Flashing irregularly.
- ◆ Flashing regularly (about 1Hz).

Activity NE2:  
Hardware Failure

The ROM diagnostics detected a Remote Annex 4000 hardware problem requiring service. Call technical support.

Activity NE3:  
Network Test Failure

The Ethernet interface did not pass a simple transceiver loopback test. First, verify that the Ethernet port either is connected to an Ethernet transceiver or has a loopback plug installed. If the test still fails, enter test mode (see *net* on page 3-22 for more details).

Activity NE4: No IP  
Address or  
Gateway

Some of the boot information required in EEPROM is missing. Typically, either the information was never entered or it was erased accidentally. Two EEPROM parameters are required:

- ❑ The Remote Annex 4000's Internet address.
- ❑ The load/dump gateway required to reach the preferred load server host when the preferred host is on a different network or subnet from the Remote Annex 4000.

The Remote Annex 4000 runs the ROM Monitor **addr** command automatically, allowing you to enter the missing parameter(s). When you are finished, the unit continues with the load or dump and returns to normal mode at the end of the boot.

If the IP address or load/dump gateway address is lost during normal operation, i.e., not through operator error, the Remote Annex 4000 may require service.

Activity NE5:  
Booted Wrong  
Image

The Remote Annex 4000 has just loaded an inappropriate image. A system reset clears this error. The Remote Annex 4000 loads inappropriate images if one of the following operator errors occurs:

- ❑ Configuring the Remote Annex 4000 with an incorrect file name, or renaming or copying the image file to the wrong name.
- ❑ Supplying the wrong name to any of the boot commands (**na boot**, **dumpboot**, or the superuser CLI **boot**).

If you are uncertain as to why the Remote Annex 4000 booted the wrong image, enter test mode and issue an **image -d** command. This command shows which host file the unit is trying to load.



## Test Mode Diagnostics

### Test Mode

Pressing the **Test** switch within 3 seconds of either cycling on power or resetting the unit via the Test switch puts the Remote Annex 4000 into test mode.

### Test Mode Error-free Sequence

[Table 4-3](#) summarizes the LED sequences that display in test mode during an error-free start-up. A description of each sequence follows [Table 4-3](#).

Table 4-3. Test Mode Error-free LED States

Activity	Power Green	Unit Green	Net Green	Attn Amber	Load Green	Active Green
T1: Testing LEDs	●	●	●	●	●	●
T2: Testing hardware	●	■	×	×	×	■
T3: Testing network	●	●	■	×	×	■
T4: At monitor prompt	●	●	●	●	×	■
T5: Looking for boot file	●	●	●	●	◆	■
T6: Loading code using the <b>boot</b> command	●	●	●	×	●	■
T7: Running operational code	●	●	●	×	×	■

Key:

- |   |                  |   |                                 |
|---|------------------|---|---------------------------------|
| ● | On continuously. | ■ | Flashing irregularly.           |
| × | Off.             | ◆ | Flashing regularly (about 1Hz). |

Activity T1: Testing LEDs

All front panel LEDs light for a few seconds, then all but the **Power** LED turn off. This sequence confirms that all LEDs are operational. At this point, the Remote Annex 4000 is in normal mode. Press the **Test** switch to set the Remote Annex 4000 for the next activity.

Activity T2: Testing the Hardware

During power-up, the Remote Annex 4000 runs self-tests that execute CPU diagnostics, ROM and EEPROM checksums, internal serial port and LAN loopbacks, and RAM tests. The **Unit** and **Active** LEDs flash during the power-up tests. After completing the power-up self-tests, only the **Unit** and **Power** LEDs remain on.

Activity T3: Testing the Network

The Remote Annex 4000 sends a short packet addressed to itself through the transceiver to test the transceiver and its cable. The **Net** LED flashes during the test. After completing the test, the **Net** LED remains on.

Activity T4: At the Monitor Prompt

When the **Power**, **Unit**, **Net**, and **Attn** LEDs are on, the ROM Monitor prompt displays on the console terminal. Enter the **boot** command at the prompt. If you did not enter a file name with the command, you are prompted for one.

Activity T5: Looking for the Boot File

The **Load** LED flashes and the **Attn** LED remains on while the Remote Annex 4000 waits for a response to its load request from a load server host.

Activity T6: Loading Code with the boot Command

The **Load** LED lights when the Remote Annex 4000 tries to load from a load server host. The Remote Annex 4000 loads its operational code when a host responds. The console terminal displays messages describing the boot request and the boot process.

Activity T7: Running Operational Code

After the Remote Annex 4000 loads the proper image, the **Load** LED turns off. The Remote Annex 4000 is ready.

## Test Mode Error Sequences

[Table 4-4](#) describes the state of the LEDs if errors occur at different stages of the start-up process. For example, if the Remote Annex 4000 fails while testing the hardware (state T2), the error condition is hardware failure TE2. A description of each error condition follows [Table 4-4](#).

Table 4-4. Test Mode Error LED States

Activity	Power Green	Unit Green	Net Green	Attn Amber	Load Green	Active Green
TE2: Hardware failure	●	◆	×	◆	×	×
TE3: Network test failure	●	●	◆	×	×	■
TE4: Network test aborted or <b>net</b> command failed	●	●	×	◆	×	■
TE7: Booted wrong image	●	●	●	◆	×	×

### Key:

- On continuously.
- ×
- Flashing irregularly.
- ◆ Flashing regularly (about 1Hz).

Activity TE2:  
Hardware Failure

The ROM diagnostics detected a Remote Annex 4000 hardware problem requiring service. Call technical support.

Activity TE3:  
Network Test Failure

The Ethernet interface did not pass a simple transceiver loopback test. First, verify that the Ethernet port either is connected to an Ethernet transceiver or has a loopback plug installed. If the test still fails, type **q** on the console to access the ROM Monitor prompt. See *net* on page 3-22 for more information on isolating the problem.

Activity TE4:  
Network Test was  
Aborted or the net  
Command Failed

The Ethernet loopback test failed and the user typed **q** to access the ROM Monitor prompt.

Activity TE7: Booted  
Wrong Image

The Remote Annex 4000 loaded an inappropriate image. Pressing the Reset switch clears this error. The Remote Annex 4000 loads inappropriate images if one of the following operator errors occurs:

- ❑ Configuring the Remote Annex 4000 with an incorrect file name, or renaming or copying the image file to the wrong name.
- ❑ Supplying the wrong name to the **boot** command.

## Boot Failures

The procedures for troubleshooting a power-up failure established that:

- ❑ The hardware is functional.
- ❑ The Ethernet interface is functional.
- ❑ The Remote Annex 4000 can communicate with the Ethernet.

If the Remote Annex 4000 still is not booted, you must pinpoint the problem. The *boot error report* can help in this process.



The Remote Annex 4000 generates and displays a *boot error report* only if it has opened the boot file and an error occurs during the boot process.

Generally, two problems cause boot failures: the Remote Annex 4000 is not configured properly, or the load server host is not responding. The Remote Annex 4000 requests a boot either from a pre-defined load host, or by broadcasting its boot request. When a host responds, the Remote Annex 4000 loads its operational code.

The Remote Annex 4000 requires setting certain configuration parameters. Enter these parameters using the ROM Monitor commands for the initial boot sequence. See Chapter 3 for more information on these commands.

If the problem is a non-responsive host, the boot error report displays that information under the *Rsp T/O's* field. This field indicates that the Remote Annex 4000 timed out while waiting for a response to its boot request; if this field is empty, check the Remote Annex 4000's configuration parameters.

## Boot Error Report

If an error occurs, a *boot error report* is generated *only* if the Remote Annex 4000 has opened the boot file. The report is displayed using the following format:

```
BOOT ERROR REPORT (for BFS files only)
Boot attempt from host nn.nn.nn.nn:
Errors from Last Open Request:
0 ARP errors 0 ERPC layer errors 0 Aborts rx'd
Errors from Last Read Request:
0 Msgs w/ wrong size 0 ERPC layer errors 0 Aborts rxd
Errors from Last ERPC Layer Invocation:
0 H/W errors 1 Msgs from wrong host 0 Rsp T/O's 0 Msgs of wrong type
```



TFTP error reporting complies with the standard, predefined TFTP error codes.

The Remote Annex 4000 generates a boot error report for the Internet address from which it tried, and failed, to boot.

The error count pinpoints the error that caused the boot failure. For example, if the boot failed during a Read Request due to excessive Expedited Remote Procedure Call (ERPC) layer errors, the Errors from Last ERPC Layer Invocation lists only errors that occurred during the failed Read Request (see [Table 4-5](#)). The report does not list errors that occurred during any other Read Request (see [Table 4-6](#)) or during the Open Request (see [Table 4-7](#)).

The Open Request and the Read Request layers communicate with the block file server (BFS) on the host. The ERPC layer resides below the Open Request and the Read Request layers. It is responsible for sending a given message to a specific host UDP port, and for receiving the correct response to that message from the port.

Table 4-5. Errors from Last ERPC Layer Invocation

Error	Description
H/W errors	The Remote Annex 4000 sensed a hardware error during message transmission or reception. This error indicates a fault with the Remote Annex 4000, the transceiver cable, or the transceiver. Use the <b>net</b> command to isolate the problem (see <a href="#">net</a> on page 3-22).
Msgs from wrong host	The Remote Annex 4000 received a message from an incorrect host. This indicates that the Remote Annex 4000 received, and ignored, an unsolicited packet.
Rsp T/O's	The Remote Annex 4000 never received a correctly formatted response from the correct host, or any response from any load server hosts.
Msgs of wrong type	The correct host sent a message to the Remote Annex 4000, but the message was not a correctly formatted response to the transmitted request.

Table 4-6. Errors from Last Read Request

Error	Description
Msgs with wrong size	The correct host responded to the Read Request, but the data size is incorrect.
ERPC layer errors	See <a href="#">Table 4-5</a> .
Aborts rx'd	The host's BFS transmitted an abort in response to the Remote Annex 4000's Read Request. Run <b>erpcd -D</b> on the host to obtain more information.

Table 4-7. Errors from Last Open Request

Error	Description
ARP errors	Address Resolution Protocol (ARP) errors indicate that the Remote Annex 4000 is configured to boot from a specified host, but the host would not transmit its Ethernet address to the Remote Annex 4000. Possibly, the Remote Annex 4000 configuration includes the wrong IP encapsulation.
ERPC layer errors	See <a href="#">Table 4-5</a> .
Aborts rx'd	The host's BFS transmitted an abort in response to the Remote Annex's Open Request. This often means that the requested file does not exist on that server. Run <code>erpcd -D</code> on the host to obtain more information.

## Correcting Remote Annex 4000 Parameters

The following parameters must accurately reflect both the Remote Annex 4000 and the network environment in which it operates. Verify the Remote Annex 4000's IP address using the `addr` command. If your network configuration does not support the factory defaults, verify the following parameters using the `addr` command:

- ❑ The broadcast address.
- ❑ The subnet mask.
- ❑ The load/dump gateway address (which must be specified if the preferred load server host is located on another network or subnet).
- ❑ The IP encapsulation type. Many systems have hardware Ethernet interfaces that are IEEE 802.3 compliant, but very few actually do 802.3 IP packet encapsulation. Use the default, Ethernet, unless you know absolutely that your LAN does 802.2/802.3 IP packet encapsulation.



Unless otherwise stated, if you are using a SLIP interface to boot the Remote Annex 4000, obtain the following information using the **slip** command:

- ❑ Whether the port is configured as a SLIP interface.
- ❑ The default Internet address for the SLIP network interface.
- ❑ The default Internet address for the remote end of the SLIP connection.
- ❑ The default Internet address for the load/dump host (this must be specified if the remote end is a gateway and not a load host).
- ❑ Whether the SLIP network interface is included in the load/dump interface list (use the **sequence** command).
- ❑ The baud rate.
- ❑ The number of stop bits.
- ❑ The parity.

You can use the defaults for the name of the image file containing the Remote Annex 4000's software and the address of the preferred load server host. If the value for the image name is incorrect, the Remote Annex 4000 cannot boot. Correct the name using the **image** command. If the address for the preferred load server host is incorrect, the boot takes longer, since the Remote Annex 4000 has to broadcast for a host. Correct the load host's address using the **addr** command.

Confirm that the Remote Annex 4000 boot parameters are correct by using the appropriate ROM Monitor commands. Modify any boot parameters that are incorrect or missing. Boot the Remote Annex 4000 either by entering the **boot** command at the console, or by holding down the **Test** button until the **Power** LED blinks rapidly and then releasing the **Test** button.

## Load Server Host Not Responding

The Remote Annex 4000 can boot from one of six types of hosts acting as a load server host:

- ❑ Novell Server.
- ❑ A UNIX host on the local area network.
- ❑ A UNIX host at the end of a SLIP interface.
- ❑ Another Remote Annex 4000.
- ❑ A VAX VMS load server host.
- ❑ Any host (UNIX or non-UNIX) using **tftp**.

The following subsections discuss troubleshooting for some of these load server hosts.

### UNIX Host on the LAN

When troubleshooting a UNIX host on the LAN, make sure that:

- ❑ The host is booted and functioning properly.
- ❑ The host can communicate with other network nodes using standard UNIX networking features and utilities.
- ❑ All Remote Annex 4000 software is installed properly on the host. See the *Annex Software Installation Notes* that come with the Remote Annex 4000 software release.
- ❑ The **erpcd** daemon or **tftp** server, which loads the operational image to the Remote Annex 4000, is running.

In test mode, both the Remote Annex 4000 and **erpcd** on the load server host display boot progress reports. The Remote Annex 4000 displays its reports on the console; **erpcd** displays its reports on the UNIX terminal that invokes test mode.

- 1 To place `erpcd` on the load server host into test mode, kill the `erpcd` program (requires superuser privileges) and restart it using the `-D` option:

```
# /etc/erpcd -D5
```

- 2 To place the Remote Annex 4000 into test mode, hold down the Test button until the Power LED blinks rapidly, then release the Test button and press it again within 3 seconds. (This resets the Annex, so warn users before you do it.) Then enter:

```
# boot -v
```

When the Remote Annex 4000 boots in test mode, the console displays the load server host's Internet address, and indicates whether it receives a response to its Open File Request and to any of its Read File Requests. The host's progress report indicates receipt of any File Server Requests and its responses to such requests. The host displays `erpc_return 0` if it successfully receives a request and is sending out an affirmative response. If any Remote Annex 4000-related files are missing or cannot be installed, contact technical support (see Appendix C).

### UNIX Host on a SLIP Interface

When troubleshooting a UNIX host at the end of a SLIP network interface, make sure:

- ❑ The host is booted and functioning properly.
- ❑ The SLIP link is connected correctly.
- ❑ The Internet addresses are correct for both sides of the SLIP link.
- ❑ All Remote Annex 4000 software is installed properly on the host. (see the *Software Installation Notes* that accompany your software release).
- ❑ The `erpcd` daemon or `tftp` server, which loads the operational image to the Remote Annex 4000, is running.

A PC host running the UNIX operating system has both the **erpcd** and **slipd** daemons (provided with the distribution and installed in **/etc**) running in the background on the PC. Set the Remote Annex 4000 and the **erpcd** on the load host into test mode:

- 1 For **erpcd** on the load server host, as superuser, kill the **erpcd** program and restart it using the **-D** option:

```
# /usr/annex/erpcd -D5
```

- 2 For the Remote Annex 4000, hold down the **Test** button until the Power LED blinks rapidly, then release the **Test** button and press it again within 3 seconds. Then enter:

```
# boot -v
```

### Another Remote Annex 4000

When troubleshooting a Remote Annex 4000 configured as a load server host:

- 1 Use the CLI telnet command to access the unit and verify that it is up and running.
- 2 Communicate with the unit on the Ethernet using the superuser CLI ping command.
- 3 Verify the unit's configuration using the **na** utility.

The *Remote Annex Administrator's Guide for UNIX* provides more information on these commands.

A Remote Annex 4000 that has been reconfigured as a load server host, but not rebooted, cannot boot another Remote Annex 4000 on the network. Rebooting the Remote Annex 4000 load server host ensures that the parameters are set.

## VAX VMS Load Host on the LAN

If the installation was successful and the NCP CIRCUIT SERVICE is enabled, but the Remote Annex still fails to boot, performing the following steps may locate your problem:

- 1 Make sure that the file OPER\_46\_ENET.SYS is in the directory MOM\$LOAD and the file protection allows reading.
- 2 Enter the system manager account and enable console logging to see the MOP boot requests, as in the following example:

```

$reply/enable
$
%%%%%%%% OPCOM 23-DEC-1994 08:3.37 %%%%%%%%%
Operator_NTA2: has been enabled, username TOPAZ
$
$
%%%%%%%% OPCOM 23-DEC-1994 08:0.49 %%%%%%%%%
Operator status for operator _NTA2:
CENTRAL, PRINTER, TAPES, DISKS, DEVICES, CARDS, NETWORK,
CLUSTER, SSECURITY, LICENSE, OPER1, OPER2, OPER3, OPER4,
OPER5, OPER6, OPER7, OPER8, OPER9, OPER10, OPER11, OPER12
$
$
%%%%%%%% opcom 23-DEC-1994 08:03:43.55 %%%%%%%%%
Message from user DECNET
DECnet event 0.3, automatic line service
From node 1.69 (BINGO), 23-DEC-1994 08.03.43.52
Circuit SVA-0, Load, requested, Node =2.69 (BART)
File = MOM$SYSTEM_SOFTID:OPER_46_ENET.SYS,Operating System
Ethernet address = 00-80-2D-00-1A-DE
$
%%%%%%%% opcom 23-DEC-1994 08:03:50.55 %%%%%%%%%
Message from user DECNET
DECnet event 0.3, automatic line service
From node 1.69 (BINGO), 23-DEC-1994 08.03.50.52
Circuit SVA-0, Load, Successful, Node =2.69 (BART)
File = MOM$SYSTEM_SOFTID:OPER_46_ENET.SYS,Operating System
Ethernet address = 00-80-2D-00-1A-DE

```

## Remote Annex 4000 Dumps

The Remote Annex 4000 dumps its memory image to a host running load server software when certain software or hardware events occur. [Table 4-8](#) shows the LED states during a dump.



Dump files are generated for use by technical support personnel only.

Events that trigger Remote Annex 4000 dumps are:

- Non-recoverable hardware or software errors.
- Software fails to reset the Remote Annex 4000's watchdog timer.
- Software fails one or more internal consistency checks.
- Hardware detects an internal fault.

Table 4-8. LED States During a Dump

Activity	Power Green	Unit Green	Net Green	Attn Amber	Load Green	Active Green
Dump	●	●	●	●	●	■

Key:

- On continuously.
- Flashing irregularly.

The Remote Annex 4000 sends a dump file to a preferred load dump host. If you do not define this host by specifying an address, the Remote Annex 4000 broadcasts a request and dumps to the first host that responds.

The Remote Annex sends a dump to the **/usr/spool/erpcd/bfs** directory on the dump host. The **/usr/spool/erpcd/bfs** directory is a default pathname and can be changed. The receiving Remote Annex assigns a unique file name for each device that it receives a dump from but not for each crash dump.



Rename any crash dumps that you want to save. The Remote Annex 4000 overwrites crash dumps.

The assigned name depends on the number of characters per file name that the dump host supports. For hosts supporting file names longer than 14 characters (e.g., BSD hosts), dump files are named **dump.addr**. The file extension **addr** is the Remote Annex 4000's IP address.

For hosts that limit file names to 14 characters (e.g., System V hosts), a dump creates two additional directories under **/usr/spool/erpcd/bfs**. The name of the first directory is **dump**; the second directory uses the Remote Annex 4000's IP network address as its name. The dump file uses the Remote Annex 4000's IP host address as its name.



The **tftp** dump names are user-defined. If a name is not specified, the Remote Annex 4000 uses the **bfs** convention.

Each dump file contains a complete image of the Remote Annex 4000 RAM memory and hardware state. The amount of space required for a dump file varies according to the port configuration. The ROM Monitor **config** command displays the amount of memory for the Remote Annex 4000.

[Table 4-9](#) shows sample dump file names. All pathnames are relative to the file **/usr/spool/erpcd/bfs**.

Table 4-9. Dump File Naming Conventions

Remote Annex 4000 Address	Network Address	BSD Filename	System V Pathname
63.0.0.75	63	dump.63.0.0.75	dump/63/0.0.75
131.140.23.1	131.140	dump.131.140.23.1	dump/131.140/23.1
195.46.2.15	195.46.2	dump.195.46.2.15	dump/195.46.2/15



This appendix identifies the signals and the associated pins used by the following Remote Annex 4000 ports:

- ❑ *Console Port.*
- ❑ *10Base2 Ethernet Port.*
- ❑ *10Base5 Ethernet Port.*
- ❑ *10BaseT Ethernet Port.*
- ❑ *Serial Port.*
- ❑ *Parallel Printer Port.*

## Console Port

[Figure A-1](#) illustrates the RJ45 console port. [Table A-1](#) lists the RJ45 console port pin/signal allocations.

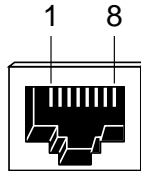


Figure A-1. RJ45 Console Port

Table A-1. RJ45 Console Port Pin/Signal Allocations

Pin Number	Signal
1	Reserved
2	DTR
3	TXD
4	DCD
5	RXD
6	GND
7	Reserved
8	Reserved

## 10Base2 Ethernet Port

Figure A-2 illustrates a 10Base2 BNC Ethernet port.

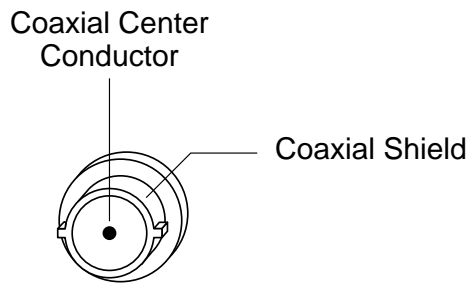


Figure A-2. 10Base2 BNC Ethernet Port

## 10Base5 Ethernet Port

[Figure A-3](#) illustrates a 10Base5 Ethernet transceiver port. [Table A-2](#) lists the connector's pin/signal allocations.

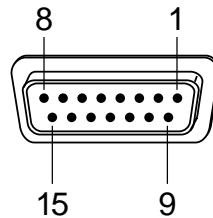


Figure A-3. 10Base5 Ethernet Port

Table A-2. 10Base5 Ethernet Port Pin/Signal Allocation

Pin Number	Signal
1	Chassis ground
2	Collision +
3	Transmit +
4	NC
5	Receive +
6	Ground (for transceiver power)
7-8	NC
9	Collision -
10	Transmit -
11	NC
12	Receive -
13	+ 12 volts (for transceiver power)
14-15	NC

# 10BaseT Ethernet Port

Figure A-4 illustrates a 10BaseT RJ45 Ethernet port receptacle. Table A-3 lists the receptacle’s pin/signal allocations.

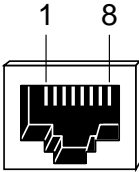


Figure A-4. 10BaseT RJ45 Ethernet Port

Table A-3. 10BaseT Ethernet Port Pin/Signal Allocations

RJ45 Pin	Signal
1	TXD +
2	TXD -
3	RXD +
4	NC
5	NC
6	RXD -
7	NC
8	NC

## Serial Port

[Figure A-5](#) illustrates a serial port connector. [Table A-4](#) lists the connector's pin/signal allocations.

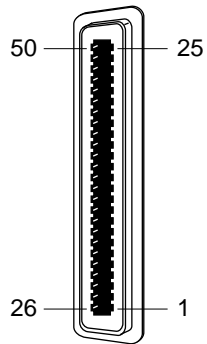


Figure A-5. Serial Port Receptacle

Table A-4. Serial Port Pin/Signal Allocations

Pin	Signal	Pin	Signal
1	DCD1	26	RXD1
2	GND	27	TXD1
3	DSR1	28	DTR1
4	RTS1	29	CTS1
5	DCD2	30	RXD2
6	GND	31	TXD2
7	DSR2	32	DTR2
8	RTS2	33	CTS2
9	DCD3	34	RXD3
10	GND	35	TXD3
11	DSR3	36	DTR3
12	RTS3	37	CTS3
13	DCD4	38	RXD4
14	GND	39	TXD4
15	DSR4	40	DTR4
16	RTS4	41	CTS4
17	DCD5	42	RXD5
18	GND	43	TXD5
19	DSR5	44	DTR5
20	RTS5	45	CTS5
21	DCD6	46	RXD6
22	GND	47	TXD6
23	DSR6	48	DTR6
24	RTS6	49	CTS6
25	NC	50	NC

## Parallel Printer Port

[Figure A-6](#) illustrates a parallel printer port. [Table A-5](#) lists the port's pin/signal allocations.



The Remote Annex 4000 does not use a standard Dataproducts interface.

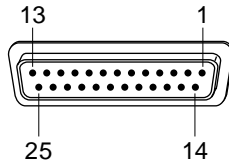


Figure A-6. Parallel Printer Port

Table A-5. Parallel Printer Port Pin/Signal Allocations

Pin	Centronics Signal	Dataproducts Signal
1	Data Strobe (low true)	Data Strobe (high true)
2	Data 1	Data 1
3	Data 2	Data 2
4	Data 3	Data 3
5	Data 4	Data 4
6	Data 5	Data 5
7	Data 6	Data 6
8	Data 7	Data 7
9	Data 8	Data 8
10	Acknlg (low true)	NC
11	Busy	Demand
12	PE	VFU Verify
13	SLCT	On-line
14	NC	Paper Inst.
15	Fault (low true)	Ready
16	Input Prime (low true)	Buffer CLR
17	NC	Ident0
18	NC	Ident1
19	Ground	Ground
20	NC	VFU_RDY
21–25	Ground	Ground



This appendix describes the wiring for the following cables and connectors:

- ❑ *Serial Port Cables.*
- ❑ *Printer Cables.*
- ❑ *Loopback Connectors.*

The accessory kit includes the loopback connectors; it does not supply the serial port and printer cables.

## Serial Port Cables

The Remote Annex 4000 is a DTE system that conforms to a 6-channel, 8-wire USOC wiring standard.

### Fan-out Cable

The 50-pin PBX Champ connector (male 90°) fans out to six individual ports. Each of the six ports can be connected to an asynchronous serial device. [Figure B-1](#) illustrates the fan-out cable.

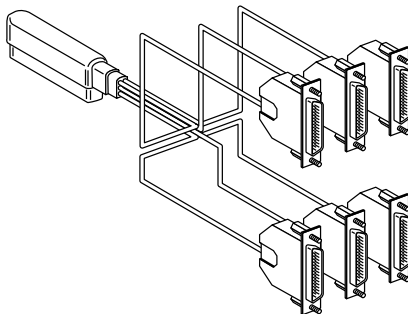


Figure B-1. Fan-out Cable

This cable can be purchased as a shielded or unshielded cable.

❑ **Shielded Cables**

Shielded cables are required to conform to VDE-B EMI limits. Shielded cables convert 6-port Remote Annex 4000 Champs to six DB25 RS232 connectors. The connectors can be male or female and are available from Xylogics.

❑ **Unshielded Cable**

Unshielded cables are available as off-the-shelf parts through a distributor. These cables convert the 50-pin PBX Champ connector to six RJ45 plugs. You can also obtain RJ45 to DB25 adapters for use with unshielded cables.

### Wiring for the PBX to DB25 Terminal Cable Connections

[Table B-1](#) shows the wiring for the PBX to female DB25 terminal (DTE) connectors.

Table B-1. PBX to DB25 Terminal Cable Connections

PBX Pin	Remote Annex 4000 Signal	DB25 Port-Pin	Terminal Signal
1	DCD1	P1-20	DTR1
2	GND	P1-7	GND
3	DSR1	P1-20	DTR1
4	RTS1	P1-5	CTS1
5	DCD2	P2-20	DTR2
6	GND	P2-7	GND2
7	DSR2	P2-20	DTR2
8	RTS2	P2-5	CTS2
9	DCD3	P3-20	DTR3
10	GND	P3-7	GND3

*(continued on next page)*

Table B-1. PBX to DB25 Terminal Cable Connections

PBX Pin	Remote Annex 4000 Signal	DB25 Port-Pin	Terminal Signal
11	DSR3	P3-20	DTR3
12	RTS3	P3-5	CTS3
13	DCD4	P4-20	DTR4
14	GND	P4-7	GND4
15	DSR4	P4-20	DTR4
16	RTS4	P4-5	CTS4
17	DCD5	P5-20	DTR5
18	GND	P5-7	GND5
19	DSR5	P5-20	DTR5
20	RTS5	P5-5	CTS5
21	DCD6	P6-20	DTR6
22	GND	P6-7	GND6
23	DSR6	P6-20	DTR6
24	RTS6	P6-5	CTS6
26	RXD1	P1-2	TXD1
27	TXD1	P1-3	RXD1
28	DTR1	P1-6, P-8	DSR1, DCD1
29	CTS1	P1-4	RTS1
30	RXD2	P2-2	TXD2
31	TXD2	P2-3	RXD2
32	DTR2	P2-6, P-8	DSR2, DCD2
33	CTS2	P2-4	RTS2
34	RXD3	P3-2	TXD3
35	TXD3	P3-3	RXD3

*(continued on next page)*

Table B-1. PBX to DB25 Terminal Cable Connections (continued)

PBX Pin	Remote Annex 4000 Signal	DB25 Port-Pin	Terminal Signal
36	DTR3	P3-6, P-8	DSR3, DCD3
37	CTS3	P3-4	RTS3
38	RXD4	P4-2	TXD4
39	TXD4	P4-3	RXD4
40	DTR4	P4-6, P-8	DSR4, DCD4
41	CTS4	P4-4	RTS4
42	RXD5	P5-2	TXD5
43	TXD5	P5-3	RXD5
44	DTR5	P5-6, P-8	DSR5, DCD5
45	CTS5	P5-4	RTS5
46	RXD6	P6-2	TXD6
47	TXD6	P6-3	RXD6
48	DTR6	P6-6, P-8	DSR6, DCD6
49	CTS6	P6-4	RTS6

## Wiring for the PBX to DB25 Modem Cable Connections

**Table B-2** shows the wiring for the PBX to male DB25 modem (DCE) connectors.

Table B-2. PBX to DB25 Modem Cable Connections

PBX Pin	Remote Annex 4000 Signal	DB25 Port-Pin	Modem Signal
1	DCD1	P1-8	DCD1
2	GND	P1-7	GND1
3	DSR1	P1-6	DSR1
4	RTS1	P1-4	RTS1
5	DCD2	P2-8	DCD2
6	GND	P2-7	GND2
7	DSR2	P2-6	DSR2
8	RTS2	P2-4	RTS2
9	DCD3	P3-8	DCD3
10	GND	P3-7	GND3
11	DSR3	P3-6	DSR3
12	RTS3	P3-4	RTS3
13	DCD4	P4-8	DCD4
14	GND	P4-7	GND4
15	DSR4	P4-6	DSR4
16	RTS4	P4-4	RTS4
17	DCD5	P5-8	DCD5
18	GND	P5-7	GND5
19	DSR5	P5-6	DSR5
20	RTS5	P5-4	RTS5
21	DCD6	P6-8	DCD6
22	GND	P6-7	GND6

*(continued on next page)*

Table B-2. PBX to DB25 Modem Cable Connections (continued)

PBX Pin	Remote Annex 4000 Signal	DB25 Port-Pin	Modem Signal
23	DSR6	P6-6	DSR6
24	RTS6	P6-4	RTS6
26	RXD1	P1-3	RXD1
27	TXD1	P1-2	TXD1
28	DTR1	P1-20	DTR1
29	CTS1	P1-5	CTS1
30	RXD2	P2-3	RXD2
31	TXD2	P2-2	TXD2
32	DTR2	P2-20	DTR2
33	CTS2	P2-5	CTS2
34	RXD3	P3-3	RXD3
35	TXD3	P3-2	TXD3
36	DTR3	P3-20	DTR3
37	CTS3	P3-5	CTS3
38	RXD4	P4-3	RXD4
39	TXD4	P4-2	TXD4
40	DTR4	P4-20	DTR4
41	CTS4	P4-5	CTS4
42	RXD5	P5-3	RXD5
43	TXD5	P5-2	TXD5
44	DTR5	P5-20	DTR5
45	CTS5	P5-5	CTS5
46	RXD6	P6-3	RXD6
47	TXD6	P6-2	TXD6
48	DTR6	P6-20	DTR6
49	CTS6	P6-5	CTS6

### Serial Cable Wiring Diagrams

Figure B-2, Figure B-3, and Figure B-4 illustrate the pin numbers and signal directions for the standard Remote Annex 4000 fan-out and console cable's 25-way connectors.

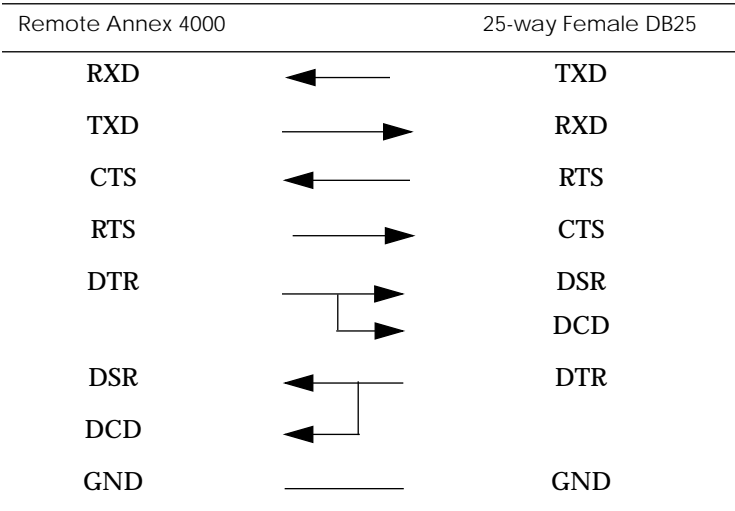


Figure B-2. DTE Crossover Terminal Cable

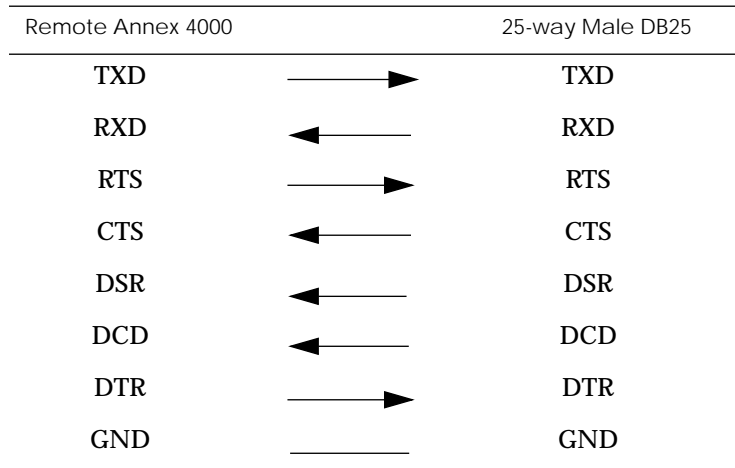


Figure B-3. DCE Straight-Through Modem Cable

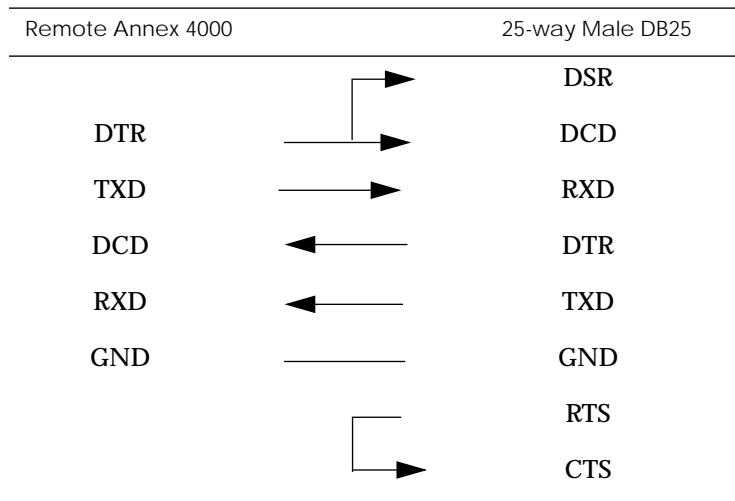


Figure B-4. RJ45 Console to DTE Terminal



# Printer Cables

Centronics Printer Cable

The Remote Annex 4000 uses a standard Centronics interface. [Table B-3](#) shows the cable connections.

Table B-3. Centronics Printer Cable Connections

25-Pin Male D-type Pin Number	36-Pin Male PBX Champ Pin Number
Shell	17
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
15	32
16	31
19	19–24
25	25–29

Dataproducts  
Printer Cable

The Remote Annex 4000 does not use a standard Dataproducts interface. [Table B-4](#) shows this custom cable’s connections.

Table B-4. Dataproducts Printer Cable Connections

25-Pin Male D-type Pin Number	50-Pin Male Dataproducts Connector Pin Number
1	38
2	19
3	20
4	1
5	41
6	34
7	43
8	36
9	28
10	NC
11	23
12	47
13	21
14	30
15	22
16	31
17	50
18	49
19	15, 45, 6, 14
20	26
21	5, 7, 48
22	35, 42
23	18, 40
24	2, 4
25	3, 37

## Loopback Connectors

10Base2 Ethernet  
Loopback  
Connector

The 10Base2 loopback connector is a 22-Ohm BNC terminator plug. The connector comprises a 22-Ohm resistor connected between the BNC plug's center coaxial line and shield.

10Base5 Ethernet  
Loopback  
Connector

The 15-pin male Ethernet 10Base5 loopback connector is equipped with an LED that confirms the presence of the +12-volt transceiver drive voltage. [Table B-5](#) shows this connector's pin/signal allocations.

Table B-5. 10Base5 Ethernet Loopback Connector

Pin Number	Remote Annex 4000 Signal	Connects to Pin Number	Signal
3	Transmit +	5	Receive +
10	Transmit -	12	Receive -

10BaseT Ethernet  
Loopback  
Connector

[Table B-6](#) lists the 10BaseT Ethernet connector's pin/signal allocations.

Table B-6. 10BaseT Ethernet Loopback Connector Wiring

Pin Number	Remote Annex 4000 Signal	Connects to Pin Number	Signal
1	Transmit +	3	Receive +
2	Transmit -	6	Receive -

PBX Loopback Connector

The 50-pin male (90°) PBX loopback connector loops the following signals: Transmit and Receive; RTS and CTS; and DTR, DCD, and DSR. [Table B-7](#) shows the PBX loopback connector's pin/signal allocations.

Table B-7. PBX Loopback Connector Wiring

Pin Number	Remote Annex 4000 Signal	Connects to Pin Number	Signal
26	RXD1	27	TXD1
4	RTS1	29	CTS1
28	DTR1	1, 3	DCD1, DSR1
30	RXD2	31	TXD2
8	RTS2	33	CTS2
32	DTR2	5, 7	DCD2, DSR2
34	RXD3	35	TXD3
12	RTS3	37	CTS3
36	DTR3	9, 11	DCD3, DSR3
38	RXD4	39	TXD4
16	RTS4	41	CTS4
40	DTR4	13, 15	DCD4, DSR4
42	RXD5	43	TXD5
20	RTS5	45	CTS5
44	DTR5	17, 19	DCD5, DSR5
46	RXD6	47	TXD6
24	RTS6	49	CTS6
48	DTR6	21, 23	DCD6, DSR6

## Appendix C Port Upgrade Instructions

The Remote Annex 4000 port upgrade kit allows you to upgrade the number of ports by adding or swapping a Serial Line Controller (SLC). These installation instructions provide the following:

- ❑ *Contents of the Kit.*
- ❑ *Disassembly Instructions.*
- ❑ *Installation Instructions.*
- ❑ *Assembly Instructions.*
- ❑ *Power-up and Test.*

### Contents of the Kit

The Remote Annex 4000 port upgrade kit contains:

- ❑ One serial line controller.
- ❑ Two pan-head Phillips screws (#8-32x<sup>1</sup>/<sub>4</sub>) and washers.
- ❑ One cable retainer.

### Required Tools

The required tool is a Phillips screwdriver.

## Disassembly Instructions



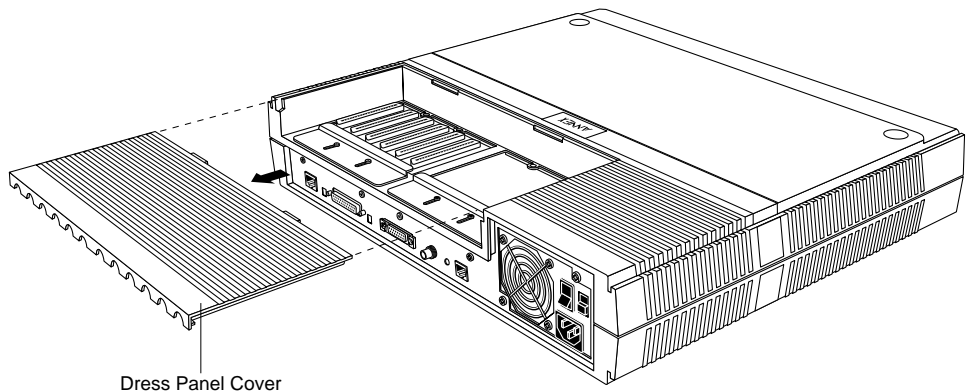
Static electricity can damage contents; open only at a static-free station.

The following instructions describe disassembling the Remote Annex 4000; these instructions assume that you are facing the unit's rear panel. [Figure C-1](#) illustrates the instructions.



These instructions assume that the Remote Annex 4000 has only one SLC and that you are adding a second SLC for the port upgrade.

- 1 Unplug the unit.
- 2 Disconnect all the cables.
- 3 Remove the dress panel cover by pulling it toward you ([Figure C-1](#)).



Dress Panel Cover

Figure C-1. Removing the Dress Panel Cover

- 4 Remove the ten pan-head Phillips screws and two cable retainers (see [Figure C-2](#)).

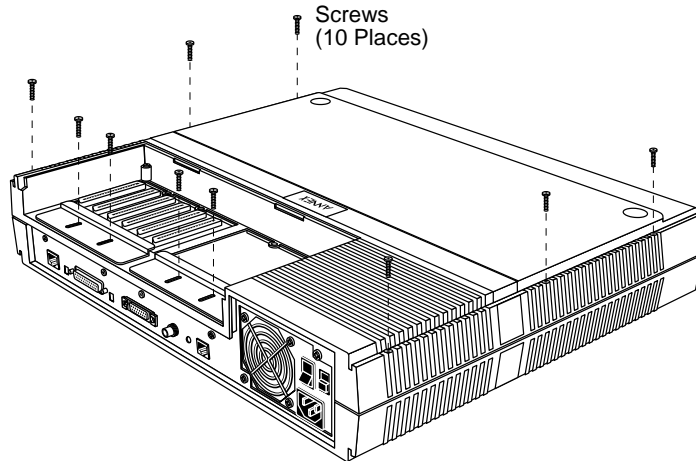


Figure C-2. Removing the Screws from the Cover

- 5 Lift the cover vertically (see [Figure C-3](#)).

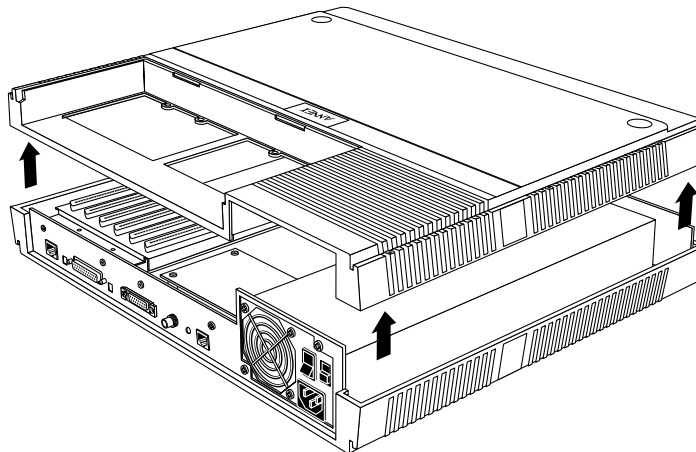


Figure C-3. Removing the Cover

- 6 Remove the four pan-head Phillips screws and the dummy plate (see [Figure C-4](#)).

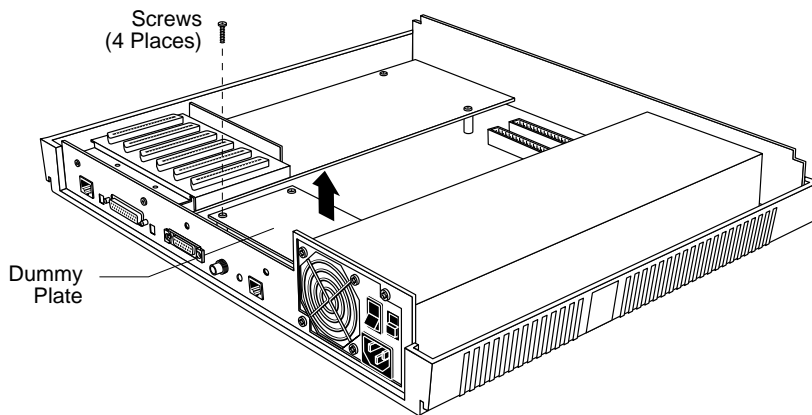


Figure C-4. Removing the Dummy Plate

## Installation Instructions

The following instructions describe how to install an additional asynchronous SLC.



Observe handling precautions: electrostatic-sensitive devices.

- 1 Lower the SLC onto the MLB; keep the SLC horizontal (see [Figure C-5](#)).

Align the SLC with the MLB to avoid bending the pins during installation.



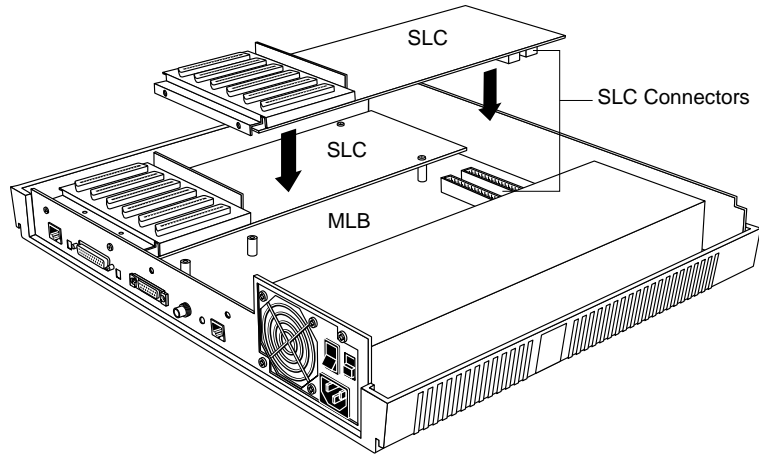


Figure C-5. Lowering the SLC onto the MLB

- 2 Carefully press the SLC connectors into place. Make sure the connectors are seated properly (see [Figure C-6](#)).

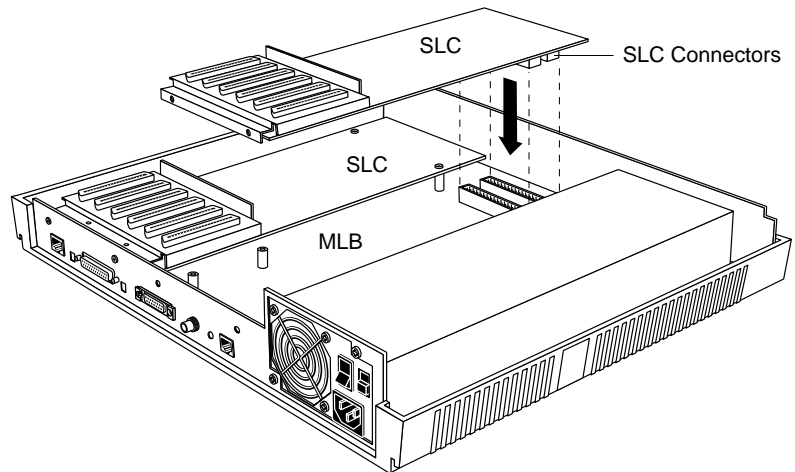


Figure C-6. Attaching the SLC Connectors

- 3 Secure the SLC to the rear panel using two pan-head Phillips screws (see [Figure C-7](#)).

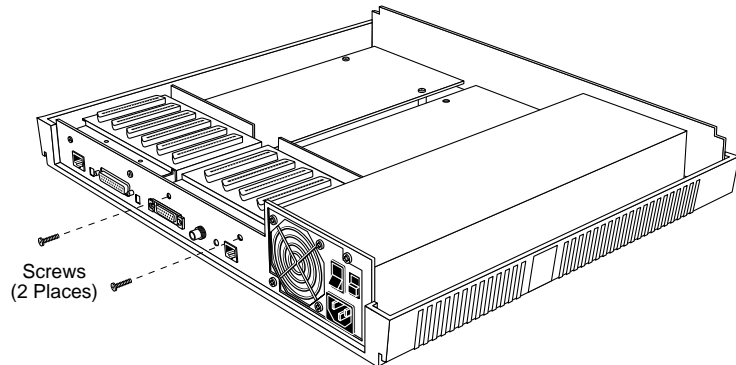


Figure C-7. Securing the SLC to the Rear Panel

- 4 Secure the SLC to the MLB using four pan-head Phillips screws and two flat washers (see [Figure C-8](#)).



**High voltage: do not open or remove the power supply shield. The power supply is not user-serviceable.**

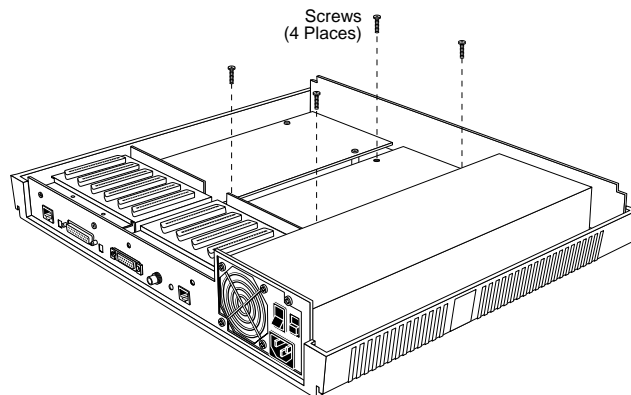


Figure C-8. Securing the SLC to the MLB

## Assembly Instructions

The following instructions describe reassembling the Remote Annex.

- 1 Lower the Remote Annex 4000's cover onto the unit (see [Figure C-9](#)).

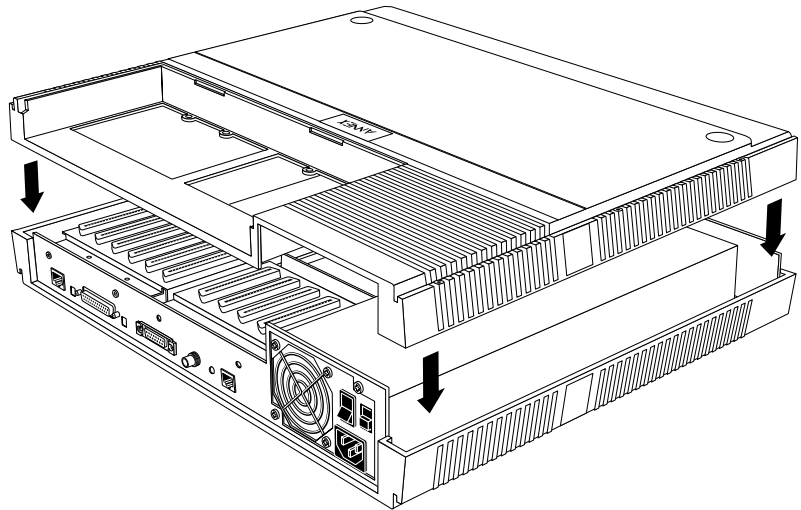


Figure C-9. Replacing the Remote Annex 4000's Cover

- 2 Secure the cover and cable retainers using ten screws (see [Figure C-10](#)).



Do not over-tighten these screws (beyond 10 in-lbs. of torque).

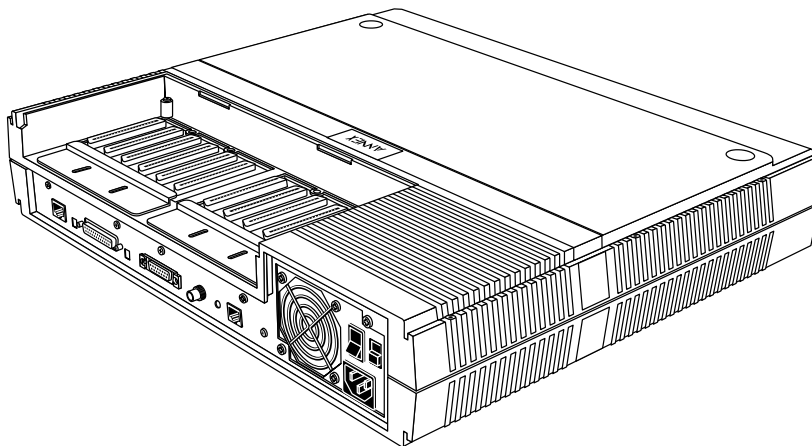


Figure C-10. Securing the Cover

## Power-up and Test

The following instructions describe the power-up and test sequence.

- 1 Reconnect all the cables, including:
  - The transceiver cable.
  - Existing cables for the serial devices.
  - The parallel printer cable.
  - The console terminal cable.
  - The power cord.

- 2 Set the Remote Annex 4000 to test mode by pressing the Test switch on the front panel (see [Figure C-11](#)). The Test LED should light.



To access test mode, press the **Test** switch within 3 seconds of either powering-up or resetting the unit via the **Test** switch.

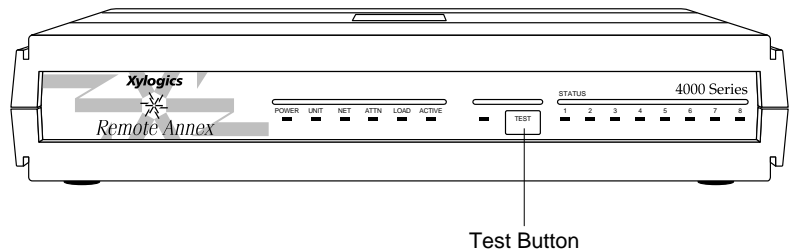


Figure C-11. Setting the Remote Annex 4000 to Test Mode

The Remote Annex 4000 runs its ROM-resident power-up diagnostics:

- ❑ All LEDs, except for **Power**, light momentarily and then turn off.
  - ❑ The **Active** LED flashes to show that diagnostics are running.
  - ❑ If the diagnostics complete successfully, the **Power**, **Unit**, and **Net** LEDs light. After about one minute, the ROM Monitor prompt appears on the console terminal.
- 3 Issue the config command to verify the new hardware and port configuration.

- 4 Attach a PBX loopback plug to the PBX connectors for the new ports (see [Figure C-12](#)).



The accessory kit provides PBX loopback plugs.

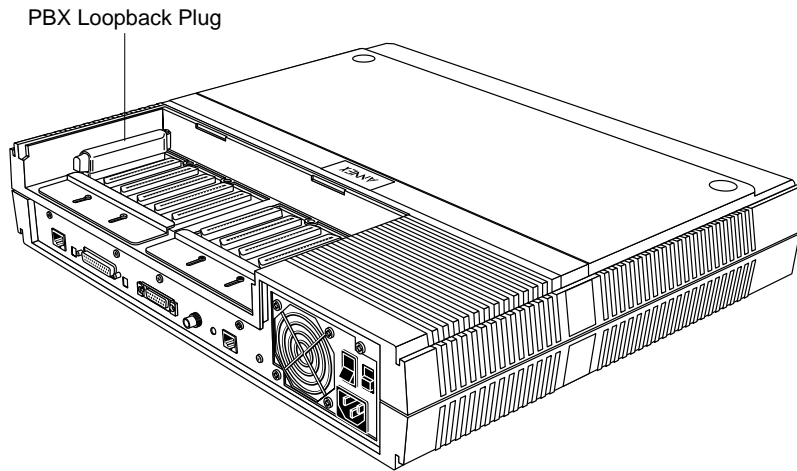


Figure C-12. Attaching a PBX Loopback Plug to the PBX Connectors

- 5 Issue the `ports` command and enter the number of ports to be tested as a range at the prompt requesting the port list.

If the ports tests complete successfully, and the `config` command indicates that the Remote Annex 4000 sees the new SLC, the installation is complete.

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