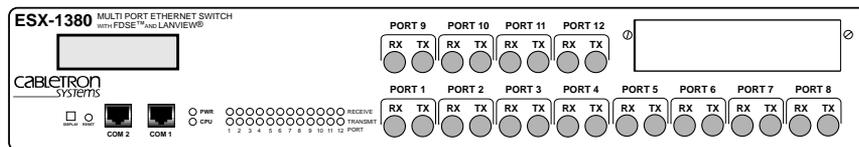
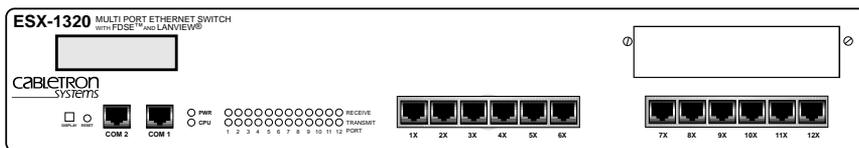


# ESX-1320/ESX-1380 INSTALLATION GUIDE



**Cabletron**  
Systems  
The Complete Networking Solution™





Only qualified personnel should perform installation procedures.

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**73/23/EEC**

Manufacturer's Name: **Cabletron Systems, Inc.**

Manufacturer's Address: **35 Industrial Way**  
**PO Box 5005**  
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European Representative Name: **Mr. J. Solari**

European Representative Address: **Cabletron Systems Limited**  
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**London Road, Newbury**  
**Berkshire RG13 2PZ, England**

Conformance to Directive(s)/Product Standards: **EC Directive 89/336/EEC**  
**EC Directive 73/23/EEC**  
**EN 55022**  
**EN 50082-1**  
**EN 60950**

Equipment Type/Environment: **Networking Equipment, for use in a**  
**Commercial or Light Industrial**  
**Environment.**

We the undersigned, hereby declare, under our sole responsibility, that the equipment packaged with this notice conforms to the above directives.

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# CHAPTER 1

## INTRODUCTION

Welcome to the Cabletron Systems **ESX-1320/ESX-1380 Installation Guide** for the ESX-1320 and ESX-1380 Ethernet Workgroup Switches. This manual describes the ESX-1320 and ESX-1380 switches and provides information concerning installation and troubleshooting.

The ESX-1320 and ESX-1380 Ethernet Workgroup Switches, shown in Figure 1-1, are standalone network switch devices. Except for the difference in the network media supported (ESX-1320, RJ45 Twisted Pair ports and ESX-1380, Multimode Fiber Optic ST ports), the two ESX switches are identical in operation.

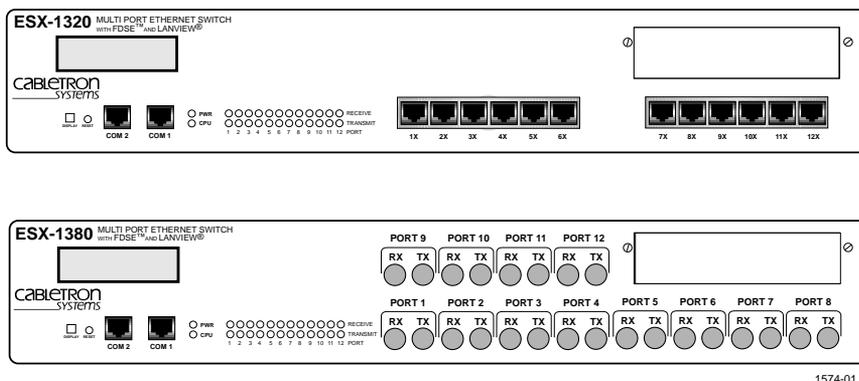


Figure 1-1 ESX-1320 and ESX-1380 Switches



Throughout this manual the term ESX refers to both switches, the ESX-1320 and the ESX-1380. If the information applies to only one of the switches, then that switch is referred to by its model name, ESX-1320 or ESX-1380.

### 1.1 USING THIS MANUAL

You should have a general working knowledge of Ethernet or IEEE 802.3 type data networks and their physical layer components, prior to installing the ESX. The following summarizes the organization of this manual.

Chapter 1, **Introduction**, provides instructions for using this manual, product features, document conventions, related documents, and how to contact Cabletron Technical Support.

Chapter 2, **Controls and Indicators**, discusses the controls and indicators for the ESX.

Chapter 3, **Installation**, provides instructions required to unpack the ESX, perform pre-installation testing, install the ESX, and connect the ESX to the network.

Chapter 4, **Troubleshooting**, provides detailed troubleshooting procedures for the ESX.

Appendix A, **Specifications**, contains information on functionality and operating specifications, connector pinouts, environmental requirements, and physical properties.

Appendix B, **Ethernet Cabling Requirements**, contains information on general networking guidelines.

### 1.2 FEATURES

#### **i960 RISC Processor Controlled**

The ESX complies to the PLUS Architecture with Dual Intel i960 RISC processors and provides advanced management capabilities such as SNMP, RMON, and DLM. The ESX provides the option of using Cabletron Systems Distributed LAN Monitor (DLM) software to locally poll and monitor any SNMP or IP device.

**Connectivity**

The ESX-1320 switch connects to the external Ethernet networks or workstations through the 12 standard RJ45 connectors on its front panel. The RJ45 connectors (interface ports) support Unshielded Twisted Pair (UTP) and Shielded Twisted Pair (STP) cabling at lengths up to 100 meters. The ports are IEEE 802.3 10BASE-T compliant.

The ESX-1380 switch connects to the external Ethernet networks or workstations through the 12 Fiber Optic ST connectors on its front panel. The ports are Fiber Optic Inter-Repeater Link (FOIRL) compliant.

The ESX provides a port located on the front panel that supports one Cabletron Systems Bridge/Router Interface Module (BRIM). BRIMs are an optional feature for the ESX that provide flexible, integrated switching functions to the workgroup and enterprise network hub. Refer to the **Release Notes** for a list of BRIMs currently supported by the ESX.

**Memory**

The ESX has 4 Megabytes (MB) of Shared Dynamic Random Access Memory (SDRAM), 4 MB of Local Dynamic Random Access Memory (LDRAM), and 2 MB of FLASH Electrically Erasable Programmable Read Only Memory (FLASH EEPROM). A new firmware image can also be loaded while the system is operating through a Runtime Download. This option allows the loading of a new firmware image from a network interface into FLASH memory while the ESX is operating with the “old” image. In addition, the ESX motherboard provides the option of upgrading memory capacity by using Single In-line Memory Modules (SIMMs). Cabletron Systems currently offers an 8 MB upgrade for LDRAM and SDRAM (Part Number 8MB-SCM-UGK-60). Note that the SDRAM is used for packet processing; the LDRAM is used for statistical information and RMON support.

**Full Duplex Switched Ethernet (FDSE)**

Each switched Ethernet port supports full wire-speed Ethernet communications and can be configured to operate in FDSE mode. FDSE allows each port to provide a dedicated 20 Mbps bandwidth for file server or high-end workstation connections.

### **Management**

The ESX can be managed using Local Management (LM) tools or remote SNMP management stations. Out-of-band Local Management is provided through RS232 COM ports on the front panel using a standard VT220 or VT320 terminal or emulator. In-band remote management is possible through any SNMP compliant Network Management System (NMS).

### **Traditional Switching**

The ESX provides Traditional Switching or future SECUREFAST Switching Virtual Network Services between all of the front panel interfaces as well as the high-speed uplink BRIM interface. This allows for future migration to Virtual Network technologies without requiring the replacement of existing infrastructure purchases.

### **IEEE 802.3 Compatibility**

The ESX provides IEEE 802.1d Spanning Tree Algorithm (STA) support to enhance the overall reliability of the network and protect against “loop” conditions. The ESX supports a wide variety of industry standard MIBs including RFC 1213 (MIB II), RFC 1757 (RMON), and RFC 1493 (Bridge MIB). A full suite of Cabletron Systems Enterprise MIBs provide a wide array of statistical information to enhance troubleshooting.

### **LANVIEW Diagnostic LEDs**

The LANVIEW diagnostic and status monitoring LEDs serve as an important troubleshooting aid by providing an easy way to observe the status of individual ports and overall network operations. Chapter 4 provides details about the ESX LANVIEW LEDs.

### **LCD Display**

The front panel LCD Display provides information on power-up diagnostics, hardware and firmware revision levels, IP address, serial number, and alarms. This allows non-technical personnel to provide network technicians with basic information critical to the troubleshooting process through simple push-button operation. Chapter 4 provides details about the LCD Display.

## **1.3 DOCUMENT CONVENTIONS**

The following conventions are used throughout this document:



**Note** symbol. Calls the reader's attention to any item of information that may be of special importance.



**Tip** symbol. Conveys helpful hints concerning procedures or actions.



**Caution** symbol. Contains information essential to avoid damage to the equipment.



**Electrical Hazard Warning** symbol. Warns against an action that could result in personal injury or death due to an electrical hazard.

## 1.4 RELATED MANUALS

The following manuals may help the user to control and manage the ESX using SNMP network management systems.

Cabletron Systems *ESX-1320/ESX-1380 Local Management Guide*

Cabletron Systems *SPECTRUM Element Manager*

Cabletron Systems *SPECTRUM* and *SPECTRUM Portable Management Applications (SPMA)* manuals

Documentation for Third Party SNMP compliant Network Management Packages

## 1.5 GETTING HELP

If you need additional support related to this device, or if you have any questions, comments, or suggestions concerning this manual, contact Cabletron Systems Technical Support:

Phone	(603) 332-9400 Monday – Friday; 8 A.M. – 8 P.M. Eastern Time
CompuServe	GO CTRON from any ! prompt
Internet mail	support@ctrn.com

FTP Login Password	ctron.com (134.141.197.25) <i>anonymous</i> <i>your email address</i>
BBS Modem setting	(603) 335-3358 8N1: 8 data bits, 1 stop bit, No parity
For additional information about Cabletron Systems products, visit our World Wide Web site: <a href="http://www.cabletron.com/">http://www.cabletron.com/</a>	

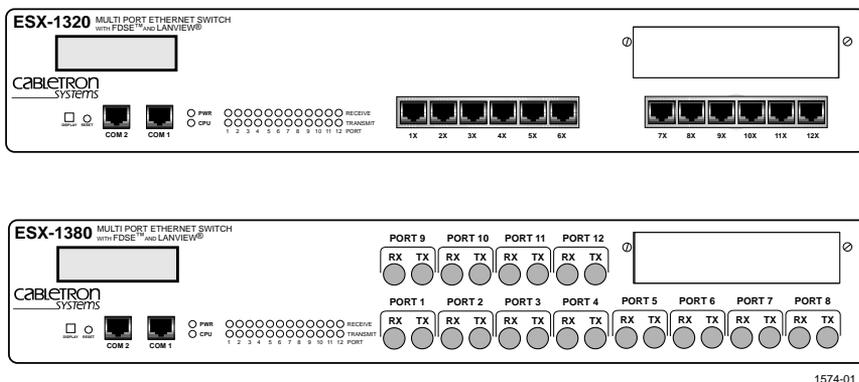
Before calling Cabletron Systems Technical Support, have the following information ready:

- A description of the failure
- A description of any action(s) already taken to resolve the problem (e.g., changing mode switches, rebooting the unit, etc.)
- A description of your network environment (layout, cable type, etc.)
- Network load and frame size at the time of trouble (if known)
- The serial and revision numbers of all Cabletron Systems products in the network
- The device history (i.e., have you returned the device before, is this a recurring problem, etc.)
- Any previous Return Material Authorization (RMA) numbers

# CHAPTER 2

## CONTROLS AND INDICATORS

This chapter provides descriptions of the controls and indicators for the ESX-1320 and ESX-1380 Ethernet Workgroup Switches shown in Figure 2-1.



1574-01

Figure 2-1 ESX-1320 and ESX-1380 Switches

### 2.1 LANVIEW LEDs

The ESX-1320 and ESX-1380 incorporate the Cabletron Systems LANVIEW status monitoring and diagnostics system. LANVIEW LEDs (PWR, CPU, TRANSMIT, and RECEIVE) help diagnose problems, such as power failures or a cable fault.

### 2.2 RESET BUTTON

The front panel of the ESX has a RESET button that allows you to re-initialize the processor. Chapter 4 provides procedures for using the RESET button.

### **2.3 LCD DISPLAY**

The ESX is equipped with an LCD display located on the front panel. The LCD provides status information about the present as well as past conditions of the ESX. You can view power up diagnostics, firmware revisions, MAC addresses, IP addresses, and alarm messages. The LCD displays the most current event, but can store up to 25 past events in memory. Chapter 4 provides details about the LCD Display.

### **2.4 NETWORK MANAGEMENT CAPABILITIES**

You can control and manage the ESX using any of the following SNMP network management systems:

- Cabletron Systems Local Management
- Cabletron Systems SPECTRUM
- Cabletron Systems SPECTRUM Element Manager for Windows
- Cabletron Systems Remote SPECTRUM Portable Management Applications
- Third Party SNMP compliant Network Management Packages

Network management capabilities provide the necessary management tools for the ESX to operate at full capacity. Your ability to set up parameters with network management ensures optimal performance of the ESX.

Refer to the applicable network management package user's manual for more information.

### **2.5 SIMPLEX OR FULL DUPLEX MODE OPERATION**

With FDSE, each switched port can be configured to operate in simplex or full duplex mode. The default is simplex mode.

In simplex mode, a port can send and receive, but not both simultaneously. Collision detection is turned on. In the full duplex mode, the transmit and receive paths operate independently, collision detection is turned off (eliminating the collision domain), and a separate CRC generator and receive CRC checker are used on the port transmit and receive lines for error detection.

To set a port for full duplex operation using MIB Navigator, proceed as follows:

1. Access Local Management as described in the *ESX-1320/ESX-1380 Local Management Guide*.
2. Select MIB Navigator via the Local Management Main Menu screen. The MIBNav -> prompt appears.
3. Enter the following commands (shown in **bold** type) at the MIBNav -> prompt as shown below:

```
MIBNav -> ctron  
MIBNav -> cd 4/3/3/2/1/1  
MIBNav -> set 5[x] y
```

where **x** equals the port number (1 through 12)

where **y** can equal either 2 for simplex mode or 3 for full duplex mode. For example: **set 5[3] 3** would set port 3 for full duplex operation.

For more information concerning MIB Navigator, refer to the *ESX-1320/ESX-1380 Local Management Guide*.



# CHAPTER 3

## INSTALLATION

This chapter provides the instructions to install and connect the ESX to the network. It includes the following procedures:

- Unpacking the ESX (Section 3.1)
- Removing the chassis cover (Section 3.2)
- Locating and setting the mode switches (Section 3.3)
- Using the NVRAM reset switch (Section 3.4)
- Adding/replacing Single In-line Memory Modules (SIMMs) (Section 3.5)
- Identifying the BRIM connector location (Section 3.6)
- Installing the ESX on a shelf or into a standard rack (Section 3.7)
- Pre-network installation testing (Section 3.8)
- Connecting to a network (Section 3.9)



Only qualified personnel should perform installation procedures.



For information on how to install an optional BRIM, refer to your specific BRIM documentation.

### **3.1 UNPACKING THE ESX**

Unpack the ESX as follows:

1. Remove the shipping material covering the ESX.
2. Verify the contents of the packing carton. The carton, as shipped, should contain the following items:
  - ESX-13XX
  - Firmware Images, 2
  - Grounding strap
  - RJ45 Adapter Kit
  - Release Notes
  - Rack Mounting Kit
  - Accessory Kit
  - ESX-1320/ESX-1380 Installation Guide
  - ESX-1320/ESX-1380 Local Management Guide
3. If any of these items are missing, contact Cabletron Systems Technical Support immediately. For help, refer to Section 1.5.
4. Carefully remove the ESX from the shipping box.
5. Visually inspect the ESX. If there are any signs of damage, contact Cabletron Systems Technical Support immediately. For help, refer to Section 1.5.

## **3.2 REMOVING THE CHASSIS COVER**

This section describes how to remove the ESX chassis cover. The chassis cover must be removed to install a BRIM, set the mode switch bank, or install SIMM memory upgrades.



Do not remove the cover from the ESX when power is applied to the unit. Hazardous voltages are present. While performing this procedure, remove only the screws shown to remove the cover.



The internal components and boards associated with the ESX are static sensitive devices. Use the antistatic wrist band and observe standard antistatic safety procedures when the cover is removed. Failure to do so could cause damage or severely limit the life expectancy of the ESX.

To remove the chassis cover, perform the following steps:

1. Disconnect the ESX from the network as follows:
  - a. Turn off the ESX by disconnecting the power cord from the rear of the ESX.
  - b. Mark the cables connected to the ESX according to their associated port numbers. This is recommended for ease of reinstallation.
  - c. Disconnect all network cables attached to the ESX.
2. If the ESX is mounted in a rack, perform the following steps. Otherwise, continue with step 3.



To prevent damaging the ESX in the next step, support the ESX while removing it from the rack.

- a. Refer to Figure 3-1. Remove the four screws securing the ESX brackets to the rack, and then pull the ESX out from the front of the rack.

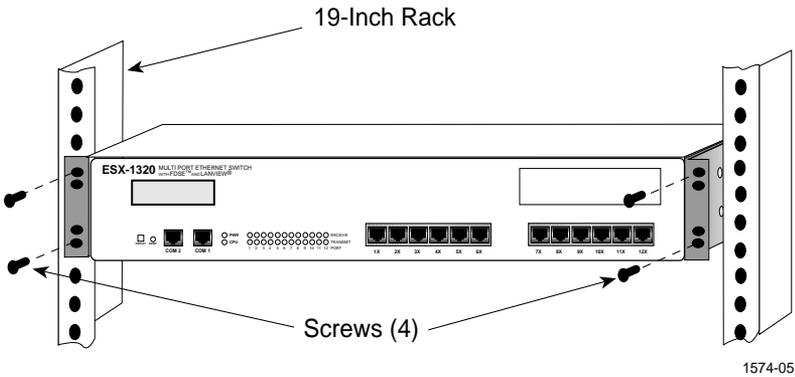


Figure 3-1 Unfastening/Removing the ESX from the Rack

- b. Refer to Figure 3-2. Remove the four screws securing the mounting brackets to the side of the ESX and remove the brackets from the ESX.

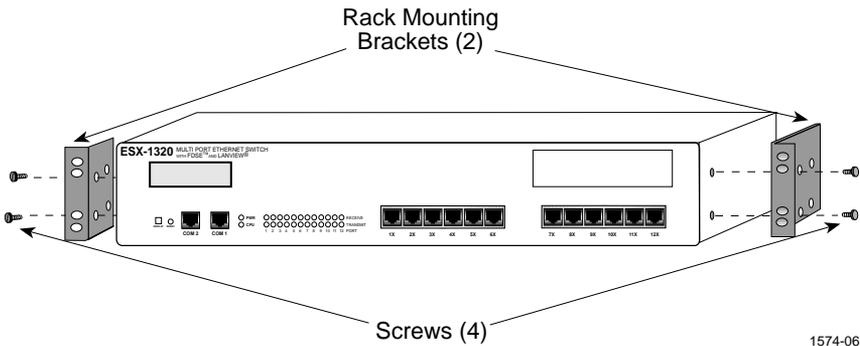
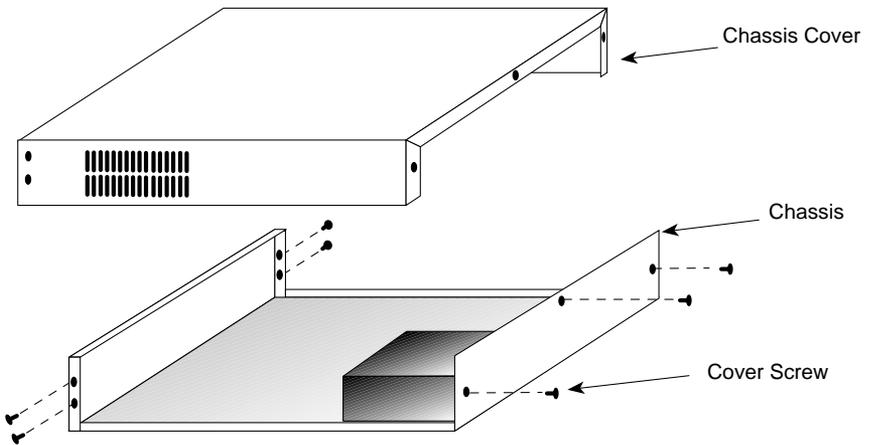


Figure 3-2 Removing the Mounting Brackets

- Use a Phillips screwdriver to remove the screws attaching the cover to the ESX chassis. (See Figure 3-3.)



1574-07

**Figure 3-3 Removing the Chassis Cover**

- Remove the cover by sliding it backwards and lifting it up from the chassis.

To reinstall the chassis cover, perform the removal procedures in reverse order.

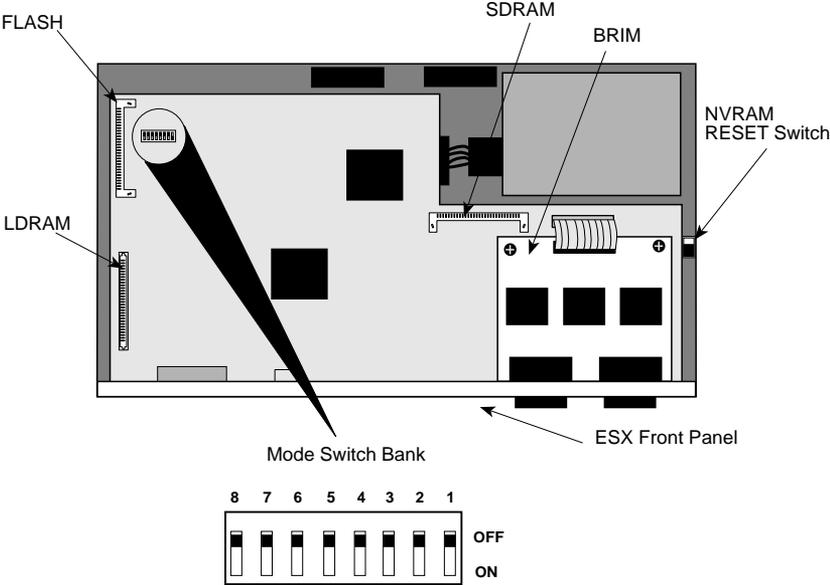
### 3.3 SETTING MODE SWITCHES



Never adjust switch settings while the ESX has power applied to it. Not only is this dangerous, but the change in position activates the switch function only after reinstalling or cycling power to the ESX.

Figure 3-4 shows the location and positions of the mode switches. These switches are shipped in the positions shown and need not be checked before operating the ESX.

ESX TOP VIEW WITHOUT COVER



15741-08

Figure 3-4 ESX Mode Switch Location/Component Layout

Switch definitions are as follows:

- Switch 1 - Cabletron Systems use only.
- Switch 2 - Cabletron Systems use only.
- Switch 3 - Cabletron Systems use only.
- Switch 4 - Cabletron Systems use only.
- Switch 5 - Cabletron Systems use only.
- Switch 6 - Forced Download. Changing the state of this switch (i.e., moving the switch from one position to the other) clears download information from NVRAM (Non-Volatile Random Access Memory) and forces a BOOTP/TFTP download.

After changing the switch 6 position and restarting the ESX, the ESX requests a new image download until it either receives a new image from the BOOTP server or the RESET button on the front panel is pressed. When the RESET button is pressed, the ESX continues trying to contact a BOOTP server, but will timeout in approximately one minute. If the ESX times out, the image is loaded from its FLASH memory.

- Switch 7 - Cabletron Systems use only.
- Switch 8 - Password Defaults. Changing the state of this switch clears user-entered community names stored in NVRAM, and restores the default settings. Once the ESX is reset, the community names can either be reentered or the default settings (“public” or <Return>) may be used.



Do not change the position of switch 8 unless it is necessary to reset the ESX community names to their factory default settings.

### 3.4 NVRAM RESET SWITCH

The ESX uses Non-Volatile Random Access Memory (NVRAM) to store user-entered parameters such as IP addresses and Community Names. The NVRAM reset switch (location shown in Figure 3-5), prepares the ESX electronics to reset NVRAM on either the next power up or the next operation of the front panel RESET button.

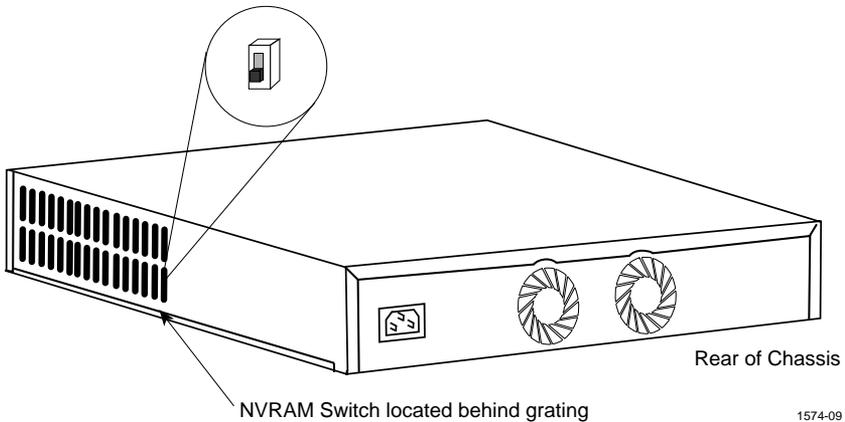


Figure 3-5 NVRAM Reset Switch

Changing the NVRAM reset switch position has no effect on operation until the RESET button is pressed or the power to the ESX is cycled. This will initiate the ESX processor and clear the NVRAM of user-entered parameters such as IP addresses and community names.



Use only a non-metallic tool to set the NVRAM reset switch. Otherwise, injury or damage to the ESX may occur.

To change the NVRAM reset switch position, use a **non-metallic** tool to reach in through the chassis grillwork and move the switch. There is no need to remove the chassis cover to set the NVRAM reset switch.

## **3.5 SIMM UPGRADES**

The ESX allows memory upgrades for Shared DRAM, Local DRAM, and FLASH EEPROM. This section explains how to locate and add/replace a Single In-line Memory Module (SIMM) for any of these memory types. Cabletron Systems currently offers an 8 MB upgrade for Local and Shared DRAM (Part Number 8MB-SCM-UGK-60).

### **3.5.1 Locating SIMMs**

Each memory type has a specific SIMM slot location on the ESX motherboard. When installing SIMM boards, make sure that you place them in their proper slots. Figure 3-4 shows the location of the ESX SIMM slots.

### **3.5.2 Installing SIMMs**

The ESX has two SIMM slot types. FLASH SIMMs use an angle-down slot (where the SIMM rotates down to a horizontal locked position). SDRAM and LDRAM SIMMs use an angle-up slot (where the SIMM rotates up to a vertical locked position).

Installing a SIMM in either slot is a simple two-step process. After finding the proper SIMM slot location (Figure 3-4), refer to the proper illustration and procedures for each SIMM slot type.

### Installing the FLASH SIMM

To install a FLASH SIMM, refer to Figure 3-6 and proceed as follows:

1. Remove the chassis cover as described in Section 3.2.
2. Locate the FLASH SIMM slot. (See Figure 3-4.)



The internal components and boards associated with the ESX are static sensitive devices. Use the antistatic wrist band and observe standard antistatic safety procedures when the cover is removed. Failure to do so could cause damage or severely limit the life expectancy of the ESX.

3. Insert the SIMM between the connector teeth in the SIMM slot.
4. Pivot the SIMM down until it locks into the clips in the SIMM slot, and the SIMM holes fit over the SIMM slot posts.

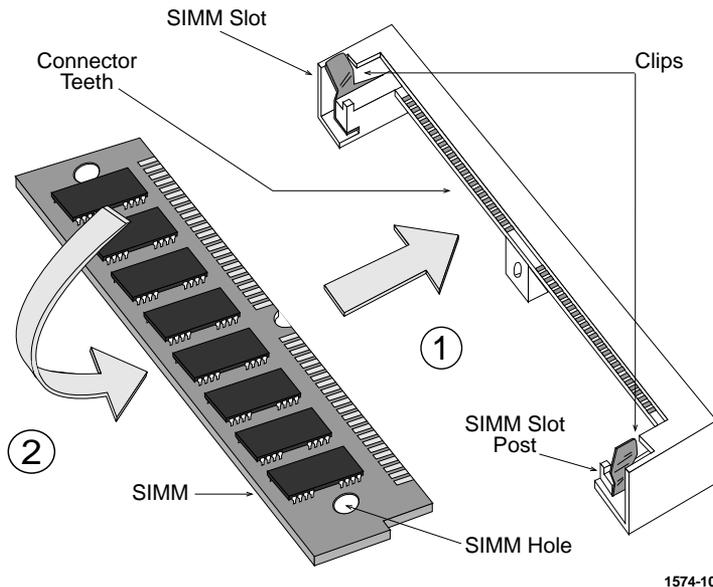


Figure 3-6 Installing a FLASH SIMM

## Installing the SDRAM or LDRAM SIMM

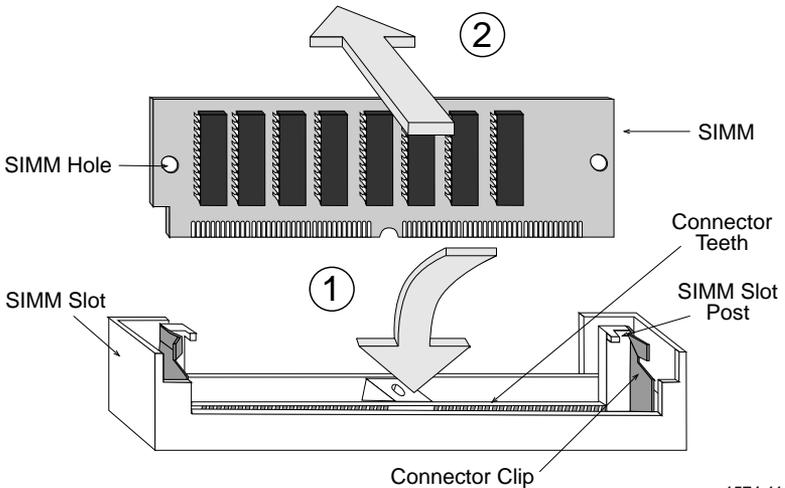
To install an SDRAM or LDRAM SIMM, refer to Figure 3-7 and proceed as follows:

1. Remove the chassis cover as described in Section 3.2.
2. Locate the SDRAM or LDRAM SIMM slot as shown in Figure 3-4.



The internal components and boards associated with the ESX are static sensitive devices. Use the antistatic wrist band and observe standard antistatic safety procedures when the cover is removed. Failure to do so could cause damage or severely limit the life expectancy of the ESX.

3. Insert the SIMM between the connector teeth in the SIMM slot.
4. Pivot the SIMM back until it locks into the clips in the SIMM slot, and the SIMM holes fit over the SIMM slot posts. (See Figure 3-7.)

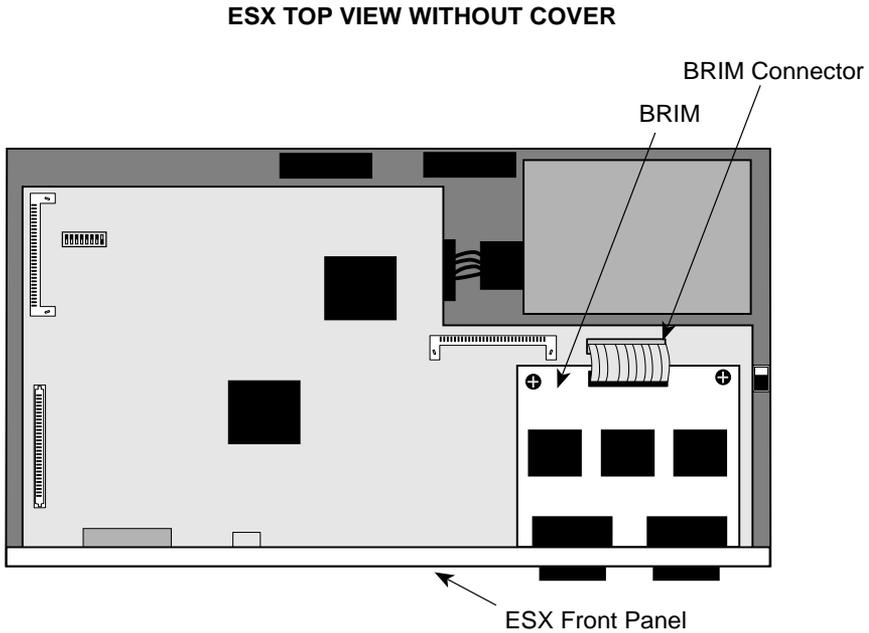


1574-11

**Figure 3-7 Installing an SDRAM or LDRAM SIMM**

### 3.6 BRIM CONNECTION

Figure 3-8 shows the location of the Bridge/Router Interface Module (BRIM) connector on the ESX board. Refer to the BRIM Guide for installation procedures and additional information.



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**Figure 3-8 BRIM Connector Location**

### 3.7 INSTALLING THE ESX

The ESX may be installed on a tabletop, shelf, or in a 19-inch rack. Refer to Section 3.7.1 for information concerning a tabletop or shelf installation. Section 3.7.2 describes the rackmount installation.



To prevent possible personal injury and/or damage to the unit, do **NOT** connect power to the ESX until instructed to do so.

### 3.7.1 Tabletop or Shelf Installation

The following two subsections provide guidelines for installation on a tabletop or shelf.

#### Guidelines for Tabletop and Shelf Installations

Tabletop and shelf installations must be within reach of the network cabling and meet the requirements listed below:

- An appropriate grounded power receptacle must be located within seven feet of the location.
- In a shelf installation, the shelf must be able to support 13.6 kg (30 lb) of static weight for each ESX.
- Maintain a temperature of between 5°C (41°F) and 40°C (104°F) at the installation site with fluctuations of less than 10°C per hour.

#### Installation

For a tabletop or shelf installation, locate the ESX within seven feet of its power source and with an unrestricted free surface area as shown in Figure 3-9. Proceed to Section 3.7.3 for power connection instructions.



In order to allow for proper cooling, there must be a two-inch clearance on either side and the back of the unit.

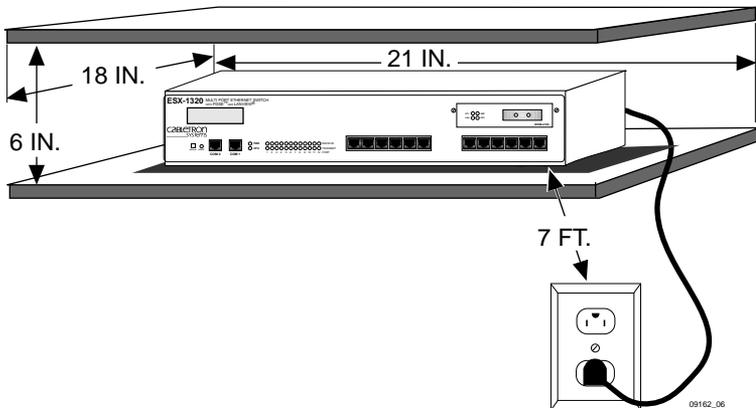


Figure 3-9 Tabletop or Shelf Installation

### 3.7.2 Rackmount Installation

To install the ESX in a 19-inch rack, Cabletron Systems includes an accessory kit containing the rackmount brackets, mounting screws for attaching the rackmount brackets to the ESX chassis, and a strain-relief bracket for cable management. Screws to mount the ESX to the rack rails are provided by the user.

#### Guidelines for the Rackmount Installation

The installation site must be within reach of the network cabling and meet the requirements listed below:

- An appropriate grounded power receptacle must be located within seven feet of the location.
- Maintain a temperature of between 5°C (41°F) and 40°C (104°F) at the installation site with fluctuations of less than 10°C per hour.
- In order to allow for proper cooling, there must be a two-inch clearance on either side and the back of the unit.

#### Installation

Rack mounting the ESX involves the following:

- Attaching the strain-relief bracket
- Rack mounting the ESX (attaching the mounting brackets and fastening the ESX to the rack)

#### Attaching the Strain-Relief Bracket

Attach the strain-relief bracket to the front of the ESX as follows:

1. Locate the strain-relief bracket and four 8-32 x 3/8-inch pan head screws in the rackmount kit.



Do not use longer screws to attach the strain-relief bracket. Longer screws could contact electrical components and cause personal injury and/or damage the unit.

2. Attach the strain-relief bracket to the bottom of the ESX using the four 8-32 x 3/8-inch pan head screws (Figure 3-10).

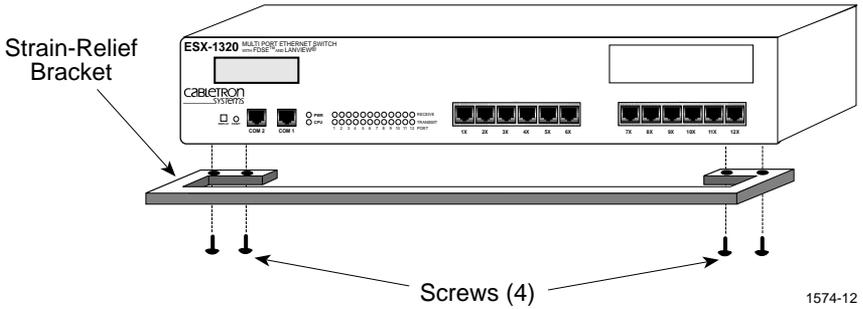


Figure 3-10 Attaching the Strain-Relief Bracket

### Rack Mounting the ESX

Proceed as follows to install the ESX into a 19-inch rack.

1. Remove and discard the four cover screws (two from each side) located along the front edges of each side of the ESX.



Do not remove the cover from the ESX. Complete any BRIM installation or SIMM upgrades before installing the ESX in a rack.

2. Locate the four 6-32 x 3/8-inch flathead replacement cover screws in the accessory kit. Using these screws, attach the rack mounting brackets to each end of the ESX as shown in Figure 3-11.

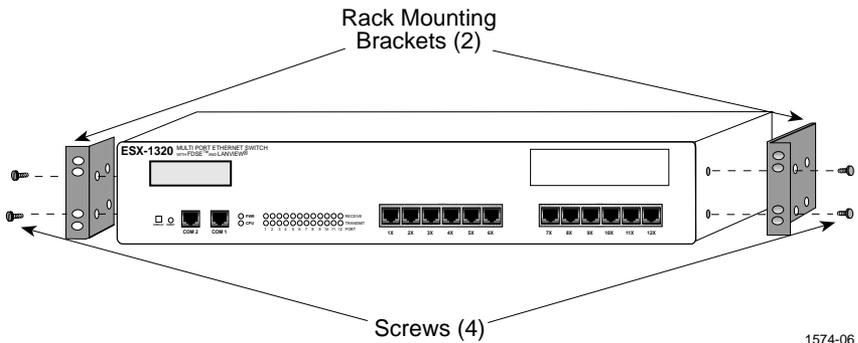
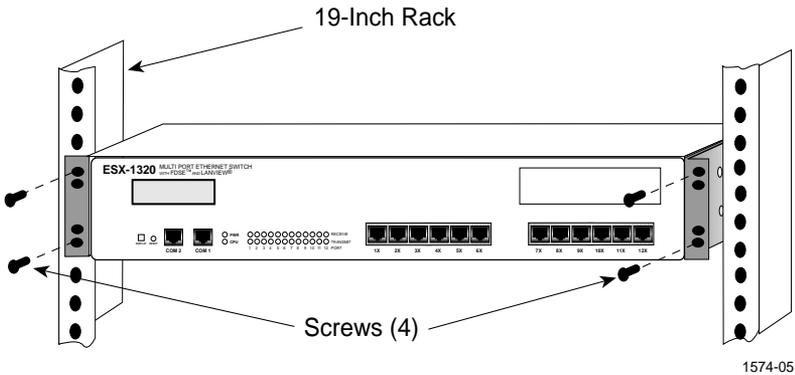


Figure 3-11 Installing the Rack Mounting Brackets

3. With the mounting brackets installed, position the ESX between the vertical frame members of the 19-inch rack and fasten it securely with four user-supplied mounting screws as shown in Figure 3-12.



**Figure 3-12** Installing the ESX in the Rack

Proceed to Section 3.7.3 for instructions to connect the ESX to a power source.

### 3.7.3 Connecting to the Power Source



The ESX has a universal power supply. This allows connection of the ESX to power sources ranging from 100 to 125 Vac, or 200 to 250 Vac, 50/60 Hz.

Connect power to the ESX as follows:

1. Plug the female end of the supplied power cord into the 3-prong receptacle on the back panel of the ESX.
2. Plug the power cord into a grounded wall outlet. The POWER LED turns ON (green) and the CPU LED turns ON (green) briefly.



While booting, the ESX displays boot diagnostics and messages on Local Management, and the LCD also displays messages.

3. Observe the LCD and LANVIEW LEDs. As the ESX progresses through bootup, the following messages will be displayed:
  - “Cabletron Test in progress”
  - The CPU LED illuminates amber.
  - “Boot from Flash”
  - The CPU LED blinks amber and goes off.
  - “Decompress Image”
  - “Cabletron ESX-1320” or “Cabletron ESX-1380” (depending on the ESX model)

The CPU LED starts blinking green, indicating that the ESX booted successfully. If the ESX does not boot successfully, all transmit LEDs flash amber for several seconds. If the CPU LED is not green, contact Cabletron Systems for assistance. Refer to Chapter 1, **Getting Help**.

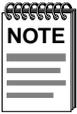
### **3.8 PRE-NETWORK INSTALLATION TEST**

Before connecting the ESX to a live network, you may want to test the ESX in a controlled situation to ensure that it is switching packets. You can perform this test using two workstations and an ESX. To perform this test, refer to Figure 3-13 and proceed as follows:



Except for the difference in the type of cables (media) needed to connect to ports 1 through 12, the following procedure applies to both the ESX-1320 and the ESX-1380.

1. Install and power up the ESX as described in the previous sections.
2. Connect the first workstation to any ESX interface (except the BRIM interface).
3. Connect the second workstation to any other ESX interface (except the BRIM interface).



Interface 13, the BRIM, requires additional network equipment for proper testing.

4. Designate the first workstation as a file server and the second one as the client (refer to individual workstation manuals for instructions on assigning server/client relationships).
5. Send packets between the two workstations to verify the proper operation of the ESX.

If a failure occurs, contact Cabletron Systems Technical Support. Refer to Chapter 1, **Getting Help**.

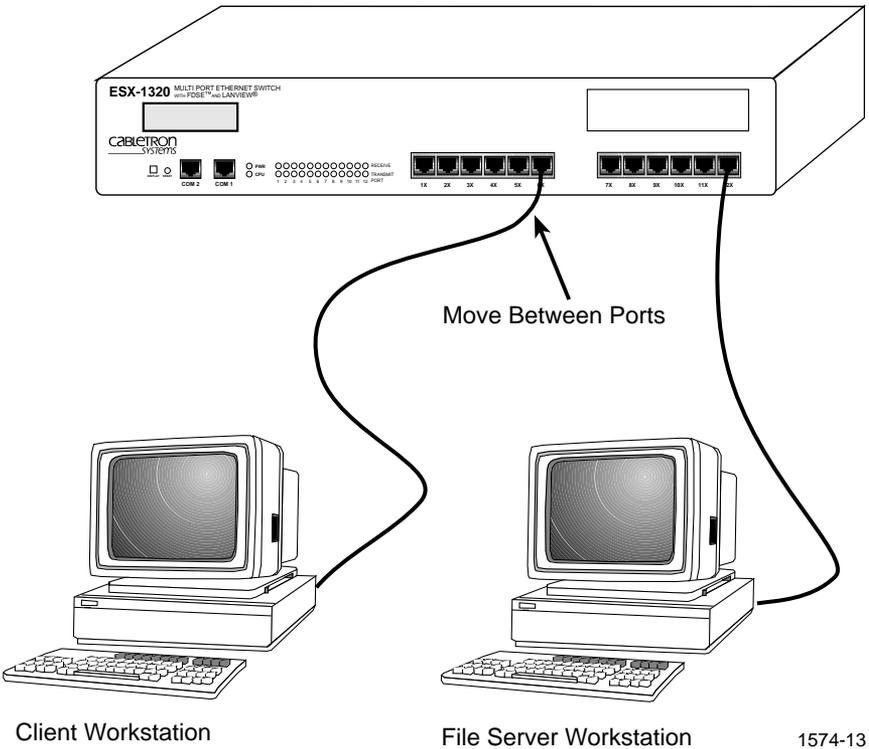


Figure 3-13 Pre-Installation Test

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## 3.9 CONNECTING TO THE NETWORK

This section gives procedures for connecting the ESX-1320 twisted pair segment and the ESX-1380 multimode fiber optic segment to the network. It is recommended that the pre-installation test procedures in Section 3.8 be performed prior to connecting either ESX model to the network.

The procedures for connecting segments to the ESX BRIM slot are detailed in the appropriate BRIM Installation Guide.

To connect the ESX-1320 to the network, proceed to Section 3.9.1. To connect the ESX-1380 to a network, proceed to Section 3.9.2.

### 3.9.1 Connecting a Twisted Pair Segment to the ESX-1320

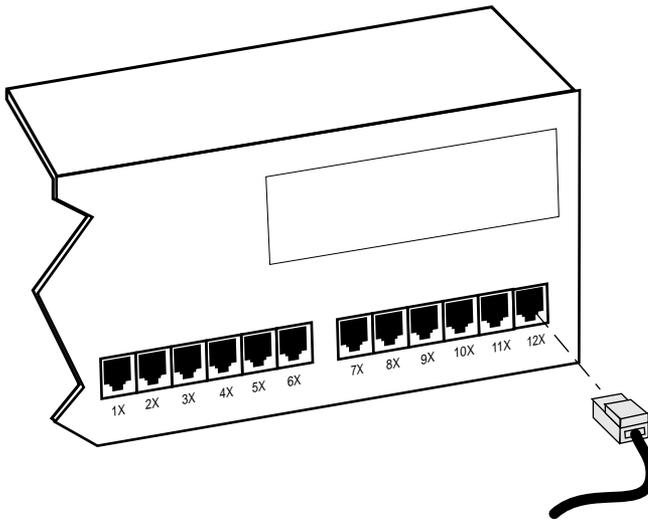
Before connecting a segment to the ESX-1320, check each end of the segment to verify wire crossover.



To establish a link, you must have an odd number of crossovers (preferably one) between 10BASE-T devices of the same type (i.e., from repeater to repeater or bridge port to bridge port).

To connect a twisted pair segment to the ESX-1320, proceed as follows:

1. Refer to Figure 3-14. Connect the twisted pair segment to the module by inserting the RJ45 connector on the twisted pair segment into the desired RJ45 port on the module, Ports 1 through 12.



1574-14

**Figure 3-14 ESX-1320 Twisted Pair Connection**

2. Verify that the port RECEIVE LED is either ON solid green or OFF. Verify that the TRANSMIT LED is OFF or flashing green, yellow, or red. If these conditions are not met, perform the following steps:
  - a. Check that the 10BASE-T device at the other end of the twisted pair segment is ON.
  - b. Verify that the RJ45 connectors on the twisted pair segment have the proper pinouts (Figure 3-15) and check the cable for continuity.
  - c. Check that the twisted pair connection meets the dB loss and cable specifications outlined in Appendix B.

If a link is not established, contact Cabletron Systems Technical Support. (Refer to Chapter 1, **Getting Help**).

3. Repeat step 2, above, until all connections to the ESX-1320 have been made.

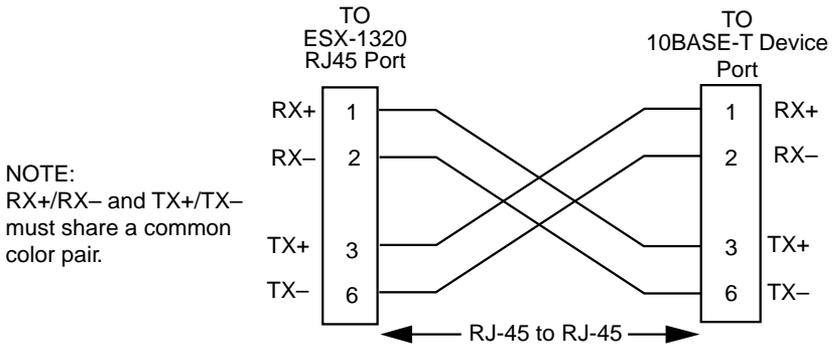


Figure 3-15 Cable Pinouts - (RJ45) Crossover Cable

### 3.9.2 Connecting a 10BASE-F Segment to the ESX-1380

Each fiber optic link consists of two strands of fiber optic cabling: the transmit (TX) and the receive (RX). The transmit strand from a module port connects to the receive port of a fiber optic Ethernet device at the other end of the segment. The receive strand of the applicable port on the module connects to the transmit port of the fiber optic Ethernet device.

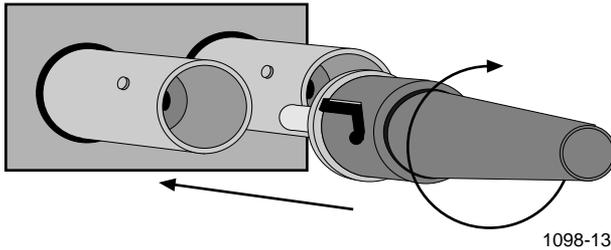
Cabletron Systems recommends labeling fiber optic cables to indicate receive and transmit ends. Many cables are pre-labeled, providing matching labels or tapes at both ends of each strand of cable.



Do not touch the ends of the fiber optic strands, and do not let the ends come in contact with dust, dirt, or other contaminants. Contamination of cable ends causes problems in data transmissions. If necessary, clean contaminated cable ends using alcohol and a soft, clean, lint-free cloth.

1. Remove the protective plastic covers from the fiber optic ports on the applicable port on the module, and from the ends of the connectors on each fiber strand.

2. Attach one fiber to the applicable receive port on the module. Insert the ST connector into the port with the alignment slot on the connector inserted over the locking key on the port. Turn the connector clockwise to lock it down as shown as Figure 3-16.



**Figure 3-16 ST Connector Insertion**

3. Attach the other fiber of the pair to the applicable transmit port on the module. Use the same procedure for insertion of the ST connector.
4. Attach the other end of the fibers to the appropriate transmit and receive ports of the other device being connected.

If link indicators are present for the fiber optic connection, check that they are ON. If an indicator is present but not ON, that port does not have a valid link. Perform each of the following steps until you reach a resolution of the problem and achieve a link.

- Check that the device at the other end of the link is ON.
- Verify proper crossover of the fiber strands. Try swapping the transmit and receive connections at only one end of the link.
- Verify that the fiber connection meets the dB loss specifications outlined in Appendix B.

If you are still unable to establish a link, attempt to make the connection between the devices with another fiber optic cable. If this is unsuccessful, contact Cabletron Systems Technical Support.

# CHAPTER 4

## TROUBLESHOOTING

This chapter provides information for troubleshooting network and ESX operational problems. The chapter describes the LANVIEW LEDs, provides a troubleshooting checklist, and explains how to use the LCD and the RESET button.

### 4.1 USING LANVIEW

The ESX uses the Cabletron Systems built-in visual diagnostic and status monitoring system called LANVIEW. With LANVIEW, you can quickly scan the LANVIEW LEDs (Figure 4-1) of the ESX to observe network status or diagnose network problems. Refer to Table 4-1 for a description of the LEDs.

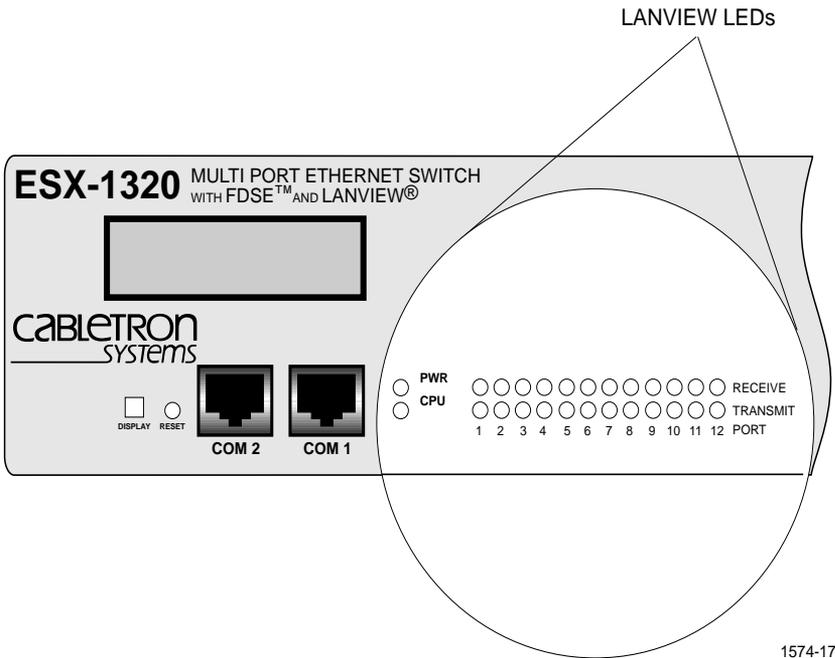


Figure 4-1 LANVIEW LEDs

Table 4-1 LANVIEW LEDs

LED	Color	Description	Error Condition Recommended Action
CPU	Off	Power off.	Turn power on.
	Red	<b>Blinking.</b> SDRAM or LDRAM failure.	Contact Cabletron Systems Technical Support.
	Yellow	<b>Blinking.</b> No communications with switch processor.	Contact Cabletron Systems Technical Support for assistance.
	Green	<b>Blinking.</b> Board OK.	No action.
	Yellow and Green	<b>Blink</b> 1/2 sec. green and 1/2 sec. yellow. Booting. Performing BOOTP, TFTP, or loading from FLASH.	Verify LED blinks green only after approx. 45 seconds. Otherwise, press the RESET button.
	Yellow	Testing. Board performing memory test.	Verify LED blinks green after approx. 180 seconds. Otherwise, press the RESET button.
Transmit	Off	Port enabled, no activity.	Should flash green every 2 seconds indicating BPDUs being sent if Spanning Tree Algorithm is active.
	Green	<b>Flashing.</b> Indicates activity or enabled port. Note that the flashing is pulsed-stretched for easy viewing and does not accurately represent the rate of traffic.	No error.
	Yellow	<b>Blinking.</b> Port in standby.	May be disabled due to Spanning Tree Algorithm.
	Red	<b>Flashing</b> to constantly on. Indicates collision rate.	If on constantly indicates a problem. Contact Cabletron Systems Technical Support for assistance.
	Red	<b>Solid.</b> Port disabled.	Contact Cabletron Systems Technical Support for assistance.

Table 4-1 LANVIEW LEDs (Continued)

LED	Color	Description	Error Condition Recommended Action
Receive	Off	Port enabled, no activity.	No error.
	Green	<b>Solid.</b> Port enabled, link, no activity.	No error.
	Yellow	<b>Flashing.</b> Indicates receive activity.	No error.
	Red	<b>Solid.</b> No link, port disabled. <b>Blinking.</b> Link but port disabled.	Contact Cabletron Systems Technical Support for assistance.

## **4.2 TROUBLESHOOTING CHECKLIST**

If your ESX is not operating properly, refer to Table 4-2 for a checklist of some of the problems that can occur with the ESX, the possible causes for the problem, and suggestions for resolving the problem.

**Table 4-2 Troubleshooting Checklist**

<b>Problem</b>	<b>Possible Cause</b>	<b>Recommended Action</b>
All LEDs are OFF.	Loss of Power to the ESX.  ESX not properly installed.	Check the proper connection of the power cable and its access to a live outlet.
No Local Management Password screen.	Terminal setup is not correct.  Improper console cable/UPS cable pinouts.	Refer to ESX Local Management Guide for proper setup procedures.  Refer to ESX Local Management Guide for proper console port pinouts.
Cannot contact the ESX from in-band management.	Improper Community Name Table.  ESX does not have an IP address.  Port is disabled.  No link to device.	Refer to ESX Local Management Guide for Community Name Table setup.  Refer to ESX Local Management Guide for IP address assignment procedure.  Enable port.  Check link to device.

**Table 4-2 Troubleshooting Checklist (Continued)**

<b>Problem</b>	<b>Possible Cause</b>	<b>Recommended Action</b>
Port(s) goes into standby for no apparent reason.	Configurations where devices connect across ESX channels can cause the ESX to detect a looped condition.	Discuss these configurations with Cabletron Systems Technical Support before implementing them into your network.
User parameters (IP address, Device and Module name, etc.) are lost when the ESX is powered down or the front panel RESET button is pressed.	Position of the NVRAM Reset Switch was changed before the last power down or pressing of the RESET button, causing the user-entered parameters to reset to factory default settings.  NVRAM may be defective.	Reenter the lost parameters as necessary.  Call Cabletron Systems Technical Support.

### 4.3 USING THE RESET BUTTON

The RESET button shown in Figure 4-2 initializes the ESX processor without affecting the NVRAM.



The RESET button may be used in conjunction with the NVRAM reset switch (not shown) to also initialize the NVRAM as described in Section 3.4.

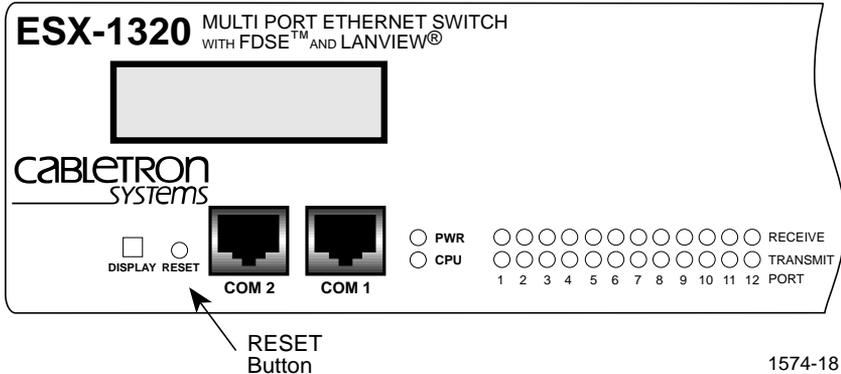


Figure 4-2 RESET Button

To use the RESET button, use a pen or pencil to press and release the button. The ESX goes through an initialization process for approximately 180 seconds.

## 4.4 USING THE LCD

The LCD displays messages concerning network statistics and diagnostic information such as Power-up diagnostics, Revision levels, MAC and IP addresses, and Error alerts.

Depending on the type of message, the message may be displayed on the LCD as an incident occurs, or saved and displayed later by using the DISPLAY button. The LCD and the DISPLAY button are shown in Figure 4-3.

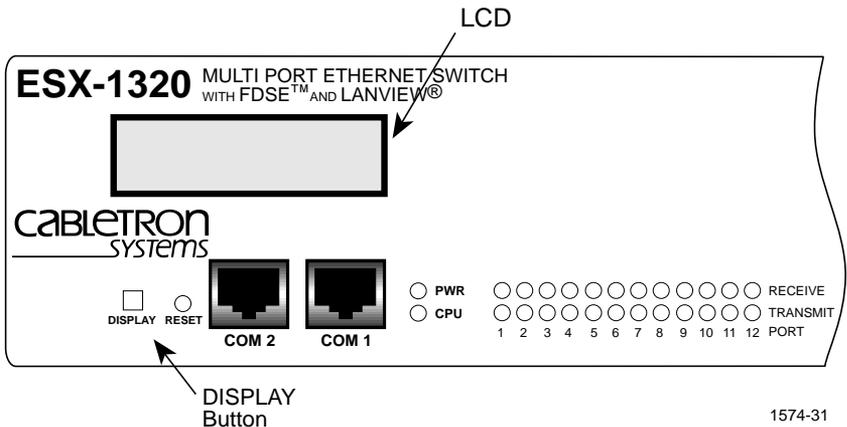


Figure 4-3 LCD and DISPLAY Button

The following five types of messages are displayed on the LCD:

- Initialization Messages \*
- Static System Messages
- Alarm Messages
- System Messages
- Failure or Error Messages \*

\*These messages are displayed as an associated event occurs and are **not** saved to be displayed later using the DISPLAY button.

Sections 4.4.1 through 4.4.5 describe the five types of LCD messages provided and, when applicable, the instructions for displaying them using the DISPLAY button.

### 4.4.1 Unsaved Initialization Messages

The unsaved Initialization Messages are generated during power-up and appear as events occur. These messages track the boot up sequence. They are not saved and cannot be recalled using the DISPLAY button.

Cabletron  
Hardware Init

Cabletron  
Boot From Flash

Cabletron  
BOOTP Discovery

Cabletron  
RARP Req. State

Cabletron  
TFTP Req. State

Cabletron  
TFTP in Progress

Cabletron  
TFTP Complete

Cabletron  
Erasing Flash

Cabletron  
Programming Flash

Cabletron  
Flash Programmed

Cabletron  
Boot Complete

Cabletron  
Test in Progress

Cabletron  
Decompress Image

## 4.4.2 Static System Messages

The Static System Messages provide ESX configuration information. The product name must be displayed on the LCD before you can start stepping through the messages in the sequence shown in Table 4-3.



Whether you are displaying Static System Messages, Alarm System Messages, or Saved System Messages, the display returns to the product name display 20 seconds after the last operation of the DISPLAY button.

### To Display the Messages

With the product name (e.g., CABLETRON ESX-1320) displayed, momentarily press the DISPLAY button to step to the first message. Each time you press the DISPLAY button, the next message is displayed until the last message. Then the display automatically exits to the product name.

### To Exit

There are three ways to exit the Static System Messages:

- **From the last Static System message**  
Momentarily press the DISPLAY button while the last message “COM 2 Port Function xxxxx” is displayed. The display automatically returns to the product name.
- **Automatic 20-second exit**  
Allow 20 seconds to elapse after the last DISPLAY button operation. The display returns to the product name.
- **Jump to Alarm Messages**  
Press and hold the DISPLAY button for 3 seconds. When released, the display steps to the Alarm Messages described in Section 4.4.3.

**Table 4-3 Static System Messages**

<b>Displayed Messages</b>	<b>Comments</b>
Host IP Address xxx.xxx.xxx.xxx	Displays the ESX IP address.
MAC Address 00001dxxxxxx	Displays the MAC address of channels 1 through 12, and 13 if a BRIM is installed.
RAM Image Rev. xx.xx.xx	Displays the revision number of the FLASH EEPROM.
Boot PROM Rev. xx.xx.xx	Displays the revision number of the internal Boot PROM.
Flash Programmed xx Times	Displays the number of times a new software load to FLASH has occurred.
COM 1 Port Baud Rate Auto	Displays Auto for the Baud Rate for COM 1 Port.
COM 1 Port Function xxxxx	Displays the current function of the COM 1 Port.
COM 2 Port Baud Rate Auto	Displays Auto for the Baud Rate for COM 2 port.
COM 2 Port Function xxxxx	Displays the current function of the COM 2 Port.

### 4.4.3 Alarm Messages

Alarm Messages pertain to events that occur within the ESX regarding port status. The messages that can be displayed are shown in Table 4-4.



Whether you are displaying Static System Messages, Alarm System Messages, or Saved System Messages, the display returns to the product name display 20 seconds after the last operation of the DISPLAY button.

#### To Display the Messages

There are two ways to gain access and display the Alarm Messages:

- **From the product name display**  
Press and hold the DISPLAY button for 3 seconds while the product name (e.g., CABLETRON ESX-1320) is displayed. When the button is released, the display steps to the first of the saved Alarm Messages described in Table 4-4. Thereafter, each time you press the DISPLAY button, the next message is displayed.
- **From a Static System Message display**  
Press and hold the DISPLAY button for 3 seconds while a Static System Message is displayed. When the button is released, the display steps to the saved Alarm Messages described in Table 4-4. Thereafter, each time you press the DISPLAY button, the next saved message is displayed.

#### To Exit

There are two ways to exit the Static System Messages:

- **Automatic 20-second exit**  
Allowing 20 seconds to elapse after the last DISPLAY button operation. The display returns to the product name.
- **Jump to saved System Messages**  
Press and hold the DISPLAY button for 3 seconds. When the button is released, the display steps to the saved System Messages described in Section 4.4.4.

Table 4-4 Alarm Messages

Displayed Messages	Comments
Port xxxxxx Link Established	Displays the individual link status of ports 1 through 13.
Port xxxxxx Not linked	Displays the individual link status of ports 1 through 13.
Switch Port x Stand-By	Indicates if a Switch port is in stand-by. Individually for ports 1 through 13.
Switch Port xx On-Line	Indicates if a Switch port is on-line. Individually for ports 1 through 13.
No Messages in Queue x	No Alarm messages.

### 4.4.4 Saved System Messages

Saved System Messages are device related startup or boot strap messages, BOOTP/TFTP host, or startup error messages. The following messages may be displayed:

TFTP Host  
xxx.xxx.xxx.xxx

TFTP File  
xxxxxxx.hex

Last TFTP File  
xxxxxxx.hex

Last TFTP Host  
xxx.xxx.xxx.xxx



Whether you are displaying Static System Messages, Alarm System Messages, or saved System Messages, the display returns to the product name display 20 seconds after the last operation of the DISPLAY button.

### **To Display the Messages**

There are two ways to access and display the saved System Messages:

- **From the product name display**

Press and hold the DISPLAY button for 3 seconds while the product name (e.g., CABLETRON ESX-1320) is displayed. When the button is released, the display steps to the Alarm Messages. Then press and hold the DISPLAY button for another 3 seconds. When the button is released, the display steps to the first of the saved System Messages. Thereafter, each time you press the DISPLAY button, the next saved message is displayed.

- **From an Alarm Message display**

Press and hold the DISPLAY button for 3 seconds while an Alarm Message is displayed. When released, the display steps to one of the saved System Messages. Thereafter, each time you press the DISPLAY button, the next saved message is displayed.

### **To Exit**

There are two ways to exit the System Messages:

- **Automatic 20-second exit**

Allowing 20 seconds to elapse after the last DISPLAY button operation. The display returns to the product name.

- **From any displayed System Message**

Press and hold the DISPLAY button for 3 seconds. When released, the display automatically returns to the product name.

### **4.4.5 Failure or Error Messages**

Failure or Error Messages appear when an unrecoverable condition occurs. These messages are not saved and cannot be recalled using the DISPLAY button. When any of these messages appear call Cabletron Systems Technical Support.

The failure or error messages are as follows:

Cabletron  
Ctrl. Reg. Err.

Cabletron  
BBRAM Failure

Cabletron  
SDRAM Failure

Cabletron  
Modem SCC Failure

Cabletron  
SONIC Failure

Cabletron  
Bit Swap Failure

Cabletron  
Console SCC Error

Cabletron  
LDRAM Failure

Cabletron  
82C54 Failure

# APPENDIX A

## SPECIFICATIONS

This appendix provides the operating specifications for the Cabletron Systems ESX. Cabletron Systems reserves the right to change these specifications at any time without notice.

### A.1 FUNCTIONALITY

FLASH Memory:	2 MB
Shared Sonic Memory:	4 MB
Internal Processor:	2 Intel i960s
NVRAM:	128 kB
Ethernet Controller:	12 Sonic Controllers
CPU Memory:	4 MB

### A.2 COM PORT 1 AND COM PORT 2

COM ports 1 and 2 are standard RJ45 ports with the following pin assignments:

Pin	Signal Name	Input/Output
1	Transmit Data (XMT)	Output
2	Data Carrier Detect (DCD)	Output
3	Data Set Ready (DSR)	Input
4	Receive Data (RCV)	Input
5	Signal Ground (GND)	NA
6	Data Terminal Ready (DTR)	Output
7	Request to Send (RTS)	Input
8	Clear to Send (CTS)	NA

### **A.3 ENVIRONMENTAL REQUIREMENTS**

Operating Temperature: 5° to 40°C (41° to 104°F)  
Storage Temperature: -30° to 73°C (-22° to 164°F)  
Operating Humidity: 15% to 90% (non-condensing)

### **A.4 REGULATORY**

Safety: UL 1950, CSA C22.2 No. 950, EN 60950, IEC 950, and 73/23/EEC

Electromagnetic  
Compatibility (EMC): FCC Part 15, VCCI Class 1, EN 55022, EN 50082-1, and 89/336/EEC

### **A.5 PHYSICAL PROPERTIES**

Dimensions: 7.11H x 43.18W x 34.29D (cm)  
2.8H x 17W x 13.5D (in)

Weight (Unit): 3.18 kg (7 lb)

### **A.6 ELECTRICAL SPECIFICATIONS**

Input: 100-125 V~ / 4.0 A  
200-250 V~ / 2.0 A

Phasing: Single-phase

Frequency: 50/60 Hz

# APPENDIX B

## ETHERNET CABLING REQUIREMENTS

This chapter contains general networking guidelines. Before attempting to install the ESX, review the requirements and specifications outlined in this chapter.



Your network installation must meet the conditions, guidelines, specifications, and requirements included in this chapter to ensure satisfactory performance of this equipment. Failure to follow these guidelines may result in poor network performance.

### B.1 NETWORK REQUIREMENTS

Take care in planning and preparing the cabling and connections for your network. The quality of the connections, the length of cables, and other conditions of the installation play critical roles in determining the reliability of your network.

Refer to the sections which follow that apply to your specific network configuration.

### B.2 10BASE-T TWISTED PAIR NETWORK

When connecting a 10BASE-T segment to the ESX-1320, ensure the network meets the following requirements:

- **Length:** The IEEE 802.3 10BASE-T standard requires that 10BASE-T devices transmit over a 100 meter (328 foot) link using 22-24 AWG unshielded twisted pair wire. This is supported by Cabletron Systems. However, cable quality largely determines maximum link length. If you use high quality, low attenuation cable, you can achieve link lengths of up to 200 meters. Cable delay limits the maximum link length to 200 meters.



Losses introduced by connections at punch-down blocks and other equipment reduce total segment length. For each connector or patch panel in the link, subtract 12 meters from the total length of your cable.

- **Insertion Loss:** Between frequencies of 5.0 and 10.0 MHz, the maximum insertion loss must not exceed 11.5 dB. This includes the attenuation of the cables, connectors, patch panels, and reflection losses due to impedance mismatches in the link segment.
- **Impedance:** Cabletron Systems 10BASE-T products work on twisted pair cable with 75 to 165 ohms impedance. Unshielded twisted pair cables typically have an impedance of between 85 and 110 ohms. You can also use Shielded Twisted Pair cables, such as IBM Type 1 cable, but keep in mind that this cable has an impedance of 150 ohms. The high impedance of the IBM Type 1 cable increases signal reflection. However, due to cable shielding and the subsequent lack of crosstalk between shielded pairs, signal reflection has little effect on the quality of the received signal.
- **Jitter:** Intersymbol interference and reflections can cause jitter in the bit cell timing, resulting in data errors. 10BASE-T links must not generate more than 5.0 ns of jitter. Make sure your cable meets 10BASE-T link impedance requirements to rule out jitter as a concern.
- **Delay:** The maximum propagation delay of a 10BASE-T link segment must not exceed 1000 ns. This 1000 ns maximum delay limits the maximum link segment length to no greater than 200 meters.
- **Crosstalk:** Signal coupling between different cable pairs within a multi-pair cable bundle causes crosstalk. 10BASE-T transceiver design alleviates concerns about crosstalk, provided the cable meets all other requirements.
- **Noise:** Crosstalk, or externally induced impulses, can cause noise. Impulse noise may cause data errors if the impulses occur at very specific times during data transmission. Generally, noise is not a concern. If you suspect noise-related data errors, you may need to reroute the cable or eliminate the source of the impulse noise.
- **Temperature:** Multi-pair PVC 24 AWG telephone cables typically have an attenuation of approximately 8–10 dB/100 m at 20°C (68°F). The attenuation of PVC insulated cable varies significantly with temperature. At temperatures greater than 40°C (104°F), we strongly recommend using plenum-rated cable to ensure that attenuation remains within specification.

### B.3 MULTIMODE FIBER OPTIC NETWORK

When connecting a multimode fiber optic link segment to the ESX-1380, ensure the network meets the following requirements:

- **Cable Type:** Use the following multimode fiber optic media:
  - 50/125  $\mu\text{m}$  fiber optic cabling
  - 62.5/125  $\mu\text{m}$  fiber optic cabling
  - 100/140  $\mu\text{m}$  fiber optic cabling
- **Attenuation:** You must test the fiber optic cable with a fiber optic attenuation test set adjusted for an 850 nm wavelength. This test verifies that the signal loss in a cable falls within the following acceptable levels:
  - 13.0 dB or less for a 50/125  $\mu\text{m}$  fiber cable segment
  - 16.0 dB or less for a 62.5/125  $\mu\text{m}$  fiber cable segment
  - 19.0 dB or less for a 100/140  $\mu\text{m}$  fiber cable segment
- **Budget and Propagation Delay:** When you determine the maximum fiber optic cable length to incorporate fiber runs into your network, you must calculate and consider the fiber optic budget (a total loss of 10.0 dB or less is permissible between stations) and total network propagation delay.

To determine the fiber optic budget, combine the optical loss due to the fiber optic cable, in-line splices, and fiber optic connectors. Typical loss for a splice and connector (together) equals 1 dB or less.

Network propagation delay is the amount of time it takes a packet to travel from the sending device to the receiving device. Total propagation delay allowed for the entire network must not exceed 25.6  $\mu\text{s}$  in one direction (51.2  $\mu\text{s}$  round trip). If the total propagation delay between any two nodes on the network exceeds 25.6  $\mu\text{s}$ , you must use bridges or switches.

- **Length:** The maximum possible multimode fiber optic cable length is 2 km (1.24 miles). However, IEEE 802.3 FOIRL specifications specify a maximum of 1 km (0.62 miles).



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## **POWER SUPPLY CORD**

The mains cord used with this equipment must be a 2 conductor plus ground type with minimum 0.75 mm square conductors and must incorporate a standard IEC appliance coupler on one end and a mains plug on the other end which is suitable for the use and application of the product and that is approved for use in the country of application.

### **GERMAN:**

Die Netzleitung, die mit diesem Gerat benuetzt wird, soll einen zwei Leiter mit Erdleiter haben, wobei die Leiter mindestens 0.75 mm sind, mit einer normalen IEC Geratesteckdose an einem Ende und einem Geratestecker am anderen Ende versehen sind, der fuer den Gebrauch und die Anwendung des Gerates geeignet und der zum Benuetzen im Lande der Anwendung anerkannt ist.

### **SPANISH:**

El cable principal de la red eléctrica utilizado con este equipo debe tener 2 conductores y 1 toma de tierra con un mínimo de 0.75 mm<sup>2</sup> cada uno y necesita tener un aparato de acoplamiento standard IEC en un extremo y un enchufe para el cable principal de la red eléctrica en el otro extremo, lo cual sea adecuado para el uso y aplicación del producto y lo cual sea aprobado para uso en el país de aplicación.

### **FRENCH:**

Le cordon d' alimentation reliant cet appareil au secteur doit obligatoirement avoir deux fils conducteurs de 0.75 mm<sup>2</sup> minimum et un fil de terre. It doit également être équipé du côté appareil d'une fiche agréée IEC et du côté secteur, d'une prise adaptée à l'usage du produit et aux normes du pays où l'appareil est utilisé.



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