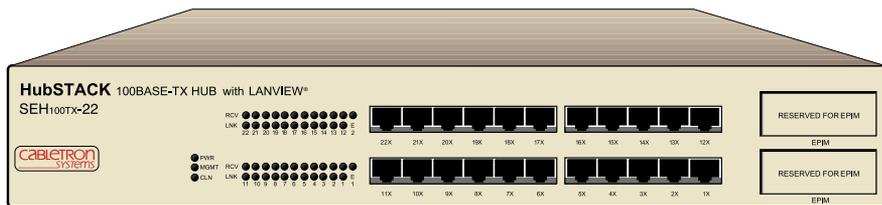


SEH100TX-22

100BASE-T STACKABLE HUB

USER'S GUIDE



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Application of Council Directive(s): **89/336/EEC**
73/23/EEC

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

Manufacturer's Address: **35 Industrial Way**
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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.

Manufacturer

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Full Name

Principal Compliance Engineer

Title

Rochester, NH, USA

Location

Legal Representative in Europe

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CHAPTER 1

INTRODUCTION

Welcome to the Cabletron Systems **SEH100TX-22 100BASE-T Stackable Hub User's Guide**. This manual provides installation instructions, troubleshooting and reference information for the SEH100TX-22.



The terms SEH (Stackable Ethernet Hub) and SEHI (Stackable Ethernet Hub with Intelligence) are used throughout this manual when referring to the SEH100TX-22 and the SEHI100TX-22, respectively.

1.1 USING THIS MANUAL

Read through this manual to gain an understanding of the features and capabilities of the SEH. A general knowledge of Ethernet and IEEE 802.3u type data communications networks and their physical layer components is helpful when installing the SEH.

Chapter 1, **Introduction**, outlines the contents and describes the objectives and conventions of this manual. This chapter also provides information about how to get help and concludes with a list of related manuals.

Chapter 2, **SEH Features and Options**, briefly describes SEH features and provides information about available options.

Chapter 3, **Installation Requirements and Specifications**, provides installation requirements, network guidelines, and SEH specifications.

Chapter 4, **Installation**, contains instructions for installing the SEH as a stackable or standalone hub.

Chapter 5, **Connecting to the Network**, explains how to connect the SEH to the network using the various media types.

Chapter 6, **Troubleshooting**, describes how to use the LANVIEW LEDs to troubleshoot network problems.

Appendix A, **EPIM Information**, provides specifications, cabling information, and switch settings for the Ethernet Port Interface Modules.

1.2 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.

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

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

1.4 RELATED MANUALS

Use the Cabletron Systems *SEH100TX-22 100BASE-T Intelligent Stackable Hub User's Guide* to supplement the procedures and other technical data provided in this manual. The procedures contained in the *SEH100TX-22 100BASE-T Intelligent Stackable Hub User's Guide* are referenced where appropriate, but not repeated in this manual.

CHAPTER 2

SEH FEATURES AND OPTIONS

This chapter provides an overview of the SEH (Figure 2-1) and contains sections detailing the features and available options.



The abbreviations SEH (Stackable Ethernet Hub) and SEHI (Stackable Ethernet Hub with Intelligence) are used throughout this manual when referring to the SEH100TX-22 and the SEHI100TX-22, respectively.

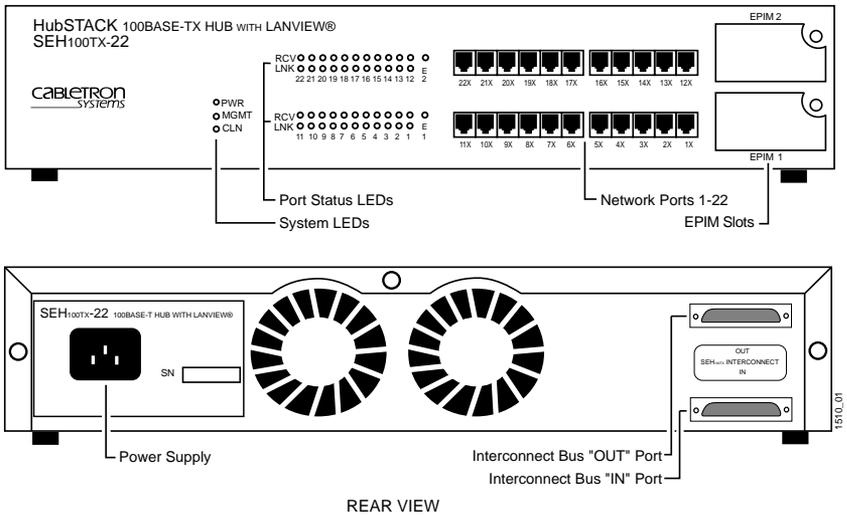


Figure 2-1 Front and Rear Views of the SEH100TX-22

2.1 SEH OVERVIEW

The SEH100TX-22 is a repeating hub providing 22 RJ45 ports and two Ethernet Port Interface Module (EPIM) ports on the front panel for network connections. The SEH has two rear panel Interconnect Bus ports for stackable connections. The front panel EPIM ports support the EPIM-100TX, EPIM-100FX, and the EPIM-100FMB. The SEH100TX-22 is designed to be managed by the Cabletron Systems intelligent stackable hub, the SEH100TX-22.



The SEH100TX-22 operates in a 100BASE-T Ethernet network. This product will NOT operate in a 10BASE-T environment. Connect the SEH100TX-22 only to similar 100BASE-T products such as the SEH100TX-22.

The SEH100TX-22 supports the EPIM-100TX, EPIM-100FX, and the EPIM-100FMB. No other Cabletron Systems EPIMs operate in this device.

2.2 SEH FEATURES

Repeater Functionality

The SEH fully conforms to the IEEE 802.3u Repeater specifications. The SEH transmits retimed data packets, regenerates the preamble, extends fragments, and arbitrates collisions.

The SEH100TX-22 meets IEEE 802.3u Repeater Class I standards. Class I standards allow one repeater between any two Data Terminal Equipment (DTE) devices within a single collision domain (network).

The SEH automatically partitions problem segments, and reconnects repaired segments to the network. This feature minimizes the impact on network operation resulting from a problem on one segment by isolating the problem segment. Only devices on the problem segment are affected. When the problem is solved, the SEH automatically reconnects the isolated segment to the network.

Polarity Detection and Correction

Each twisted pair port on the SEH incorporates a Polarity Detection and Correction feature which allows the SEH to pass data regardless of the polarity of the receive link on the twisted pair segment.

LANVIEW LEDs

Cabletron Systems LANVIEW status monitoring and diagnostics system is a troubleshooting tool that helps in diagnosing power failures, collisions, cable faults, and link problems. The LANVIEW LEDs are conveniently located on the SEH front panel.

2.3 STACKABLE CAPABILITIES

The SEH100TX-22 is a non-intelligent hub designed to be managed by the Cabletron Systems SEHI100TX-22 intelligent hub. The design of the SEH allows the stacking of five SEH hubs in an unmanaged configuration or up to four Cabletron Systems SEH non-intelligent hubs with one SEHI. The SEHI is placed at the bottom of the stack. It manages all SEH hubs in the stack and provides full packet and error statistics for the entire stack, individual devices, or individual ports.

SEH non-intelligent hubs may be stacked together or with one SEHI using Cabletron Systems HubSTACK Interconnect cables provided with the SEH. Stackable configurations make it possible to maintain only one IEEE repeater hop while providing up to 120 ports. The design allows hubs to be added or removed from a stack without having to power down the entire stack.

2.4 RACK MOUNTING CAPABILITIES

The SEH can be installed in a 19-inch rack. Cabletron Systems provides the necessary brackets and mounting screws for the SEH. Refer to Chapter 4, **Installation**, for complete rack mounting instructions.

2.5 OPTIONAL EPIMs

EPIMs are not included with the SEH, but they can be purchased separately from Cabletron Systems.

EPIMs enable the expansion of a network through different types of media. Cabletron Systems offers three optional EPIMs for the SEH100TX-22 and SEHI100TX-22 as shown in Table 2-1

Table 2-1 100BASE-TX/FX/FMB EPIMs

EPIM	Media Type	Connector
EPIM-100TX	Category 5 Unshielded Twisted Pair Cable	RJ45
EPIM-100FX	Multimode Fiber Optic Cable	SC
EPIM-100FMB for buffered uplinks	Multimode Fiber Optic Cable	SC

For more details about the EPIMs, refer to Appendix A.

CHAPTER 3

INSTALLATION REQUIREMENTS AND SPECIFICATIONS

This chapter describes cabling requirements, network guidelines, and operating specifications for the SEH100TX-22.



The network must meet the requirements and conditions specified in this chapter to obtain satisfactory performance from this equipment. Failure to follow these guidelines could result in poor network performance.

3.1 CABLE SPECIFICATIONS

The front panel SEH100TX-22 network ports support Category 5 Unshielded Twisted Pair (UTP) cabling. Ethernet Port Interface Modules (EPIMs) expand the network using UTP (EPIM-100TX) or multimode fiber optic (EPIM-100FX or EPIM-100FMB) cabling. For information concerning the two EPIM types, refer to Appendix A. The rear panel Interconnect Bus ports support Cabletron Systems Interconnect cables for stackable applications.

Take care in planning and preparing the network cabling and connections. The quality of the connections and the length of cables are critical factors in determining the reliability of the network. The following sections provide the specifications for each media type.

3.1.1 HubSTACK Interconnect Cable Requirements

Connect units in the stack together with the HubSTACK Interconnect cables shipped with the SEH module and available only from Cabletron Systems (P/N 9380209). The cables attach to the SEH100TX-22 rear panel bus ports.

The rear panel of the SEH has an Interconnect Bus Out port and an Interconnect Bus In port to stack hubs together. The bus supports five stackable devices. Stack up to five SEH hubs together or stack up to four SEH hubs together with one SEH100TX-22.

3.1.2 UTP Cable Specifications

The device at the other end of the twisted pair segment must meet IEEE 802.3u 100BASE-T specifications. When connecting a 100BASE-TX twisted pair segment to the SEH twisted pair network ports and the EPIM-100TX module, the network must meet the following requirements:

Length

The IEEE 802.3u 100BASE-T standard requires that 100BASE-TX devices have the ability to transmit over a 100 meter (328 foot) link using Category 5 UTP wire. The cable used must meet the Horizontal requirements and 90-meter length limitations. Patch cable should be used on each end of the Horizontal wire to make connections to punch down blocks, panels, or other connecting devices. The combined lengths of the patch cords must not exceed 10 meters so the total segment length including the patch cords does not exceed 100 meters (328 feet).

Category 5 cables are marked on the cable jacket as Cat 5, Category 5, Level 5, Level V, or an equivalent.

Impedance

UTP cables typically have an impedance of between 85 and 110 ohms.

Jitter

Intersymbol interference and reflections cause jitter in the bit cell timing, resulting in data errors. A 100BASE-TX link must not generate more than 1.4 ns of jitter. If the cable meets the impedance requirements for a 100BASE-TX link, jitter should not be a concern.

Crosstalk

Crosstalk is caused by signal coupling between the different cable pairs contained within a multi-pair cable bundle. 100BASE-TX transceivers are designed so that the user does not need to be concerned about cable crosstalk, provided the cable meets all other requirements.

Noise

Noise is caused by either crosstalk or externally induced impulses. Impulse noise may cause data errors if the impulses occur at very specific times during data transmission. Generally, the user need not be concerned about noise. If noise-related data errors are suspected, it may be necessary to either reroute the cable or eliminate the source of the impulse noise.

Propagation Delay

Propagation delay is the amount of time it takes data to travel from the sending device to the receiving device. Total propagation delay allowed for the network is 256 bit times (2.56 μ s) in one direction (5.12 μ s round trip). If the total propagation delay between any two nodes on the network exceeds 2.56 μ s, then use bridges or other devices to further segment the network.

Temperature

The attenuation of PVC insulated cable varies significantly with temperature. At temperatures greater than 40°C (104°F), Cabletron Systems recommends the use of plenum-rated cables to ensure that cable attenuation remains within specification.

3.1.3 Multimode Fiber Optic Cable Specifications

The SEH supports the Cabletron Systems EPIM-100FX and EPIM-100FMB. These EPIMs meet IEEE 802.3u standards. When connecting a fiber optic segment to the SEH EPIM-100FX or EPIM-100FMB module, the network must meet the following requirements:

Cable Loss

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 is within an acceptable level. The maximum loss for a multimode fiber optic cable is 11.0 dB.

Fiber Optic Budget and Propagation Delay

Determine the maximum fiber optic cable length by calculating the fiber optic budget delay and total network propagation before fiber optic cable runs are incorporated in any network design.

Fiber optic budget is the combination of the optical loss due to the fiber optic cable, in-line splices, and fiber optic connectors.

Propagation delay (collision delay) is the amount of time it takes data to travel from the sending device to the receiving device. Total propagation delay allowed for the entire network is 256 bit times (2.56 μ s) in one direction (5.12 μ s round trip). If the total propagation delay between any two nodes on the network exceeds 2.56 μ s, then use bridges or other devices to further segment the network.

3.2 NETWORK CABLE LENGTHS

This section details the maximum network cable lengths specified by the IEEE 802.3u standard for a Class I repeater. As stated previously, the physical size of the network is limited primarily by propagation delay. The round trip delay cannot exceed 512 bit times or 5.12 μ s.



A stack of five SEH hubs or four SEH hubs and one SEHI hub is equivalent to one repeater.

A 100BASE-T network might use all UTP links, all fiber links, or a combination of both. Figure 3-1 shows a simplified example of a network with one Class I repeater. Link segments A and B represent the longest links in the network. In this case, if both segment A and segment B are UTP, each segment may be up to 100 meters long for a maximum network length of 200 meters. If segment A is UTP and segment B is fiber optic, the maximum length of the network is 263 meters (with a maximum UTP segment length of 100 meters). If both segments A and B are multimode fiber optic, the maximum length is 274 meters.

If a buffered uplink (EPIM-100FMB) is used, the collision domain is stopped at the EPIM slot. This allows a full length fiber optic link of 400 meters to be used as an uplink while maintaining 100-meter UTP and 400-meter fiber optic lengths to desktops. So if segment A, shown in Figure 3-1, is UTP and segment B is fiber optic, the maximum length of the network is 500 meters. If both segments are fiber optic, the maximum length is 800 meters.

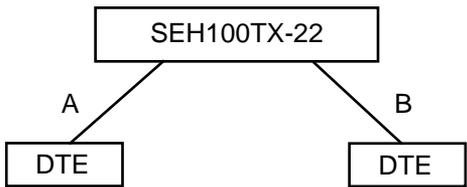


Figure 3-1 Class I Network

Table 3-1 summarizes the maximum segment lengths for the type and combination of cables used with a Class I repeater.



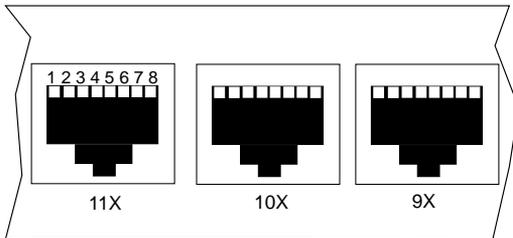
The maximum length of an individual UTP segment may be no more than 100 meters for proper operation.

Table 3-1 Maximum Class I Network Cable Length

Number of Repeaters	UTP	UTP & Multimode Fiber Optics	Multimode Fiber Optics	UTP & Buffered EPIM	Fiber Optics & Buffered EPIM
1	200 m	263 m	274 m	500 m	800 m

3.3 NETWORK PORT SPECIFICATIONS

The SEH network ports use shielded RJ45 connectors that support UTP cabling. Figure 3-2 shows the RJ45 pinouts.



- | | |
|---------------|---------------|
| 1. Receive + | 5. Not Used |
| 2. Receive - | 6. Transmit - |
| 3. Transmit + | 7. Not Used |
| 4. Not Used | 8. Not Used |

09162_02

Figure 3-2 RJ45 Network Port Pinouts

3.4 OPERATING SPECIFICATIONS

This section details power supply and environmental requirements.

3.4.1 Power Supply Requirements

The SEH has a universal power supply. The input power requirements are listed in Table 3-2.

Table 3-2 Power Requirements

Line Input Range	Current	Frequency
100–125 Vac	4.0 A	50/60 Hz
200–250 Vac	2.0 A	

3.4.2 Environmental Requirements

The environmental requirements for the SEH are detailed in this section.

Operating Temperature: 5°C to 40°C (41°F to 104°F)

Storage Temperature: -30°C to 73°C (-22°F to 164°F)

Operating Humidity: 15% to 95% (non-condensing)

3.5 AGENCY APPROVALS

The safety, emission, and immunity approvals for the SEH are detailed in this section.

3.5.1 Safety

This unit meets the requirements of UL 1950, CSA C22.2 No. 950, IEC 950, and EN 60950.

3.5.2 Emission

This unit is compliant with the requirements of FCC Part 15 Class A, EN 55022 Class A, and VCCI Class I.

CHAPTER 4

INSTALLATION

This chapter outlines the procedure for attaching the SEH to the network as a stackable or standalone device. Ensure that the network meets the guidelines and requirements outlined in Chapter 3, **Installation Requirements and Specifications**, before installing the SEH.



A single phase grounded power receptacle that meets the power supply requirements listed in Chapter 3 must be located within seven feet of the installation.



Failure to follow installation instructions may result in damage to the equipment or electrical shock hazard.

This chapter covers the following topics:

- Unpacking the SEH (Section 4.1)
- Installing the SEH in a tabletop configuration (Section 4.2)
- Rack Mounting the SEH (Section 4.3)
- Powering Up and Stacking the SEH (Section 4.4)
- Installing Optional EPIMs (Section 4.5)

4.1 UNPACKING THE SEH

Unpack the SEH as follows:

1. Remove the shipping material covering the SEH in the shipping box.
2. Carefully remove the SEH from the shipping box and set it aside to prevent damage.
3. Visually inspect the SEH. If there are any signs of damage, contact Cabletron Systems Technical Support immediately. Refer to Section 1.3, **Getting Help**, for instructions.

The SEH may be installed on a tabletop or shelf, or in a 19-inch rack, and configured as a standalone or stacked hub.

Go to Section 4.2 to install an SEH on a table or shelf. Go to Section 4.3 to install the SEH in a rack.

4.2 TABLETOP OR SHELF INSTALLATION

This section provides guidelines for installation on a tabletop or shelf.

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

- In a shelf installation, the shelf must be able to support 30 pounds of static weight for each device in the stack.
- 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.

The SEH must be located within seven feet of its power source and with an unrestricted free surface area as shown in Figure 4-1.



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

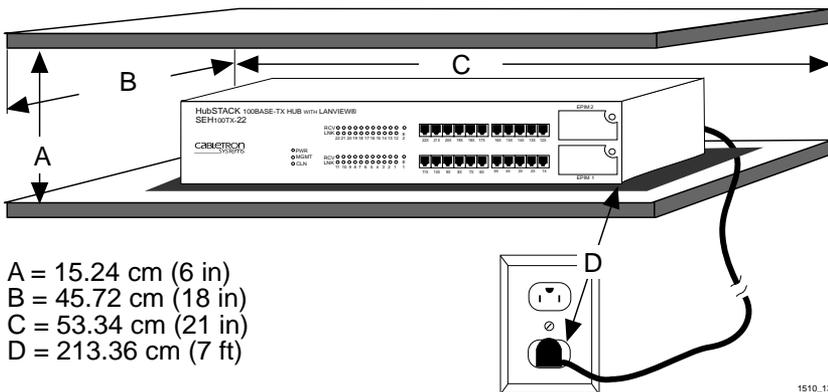


Figure 4-1 Tabletop or Shelf Installation

Proceed to Section 4.4, **Powering Up and Stacking the SEH.**

Rack Mounting the SEH

Refer to Figure 4-3 and proceed as follows to install the SEH into a 19-inch rack.

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



Do not remove the cover from the SEH. Do not remove any other screws from the unit.

2. Using the four 6-32 x 3/8-inch replacement flathead cover screws provided in the rackmount kit, attach the rack mounting brackets to each side of the SEH.

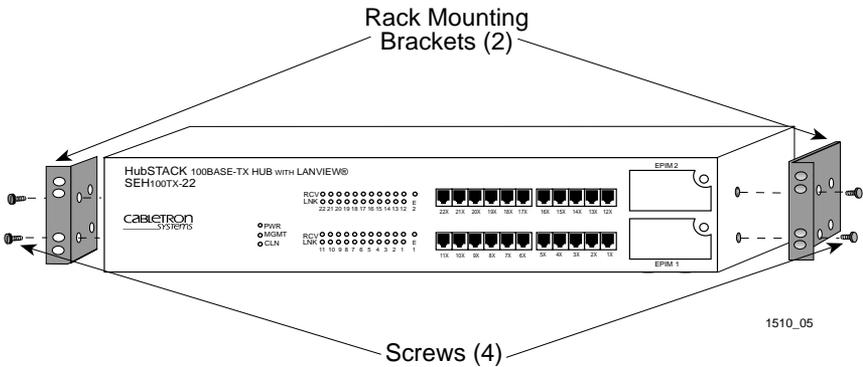


Figure 4-3 Installing the Rack Mounting Brackets



The cooling fans at the rear panel of the SEH must have adequate clearance (**two inches on either side and in the rear**) for unrestricted air flow. The temperature for the selected location must be maintained between 5°C and 40°C, and fluctuate less than 10°C per hour.

3. Ensure that the rack used will support the unit, and that the rack will remain stable with the unit installed in it. Support the SEH securely from underneath, and align the mounting brackets of the SEH chassis with the screw holes in the equipment rack as shown in Figure 4-4. Fasten the SEH to the equipment rack securely.

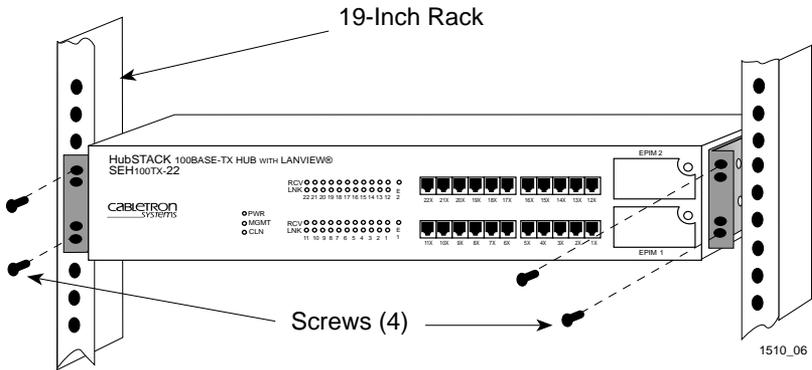


Figure 4-4 Installing the SEH in the Rack

Proceed to Section 4.4, **Powering Up and Stacking the SEH**.

4.4 POWERING UP AND STACKING THE SEH

The following section details the procedures that **must** be followed to power up and interconnect stacked hubs.



Failure to follow this procedure may result in damage to the equipment.



If you are using an intelligent hub (SEHI) to manage the stack, you must locate the SEHI at the bottom of the stack.

The SEHI must be completely powered up and initialized before powering up and interconnecting the rest of the stack.

If you are using an SEHI to manage the SEH stack, proceed to Section 4.4.1. If you are not using an SEHI to manage the SEH stack, proceed to Section 4.4.2.

4.4.1 Stacking SEH Hubs with an SEHI

Follow the procedures in this section if you are using an SEHI to manage an SEH stack:



The SEH and the SEHI have universal power supplies that allow connection to power sources from 100 Vac to 125 Vac @ 4.0 A or 200 Vac to 250 Vac @ 2.0 A, 50/60 Hz.

1. Power up the SEHI by plugging the power cord into the back panel of the SEHI and plugging the other end into a grounded receptacle.



Locate the SEHI at the bottom of the stack.

For management purposes, stacked hubs are always numbered from 1 to 5 starting at the bottom.

2. Verify that the PWR LED is on, indicating that the SEHI is receiving power. After the SEHI runs a self test and completes the boot process successfully, the CPU LED blinks green indicating normal operation. If the LED remains red, the processor is faulty; contact Cabletron Systems Technical Support. Do not proceed with the following steps until the CPU LED is a steady blinking green.



Do NOT power up or interconnect any other hubs in the stack until the SEHI has successfully completed the boot process.

Also, do NOT connect the interconnect cable between the SEH and the SEHI before powering up the SEH. Otherwise, damage to the SEH may result.

3. Power up the SEH above the SEHI in the stack by plugging the power cord into the back panel of the SEH and plugging the other end into a grounded receptacle.
4. Verify that the **PWR** LED is on, indicating that the SEH is receiving power.

- Attach the interconnect cable to the “IN” port on the rear panel of the SEH as shown in Figure 4-5.

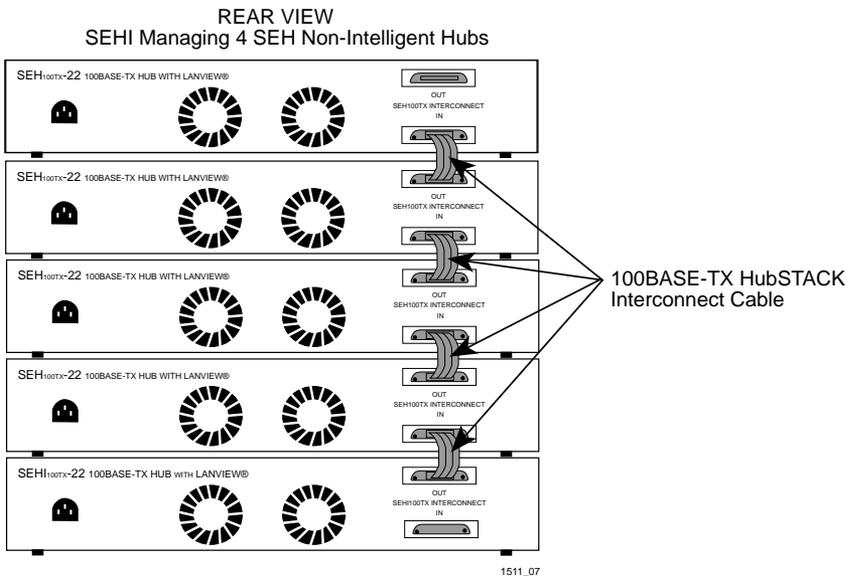


Figure 4-5 Stacking the SEH and SEHI

- Attach the other end of the interconnect cable to the “OUT” port on the rear panel of the hub at the bottom of the stack.



Do not leave an interconnect cable connected at only one end during network operation. Corrupted data may result.

- Repeat steps 3 through 6 until all SEH hubs are connected.

4.4.2 Stacking Unmanaged SEH Hubs Together

Use the following procedure to stack non-intelligent hubs (SEHs) together.



The SEH has a universal power supply that allows connection to power sources from 100 Vac to 125 Vac @ 4.0 A or 200 Vac to 250 Vac @ 2.0 A, 50/60 Hz.

1. Power up each SEH in the stack by plugging the power cord into the back panel of the SEH and plugging the other end into a grounded receptacle.
2. Verify that the **PWR** LED for each hub is on, indicating that each SEH is receiving power.
3. Attach the interconnect cable to the “IN” port on the rear panel of the second SEH in the stack as shown in Figure 4-5.
4. Attach the other end of the interconnect cable to the “OUT” port on the rear panel of the first SEH in the stack.



Do not leave an interconnect cable connected at only one end during network operation. Corrupted data may result.

5. Continue connecting ports in this manner until all hubs are connected.

4.5 INSTALLING AN EPIM

This section contains procedures on how to replace an EPIM-100TX, EPIM-100FX, or EPIM-100FMB to upgrade or change the capabilities of your SEH100TX-22. After installing a new EPIM, refer to the appropriate EPIM section in Appendix A to verify proper operation.



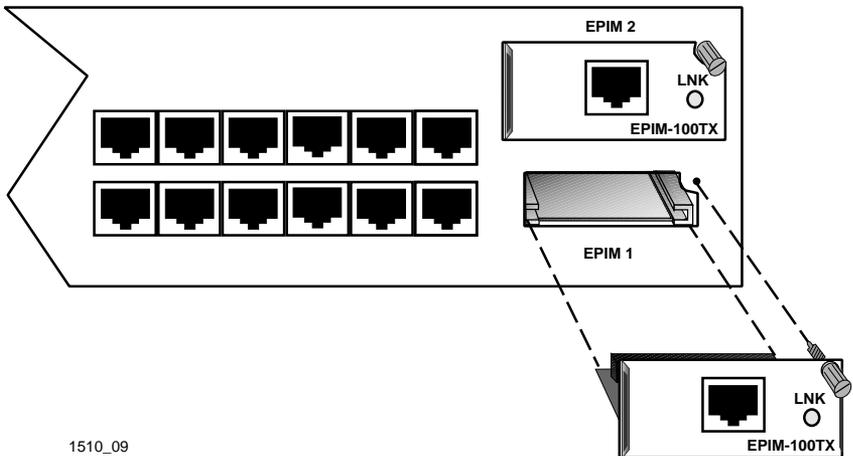
Observe all static precautions while handling an EPIM.

To install an EPIM-100TX, EPIM-100FX, or EPIM-100FMB, proceed as follows:



When removing an EPIM, pull the module straight out to prevent damage to the connector.

1. Remove the coverplate or the existing EPIM (whichever applies).
2. Slide the new EPIM into place, making sure that the connectors on the rear of the EPIM align correctly and firmly with the connector inside the SEH. Refer to Figure 4-6.
3. Tighten the mounting screw.



1510_09

Figure 4-6 Installing an EPIM

CHAPTER 5

CONNECTING TO THE NETWORK

This chapter outlines the procedure for connecting the SEH to a network. Ensure that the network meets the guidelines and requirements outlined in Chapter 3, **Installation Requirements and Specifications**, before installing the SEH100TX-22.

5.1 CONNECTING THE SEH100TX-22 TO THE NETWORK

The procedure for connecting network segments to the SEH varies depending on the media and ports being connected. Refer to the following list and perform the procedure described in the subsections that apply to connecting the SEH to a network:

- Network Ports Section 5.1.1
- EPIM-100TX Section 5.1.2
- EPIM-100FX or EPIM-100FMB Section 5.1.3

Prior to connecting the network cabling, check the connectors for the proper pinouts as shown in Chapter 3.

5.1.1 Connecting to Network Ports

Attach UTP segments to the RJ45 network ports on the front panel of the SEH. Each RJ45 network port on the SEH incorporates a polarity detection and correction feature. The polarity detection and correction feature allows the SEH to pass data regardless of the polarity of the twisted pair segment's receive link. Operating in this condition is not recommended; the segment should be removed from the network and wired correctly by a technician.

Connect the twisted pair segments to the SEH as follows:

1. Plug the RJ45 connector from each twisted pair segment into the desired network port on the SEH. See Figure 5-1.
2. Plug the RJ45 connector at the other end of the twisted pair segment into the other device as appropriate.

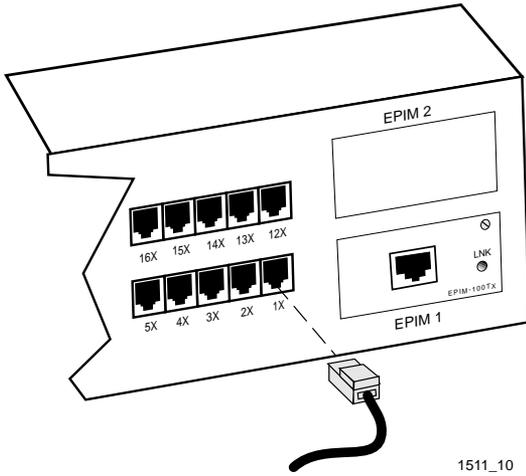


Figure 5-1 SEH Network Ports

3. Check that the applicable **LNK** LED for the port is on. If the LED is off, perform each of the following steps until it is on:
 - a. Check that the 100BASE-TX device at the other end of the twisted pair segment is powered up.
 - b. Verify that the RJ45 connector on the twisted pair segment has the proper pinouts.
 - c. Check the cable for continuity.
 - d. Check that the twisted pair connection meets the cable specifications outlined in Section 3.1.2.

If a link is not established, contact Cabletron Systems Technical Support. Refer to Section 1.3 for details on getting help.

5.1.2 Connecting to an EPIM-100TX

The EPIM-100TX is often used to provide a connection between the SEH and a bridge, router, or switch. Normally, in this configuration, a “straight-through” cable is used and the EPIM crossover switch, shown in Figure 5-2, is set to “not crossed over.”

The EPIM-100TX is also used to provide another RJ45 port to connect to a UTP segment. Before connecting a segment to the EPIM-100TX, check each end of the segment to determine if the wires have been crossed over for the proper connection. If the wires do not cross over, use the switch on the EPIM-100TX to internally cross over the RJ45 port. Refer to Figure 5-2 to set the EPIM-100TX crossover switch.

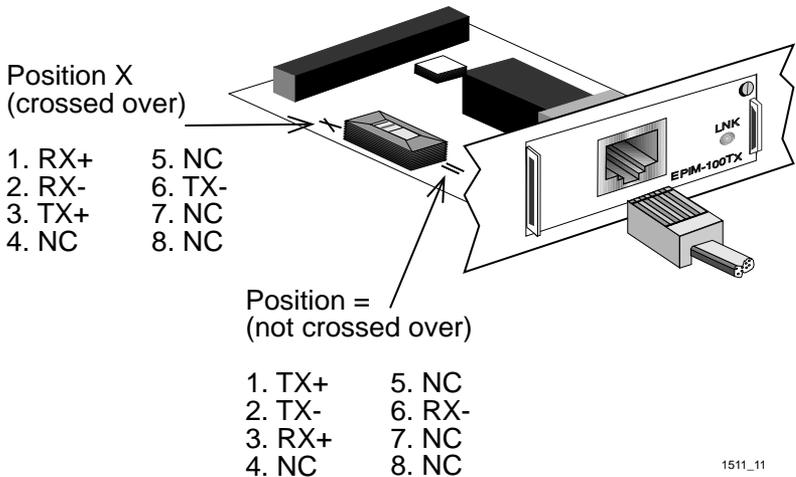


Figure 5-2 EPIM-100TX Crossover Switch

Connect an EPIM-100TX to a twisted pair segment as follows:

1. Connect the twisted pair segment to the module by plugging the RJ45 connector on the twisted pair segment into the RJ45 port on the module. See Figure 5-2.
2. Plug the RJ45 connector at the other end of the twisted pair segment into the other device as appropriate.
3. Check that the **LNK** LED on the EPIM-100TX is on. If the LED is off, perform each of the following steps until it is on:
 - a. Check that the 100BASE-TX device at the other end of the twisted pair segment is powered up.
 - b. Verify that the RJ45 connector on the twisted pair segment has the proper pinouts.

- c. Check the cable for continuity.
- d. Check that the twisted pair connection meets the cable specifications outlined in Section 3.1.2.
- e. Check that the crossover switch is in the correct position.

If a link is not established, contact Cabletron Systems Technical Support.

5.1.3 Connecting an EPIM-100FX or EPIM-100FMB

The EPIM-100FX and EPIM-100FMB have an SC style network port (see Figure 5-3). Cabletron Systems supplies fiber optic cables that use SC connectors that are keyed to insure proper crossover of the transmit and receive fibers.



An odd number of crossovers (preferably one) must be maintained between devices so that the transmit port of one device is connected to the receive port of the other device and vice versa.

Use the following steps to connect a fiber segment to the EPIM-100FX or EPIM-100FMB:

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



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 the ends causes problems in data transmissions. If the ends become contaminated, clean them with alcohol using a soft, clean, lint-free cloth.

2. Insert one end of the SC connector into the SEH EPIM-100FX or EPIM-100FMB. See Figure 5-3.
3. At the other end of the fiber optic cable, attach the SC connector to the other device.

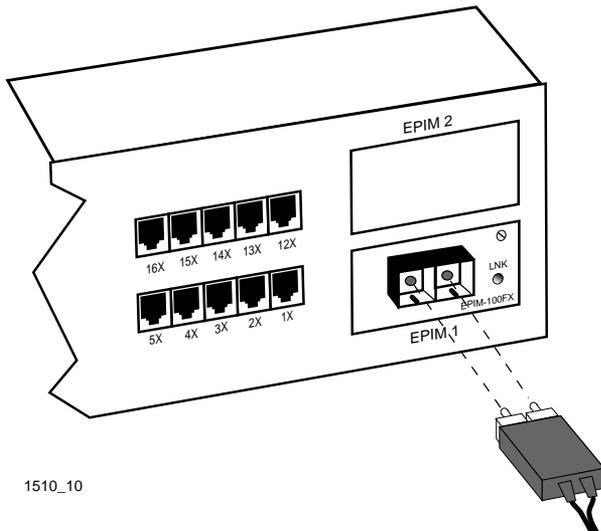


Figure 5-3 EPIM-100FX Port

4. Check that the EPIM-100FX or EPIM-100FMB **LNK** LED is on. If the LED is off, perform the following steps until it is on:
 - a. Check that the device at the other end of the link is powered up.
 - b. Verify that there is proper “cross-over” of the fiber optic strands between the applicable port on the SEH and the fiber optic device at the other end of the fiber optic segment.
 - c. Verify that the fiber optic connection meets the dB loss specifications outlined in Section 3.1.3.

If a link is not established, contact Cabletron Systems Technical Support. Refer to Section 1.3 for instructions on getting help.

5.2 TESTING THE INSTALLATION

The SEH100TX-22 is now ready for operation. Before placing the network into service, test that all stations can be addressed and that the SEH and all stations are indicating normal operation. Ensure that the networking software is configured properly to match the installed network. If there are any errors or abnormal operation, proceed to Chapter 6, **Troubleshooting**.

CHAPTER 6

TROUBLESHOOTING

This chapter contains instructions for using LANVIEW LEDs to troubleshoot physical layer network problems.

6.1 INSTALLATION TEST

After connecting the SEH to the network, verify that packets pass between all Ethernet devices connected to the SEH and any other devices connected to the network. If there is a problem with any of the attached devices, check the link as follows:

1. Check that the **LNK** LED, if applicable, for the port is on. If the LED is off, perform each of the following steps until it is on.
 - a. Check that the 100BASE-T device at the other end of the twisted pair segment is powered up.
 - b. Verify that the connector on the twisted pair segment has the proper pinouts. Refer to Chapter 3, for the pin assignments for twisted pair connectors.
 - c. For the EPIM-100FX or EPIM-100FMB, check that the TX and RX strands are properly connected.
 - d. Check the cable for continuity. Several tools are available for this test, depending on the media used.
 - e. Check that the twisted pair segments or fiber optic segments meet the cable specifications as described in Chapter 3.

2. If the remote station is ready and the **LNK** LED is on, but no data passes through the port, one of the following conditions may exist:
 - a. Network management has disabled the port. Correct this condition by enabling the port through network management.
 - b. The port is segmented either because the collision detector was on for more than 110 μ s or the SEH detected more than 32 consecutive collisions on the attached segment. The affected port remains segmented until a good packet is transmitted/received without collisions.

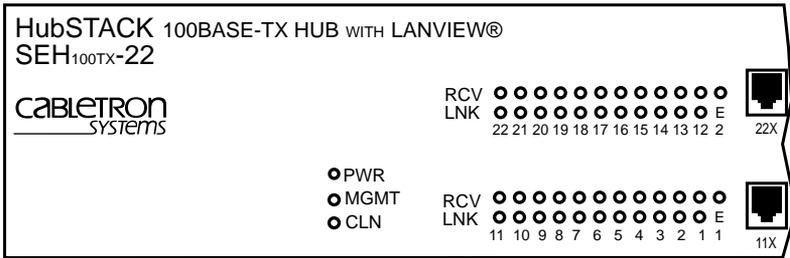
If the **LNK** LED is still off, contact Cabletron Systems Technical Support.

6.2 USING LANVIEW

The SEH incorporates the Cabletron Systems LANVIEW status monitoring and diagnostics system. LANVIEW LEDs help diagnose problems such as power failure or cable fault. The SEH includes the following LANVIEW LEDs:

- **PWR**, for power status
- **MGMT**, for management status
- **RCV** (Receive), **LNK** (Link), and **CLN** (Collision) for Ethernet status

Figure 6-1 provides a quick reference chart of LED locations and definitions. This chapter also includes a detailed description of each LED.



LED NAME	LED COLOR	DEFINITION
PWR (Power)	Off	No power
	Green (Solid)	Power
MGMT (Management)	Green (Flashing)	SEH managed by an intelligent hub
	Off	SEH not managed
CLN (Collision)	Red (Flashing)	Collision
	Off	No collision
RCV (Receive)	Yellow (Flashing)	SEH is receiving data
	Off	No activity
LNK (Link)	Green	Link established
	Off	No Link

15101_02

Figure 6-1 LANVIEW LEDs



Flashing indicates an irregular LED pulse.

Blinking indicates a steady LED pulse.

PWR

When this green LED is on, it indicates that the SEH is receiving power. If this LED is off, it indicates a loss of input power. Check that the power cord is properly plugged into the SEH and into the ac input power source (circuit breaker, fuse, etc.). If the proper source power is present, the problem could be with the SEH.

MGMT

This LED flashes when an intelligent hub is managing the SEH. If this LED is not flashing, an intelligent hub is not managing the SEH. If an intelligent hub is attached to the SEH and the LED is not flashing, inspect the HubSTACK interconnect cables for proper connection.

CLN

When this red LED flashes, it indicates that a collision has occurred on one of the ports.

RCV

When a yellow RCV LED flashes, it indicates that the SEH is receiving data packets from the associated port segment. Each SEH port has a corresponding RCV LED:

- Network Ports: RCV LEDs 1-22
- EPIM 1: RCV LED E1
- EPIM 2: RCV LED E2

LNK

When a green LNK LED is on, it indicates an established link between the associated port and the device at the other end of the segment. The LNK LED remains on as long as a link is maintained. Each SEH Network Port (ports 1-22) has a corresponding LNK LED.

APPENDIX A

EPIM INFORMATION

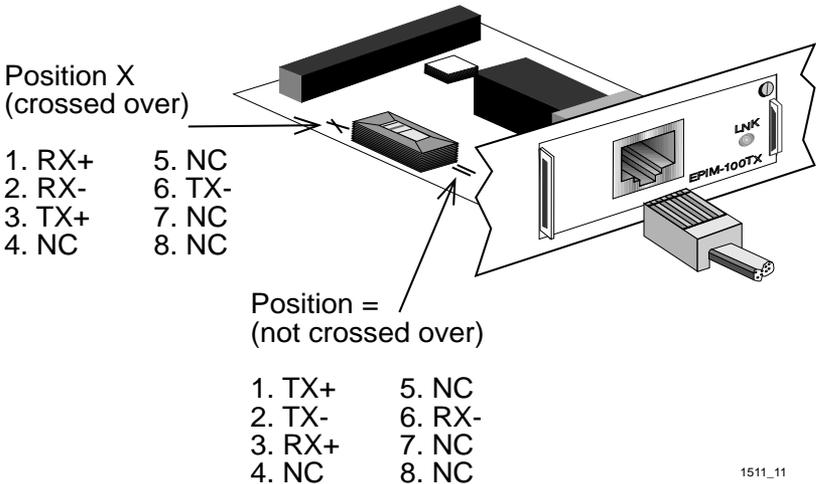
A.1 EPIM SPECIFICATIONS

EPIMs enable the connection of the SEH to the network using different media types. The SEH100TX-22 supports the EPIM-100TX, EPIM-100FX, and the EPIM-100FMB. This appendix provides the specifications for each EPIM.

A.1.1 EPIM-100TX

The EPIM-100TX is an RJ45 connector supporting Unshielded Twisted Pair (UTP) cabling.

The slide switch on the EPIM-100TX determines the crossover status of the cable pairs. If the switch is on the **X** side, the pairs are internally crossed over. If the switch is on the **=** side, the pairs are not internally crossed over. Figure A-1 shows the pinouts for the EPIM-100TX in both positions.



1511_11

Figure A-1 EPIM-100TX Pinouts

A.1.2 EPIM-100FX

The EPIM-100FX shown in Figure A-2 supports Multimode Fiber Optic cabling. The EPIM-100FX is equipped with an SC style connector. Specifications for the EPIM-100FX are listed in Table A-1.

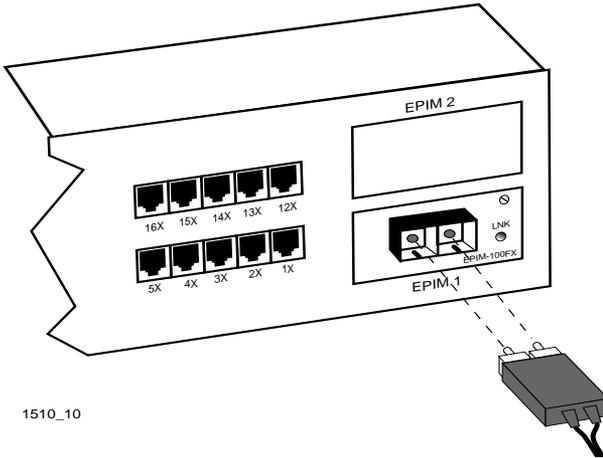


Figure A-2 EPIM-100FX

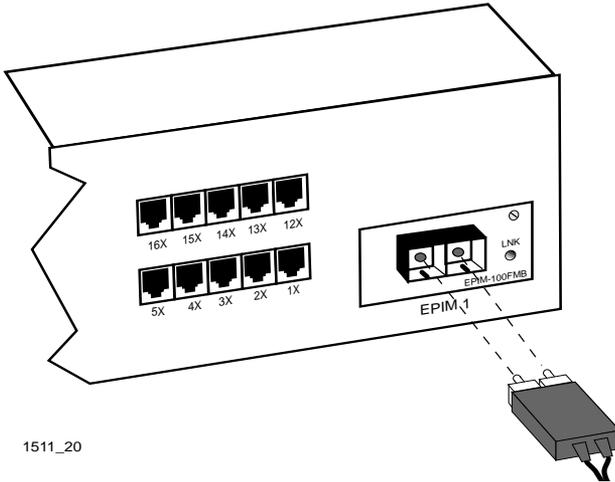
Table A-1 Transmitter Power (EPIM-100FX)

Cable Type	Worst Case Budget	Typical Budget
50/125 μm fiber optic	6.0 dB	9.0 dB
62.5/125 μm fiber optic	9.0 dB	12.0 dB
100/140 μm fiber optic	15.0 dB	18.0 dB

The transmitter power levels listed above are peak power levels after optical overshoot. A peak power meter must be used to correctly compare the values given above to those measured on any particular port. If power levels are being measured with an average power meter, add 3 dBm to the measurement to compare the measured values to the values listed above.

A.1.3 EPIM-100FMB

The EPIM-100FMB shown in Figure A-3 supports multimode fiber optic cabling and has an SC style connector.



1511_20

Figure A-3 EPIM-100FMB

The EPIM-100FMB acts as a non-filtering bridge. Its purpose is to extend the Broadcast Domain of a shared access 100BASE-T LAN, so that a full length of fiber optic cable can be used to reach the next domain or more typically to a switch port.

The maximum 100BASE-T collision domain using UTP cable to the desktop and fiber cable in the next domain or switch port is only 263 meters (100 meters of UTP and 163 meters of fiber optics). There are circumstances where the maximum fiber optic cable length of 163 meters does not meet some requirements such as in the cabling of high rise buildings or campus environments. The EPIM-100FMB helps meet these requirements by extending the maximum fiber optic cable length that can be used from 163 meters to 400 meters.

Table A-2 provides the specifications for the EPIM-100FMB.

Table A-2 Transmitter Power (EPIM-100FMB)

Cable Type	Worst Case Budget	Typical Budget
50/125 μm fiber optic	6.0 dB	9.0 dB
62.5/125 μm fiber optic	9.0 dB	12.0 dB
100/140 μm fiber optic	15.0 dB	18.0 dB

The transmitter power levels and receive sensitivity levels listed are peak power levels after optical overshoot. A peak power meter must be used to correctly compare the values given above to those measured on any particular port. If power levels are being measured with an average power meter, add 3 dBm to the measurement to compare the measured values to the values listed above.

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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 Geraet benuetzt wird, soll einen zwei Leiter mit Erdleiter haben, wobei die Leiter mindestens 0.75 mm sind, mit einer normalen IEC Geraetesteckdose an einem Ende und einem Geraetestecker am anderen Ende versehen sind, der fuer den Gebrauch und die Anwendung des Geraetes 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 mm² 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 mm² 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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