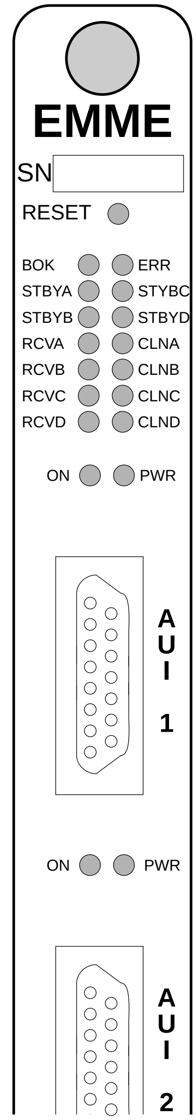
EMME

(ETHERNET MANAGEMENT MODULE WITH ETHERNET)

USER'S GUIDE



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CHAPTER 1
INTRODUCTION

Welcome to the Cabletron Systems **Ethernet Management Module (EMME) User's Guide**. This manual provides the technical user with a description of the EMME and the information needed to install and operate it in a Cabletron Systems Multi Media Access Center with the Flexible Network Bus (MMAC-FNB).

A general knowledge of Ethernet and IEEE 802.3 type data communications networks and their physical layer components is helpful when using the EMME.

1.1 USING THIS MANUAL

Before installing or operating the EMME, read through this manual to familiarize yourself with its content and to gain an understanding of the features and capabilities of the EMME. This manual is organized as follows:

Chapter 1, **Introduction**, discusses the capabilities of the EMME and provides an overview of its multichannel capability that supports up to four separate Ethernet segments. This chapter also explains the EMME repeater and bridge functionality, concluding with a list of related manuals.

Chapter 2, **Network Planning and Configuration**, explains the network requirements to consider before installing the EMME. This chapter also includes sample configurations demonstrating various applications for the EMME.

Chapter 3, **Installing the EMME**, provides instructions on how to install the EMME into an MMAC-FNB, set the EMME's mode switches, and connect segments to the EMME.

Chapter 4, **Testing the EMME**, provides procedures for testing the EMME before it is installed and again after connecting it to the network.

Chapter 5, **Local Management**, describes EMME Local Management. Local Management provides tools to manage the EMME and its attached segments.

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Chapter 6, **MIB Navigator**, describes MIB Navigator's management and control. The MIB Navigator manages EMME-related Management Information Bases.

Chapter 7, **Troubleshooting**, details the Remote LANVIEW LEDs incorporated into the EMME that enable you to quickly diagnose problems that may occur with the module. This chapter also includes a troubleshooting checklist, procedures for using the reset button, and instructions for calling Technical Support if you need assistance.

Appendix A, **Image File Download Using OIDs**, provides instructions for downloading an image file to the EMME by setting the MIB OID strings.

Appendix B, **EMME OIDs**, contains selected OID strings which are most often used.

Appendix C, **EMME Specifications**, contains location requirements and operating specifications for the EMME.

1.2 ETHERNET MANAGEMENT MODULE OVERVIEW

The Cabletron Systems Ethernet Management Module with Ethernet (EMME) is the heart of the Cabletron Systems Multi Media Access Center. The EMME can provide four bridged and managed channels and management for three separate Ethernet channels within a single MMAC. This is accomplished by having channel A operate over the Power and Management Bus, Cabletron's original Ethernet channel. Channels B and C operate over the Flexible Network Bus (FNB). The EMME can also bridge all three channels to a fourth externally connected channel (D, usually a backbone connection), using one of the AUI ports on the faceplate of the module.

The Cabletron Systems Ethernet non-repeater Media Interface Modules use channel A on the MMAC backplane to communicate with the EMME which performs the repeating function. MIMs provide a variety of different media connections at one point within an MMAC. The EMME incorporates an IEEE 802.3 repeater to provide repeater functionality for these MIMs.

The EMME is fully compliant with IEEE 802.3 standards and provides support for Spanning Tree IEEE 802.1d and DECnet.

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The EMME operates in conjunction with Cabletron Systems' Repeater Interface Controller (RIC) Media Interface Modules (MIMs) by using the MMAC's FNB Ethernet channels B and C.

The EMME is SNMP compliant and can be controlled and monitored by numerous SNMP Network Management packages both remotely and locally. EMME firmware also supports Distributed LAN Monitor (DLM) and Full Remote Monitoring (RMON) groups including: Alarms, Events, History, Hosts, Hosts Top N, Statistics, Matrix, Captive and Filter.

The EMME also provides the following:

- i960 RISC based processor
- Four bridged/routed Ethernet networks
- IEEE 802.1 D Spanning Tree and DEC Spanning Tree support
- IEEE 802.3 compliance
- Flash download capability for easy firmware downloads
- Standard FTP download capability
- LANVIEW diagnostic LEDs
- Special Filtering Data Base
- Complete SNMP management capability
- IETF MIB support including bridge, RMON, and MIBII
- Complete packet and error breakdown for all four channels
- Cabletron Systems' Distributed LAN Monitoring (DLM) reducing management traffic between network devices and management platform
- Cabletron Systems' cable redundancy

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1.2.1 Multi Media Access Center with Flexible Network Bus

The Multi Media Access Center with Flexible Network Bus (MMAC-FNB) provides the platform for the operation of the EMME. The MMAC backplane provides three Ethernet buses designated as Ethernet A, B, and C (See Figure 1-1). Cabletron Systems' non-repeater MIMs communicate over Ethernet A while Cabletron Systems' repeater MIMs use the Ethernet B and C buses. The EMME connects these buses to provide bridging and management functionality.

There are two types of MMACs supporting Flexible Network Bus architecture: shunting and non-shunting. Shunting supportive MMAC-FNBs allow modules operating on either the Ethernet B or C bus to continue communications with the EMME regardless of whether there is an empty slot or an Ethernet A bus module between them in the chassis.

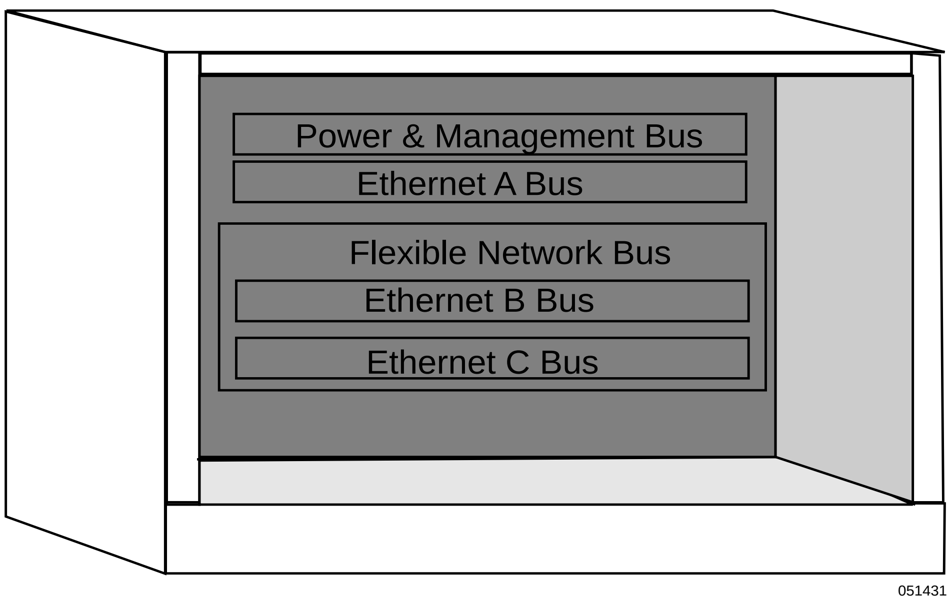

Figure 1-1. MMAC Flexible Network Bus

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Table 1-1 provides a list of the MMAC-FNB chassis where shunting capabilities are set at the factory.

Table 1-1. MMAC-FNB Chassis

MMAC-FNB Chassis	Serial No.
MMAC-3FNB	**FC**000000000 or above
MMAC-5FNB	**CC**000000000 or above
MMAC-8FNB	**CG**000000000 or above
MMAC-M3FNB	ALL
MMAC-M5FNB	ALL
MMAC-M8FNB	**DK**000000000 or above

1.2.2 Repeater Interface Controller Media Interface Modules

Cabletron Systems' MultiChannel family of Media Interface Modules (MIMs) includes the Repeater Interface Controller (RIC), which is an IEEE 802.3 compliant multi-port repeater. You can configure these modules to operate on either the Ethernet B or C bus, via hardware jumpers or management software. Software management overrides any hardware configuration setting.

RIC technology provides the MIM with an inter-RIC bus, allowing multiple RIC MIMs communicating over the RIC bus to act as a single logical repeater. For example, an Ethernet frame taking a path from one RIC MIM, to the Inter-RIC bus, to another RIC MIM (the frame being retimed and regenerated to all ports from the last RIC MIM) has a path cost equivalent to only one repeater hop. Since Ethernet networks are limited to four serially linked repeaters, using the RIC repeater offers a significant advantage. By using cascading RIC MIMs, each of which support at least 13 cable segments, you can build a much larger network than you could with stand-alone repeaters.

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1.2.3 Ethernet Channels A, B, C, and D

The EMME supports up to four Ethernet channels, provides management for the four channels, and bridging between the ports. The four EMME Ethernet channels access the same shared memory so that bridging between the channels occurs concurrently.

TPMIM, FOMIM, and THNMIM - The EMME provides repeater functionality for these Cabletron Systems non-repeater Media Interface Modules by using Ethernet channel A on the MMAC backplane to transmit and receive data.

TPRMIM, FORMIM, and CXRMIM - Ethernet channels B and C transmit and receive packets over the Repeater Interface Controller (RIC) management bus on the FNB to these Cabletron Systems RIC MIMs. These MIMs can repeat packets autonomously without channeling them through the EMME.

Third Party MIMs - The EMME recognizes the third party MIMs listed below and provides each module with support concerning the statistics on the backplane and the control of channel selection for the entire module:

- **CSMIM2** - With supported connectivity for channels A, B, or C in an FNB chassis.
- **MODMIM** - With supported connectivity for channels A, B, or C in an FNB chassis.
- **CRM-3E** - With supported connectivity for channels A, B, or C in an FNB chassis.
- **PCMIM** - With supported connectivity for channel A in any MMAC chassis.
- **SNACMIM-E** - With supported connectivity for channel A in any MMAC chassis.

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FDDI and Token Ring Modules - The EMME recognizes the following FDDI and Token Ring modules, but the EMME management does not provide control or statistics.

- **CRM-3T**
- **SNACMIM**
- **TRMIM-32A**
- **TRMIM-34A**
- **TRRMIM-F2T**
- **TRRMIM-F3T**

With TRMMIM version 2.02 or greater, both Token Ring and Ethernet modules can reside in the same chassis and support physical management capabilities of the Token Ring MIMs using the TRMMIM as the token ring management module. Without the TRMMIM, the EMME will only recognize the Token Ring modules.

Ethernet Channel D - Ethernet channel D is provided by one of the two redundant AUI ports on the front panel of the EMME. With the correct transceiver, the AUI ports provide the capability for cable redundancy and a variety of Ethernet transmission media connections, including twisted pair, fiber optic, and thick or thin Ethernet coaxial cable.

Either one of the AUI ports can act as the bridge port to the external network. When the EMME is first powered up, the AUI 1 port acts as the bridge port and the AUI 2 port is off. Using the EMME's network management capabilities, you can reverse this configuration to have the AUI 2 port act as the primary bridge port.

TPXMIM - The EMME also supports Cabletron's family of Twisted Pair Switching Media Interface Modules (TPXMIMs). These modules provide board or individual port connectivity to any MMAC-FNB Ethernet Channel (A, B, or C) with full SNMP management including RMON. All ports initially default to Channel B upon power up and require a Management Information Base (MIB) change to access any other channel.

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1.2.4 Local Management

Built into the front panel of the EMME are two RJ45 ports. The Console port allows access to Local Management by locally connecting a DEC VT 320 terminal, or a PC using VT320 emulation software. Refer to Chapter 5, Local Management.

1.2.5 MIB Navigation

EMME firmware supports a management tool through which you navigate through Management Information Bases (MIBs). Refer to Chapter 6, MIB Navigator.

1.2.6 LANVIEW LEDs

The EMME incorporates Cabletron Systems' LANVIEW Status Monitoring and Diagnostics System. Should a problem arise, such as a power failure or a cable fault, the LANVIEW LEDs will help you to diagnose it. The module includes the following LANVIEW LEDs:

- Board OK and Error LEDs for board status
- Standby, Receive, and Collision LEDs for Ethernet Channel Status
- On and Power LEDs for AUI Port Status

1.2.7 LANVIEWSECURE

The EMME supports the LANVIEWSECURE suite of Ethernet MMAC products. The LANVIEWSECURE products support both inbound data, "Intruder Prevention," and outbound data, "Eavesdrop Prevention." These products are identified by the words "LANVIEWSECURE" printed on the faceplate of the product.

Intruder prevention allows locking of ports when an intruder, based on the expected MAC address assigned to that port, is seen on that port. A trap is then generated and sent to the Network Management station to indicate an intruder violation. When locking is enabled, the default configuration for intruder prevention in LANVIEWSECURE disables the port and sends a trap to the management station. If the trap screen is configured appropriately, through Local Management or setting OIDs, traps are sent to the management station.

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Eavesdrop prevention delivers a modified data portion (filled with a random pattern of binary ones and zeros) of the Ethernet packet to all ports except the port specified in the original packet's destination MAC address field. Effectively all ports, except the actual destination port, receive meaningless information. There are two learned MAC addresses per port.

Full security allows the network administrator to configure the ports, so that "broadcast" and "multicast" packets have the data portion of the packet modified with a random pattern of ones and zeroes. Therefore, the ports set to this mode do not see these packet types. The default setting for "Full security" is disabled. Enabling the "Full security" function modifies the broadcast and multicast packets.

LANVIEWSECURE products support assignment of up to 32 MAC addresses per LANVIEWSECURE chip. The addresses can be assigned to one or divided among several ports on the chip.

For LANVIEWSECURE products, trunk ports are defined as 3 or more MAC addresses but may not exceed 34 MAC addresses, on that port, in order to secure it. A port with 35 or more addresses can never be secured. Ports with 3 - 34 MAC addresses can be secured and will need the addresses manually entered to secure the port. Non-LANVIEWSECURE ports can only be secured with 2 or less MAC addresses associated with that port. Non-LANVIEWSECURE ports with three or more addresses can never be secured.

LANVIEWSECURE is enabled upon locking a channel, module, or port. When enabled, the first two addresses that are learned become the expected address associated with that port on any LANVIEWSECURE module.

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1.3 REPEATER FUNCTIONALITY

The EMME's repeater functionality ensures that any problem segments connected to any port on the MMAC-FNB will not affect any other segments connected to the MMAC-FNB. For example, if 32 consecutive collisions are detected on any segment, or if a collision detector is on for more than 2.4 milliseconds, the EMME automatically partitions that segment from the MMAC-FNB. The segment is automatically reconnected to the MMAC-FNB when a good packet is transmitted onto the segment.

For Cabletron Systems' original non-repeater MIMs (i.e., TPMIM, FOMIM) the EMME's IEEE 802.3 compliant repeater provides the MMAC-FNB with the ability to achieve maximum data paths on all Ethernet transmission media, including 10BASE-T twisted pair, fiber optic, and thick or thin Ethernet type cabling. To attain these maximum data paths, the EMME retimes data packets and regenerates the preamble of each data packet that enters the MMAC-FNB.

With the Cabletron Systems repeater modules (TPRMIM, CXRMIM, and FORMIM), packets are repeated autonomously on the MIM and are not channelled through the EMME. Module to module repeating is achieved over the FNB backplane. The EMME provides management for these modules and keeps Device, Network, Board, and Port Level performance and error statistics.

1.4 BRIDGING FUNCTIONALITY

The EMME automatically configures itself as a bridge between channels A, B, C, and D, for a four port bridge maximum. The EMME provides 802.1d compliant bridging capabilities to prevent unnecessary network traffic from passing between segments.

Frames received by the EMME are forwarded to four megabytes of buffering memory. The EMME's processor accesses the frames from the buffered memory and passes address information to the bridging algorithm. Then, based on the bridging decision, the frames are filtered or forwarded.

The EMME incorporates the Spanning Tree and DEC Spanning Tree Algorithms that allow network architects to set up bridges in parallel between segments as backup paths for fault tolerance. These bridges remain in a standby condition until the primary parallel path fails.

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1.5 MORE ABOUT BRIDGES

A bridge is a device that can be added to a network to allow expansion beyond the limitations of IEEE 802.3. If an Ethernet network has a repeater hop (count) of four repeaters or a propagation delay near the 51.2-microsecond maximum, a bridge can be used to build an extended network. Ethernet bridges read in packets and decide to filter or forward them based on the destination address of the packet. The simple forward/ filter decision process allows a bridge to segment traffic between two networks, keeping local traffic local. This process increases the availability of each network while still allowing traffic destined for the opposite side of the bridge to pass.

Bridges are also used to connect similar networks such as Ethernet, Token Ring, and Fiber Distributed Data Interface (FDDI) together. Note that similar networks means that the upper five layers of the OSI model (see Figure 1-2) are the same but may have different Data Link and Physical layers. The Bridge operates at the Data Link level of the OSI model. It stores packets and based on the packet destination address, forwards or filters the packets. Because bridges work at layer 2 of the OSI model, bridges are protocol independent. Bridges are slower than repeaters because a bridge must read the complete data frame, check for errors, and make forward or filter decisions based on recognized addresses stored in its source address table.

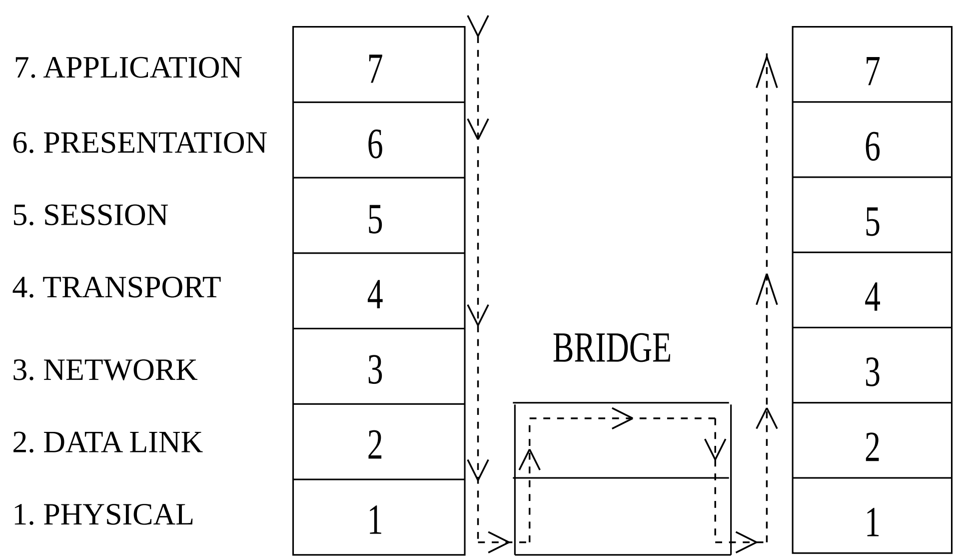

Figure 1-2. OSI Model

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The bridge is considered a node on the network and performs store and forward functions for packets on each network. This contrasts with a repeater which repeats the signal bit by bit from one side of the network to the other. The bridge actually reads each packet, checks the packet for accuracy, then decides whether the packet should be sent to the other network based on the destination address. If the other network is busy, it is the responsibility of the bridge to store the packet, for a reasonable time, until the transmission can be made.

The bridge is also responsible for handling collisions. If a collision happens as the bridge is transmitting onto the second network, the bridge is responsible for the back off and retransmission process. The original sending node is not made aware of the collision. It assumes the packet has been sent correctly. If the bridge is unable to send the packet to its final destination, the original sending station, expecting some response from the device it was attempting to contact, will “time out” and depending on the protocol attempt retransmission.

1.5.1 Filtering and Forwarding

The bridge decides whether to forward or filter a packet based on the physical location of the destination device with respect to the source device. A bridge dynamically learns the physical location of devices by logging the source addresses of each packet and the bridge port the packet was received on in a table called the Source Address Table (SAT).

The EMME supports the Special Filtering Database. This feature allows the networks manager to define bridge filters above and beyond the normal source and destination filters. The Special Filtering Database allows filters to be configured for source, destination, type field, and a flexible 64-byte offset to filter on information within the data portion of the packet. A 64-byte window of data can search the data portion of the packet to make filtering and forwarding decisions.

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1.5.2 Spanning Tree Algorithm

The Spanning Tree Algorithm (STA) is used by bridges to detect data loops (duplicate data paths). The bridges will then automatically break the loop and use the now blocked path as a backup in case the primary path fails.

When a bridge is powered up, it goes through a series of self tests to check its internal operation. During this time the bridge is in a standby condition and does not forward traffic. Also during this standby period, the bridge sends out special bridge management packets called configuration Bridge Protocol Data Packets (BPDU). Bridges use the BPDUs as a way of communicating with each other. The purpose of the configuration BDPU is to notify other bridges on all of the connected networks of the current topology. Based on the bridge priority and address, the other bridges will automatically detect loops and negotiate a single path. The bridge or bridges involved in this primary data path will then come on-line and the bridges with lower priority involved in the backup path(s) will go into a blocking condition.

The other type of BPDU is the topology change BPDU. This BPDU is made up of four bytes and notifies the other bridges that a change has taken place. Upon receipt of the topology change BPDU the bridges will re-arbitrate, or re-span, to form a legal topology.

1.6 ROUTING FUNCTIONALITY

For routing functionality in the EMME, the following is needed:

- Routing Services software for the EMME module. A license must be purchased for each module upgrade.
- 8-MB memory upgrade to bring the Dynamic Random Access Memory (DRAM) up to a total of 12 MB. For information about 8-MB upgrade kits, refer to the EMME Upgrades section at the end of this chapter.

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The Routing Services software provides the following additional funtionality:

- Security via access lists
- Directed User Datagram Protocol (UDP) broadcast forwarding
- Support for multiple frame types:
  - Internet Protocol (IP) and DECnet - Ethernet Type II and SubNetwork Address Protocol (SNAP)
  - Internet Packet Exchange (IPX) - Ethernet Type II, Novell, 802.2 and SNAP
- Statistics for host delivered and sourced packets
- Basic configuration via a local terminal
- Diagnostics via Telnet
- Flash download via Trivial File Transfer Protocol (TFTP)

With the Router Software loaded in the EMME, the EMME has the options available for three network protocols. The user, through Local Management, can select either IP, IPX, or DECnet Phase IV routing.

IP routing is the TCP/IP protocol that specifies how information is broken into packets, and how they are addressed to route over a network.

DECnet Phase IV specifies two forms of DECnet routing as follows:

- Phase IV or Level 1- For routing DECnet packets from one node to another within a DECnet area.
- Area or Level 2 - For routing DECnet packets from one DECnet area to another.

The DECnet Phase IV routing services are based on Digital Equipment Corporation's requirements for DECnet Phase IV, Level 1, and Area routers.

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1.7 COMMUNITY NAMES

When using Local or Remote management tools to access the EMME, it is important that the network manager has the ability to maintain network security. Community names provide some network security by serving as passwords to the device and the software running it. The network manager (super user) establishes three (3) passwords, each of which controls varying levels of access to the hardware and software. The Community names are set through the Local Management SNMP Community Names Table. Once these are set by the network manager, they can be maintained in confidence or limited to users who have a need to manage the system.

The three levels of access are:

- Super-User - Allows full management privileges
- Read Write - Allows edit of device configuration parameters not including changing Community names
- Read Only - Allows reading of device parameters not including Community names

1.8 SNMP (SIMPLE NETWORK MANAGEMENT PROTOCOL)

SNMP is a protocol within the TCP/IP protocol suite. Network applications such as Local Management and MIB Navigator use SNMP to manage device configurations and monitor operating conditions. SNMP protocol defines methods for "GETs," "SETs," and "TRAPs," either remotely from any point along the TCP/IP network or locally. This allows for control of the device from any point along the network. MIB Navigator uses the Management Information Base (MIB), located on the device to be managed, to access information (GET), change device parameters (SET), and to notify preselected users that an event has occurred (TRAP).

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1.8.1 Management Information Base (MIBs)

The MIBs are a database which are resident on the network device (i.e., EMME). Objects in the information base are uniquely identified by administratively assigned identifiers (called object identifiers or OIDs) and can be viewed, retrieved, or changed using an SNMP packet exchange over the network or locally using MIB Navigator.

1.9 IP ADDRESSING

Each network interface or TCP/IP host is identified by a 32-bit binary number called the IP address. This 32-bit number is divided into four 8-bit numbers called octets. Each octet is translated into its decimal equivalent and is represented using Dotted Decimal Notation (DDN). The DDN format is **XXX.XXX.XXX.XXX**.

The IP address consists of two distinct parts, the Network ID and Host ID. There are three classes of IP addressing: Class A, B, and C.

Tables 1-2 through 1-4 describe the classes.

Table 1-2. Class A

Range of Network IDs:	1 - 126.host.host.host [1 octet for the Network ID (127 reserved)]
Binary translation: (of first octet)	**0**0000001 - 01111111 [first bit is always 0]
Range for the Host ID:	net.1 - 254.1 - 254.1 - 254 [3 octets for the Host ID - allows 16,777,214 hosts per network]

Table 1-3. Class B

Range of Network IDs:	128 -191.1 - 254.host.host [2 octets for the Network ID]
Binary translation: (of first octet)	**10**000000 - 10111111 [first bit is always 1 and second is always 0]
Range for the Host ID:	net.net.1 - 254.1 - 254 [2 octets for the Host ID - allows 65,534 hosts per network]

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Table 1-4. Class C

Range of Network IDs:	192 - 223.1 - 254.1 - 254.host [3 octets for the Network ID]
Binary translation: (of first octet)	**110**0000 - 11011111 [first and second bits always 1 and third is always 0]
Range for the Host ID:	net.net.net.1 - 254 [1 octet for the Host ID - allows 254 hosts per network]

1.9.1 Network ID

The Internet Assigned Numbers Authority (IANA) assigns the Network ID and uniquely identifies a network on the Global Internet. On private internal networks, unofficial IP addresses can be used allowing the network address to be unique only within that internal network. (This is not recommended by Cabletron.) The size of the Network ID is determined by the class of the IP address.

1.9.2 Host ID

Host IDs are assigned by the local administrator. Since all hosts within the same network share the same Network ID, each host must have a unique Host ID. This allows for the identification of each host within the network based on this portion of the IP address. The class of IP address used determines the size of the Host ID.

1.9.3 Subnet Addresses

Subnet addresses are used to partition an IP network into multiple subnetworks or subnets. The use of Subnet addresses adds an additional layer of hierarchy to the IP addressing scheme. This additional addressing layer facilitates isolation, control, and administration of users within the network. This is done by grouping hosts into separate subnets. Use of subnet addresses on the network means using a subnet mask in conjunction with each IP address.

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1.9.4 Subnet Masks

The purpose of the subnet mask is to indicate the part of the Host ID that is being used as a Subnet address. By default no part of the Host ID is used, and therefore, the default or “Natural Mask” masks just the octets that comprise the Network ID. Table 1-5 shows the default masks.

Table 1-5. Class and Default Masks

Network Class	Length of Network ID	Default Mask
Class A	X.	255.0.0.0
Class B	X.X.	255.255.0.0
Class C	X.X.X.	255.255.255.0

The binary 1’s in the mask “mask-out” the Network ID and the 0’s show where the Host ID is. When using part of the Host ID as a subnet address, define a subnet mask that will mask-out the bits of the Host ID that are being used as a subnet address. The calculations for the mask must be done at the bit level since in some cases, always in Class C addresses, the last octet must be split into part Host ID and part Subnet address.

Table 1-6 shows how using the mask determines the subnet and Host addresses that are available from the octet.

Table 1-6. Examples of Subnet Masks

Decimal Mask	Binary Equivalent	Available Subnet Addresses	Available Host IDs
255	11111111	1 - 254	None
254	11111110	2 - 254 (Even numbers only)	None
252	11111100	4 - 252 (Multiples of 4 only)	1 and 2
248	11111000	8 - 248 (Multiples of 8 only)	1 - 6
240	11110000	16 - 240 (Multiples of 16 only)	1 -14
224	11100000	32, 64, 96, 128, 192, 224	1 - 30
192	11000000	64 and 192	1 - 62

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1.10 DEFAULT GATEWAY

The default gateway is the IP address of the network or host to which all packets addressed to unknown network or host are sent. The default gateway should be a perimeter or border device that connects the network with the rest of the world. The default gateway attempts to route the packet to the correct destination. This gateway is often used by managers to handle all traffic between private networks and the *Internet*. If a default gateway is not defined the packets addressed to a network or host address not found in the forwarding table will be dropped.

1.11 MAC ADDRESS

The MAC address is a unique, 48-bit binary number, associated with a specific physical connection to a network. MAC addresses are divided into 6 octets, and represented in hexadecimal form such as the following:

00-00-1D-00-26-FB

The MAC addresses are administered by the IEEE and are generally assigned at the time of manufacture, and cannot be changed. The first three octets uniquely identify the manufacturer. Cabletron devices all start with: **00-00-1D**.

1.12 NETWORK MANAGEMENT CAPABILITIES

The Cabletron Systems EMME can be controlled and managed by any SNMP network management system. These include:

- Cabletron Systems SPECTRUM
- Cabletron Systems SPECTRUM Element Manager for Windows
- Third Party SNMP compliant Network Management Packages

The EMME's network management capabilities provide the necessary management tools for the EMME to operate at its full capacity. Your ability to set up parameters with network management ensures optimal performance of the EMME.

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For example, you can gather a large amount of statistical information about the EMME, including the quantities of the following.

- – Packets
- – Transmit Collisions
- – Runt Packets
- – CRC Error
- – Bytes Received
- – Receive Collisions
- – Giant Packets
- – Misaligned Packets
- – Out of Window Collisions

For further specific information, refer to the applicable Network Management Package User's Manual.

1.13 UNINTERRUPTIBLE POWER SUPPLIES (UPS)

The EMME can monitor and control American Power Conversion UPSs. The EMME modem port is connected to the UPS via a DB9-to-RJ45 adapter (Cabletron Part Number 9372066).

This feature supports two methods for activating the UPS monitoring as follows:

- Using the Local Management, System Level screen of the EMME via a system connected to the EMME console port.
- Using SPECTRUM Element Manager for Windows, SPECTRUM Portable Management Application (SPMA), or SPECTRUM. These software packages provide Graphical User Interfaces (GUI) to configure the UPS.

1.14 EMME UPGRADES

To take advantage of enhanced EMME features, a Dynamic Random Access Memory (DRAM) upgrade is required. These are DRAM modules that are only available through Cabletron Systems. The DRAM modules provide additional memory required to support the following:

- – Routing
- – RMON MIB Host
- – Hosts Top N
- – Matrix
- – Captive
- – Filter Groups

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To determine the upgrade required for a specific EMME, the EMME board revision level must be known. The revision level can be found using one of the following:

- Local Management, where it is shown on the Password screen
- MIB Navigator, described in Chapter 6

The OID used to determine the EMME revision is eMMEHRev, which is:

1.6.1.4.1.52.1.6.2.9.2

NOTE

This is a read only function.

Table 1-7 lists the EMME board revisions along with the associated DRAM Upgrade Kits and their part number.

Table 1-7. EMME Boards and Associated DRAM Upgrade Kit.

EMME Board Revision	DRAM Upgrade Kit Type	8-MB DRAM Part No.
05 and 07	Static Column	8MB-SC-UGK60
06, 08, and 09	Fast Page Mode	8MB-FPM-UGK60

NOTES

Revisions 04 and below do not support a SIMM socket.

The EMME only supports Static Column and Fast Page Mode DRAM from Cabletron Systems.

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1.15 GETTING HELP

For additional support related to the EMME or for any questions, comments, or suggestions related to this manual, contact Cabletron Systems Technical Support by any of the following methods.

Mail:	Cabletron Systems, Inc. P.O. Box 5005 Rochester, NH 03866-5005
Phone:	(603) 332-9400, Mon-Fri 8AM to 8PM EST
CompuServe:	GO CTRON from any ! prompt
Internet Mail:	support@ctron.com
By FTP	134.141.197.25 Login: *anonymous,* Password: *your email address*

1.16 RELATED MATERIAL

The manuals listed below should be used to supplement the procedures and other technical data provided in this manual. The procedures will be referenced where appropriate, but will not be repeated.

Cabletron Systems' **MMAC Overview and Setup Guide**

Cabletron Systems' **Repeater Interface Controller Media Interface Modules (TPRMIM/FORMIM/CXRMIM) Installation Guide**

Cabletron Systems' **SPECTRUM Element Manager for Windows User's Manual**

The Simple Book, An Introduction to Management of TCP/IP-based Internets, Marshall T. Rose, Prentice-Hall, Inc., 1991

Interconnection, Bridges, and Routers, Radia Perlman, Addison-Wesley, 1992

Internetworking with TCP/IP, Vol. I, Douglas E. Corner, Prentice-Hall, 1991

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CHAPTER 2

NETWORK PLANNING AND CONFIGURATION

Before you attempt to install the Cabletron Systems EMME, review the requirements outlined in this chapter. Also, refer to the operating specifications and environmental requirements that are listed.

All conditions, guidelines, specifications and requirements included in this chapter must be met to insure satisfactory performance of the EMME. Failure to follow these guidelines will result in unsatisfactory network performance.

2.1 NETWORK REQUIREMENTS

When connecting a network segment to the EMME, via a transceiver and an AUI cable, you will need to make sure that the following requirements are met:

- The transceivers used to connect the EMME meet Ethernet Version 2 or IEEE 802.3 standards.
- The AUI cables connecting the EMME to the transceivers on the network match the transceiver type on the network segment, Ethernet Version 1, Version 2, or IEEE 802.3 type cables, and do not exceed 50 meters in length.

2.2 EMME IN THE MULTI MEDIA ACCESS CENTER

The EMME is designed to be installed in the Cabletron Systems Multi Media Access Center (MMAC). The MMAC-FNB (Flexible Network Bus) hub series provides the platform for multiple separately repeated Ethernet segments. The FNB backplane provides two additional buses for Ethernet channels B and C. The MMAC Ethernet A channel, supports Cabletron's non-repeater Ethernet modules, while Ethernet channels B and C support Cabletron's family of repeater MIMs.

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2.3 REPEATER MEDIA INTERFACE MODULES

Repeater Media Interface Modules (RMIMs) also called RICMIMs for Repeater Interface Control MIMs, shown in Figure 2-1, are based on Repeater Interface Technology that enables each of the modules to function as an independent 802.3 compliant multi-port repeater. The EMME communicates with the repeater MIMs over Ethernet channels B and C of the FNB. The following repeater MIMs are currently available:

- CXRMIM
  - The coaxial version of the repeater MIM is equipped with twelve 10BASE-2 coaxial connectors. The module also includes an EPIM port.
- FORMIM-22
  - The FORMIM-22 includes twelve FOIRL/10BASE-F ports with ST type connectors.
- TPRMIM-20/-22
  - These MIMs are equipped with RJ45 connectors and one user configurable Ethernet Port Interface Module (EPIM) which provides a single port interface for an AUI, fiber optic, twisted pair, or coaxial connection. The TPRMIM-20 has nine RJ45 connectors and the TPRMIM-22 has twenty-one RJ45 connectors.
- TPRMIM-33/-36
  - These MIMs come equipped with 50-pin champ connectors, (the TPRMIM-33 with one and the TPRMIM-36 with two). Each connector provides the MIM with 10BASE-T twisted pair ports (twelve for each champ connector). These MIMs also have a user configurable Ethernet Port Interface Module (EPIM) providing a single port interface. The TPRMIM-36 also has an AUI port.
- TPXMIM-20/-22
  - These MIMs are equipped with RJ-45 connectors and one user configurable EPIM. The TPXMIM-20 has nine RJ-45 ports while the TPXMIM-22 has 21.

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- TPXMIM-33/-34
  - These MIMs are equipped with 50 pin Champ connectors and one user configurable EPIM. The TPXMIM-33 has one 50 pin Champ connector and the -34 has two.

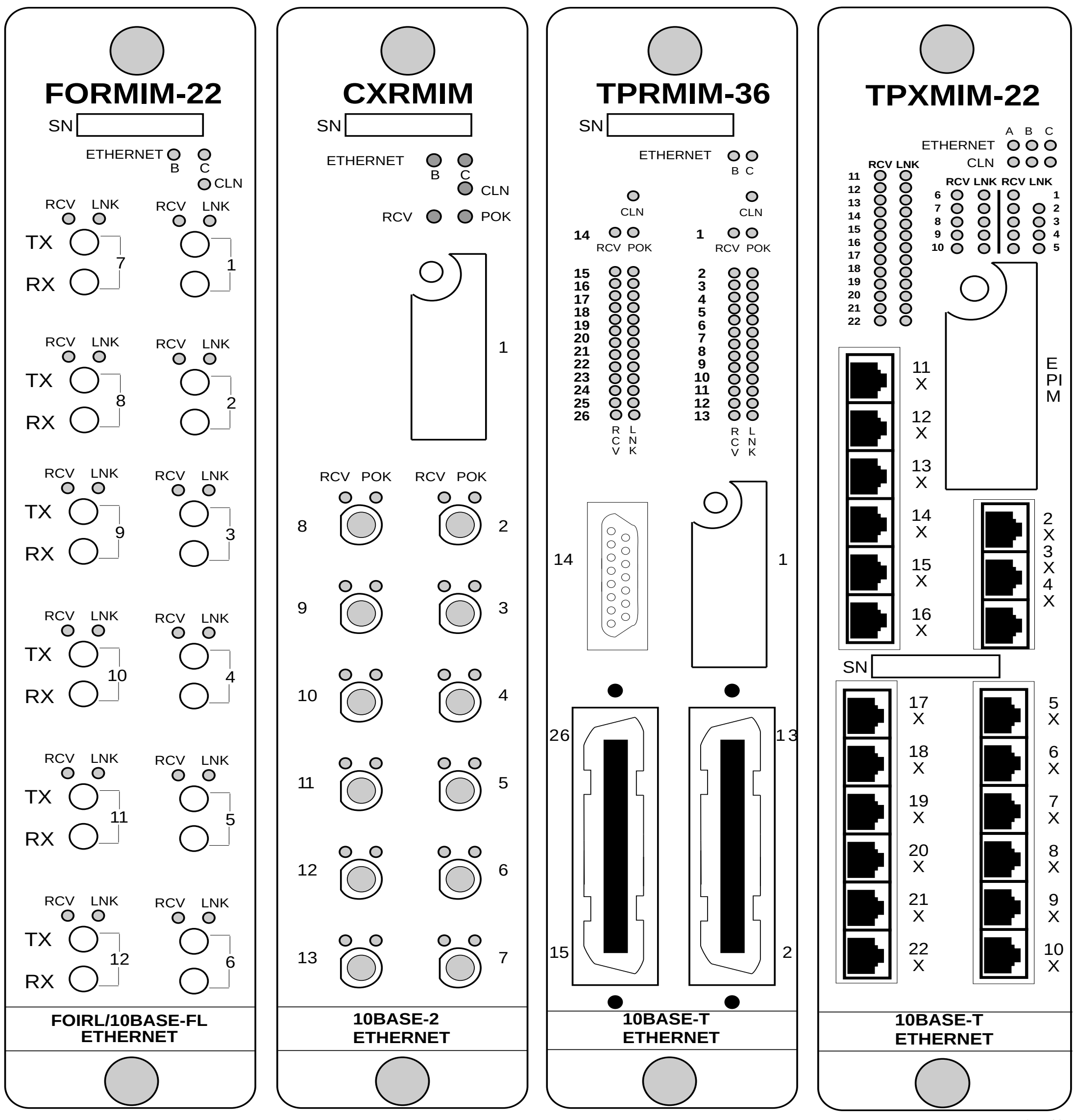

Figure 2-1. Sample Repeater MIMs

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2.3.1 Ethernet Port Interface Modules

For an additional connection to the Ethernet network, the TPRMIM-20/22, TPRMIM-33/36, and CXRMIM utilize the Cabletron Systems Ethernet Port Interface Modules (EPIMs), Figure 2-2, that allow you to connect the unit directly to:

- Thin-net cable from the Coaxial Interface Module (EPIM-C).
- Unshielded twisted pair cable from the 10BASE-T Twisted Pair Interface Module (EPIM-T).
- AUI cable, to an external transceiver, from the AUI Interface Module (EPIM-A).
- AUI cable directly from the Transceiver Interface Module with dual internal transceivers (EPIM-X).
- Multi-Mode Fiber Optic Cable, with SMA or ST connectors, from the Fiber Optic Interface Modules (EPIM-F1/ EPIM-F2).
- Single Mode Fiber Optic Cable, with ST connectors, from the single mode Fiber Optic Interface Module (EPIM-F3).

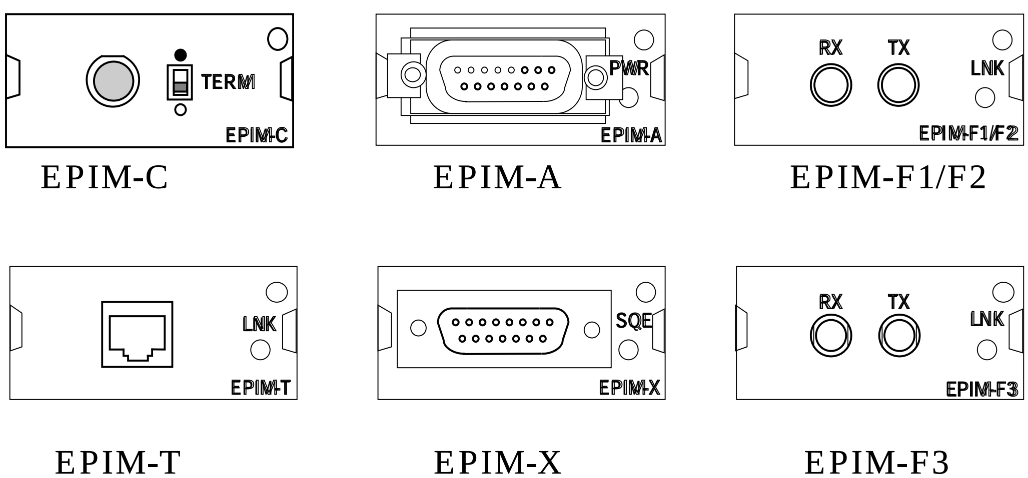

Figure 2-2. Ethernet Port Interface Modules (EPIMs)

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To support the additional functionality of the LANVIEWSECURE products, the EPIMs used in products that support LANVIEWSECURE must be at or above the revision levels listed in Table 2-1. The EPIM revision level is located on the EPIM module and consists of two numbers following the dash (-) at the end of the part number (e.g., 9031111-xx).

Table 2-1. EPIM Board Revisions

EPIM	EPIM BOARD REVISION
EPIM-3PS	Not Applicable
EPIM-A	Not Applicable
EPIM-C	05 or greater
EPIM-F1	05 or greater
EPIM-F2	05 or greater
EPIM-F3	02 or greater
EPIM-T	04 or greater
EPIM-X	02 or greater

2.4 SAMPLE NETWORK CONFIGURATIONS

This section provides you with several examples for configuring networks with the EMME. These following network configuration examples illustrate the flexibility and advantages to using the EMME and RIC MIM technology:

- Three networks within a single MMAC-FNB
- A network with a multi-port router
- Adding users to an existing network
- Seven individual networks with a single MMAC-FNB
- A fault tolerant wiring scheme

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2.4.1 Three Networks with a Single MMAC-FNB

One of the basic applications of the EMME is for configuring three separate networks with one MMAC-FNB. This provides you with the advantages of having three separate networks in one wiring closet, with full bridging and SNMP management for each network. Figure 2-3 illustrates an example of the three network configuration.

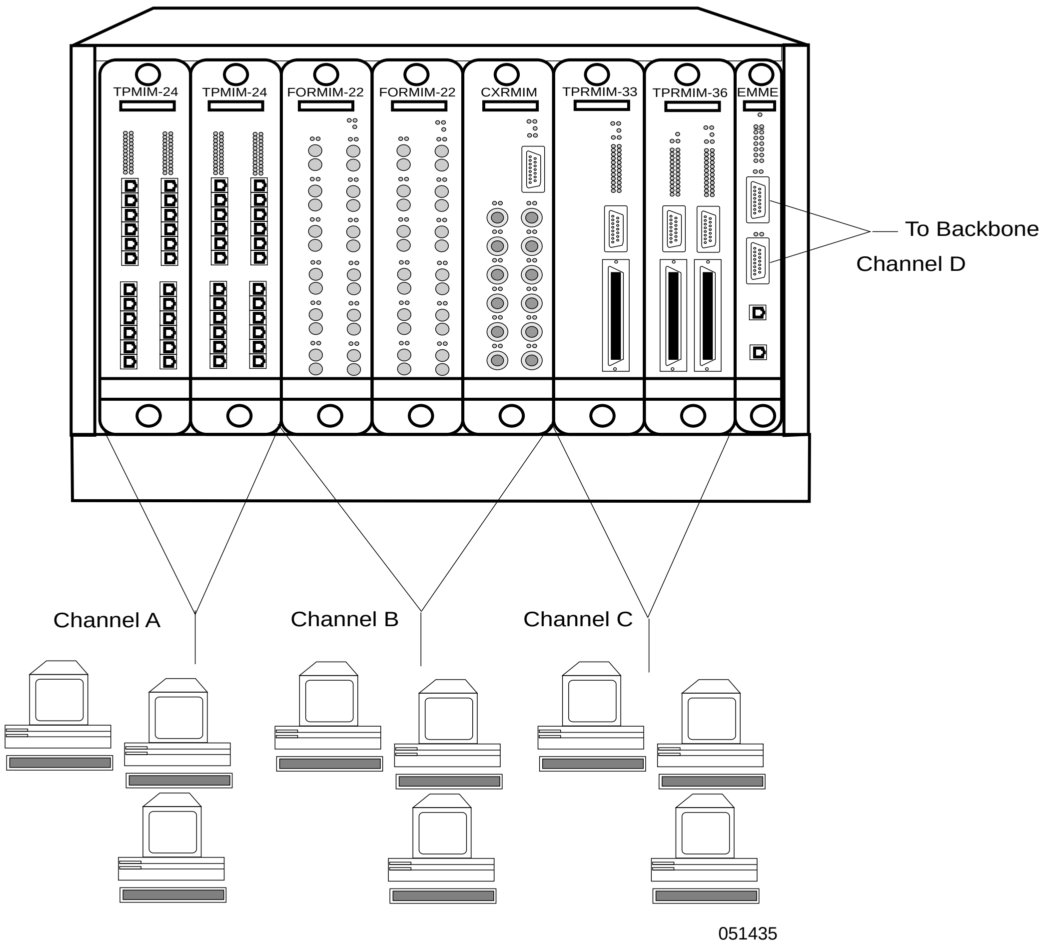

Figure 2-3. Single MMAC-FNB Configuration

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2.4.2 Network with a Multi-port Router

Another application of the EMME is configuring two or three separate networks within the same building. Using a multi-port router, you can interconnect the three networks Figure 2-4 illustrates an example of the multi-port router configuration.

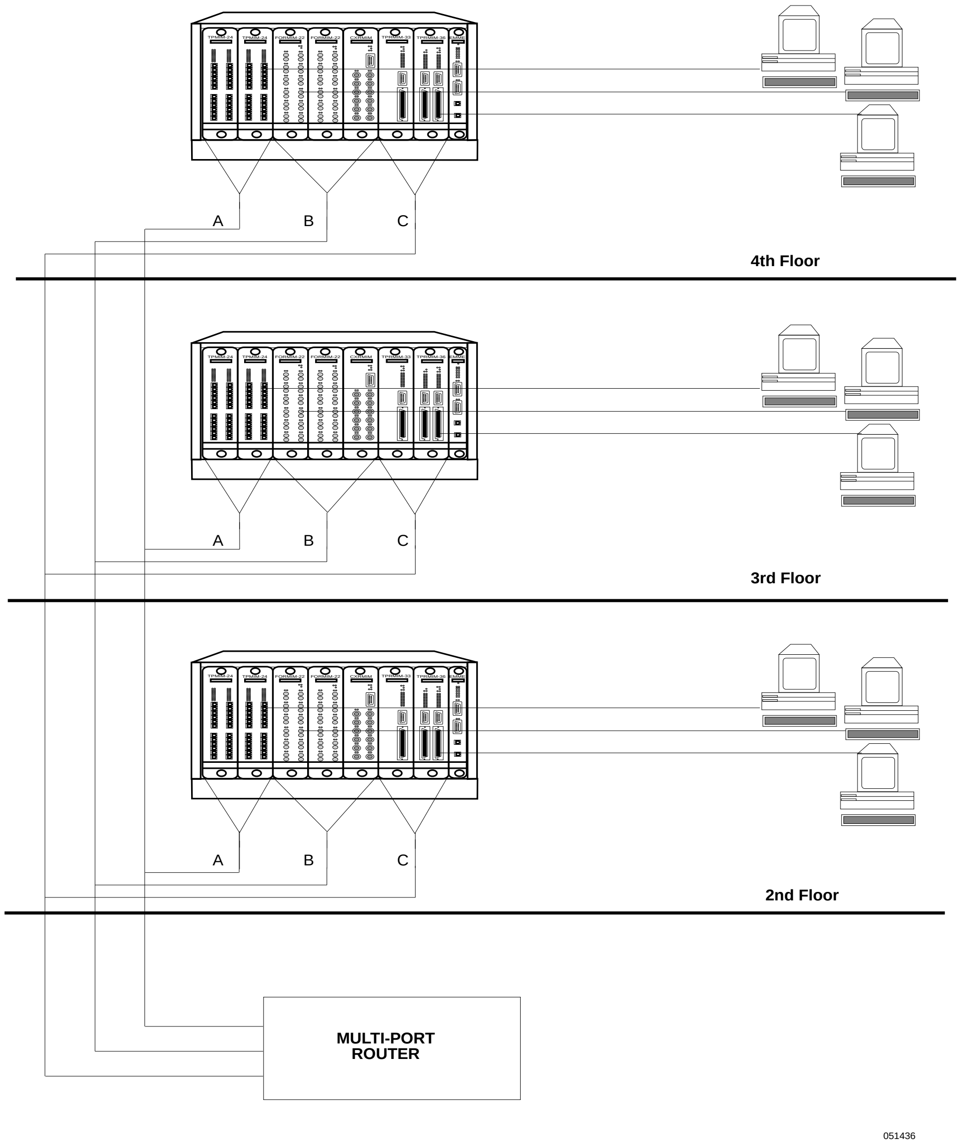

Figure 2-4. Multi-Port Router Configuration

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2.4.3 Configuring Additional Users to a Separate Segment

Before the EMME was available, adding users to a separately repeated segment required investing in a great deal of additional equipment. The example in Figure 2-5 has one Ethernet segment using; the pre-EMME technology for 48 users requires an MMAC, an IRM2 and two 24-port MIMs. Each time you want to add an additional 48 users to a separately repeated segment, you must add an MMAC-FNB, IRM2, two 24-port MIMs, and an external bridge.

When you use the new technology of the EMME, adding new users on a separately repeated segment can be accomplished simply by adding MIMs to the MMAC-FNB.

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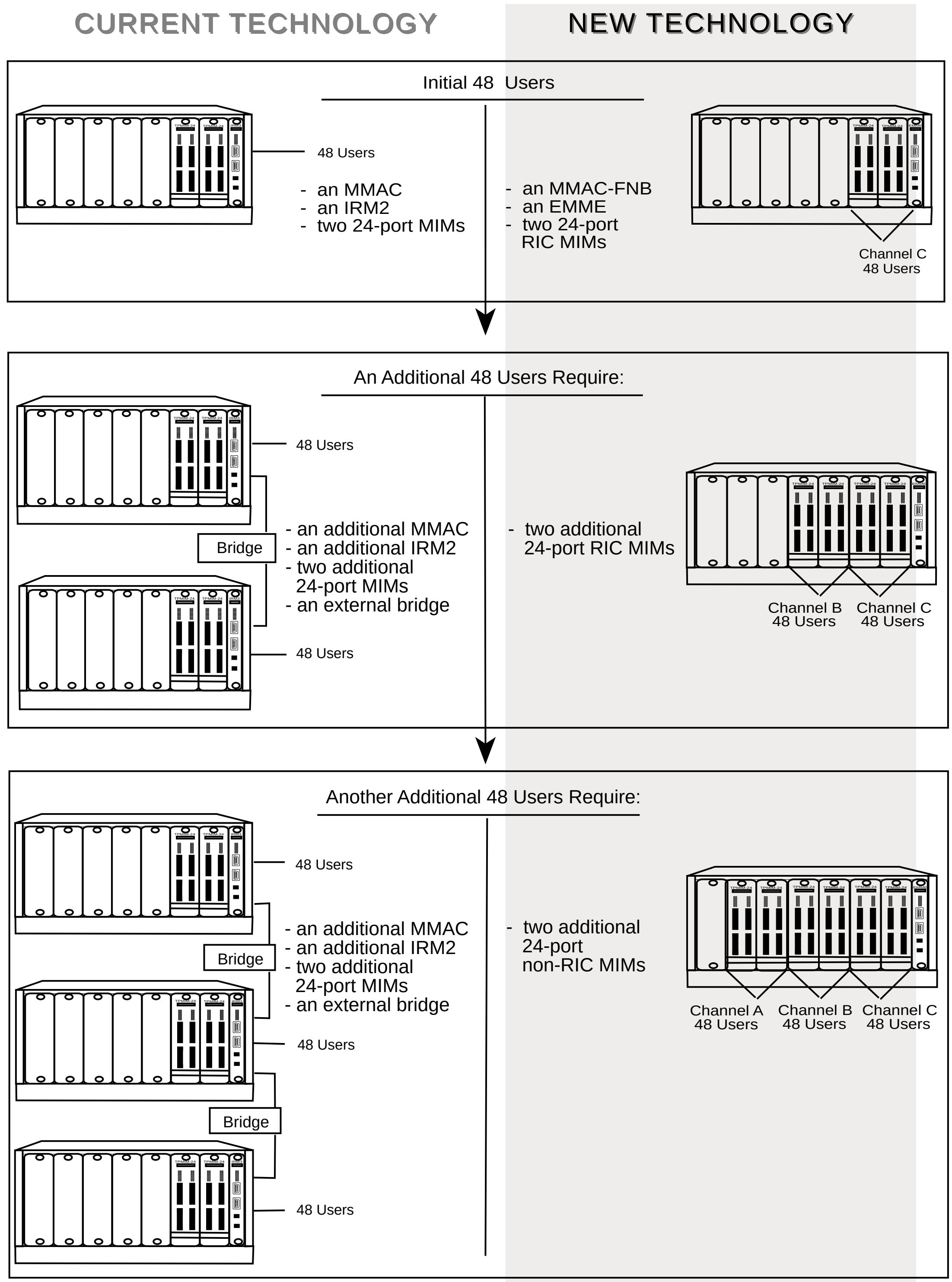

Figure 2-5. Adding New Users

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2.4.4 Multiple Routed Sub-Networks

The example in Figure 2-6 illustrates how you can use the EMME to configure up to seven individual networks in a single MMAC-FNB. This can be done by connecting each MIM in the MMAC-FNB to a multi-port router. You can then use the EMME to administratively manage all of the modules in the hub.

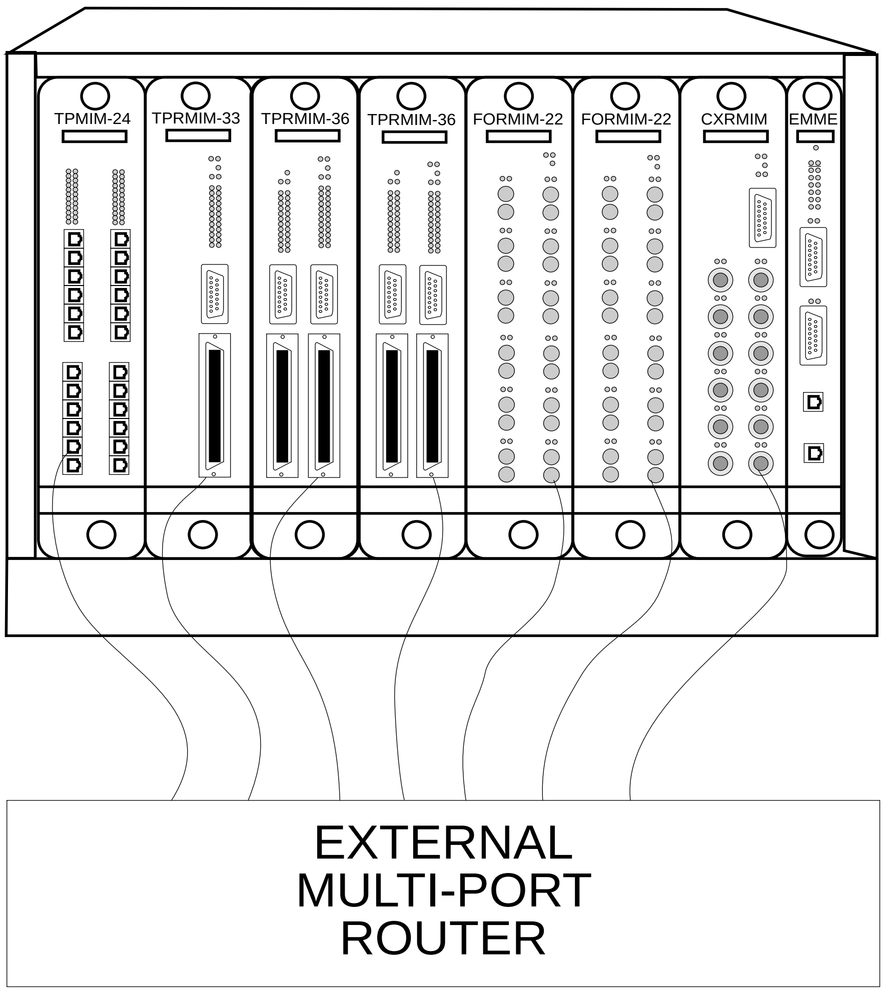

Figure 2-6. Configuring Sub-Networks

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2.4.5 A Fault Tolerant Wiring Hierarchy

The example in Figure 2-7 illustrates a fault tolerant wiring hierarchy.

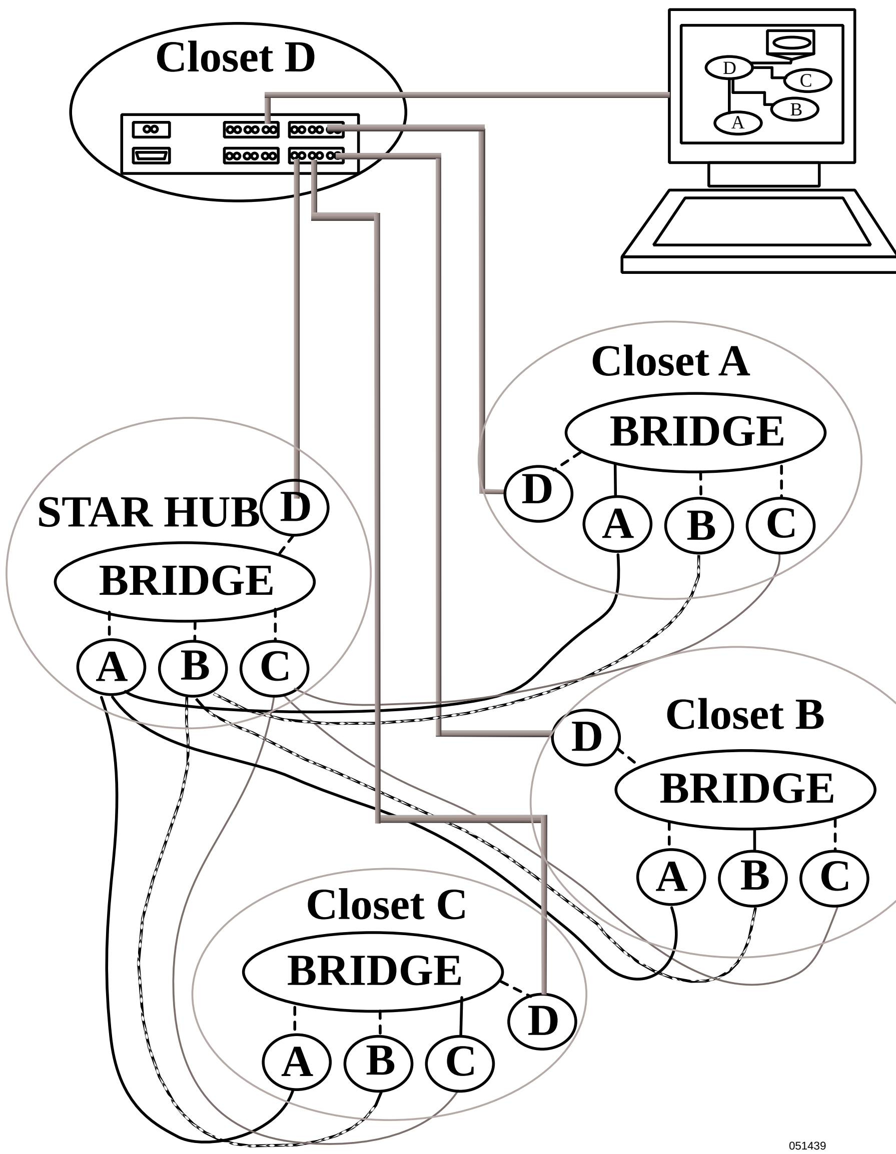

Figure 2-7. Configuring a Fault Tolerant Wiring Scheme

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Closets A, B, and C each contain an MMAC-FNB with an EMME, MIMs and RIC MIMs operating on Ethernet channels A, B, and C. Within each closet, each Ethernet channel is separately repeated, and each is dedicated to a specific set of network users (for example, Ethernet A is dedicated to administration, Ethernet B to engineering, and Ethernet C to personnel).

The Star Hub, which is an MMAC-FNB that is configured similarly to the closet hubs, is the central repeater interconnect for the closets, but does not constitute a single point of failure.

The EMME in each MMAC-FNB utilizes the 802.1d Spanning Tree Algorithm. By configuring the Root Path Cost and the Bridge Priority on the EMME, primary paths from each segment can be bridged to Network D from each EMME (indicated by the solid line between Ethernet channel A and the bridge in closet A, Ethernet channel B and the bridge in closet B, and Ethernet channel C and the bridge in closet C). The dotted lines between the other Ethernet channels and the bridge show the backup paths in a standby condition. If any repeater link fails, or if an active bridge path fails, one or many backup bridge paths could become active, replacing the failed repeater link or bridge path.

An additional level of redundancy is achieved by using the cable redundancy algorithm built into Cabletron's EMME. This feature enables you to configure redundant bridge paths, with one path remaining in backup, standby mode until the primary path fails.

In the example, Segment D provides a manageable backbone, using a MiniMMAC. Segment D provides intercommunication for channels A, B, and C, as well as serving as the network management segment for the hierarchy. The individual protocol segments are filtered by the EMME bridge component, so that the only traffic on segment D is minimal inter-channel communication (i.e., mail). Otherwise, only network management data is on segment D, out-of-band of the traffic on channels A, B, and C.

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CHAPTER 3
INSTALLING THE EMME

This chapter contains unpacking information and installation instructions for the Cabletron Systems EMME into a Cabletron Systems MMAC-FNB. Additional instructions are provided on setting the mode switches and for connecting segments to the EMME.

3.1 UNPACKING THE EMME

The contents of the EMME shipment is dependent on whether or not the EMME was ordered with the Routing software. Table 3-1 lists the items shipped without the Routing option.

Table 3-1. Items Delivered With EMME

Part Number	Description	Quantity
9372065	Cable, RJ-45 to RJ-45	1 each
2190183	Download program	1 each
9990050	Disposable wrist strap	1 each
9030514	EMME User's Guide	1 each
9030834	Release Notes, EMME Boot	1 each
9030746	Release Notes, EMME	1 each

Unpack the EMME as follows:

1. Remove the shipping material covering the EMME in the shipping box.
2. Carefully remove the module from the shipping box. Leave the module in its conductive bag until you are ready to install it. Save the shipping box and materials in the event the unit has to be reshipped.
3. Visually inspect the module. If there are any signs of damage, contact Cabletron Systems Technical Support immediately.

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3.2 SETTING THE EMME MODE SWITCHES

The bank of dip switches located at the top right of the EMME (shown in Figure 3-1) should be set to their default positions when the module is shipped. Check these switches to ensure that they are in the correct position for normal operation of the EMME.

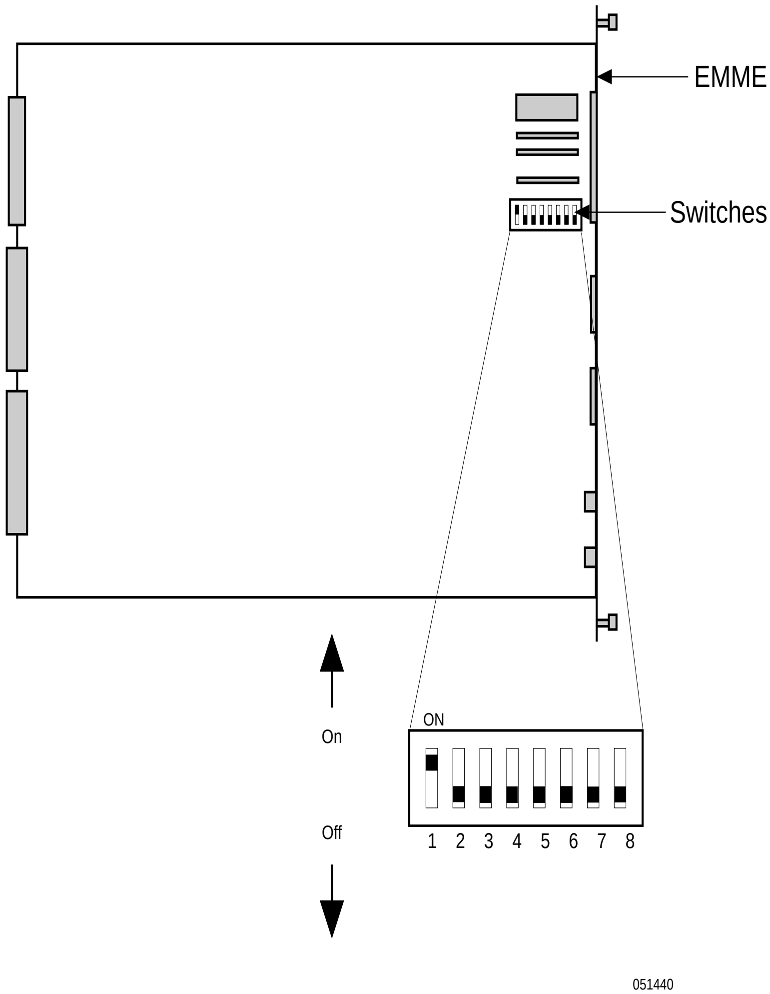

Figure 3-1. EMME Dip Switches

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Switches should be positioned as follows:

WARNING Never adjust switch settings on the EMME while there is power applied to it. Slide the EMME out of the chassis and change the switch as needed to select a function. The function is initiated when the EMME is reinstalled.

- Switch 1 - NMI (Non-Maskable Interrupt). This switch must be in the **On** position. Cabletron Systems use only.
- Switch 2 - STESTDIS (System Test Disable). This switch must be in the **Off** position. Cabletron Systems use only.
- Switch 3 - CADIC (Software Debugging Tool). For manufacturing use only. Keep in **Off** position.
- Switch 4 - MIMREV (Management Interface Module Revision). This switch must be in the **Off** position for normal operation. Only if you are using THN-MIM part numbers 9000043-05 and below in your MMAC-FNB, the switch must be in the **On** position.
- Switch 5 - Baud Rate Default. Allows you to set the Console port's baud rate. The **Off** position sets the baud rate to 9600. The **On** position sets the baud rate to 2400.
- Switch 6 - Forced Download. Changing the position of this switch after pulling the board out of the MMAC-FNB, clears download information from NVRAM and forces image files to be downloaded from the station configured to act as that EMME's BOOTP server.

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NOTES

Ensure that a BOOTP server has been configured prior to changing the switch 6 position.

When the state of switch 6 is changed, the EMME will begin requesting a BOOTP server in an attempt to get a flash image download. The EMME's BOOT PROM inhibits the sequence and the EMME requests an IP address and a filename from the BOOTP server. When received, the EMME requests a TFTP of the image. The EMME will not function until the image is downloaded. If the switch 6 position was changed inadvertently and the BootP state is not desired either press the EMME reset button, cycle the chassis power, or remove the EMME from the chassis and reinstall it.

For more information on configuring a station as a BOOTP server refer to the **SPECTRUM Element Manager for Windows User's Manual**.

- Switch 7 - NVRAM (Non-Volatile RAM Reset). The EMME uses NVRAM to store user entered parameters such as IP addresses, device name, etc. To reset these parameters to the factory defaults, toggle this switch. Once reset you can use the defaults or re-enter your own parameters which will be stored in NVRAM when the EMME is powered down, and remain there until the switch is toggled again.

CAUTION

Do not toggle Switch 7 unless you intend to reset the EMME user parameters to the factory default settings.

- Switch 8 - Password Defaults. When toggled, this switch clears user-entered passwords stored in NVRAM, and restores the default passwords. Once reset you can use the defaults or re-enter your passwords.

CAUTION

Do not toggle Switch 8 unless you intend to reset the EMME user-configured passwords to their factory default settings.

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3.3 INSTALLING THE EMME

No special skills or tools are required to install the EMME into an MMAC-FNB. Use the following guidelines when installing the EMME.

- The EMME must be installed in slot 1 of the MMAC-FNB. (Identified as the IRM slot in the older MMAC models.)
- When installing the EMME into an MMAC-FNB, be sure that the MMAC-FNB is properly equipped with a power supply module (PSM-R) to supply power to the EMME.
- RIC MIMs in an MMAC-FNB series hub should be positioned contiguously to the EMME, from right to left. This insures that the channels are not accidentally placed in stand-alone or desegmented from the B or C channel. This does not apply to shunting MMAC-FNBs where the data path remains unbroken allowing communication to continue.

Install the EMME into the MMAC-FNB as follows:

1. Slide the EMME (Figure 3-2) into slot 1 of the MMAC-FNB's card cage. (Identified as the IRM slot in the older MMAC models.) Be sure that the module is properly aligned in the top and bottom slot guides and firmly press it into the backplane.
2. Secure the module to the MMAC-FNB by turning the knurled knobs. Be sure that the module is firmly attached to the MMAC-FNB.

NOTE

For proper seating and operation of the EMME and all MMAC modules, fasten them securely using their front panel thumbscrews.

3. Power up the MMAC-FNB if it isn't already on. The LEDs flash and then extinguish for 30 to 40 seconds. After this period of time, the BOK LED starts blinking.

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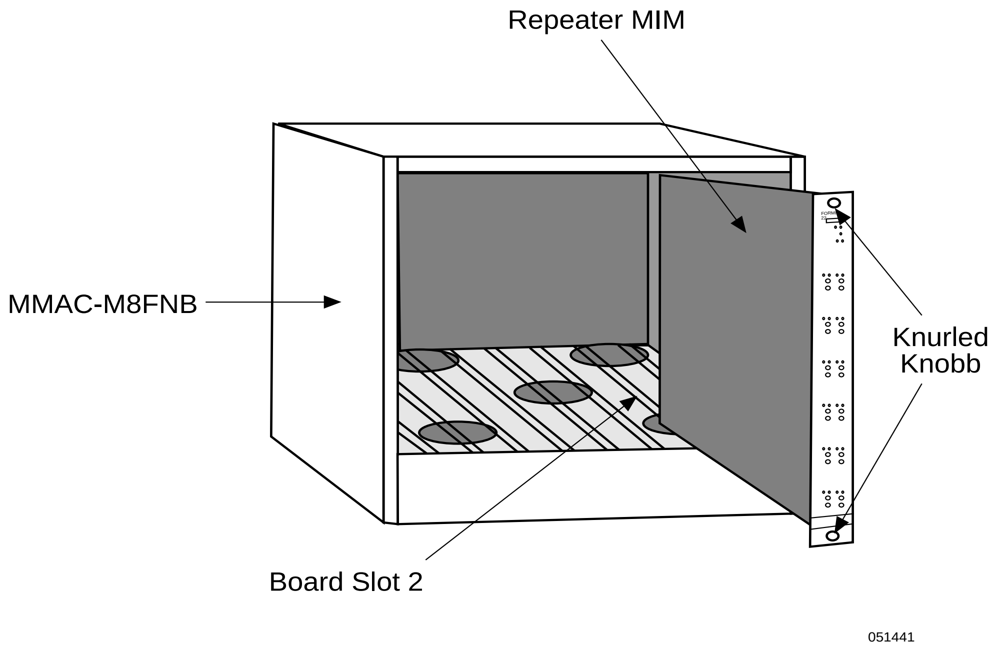
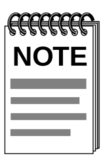


Figure 3-2. Installing the EMME



Do not reset the EMME during this time.

4. After the system boot procedure, the LEDs should be in the following conditions:

- BOK LED flashing, indicating that the EMME is operating properly.
- STBY (A, B, C, D) LEDs on or off, depending on the port's status after the Spanning Tree Algorithm has run (Operational-STBY LED OFF or Blocking-STBY LED ON).
- PWR LEDs lit for the AUI ports, indicating that those ports are receiving power.
- ON LED lit for the AUI port through which traffic will be passing to, and from, channel D.

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3.4 CONNECTING THE EMME TO THE NETWORK

This section provides procedures for connecting the EMME to the network via the AUI 1 or AUI 2 port. When the EMME is first powered up, the AUI 1 port acts as the bridge port and the AUI 2 port is off. To connect to the network via an AUI port:

1. Attach an external transceiver to the segment to which the AUI connector will be attached.
2. Attach the female end of an AUI cable, no more than 50 meters in length,

Make sure to disable the SQE test function on the transceiver that you will be connecting to the EMME's AUI port. Failure to do so will result in improper operation of the EMME. Refer to the applicable transceiver manual.

3. Attach the male connector on the AUI cable (Figure 3-3) to the appropriate AUI port on the EMME.
4. Move the slide latch on the AUI port to secure it to the lock posts on the connector.

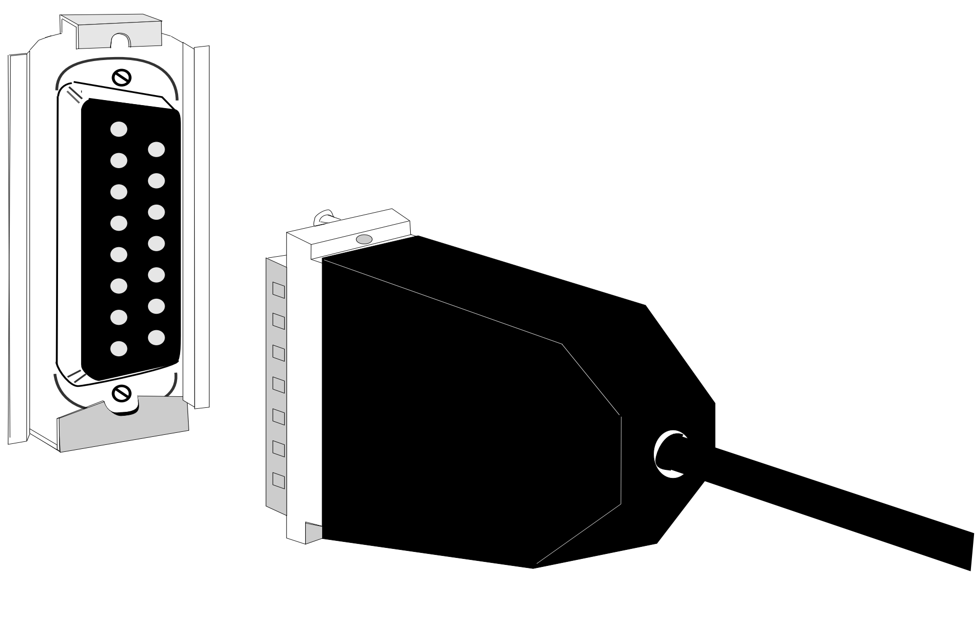

Figure 3-3. Connecting to the AUI Port

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CHAPTER 4

TESTING THE EMME

This chapter contains EMME testing procedures for before and after making network connections.

4.1 PRE-INSTALLATION TEST

Before installing the EMME in a live network, test the module in a controlled situation to insure that it is repeating bridging packets. You can perform this test with two workstations (Figure 4-1), using an MMAC-FNB, or MMAC-MFNB, installed with an EMME and a Media Interface Module (MIM) as follows:

1. Install the EMME and a MIM (TPMIM, THN-MIM, FOMIM, CXRMIM, FORMIM, etc.) into a stand-alone MMAC-FNB.
2. Connect the first workstation to either the MIM, using the appropriate cable and transceiver, or to the EMME's AUI port, using a transceiver and an AUI cable.
3. Connect the second workstation to the MIM using the appropriate cable.
4. Set the first workstation as the file server and the second as the client. (Refer to the workstation manuals for establishing one as a file server and one as a client. You must assign a valid IP address to the EMME through Local Management.) Proceed by sending packets between them to verify that the EMME is operating properly.

NOTE

If using UNIX workstations, a "ping" test will verify that the EMME is operating properly.

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If a failure occurs, refer to Chapter 7, **Troubleshooting**.

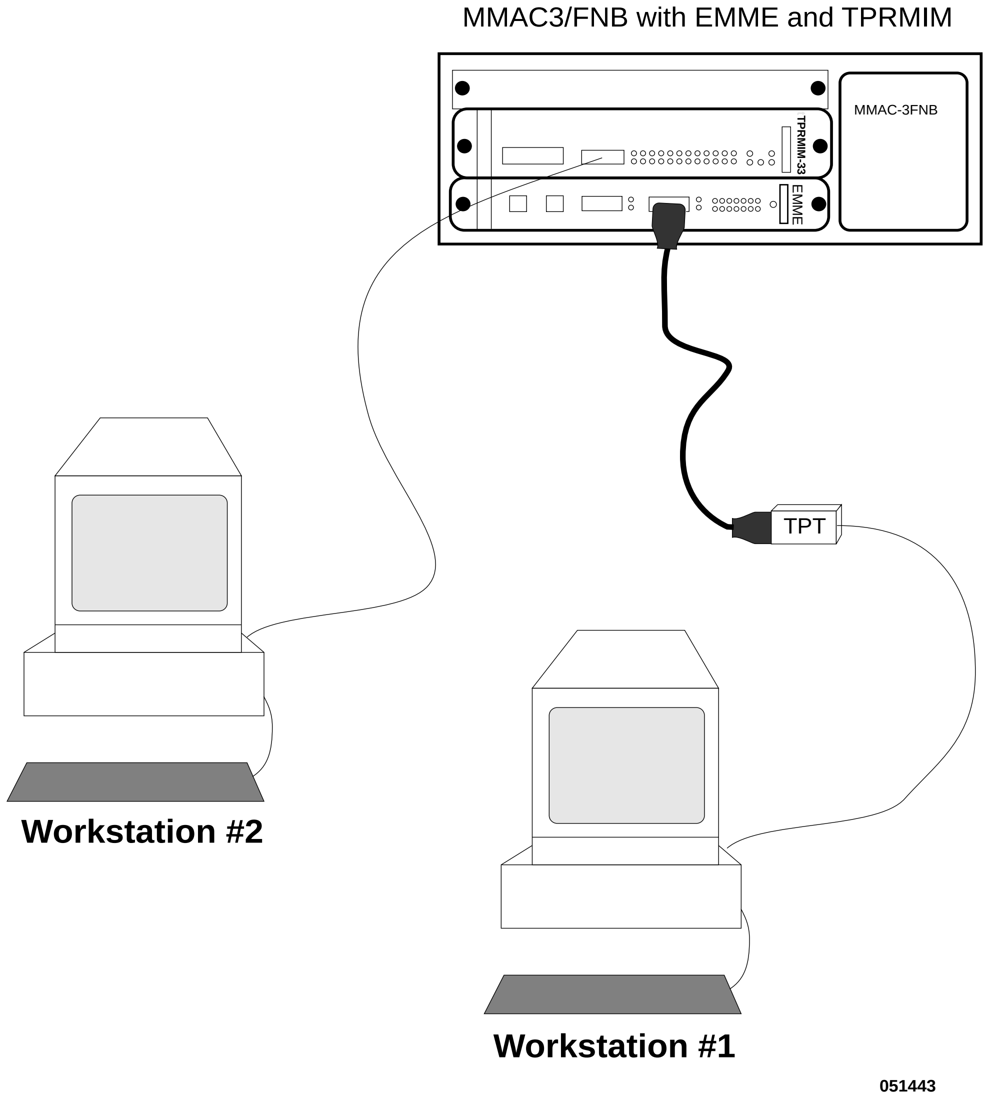

Figure 4-1. Pre-installation Test

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4.2 INSTALLATION CHECK-OUT

After the EMME is connected to the network, verify that packets can be passed over the network segments via the EMME. Again you can use two workstations set up as file server and client. Keep the server workstation stationary in the wiring closet with the EMME, and use the client workstation to move to each node connected to the EMME (Figure 4-2).

1. After the EMME is installed in the MMAC, connect the server workstation to either a MIM or to the EMME via an AUI port, using a transceiver and an AUI cable.

2. Sequentially connect a client workstation to each node connected to the MMAC and proceed to test the segment.

If a failure occurs, refer to Chapter 7, **Troubleshooting**.

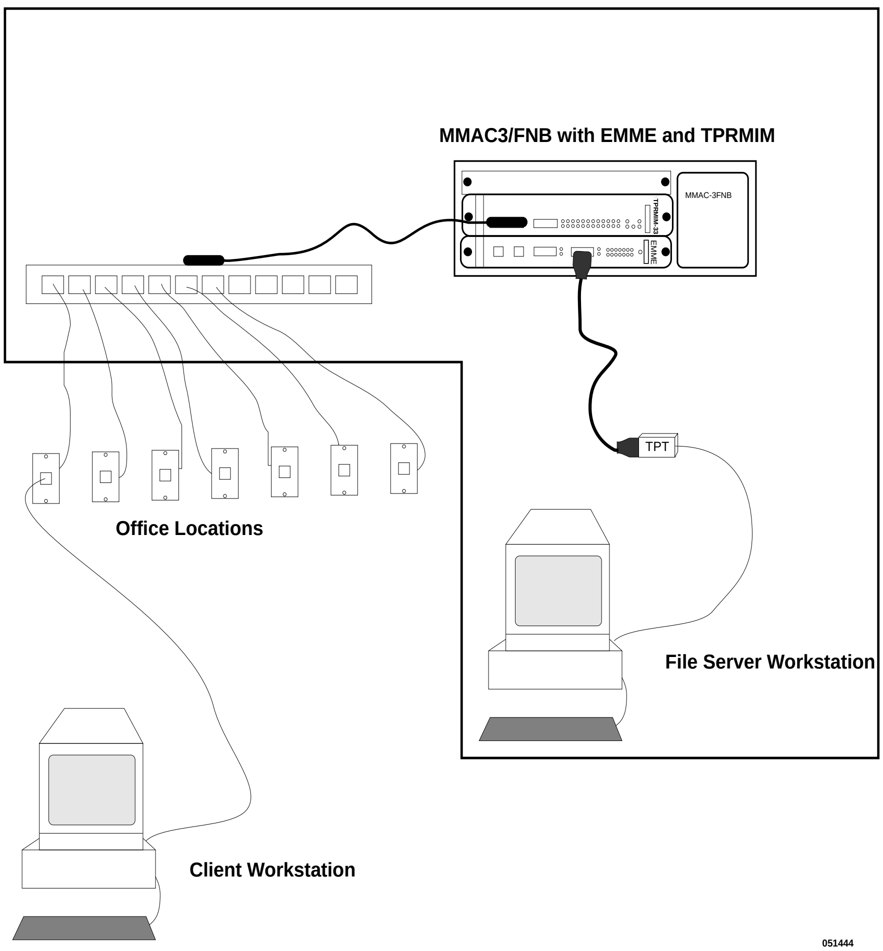

Figure 4-2. Installation Check-Out Test Configuration

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CHAPTER 5
LOCAL MANAGEMENT

This chapter describes how to access and use Local Management for the EMME. To access Local Management, you need to attach a management terminal to the EMME’s Console port or establish a Telnet connection from a station connected to the network.

Local Management for the EMME consists of a series of management screens that provide tools to manage the EMME and its attached segments. These tools allow you to perform the following tasks:

- Assign IP addresses and subnet masks to any of the EMME’s four bridge channels in the four-channel IP routing table.
- Select a default gateway and subnet mask.
- Control access to the EMME by establishing community names.
- Designate which Network Management Workstations receive SNMP traps from the device.
- Navigate through Management Information Bases (MIBs). Since the EMME is an SNMP compliant device, you can manage EMME-related SNMP MIB objects given the appropriate security level. You can also manage the IETF Bridge MIB objects and many of the RMON (Remote Monitoring) MIB objects.

This chapter also explains how to attach a cable from an Uninterruptible Power Supply (UPS) to the EMME, and how to configure the EMME’s Modem port for the UPS application.

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5.1 MANAGEMENT TERMINAL CONFIGURATION

To access Local Management, you need either a VT320 terminal or PC running VT terminal emulation software.

The following instructions explain how to configure a terminal to communicate with Local Management. Refer to the terminal's user guide for more instructions if necessary. To access the set-up directory on a VT320 terminal, press **F3** (Table 5-1 lists the directory selections).

Table 5-1. VT320 Set-Up Directory Selections

Display Set-up	
Columns –>	80 Columns
Controls –>	Interpret Controls
Auto Wrap –>	No Auto Wrap
Scroll –>	Jump Scroll
Text Cursor –>	Cursor
Cursor Style –>	Underline Cursor Style
General Set-up	
Mode –>	VT300, 7 Bit Controls
ID Number –>	VT320ID
Cursor Keys –>	Normal Cursor Keys
Power Supply –>	UPS DEC Supplemental
Communication Set-up	
Transmit –>	Transmit=9600
Receive –>	Receive=Transmit
XOFF –>	XOFF at 64
Bits –>	8 bits
Parity –>	No Parity
Stop Bit –>	1 Stop Bit
Local Echo –>	No Local Echo
Port –>	DEC-423, Data Leads Only
Transmit –>	Limited Transmit
Auto Answerback –>	No Auto Answerback
Keyboard Set-Up	
Keys –>	Typewriter Keys
Auto Repeat –>	any option
Keyclick –>	any option
Margin Bell –>	Margin Bell
Warning Bell –>	Warning Bell

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5.1.1 Cable Configuration for the Management Terminal

This section outlines the proper cable configurations to connect a management terminal to the Console port of the EMME. For information on the appropriate pinouts, refer to Appendix C.

You need an adapter kit containing the following items to connect a terminal to the EMME Console port:

- An RS232 cable
- An adapter
- A device cable

The adapter you use depends on whether you connect a VT320 terminal or a PC emulating a VT320 to the EMME Console port. Read the information included with the adapter kit to make sure that you are using the correct adapter.

To configure the cables, perform the following steps:

1. Plug a straight-through twisted pair cable (e.g., an RS232 cable) into the EMME's RJ45 Console port.
2. Plug the other end of the RS232 cable into the adapter.
3. Connect the adapter into the device cable and plug the other end of the device cable into the terminal.
4. Power on the terminal. Access to Local Management is automatic.

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5.1.2 Cable Configuration for the UPS

To configure a cable from the Uninterruptible Power Supply (UPS) to the EMME perform the following steps:

1. Plug a straight-through twisted pair, RS232, cable into the EMME RJ45 Modem port.

2. Plug the other end of the RS232 cable into the adapter (Part No. 9372066) and connect the adapter to the UPS.

After the cable configuration is complete, use one of the following management tools to configure the EMME Modem port for UPS application:

- EMME Local Management – The System Level Screen section of this chapter provides instructions for setting up the EMME Modem port for the UPS application.

- Graphical user interfaces provided by SPECTRUM Element Manager for Windows, SPECTRUM Portable Management Applications (SPMAs), or SPECTRUM software packages.

5.2 ESTABLISHING A TELNET CONNECTION

Once the EMME has a valid IP address, you can establish a Telnet session with Local Management from any TCP/IP based node on the network. Telnet connections to the EMME require the community name passwords assigned at the SNMP Community Names screen. Refer to the SNMP Community Names section of this manual for additional information about community names.

NOTE

See the instructions included with the Telnet application for information about establishing a Telnet session.

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5.3 LOCAL MANAGEMENT KEYBOARD CONVENTIONS

All key names appear in this manual as capital letters. For example, the Enter key appears as ENTER, the Escape Key appears as ESC, and the Backspace Key appears as BACKSPACE. Table 5-2 explains the keyboard conventions used in this manual as well as the key functions.

Table 5-2. Keyboard Conventions

Key	Function
ENTER Key and RETURN Key	These are selection keys that perform the same Local Management function. For example, “Press ENTER” means that you can press either ENTER or RETURN, unless this manual specifically instructs you otherwise.
ESCAPE (ESC) Key	This key lets you escape from a Local Management screen without saving your changes. For example, “Press ESC twice” means that you must quickly press the ESC key two times.
SPACEBAR and BACKSPACE Key	These keys cycle through selections in some Local Management fields. Use the SPACEBAR to cycle forward through selections and use BACKSPACE to cycle backward through selections.
Arrow Keys	These are navigation keys. Use the UP-ARROW, DOWN-ARRROW, LEFT-ARROW, and RIGHT-ARROW keys to move the screen cursor. For example, “Use the arrow keys” means to press whichever arrow key moves the cursor to the desired field on the Local Management screen.

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Table 5-2. Keyboard Conventions (Continued)

SHIFT + [**+**] Keys	This key combination increments values in a Local Management increment field. For example, “Press SHIFT + [**+**]” means to hold down the SHIFT key while pressing the plus sign key.
[**–**] Key	This key decreases values from a Local Management increment field. For example, “Press [**–**]” means to press the minus sign key.
DEL Key	The DEL (Delete) key removes characters from a Local Management field. For example, “Press DEL” means to press the Delete key.

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5.4 ACCESSING LOCAL MANAGEMENT

Verify that your terminal has been properly connected to the EMME before proceeding.

To access Local Management, perform the following steps:

1. Power on the terminal. The EMME Password screen, Figure 5-1, appears.

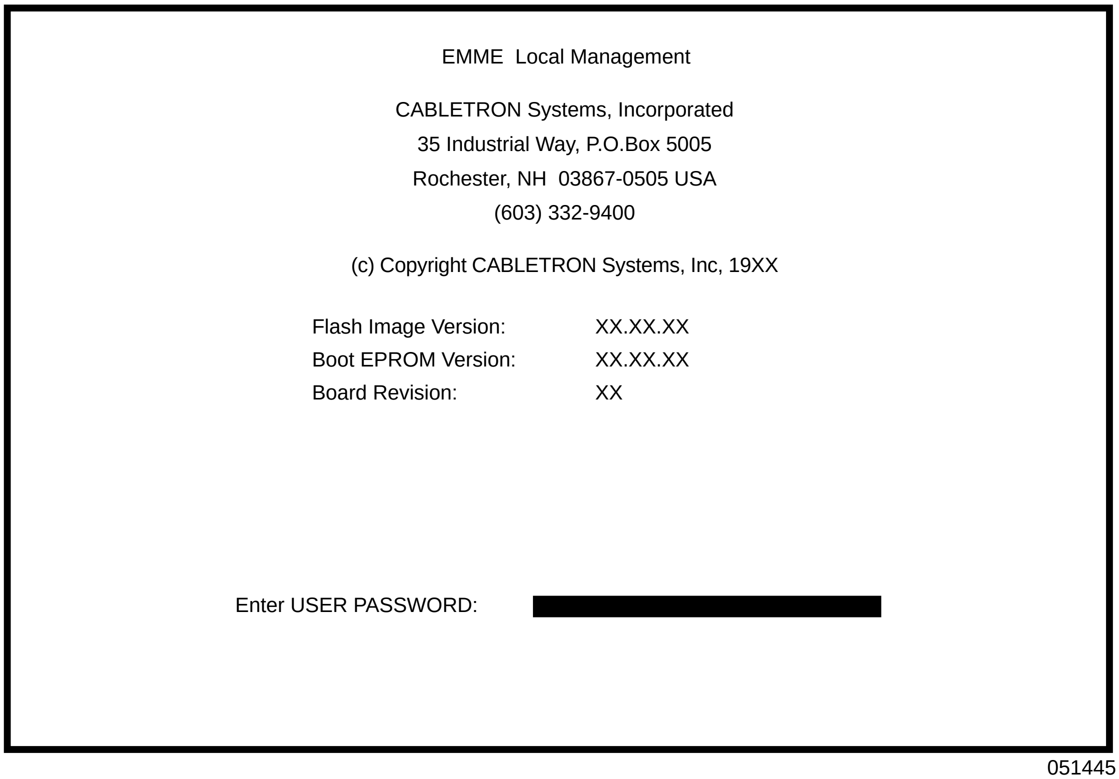

Figure 5-1. The EMME Password Screen

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2. Enter your Password and press ENTER. The default super-user access password is "*public*" or press ENTER.

NOTE

Your password is one of the community names specified in the SNMP Community Names screen. Access to certain Local Management capabilities depends on the degree of access accorded that community name. See the SNMP Community Names section.

- If an invalid password is entered the terminal beeps and the cursor returns to the beginning of the password entry field.
- Entering a valid password causes the associated access level to display at the bottom of the screen and the Main Menu screen, Figure 5-3, appears.

If no activity occurs for several minutes the Password screen reappears and the password will have to be re-entered.

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5.5 NAVIGATING LOCAL MANAGEMENT SCREENS

EMME Local Management consists of a series of menu screens. You navigate through Local Management by selecting items from the menu screens. EMME Local Management consists of the following menu screens:

- Main Menu screen
- Setup Menu screen
- Status Menu screen

Figure 5-2 shows the hierarchy of Local Management screens.

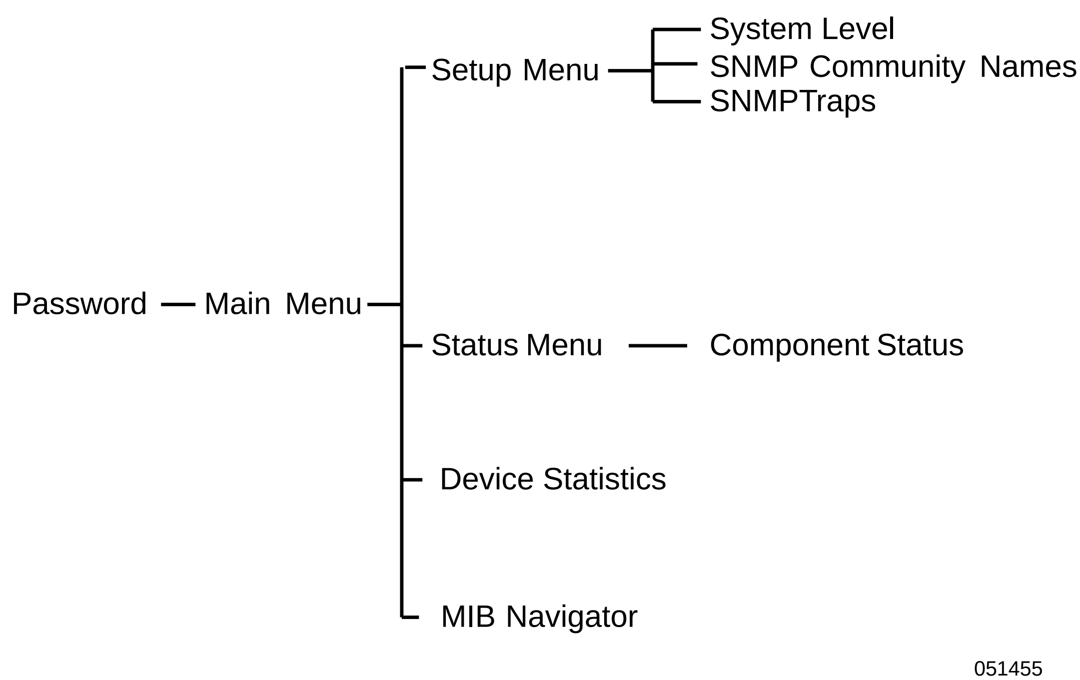

Figure 5-2. Hierarchy of Local Management Screens

5.5.1 Selecting Local Management Menu Screen Items

To Select items on a Local Management menu screen, perform the following steps:

1. Use the arrow keys to highlight a menu item.
2. Press ENTER. The selected menu item appears on the screen.

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5.5.2 Exiting Local Management Screens

To exit any of the Local Management screens, perform the following steps:

1. Use the arrow keys to highlight the **RETURN** command at the bottom of the Local Management screen.

2. Press ENTER. The previous screen in the Local Management hierarchy appears.

NOTE

You can also exit Local Management screens by pressing ESC twice. This exit method does not warn you about unsaved changes and all unsaved changes will be lost.

3. To Exit from EMME Local Management, repeat steps 1 and 2 until the Main Menu screen appears.

4. Use the arrow keys to highlight the **EXIT** command at the bottom of the Main Menu screen.

5. Press ENTER. The EMME Local Management Password screen appears and the Local Management session ends.

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5.6 THE MAIN MENU SCREEN

The Main Menu screen is the starting point from which all the Local Management screens are accessed. Figure 5-3 shows the Main Menu screen.

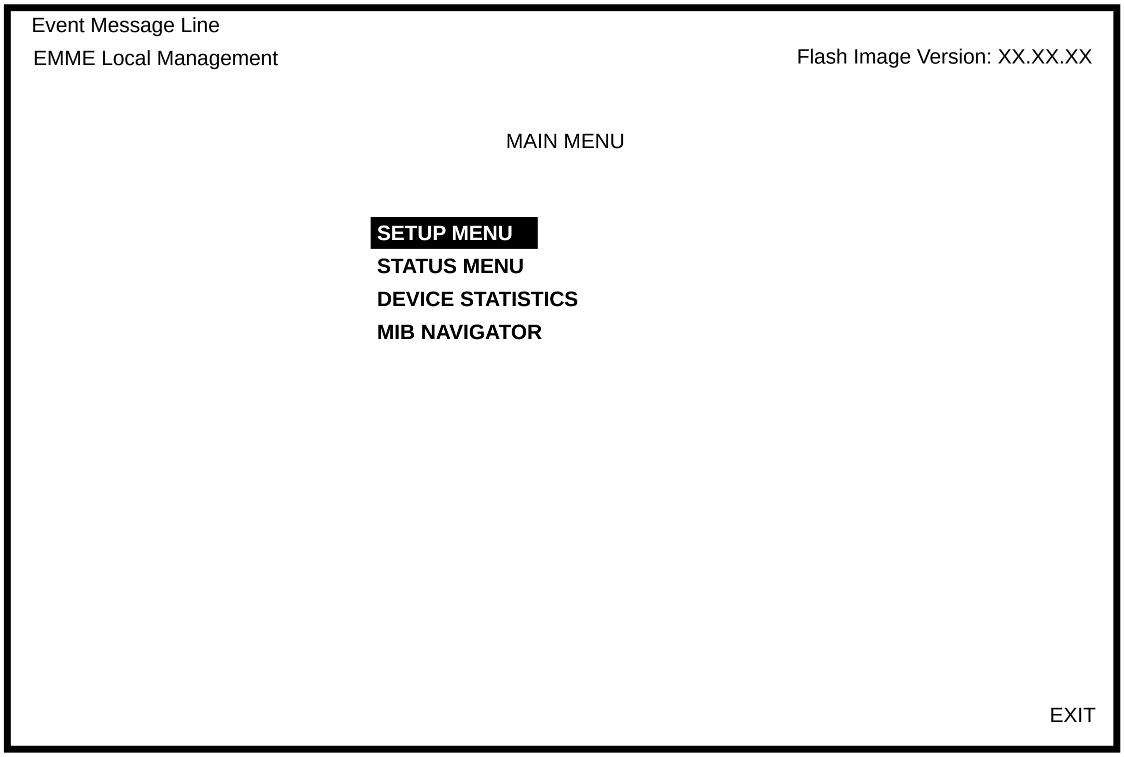

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Figure 5-3. The Main Menu

The Main Menu screen displays the following menu items:

- **SETUP MENU -** The Setup Menu provides access to Local Management screens that are used to configure the EMME.
- **STATUS MENU -** The Status Menu provides access to the Component Status screen which displays the operational and administrative status of EMME MIB components.
- **DEVICE STATISTICS -** The Device Statistics screen provides statistics and performance information for devices managed by the EMME in the network.
- **MIB NAVIGATOR -** The MIB Navigator is a Local Management utility which allows the user to access, monitor, and set specific Management Information Base (MIB) items within the EMME. Chapter 6 explains how to use the MIB Navigator utility.

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5.7 SETUP MENU SCREEN

The Setup Menu provides access to Local Management screens that are used to configure or alter the configuration of the EMME. Examples of functions accessible through the Setup Menu include configuring IP addresses and subnet masks, assigning SNMP community names, and configuring SNMP trap notification. Figure 5-4 shows the Setup Menu.

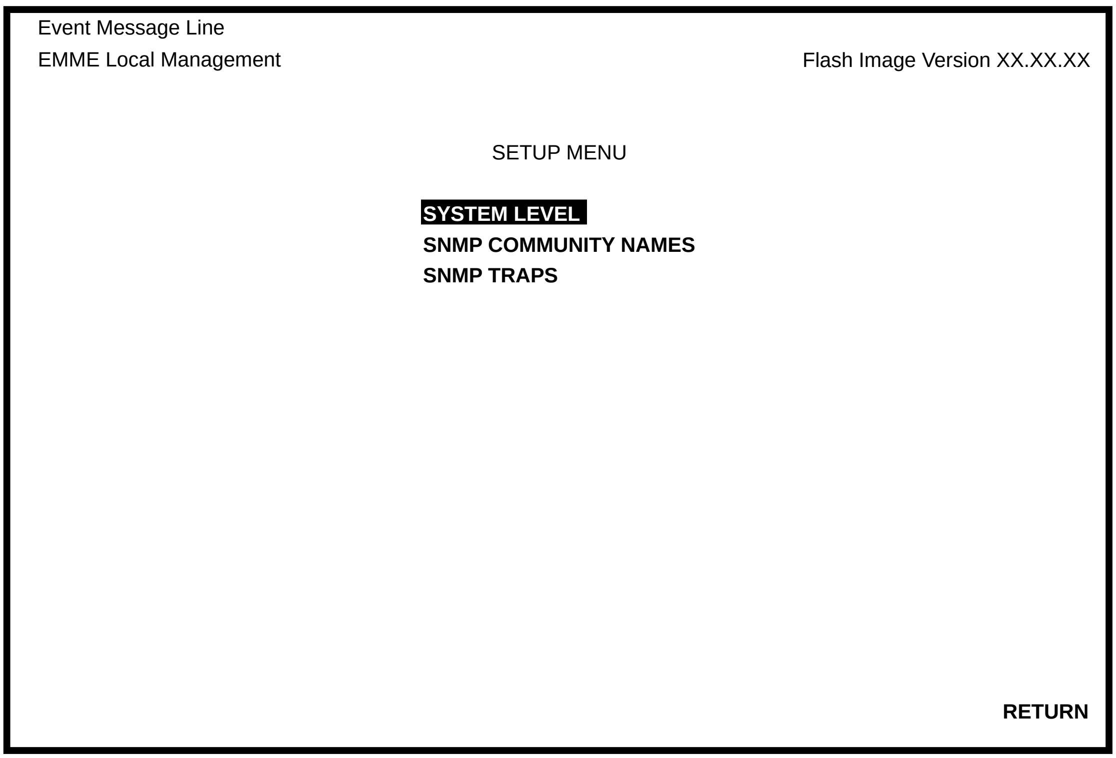

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Figure 5-4. The Setup Menu

The Setup Menu displays the following menu items:

- **SYSTEM LEVEL** - The System Level Setup screen allows you to configure basic operating parameters for the EMME.
- **SNMP COMMUNITY NAMES** - The SNMP Community Names Setup screen allows you to change or review the community names used as access passwords for local management operation.
- **SNMP TRAPS** - The SNMP Traps Setup screen provides display and configuration access to the table of IP addresses used for trap destinations and associated community names.

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5.8 THE SYSTEM LEVEL SCREEN

Figure 5-5 shows the EMME System Level screen. This screen allows you to configure the following parameters:

- System Date and System Time
- IP Addresses, Subnet Masks, and Default Gateway
- Default Interface
- Console and Modem port applications

Event Message Line
EMME Local Management   Flash Image Version XX.XX.XX

SYSTEM LEVEL

System Date: **12/30/95**   System Time: **14:23:00**

I/F	Channel	IP Address	Subnet Mask	MAC Address
1	**A**	**000.000.000.000**	**255.255.0.0**	**00-00-1D-07-50-0E**
2	**B**	**000.000.000.000**	**255.255.0.0**	**00-00-1D-07-50-0F**
3	**C**	**000.000.000.000**	**255.255.0.0**	**00-00-1D-07-50-10**
4	**D**	**000.000.000.000**	**255.255.0.0**	**00-00-1D-07-50-11**

Default Interface **01**   Default Gateway **0.0.0.0**

Console Application: **[LM]**
Modem Application: **[UPS]**

SAVE

RETURN

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Figure 5-5. The System Level Screen

5.8.1 System Level Screen Fields

The following briefly explains each System Level screen field.

System Date - Displays the system date.

System Time - Displays the system time.

I/F - Displays the number of the interface corresponding to the channel over which packets with that IP address are passing.

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Channel - Shows the channel, or bus, through which packets with that IP address are passing. Channel A is the original Ethernet bus channel. Channels B & C are the Flexible Network Bus channels. Channel D is the external Ethernet network accessed through an AUI port. Refer to Chapter 1 for a more complete description about channels.

IP Address - Displays the IP address of each of the four EMME interfaces.

Subnet Mask - Displays the subnet mask for each of the four EMME channels. A subnet mask “masks out” the network bits of the IP address by setting the bits in the mask to 1 when the network treats the corresponding bits in the IP address as part of the network or subnetwork address, or to 0 if the corresponding bit identifies the host.

MAC Address - Displays the physical address of each bridge interface.

Default Interface - Displays the default interface for the EMME’s default gateway. The default interface is the channel that is set up to handle message traffic to external networks. This field defaults to four.

Default Gateway - Displays the default gateway for the EMME. This should be the IP address of a perimeter or border device that connects your network to the rest of the world. The border device can be any device that is suitable for interfacing with external message traffic. This field is not defined until an appropriate value is entered.

Console Application - Displays the Console port’s application setting as UNASSIGNED, SLIP, UPS, or LM.

Modem Application - Displays the Modem port’s application setting as UNASSIGNED, SLIP, UPS, or LM.

Baud Rate - (This field only appears when the Console Application or the Modem Application is set to SLIP) - Displays the Baud Rate setting of the device attached to the EMME through the CONSOLE or MODEM port. The settings for this field are 19200, 9600, 4800, 2400, 1200, 600, and 300. The default setting is 9600.

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5.8.2 Setting the System Date

To set the system date, perform the following steps:

1. Use the arrow keys to highlight the System Date field.
2. Enter the date in a MM/DD/YY format.

NOTE

When entering the date in the system date field, you do not need to add any separators between month, day, and year numbers, as long as each entry uses two decimal numbers. For example, to set the date to 03/17/96, type "031796" in the System Date field.

3. Press ENTER to set the system calender to the date in the input field.
4. Use the arrow keys to highlight the **SAVE** command at the bottom of the screen and press ENTER.

If the date entered was a valid format, the Event Message Line at the top of the screen displays "SAVED OK." If the entry was not valid, Local Management does not alter the current value and refreshes the System Date field with the previous value.

5.8.3 Setting the System Time

To set the system clock, perform the following steps:

1. Use the arrow keys to highlight the System Time field.
2. Enter the time in a 24-hour format, HH:MM:SS.

NOTE

When entering the time in the system time field, you do not need to add any separators between hours, minutes, and seconds, as long as each entry uses two decimal numbers. For example, to set the time to 6:45 a.m., type "064500" in the System Time field.

3. Press ENTER to set the system clock to the time in the input field.

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4. Use the arrow keys to highlight the **SAVE** command at the bottom of the screen and press ENTER.

If the time entered was a valid format, the Event Message Line at the top of the screen displays “SAVED OK.” If the entry was not valid, Local Management does not alter the current value and refreshes the System Time field with the previous value.

5.8.4 Setting the IP Address

The IP Address table allows you to assign IP addresses to each of the four EMME interfaces. These four interfaces keep the packet traffic between devices for a specific channel’s subnetwork on that subnetwork, and only forwards packets meant for devices on another channel and its related subnetwork(s). This increases the number of segments that can be connected to one EMME-controlled FNB supporting MMAC.

Before you configure the IP Address Table, check that your configuration correctly establishes your repeater MIMs for either Channel B, C, or as stand-alones (refer to your repeater MIM documentation if necessary).

To set the EMME IP address, perform the following steps;

1. Use the arrow keys to highlight the appropriate IP address field.
2. Enter the IP address into this field using Decimal Dotted Notation (DDN) format.

   For example: 134.141.25.17
3. Press ENTER. If the IP Address entered was a valid format, the cursor returns to the beginning of the IP Address field. If the entry was not valid, the Event Message Line displays “INVALID IP ADDRESS OR FORMAT ENTERED.” Local Management does not alter the current value and refreshes the IP Address field with the previous value.
4. Repeat steps 1–3 to enter each Interface’s IP address.
5. Use the arrow keys to highlight the **SAVE** command.
6. Press ENTER. The Event Message Line at the top of the screen displays “SAVED OK.”

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5.8.5 Setting the Subnet Mask

If the management workstation that will be receiving SNMP traps from the SNMP agent of the managed device is located on a separate subnet, the subnet mask for the managed device must be changed from its default.

To change the subnet mask from its default value, perform the following steps:

1. Use the arrow keys to highlight the appropriate Subnet Mask field.
2. Enter the subnet mask into this field using Decimal Dotted Notation (DDN) format.

   For example: 255.255.0.0
3. Press ENTER. If the subnet mask entered was a valid format, the cursor returns to the beginning of the Subnet Mask field. If the entry was not valid, the Event Message Line displays “INVALID SUBNET MASK OR FORMAT ENTERED.” Local Management does not alter the current value and refreshes the Subnet Mask field with the previous value.
4. Repeat steps 1 - 3 for each interface’s subnet mask.
5. Use the arrow keys to highlight the **SAVE** command.
6. Press ENTER. The Event Message Line at the top of the screen displays “SAVED OK.”.

5.8.6 Setting the Default Interface

The default interface should be set to reflect the interface channel for the designated default gateway. To set the Default Interface, perform the following steps:

1. Use the arrow keys to highlight the Default Interface field.
2. Enter the interface number for the default gateway in this field with a value from 1 to 4.

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3. Press ENTER. If the subnet mask entered was a valid format, the cursor returns to the beginning of the Subnet Mask field. If the entry was not valid, the Event Message Line displays “PERMISSIBLE RANGE: 1...4.” Local Management does not alter the current value and refreshes the Default Interface field with the previous value.
4. Use the arrow keys to highlight the **SAVE** command.
5. Press ENTER. The Event Message Line at the top of the screen displays “SAVED OK.”.

5.8.7 Setting the Default Gateway

If the SNMP management station is located on a different IP subnet than the managed device, a default gateway must be specified. When an SNMP Trap is generated, the device will send it to both the Management station and the default gateway. To set the default gateway, perform the following steps:

1. Use the arrow keys to highlight the Default Gateway field.
2. Enter the IP address of the default gateway. IP address entries must follow the DDN format.

   For example: 134.141.79.121
3. Press ENTER. If the default gateway entered was a valid format, the cursor returns to the beginning of the Default Gateway field. If the entry was not valid, the Event Message Line displays “INVALID DEFAULT GATEWAY OR FORMAT ENTERED.” Local Management does not alter the current value and refreshes the Default Gateway field with the previous value.
4. Use the arrow keys to highlight the **SAVE** command.
5. Press ENTER. The Event Message Line at the top of the screen displays “SAVED OK.”

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5.8.8 Configuring Console and Modem Ports

The EMME Console and Modem ports support the following applications:

NOTE

Refer to the Release Notes included with the EMME to verify which Console and Modem Port applications are currently supported.

- Local Management connections
- American Power Conversion (APC) Uninterruptible Power Supply (UPS) connections
- Telnet connections to a wide area network via the Serial Line Internet Protocol (SLIP)
- Unassigned applications for security reasons.

To configure the Console and Modem ports, perform the following steps:

1. Use the arrow keys to highlight the Console Application or the Modem Application field.

WARNING

Use caution not to alter the settings of the port which is operating the current Local Management connection. This could disconnect the Local Management terminal from the port and end the Local Management session.

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2. Press SPACEBAR or BACKSPACE to cycle through the available settings until the operation you require appears. Table 5-3 lists the available settings and their corresponding applications.

Table 5-3. COM Port Application Settings

Setting	Application
[LM]	Local Management Session
[UPS]	APC Power Supply SNMP Proxy
[SLIP]	Serial Line Internet Protocol
[UNASSIGNED]	Not Active

3. Press ENTER to accept the application.

If the SLIP application is chosen for the port, an additional field will appear to the right of the port field. This is the Baud Rate field. The Baud Rate field allows the port operating SLIP to be set to the correct baud rate for its modem connection.

To alter and set the SLIP baud rate, perform the following steps:

1. Use the arrow keys to highlight the COM *X* Baud Rate field.
2. Press SPACEBAR or BACKSPACE cycle through the available baud rates for SLIP operation.

NOTE

The Console port and Modem port support standard baud rates between 300 and 19,200.

3. Press ENTER to select the desired baud rate.
4. Use the arrow keys to highlight the **SAVE** command.
5. Press ENTER. The Event Message Line at the top of the screen displays “SAVED OK.”

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5.9 SNMP COMMUNITY NAMES SCREEN

Figure 5-6 shows the SNMP Community Names screen. The network manager may control Local Management access by establishing three (3) passwords. Each password controls varying levels of access to EMME Local Management.

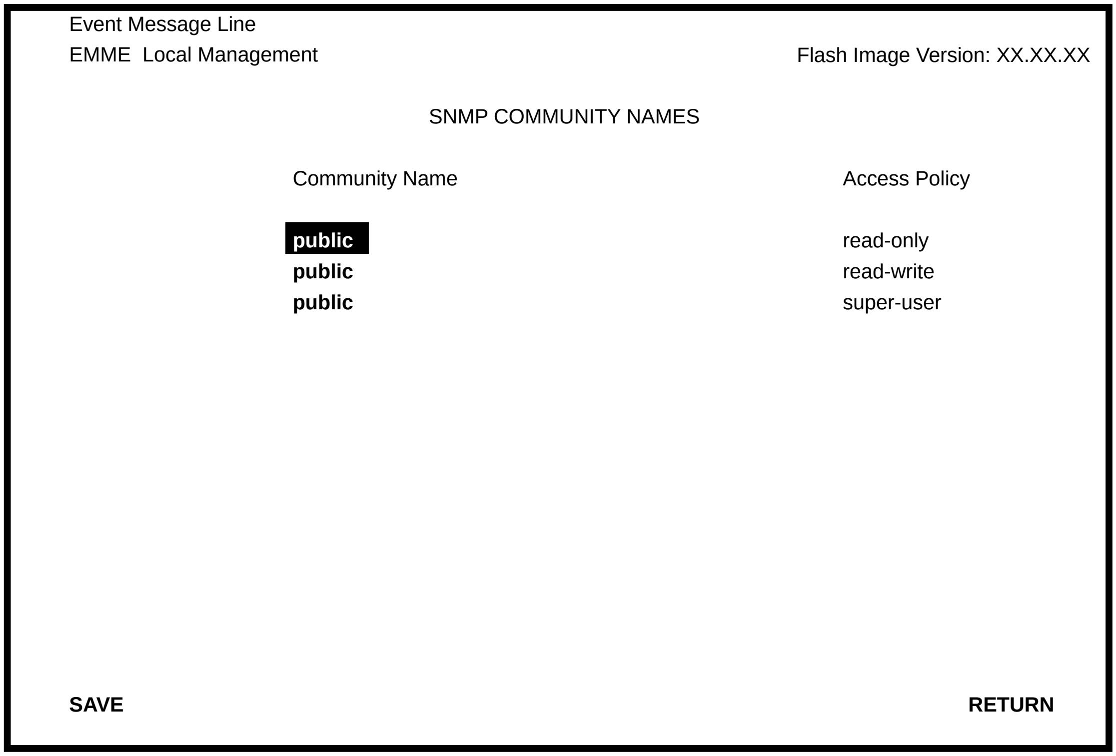

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Figure 5-6. The Community Names Screen

The following list describes each of the three levels of access:

- super-user: Allows full management privileges
- read-write: Allows edit of some device configuration parameters not including changing community names
- read-only: Allows reading of device parameters not including community names

In order to perform any operations on the SNMP Community Names screen, the user must have used the super-user community name at the User Password prompt when initiating the Local Management session.

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5.9.1 Setting SNMP Community Names

To set a community name, perform the following steps:

1. Use the arrow keys to highlight the community name you want to change.
2. Type the new community name and press ENTER. The old community name text will disappear and be replaced by the new community name.
3. Use the arrow keys to highlight the **SAVE** command.
4. Press ENTER. The Event Message Line at the top of the screen displays “SAVED OK.”

WARNING

If you edit the super-user community name, be certain you do not forget it. If you do, you will be unable to perform Local Management functions without returning the device to its factory default configurations. This will effectively erase any configuration work you may have done.

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5.10 SNMP TRAPS SCREEN

Figure 5-7 shows the SNMP Traps screen. Configuring the SNMP Traps screen allows the EMME to send SNMP Traps to multiple network management stations. The following sections explain SNMP Trap screen information fields as well as providing instructions for configuring them.

Event Message Line

EMME Local Management — Flash Image Version: XX.XX.XX

SNMP TRAPS

Trap Destination	Trap Community Name	Enable Traps
0.0.0.0	**public**	**(NO)**
0.0.0.0	**public**	**(NO)**
0.0.0.0	**public**	**(NO)**
0.0.0.0	**public**	**(NO)**
0.0.0.0	**public**	**(NO)**
0.0.0.0	**public**	**(NO)**
0.0.0.0	**public**	**(NO)**
0.0.0.0	**public**	**(NO)**

SAVE — **RETURN**

051450

Figure 5-7. The SNMP Traps Screen

5.10.1 Trap Table Screen Fields

SNMP Community Name - Displays the Community Name to be included in the trap message sent to the Network Management Station with the associated IP address.

Traps - Enables transmission of the traps to the network management station with the associated IP address.

Trap IP Address - Indicates the IP address of the workstation to receive trap alarms from the EMME.

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5.10.2 Setting SNMP Trap Destinations

To set SNMP Trap destinations using Local Management requires three distinct operations: the configuration of a destination address for the traps to be sent to, the assignment of a community name for that IP address, and the enabling of the combination of IP address and community name.

To set an SNMP trap destination, perform the following steps:

1. Use the arrow keys to highlight the Trap Destination input field you wish to modify.
2. Type the IP address of the management station to which you want SNMP traps to be sent. This address must be entered in DDN format.
3. Press ENTER.
4. Use the arrow keys to highlight the corresponding Trap Community Name input field (on the same row as the Trap Destination field).
5. Type the community name into the input field that you intend the management station to use for accessing SNMP traps and performing management operations.
6. Press ENTER.
7. Use the arrow keys to highlight the Enable Traps field (on the same row as the Trap Destination and Trap Community Name you have just configured). By default, this toggle item will be **[NO]**.
8. Press SPACEBAR or BACKSPACE to set the toggle field to **[YES]**.
9. Use the arrow keys to highlight the **SAVE** command.
10. Press ENTER. The Event Message Line at the top of the screen displays “SAVED OK.”

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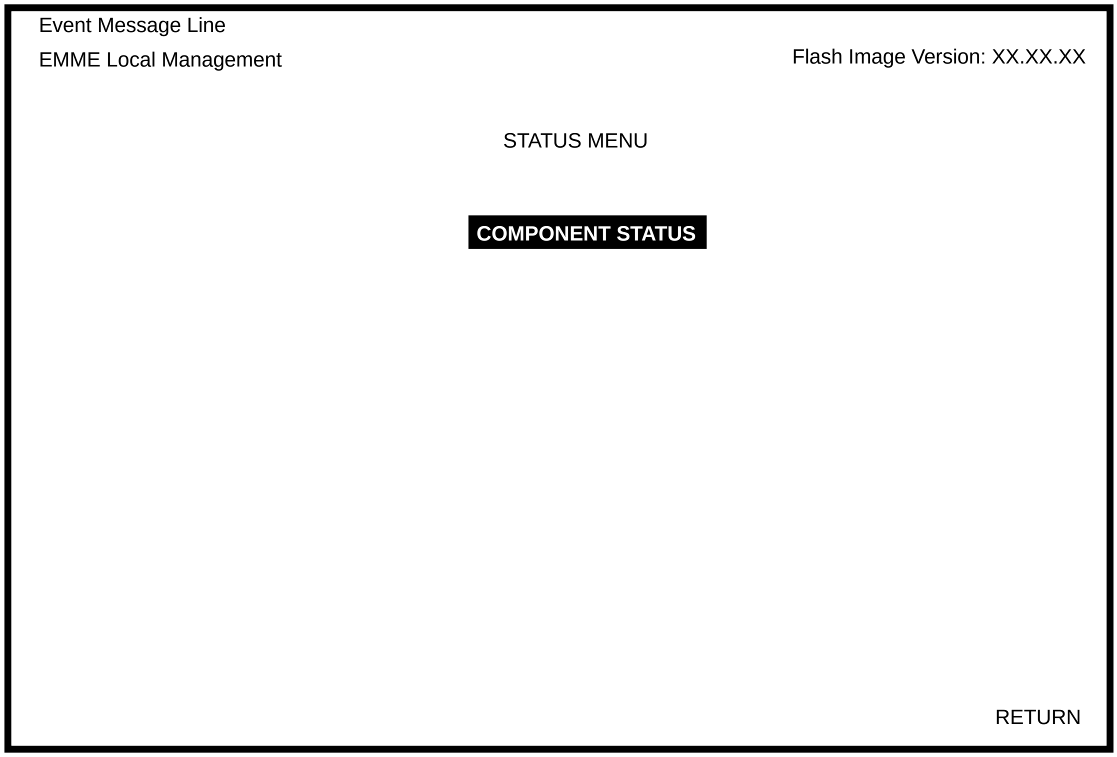
5.11 STATUS MENU

Figure 5-8 shows the Status Menu screen. The Status Menu screen provides access to the Component Status screen.



051451

Figure 5-8. The Status Menu Screen

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5.12 THE COMPONENT STATUS SCREEN

Figure 5-9 shows the Component Status screen. The Component Status screen monitors the status of the MIB Components of the EMME.

Event Message Line

EMME Local Management — Flash Image Version: XX.XX.XX

COMPONENT STATUS

Component Name	Admin. Status
EMME Chassis MGR	enabled
EMME LIM	enabled
Ctron Use Only	enabled
EMME Host Services	enabled
EMME IP Services	enabled
EMME Distributed LAN Monitor	enabled
EMME MIB Navigator	enabled
EMME RMON Default	disabled
EMME RMON Host	disabled
EMME RMON Capture	disabled
EMME Transparent Bridge	enabled

RETURN

051452

Figure 5-9. The Component Status Screen

5.12.1 Component Status Screen Fields

The Component Status table lists the Admin. Status (administrative status) of the EMME's MIB Components. The Admin. Status field displays two states: Enabled and Disabled. Refer to Figure 5-9 for a list of the EMME's MIB Component Names.

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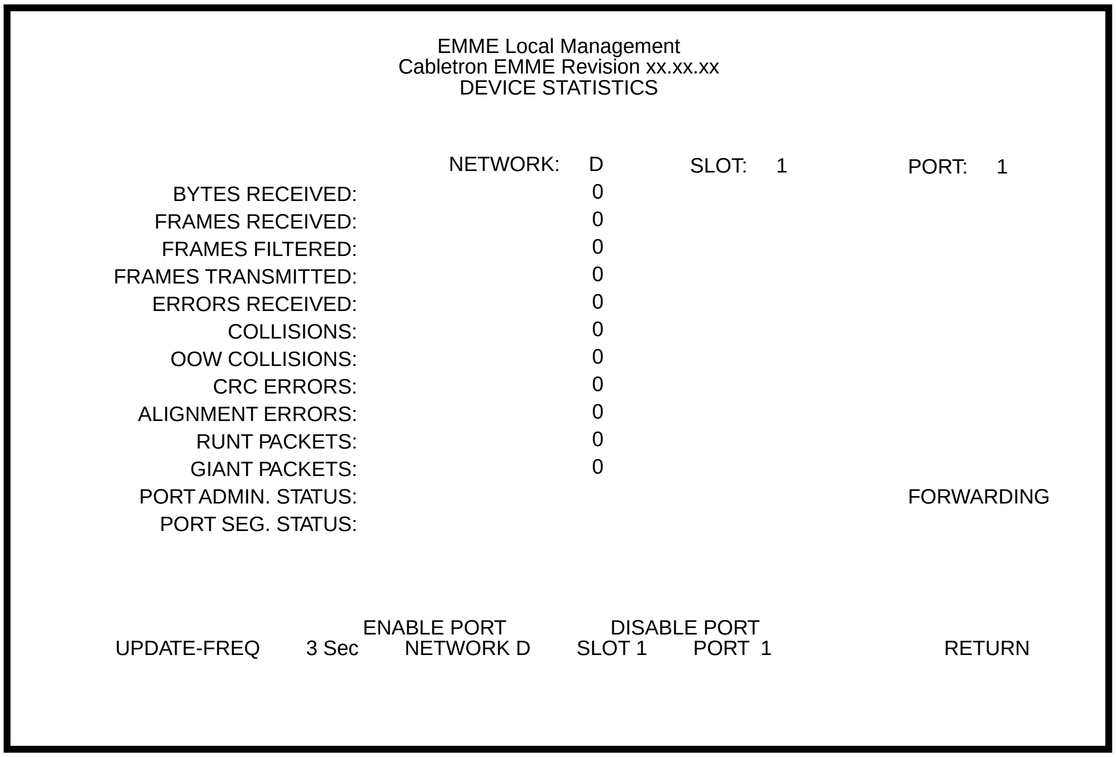
5.13 THE DEVICE STATISTICS SCREEN

Figure 5-10 shows the Device Statistics screen. The Device Statistics screen displays error, collision, and traffic statistics for the entire network, a selected slot, or a selected port. This screen also provides the option of enabling and disabling ports.



051453

Figure 5-10. Device Statistics Screen

5.13.1 Device Statistics Screen Fields

The following sections describe Device Statistics Screen fields and instructions on how to change them.

BYTES RECEIVED - Displays the number of bytes received.

FRAMES RECEIVED - Displays the number of frames received.

FRAMES FILTERED - Displays the number of frames filtered by the EMME.

FRAMES TRANSMITTED - Displays the number of frames transmitted by the EMME.

ERRORS RECEIVED - Displays the number of errors received.

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COLLISIONS - Displays the number of collisions received.

OOW COLLISIONS - Displays the number of Out Of Window (OOW) collisions. OOW collisions are usually caused by the network being too long where the round trip propagation delay is greater than 51.2 µs (the collision domain is too large), a station somewhere on the network is violating Carrier Sense and transmitting at will, or a cable somewhere on the network failed during the transmission of the packet.

CRC ERRORS - Displays the number of packets with bad Cyclic Redundancy Checks (CRC) that have been received from the network. The CRC is a 4-byte field in the data packet which ensures that the transmitted data received is the same as the data that was originally sent.

ALIGNMENT ERRORS - Displays the number of errors due to misaligned packets.

RUNT PACKETS - Displays the number of runt packets received from the network. A runt packet is less than the minimum Ethernet frame size of 64 bytes, not including preamble.

GIANT PACKETS - Displays the number of packets received whose size exceeded 1518 data bytes, not including preamble.

PORT ADMIN. STATUS - Displays the administrative status of the port selected. The two possible status messages are Enable or Disable.

PORT SEG. STATUS - Displays the segmentation status of the port selected. The two possible status messages are Segmented or Unsegmented. The EMME automatically partitions problem segments, and reconnects non-problem segments to the network.

ENABLE PORT - This command lets you enable the selected port.

DISABLE PORT - This command lets you disable the selected port.

UPDATE-FREQ - This command lets you select the time interval between Network/Slot/Port counter updates. You can choose update intervals in increments of 3 seconds, with the maximum interval being 99 seconds.

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NETWORK - This command lets you select the network you want to monitor. The choices range from A to D, depending on the configuration of your network and the options available from this configuration. For example, if you do not have a device running on Channel A, the EMME automatically disallows Channel A as a network selection.

SLOT - This command lets you select the MMAC hub slot that you want to monitor. The choices vary depending on the MMAC chassis you use. The far right slot is always slot number one (1).

PORT - This command lets you select and view port statistics for ports 1 through 26 of the device residing in the selected slot.

5.13.2 Selecting an Update-Freq

The EMME updates the Device Statistics Screen every three seconds by default. The EMME allows you to adjust the frequency in intervals of 3 seconds. The maximum update frequency is 99 seconds.

To adjust the Update-Freq, perform the following steps:

1. Use the arrow keys to highlight the Update-Freq command.
2. Press SHIFT+[+], or [–] until the desired time/frequency appears (this number increments/decrements in 3 second intervals with a minimum of 3 seconds and a maximum of 99 seconds).
3. Press ENTER to set the Update-Freq.

5.13.3 Selecting a Network/Slot/Port

When the Device Statistics Screen first appears, statistics are displayed for Network 1, Slot 1 and Port 1. To view statistics for another Network, Slot, and Port, use the **NETWORK x**, **SLOT x**, or **PORT x** commands at the bottom of the screen.

To select a Network, Slot, or Port, perform the following steps:

1. Use the arrow keys to highlight the Network, Slot, or Port command.
2. Press SHIFT+[+], or [–] until the desired Network, Slot, or Port appears.
3. Press ENTER. Statistics associated with the selected Network, Slot, or Port appear.

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5.13.4 Enabling Ports

The Enable Port command lets you enable the port selected in the Port command. You must first use the Port command to select the desired port.

To set the Port Enable command, perform the following steps:

1. Use the arrow keys to highlight the **ENABLE PORT** command at the bottom of the screen.
2. Press ENTER.

5.13.5 Disabling Ports

The Disable Port command lets you Disable the port selected in the Port command. You must first use the Port command to select the desired port.

To set the Port Disable command, perform the following steps:

1. Use the arrow keys to highlight the **DISABLE PORT** command at the bottom of the screen.
2. Press ENTER.

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CHAPTER 6

MIB NAVIGATOR

This chapter describes the MIB Navigator utility. MIB Navigator is a feature of EMME Local Management.

6.1 MANAGING DEVICE MIBS

The MIB Navigator allows access to a command set from which you can configure and manage the EMME. The MIB Navigator enables you to manage objects in the EMME's Management Information Bases (MIBs). MIBs are databases of objects used for managing the device and determining your EMME's configuration. The commands within the MIB Navigator allow you to view and modify a device's objects.

The MIB Navigator views the MIB tree hierarchy as a directory (Figure 6-1). Each layer is numerically encoded, so that every branch group and leaf object in the MIB is identified by a corresponding number, known as an Object Identifier (OID). This allows the MIB Navigator to navigate through the MIB and access the manageable leaf objects.

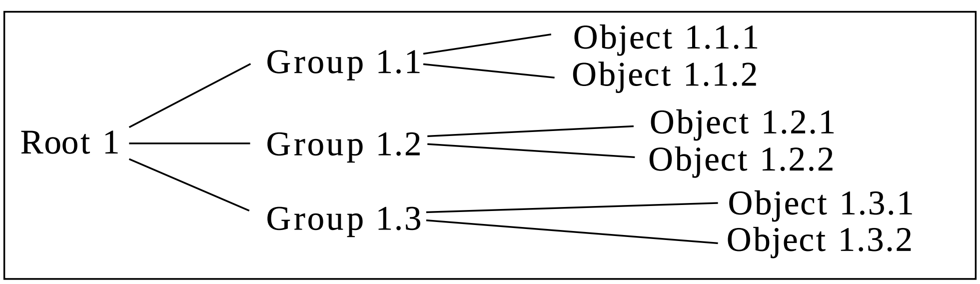

Figure 6-1. Hierarchical MIB Tree Structure

Often an ASCII name is assigned to a leaf object's OID, making it more readable. To identify the value for the object "ip Forwarding" you would use the OID (/1/3/6/1/2/1/4/1), or its ASCII name (/iso/org/dod/internet/mgmt/mib-2/ip/ipForwarding).

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6.2 ACCESSING THE MIB NAVIGATOR

MIB Navigator is a feature of Local Management. Refer to Chapter 5 of this manual for instructions about accessing Local Management.

To access the MIB Navigator screen, perform the following steps:

1. Use the arrow keys to highlight MIB NAVIGATOR menu item from the Main Menu screen. Figure 6-2 shows the Main Menu screen.

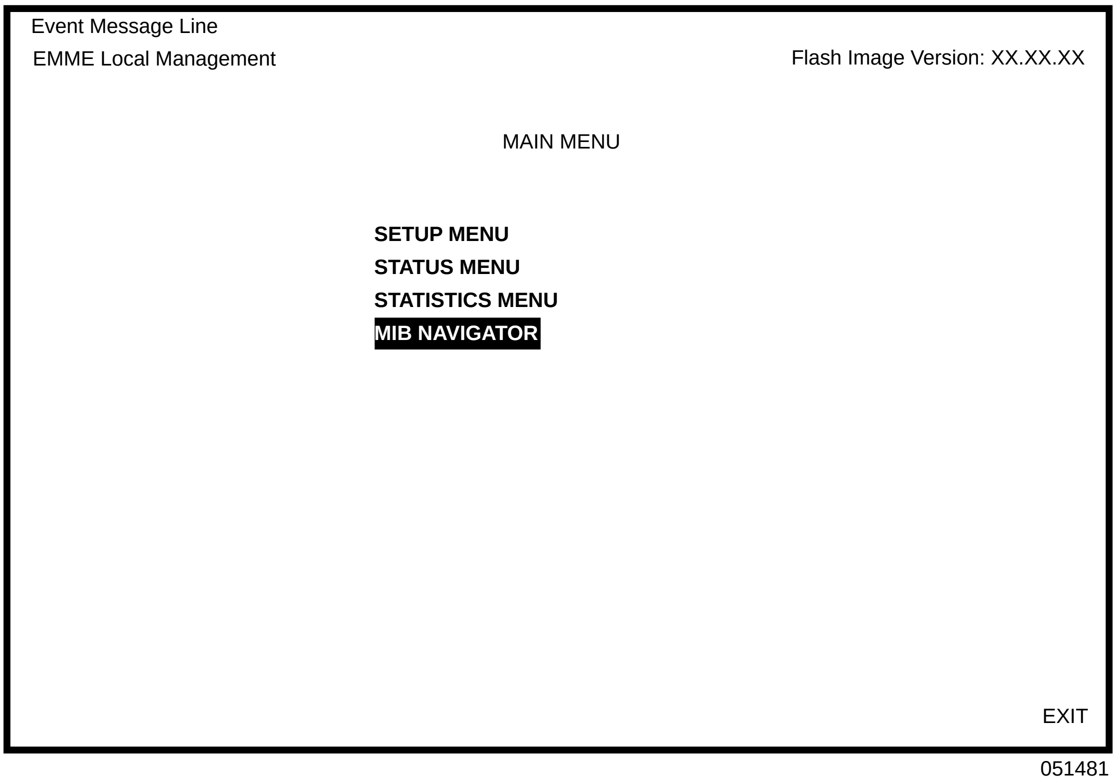

Figure 6-2. The Main Menu Screen

2. Press ENTER. The MIB Navigator screen appears. The MIB Navigator screen is identified by the presence of the *MIBNav–>* prompt.

The MIB Navigator functions are performed using a series of commands. Entering commands in the MIB Navigator involves typing the command to be executed at the MIB Navigator prompt, adding any desired or required extensions, and pressing ENTER.

The following sections explain how to use MIB Navigator commands.

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6.3 MIB NAVIGATOR COMMAND SET OVERVIEW

There are three categories of commands in the command set.

- **Navigation Commands** - Allow the user to access and manage the MIB for the device running the MIB Navigator. Some of these commands also provide user community-string information. The commands are as follows:

– branch	– cd	– ctron	– dir
– get	– ls	– mib2	– next
– pwd	– set	– show	– su
– tree	– whoami		

- **Built-In Commands** - Allow the user to access and manage network devices connected to the device running the MIB Navigator. The commands are as follows:

– arp	– defroute	– netstat	– ping
– snmpbranch	– snmpget	– snmpset	– snmptree
– traceroute			

- **Special Commands** - Allow the user to exit from the MIB Navigator. The commands are as follows:

– done	– quit	– exit

6.3.1 Conventions for MIB Navigator Commands

This manual uses the following conventions for denoting commands:

- Information keyed by the user is shown in this helvetica font.
- Command arguments are indicated by two types of brackets:
  - required arguments are enclosed by [ ].
  - optional arguments are enclosed by < >.

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MIB Navigator command conventions are as follows:

- To abort the output or interrupt a process the escape character is ^C (where ^ equals the Control key).
- A slash (/) proceeding an OID issues that command from the root directory regardless of where you are in the MIB. If no slash precedes the OID the command issues from your current MIB location.
- Dot notation (1.1.1.1) is equivalent to slash notation (1/1/1/1). Use slash notation with the navigational commands, and the dot notation with the built-in commands that are using SNMP to access and manage network devices.

MIB Navigation Commands are listed in the format shown below:

command:

Syntax:	This entry provides the format that the MIB Navigator command requires. It indicates where arguments, if any, must be specified.
Description:	This entry briefly describes the command and its uses.
Options:	This entry lists any additional fields which may be added to the command and their format.
Example:	This entry shows an example of the command.

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6.3.2 Navigation Commands

Navigation commands allow you to move from MIB object to MIB object within the MIB tree.

branch:

Syntax: branch [path]

Description: The branch command displays all of the leaves in the MIB tree below a specified path. The information displayed includes the path name, the object ASCII name, the type of object (i.e., integer, counter, time tick, etc.), and the current value of each leaf object.

Options: Not Applicable

Example:

```
MIBNav-> branch

# /1/3/6/1/2/1/7/1    udpInDatagrams    COUNTER   38216
# /1/3/6/1/2/1/7/2    udpNoPorts        COUNTER   0
# /1/3/6/1/2/1/7/3    udpInErrors       COUNTER   0
```

051456

cd:

Syntax: cd [path] or cd [option]

Description: The cd command allows you to change directories within a MIB subtree (branch). The path specified must be valid, or the cd operation will not be performed by the MIB Navigator.

Options: .. Moves you one subtree above the current one.

/ Moves you to the root.

Example:

```
MIBNav-> cd iso/org/dod/internet/mgmt
```

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ctron:

Syntax: ctron

Description: The ctron command allows you to change directories to the Cabletron MIB (1.3.6.1.4.1.52) without keying in the entire path.

Options: Not Applicable

Example:

```
MIBNav-> ctron
```

051458

help:

Syntax: help <COMMAND>

Description: The help command can provide general help on the usage of the MIB Navigator, or may be used to get more detailed help about a particular MIB Navigator command.

Options: Not Applicable

Example:

```
MIBNav-> help su

Command:        su
Format:         su <Community Name>
Allows user to change his/her community name, in
order to allow different access to the MIB.
```

051459

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mib2:

Syntax: mib2

Description: The mib2 command allows you to move directly to the MIB II subtree (1.3.6.1.2.1) without entering the entire path.

Options: Not Applicable

Example:

```
MIBNav-> mib2
```

051460

next:

Syntax: next [path]

Description: The next command enables you to determine the next leaf in the specified path within the managed device's MIB.

Options: Not Applicable

Example:

```
MIBNav-> next /1/3/6/1/2/1

#/1/3/6/1/2/1/1/1      sysDescr      String   CtronRev.X.XX.XX
```

051461

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pwd:

Syntax: pwd

Description: The pwd command displays the full path name for the directory in which you are currently working. The directory will be displayed in ASCII format.

Options: Not Applicable

Example:

```
MIBNav-> pwd

# /iso/org/dod/internet/mgmt/mib-2
```

051462

set:

Syntax: set <OID> <value>

Description: The set command enables you to set the value of a managed object. This command is valid only for leaf entries in the current MIB tree, or for managed objects in the MIB.

If the leaf specified does not exist for the given path, you will be asked what value to assign it. The following lists possible value types:

(i)nteger - number
(c)ounter - number
(g)auge - number
(t)ime ticks - number
o(p)aque - "value" (with quotation marks)
(s)tring - "value" (with quotation marks)
(o)id - OID number with dotted punctuation
(a)ddress - IP address in DDN format
(m)ac - MAC address in hexadecimal format
(n)ull - no type

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Options: Not Applicable

Example:

```
MIBNav-> set /1/3/6/1/4/1/52/1/6/4/7 122.1.1.1

Type: (i)nteger (a)ddress (c)ounter (g)auge (o)id:
```

051463

su:

Syntax: su [community name]

Description: The su command enables you to change your community name to allow for different access to the MIB. The community name that you enter allows you either read only, read-write, or super-user access to that device's MIBs, depending on the level of security access assigned the password through the SNMP Community Names screen. See Chapter 5 for more information about community names.

Options: Not Applicable

Example:

```
MIBNav-> su public
```

051464

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tree:

Syntax: tree

Description: The tree command provides a display of the entire MIB for the device. Leaves and associated values are displayed in columns.

Options: Not Applicable

Example:

```
MIBNav-> tree

# /1/3/6/1/2/1/1/1    sysDescr      STRING        EMRev X.X.X.X
# /1/3/6/1/2/1/1/2    sysObjectId   OBJECT ID     1.3.6.1.4.1.52
# /1/3/6/1/2/1/1/3    sysUpTime     TIME TICKS    8098654
# /1/3/6/1/2/1/1/4    sysContact    STRING        AlZwie/MIS
```

051465

whoami:

Syntax: whoami

Description: The whoami command displays your community string and access privileges to the MIB. When using the whoami command one of these three access levels will display: read-only, read-write, and super-user

Options: Not Applicable

Example:

```
MIBNav-> whoami

# Community Name      : super
# Access Level        : SuperUser
```

051466

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6.3.3 Built-In Commands

The built-in commands listed in this section activate functions on the LM managed device or devices being accessed through MIB Navigation.

arp:

Syntax:	arp <options>
Description:	The arp command provides access to the ARP (Address Resolution Protocol) cache, enabling you to view cache data, delete entries, or add a static route. Super-User access is required to delete an entry or add a static route. Each ARP cache entry lists: the network *interface* that the device is connected to, the device's *network address* or IP address, the device's *physical address* or MAC address, and the *media type* of connection to the device. Media types are displayed as numbers, which stand for the following states: 1 - Other 2 - Invalid entry (cannot ping device, timed out, etc.) 3 - Dynamic route entry 4 - Static route entry (not subject to change)
Options:	-a View cache data -d delete an IP address entry. Requires additional arguments: <Interface Number> <IP address> -s Adds a static entry. Requires additional arguments: <Interface Number> <IP address> <MAC address>

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Example:

```
MIBNav-> arp -a
# Interface        Network Address     Physical Address     Media Type
# (SonicInt)       122.144.40.111      00.00.0e.12.3c.04    3(dynamic)
# (SonicInt)       122.144.48.109      00.00.0e.f3.3d.14    3(dynamic)
# (SonicInt)       122.144.52.68       00.00.0e.12.3c.04    3(dynamic)
# (SonicInt)       122.144.21.43       00.00.0e.03.1d.3c    3(dynamic)

MIBNav-> arp -d 1 122.144.52.68

MIBNav-> arp -s 1 22.44.2.3 00:00:0e:03:1d:3c
```

051467

defroute:

Syntax: defroute [interface number] [IP address]

Description: The defroute command allows you to set the default IP route to a managed device through the specified interface.

Options: Not Applicable

Example:

```
MIBNav-> defroute 2 147.152.42.32
```

051469

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netstat:

Syntax: netstat [option]

Description: The netstat command provides a display of general network statistics for the managed device. The netstat command must be used with one of the two display options.

Options: -i Displays status and capability information for each interface

-r Displays routing information for each interface

Example:

```
MIBNav-> netstat -i
Interface + Description     MTU     Speed      Admin   Oper    MAC Addr

# 1 (ethernet -csmacd)      1514    10000000   up      up      0x00 0x00 0x1d 0x07 0x50 0x0e
# 2 (ethernet - csmacd)     1514    10000000   up      up      0x00 0x00 0x1d 0x07 0x50 0x0f
# 3 (ethernet - csmacd)     1514    10000000   up      up      0x00 0x00 0x1d 0x07 0x50 0x10
# 4 (ethernet - csmacd)     1514    10000000   up      up      0x00 0x00 0x1d 0x07 0x50 0x11

MIBNav-> netstat -r
Destination          Next-hop                Interface

# Default Route      DirectConnection        1
# 134.141.0.0        DirectConnection        2
# 134.141.0.0        DirectConnection        3
```

051470

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ping:

Syntax: ping [IP address]

Description: The ping command generates an outbound ping request to check the status (alive/not alive) of a device at a specified IP address.

Options: Not Applicable

Example:

```
MIBNav-> ping 122.144.40.10
122.144.40.10 is alive
```

051471

snmpbranch:

Syntax: snmpbranch [IP address] [community name] [OID]

Description: The snmpbranch command enables you to query another SNMP device. The command provides a display of objects that match the specified OID. If no match is made, no object will be displayed.

Options: Not Applicable

Example:

```
MIBNav-> snmpbranch 2.4.8.1 public 1.3.6.2.1.1

# /1/3/6/1/2/1/1/1   sysDescr      STRING       EMRev X.X.X.X
# /1/3/6/1/2/1/1/2   sysObjectId   OBJECT ID    1.3.6.1.4.1.52
# /1/3/6/1/2/1/1/3   sysUpTime     TIME TICKS   8098654
# /1/3/6/1/2/1/1/4   sysContact    STRING       AlZwie/MIS
```

051473

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snmpget:

Syntax: snmpget [IP address] [community name] [OID]

Description: The snmpget command enables you to query another SNMP device to obtain a value for a specified object. This command requires the appropriate community string and object id.

Options: Not Applicable

Example:

```
MIBNav-> snmpget 22.44.61.22 public 1.3.6.1.2.1.1.1.0

# Cabletron EMME Revision X.XX.XX
```

051474

snmpset:

Syntax: snmpset [IP address] [community name]

Description: The snmpset command enables you to set the value of an object in other SNMP devices. This command requires the appropriate community string and OID.

When defining a new leaf set, you will be asked what value to assign it. The following lists possible value types:

(i)nteger - number
(c)ounter - number
(g)auge - number
(t)ime ticks - number
o(p)aque - “value” (with quotation marks)
(s)tring - “value” (with quotation marks)
(o)id - OID number with dotted punctuation
(a)ddress - IP address in DDN format
(m)ac - MAC address in hexadecimal format
(n)ull - no type

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Options: Not Applicable

Example:

```
MIBNav-> snmpset 122.44.1.2 public
             1.3.6.1.2.1.1.4.0 "Cyrus/MIS"
```

051475

snmptree:

Syntax: snmptree [IP address] [community name]

Description: The snmptree command provides a display of all objects in the device and their corresponding values.

Options: Not Applicable

Example:

```
MIBNav-> snmptree 122.144.89.10 public

# /1/3/6/1/2/1/1/1    sysDescr      STRING        EMRev X.X.X.X
# /1/3/6/1/2/1/1/2    sysObjectId   OBJECT ID     1.3.6.1.4.1.52
# /1/3/6/1/2/1/1/3    sysUpTime     TIME TICKS    8098654
# /1/3/6/1/2/1/1/4    sysContact    STRING        AlZwie/MIS
```

051476

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traceroute:

Syntax: traceroute [IP address]

Description: The traceroute command generates a TRACEROUTE request to a specified IP address and provides a display of all next-hop routers in the path to the device. If the device is not reached, the command displays all next-hop routers to the point of failure.

Options: Not Applicable

Example:

```
MIBNav-> traceroute 122.144.11.52

# next-hop[1]  122.144.61.45
# next-hop[2]  122.144.8.113
```

051477

6.3.4 Special Commands

done, quit, exit:

Syntax: done

Description: These commands enable you to exit from the MIB Navigator and return to the Main Menu screen.

Options: Not Applicable

Example:

```
MIBNav-> done

Connection closed
```

051472

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CHAPTER 7

TROUBLESHOOTING

This chapter includes information to help you troubleshoot your EMME should a problem occur. Described are the EMME's LANVIEW LEDs, a troubleshooting checklist, and information to have available if you call Cabletron Technical Support.

7.1 INTERPRETING THE LANVIEW LEDS

The EMME uses the Cabletron Systems built-in visual diagnostic and status monitoring system called LANVIEW. With LANVIEW, you can quickly scan the LANVIEW LEDs (shown in Figure 7-1) to observe network status, or diagnose network problems.

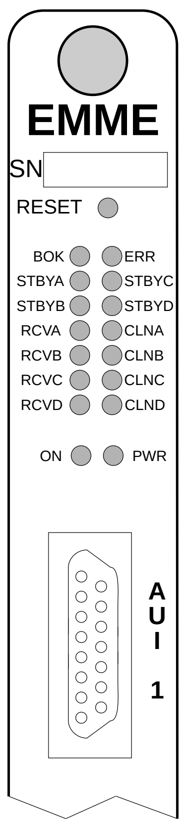

Figure 7-1. LANVIEW LEDs

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Table 7-1 describes the LEDs and the associated troubleshooting actions.

Figure 7-2. LANVIEW LEDs

LED	Color	Description	Error Condition/ Recommended Action
BOK (Board OK)	Green	When flashing, indicates that the board is operating properly.	If off, or on and not flashing, the board has a problem. Press the reset button on the EMME front panel to re-initialize the board. If the board does not re-initialize, it has probably failed. Call Cabletron Technical Support.
ERR (Error)	Red	This light indicates a hardware error which will prevent the board from operating.	If on, a hardware error has occurred. Try re-initializing the board by pressing the reset button. If the LED is still lit, call Cabletron Technical Support.
STBY A,B,C,D (Standby)	Yellow	Indicates packets cannot be forwarded as the Spanning Tree Algorithm has put the associated Bridge Port into a standby mode due to the detection of a data loop condition.	Data loop condition exists. Reconfigure the network to remove the data loop.

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Figure 7-2. LANVIEW LEDs (Continued)

LED	Color	Description	Error Condition/ Recommended Action
RCV A,B,C,D (Receive)	Yellow	Light flashes to indicate that a segment is receiving a packet.	If none of the receive lights are flashing, the EMME is not receiving packets on any of the segments. Check that each module is firmly installed in the MMAC. Ensure that all ports are enabled.
CLN (Collision)	Red	Collision detected on a segment. When the LAN is operating normally, this LED will flash occasionally.	Excessive flashing, or a solid light, indicates an inordinate amount of collisions. Ensure that the SQE test is disabled for any transceiver connected to the EMME's AUI port. Check cabling for data loops or defective cables.
ON (AUI ports)	Yellow	This LED lights to indicate which of the two AUI ports is active. Only one ON LED can be on at a time.	If this LED is not lit for either AUI port, try re-initializing the EMME by pressing the reset button. If the LEDs still do not light, call Cabletron Technical Support.
PWR (Power - AUI ports)	Green	This LED lights to indicate that the AUI port is receiving power. Both AUI ports' PWR LEDs should be on.	If the LED is off for either AUI port, that port is not receiving power. Check the fuse associated with the AUI port.

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7.2 TROUBLESHOOTING CHECKLIST

If your EMME is not operating properly, refer to Table 7-2 for a checklist describing some of the problems that may occur with the EMME installed in an MMAC, possible causes for the problem, and suggestions for resolving the problem.

Table 7-1. Troubleshooting Checklist

Problem	Possible Causes	Recommended Action
No LEDs on.	Loss of Power to the MMAC. EMME not properly installed.	Check that the MMAC power supply module is properly installed and plugged into a live outlet. Check to see that the power supply LEDs are green.
No Local Management Password screen.	Terminal set-up is not correct. Improper console cable/modem cable pinouts.	Refer to Chapter 5 for set-up procedures. Refer to Appendix C for proper console/ modem port pinouts.
Cannot contact the EMME from in-band management.	Improper Community Names Table. EMME does not have an IP address. No link to device. Packets are being bridged by a permanent entry.	Refer to Chapter 5 for Community Names. Table setup and IP address procedures. Check link to device.

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Table 7-1. Troubleshooting Checklist (Continued)

Problem	Possible Causes	Recommended Action
A port on a MIM managed by the EMME cannot access the network, while other ports on the same MIM are able to.	The port is either off or segmented. Port cable is defective.	Enable the port via local or remote management. Try connecting the port with a different cable.
User parameters (IP address, Device and Module name, etc.) are lost when device is powered down.	Switch 7 has been toggled and user-entered parameters have been reset to factory default. NVRAM may be defective.	See Chapter 3 for information on the NVRAM switch setting. If NVRAM is defective, call Cabletron Technical Support.
No power to an external transceiver connected to the AUI port.	Fuse for that AUI port (F1/F2) is blown. AUI cable is defective.	Replace fuse (F1 for AUI1 or F2 for AUI2). Replace AUI cable.
High number of collisions on AUI port.	External transceiver has SQE enabled.	Disable SQE.
Port(s) go into standby for no apparent reason.	Configurations where device connection across EMME channels can cause the EMME to detect a looped condition.	Discuss these configurations with Cabletron Tech Support before implementing them into your network.

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7.3 USING THE RESET BUTTON

The EMME incorporates a recessed reset button, located above the LEDs. See Figure 7-1. This reset button initializes the EMME processor. This will not initialize NVRAM, the non-volatile random access memory where your network management parameters are stored.

To use the reset button, use a pen or pencil to press the button. When this is done, the EMME initializes itself.

7.4 BEFORE CALLING TECHNICAL SUPPORT

If you are not able to resolve a problem with your EMME, call Cabletron Technical Support for assistance. Before calling, you should have as much information as possible available in order to save time and to allow the support representative to better serve you. When calling technical support, provide as much of the following information as possible:

- Description of the failure.
- Description of any action already taken to resolve the problem (swapping a bad unit with a unit known to work properly, etc.).
- Description of your network environment (environment, layout, cable type and length, etc.).
- Serial and revision numbers of all Cabletron products used in the network.
- Network load and frame size at the time of failure, if known.
- Product history (had the product been returned previously, did it have the same problem, etc.).
- RMA number generated, if any.

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APPENDIX A

IMAGE FILE DOWNLOAD USING OIDS

This appendix provides instructions for setting up a tftp server and to download an image file to the EMME by setting specific MIB OID strings. To set OID strings, you can use the SNMP Tools screen described in Chapter 5 or MIB Navigator described in Chapter 6.

NOTE

You can also download an image file using various remote management packages such as SPECTRUM Element Manager for Windows. Refer to specific package documentation for image file download procedures.

The EMME supports the Standard Local Download application. In this application the EMME automatically disables management while download of the new firmware image is in progress.

Before you can download the image to a device, you must have already setup a workstation as a tftp server.

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A.1 SETTING UP A UNIX WORKSTATION AS A TFTP SERVER

Due to variations between UNIX systems and individual configurations, this section provides only GUIDELINES for configuring a UNIX workstation to perform an image file download. The instructions include command examples, where appropriate. Bold lettering in examples indicates operator entry.

CAUTION: If unsure about how to properly configure your UNIX workstation using these guidelines, contact your Systems Administrator.

To set up a UNIX workstation, proceed as follows:

1. If you already have a /tftpboot directory, confirm the tftp setup of your workstation as follows:

   Request a process status and grep for tftpd (e.g., unix% **ps-aux | grep tftp**).

   The following information represents a typical output:

user	161	7.7	1.2	32	184	p3	S	12:00	grep tftp
root	87	0.0	0.9	48	136	?	S	11:05	tftp -s

   The term tftp -s , located at the end of the root string, indicates tftp is active. If tftp is NOT running, only the grep process appears.

2. If you do NOT have a /tftpboot directory, than you must create one (e.g., unix% **mkdir tftpboot**).

3. Ensure that the /tftpboot directory is not owned (e.g., unix% **chown nobody tftpboot**).

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NOTE

You must request a process status and grep for inetd to obtain the process ID number (see Step 1 above).

Cabletron ships backup copies of the image file for all of its intelligent devices. Cabletron includes the PKUNZIP utility for easy decompression of the “zipped” file. The file, suffixed with **.hex** (after it has been decompressed from a **.zip**) is for Standard Local Downloading through any port. If you are using a UNIX workstation as a tftp server, and you do not have a decompression utility that recognizes the PKZIP format, you can obtain a copy of a UNIX decompression utility or the image file from the Cabletron Systems FTP server. Contact Cabletron Technical Support for details.

4. Store the hex image file in the /tftpboot directory as emme.hex.
5. Edit the /etc/inetd.conf file by removing anything prior to the tftpboot daemon (e.g., the # sign) that comments-out the line.
6. Kill the inetd process (e.g., unix% **kill -HUP ‘process ID number’**), and then restart the process (e.g., unix% **inetd**), to enable the revised inetd.conf file.

A.2 STANDARD LOCAL DOWNLOAD

Table A-1 provides a step by step procedure for downloading the firmware image file. This section provides specific MIB OIDs, their names, and the required setting for proper image file download. Refer to your specific MIB walking tool documentation for instructions on how to set MIB OID strings.

The Download OIDs for Cabletron products reside in Cabletron enterprise MIBs (group 52). The specific OIDs necessary to perform an image file download reside in the common download group under ctDL (Cabletron Download). The full OID string to reach this group is:

1.3.6.1.4.1.52.4.1.5.8.1

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When performing the steps in Table A-1, keep the following in mind:

- You must follow the steps in order.
- Enter the IP address of the tftp server in standard dotted decimal notation (e.g., 132.177.118.24).
- Enter the FULL path to the image file in the ctDLTFTPRequest OID, including the name of the image file (e.g., c:\tftpboot\EMME.hex).

Table A-1. Standard Download Procedure

Step	OID Name	OID Number	Data Type	SNMP OID Data
(1).	ctDLForceOnBoot	1.3.6.1.4.1.52.4.1.5.8.1.**1.0**	integer	1
(2).	ctDLCommitRAMToFlash	1.3.6.1.4.1.52.4.1.5.8.1.**2.0**	integer	1
(3).	ctDLTFTPRequestHost	1.3.6.1.4.1.52.4.1.5.8.1.**4.0**	IP address	Enter the IP address of the tftp server.
(4).	ctDLTFTPRequest	1.3.6.1.4.1.52.4.1.5.8.1.**5.0**	string (ASCII)	Enter the path to the image file.
(5).	ctDLInitiateColdBoot	1.3.6.1.4.1.52.4.1.5.8.1.**3.0**	integer	1

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APPENDIX B

EMME OIDS

This appendix contains a selected number of OID strings that are most frequently needed. The OIDs are implemented by using either the SNMP Tools procedures detailed in Chapter 5 or the MIB Navigator procedures located in Chapter 6. Note that the OIDs can be accessed using LANVIEW, SPECTRUM, SPMA, or other SNMP compliant programs.

B.1 SPANNING TREE PROTOCOL

The following OID is used to select the desired Spanning Tree Protocol.

ctBridgeStpProtocolSpecification

Description:	This object allows the network manager to select which Spanning Tree Protocol will be operational on the bridge. The value decLb100' (2) indicates the DEC LANBridge 100 Spanning Tree Protocol. The value ieee8021d' (3) indicates the IEEE 802.1d Spanning Tree Protocol. The value 'none' (1) indicates no Spanning Tree Protocol is operational.
Object Identifier:	**1.3.6.1.4.1.52.4.1.2.3.2.1**
Data Type:	Integer
Values:	1 = None 2 = decLb100 3 = ieee802 1
Access Policy:	read-write

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B.2 PORT GROUP SECURITY

The next seven OIDs are used for port, group security features.

rptrSrcAddrMgmtPortLock

Description:	Setting this object to lock activates the network port security lock. Setting a value of portMisMatch (3) is invalid. A read of PortMisMatch means that the lock status between the port group, port and repeater levels do not agree.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.1.5.3.2**
Data Type:	Integer
Values:	1 = unlock 2 = lock 3 = portMisMatch
Access Policy:	read-write

rptrPortGrpSrcAddrLock

Description:	Allows the setting of the lock status for this port group. Unlock (1), unlocks the source address lock for this group. Lock (2) locks the source address for this group. Setting a value of portMisMatch (3) for this value is invalid. A read of PortMisMatch (3) means that the lock status for the ports within the port group does not match the lock status for the port group.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.2.6.1.2**
Data Type:	Integer
Values:	1 = unlock 2 = lock 3 = portMisMatch
Access policy:	read-write

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rptrPortSecurityLockStatus

Description:	Defines the lock status for this particular port entry.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.3.9.1.1.3**
Data Type:	Integer
Values:	1 = unlock 2 = lock
Access Policy:	read-write

rptrPortSecurityLockAddAddress

Description:	Setting a value to this object adds a new entry to the rptrPortSecurityListTable. When read, this object displays an Octet String of size 6 with each octet containing a 0. This object provides an easy method to add or delete conceptual rows in the rptrPortSecurityListTable. The returned value has little or no actual meaning.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.3.9.1.1.4**
Data Type:	Octet String (size 6)
Access Policy:	read-write

rptrPortSecurityLockDelAddress

Description:	Setting a value to this object deletes a corresponding entry in the rptrPortSecurityListTable. When read, this object returns the last deleted source address. An Octet String of size 0 is returned if no objects were deleted since last system reset.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.3.9.1.1.5**
Data Type:	Octet String
Access Policy:	read-write

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rptrPortSecurityDisableOnViolation

Description:	Designates whether port is disabled if source address is violated. A source address violation occurs when a address is detected which is not in the source address list for this port. If this port is disabled for this port address violation it can be enabled by setting rptrPortMgmtAdminState. Default state is enabled (2).
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.3.9.1.1.6**
Data Type:	Integer
Values:	1 = disable 2 = enable
Access Policy:	read-write

rptrPortSecurityFullSecEnabled

Description:	A port that is set to full security and is locked will scramble all packets, which are not contained in the expected source address list, including broadcasts and multicasts. A port that is set to partial security will allow broadcast and multicasts to repeat unscrambled. Default state disabled (1).
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.3.9.1.1.7**
Data Type:	Integer
Values:	1 = disables 2 = enables
Access Policy:	read-write

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B.3 NETWORK AND CHANNEL LEVEL TRAPS

The next three OIDs control traps enable and disable at the network level or channel level.

rptrHwTrapsSetLink

Description:	Enables and disables link traps for this network (i.e., Channel A, B, or C).
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.1.6.1.1**
Data Type:	Integer
Values:	1 = disable 2 = enable
Access Policy:	read-write

rptrHwTrapsSetSeg

Description:	Enables and disables segmentation traps for this network (i.e., Channel A, B, or C).
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.1.6.1.2**
Data Type:	Integer
Values:	1 = disable 2 = enable
Access Policy:	read-write

rptrSaTrapSetScraddr

Description:	Enables and disables source address traps for this network (i.e., Channel A, B, or C).
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.1.6.2.1**
Data Type:	Integer
Values:	1 = disable 2 = enable
Access Policy:	read-write

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B.4 BOARD LEVEL TRAPS

The next three OIDs are for traps enable and disable at the board level.

rptrPortGrpHwTrapSetLink

Description:	Enables and disables link traps for the specified port group at the board level.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.2.5.1.1.1.2.slot**
Data Type:	Integer
Values:	1 = disable 2 = enable
Access Policy:	read-write

rptrPortGrpHwTrapSetSeg

Description:	Enables and disables segmentation traps for the specified port group at the board level.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.2.5.1.1.1.3.slot**
Data Type:	Integer
Values:	1 = disable 2 = enable
Access Policy:	read-write

rptrPortGrpSaTrapSetSrcaddr

Description:	Enables and disables segmentation traps for the specified port group at the board level.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.2.5.1.1.2.slot**
Data Type:	Integer
Values:	1 = disable 2 = enable
Access Policy:	read-write

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B.5 PORT LEVEL TRAPS

The next three OIDs are for traps enable and disable at the port level.

rptrPortHwTrapSetLink

Description:	Enables and disables link traps for this port.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.3.8.1.1.1.3.slot.port**
Data Type:	Integer
Values:	1 = disable 2 = enable
Access Policy:	read-write

rptrPortHwTrapSetSeg

Description:	Enables and disables segmentation traps for this port.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.3.8.1.1.1.4.slot.port**
Data Type:	Integer
Values:	1 = disable 2 = enable
Access Policy:	read-write

rptrPortGrpSaTrapSetSrcaddr

Description:	Enables and disables source address traps for the specified port group.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.3.8.2.1.1.3.slot.port**
Data Type:	Integer
Values:	1 = disable 2 = enable
Access Policy:	read-write

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B.6 BRIDGING

The following OID is used to enable and disable the interface for the bridging function.

dot1dstpPortEnable

Description:	The enabled/disabled status of the port.
Object Identifier:	**1.3.6.1.2.1.17.2.15.1.4**
Data Type:	Integer
Values:	1 = enable 2 = disable
Access Policy:	read-write

B.7 TRUNK PORT SECURITY

The following OID is required if security is not desired on a trunk port. The user must force the port to be a trunk port before locking the port via the module or channel. Failing to do this will cause the port to become locked out when the third address is seen on the trunk port.

rptrPortSrcAddrForceTrunk

Description:	When this object is set to Force, it places the port into a Trunk topology state whether or not the network traffic warrants such a state. When this object is set to NoForce, it allows the port to assume the topological state it would naturally assume based on the network activity across it. When read, this object reports the current setting.
Object Identifier:	**1.3.6.1.4.1.52.4.1.1.1.4.3.5.1.4**
Data Type:	Integer
Values:	1 = NoForce 2 = Force
Access Policy:	read-write

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B.8 CHANNEL SELECTION

The following two OIDs are needed to select channel assignments (A, B, or C) for all boards or individual ports. These OIDs are needed for products supporting multichannel connectivity.

fnbconnect

Description:	Denotes the connection status of the CSMA/CD board to the inter-RIC bus.
Object Identifier:	**1.3.6.1.4.1.52.1.6.1.2.2.1.1.2.slot**
Data Type:	Integer
Values:	1 = Channel B 2 = Channel C 4 = Channel A
Access Policy:	read-write

fnbPortConnectPortAssignment

Description:	Provides the capability to change or query the specific interface that the port is assigned.
Object Identifier:	**1.3.6.1.4.1.52.1.6.1.2.3.1.1.3.slot.port**
Data Type:	Integer
Values:	1 = Channel A 2 = Channel B 3 = Channel C
Access Policy:	read-write

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APPENDIX C
EMME SPECIFICATIONS

The operating specifications for the Cabletron Systems EMME are provided in this appendix. Cabletron Systems reserves the right to change these specifications at any time without notice.

C.1 BRIDGING FUNCTIONALITY

Shared Sonic Memory:	4 MB
Internal Processor:	Intel 80960
Read Only Memory:	128K
Ethernet Controller:	4 DP83932 Controllers
CPU Memory:	4 MB
Packet Filter Rate (max. viewed per second):	29,760 packets
Packet Forward Rate (max. viewed per second):	24,630 packets
Forwarding Latency:	37 µs min.
Ageing Time:	5 minutes (default)
Filtering Database Acquired Database:	8,191 max.
Permanent Database:	1,023 max.

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C.2 REPEATER FUNCTIONALITY

Delay Times (port x in to port x out)

Start of Packet:	1,450 ns max.
Collision to JAM:	1,550 ns max.
Preamble Input:	Minimum of 40 bits to a max. of 64 bits required.
Preamble Output:	64 bits min. (last 2 bits are 1, 1).
JAM Output:	If a collision occurs on one of the segments, a pattern of 1,0 is sent to the other segments.
Minimum Packet Repeated:	96 bits including preamble. (Packet fragments are extended using the JAM [1,0] data pattern.)
FAULT Protection:	Each segment will disconnect itself from the other segments if 32 consecutive collisions occur, or the collision detector of a segment is on for longer than approximately 2.4 ms. This FAULT protection will reset automatically after one packet is transmitted onto the FAULT protected segment without causing a collision.

C.3 CONSOLE PORT

Type: Standard RJ45 port

Console Port Pinout

Pin 1:	Transmit Data (from console port)
Pin 2:	Data Set Ready (to console port)
Pin 3:	Not used
Pin 4:	Receive Data (to console port)
Pin 5	Signal Ground
Pin 6:	Data Terminal Ready (from console port)
Pin 7:	Not used
Pin 8:	Not used

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C.4 MODEM PORT

Type: Standard RJ45 port

Modem Port Pinout

Pin 1:	Transmit Data (from modem port)
Pin 2:	Data Carrier Detect (to modem port)
Pin 3	Not used
Pin 4:	Receive Data (to modem port)
Pin 5:	Signal Ground
Pin 6:	Data Terminal Ready (from modem port)
Pin 7:	Not used
Pin 8:	Ring indicator (to modem port)

C.5 AUI PORTS

Type: 15-pin D -type receptacle

AUI Port Pinout

Pin 1:	Ground
Pin 2:	Collision +
Pin 3:	Transmit +
Pin 4:	Ground
Pin 5:	Receive +
Pin 6:	Ground
Pin 7:	No Connection
Pin 8:	Ground
Pin 9:	Collision –
Pin 10:	Transmit –
Pin 11:	Ground
Pin 12:	Receive –
Pin 13:	Power (+12 Vdc)
Pin 14:	Ground
Pin 15:	No Connection
Connector Shell:	Protective Ground

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C.6 ENVIRONMENTAL REQUIREMENTS

Operating Temperature:	+5° to +40°C (+41° to +104°F)
Non-operating Temperature:	-30° to +90°C (-22° to +194°F)
Operating Humidity:	5% to 95% (non-condensing)

C.7 FLASH EPROM

The Flash EPROM memory enables users to upgrade the EMME firmware remotely.

The Flash EPROM function operates with version 2.03, or higher, of Cabletron Systems' SPECTRUM Element Manager for Windows. Refer to the **SPECTRUM Element Manager for Windows User's Manual** for procedures in using this function.

C.8 SAFETY

Designed in accordance with UL478, UL910, NEC725-2(b), CSA, IEC, TUV, VDE Class A. Meets FCC Part 15, Class A limits.

WARNING

It is the responsibility of the person who sells the system of which the EMME will be a part to ensure that the total system meets allowed limits of conducted and radiated emissions.

C.9 SERVICE

MTBF:	> 65,675 hrs. projected
MTTR:	< 0.5 hrs.

C.10 PHYSICAL PROPERTIES

Dimensions:	34.04D x 29.21H x 2.54W cm.
	(13.4D x 11.5H x 1.0W in.)
Weight	
	Unit: 0.85 kg (1.87 lbs.)
	Shipping: 1.34 kg (2.95 lbs.)

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