

MMAC-Plus™
9C300-1 Environmental Module
User's Guide

CABLETRON
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The Complete Networking Solution™

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Introduction

Using This Manual

Read through this manual to become familiar with its contents and to gain an understanding of the features and capabilities of the Environmental Module prior to installing and operating it.

Chapter 1 **Introduction**, provides product descriptions and features, gives a brief description of the 9C300-1 Environmental Module and ends with a list of related manuals.

Chapter 2 **Installing the 9C300-1 Environmental Module**, contains detailed information for unpacking and installing the Environmental Module.

Chapter 3 **9C300-1 Environmental Module Operation**, contains detailed information about the Environmental Module operation.

Chapter 4 **Specifications**, provides detailed specifications for the 9C300-1 Environmental Module.

Appendix A **EPIM Specifications**, contains detailed information about the various that can be used with the 9C300-1 Environmental Module.

Appendix B **Uninterruptible Power Supply (UPS)**, contains detailed information about connecting, configuring, and monitoring a UPS.

The 9C300-1 Environmental Module

The 9C300-1 Environmental Module, shown in Figure 1-1, provides system cooling, out-of band management capabilities, and environmental/power monitoring for the MMAC-Plus System. The Environmental Module is inserted in the slot above the module card cage in the front of the MMAC-Plus chassis.

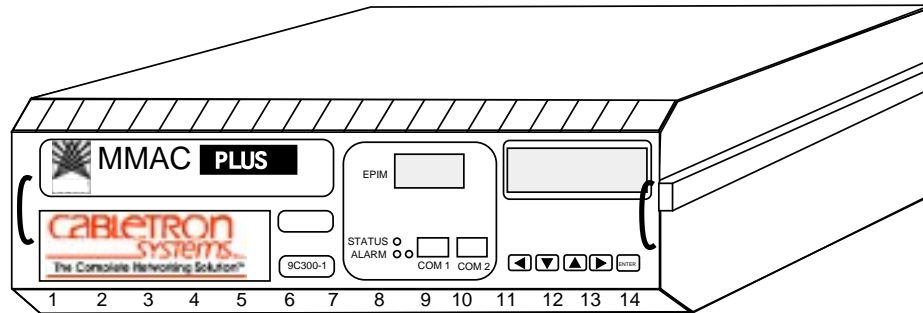


Figure 1-1. The 9C300-1 Environmental Module

Features

System Cooling

The 9C300-1 Environmental Module houses the cooling fan subsystem. There are four, high-air flow fans in the assembly to provide necessary chassis cooling. Any one of these can fail without adversely affecting system operation. The fans' operation and speed are continuously monitored, allowing network technicians to be quickly notified if repairs are needed. Control of the fans' operating speed is also provided for maximum cooling efficiency and fan life. The fans are protected from controller failure by a fail-safe circuit. In the event of a controller malfunction, this circuit forces the fan subsystem to maximum speed and notifies Network Management.

Out-of-Band Management

Out-of-band management refers to managing the MMAC-Plus via a Local Management (LM) connection or an SNMP-based management application which does not use the same network connection to the chassis as "user data."

Four Out-of-band management interfaces are built into the 9C300-1 Environmental Module. One channel is the 4x40 character backlit LCD and associated five button keypad. This interface provides a network manager or technician with the capability to review system status, performance and configuration information. Two interfaces are serial RS-232 ports. These ports support local management via a VT100 session, SLIP, or PPP, or monitor an American Power Conversion Smart UPS.

The remaining out-of-band management interface supports any standard Cabletron Ethernet Port Interface Module (EPIM). This interface provides a direct connection to the internal System Management Bus-10 (SMB-10).

Environmental/Power Monitoring

The 9C300-1 Environmental Module monitors and reports chassis power parameters, ambient chassis temperature, chassis humidity, temperature of the Environmental Module itself, as well as the status and speed of the chassis cooling fans.

Flash EEPROM

The capability of downloading future firmware upgrades has been built into the 9C300-1 Environmental Module.

Hot Swapping

The 9C300-1 Environmental Module can be removed from the chassis while the MMAC-Plus is running without interrupting network performance.

LANVIEW® LEDs

Two LEDs, STATUS and ALARM, are built into the front of the 9C300-1 Environmental Module. These LEDs indicate the status of the Environmental Module and the presence or absence of system alarms.

Related Manuals

The manuals listed below should be used to supplement the procedures and technical data contained in this manual.

MMAC-Plus Installation Guide

MMAC-Plus Operations Guide

MMAC-Plus 9C214-AC Power Supply User's Guide

In addition, each Interface Module has a user's guide.

Getting Help

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

- By phone: (603) 332-9400
- By CompuServe[®]: GO CTRON from any ! prompt
- By Internet mail: support@ctron.ctron.com
- By Fax: (603) 337-3075
- By BBS: (603) 335-3358
- By mail: Cabletron Systems, Inc.
P.O. Box 5005
Rochester, NH 03866-5005

Installing the 9C300-1 Environmental Module

Installing the 9C300-1 Environmental Module

The 9C300-1 Environmental Module is installed in the slot above the module card cage in the front of the MMAC-Plus chassis, as shown in Figure 2-1.

Install an Environmental Module by following the steps below:

1. Unpack the Environmental Module by removing it from the shipping box and sliding the two foam end caps off the unit. (Save the shipping box and packing materials in the event the Environmental Module must be reshipped.)
2. Remove it from the protective plastic bag. Observe all precautions to prevent damage from Electrostatic Discharge (ESD). (Save the bag in the event the Environmental Module must be reshipped.)
3. Remove the plastic protective cap that covers the connector on the rear of the Environmental Module.
4. Examine it carefully, checking for damage. If any damage exists, DO NOT install it. Immediately contact Cabletron Systems Technical Support.
5. Hold the left and right sides.
6. Line up the rails on the left and right sides with the tracks on the left and right inside panels of the chassis.
7. Slide the Environmental Module into the chassis until it is completely seated.

If the MMAC-Plus chassis has been powered up, the 9C300-1 Environmental Module illuminates the STATUS and ALARM LEDs and displays the name Cabletron on the LCD.

If the LEDs are any color other than green, refer to LANVIEW LEDs in Chapter 3. If no keypad entries are made within 60 seconds, the LCD scrolls through various non-interactive mode screens.

If the MMAC-Plus chassis has not been powered up, make sure that all modules have been properly installed; then power up the MMAC-Plus chassis by following the steps in the **MMAC-Plus Installation Guide**.

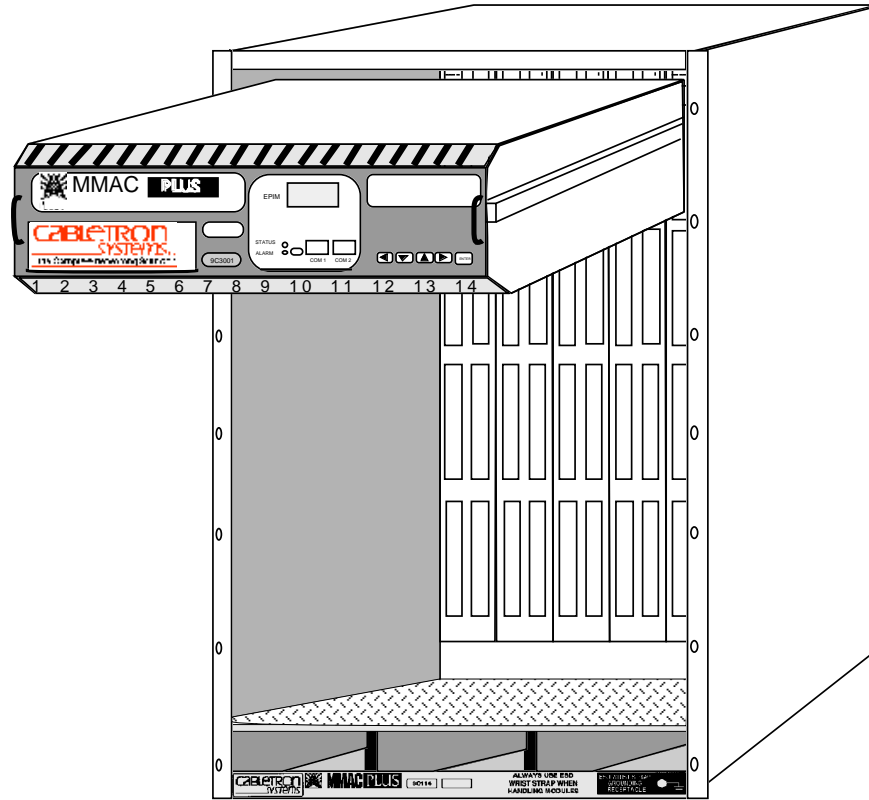


Figure 2-1. Installing the Environmental Module

9C300-1 Environmental Module Operation

The 9C300-1 Environmental Module, as shown in Figure 3-1, performs three main functions. It monitors several chassis environmental parameters, provides multiple out-of-band management interfaces, as well as system cooling. The Environmental Module also includes LANVIEW® LEDs for at-a-glance diagnostics.

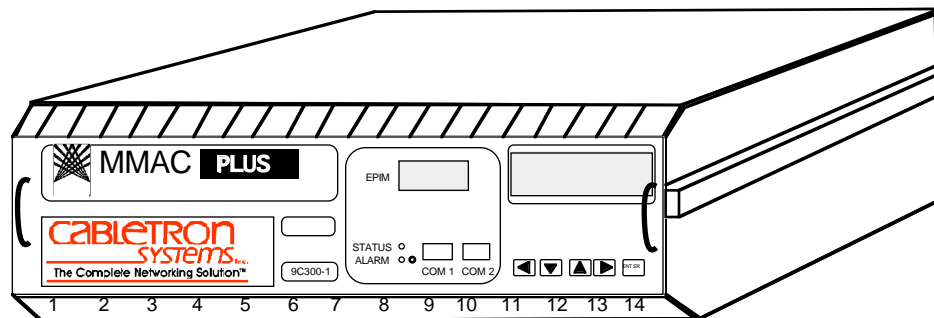


Figure 3-1. The 9C300-1 Environmental Module

Monitoring Functions

The 9C300-1 Environmental Module monitors the following MMAC-Plus functions:

- External ambient temperature
- Fan speed
- System humidity
- System voltages
- Internal operating temperature

External Ambient Temperature

The 9C300-1 Environmental Module includes an external ambient temperature sensor. This sensor is located on the front of the Environmental Module, as shown in Figure 3-2. The ambient temperature is monitored and the results of the monitoring are available to the network manager via the LCD, as well as local and remote management.

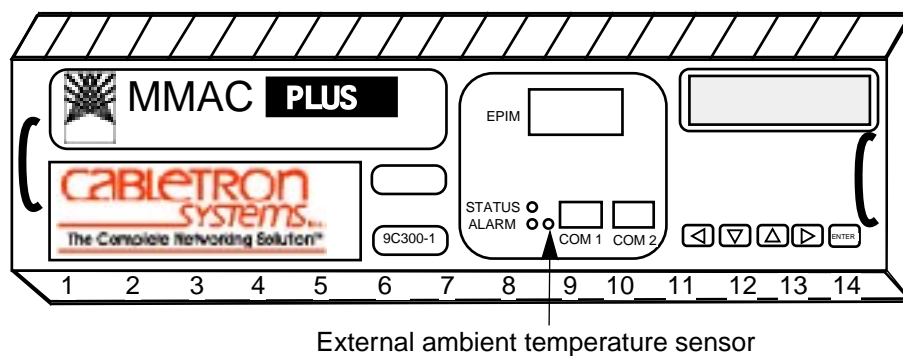


Figure 3-2. External Ambient Temperature Sensor

Table 3-1 lists the ambient temperature information available to the network manager.

Table 3-1. External Ambient Temperature

Temperature Range	LCD Display
6°C / 43°F and below	COLD
7–12°C / 44–54°F	COOL
13–32°C / 55–90°F	NORM (normal)
33–38°C / 91–101°F	WARM
39°C / 102°F and above	HOT

Fan Speed

The 9C300-1 Environmental Module adjusts the speed of the system cooling fans (Figure 3-3) based on the external ambient temperature. Fan speed increases as ambient temperature rises to ensure adequate cooling for the system. Conversely, fan speed decreases as ambient temperature decreases. In the event the ambient temperature sensor, or the Environmental Module itself, fails, fan speed defaults to maximum speed to ensure adequate cooling.

The ability to control fan speed is useful for two reasons:

- To increase the cooling level of the MMAC-Plus system to accommodate changing operating environments.
- To prolong fan life and limit audible noise when full fan speed is not necessary for cooling.

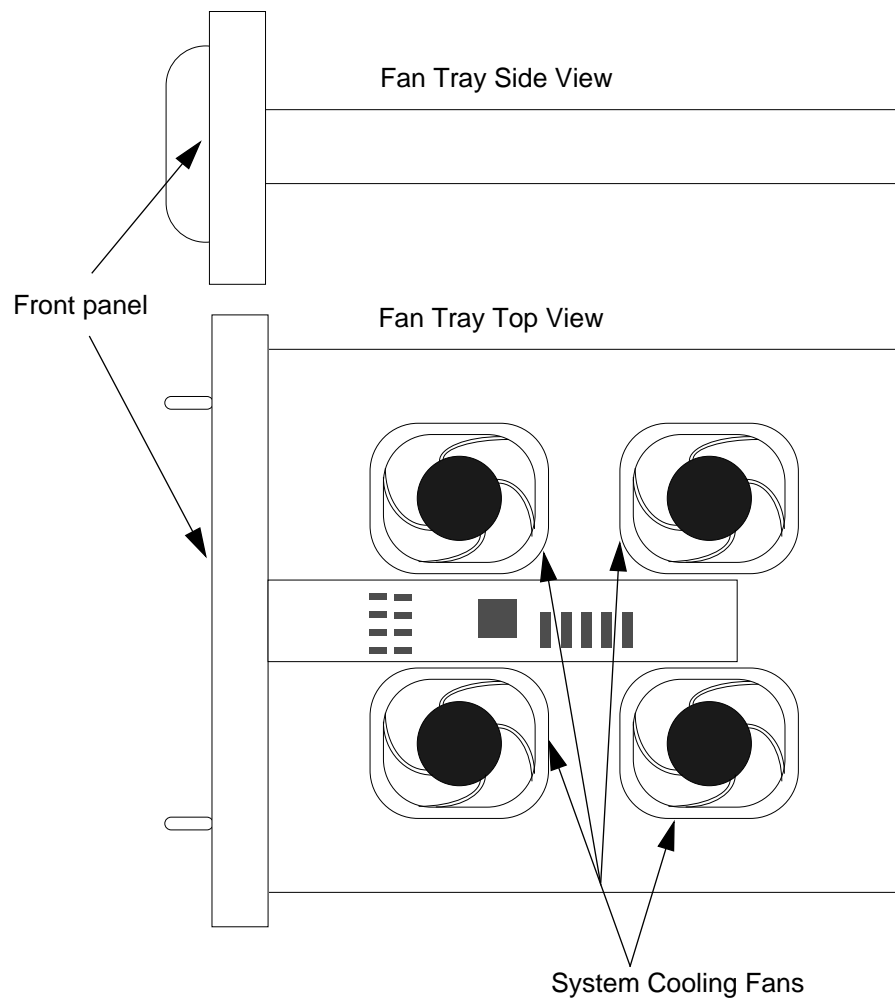


Figure 3-3. The 9C300-1 Environmental Module and Fan Tray

System Humidity

The 9C300-1 Environmental Module monitors the non-condensing humidity level of the MMAC-Plus. The results of the monitoring are available to the network manager via LCD, as well as local and remote management. The humidity levels are displayed as shown in Table 3-2.

Table 3-2. System Humidity

Humidity	LCD Display
0–45%	STATIC RISK
46–94%	NORM (normal)
95% and above	MOIST

System Voltages

The 9C300-1 Environmental Module monitors specific system power parameters to ensure that they are within acceptable limits. The power parameters monitored from the backplane are the 48 volt DC System Power Bus and the INB Termination Power Bus. The power parameter monitored within the Environmental Module is the 12 volt internal line. The results of the monitoring are available to the network manager via LCD, as well as local and remote management. Voltages above or below the acceptable voltage limits cause an alarm to be sent to the network manager. Table 3-3 summarizes these acceptable voltage limits.

Table 3-3. Acceptable Voltage Limits

Description	Acceptable Voltage Limits
48 volt DC System Power Bus	From 40 volts to 59 volts
INB Termination Power Bus	From 3.1 volts to 5 volts
12 volt internal line	From 11 volts to 13 volts

Internal Operating Temperature

The 9C300-1 Environmental Module monitors its own internal operating temperature by comparing its current temperature to the ambient temperature and programmed rise temperatures to determine current temperature status. If the temperature of the Environmental Module exceeds normal operating limits, an alarm is sent to the network manager. In addition, if the ambient temperature sensor fails, pre-established temperature ranges have been programmed to ensure proper internal temperature monitoring.

LANVIEW LEDs

The LANVIEW LEDs on the front of the 9C300-1 Environmental Module may be used as an aid in troubleshooting.

There are two LEDs visible to the user (Figure 3-4): the STATUS LED and the ALARM LED.

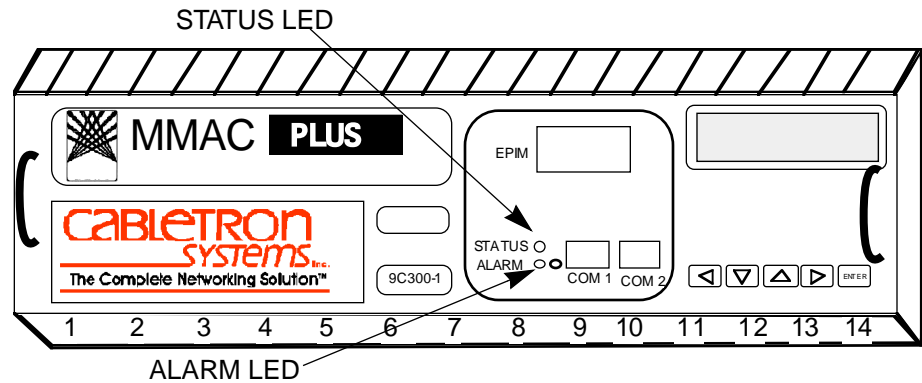


Figure 3-4. 9C300-1 Environmental Module LANVIEW LEDs

The STATUS LED indicates the current status of the Environmental Module processor and peripherals. The possible states and descriptions of the STATUS LED are listed in Table 3-4.

Table 3-4. STATUS LED

LED Color	State	Description
Green	Functional	Fully operational.
Yellow/Green	Booting	Flashes green and yellow while booting.
Yellow	Testing	Testing system.
Yellow (Flashing)	Crippled	Not fully operational.
Red	Reset	Normal power-up reset.
Red (Flashing)	Failed	Fatal error has occurred.
Off	Power off	Lack of 5 volt input to the Environmental Module.

The ALARM LED indicates the presence, or absence, of an unread system alarm(s). Unread system alarms can be read using the LCD and five-function keypad. The possible states and descriptions of the ALARM LED are listed in Table 3-5.

Table 3-5. ALARM LED

LED Color	State	Description
Green	Functional	No unread alarms.
Yellow	Functional	Pending unread system alarms, warning.
Red	Functional	Pending unread system alarms, critical.

Out-of-Band Management

Out-of-band management refers to managing the system via a Local Management (LM) connection or an SNMP-based management application which does not use the same network connection to the chassis as “user data.”

The 9C300-1 Environmental Module provides four out-of-band management interfaces for managing the MMAC-Plus system. These interfaces are listed below:

- Two serial communication ports, COM1 and COM2
- One standard Cabletron EPIM interface
- Liquid Crystal Display (4 lines by 40 characters) and an associated five button keypad

COM1 and COM2 Ports

The 9C300-1 Environmental Module front panel has two RJ-45 communication ports for RS-232 serial communication to and from the MMAC-Plus. Figure 3-5 illustrates a single RJ-45 communication port connector. COM1 and COM2 can be configured to run the Serial Line Internet Protocol (SLIP), Point-to-Point Protocol (PPP), Local Management via a terminal or modem connection, or monitor an American Power Conversion Smart UPS. Refer to the Local Management Manual for detailed information on configuring the COM1 or COM2 port.

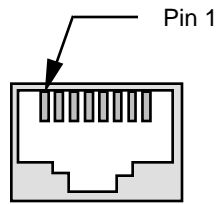


Figure 3-5. RJ-45 Communication Port Connector

Table 3-1 details the pinout connections for an RJ-45 communication port connector.

Table 3-6. Pinout Connections RJ-45 Communication Port Connector

Pin	Description
1	TRANSMIT
2	DATA CARRIER DETECT
3	DATASET READY
4	RECEIVE
5	SIGNAL GROUND
6	DATA TERMINAL READY
7	REQUEST TO SEND
8	CLEAR TO SEND

The Ethernet™ Port Interface Module (EPIM)

The 9C300-1 Environmental Module provides a port for Cabletron Systems EPIMs. The EPIM provides a direct connection to the internal SMB-10 bus. This connection can be used for out-of-band graphical SNMP management of the MMAC-Plus system or a Telnet session into local management. Any standard Cabletron EPIM can be installed. Refer to Appendix A for detailed information on the EPIM.

LCD and Keypad

The LCD functions as a “window” into the MMAC-Plus System, allowing users to navigate through various screens via the five-function keypad.

The LCD is a 4 line by 40 character, backlit liquid crystal visual display.

The five-function keypad is used to scroll through MMAC-Plus information screens, and to select option fields within each menu and submenu. The keypad consists of five buttons, four of which are directional to move the cursor; the fifth is the Enter button, used to make menu selections. Figure 3-6 shows the LCD with a System Banner Screen and the five-function keypad on the MMAC-Plus Environmental Module front panel.

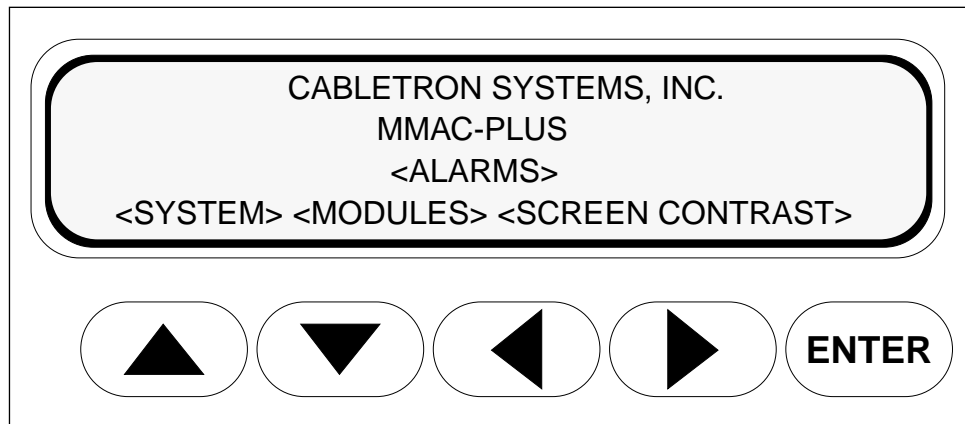


Figure 3-6. The LCD and Five-Function Keypad

Non-Interactive Mode

The LCD defaults to this mode if there is no user input within 60 seconds of installation of the Environmental Module or system start-up.

Non-Interactive Mode Screens

This section describes the LCD screens that display in the non-interactive mode. The LCD scrolls through different status screens (depending on MMAC-Plus configuration), displaying each screen for a period of 7 seconds; or, until user input is sensed on the keypad.

Line 4 of each screen displays any active alarm conditions that exist within the system. If no alarm conditions exist, the line displays "SYSTEM STATUS NORMAL."

If an alarm condition exists, line 4 displays a message describing the alarm for 5 seconds. The screen then displays a message stating how many alarms are present in the alarm queue, "XX ALARMS PENDING" and the ALARM LED on the front of the Environmental Module turns yellow or red indicating unread alarms in the queue.

The System Screen

The System Screen, as shown in Figure 3-7, is the first screen of the non-interactive mode.

Lines 1 and 2 display the MMAC-Plus chassis Internet Protocol (IP) address and Media Access Control (MAC) address.

Line 3 displays the current chassis hardware revision and serial number.

Line 4 displays the system status.



Figure 3-7. The System Screen

The Utilization Screen

The Utilization Screen, as shown in Figure 3-8, is the second screen of the non-interactive mode.

Line 1 displays the screen heading.

Line 2 displays the FDDI 1 and FDDI 2 bus utilization.

Line 3 displays the INB A and INB B bus utilization.

Line 4 displays the system status.

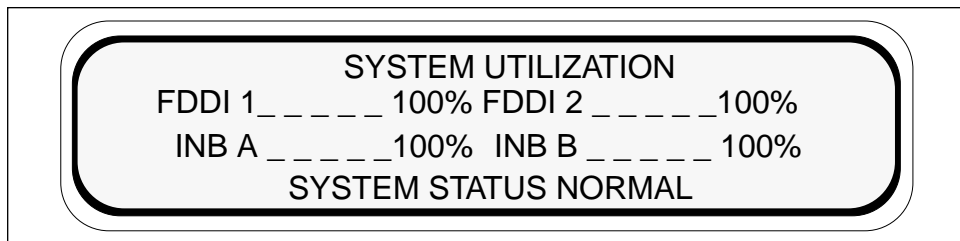


Figure 3-8. The Utilization Screen

The Environment Screen

The Environment Screen, as shown in Figure 3-9, is the third screen of the non-interactive mode.

Line 1 displays the screen heading.

Line 2 displays the external temperature of the chassis in both Fahrenheit and Celsius and qualifies the temperature as COLD, COOL, NORM (normal), WARM or HOT based on system parameters.

Line 3 displays the non-condensing humidity level of the chassis and qualifies it as STATIC RISK, NORM (normal) or MOIST based on system parameters.

Line 4 displays the system status.

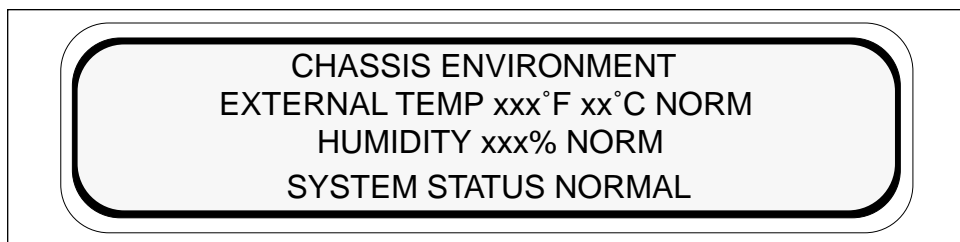


Figure 3-9. The Environment Screen

The Power Screen

The Power Screen, as shown in Figure 3-10, is the fourth screen of the non-interactive mode.

Line 1 displays the screen heading.

Line 2 displays the percentage of power being used.

Line 3 displays the availability of power redundancy.

Line 4 displays the system status.

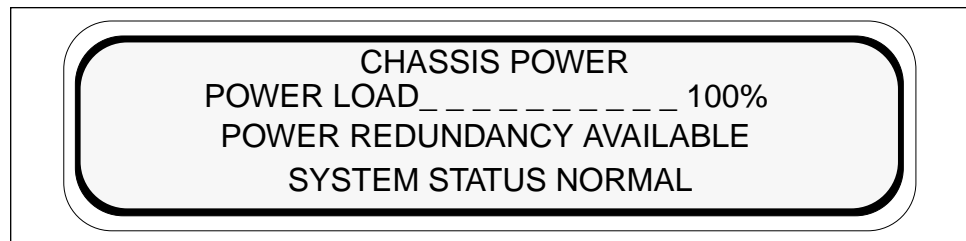


Figure 3-10. The Power Screen

The System Banner Screen

The System Banner Screen, as shown in Figure 3-11, is the fifth screen of the non-interactive mode. The information that displays is the default information built into the system.

Lines 1 and 2 display the Cabletron name and the system name.

Line 3 displays the system uptime.

Line 4 displays the system status.

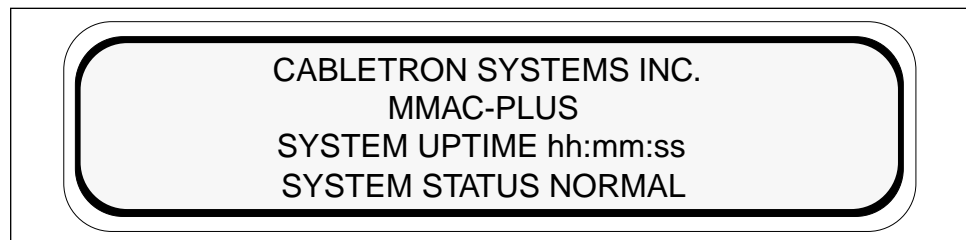


Figure 3-11. The System Banner Screen

Interactive Mode

The LCD enters this mode upon installation. This mode allows user input through the five-function keypad to navigate through MMAC-Plus status screens, and to make menu selections.

Press any button on the keypad to enter this mode from the non-interactive mode. Once past the Main screen, the Interactive Mode is maintained for three minutes without a keypad entry before returning to the non-interactive mode.

Interactive Mode Screens

This section describes the LCD screens that display in the Interactive Mode. The Interactive Mode screen flow, as shown in Figure 3-12, provides a representation of the Interactive Mode screen structure hierarchy.

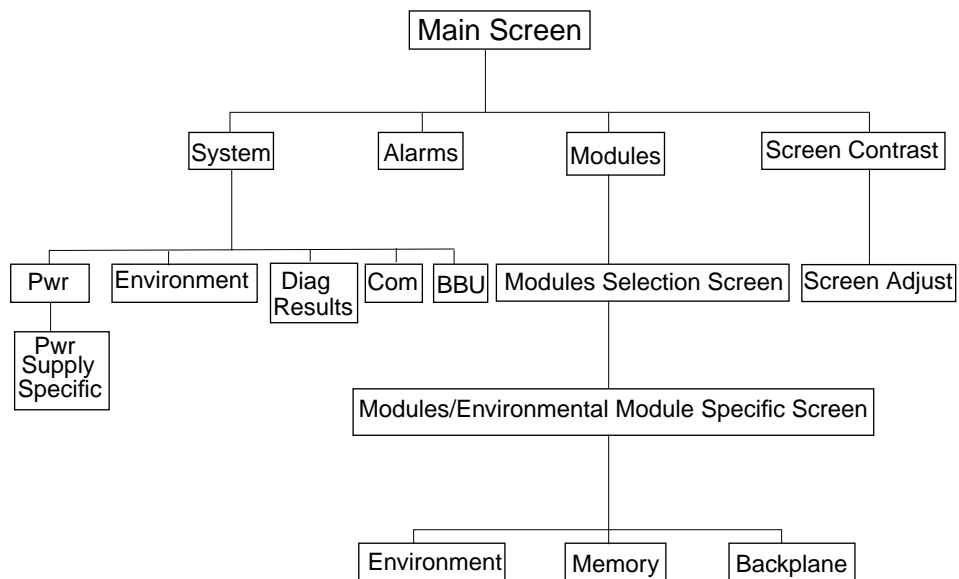


Figure 3-12. Interactive Mode Screen Flow

The Main Screen

The Main Screen, as shown in Figure 3-13, is the initial screen of the Interactive Mode. It allows access to all of the Interactive Mode screens. Interactive Mode screens are distinguished by the display of option fields. Option fields are designated with brackets (< >). To select an option, highlight the option field by using the arrow function keys to place the cursor on the option; then press the ENTER key.

Lines 1 and 2 display the screen heading.

Line 3 displays the <ALARMS> option field. Access information about any current alarms by selecting this item.

Line 4 displays the <SYSTEM>, <MODULES> and <SCREEN CONTRAST> options. Select the appropriate option to access information on the desired category.

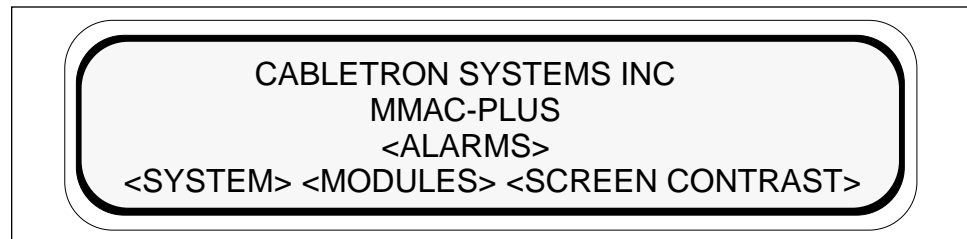


Figure 3-13. The Main Screen

The Alarm Screen

Select the <ALARMS> option field in line 3 of the Main Screen, as shown in Figure 3-13, to access the alarm message queue. Unread alarms are present in the message queue when the ALARM LED is red.

Line 1 of the Alarm Screen, as shown in Figure 3-14, displays the current alarm in the queue as well as the date and time the alarm occurred.

Lines 2 and 3 show the description of the current alarm including the module and parameter(s) causing the alarm.

If other alarms are in the queue (indicated by $x > 1$ on line 1), select <MORE> to see the information screens for them.

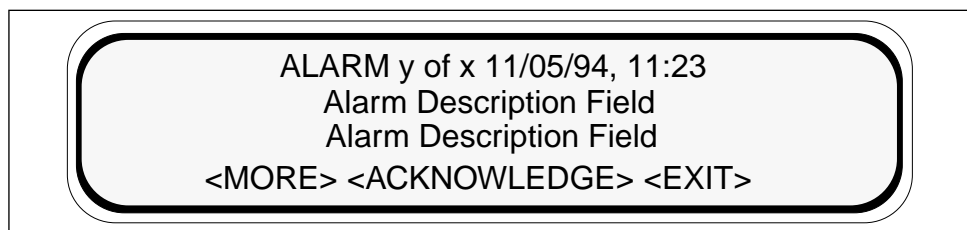


Figure 3-14. The Alarm Screen

Select **<ACKNOWLEDGE>** after reading all alarms to reset the front panel ALARM LED (red to green). Selecting **<ACKNOWLEDGE>** deletes all alarms and resets the alarm pending banner on line 4 of the non-interactive screens.

Select **<EXIT>** to return to the Main Screen.

The System Screen

Select the **<SYSTEM>** option field in line 4 of the Main Screen, as shown in Figure 3-13, to access the System Screen as shown in Figure 3-15. This screen displays information specific to the MMAC-Plus chassis. Lines 1 and 2 display the MMAC-Plus chassis Internet Protocol (IP) address and Media Access Control (MAC) address.

Line 3 displays the current chassis hardware revision and serial number.

Line 4 lists the following five submenus. Access a specific submenu by selecting it on the screen.

<PWR>	Displays general power supply configuration information, with the option to view statistics on specific power supply modules.
<ENV>	Displays environmental information about the chassis.
<COM>	Displays statistics and information about the front panel COM ports and EPIM on the Environmental Module.
<DIAGS>	Displays the results of power-up or restart diagnostic tests.
<BBU>	Displays status of BBUs, if they are installed.



Figure 3-15. The System Screen

Select **<EXIT>** to return to the Main Screen.

The Power Screen

Select **<PWR>** from the System Screen, as shown in Figure 3-15, to access information about the chassis power supply configuration.

Line 1 of the Power Screen, as shown in Figure 3-16, displays the number of power supplies currently configured and the availability of power redundancy.

Lines 2 and 3 display the power supply status as either ON, OFF DUE TO MANAGEMENT, or FAULT.

Line 4 is used to access information about a specific power supply module by selecting a power supply number.

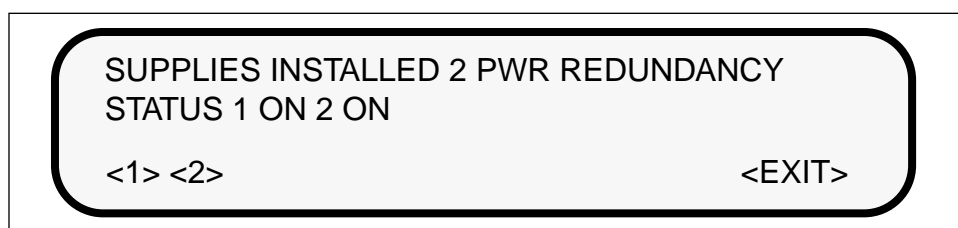


Figure 3-16. The Power Screen

Select **<EXIT>** to return to the System Screen.

The Power Supply Specific Screen

Select a power supply number from line 4 of the Power Screen, as shown in Figure 3-16, to learn about a specific power supply in the MMAC-Plus chassis. There is an LCD screen available for each installed power supply, as shown in Figure 3-17.

Line 1 identifies the power supply selected and its serial number.

Line 2 identifies the power supply's hardware revision, firmware revision of the diagnostic controller and power loading factor as a percentage of its capacity.

Line 3 provides the input and output voltages of the power supply.

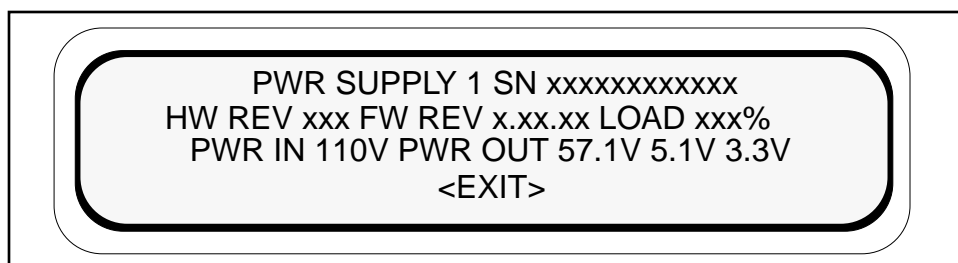


Figure 3-17. The Power Supply Specific Screen

Select **<EXIT>** to return to the Power Screen.

The Environment Screen

Select **<ENV>** from the System Screen, as shown in Figure 3-15, to view environmental parameters of the MMAC-Plus.

Line 1 of this screen, as shown in Figure 3-18, displays the external temperature of the current chassis in both Fahrenheit and Celsius, and qualifies the temperature as COLD, COOL, NORM (normal), WARM, or HOT, based on system parameters.

Line 2 displays the current system non-condensing humidity level, qualified as STATIC RISK, NORM (normal), or MOIST, based on system parameters.

Line 3 displays the current fan speed of the Environmental Module cooling system as a percentage of maximum rotational velocity.

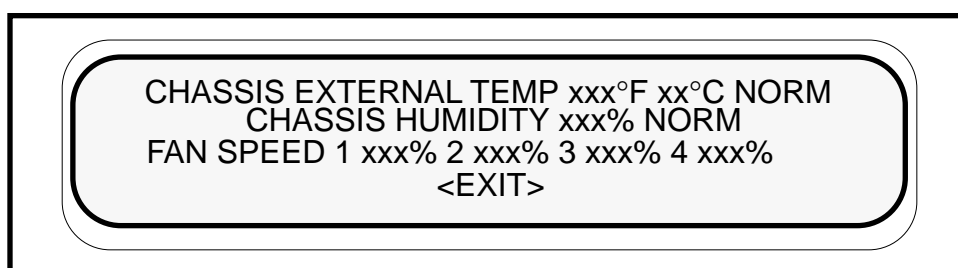


Figure 3-18. The Environment Screen

Select **<EXIT>** to return to the System Screen.

The Communications Screen

Select **<COM>** from the System Screen, as shown in Figure 3-15, to access MMAC-Plus chassis communication port status information.

Line 1, as shown in Figure 3-19, displays the status of the Ethernet Port Interface Module (EPIM) as either ENABLED, DISABLED or N/A if not installed.

Line 2 displays the Port Administration status of COM port 1 (enabled or disabled), the application in use (such as Local Management (LM), SLIP, PPP or UPS), the baud rate of the attached device (a VT100 type terminal or modem) and the port operational status (active or inactive).

Line 3 displays the Port Administration status of COM port 2 in the same manner as described for line 2.

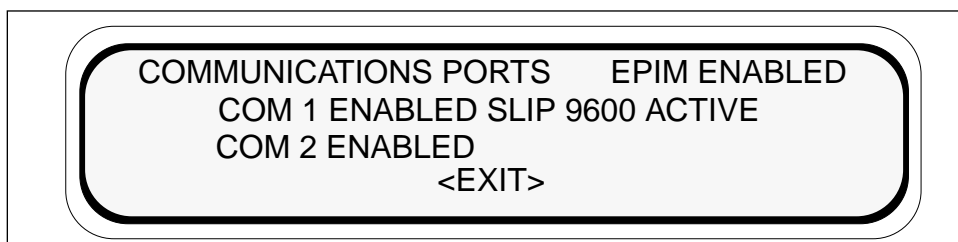


Figure 3-19. The Communications Screen

Select **<EXIT>** to return to the System Screen.

The Diagnostic Module Selection Screen

Select **<DIAGS>** from the System Screen, as shown in Figure 3-15, to view the Diagnostic Module Selection screen.

Line 1, as shown in Figure 3-20, displays the screen heading.

Lines 2 and 3 show the chassis slot locations in which modules have been installed in the MMAC-Plus.

Line 4 displays Power Supply Units and BBUs configured in the MMAC-Plus. Diagnostic test results for these units can be viewed individually. The Diagnostic Results Screen displays the diagnostic test results for the selected modules. It provides an itemized list of failed tests only.

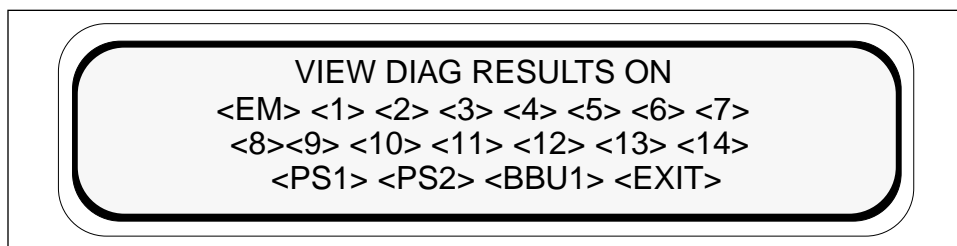


Figure 3-20. The Diagnostic Module Selection Screen

Select **<EXIT>** to return to the System Screen.

The Diagnostic Results Screen

The Diagnostic Results Screen, as shown in Figure 3-21, displays the results of failed tests for the modules selected on the Diagnostic Screen.

Line 1 displays the module(s) selected for diagnostics.

Lines 2 and 3 display failed test results; or, if no failures occurred, the message ALL DIAGNOSTICS TESTS HAVE PASSED.

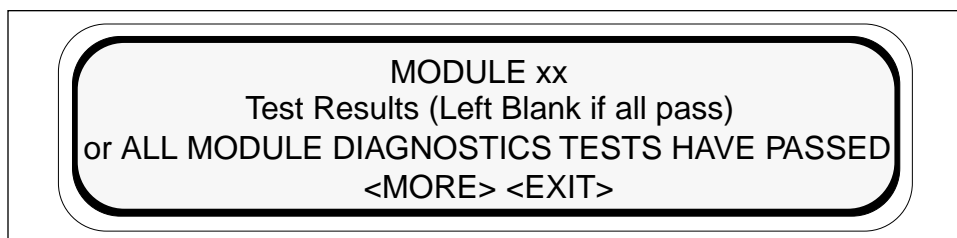


Figure 3-21. The Diagnostic Results Screen

Select **<MORE>** to view more failed tests for the current module.

Select **<EXIT>** to return to the Diagnostic Module Selection Screen.

The BBU Screen

Select **<BBU>** from the System Screen, as shown in Figure 3-15, to view the status of the Battery Backup Units (BBUs). Figure 3-22 shows the BBU Screen.

Line 1 displays the screen heading.

Line 2 displays BBU status (CHARGING, STANDBY or DISCHARGING) if BBUs are installed; however, if no BBUs are installed, the message NO BBU INSTALLED displays.

Line 3 displays the estimated amount of system run time stored in the BBUs if the system is running on a standard power source; or, if the system is running on BBUs, the amount of system run time remaining in the BBUs at the current power load.

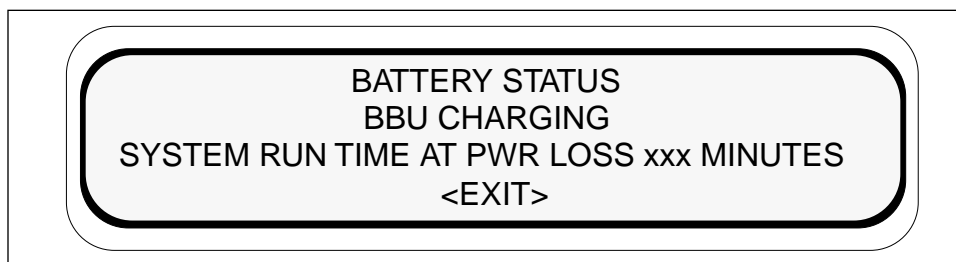


Figure 3-22. The BBU Screen

Select **<EXIT>** to return to the System Screen.

The Module Selection Screen

Select **<MODULES>** from the Main Screen, as shown in Figure 3-13, to display the chassis slot locations in which modules have been installed.

Line 1, as shown in Figure 3-23, displays the screen heading.

Lines 2 and 3 list all modules in the MMAC-Plus by slot number.

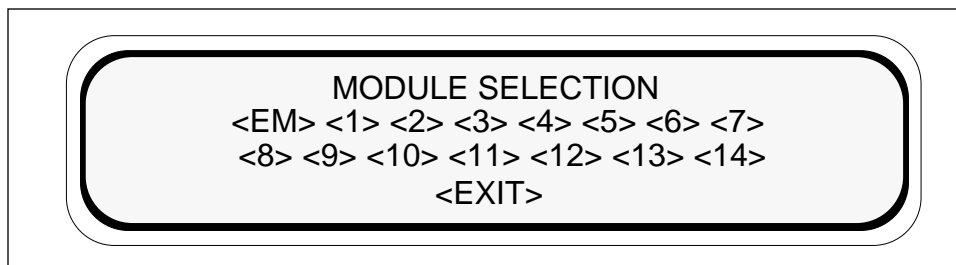


Figure 3-23. The Module Selection Screen

Select **<EXIT>** to return to the main System Screen.

The Module Specific Screen

Select a module on the Module Selection Screen, as shown in Figure 3-23, to display configuration information on the Module Specific Screen, as shown in Figure 3-24.

Line 1 identifies the selected module by chassis slot location, current status, and hardware revision. A module's status can be one of the following:

ON-LINE	The host processor is operational.
DOWN	The host processor is not operational.
FAULT	The power-up diagnostic tests have failed.

Lines 2 and 3 display a firmware revision and SMB-1 firmware revision, along with the BOOT PROM revision and the module serial number.

Line 4 lists the following three submenus. Access a specific submenu by selecting it on the screen.

<ENV>	accesses the Module Environment Screen, showing environmental parameters for the selected module.
<MEMORY>	accesses the Module Memory Screen, showing the amount of various memory categories on the module.
<BACKPLANE>	accesses the Module Backplane Screen, showing backplane configuration parameters.

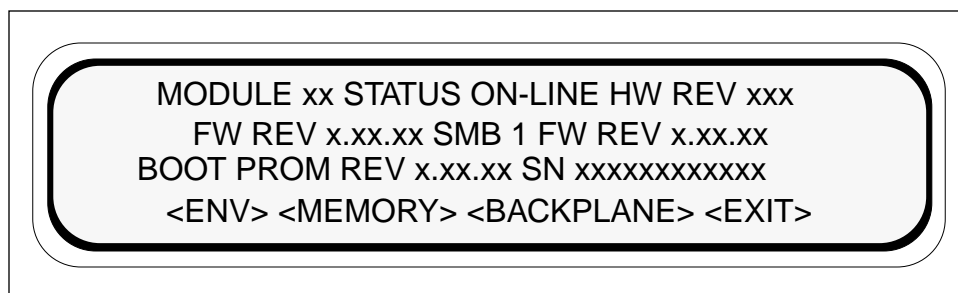


Figure 3-24. The Module Specific Screen

Select <EXIT> to return to the Module Selection Screen.

The Module Environment Screen

Select **<ENV>** at the Module Specific Screen, as shown in Figure 3-24, to display environmental parameters for the specific module.

Line 1 of the Module Environment Screen, as shown in Figure 3-25, identifies the selected module by chassis slot location.

Line 2 displays the measured input voltage from the 48 volt system power bus to the module's DC-to-DC converter. The MMAC-Plus power supply provides voltage to the module via a chassis backplane. The converter's 5 volt output line is also shown on line 2.

Line 3 displays the module's current temperature in Fahrenheit and Celsius. The temperature is qualified as either COLD, COOL, NORM (normal), WARM, or HOT based on system parameters.

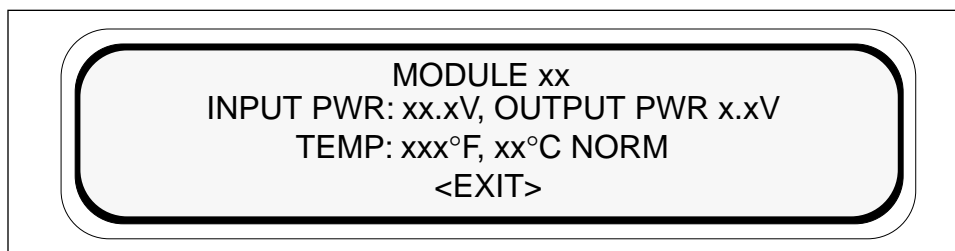


Figure 3-25. The Module Environment Screen

Select **<EXIT>** to return to the Module Specific Screen.

The Module Memory Screen

Select **<MEMORY>** at the Module Specific Screen, as shown in Figure 3-24, to view the memory configuration of a selected module.

Line 1 of the Module Memory Screen, as shown in Figure 3-26, identifies the module, and its current CPU loading factor, expressed as a percent of capacity.

Line 2 displays the amount of FLASH memory (in megabytes) installed on the module.

Line 3 displays the amount of SHARED DRAM and LOCAL DRAM (in megabytes) installed on the module.

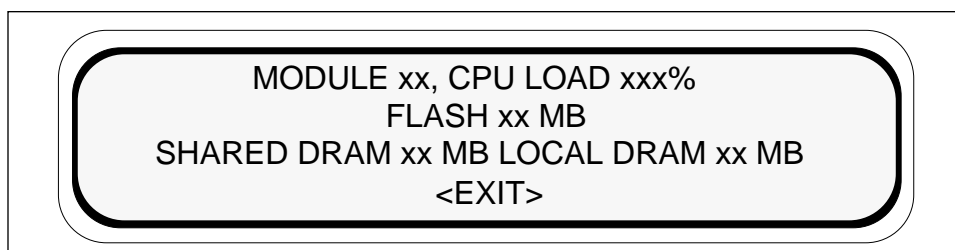


Figure 3-26. The Module Memory Screen

Select **<EXIT>** to return to the Module Specific Screen.

The Module Backplane Screen

Select **<BACKPLANE>** on the Module Specific Screen, as shown in Figure 3-24, to access the Module Backplane Screen, as shown in Figure 3-27. The Module Backplane Screen displays the current MMAC-Plus backplane configuration for a selected module.

Line 1 identifies the selected module by chassis slot location.

Line 2 displays the module's FNB connection (if applicable) and connection status. Refer to the **MMAC-Plus Operation Guide** for further information about FNB configuration.

Line 3 displays the module's INB connection (if applicable) and connection status. Refer to the **MMAC-Plus Operation Guide** for further information about the INB.

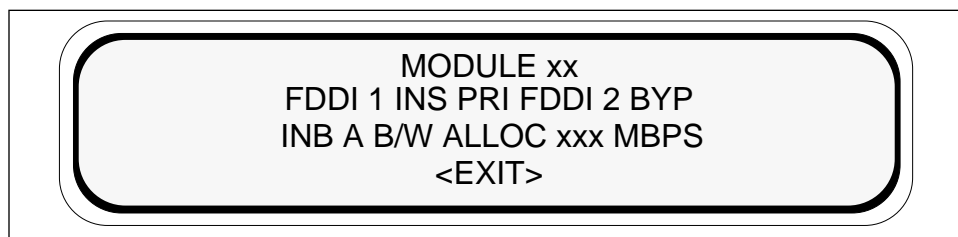


Figure 3-27. The Module Backplane Screen

Select **<EXIT>** to return to the Module Specific Screen.

The Environmental Module Specific Screen

Select **** on the Module Selection Screen, as shown in Figure 3-23, to access the Environmental Module Specific Screen, as shown in Figure 3-28.

Line 1 displays the Environmental Module's current status (on-line or fault) and the hardware revision.

Line 2 displays the Environmental Module's firmware and boot prom revision.

Line 3 displays the Environmental Module serial number.



Figure 3-28. The Environmental Module Specific Screen

Select **<ENV>** to access the Environmental Module Environment Screen (used to view Environmental Module electrical and environmental parameters).

Select **<EXIT>** to return the display to the Module Selection Screen.

The Environmental Module Environment Screen

Select **<ENV>** on the Environmental Module Specific Screen, as shown in Figure 3-28, to access the Environmental Module Environment Screen, as shown in Figure 3-29. This screen displays voltage, temperature, and non-condensing humidity readings for the Environmental Module.

Line 1 displays the measured values for the 48 volt DC power bus and the 3.3 volt bus for the Internal Network Bus (INB) terminator modules. The MMAC-Plus power supply system provides these voltages as input to the Environmental Module. The acceptable limits for the 48 volt line are between 40 and 59 volts. The acceptable limits for the 3.3 volt line are between 3.1 and 5 volts.

Line 2 displays the temperature of the Environmental Module in Fahrenheit and Celsius. The temperature is qualified as either COLD, COOL, NORM (normal), WARM, or HOT based on system parameters.

Line 3 displays the Environmental Module's non-condensing humidity level as STATIC RISK, NORM (normal) or MOIST, based on system parameters.

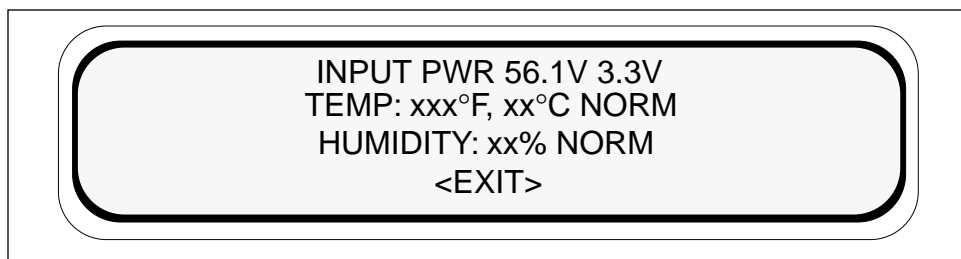


Figure 3-29. The Environmental Module Environment Screen

Select **<EXIT>** to return to the Environmental Module Specific Screen.

The LCD Contrast Adjustment Screen

Select **<SCREEN CONTRAST>** from the Main Screen, as shown in Figure 3-13, to access the LCD Contrast Adjustment Screen, as shown in Figure 3-30.

Select **<LIGHTER>** and press ENTER (repeat as necessary) to make the displayed characters appear lighter on the screen.

Select **<DARKER>** and press ENTER (repeat as necessary) to make the displayed characters appear darker on the screen.

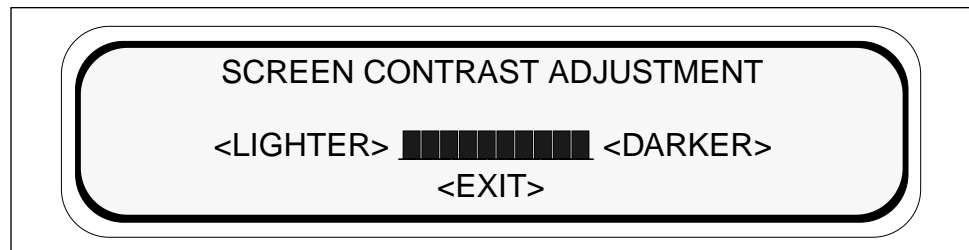
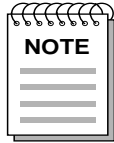


Figure 3-30. LCD Contrast Adjustment Screen

Select **<EXIT>** to return to the Main Screen.



The LCD contrast setting reverts to the darkest setting at power-up or restart of the Environmental Module.

Specifications

Safety



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

The 9C300-1 Environmental Module, when properly installed in the MMAC-Plus chassis, complies with the following safety specifications and standards.

- UL 1950
- CSA C22.2 No. 950
- EN 60950
- IEC 950
- EMI requirements of FCC Part 15 Class A
- EN 55022 Class A
- VCCI Class I
- EMC requirements of
 - EN 50082-1
 - IEC 801-2 ESD
 - IEC 801-3 Radiated Susceptibility
 - IEC 8-1-4 EFT

Service

The 9C300-1 Environmental Module is designed with the following service capability:

MTBF (MIL-STD-217): >200,000 hours projected

MTTR: <.50 hour

Physical

Dimensions

12.7 H x 43.2 W x 44.5 D centimeters
(5 H x 17 W x 17.5 D inches)

Weight

Unit: 6.5 kilograms (14 pounds)
Shipping: 7.7 kilograms (17 pounds)

Environmental

Operating Temperature: 5–40°C, 43–100°F

Operating Humidity: 5% to 95% non-condensing

Cooling: 21.8 cubic meters of air per minute drawn through the chassis

770 cubic feet of air per minute drawn through the chassis

EPIM Specifications

Introduction

The 9C300-1 Environmental Module provides a port for Cabletron Systems EPIMs. EPIMs let you connect to the main network using different media types. Cabletron Systems offers a variety of EPIMs whose specifications are explained in the following sections.

EPIM-T

The EPIM-T is an RJ-45 connector supporting UTP cabling. It has an internal Cabletron Systems TPT-T™ 10BASE-T Twisted Pair Transceiver.

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

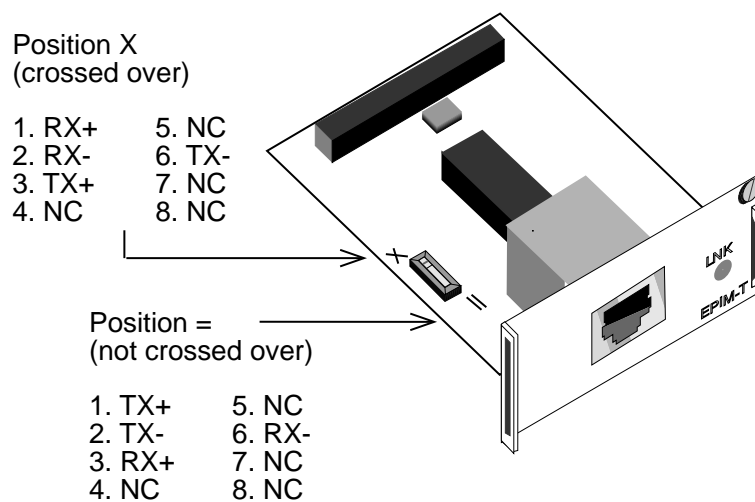


Figure A-1. EPIM-T Pinouts

EPIM-F1 and EPIM-F2

The EPIM-F1 and EPIM-F2 support Multimode Fiber Optic cabling. Each EPIM has an internal Cabletron Systems FOT-F™ Fiber Optic Transceiver. The EPIM-F1 is equipped with SMA Connectors and the EPIM-F2 is equipped with ST Connectors. Figure A-2 shows both EPIMs. Specifications for the EPIMs are listed in Table A-1.

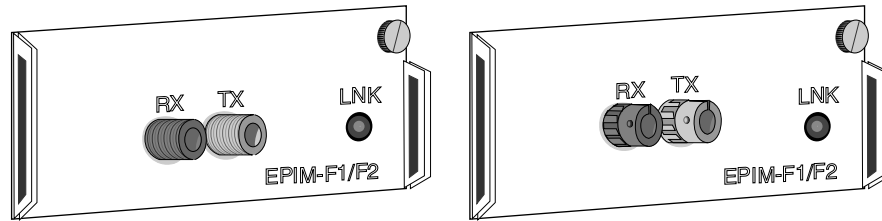


Figure A-2. EPIM-F1 and EPIM-F2

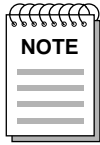
Table A-1. EPIM-F1 & EPIM-F2 Specifications

Parameter	Typical Value	Worst Case	Worst Case Budget	Typical Budget
Receive Sensitivity	-30.5 dBm	-28.0 dBm	—	—
Peak Input Power	-7.6 dBm	-8.2 dBm	—	—

Transmitter power parameters are listed Table A-2.

Table A-2. Transmitter Power

Parameter	Typical Value	Worst Case	Worst Case Budget	Typical Budget
50/125 μm fiber	-13.0 dBm	-15.0 dBm	13.0 dB	17.5 dB
62.5/125 μm fiber	-10.0 dBm	-12.0 dBm	16.0 dB	20.5 dB
100/140 μm fiber	-7.0 dBm	-9.0 dBm	19.0 dB	23.5 dB
Error Rate	Better than 10^{-10}			



The transmitter power levels and receive sensitivity levels listed are Peak Power Levels after optical overshoot. A Peak Power Meter must be used to correctly compare the values given above to those measured on any particular port. If Power Levels are being measured with an Average Power Meter, then 3 dBm must be added to the measurement to correctly compare those measured values to the values listed (i.e., -30.5 dBm peak = -33.5 dBm average).

EPIM-F3

The EPIM-F3 supports Single Mode Fiber Optic cabling. It has an internal Cabletron Systems FOT-F™ Fiber Optic Transceiver and is equipped with ST Connectors. Figure A-3 shows the EPIM-F3. Specifications for the EPIM-F3 are listed in Figure A-4 and Table A-3.

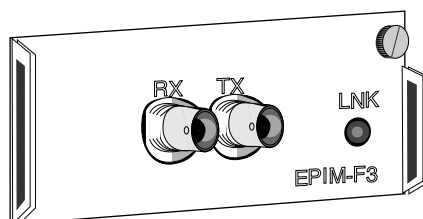


Figure A-3. EPIM-F3

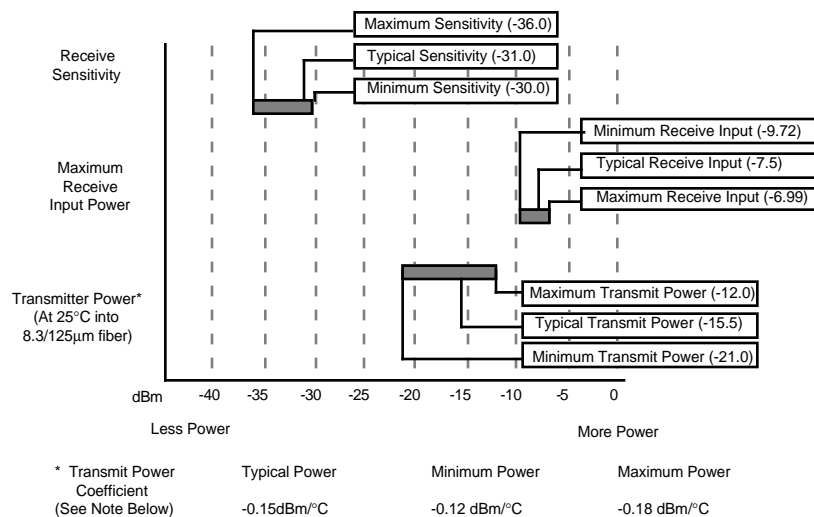
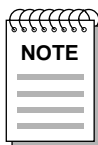


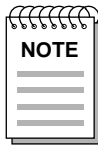
Figure A-4. EPIM-F3 Power and Sensitivity Specifications



Transmitter Power decreases as temperatures rise and increases as temperatures fall. Use the Output Power Coefficient to calculate increased or decreased power output for your operating environment. For example, the typical power output at 25°C is -16.4 dBm. For a 4°C temperature increase, multiply the typical coefficient (-0.15 dBm) by four and add the result to typical output power (4 x -0.15 dBm + -16.4 = -17.0).

Table A-3. EPIM-F3 Specifications

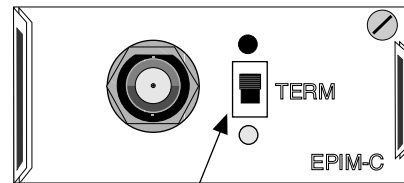
Parameter	Typical	Minimum	Maximum
Transmitter Peak Wave Length	1300 nm	1270 nm	1330 nm
Spectral Width	60 nm	-	100 nm
Rise Time	3.0 nsec	2.7 nsec	5.0 nsec
Fall Time	2.5 nsec	2.2 nsec	5.0 nsec
Duty Cycle	50.1%	49.6%	50.7%
Bit Error Rate	Better than 10^{-10}		



The transmitter power levels given above are Peak Power Levels after optical overshoot. You must use a Peak Power Meter to correctly compare the values given above to those measured on any particular port. If you are measuring power levels with an Average Power Meter, add 3 dBm to the average power measurement to correctly compare the average power values measured to the values listed above (i.e., -33.5 dBm average + 3 dB = -30.5 dBm peak).

EPIM-C

The EPIM-C supports thin-net coaxial cabling and is equipped with an internal Cabletron Systems TMS-3™ Transceiver. You can use the TERM switch on the front of the EPIM-C to set the internal 50-ohm terminator. This eliminates the need to connect the port to a tee-connector and terminator. Figure A-5 shows the setting for the terminator switch.



Internal Termination Switch
● = On (internally terminated)
○ = Off (need external termination)

Figure A-5. EPIM-C

Connector Type

This connector type is a BNC receptacle, with gold center contact, for use with BNC type tee-connectors and RG-58 thin-net cable.

Grounding

For safety reasons, only one end of a thin-net segment should be connected to earth ground. Connection to earth ground at more than one point on the segment may cause dangerous ground currents.

The BNC port of the Coaxial Interface Modules is not connected to earth ground.

EPIM-A and EPIM-X (AUI Port)

The EPIM-A is a DB-15 female connector used to attach segments to an external transceiver. The EPIM-X is equipped with dual internal transceivers. It has a DB-15 male connector used to attach segments to an AUI cable. Figure A-6 shows both modules.

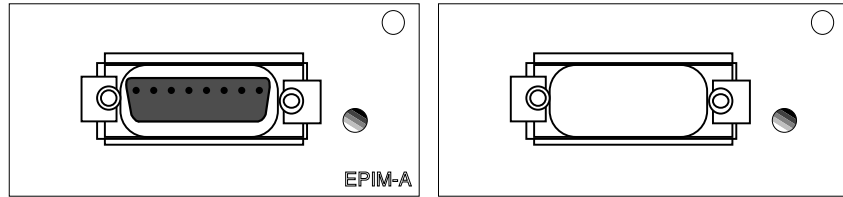


Figure A-6. The EPIM-A and EPIM-X

Table A-4 lists the DB-15 pinouts.

Table A-4. DB-15 Pinouts

Pin Number	Represents	Pin Number	Represents
1	Logic Ref.	10	Transmit -
2	Collision +	11	Logic Ref.
3	Transmit	12	Receive -
4	Logic Ref.	13	Power (+12Vdc)
5	Receive	14	Logic Ref.
6	Power Return	15	No Connection
7	No Connection	*Connector Shell	Positive Ground
9	Collision -		

*Connector Shell: Protective Ground

Uninterruptible Power Supply (UPS)

Introduction

The MMAC-Plus can be connected to a UPS to provide an uninterruptible source of AC power. Two UPS models are available, the Matrix 3000 and the Matrix 5000. Either can be monitored via remote SNMP Management after connecting the UPS to the Environmental Module (EM).

Connecting a UPS to an EM

To connect a UPS to an EM, use the RJ-45/DB-9 adapter labeled “UPS”, the RJ-45 cable included in the 9372089 kit shipped with the EM, and follow the steps below.

1. Plug the RJ-45/DB-9 adapter labeled “UPS” into the receptacle on the rear of the UPS (Figure B-1).
2. Plug one end of the cable with the RJ-45 connector into the RJ-45/DB-9 adapter labeled “UPS” on the rear of the UPS (Figure B-1).
3. Plug the other end of the cable with the RJ-45 connector into the COM2 port on the front of the EM inserted in the MMAC-Plus Chassis (Figure B-1).

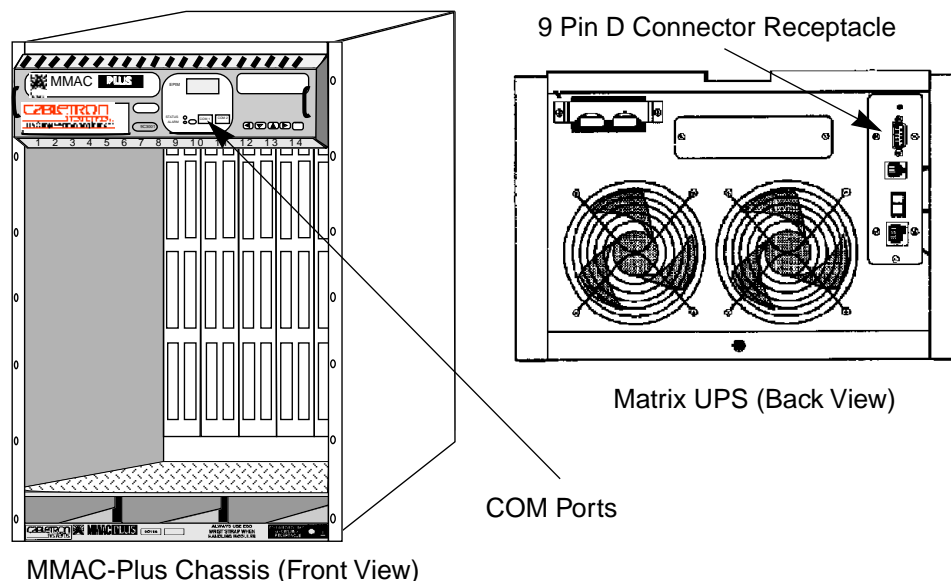


Figure B-1. Connecting EM to UPS

Configuring COM Port for UPS

After the UPS has been connected to the COM2 port, the COM2 port must be configured for UPS Management. To configure the COM2 port for UPS Management, follow the steps below.

1. Connect the terminal or PC used for local management to the COM1 port on the Environmental Module (EM) and press RETURN until the Slot Selection Screen displays.
2. At the Slot Selection Screen, enter 0 (zero) to display the EM Configuration Screen.
3. At the EM Configuration Screen, cursor to the Application Field for the COM2 port.
4. Using the space bar, toggle to the UPS option.
5. Using the tab key, tab to the SAVE option and press RETURN.

If you need additional information about configuring the COM ports, refer to the **Local Management User's Guide**.

Verifying Configuration

After configuring the COM port for a UPS, verify the configuration was done correctly by checking the Communications Screen on the EM. Follow the steps below to verify the configuration.

1. At the Main Screen select <SYSTEM> and press ENTER.
2. At the System Screen select <COM> and press ENTER.
3. At the Communications Screen, verify that the screen displays “ENABLED UPS 2400 ACTIVE FOR COM PORT 2”.

Monitoring UPS

Information about the operation of the UPS is obtained via Remote SNMP Management or locally by the LCD on the front of the UPS. Refer to the UPS User’s Guide, provided by the vendor, for detailed information on the UPS LCD.

