



ONline Ethernet RMON MultiProbe Module Installation and Operation Guide

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Model Number: RMON-EMP-3
Software Version 1.0

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How to Use This Guide

This guide describes how to install the 3Com Ethernet RMON MultiProbe™ Module into the 3Com ONline™ System Concentrator and the ONcore® Switching Hub. This guide also provides troubleshooting suggestions to use if a problem occurs with the module.

Audience

This guide is intended for the following people at your site:

- Network manager or administrator
- Hardware installer

Structure of This Guide

This guide contains the following chapters and appendix:

Chapter 1, Introduction – Provides an introduction to the 3Com Ethernet RMON MultiProbe Module.

Chapter 2, Installing the Module – Describes the installation procedures for the module and describes how to monitor the front panel.

Chapter 3, Configuring the Module – Describes how to configure the module for operation.

Chapter 4, Troubleshooting – Describes troubleshooting information for correcting possible problems during module installation or operation.

Appendix A, Specifications – Provides specifications for the RMON MultiProbe Module.

Appendix B, Technical Support – Lists the various methods for contacting the 3Com technical support organization and for accessing other product support services.

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Document Conventions

The following document conventions are used in this guide:

Convention	Indicates	Example
Courier text	User input	In the Agent Information Form, enter <code>MIS</code> in the New Contact field.
	System output	After pressing the Apply button, the system displays the message <code>Transmitting data.</code>
Bold command string	Path names	Before you begin, read the <code>readme.txt</code> file located in <code>/usr/snm/agents</code> .
Italic text in braces	User-substituted identifiers	Use the following command to show port details: <code>SHOW PORT {slot.all} VERBOSE</code>
Capitalized text in plain brackets	Keyboard entry by the user	Type your password and press <code>[ENTER]</code> .
Italics	Text emphasis, document titles	Ensure that you press the Apply button <i>after</i> you add the new search parameters.

Convention	Indicates	Example
Note:	A Note . The information is important	Note: Use STP lobe cables for your system.
 Caution:	A Caution . A condition may damage software or hardware	 Caution: Do not put your installation diskettes on a magnetic surface. This may damage the diskettes.
 Warning:	A Warning . A condition may threaten personal safety	 Warning: Wear eye protection when performing these maintenance procedures.

Related Documents

This section provides information on supporting documentation, including:

- ❑ 3Com Documents
- ❑ Reference Documents

3Com Documents

The following documents provide additional information on 3Com products:

ONline System Concentrator Installation and Operation Guide - Provides information on the installation, operation, and configuration of the ONline System Concentrator. This guide also describes the principal features of the ONline Fault-Tolerant Controller Module.

ONcore Switching Hub Installation and Operation Guide - Provides information on the installation, operation, and configuration of the ONcore Switching Hub. This guide also describes the principal features of the ONcore Fault-Tolerant Controller Module.

ONline Ethernet Management Module Installation and Operation Guide - Provides information on the operation, installation, and configuration of the ONline Ethernet Management Module.

Distributed Management Module User's Guide - Provides information on the operation, installation, and configuration of the ONcore Distributed Management Module. This guide also describes the software commands associated with the Distributed Management Module.

ONline Management Commands Guide - Describes the software commands associated with the ONline Management Modules.

Distributed Management Module Commands Guide - Describes each management command by providing detailed information on the commands's format, use, and description.

For a complete list of 3Com documents, contact your 3Com representative.

Reference Documents

The following documents supply related background information:

Case, J., Fedor, M., Scoffstall, M., and J. Davin, *The Simple Network Management Protocol*, RFC 1157, University of Tennessee at Knoxville, Performance Systems International and the MIT Laboratory for Computer Science, May 1990.

Rose, M., and K. McCloghrie, *Structure and Identification of Management Information for TCP/IP-based Internets*, RFC 1155, Performance Systems International and Hughes LAN Systems, May 1990.

Waldbusser S., *Remote Network Monitoring Management Information Base*, RFC 1757, Carnegie Mellon University, February 1995.

1

Introduction

This chapter provides an introduction to the 3Com Ethernet RMON MultiProbe™ Module (hereafter referred to as the RMON MultiProbe Module). The RMON MultiProbe Module is managed by the following 3Com management modules:

- ❑ ONcore® Distributed Management Module (Version V2.10)
- ❑ ONline™ Ethernet Management Module (Version V4.20)

This chapter contains the following sections:

- ❑ RMON Overview
- ❑ RMON MultiProbe Module Overview
- ❑ RMON MultiProbe Module Features

RMON Overview

Remote Monitoring (RMON) is a standards-based network management tool that allows you to efficiently and effectively monitor segments throughout the network. You can use RMON to identify and isolate potential problems in your network before disruptions occur.

RMON-compliant devices operate without impacting network operation. They function as promiscuous devices, which listen to and capture data on the network, but do not add additional traffic.

The following sections describe:

- ❑ RMON Architecture
- ❑ Ethernet RMON Groups

RMON Architecture

RMON technology requires two components within a network:

- ❑ RMON Probe
- ❑ RMON Client

RMON Probe

An RMON probe contains both hardware and software, and is referred to as the RMON agent. As a promiscuous device, the RMON probe:

- ❑ Observes packets on the network
- ❑ Captures packets that match user-defined criteria
- ❑ Stores packets from the network segment

Through the packet capture and store feature, the RMON agent provides an extensive set of Ethernet-based statistics to the network manager.

RMON Client

The RMON Client consists of a management station running an application that uses SNMP (such as the 3Com ONdemand LANsentry™ software) to request data from the probe and display that data in various formats. You can also use the graphical interface to configure the RMON agent.

The client application does not have to be located on the same segments as the network to which the probe is assigned, but does need connectivity to the networks.

Ethernet RMON Groups

The Ethernet RMON standard is defined in Request For Comment (RFC) 1757 (formerly 1271). The goal of the standard is to ensure interoperability in multivendor environments. As defined by the RFC standards for Ethernet RMON, the Ethernet RMON specification identifies the following RMON groups:

- ❑ **Alarm Group** - Allows you to define and set thresholds for various counters. If a counter reaches a predefined threshold, an event is generated. (See Event Group below.)
- ❑ **Event Group** - Controls the action taken as a result of an event, (an event can be triggered by an alarm). For example, if a counter reaches a threshold, then a trap may be generated or an event may be logged.
- ❑ **Filter Group** - Instructs the RMON MultiProbe Module to capture only those packets that match a specific criteria (such as IP Protocol or a specific MAC address).
- ❑ **History Group** - Provides historical views of statistics based on predefined sampling intervals. This information illustrates traffic or error patterns, which can be useful in trend analysis.
- ❑ **Host Group** - Contains statistical counters, grouped by MAC address, specific to each station on the network. This group also contains the order in which devices or stations were discovered.

- ❑ **HostTopN Group** - Sorts stations by top traffic contributors. You can use this information to identify the most active hosts on a segment or the hosts producing the most errors.
- ❑ **Matrix Group** - Collects statistics between pairs of devices on the network and tracks information specific to each connection, such as the number of packets transmitted between devices.
- ❑ **Packet Capture Group** - Handles the capture and uploading of packets collected by the RMON MultiProbe Module.
- ❑ **Statistics Group** - Contains cumulative traffic and error statistics (for example, packet distribution, and Cyclic Redundancy Check) for each device being monitored.

RMON MultiProbe Module Overview

The RMON MultiProbe Module is a single-slot Ethernet module that you install in an ONline and ONcore hub. The RMON MultiProbe Module can monitor up to three Ethernet networks simultaneously and perform all functions on all networks in parallel.

The RMON MultiProbe Module supports:

- ❑ UDP/IP (User Datagram Protocol/Internet Protocol) over Ethernet
- ❑ SLIP (Serial Line Internet Protocol)
- ❑ SNMP (Simple Network Management Protocol) over UDP for management access
- ❑ ICMP (Internet Control Message Protocol) Echo and Redirect

RMON MultiProbe Module Features

When you use the RMON MultiProbe Module in conjunction with an RMON client application, you can:

- Monitor the network
- Generate reports based on network information
- Filter and capture packets
- Process events and thresholds
- Detect network events

In addition, the RMON MultiProbe Module monitors:

- Per-network collisions
- Per-port collisions (PPC)
- Port-address correlation (PAC)

Other benefits of the RMON MultiProbe Module include:

- ❑ **3Com TriChannel™ Architecture** - The RMON MultiProbe Module operates in an ONline System Concentrator and an ONcore Switching Hub.
- ❑ **Slot Independence** - You can install modules into any available slot in a 3Com ONline or ONcore hub. This flexibility eliminates the need to shut down the network and rearrange the existing configuration of the concentrator when you install new modules.
- ❑ **Hot Swap Capability** - You can install or remove modules from the ONline or ONcore hubs when the hub is powered up without affecting the operation of any other modules in the concentrator.
- ❑ **Management Support** - You can manage the RMON MultiProbe Module through the 3Com® ONdemand LANsentry application. You can also manage the module using terminal management through an ONline Ethernet Management Module (EMM) or an ONcore Distributed Management Module (DMM).
- ❑ **Compliance** - The 3Com Ethernet RMON MultiProbe Module complies with the RMON standard as defined by RFC 1757.

Theory of Operation

This section describes the theory of operation for the RMON MultiProbe Module.

The RMON MultiProbe Module:

- ❑ Supports simultaneous analysis of three Ethernet channels
- ❑ Monitors the network proactively

For example, when a network event occurs or a problem becomes apparent in the network, you use a protocol analyzer to attempt to isolate and correct the problem. RMON technology also provides you with protocol analyzer capabilities. However, RMON takes a more proactive approach to network monitoring by:

- ❑ Alerting you of network events before they can become a problem
- ❑ Providing you with information to help isolate problems

You can also configure the RMON MultiProbe Module to check continuously for specific error conditions and notify you or log the event when the conditions occur.

Sample Application

Figure 1-1 illustrates a sample application of RMON MultiProbe Modules in a concentrator monitoring Ethernet segments in Boston and New York. With the appropriate interconnections, you can view the RMON data collected by the RMON MultiProbe Modules from a client workstation application in Los Angeles

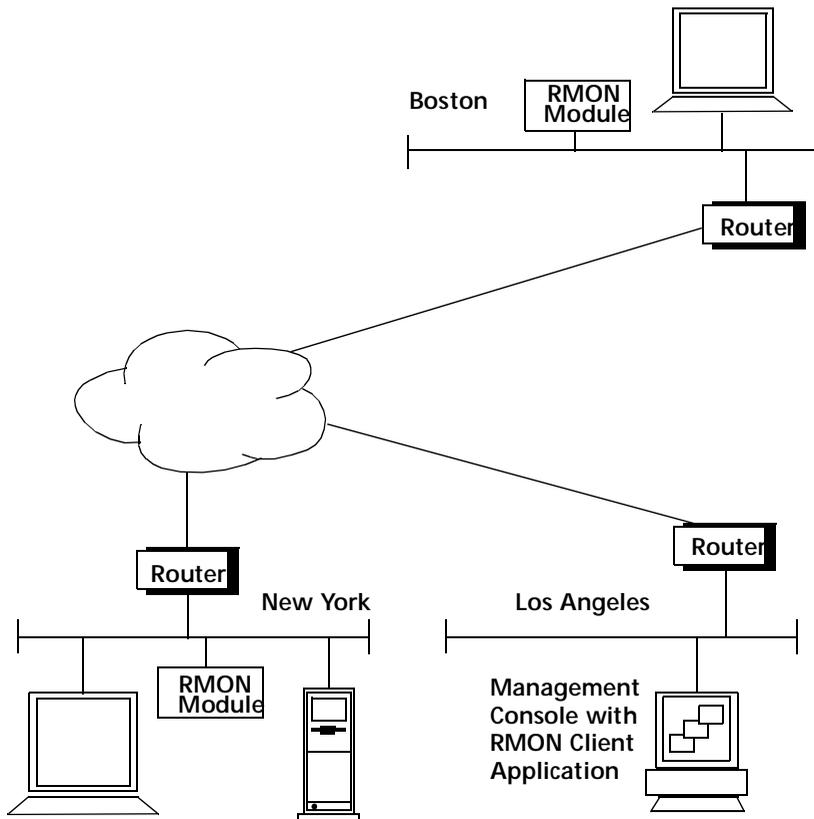


Figure 1-1. RMON Sample Application

2 *Installing the Module*

This chapter contains the following sections:

- ❑ Precautionary Procedures
- ❑ Quick Installation
- ❑ Unpacking Procedures
- ❑ Installing the RMON MultiProbe Module
- ❑ Connecting a Terminal
- ❑ Initializing the RMON MultiProbe Module
- ❑ Monitoring the Front Panel

Precautionary Procedures



Caution: Electrostatic discharge (ESD) can damage static-sensitive devices on circuit boards.

When you handle the module:

- Do not remove the board from its antistatic shielding bag until you are ready to inspect or install it.
- Handle the board by the faceplate only.

Use proper grounding techniques when you install the module, including:

- Using a footstrap and grounded mat or wearing a grounded static discharge wrist strap.
- Touching the grounded rack or other source of ground just before you handle the module.

Quick Installation

Table 2-1 outlines the steps necessary to complete the installation of the RMON MultiProbe Module. If you are familiar with installing 3Com modules, use this table as a checklist. Otherwise, consult the remainder of this chapter.

Table 2-1. Quick Installation Steps

Step	Procedure	Chapter/Section
1	Unpack the module.	Chapter 2, Unpacking Procedures section
2	Install the module into an open slot in the hub.	Chapter 2, Installing the Module section
3	Connect a terminal or management workstation to the RS-232 console port on the module faceplate.	Chapter 2, Connecting a Terminal section
4	Assign an IP address and subnet mask for each RMON interface using a BOOTP server or the configuration menus.	Chapter 3, Assigning the Interface IP Address and Subnet Mask section
5	Assign a default gateway for the module using the configuration menus or BOOTP.	Chapter 3, Assigning the Module Default Gateway section
6	Configure the RMON interfaces to a network using either the DIP switch or the SET PORT command.	Chapter 3, Assigning Interfaces to Networks section.
7	Configure optional module parameters using the configuration menus.	Chapter 3, Configuring the Module

Unpacking Procedures

To unpack the RMON MultiProbe Module:

1. Verify that the RMON MultiProbe Module (Model Number RMON-EMP-3) is the model you ordered by checking the model number listed on the side of the shipping carton.

Note that the product model number printed on the shipping box differs from the model number on the product. The model number on the shipping box contains the prefix '3C9'.

2. Remove the module, in its antistatic bag, from the shipping carton.
3. Remove the module from the antistatic shielding bag and inspect it for damage.

Always handle the module by the faceplate, being careful not to touch the components. If the module appears to be damaged, return it to the anti-static shielding bag, repack it in the shipping carton, and contact your local supplier.

Keep the shipping carton and anti-static shielding bag in which your module was shipped so that you can repack the module for storage or shipment.

Installing the RMON MultiProbe Module

You do not need to power down the hub to install or remove the RMON MultiProbe Module. You can insert the module while the hub is operating (this is called a hot swap).

To install the RMON MultiProbe Module:

1. Properly ground yourself prior to handling the module.
For example, wear a static wrist guard or touch a grounded static mat prior to handling the module.
2. Locate an open slot in the hub. Remove a blank panel on the hub to expose a slot for the module, if necessary.
3. Insert the module into the board guides at the top and bottom of the slot and slide it into the hub by pressing firmly at the top and bottom of the faceplate. Make sure the connectors are well-seated into the backplane of the hub.

Once you install the module, it automatically begins self-diagnostics and initializes.

Figure 2-1 shows the RMON MultiProbe Module installed in an ONline System Concentrator. You can also install the RMON MultiProbe Module in the ONcore MultiProtocol Switching Hub using an ONline Module Adapter Kit.

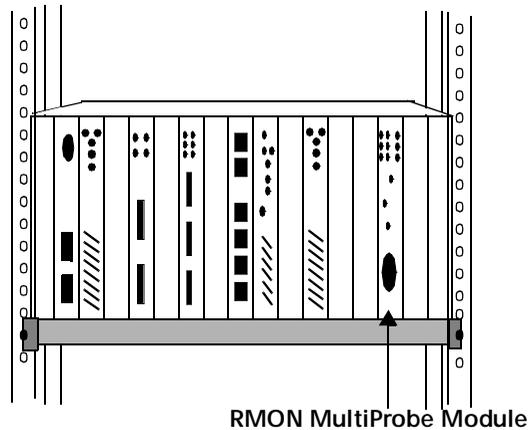


Figure 2-1. RMON MultiProbe Module in the ONline System Concentrator

4. Using your fingers, tighten the spring-loaded screws on the front of the module faceplate (do not overtighten). Once you install the RMON MultiProbe Module, it begins diagnostic testing automatically.
5. Connect one end of an RS-232 cable to the RS-232 port on the front of the module.
6. Connect the other end of the cable to a terminal (as described in the next section).

Connecting a Terminal

You can connect a terminal or workstation running a terminal emulation program to the RMON MultiProbe Module RS-232 port to:

- Configure IP address information for the RMON MultiProbe Module interfaces
- Display the RMON MultiProbe Module configuration

To connect a terminal to the RMON MultiProbe Module:

1. Verify that the terminal is configured as follows:
 - 8-bit data
 - No parity
 - 1 stop bit
 - 9600 baud rate

Note: The RMON MultiProbe Module does not support XON and XOFF.

2. Using an RS-232 null-modem cable, attach a terminal (or a workstation running ASCII terminal emulation software) to the RMON MultiProbe Module RS-232 port.

Initializing the RMON MultiProbe Module

Once you complete module installation procedures and attach an RS-232 cable to the front panel, you can initialize the RMON MultiProbe Module and display the configuration menus.

To initialize the RMON MultiProbe Module and display the configuration menus:

1. Press the front panel Reset button. Pressing the Reset button warm-starts the module. (Refer to Chapter 3, Configuring the Module, for a description of warm and cold starts.)

When reset, the module completes diagnostics and initializes.

2. To display the RMON MultiProbe Module Main configuration menu, hold down the **X** key on the terminal keyboard within 15 seconds of powering up or resetting the module. If you do not hold down the **X** key within 15 seconds, the RMON MultiProbe Module:
 - a. Begins monitoring the network
 - b. Reports any error messages if the module experiences an error condition
3. If you miss the 15-second window, press the Reset button to re-initialize the module.
4. When you hold down the **X** key, the following banner is displayed:

```
Tests interrupted!  
Boot System Version x.xx for Ethernet RMON  
MultiProbe, Rev x  
Built on Thu April x, 17:36:58 EST 199x  
  
Loading configuration system.  
Entering configuration system. Please  
wait.....
```

The Main configuration menu appears (Figure 2-2).

```
                Main menu Rev x.xx (Rev x.x)

1 Modify/View configuration values ->

2 Download new firmware ->

3 Warm start and Exit

4 Cold start and Exit

Enter one of: 1 2 3 4 ?
```

Figure 2-2. Main Configuration Menu

5. Refer to Chapter 3, Configuring the Module, for a description of the configuration menus and instructions for configuring the module and its interfaces using the configuration menus.

Once you configure the RMON MultiProbe Module and it initializes successfully, the module begins to operate normally and monitor the network.

Note: Hardware flow control is not active on the RMON MultiProbe Module when you are using the configuration menus. Depending on the Serial Port Mode setting, hardware flow control is active when you exit the configuration menus.

For information on the Serial Port Mode settings, refer to Chapter 3, Configuring the Module, Table 3-4 Modify/View Serial Configuration Values Menu Description.

Monitoring the Front Panel

Use the LEDs on the front panel of the RMON MultiProbe Module to monitor the status of the module and the module interfaces. The RMON MultiProbe Module front panel also contains a recessed Reset button for resetting the module.

Resetting the module is equivalent to a warm start. Refer to Chapter 3, *Configuring the Module*, the section titled *Re-Initializing the RMON MultiProbe Module* for information on warm and cold starts.

When you install the RMON MultiProbe Module in the hub, an Interface Status LED illuminates for each interface after the following conditions are met:

- ❑ The RMON MultiProbe Module completes self-diagnostics and initializes.
- ❑ You assign an interface to a network (the interface is enabled automatically once you assign a network using a 3Com management module or set the DIP switches).

The Module Status LED illuminates once the module completes self-diagnostics and initializes (45 seconds).

Figure 2-3 shows the LEDs, Reset button, and RS-232 port on the module faceplate. Each LED indicates the state of the module or interface as described in Table 2-2.

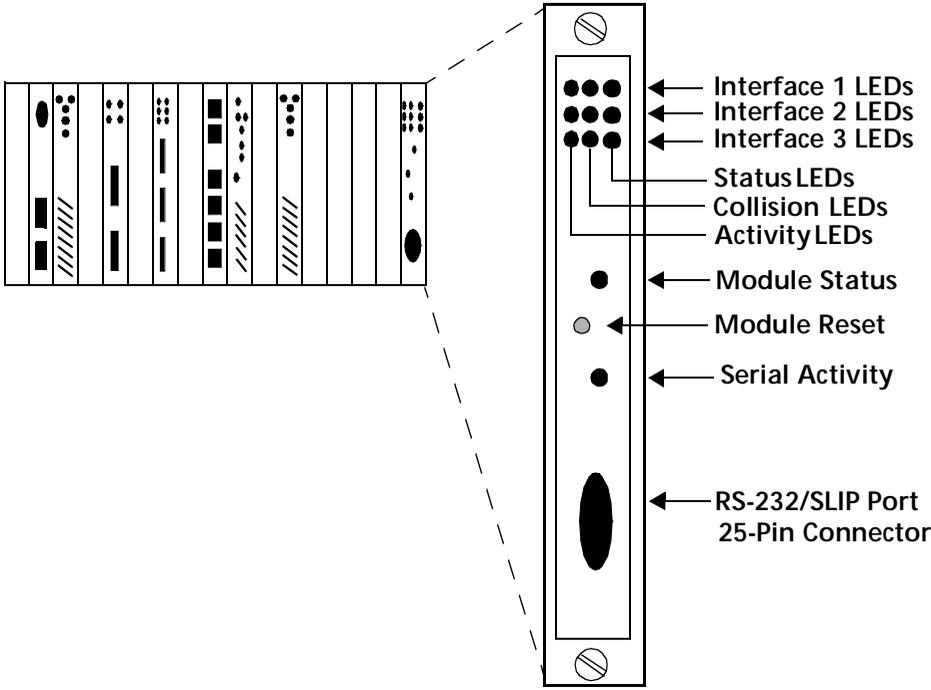


Figure 2-3. RMON MultiProbe Module Front Panel LEDs and Reset Button

Table 2-2. Module LED Interpretations

LED Name	Color	State	Indicates
Interface1 Interface 2 Interface 3 (Interface Status)	Green	Off	Interface is set to isolated (not assigned to any network).
		On	Interface is configured to a network and is enabled.
		Blinking	LED blinks briefly during diagnostics.
Collision (Interface Collision)	Yellow	Off	Interface is not experiencing collisions or is isolated.
		Blinking	Interface is experiencing collisions. Blinks once for each collision detected.
Activity (Interface Activity)	Yellow	Off	No traffic is being passed or interface is isolated.
		Blinking	Monitors received traffic. Blinks once for each packet received.
Module Status	Green	Off	Module failed diagnostics. This indicates an unrecoverable hardware or software error. Contact the 3Com Customer Service Center.
		On	Module is operating correctly.
		Blinking	Blinks at 1-second intervals during module initialization.

Table 2-2. Module LED Interpretations (Continued)

LED Name	Color	State	Indicates
Serial Activity	Yellow	Blinking	Activity over the RS-232 port. Blinks once for each character received or transmitted.
Reset Button	Black	When pressed	Re-initializes module software and resets module hardware.

3 *Configuring the Module*

This chapter describes how to configure the 3Com Ethernet RMON MultiProbe Module for operation.

This chapter contains the following sections:

- ❑ Configuration Menu Overview
- ❑ Configuring the Module and Interfaces
- ❑ Assigning Interfaces to Networks
- ❑ Showing Module and Interface Configurations
- ❑ Re-initializing the RMON MultiProbe Module

Configuration Menu Overview

This section describes the RMON MultiProbe Module configuration menus and how to use the menus to configure the module and interface. The configuration menus enable you to configure the module and interfaces using a terminal attached to the front panel RS-232 port and an RS-232 null-modem cable. (Refer to Appendix A, Specifications, for information on cable pinouts.)

This section includes:

- ❑ Modifying Configuration Menu Values
- ❑ Using the Main Configuration Menu
- ❑ Using the Download Menu
- ❑ Using the Modify/View Configuration Values Menu
- ❑ Using the Modify/View Serial Configuration Values Menu
- ❑ Using the Modify/View Network Settings Menu
- ❑ Using the Modify/View Network Interface Settings Menu

Figure 3-1 is a flow chart of the RMON MultiProbe Module configuration menus.

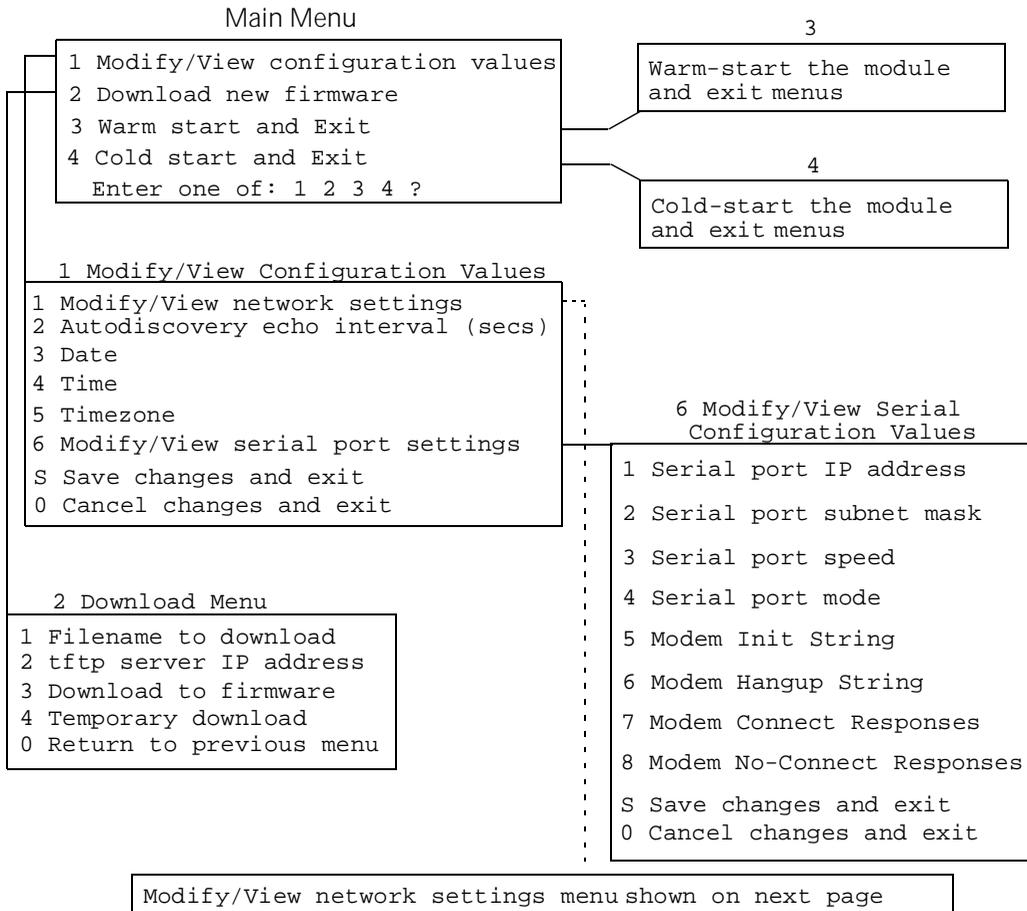


Figure 3-1. Configuration Menu Flow Chart

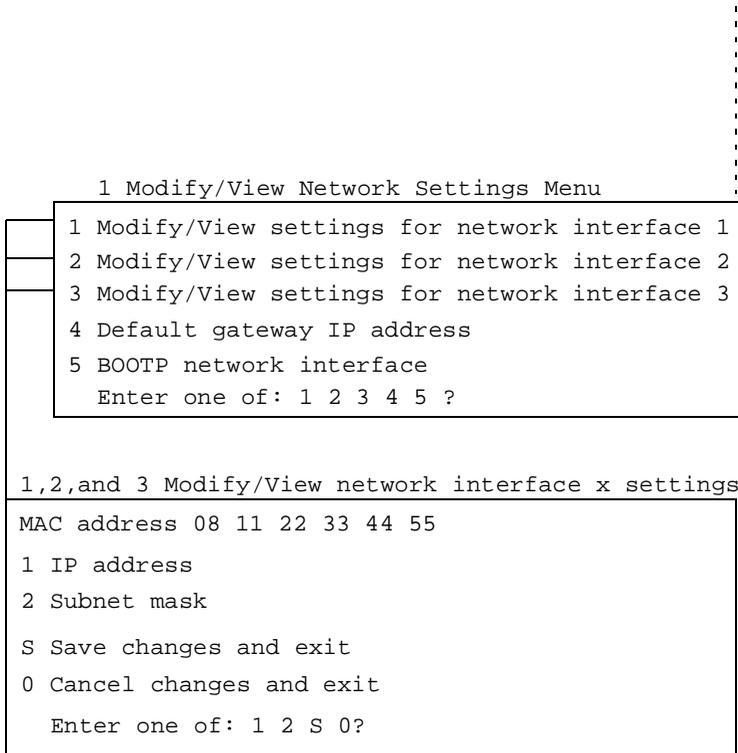


Figure 3-1. Configuration Menu Flow Chart (Continued)

The following sections provide examples of each configuration menu. Each section also contains a table describing the menu options.

Modifying Configuration Menu Values

The configuration menus contain options that enable you to:

- ❑ Display additional configuration menus
- ❑ Display and modify configuration values

To display a menu from within a menu, type the number of the option and press **Return**.

To display or modify a value from a configuration menu:

1. Type the number of the option you want to display or modify and press **Return**. The configuration menus have a timeout value of 2 minutes. Therefore, you must enter a keystroke to a menu within 2 minutes or the following message displays and the module automatically warm-starts.

```
Keyboard input timeout.  
Module warm started and config system exited.
```

2. To modify configuration menu values, delete one character at a time using the Backspace key. To delete the entire value, press **Ctrl-U**. When you press Ctrl-U, **<CANCEL>** appears at the end of the current value to verify that the current value is canceled.
3. Enter the new value and press **Return**.
4. Select **S** to save changes and exit the current menu, or **0** (zero) to cancel changes and exit the current menu. Exiting a current menu brings you up one menu level. When you return to the Main menu, you must select either a warm or cold start to re-initialize the RMON MultiProbe Module.
5. To re-initialize the RMON MultiProbe Module, select option 3 for a *warm* start or select option 4 for *cold* start.

(Refer to the section Re-initializing the RMON MultiProbe Module later in this chapter for information on the effects of warm and cold starts.)

Using the Main Configuration Menu

Use the Main configuration menu to:

- Display the Modify/View Configuration Values menu
- Download new firmware
- Initiate a warm or cold start

To display the Main configuration menu:

1. Press the front panel Reset button to re-initialize the module.
2. Hold down the **X** key within 15 seconds of powering up or resetting the module.
3. If you miss the 15-second window, press the Reset button to re-initialize (warm start) the module.
4. When you hold down the **X** key, diagnostics are terminated and the following banner is displayed:

```
Tests interrupted!  
Boot System Version x.xx for Ethernet RMON  
MultiProbe, Rev x  
Built on Thu April x, 17:36:58 EST 199x
```

```
Loading configuration system.  
Entering configuration system. Please  
wait.....
```

The Main configuration menu appears (Figure 3-2).

```
Main menu Rev x.xx (Rev x.x)

1 Modify/View configuration values ->

2 Download new firmware ->

3 Warm start and Exit

4 Cold start and Exit

Enter one of: 1 2 3 4 ?
```

Figure 3-2. Main Configuration Menu

The configuration menus for options 1 and 2 are described in the following sections. Options 3 and 4 are described in the section Re-initializing the RMON MultiProbe Module later in this chapter.

Table 3-1 describes the Main menu options.

Table 3-1. Main Configuration Menu Description

Option	Result
1. Modify/View configuration menu	Displays the Modify/View Configuration Value menu. For a description of this menu, refer to the section Using the Modify/View Configuration Value Menu later in this chapter.
2. Download new firmware	Downloads new firmware to FLASH memory. For a description of this menu, refer to the section Using the Download Menu later in this chapter.
3. Warm start and Exit	Warm-starts the module and exits the menu system.
4. Cold start and Exit	Cold-starts the module and exits the menu system.

Using the Download Menu

Use the Download menu to:

- ❑ Configure the RMON MultiProbe Module for a software download
- ❑ Display the current IP address and subnet mask for each interface

To display the Download menu, select option 2 from the Main configuration menu.

Figure 3-3 is an example of the Download menu.

```
Download Menu Rev x.xx

1 Filename to download ->
/chome/spe/onown/rmon_mod/mar06/ax3_field.rom.cf.1.20

2 tftp server IP address ->                               151.104.3.6

3 Download to firmware ->

4 Temporary download

0 Return to previous menu

IP address 1:                                             151.104.6.7
Subnet mask 1:                                           255.255.255.0
IP address 2:                                             151.104.7.8
Subnet mask 2:                                           255.255.255.0
IP address 3:                                             151.104.8.9
Subnet mask 3:                                           255.255.255.0
Default gateway IP address:                               151.104.6.1
Enter one of: 1 2 3 4 0 ?
```

Figure 3-3. Download Menu

Table 3-2 describes the Download menu options.

Table 3-2. Download Menu Description

Option	Result
1. Filename to download	Displays the pathname of the file to download and enables you to enter a new value. The filename can be a maximum of 127 characters. If the download file: <ul style="list-style-type: none"> <input type="checkbox"/> Resides in the /tftpboot directory of the server, you only need to enter the filename. <input type="checkbox"/> Does not reside in the /tftpboot directory, you must entire the complete directory path.
2. TFTP Server IP address	Displays the TFTP server IP address and enables you to enter a new value.
3. Download to firmware	Initiates a download to FLASH memory.
4. Temporary download	Initiates a download to RAM. This option enables you to run and verify the new software before you initiate a download to FLASH memory. After being reset, the module reverts to the software contained in FLASH memory.
0. Return to previous menu	Closes the current menu and returns to the Main menu.

Using the Modify/View Configuration Values Menu

Use the Modify/View Configuration Values menu to:

- ❑ Set module values (such as date and time)
- ❑ Display the Modify/View Network Settings menu
- ❑ Display the Modify/View Serial Port Settings menu

To display this menu, select option 1 from the Main configuration menu.

Figure 3-4 is an example of the Configuration Values menu.

```
Modify/view configuration values menu Rev N.NN

Memory configuration 8M bytes
Three ethernet network interfaces

1 Modify/View network settings
2 Autodiscovery echo interval (secs)                1800
3 Date                                               Sat 1/28/1995
4 Time                                               22:45:05
5 Timezone                                           PST
6 Modify/View serial port settings

S Save changes and exit
0 Cancel changes and exit

Enter one of: 1 2 3 4 5 6 S 0 ?
```

Figure 3-4. Modify/View Configuration Values Menu

Table 3-3 describes the Configuration Values menu options.

Table 3-3. Modify/View Configuration Values Menu Description

Option	Result
1. Modify/View network settings	Displays the Modify/View Network Settings menu. For a description of this menu, refer to the section Using the Modify/View Network Settings menu.
2. Autodiscovery Echo Interval	Displays the Autodiscovery Echo Interval and enables you to enter a new interval (in seconds) after which the RMON MultiProbe Module sends an Internet Control Message Protocol (ICMP) echo request to the default gateway.
3. Date	Displays the date and enables you to enter a new value. Use the format: mm/dd/yyyy. Changes are saved immediately and cannot be canceled. To correct an error, re-enter the date.
4. Time	Displays the time and enables you to enter a new value. Use the format hh:mm:ss. Changes are saved immediately and cannot be canceled. To correct an error, re-enter the time.
5. Timezone	Displays the time zone and enables you to enter a new value (for example, EST, GMT).
6. Modify/View Serial Port settings	Displays the Serial Port Configuration menu containing the current serial port settings. For a description of this menu, refer to the section Using the Serial Port Configuration menu later in this chapter.

**Table 3-3. Modify/View Configuration Values Menu
Description (Continued)**

Option	Result
S Save Changes and Exit	Saves all changes to the configuration menu to non-volatile memory and returns to the Main menu.
0 Cancel Changes and Exit	Cancels changes to the configuration menu and returns to the Main menu.

Note: All configuration settings except for the Autodiscovery Echo Interval field value are preserved after a cold start.

Using the Modify/View Serial Configuration Values Menu

Use the Modify/View Serial Configuration Values menu to configure the module RS-232 serial port to run Serial IP (SLIP):

- Over a direct link
- Using a modem

The Serial IP feature enables the RMON MultiProbe Module and a network management workstation to communicate when a network link is not available.

To display this menu, select option 6 from the Modify/View Configuration Values Menu and press **Return**. The Serial Configuration Values menu is displayed with factory-default settings for the serial port (Figure 3-5).

Figure 3-5 is an example of the Serial Configuration Values menu options.

```
Modify/view serial configuration values menu Rev N.NN

1 Serial port IP address                187.187.187.193
2 Serial port subnet mask              255.255.255.192
3 Serial port speed                    9600
4 Serial port mode                    Direct

5 Modem Init String                   ^s^MATEOQ0V1X4 S0=1 S2=43^M^d2
6 Modem Hangup String                 ^d2^s+++^d2^s^ATH0^M^d2
7 Modem Connect Responses
/CONNECT/300/CONNECT 1200/1200/CONNECT
2400/2400/CONNECT 4800/4800/CONNECT
9600/9600/CONNECT 14400/14400/CONNECT
19200/19200/CONNECT 38400/38400/
8 Modem No-Connect Responses
/NO CARRIER/BUSY/NO DIALTONE/NO ANSWER/ERROR/

S Save changes and exit
0 Cancel changes and exit

Enter one of: 1 2 3 4 5 6 7 8 S 0 ?
```

Figure 3-5. Modify/View Serial Configuration Values Menu

Table 3-4 describes the Serial Configuration Values menu options.

**Table 3-4. Modify/View Serial Configuration Values
Menu Description**

Option	Result
1 Serial Port IP Address	Displays the serial IP address of the RMON MultiProbe Module and enables you to enter a new IP address.
2 Serial Port Subnet Mask	Not used.
3 Serial Port Speed	Displays the serial port speed that sets the baud rate used by the serial interface and enables you to enter a new value. Valid values: 1 = 300 2 = 1200 3 = 2400 4 = 4800 5 = 9600 6 = 14400 7 = 19200 8 = 38400
4 Serial Port Mode	Display the serial connection value which indicates whether or not the connection is direct or is using a modem and enables you to enter a new value. Valid values: 1 = direct 2 = modem 3 = direct with hardware flow control 4 = modem with hardware flow control

**Table 3-4. Modify/View Serial Configuration Values
Menu Description (Continued)**

Option	Result
5 Modem Init String	Display the modem init string and enables you to enter a new value. In modem mode, this string initializes the modem.
6 Modem Hangup String	Displays the modem hangup string and enables you to enter a new value. In modem mode, this string hangs up the modem.
7 Modem Connect Response	Displays the modem connect response and enables you to enter a new value. In modem mode, this string contains valid modem connect responses and the baud rate to which the serial port should be set.
8 Modem No Connect Response	Displays the modem no connect response and enables you to enter a new value. In modem mode, this string lists the modem connection failure response codes.
S Save Changes and Exit	Saves changes to the serial port configuration menu to non-volatile memory and returns to the Modify/View Configuration Values menu.
0 Cancel Changes and Exit	Cancels changes to the configuration menu and returns to the Modify/View Configuration Values menu.

Note: All serial configuration information is preserved after a cold start.

Modem Init Strings and Hangup Strings

This section describes the format of the modem:

- ❑ Init Strings
- ❑ Hangup Strings

To allow the RMON MultiProbe Module to communicate with a modem or a serial data switch, use the modem Init String and Hangup String. The strings contain embedded commands to control how the module interacts with a remote device through the serial interface. Commands are represented as 2-character sequences beginning with the ^ character.

Table 3-5 describes the modem Init Strings and Hangup Strings that the RMON MultiProbe Module supports.

Note: Command characters are case-sensitive.

Table 3-5. Modem Init Strings and Hangup Strings

Command	Result
^s	Sends string that follows, which is terminated by the next command or the end of string.
^c	Delays for the number of seconds that follows. Discard any data received instead of storing it in a buffer for parsing.
^t	Sets timeout to the value represented by the decimal digits that follow. The default timeout is 20 seconds. The timeout may be overridden by a smaller serial Timeout configured for the associated serial interface.

Table 3-5. Modem Init Strings and Hangup Strings (Continued)

Command	Result
<code>^w</code>	Waits for the reply string that follows which is terminated by the next command or the end of string. Partial and case insensitive matching is applied (that is, if the RMON MultiProbe Module finds the reply string [any case combination] anywhere in the received string, the match is found). If the current timeout elapses without a match, the module ignores the remaining control string.
<code>^!</code>	The <code>^</code> character.
<code>^d</code>	Delays the number of seconds specified by the decimal digits that follow.
<code>^b</code>	Sends break for the number of milliseconds specified by the decimal digits that follow. If no digits follow, break is enforced for 250 ms by default.

You may insert the following ASCII control characters into the `^s` send string or the `^w` reply string:

<code>^@</code>	0x00
<code>^A</code>	0x01
<code>^M</code>	0x0D
<code>^Z</code>	0x1A
<code>^[</code>	0x1B
<code>^\</code>	0x1C
<code>^]</code>	0x1D
<code>^^</code>	0x1E
<code>^_</code>	0x1F

You may also insert binary data into the data stream using the following control sequence for each byte of binary data: **^Ox##** (where ## is the hexadecimal representation of the data byte).

Two ASCII characters (0-9, a-f, A-F) must follow the **^Ox** control prefix. For example, **^Ox0D^Ox0A** is interpreted as a carriage return followed by a line feed.

Modem Response Strings

This section describes the modem response string formats:

- Connect Response Strings
- No Connect Response Strings

Connect Response - An ASCII string that contains substrings that describe the expected modem connection response code and associated bps rate. The substrings are delimited by the first character in the string.

The following connect response string example is interpreted in Table 3-6.

```
CONNECT/300/CONNECT 1200/1200/CONNECT  
2400/2400/CONNECT 4800/4800/CONNECT 9600/9600
```

Table 3-6. Connect Response String Example

Response code	Bps rate
CONNECT	300
CONNECT1200	1200
CONNECT 2400	2400
CONNECT 4800	4800
CONNECT 9600	9600

The RMON MultiProbe Module uses the information in this string to adjust the bps rate of the serial interface once you establish a modem connection.

No Connect Response - An ASCII string that contains response codes generated by a modem to report the reason for a connection attempt failure. The response codes are delimited by the first character in the string.

For example:

```
/NO CARRIER /BUSY/NO DIALTONE/NO ANSWER/ERROR/
```

If the RMON MultiProbe Module receives one of the response codes on its serial interface while attempting to make a modem connection, the module issues the hangup command as specified by modem Hangup String.

Using the Modify/View Network Settings Menu

Use the Modify/View Network Settings menu to:

- Display the Modify/View Network Interface Settings menu for each interface
- Display and modify the module default gateway
- Display and modify the BOOTP network interface

To display this menu, select option 1 from the Modify/View Configuration Values menu.

Figure 3-6 is an example of the Modify/View Network Settings menu.

```
Modify/View Network Settings Menu
1 Modify/View settings for network interface 1
2 Modify/View settings for network interface 2
3 Modify/View settings for network interface 3
4 Default gateway IP address                151.104.3.6
5 BOOTP network interface                    1
S Save changes and exit
0 Cancel changes and exit
Enter one of: 1 2 3 4 5 S 0?
```

Figure 3-6. Modify/View Network Settings Menu

Table 3-7 describes the Modify/View Network Settings menu options.

Table 3-7. Modify/View Network Settings Menu Description

Option	Result
1 Modify/View settings for network interface 1	Displays the Modify/View Network Interface 1 Settings menu. For a description of this menu, refer to the section Using the Modify/View Network Interface Settings menu later in this chapter.
2 Modify/View settings for network interface 2	Displays the Modify/View Network Interface 2 Settings menu. For a description of this menu, refer to the section Using the Modify/View Network Interface Settings menu later in this chapter.
3 Modify/View settings for network interface 3	Displays the Modify/View Network Interface 3 Settings menu. For a description of this menu, refer to the section Using the Modify/View Network Interface Settings menu later in this chapter.
4 Default gateway IP address	Displays the default gateway IP address for the module and enables you to enter a new value.
5 BOOTP network interface	Displays the network interface configured for BOOTP and enables you to enter a new value.

**Table 3-7. Modify/View Network Settings Menu Description
(Continued)**

Option	Result
S Save Changes and Exit	Saves all changes made to the configuration menu to non-volatile memory and returns to the Modify/View Configuration Values menu.
0 Cancel Changes and Exit	Cancels changes made to the Configuration menu and returns to the Modify/View Configuration Values menu.

Using the Modify/View Network Interface Settings Menus

Each interface has a Modify/View Network Interface Settings menu. Use the interface menus to:

- Display the module MAC address
- Display and modify the interface IP address
- Display and modify the interface subnet mask

To display a Modify/View Network Interface Settings menu for an interface, select option 1, 2, or 3 from the Modify/View Network Settings menu.

Figure 3-7 is an example of the Modify/View Network Interface 1 Settings menu

```
Modify/View Network Interface 1 Settings Menu

MAC address 08 11 22 33 44 55

1 IP address                151.104.6.7
2 Subnet mask                255.255.255.0

S Save changes and exit

0 Cancel changes and exit

Enter one of: 1 2 S 0?
```

Figure 3-7. Modify/View Network Interface 1 Settings Menu

Table 3-8 describes the Modify/View Network Interface Settings menu options.

Table 3-8. Modify/View Network Interface Settings Menu Description

Option	Result
1 IP address	Displays the interface IP address and enables you to enter a new value.
2 Subnet Mask	Displays the interface subnet mask and enables you to enter a new value.
S Save Changes and Exit	Saves all changes made to the Interface menu to non-volatile memory and returns to the Modify/View Network Settings menu.
0 Cancel Changes and Exit	Cancels changes made to the Interface menu and returns to the Modify/View Network Settings menu.

Configuring the Module and Interfaces

Before the RMON MultiProbe Module can become operational, you must configure the following parameters for the module and interfaces:

- ❑ IP address (for each interface)
- ❑ Subnet mask (for each interface)
- ❑ Default gateway (for the module)

Assigning the Interface IP Address and Subnet Mask

You must assign a unique IP network address for each interface.

For example, if you do not bridge the three interfaces, you could assign IP addresses for a subnetted class B network as shown in the following IP address examples:

Note: In both of the IP address examples, each interface has a subnet mask of 255.255.255.0.

- ❑ Interface 1 - 151.104.36.7
- ❑ Interface 2 - 151.104.37.8
- ❑ Interface 3 - 151.104.38.9

For example, if you bridge the three interfaces, the network portion of the IP addresses can be identical as shown in the following IP address examples:

- ❑ Interface 1 - 151.104.36.7
- ❑ Interface 2 - 151.104.36.8
- ❑ Interface 3 - 151.104.36.9

This configuration sets up one interface for each bridged segment.

To assign an IP address or subnet mask for an interface:

1. From the Main menu, select option 1, Modify/View Configuration Values, and press **Return**. The Modify/View Configuration Values menu is displayed (see Figure 3-4).
2. From the Modify/View Configuration Values menu, select option 1, Modify/View Network Settings, and press **Return**. The Modify/View Network Settings menu is displayed (see Figure 3-6).
3. From the Modify/View Network Settings menu, select option 1, 2, or 3 (depending on which interface you want to modify) and press **Return**. The Modify/View Network Interface 1 Settings menu is displayed (Figure 3-7).
4. To assign:
 - a. An IP address, select option 1. The module displays the current value and prompts you to enter a new value.
 - b. A subnet mask, select option 2. The module displays the current value and prompts you to enter a new value.
5. To modify an IP address or subnet mask, delete one character at a time using the Backspace key. To delete the entire value, press **Ctrl-U**.
6. Enter the new value and press **Return**.
7. Select S to save the changes and return to the previous menu.
8. Repeat steps 3 through 7 to assign an IP address and subnet mask for each interface.

Assigning the Module Default Gateway

You must assign a default gateway for the RMON MultiProbe Module.

To assign a default gateway:

1. From the Main menu, select option 1, Modify/View Configuration Values, and press **Return**. The Modify/View Configuration Values menu is displayed (see Figure 3-4).
2. From the Modify/View Configuration Values menu, select option 1, Modify/View Network Settings, and press **Return**. The Modify/View Network Settings menu is displayed (see Figure 3-6).
3. From the Modify/View Network Settings menu, select option 4 and press **Return**. The module displays the current default gateway and prompts you to enter a new value.
4. Enter the new default gateway.
5. To save the changes and return to the previous menu, select **S**.

Using BOOTP to Configure the Module and Interfaces

This section describes:

- ❑ BOOTP Description
- ❑ BOOTP Configuration Process
- ❑ BOOTP Requirements
- ❑ Using BOOTP

BOOTP Description

BOOTP (Bootstrap Protocol) is a UDP/IP-based (User Datagram Protocol/Internet Protocol) broadcast protocol which allows a device to configure itself dynamically without user intervention. Use BOOTP to download configuration information from a BOOTP server to the RMON MultiProbe Module interface configured for BOOTP.

BOOTP Configuration Process

During initialization, the RMON MultiProbe Module verifies that the IP address and subnet mask of the interface configured for BOOTP is not set to null (all zeros). If either the IP address or subnet mask are null, the module automatically sends out BOOTP requests every 60 seconds through the designated BOOTP interface until it receives a valid BOOTP response. If the default gateway is originally set to null, the BOOTP server also supplies the module with gateway information.

The response from the BOOTP server supplies the RMON MultiProbe Module with its network parameters. When BOOTP obtains valid addresses, the module stores the parameters in battery-backed RAM and becomes operational.

The RMON MultiProbe Module defaults to interface 1 for a BOOTP server. Because only one interface at a time can be used with BOOTP, you can only download configuration information to the interface configured for BOOTP.

To configure other interfaces, use the Modify/View Network Settings configuration menu to change the BOOTP network interface.

BOOTP Requirements

The BOOTP server must perform the following functions:

- Map hardware addresses to IP addresses
- Respond to BOOTP requests from clients
- Support the vendor-specific subnet mask and default gateway fields

Using BOOTP

To use BOOTP, add the following information to the BOOTP server bootptab configuration file:

- MAC address** - Hardware address of the RMON MultiProbe Module interface to be configured
- IP address** - IP address for the module interface
- Subnet mask** - Subnet mask for the module interface
- Default gateway** - Default gateway for the RMON MultiProbe Module

For additional information on BOOTP configurations, refer to your server documentation.

Sample BOOTPtab file

A sample bootptab file is shown on the next page. If necessary, create this file on the BOOTP server.

```

# /etc/bootptab: database for bootp server (/etc/bootpd)
# Blank lines and lines beginning with '#' are ignored.
#
# Legend:
#
#   first field -- hostname
#   (should be full domain name)
#
#   hd -- home directory
#   bf -- bootfile
#   cs -- cookie servers
#   ds -- domain name servers
#   gw -- gateways
#   ha -- hardware address
#   ht -- hardware type
#   im -- impress servers
#   ip -- host IP address
#   lg -- log servers
#   lp -- LPR servers
#   ns -- IEN-116 name servers
#   rl -- resource location protocol servers
#   sm -- subnet mask
#   tc -- template host (points to similar host entry)
#   to -- time offset (seconds)
#   ts -- time servers
# Define a global entry which specifies the information every host uses.
#
global.dummy:\
:hd=/tftpboot:bf=null
# Define different master entries for each subnet. . .

default:vm=rfc1048:hd=/tftpboot:bf=" null":sm=255.255.255.0:

js-test-64:ip=151.104.15.2:\
  ht=ethernet:\
  ha=081122334455:\
  gw=151.104.15.1:\
  tc=default

```

Assigning Interfaces to Networks

To assign RMON MultiProbe Module interfaces to networks, you can use either:

- ❑ DIP switch settings, if your hub is unmanaged (an ONline or ONcore management module is not installed in the hub).
- ❑ ONline or ONcore network management commands (if an ONline or ONcore management module is installed in the hub).

You can assign the three RMON MultiProbe Module network interfaces as follows:

- ❑ Interface 1 to Ethernet 1 or Isolated
- ❑ Interface 2 to Ethernet 2 or Isolated
- ❑ Interface 3 to Ethernet 3 or Isolated

Note: Each interface can only be configured to its corresponding Ethernet network or isolated (that is, Interface 1 to Ethernet 1, Interface 2 to Ethernet 2, Interface 3 to Ethernet 3).

Using the DIP Switch to Assign Networks

If you have an unmanaged hub, use the DIP switch on the module to assign networks to the RMON MultiProbe Module interfaces. However, the DIP switch settings are ignored if the following two conditions are met:

- ❑ A network management module is installed in the hub.
- ❑ The master management module has DIP_CONFIGURATION disabled.

The RMON MultiProbe Module contains an 8-position DIP switch (SW1). This DIP switch allows you to configure and enable the three RMON MultiProbe Module interfaces to the corresponding Ethernet networks.

Figure 3-8 shows the DIP switch location on the module

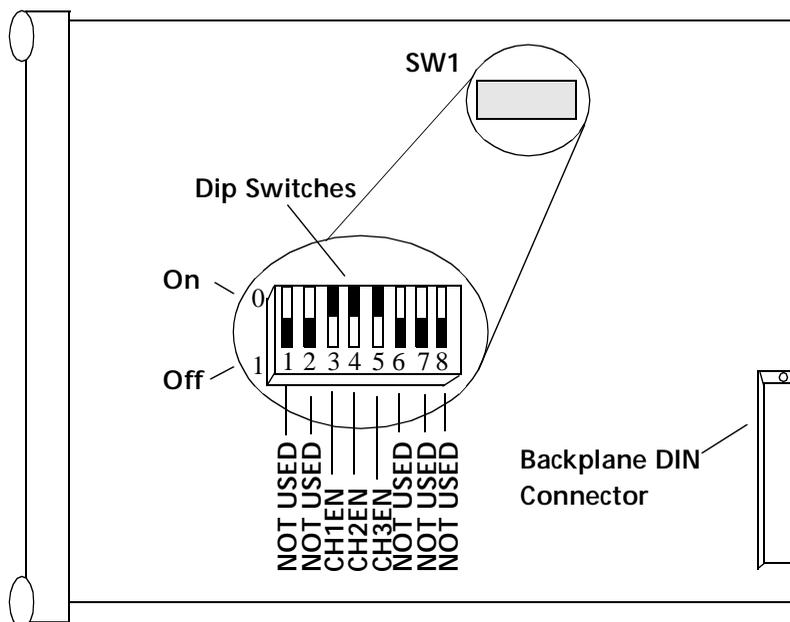


Figure 3-8. DIP Switch Location

Table 3-9 describes the positions of the DIP switches required to configure and enable the RMON MultiProbe Module interfaces to corresponding Ethernet networks. As the table shows, switches 1, 2, 6, 7, and 8 are not used.

Table 3-9. Network Selection DIP Switch Settings

Switch Setting	Network Selection	
	ON	OFF
1	Reserved	
2	Reserved	
3	Ethernet 1	Isolated
4	Ethernet 2	Isolated
5	Ethernet 3	Isolated
6	Reserved	
7	Reserved	
8	Reserved	

Using Management Commands to Assign Interfaces to Networks

With a terminal attached to a 3Com management module console, you can use management commands to assign the RMON MultiProbe Module interfaces to networks.

The following 3Com network management modules enable you to assign interfaces to networks:

- ❑ Online Ethernet Management Module (EMM) (Version V4.20)
- ❑ ONcore Distributed Management Module (DMM) (Version V2.10)

To configure all other RMON MultiProbe Module parameters (such as IP address, subnet mask, and serial configurations), use the RMON MultiProbe Module configuration menus.

Examples of the management commands for assigning networks are discussed here briefly. For additional information on management commands, refer to the appropriate management module commands guide.

Note: Management commands that refer to ports are applicable to the RMON MultiProbe Module interfaces. (For example, the SET PORT and SHOW MODULE_PORT commands apply to the module interfaces.)

Management Command Examples

To assign interface 1 on the RMON MultiProbe Module in slot 7 to Ethernet 1, use the following network management command:

```
SET PORT 7.1 NETWORK ETHERNET_1
Port 07.01 network id set to ETHERNET_1.
```

To assign interface 1 to isolated, use the following command:

```
SET PORT 7.1 NETWORK ISOLATED
Port 07.01 network id set to ISOLATED.
```

To assign interface 3 on the RMON MultiProbe Module in slot 7 to Ethernet 3, use the following network management command:

```
SET PORT 7.3 NETWORK ETHERNET_3
Port 07.03 network id set to ETHERNET_3.
```

You cannot assign an interface to a network other than its corresponding network. For example, a management module aborts the following command:

```
SET PORT 7.3 NETWORK ETHERNET_1
Port 3 can only be set to ETHERNET_3 or
ISOLATED: command aborted.
```

Saving Network Assignments

After you make configuration changes to the module, issue the `SAVE MODULE_PORT` command as shown to save the interface network configurations.

```
SAVE MODULE_PORT
```

Note: Failure to save the interface network configurations may result in loss of configuration data.

Showing Module and Interface Configurations

To display module and interface configuration information, use the following management commands:

- ❑ `SHOW MODULE`
- ❑ `SHOW PORT`

These commands are described below.

Show Module Command

The `SHOW MODULE` command enables you to display both brief (`no_verbose`) and verbose information about a particular module. Brief is the default.

The syntax of the `SHOW MODULE` command is:

```
SHOW MODULE {slot} {verbose}  
{no_verbose}
```

The following output is an example of the SHOW MODULE VERBOSE command issued for an RMON MultiProbe Module installed in slot 6 of an ONline System Concentrator:

```
ONline> show module 6 verbose
```

Slot	Module	Version	Network	General Information
06	RMON-EMP-3	Vx.xx	PER_PORT	Module is up

RMON-EMP-3: Ethernet RMON MultiProbe

Boot Version: vx.xx
Native Software Version: vx.xx
Native Boot Software Version: vx.xx

Show Port Command

The SHOW PORT command enables you to display brief and verbose information on an individual interface or on all interfaces.

The syntax of the SHOW PORT command is:

```
SHOW PORT {slot.port} {verbose}  
          {slot.all}  {no_verbose}
```

The following output is an example of the SHOW PORT ALL command issued for a module installed in slot 6:

```
ONline> show port 6.all
```

Port Display for Module RMON-EMP-3:

Port	Mode	Status	Network	General Information
06.01	LOGICAL	OKAY	ETHERNET_1	
06.02	LOGICAL	OKAY	ETHERNET_2	
06.03	LOGICAL	OKAY	ETHERNET_3	

The following output is an example of the SHOW PORT VERBOSE ALL command issued for a module installed in slot 6:

```
ONline> show port 6.all verbose
```

```
Port Display for Module RMON-EMP-3:
```

Port	Mode	Status	Network	General Information
06.01	LOGICAL	OKAY	ETHERNET_1	
Port Connector:			BACKPLANE	
IP Address:			151.104.6.28	
Station Address:			08-11-22-33-44-59	
06.02	LOGICAL	OKAY	ETHERNET_2	
Port Connector:			BACKPLANE	
IP Address:			151.104.16.2	
Station Address:			08-11-22-33-44-5A	
06.03	LOGICAL	OKAY	ETHERNET_3	
Port Connector:			BACKPLANE	
IP Address:			151.104.17.2	
Station Address:			08-11-22-33-44-5B	

Re-initializing the RMON MultiProbe Module

Once you install and configure the RMON MultiProbe Module and it has successfully completed its diagnostics, the module functions without user intervention. You can re-initialize the module by performing one of the following actions:

- ❑ Issue the RESET MODULE command from the management module (performs a warm start)
- ❑ Press the front panel Reset button (performs a warm start)
- ❑ Initiate one of the following starts from the Main configuration menu:
 - Warm start
 - Cold start

The effects of warm and cold starts are discussed below.

Warm-Starting the RMON MultiProbe Module

When you re-initialize the RMON MultiProbe Module by initiating a warm start (for example, by pressing the Reset button), all collected information stored in the module Random Access Memory (RAM) is lost. Configuration information, however, is not lost. Table 3-10 lists the information preserved and lost upon a warm start of the module.

Table 3-10. RMON MultiProbe Module Information Preserved and Lost on Warm Start

Information Preserved	Information Lost
All installed filter and channel tables	Captured Packets
Buffer Control Table	Counted Packets
History Control Table	Historical Ethernet Statistics
Alarm Table	Current Ethernet Statistics
Event Table	Matrix Tables
Community Access Table Entries	Host Top N Tables
Client Table Entries	Host Tables
Module Configuration Entries (IP Address, Subnet Mask)	Logs
TFTP Server Address	
Download Filename	
Time Zone	
Serial Port Configuration Information	
Serial Connection Table	
Trap Destination Table	

Cold-Starting the RMON MultiProbe Module

When you re-initialize the RMON MultiProbe Module by initiating a cold start (for example, by selecting option 4 from the Main Configuration menu), all network management information is lost, with the exception of the following interface and module configuration information:

- ❑ IP address (for each interface)
- ❑ Subnet mask (for each interface)
- ❑ Default gateway (for the module)

Table 3-11 lists the information that is preserved and lost upon a cold start of the module.

Table 3-11. RMON MultiProbe Module Information Preserved and Lost on Cold Start

Information Preserved	Information Lost
Module Configuration Information (IP Address, Subnet Mask, Default Gateway)	Community Access Table Entries (reverts to defaults)
TFTP Server Address	Client Table Entries (reverts to defaults)
Download Filename	Packet Capture Filters
Time Zone	Captured Packets
Serial Port Configuration Information	Counted Packets
	Historical Ethernet Statistics
	Current Ethernet Statistics
	Host Tables
	Matrix Tables

Table 3-11. RMON MultiProbe Module Information Preserved and Lost on Cold Start (Continued)

Information Preserved	Information Lost
	Host Top N Tables
	Logs
	Alarm Table
	Filter Table
	Channel Table
	Buffer Control Table
	Event Table
	Serial Connection Table
	Trap Destination Table

4 *Troubleshooting*

This chapter provides hardware troubleshooting information which you can use if the RMON MultiProbe Module fails to operate correctly. If after reviewing the information in this chapter you cannot correct the problem, contact your 3Com representative for further assistance.

This chapter contains the following sections:

- ❑ Troubleshooting Startup Problems
- ❑ Troubleshooting Malfunctions
- ❑ Troubleshooting Network Connectivity Problems
- ❑ Technical Assistance

Troubleshooting Startup Problems

This section describes how to troubleshoot startup problems by monitoring the Interface Status LEDs and the Module Status LED on the RMON MultiProbe Module faceplate.

When you first install the RMON MultiProbe Module in the hub, the module runs the following diagnostics:

- ❑ SRAM Data Bus
- ❑ SRAM Address Bus

The Interface Status LEDs display a pattern during the execution of each diagnostic test. The patterns correspond to the test as indicated in Table 4-1.

Table 4-1. Diagnostic Tests and Interface Status LEDs

Diagnostic	Interface 1 Status LED	Interface 2 Status LED	Interface 3 Status LED
SRAM Data Bus	On	Off	Off
SRAM Address Bus	Off	On	Off

If the SRAM Data Bus or SRAM Address Bus diagnostics fail, the pattern of the failed diagnostic remains on the Interface Status LEDs. If this occurs, contact the 3Com Customer Service Center for corrective action.

Troubleshooting Malfunctions

Table 4-2 lists the symptoms of operating malfunctions for the RMON MultiProbe Module and shows possible causes and corrective actions for these malfunctions.

Table 4-2. Troubleshooting Malfunctions

Symptom	Possible Cause	Corrective Action
Module Status LED does not illuminate or blink	An unrecoverable error in the module hardware or software has occurred.	Contact the 3Com Customer Service Center.
Module Status LED blinks continuously	Interprocessor failure.	Press the Reset button on the front panel to reset the module.
Module Status LED illuminates briefly and then remains off	68030 diagnostics failed.	Contact the 3Com Customer Service Center.
Module Status LED blinks continuously	i960 diagnostics failed.	Attach a terminal to the module RS-232 port. Reset the module. Note the failure code. Contact the 3Com Customer Service Center.

Table 4-2. Troubleshooting Malfunctions (Continued)

Symptom	Possible Cause	Corrective Action
Module does not power up	Module is not fitted correctly against backplane.	Remove the module from the slot and replace it in the slot. This action ensures that the module is fitted correctly.
		Place the module in a different slot in the hub.
	The hub is not receiving electrical power.	Check that the hub is receiving power.
		Test for power at the wall outlet by plugging in another device.
		Select another outlet on a different circuit if necessary.
	Module is unable to communicate with hub backplane.	Reset the RMON MultiProbe Module through the management module or press the Reset button on the RMON MultiProbe Module front panel.

Table 4-2. Troubleshooting Malfunctions (Continued)

Symptom	Possible Cause	Corrective Action
Attached terminal does not operate	The terminal is malfunctioning.	Follow the troubleshooting procedures recommended by the terminal manufacturer.
	Cables are unattached.	Make sure that the cable connections at both ends are secure.
	Cables are not the correct type.	Make sure that the cable attached to the terminal conforms to the specification as described in Appendix A, Specifications, the section titled Connectors and Cables.
	The terminal is configured incorrectly.	Check the console port configuration. Verify that the terminal is configured as 8-bit data, no parity, 1 stop bit, and 9600 baud rate.

Table 4-2. Troubleshooting Malfunctions (Continued)

Symptom	Possible Cause	Corrective Action
The terminal fails to respond to commands entered at the keyboard	The terminal is not receiving commands.	Power off the terminal, wait 30 seconds, and then power it on again.
	The keyboard cable is attached incorrectly.	If the terminal still does not respond to commands, power off the terminal and disconnect the keyboard cable. Then reattach the keyboard cable and power on the terminal.
	The RS-232 port is malfunctioning.	Check the state of the Serial Activity LED on the module faceplate (see Figure 2-3). If the LEDs indicate a problem, contact your 3Com representative for assistance.
		Verify the RS-232 port configuration using the RMON configuration menus. Ensure the RS-232 port is configured to 9600 baud, 8-bit, no parity, and 1 stop bit.

Table 4-2. Troubleshooting Malfunctions (Continued)

Symptom	Possible Cause	Corrective Action
The terminal fails to respond to commands entered at the keyboard (continued)	The RS-232 cable pinouts are wired incorrectly or the cable is defective.	Try a different RS-232 cable. Refer to Appendix A, Specifications, for information on RS-232 cable pinouts.
	The terminal is malfunctioning.	Repair or replace the terminal.
Panic message appears on the terminal	Module parameters are lost from NVRAM.	Contact the 3Com CustomerSupportCenter.

Troubleshooting Network Connectivity Problems

If the RMON MultiProbe Module does not appear to be transmitting or receiving traffic properly on the network, it could indicate that there is no connection to the network. Try performing one or more of the following troubleshooting actions:

- ❑ From the 3Com management interface (for example, ONline management module), verify that the RMON MultiProbe Module interfaces are set to the appropriate networks.
- ❑ Using the RMON MultiProbe Module configuration menus, verify that the following terminal parameters are set correctly:
 - IP address
 - Subnet mask
 - Default gateway

For terminal configuration information, refer to Chapter 2, Installing the Module, the section Connecting a Terminal.

- ❑ Use the ping utility to confirm there is network connectivity.
- ❑ Verify that the Ethernet configuration is valid. Refer to the documentation that accompanied the Ethernet media modules for more information.

If the RMON MultiProbe Module responds to pings, but not to SNMP, verify that the RMON client software community string matches the RMON MultiProbe Module community string default value. The RMON MultiProbe Module default community name is **admin**. (Community names are case-sensitive.) The **admin** community name provides read-write access.

Note: You can only modify the community name using the RMON client software.

Technical Assistance

You can receive assistance for installing and troubleshooting the Ethernet RMON MultiProbe Module by calling either your 3Com reseller or 3Com Technical Support. Be prepared to supply a representative with the following information:

- Description of the problem
- Steps you have taken to try and correct the problem
- Type and software version of the ONline network management module being used
- Version of software installed on your Ethernet RMON MultiProbe Module
- Status of the front panel LEDs
- Configuration of your concentrator
(you may find it helpful to refer to the Slot Usage Chart in Appendix B of the *ONline System Concentrator Installation and Operation Guide* for a record of this information)
- Status of powerup diagnostics

Refer to Appendix B for instructions on contacting Technical Support for your product.

A *Specifications*

This appendix lists specifications for the 3Com RMON MultiProbe Module, including:

- ❑ Electrical Specifications
- ❑ Environmental Specifications
- ❑ Mechanical Specifications
- ❑ General Specifications
- ❑ Connectors and Cables
- ❑ Memory Configuration Allocation

Electrical Specifications

Power Requirements	+5 V +/- 4% +12 V +/- 5% 2.5 A for +5 V 0.008 A for + 12 V
Fuse	4.0 A Fast Blow for +5 V 0.5 A Fast Blow for +12 V
Consumption	13 watts

Environmental Specifications

Operating Temperature	0° to 40° C (32° to 122° F)
Storage Temperature	-30° to 65° C (22° to 149° F)
Humidity	Less than 95%, noncondensing
BTU/hr	44.37
MTBF/hr	119,563

Mechanical Specifications

Width	1.0"
Length	10.275"
Height	8.5"
Weight	1.25 lbs

General Specifications

RMON Processor	Intel™ 960CF 33 Mhz processor 128 KB Boot Flash 512 KB Application Flash 8 MB DRAM SIM supported 128 KB NVRAM (Battery Backed SRAM)
Network Processor	Motorola® 68302 16 Mhz processor 512 KB Flash (Boot and Application) 512 KB SRAM
Special Circuits	Real Time Clock Per Port Correlation capability
Ethernet Interface 1	Ethernet 1 or Isolated
Ethernet Interface 2	Ethernet 2 or Isolated

Ethernet Interface 3	Ethernet 3 or Isolated
Configuration	Using SLIP, BOOTP, inband and out-of-band management

Connectors and Cables

Use the information in this section to ensure that the cables and connecting hardware meet requirements. For proper operation, use only approved cables when you install all equipment.

This section describes:

- ❑ RS-232 25-Pin Port Connector Pinouts
- ❑ RS-232 Crossover Cable for a Terminal With a 25-Pin Connector
- ❑ RS-232 Straight-Through Cable for a PC With a 9-Pin Connector
- ❑ Modem Cable Pinouts

RS-232 25-Pin Port Connector Pinouts

This section describes the serial port pinouts for the RS-232 25-pin connector on the RMON MultiProbe Module faceplate. Table A-1 lists the pinouts for the RS-232 25-pin connector.

Table A-1. RMON MultiProbe Module RS-232 25-Pin Port Connector Pinouts

Pin	US	CCITT	DIN
1	CHS GND	101	
2	Tx	103	D1
3	Rx	104	D2
4	RTS	105	S2
5	CTS	106	M2
6	DSR	107	M1
7	GND	102	
8	DCD	109	M5
20	DTR	108	S1
22	RI	125	M3
23	SR	111	

Note: The RMON MultiProbe Module asserts pins 20 and 4 continuously. Pins 20 and 4 are de-asserted only when the serial line is hung up in a modem connection.

RS-232 Crossover Cable for a PC or Terminal

This section describes pinouts for an RS-232 crossover cable when you connect a PC or terminal to the RMON MultiProbe Module. The RMON MultiProbe Module end of the cable is a 25-pin female connector.

Figure A-1 represents the minimum pinouts required for a crossover cable

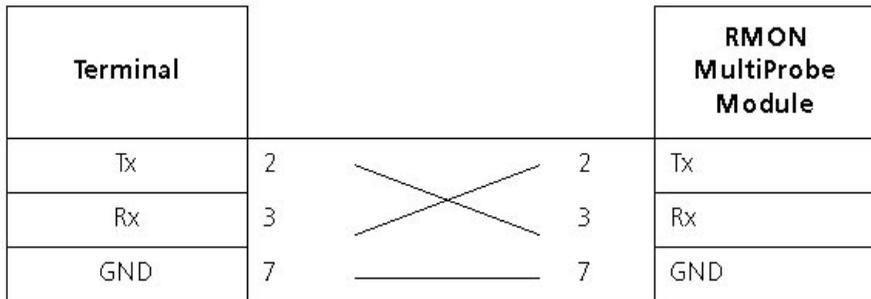


Figure A-1. RS-232 Crossover Cable for a Terminal With a 25-Pin Connector

Modem Cable Pinouts

You can connect a modem to the RMON MultiProbe Module to allow a remote client to have out-of-band access to the module if the main network link fails. For example, you can access the RMON MultiProbe Module using Serial Line Internet Protocol (SLIP).

From a management workstation (such as one using the 3Com ONdemand LANsentry™ software), you can physically connect the RMON MultiProbe Module to any of the following devices:

- Modem
- Data switch
- Serial line

Sample Out-of-Band Connections

Figure A-2 provides two examples of out-of-band connections to the RMON MultiProbe Module in an ONline System Concentrator with the following connections:

- Modem
- Direct SLIP

The modem that you connect to the RMON MultiProbe Module must be Hayes-compatible.

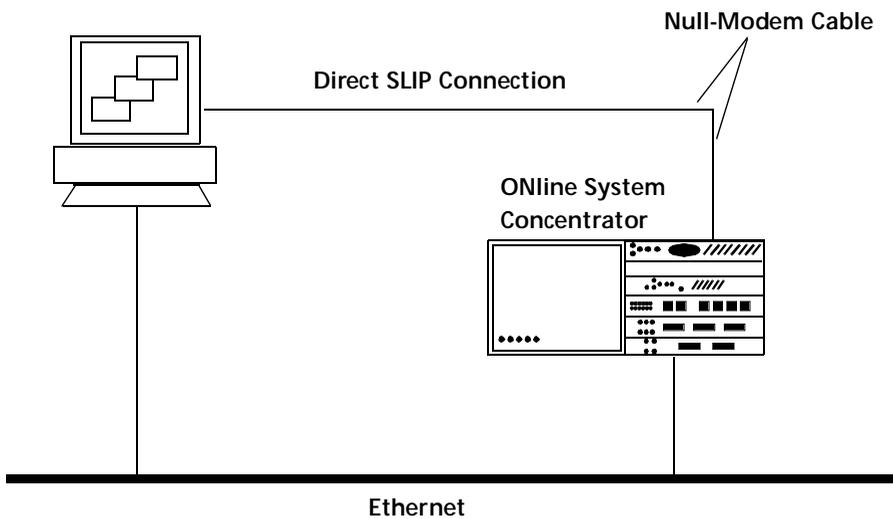
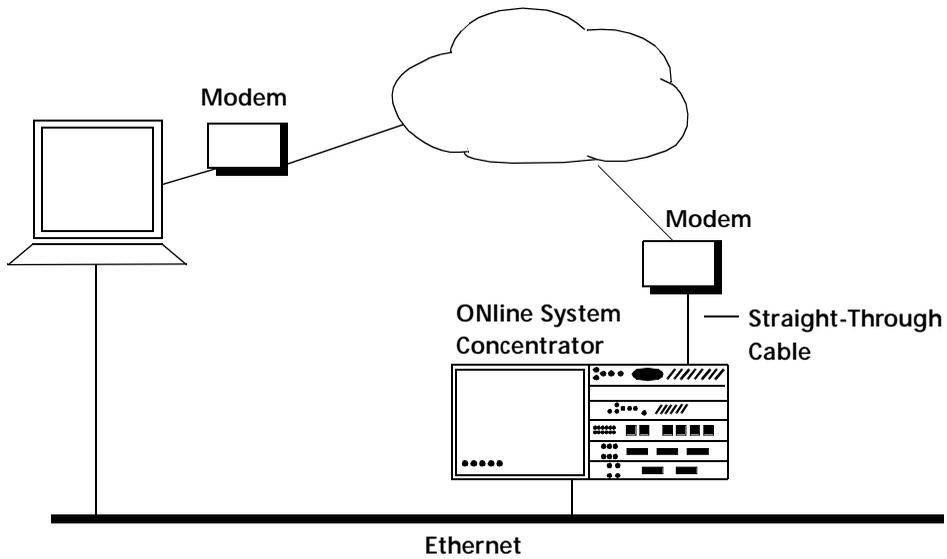


Figure A-2. Out-of-Band Connections to the RMON MultiProbe Module

Using the RMON MultiProbe Module SLIP Address

To communicate with the RMON MultiProbe Module, the client software must use the RMON MultiProbe Module local SLIP address as the module destination IP address. For information on configuring a SLIP route to a device, refer to the workstation UNIX® manual.

Over a SLIP connection, the RMON MultiProbe Module supports the following configuration:

- Various baud rates (refer to the Serial Configuration menu in Chapter 3, Configuring the Module).
- 8-bit
- No parity
- 1 stop bit

RS-232 Straight-Through Cable

Table A-2 represents the minimum pinouts required for an RS-232 straight-through cable. The modem end of the cable is a 25-pin male connector. The RMON MultiProbe Module end of the cable is a 25-pin female connector.

Table A-2. RS-232 Straight-Through Cable Pinouts

Modem		RMON MultiProbe Module
2	(Tx)	2
3	(Rx)	3
4	(RTS)	4
5	(CTS)	5
6	(DSR)	6
7	(GND)	7
8	(DCD)	8
20	(DTR)	20
22	(RI)	Not connected
23	(SR)	Not connected

RS-232 Null-Modem Cable

Figure A-3 represents the minimum pinouts required for an RS-232 null-modem cable. The terminal end of the cable is a 25-pin female connector. The RMON MultiProbe Module end of the cable is a 25-pin female connector.

PC or Terminal		RMON MultiProbe Module
2	TX	2
3	RX	3
4	RTS	4
5	CTS	5
6	DSR	6
8	DCD	8
20	DTR	20
7	GND	7

Figure A-3. RS-232 Straight-Through Cable Pinouts

Memory Configuration Allocation

This section describes how the 8 MB of RAM shipped with the RMON MultiProbe Module is allocated for each Ethernet table.

Table A-3 lists the maximum number of entries for each Ethernet table.

Table A-3. Maximum Number of Entries for Ethernet Tables

Ethernet Table	Maximum Number of Entries
hostTopN entries	10
historyControl entries	10
alarm entries	60
event entries	150
filter entries	60
channel entries	40
bufferControl entries	16
commAccess entries	20
client entries	20
trapDest entries	300
serialConnect entries	20
log table entries	2800
host table entries	4000
matrix table entries	18,000

B

Technical Support

3Com provides easy access to technical support information through a variety of services. This appendix describes the following services:

- On-line Technical Support
- Support from Your Network Supplier
- Support from 3Com
- Returning Products for Repair
- Accessing the 3Com MIB
- 3Com Technical Publications

On-line Technical Support

3Com offers worldwide product support through the following on-line systems:

- Email Technical Service
- World Wide Web Site

Email Technical Support

You can contact the Integrated Systems Division (formerly Chipcom) on the Internet for technical support using the e-mail address techsupp@chipcom.com.

World Wide Web Site

You can access the latest networking information on the 3Com World Wide Web site by entering our URL into your Internet browser:

<http://www.3Com.com/>

This service features news and information about 3Com products, customer service and support, the 3Com latest news releases, selected articles from 3TECH™, the 3Com award-winning technical journal, and more.

You can contact the Integrated Systems Division on the World Wide Web by entering our URL into your Internet browser:

<http://www.chipcom.com/>

There are links between both WWW pages to view information from all 3Com divisions.

Support from Your Network Supplier

If additional assistance is required, contact your network supplier. Many suppliers are authorized 3Com service partners who are qualified to provide a variety of services, including network planning, installation, hardware maintenance, application training, and support services.

When you contact your network supplier for assistance, have the following information ready:

- ❑ Diagnostic error messages
- ❑ A list of system hardware and software, including revision levels
- ❑ Details about recent configuration changes, if applicable

If you are unable to contact your network supplier, see the following section on how to contact 3Com.

Support from 3Com

If you are unable to receive support from your network supplier, technical support contracts are available from 3Com.

For direct access to customer service for Integrated Systems Division products in:

- ❑ U.S.A. and Canada - call (800) 724-2447
- ❑ Asia Pacific - call (508) 787-5151
- ❑ Europe - refer to the table below. For European countries not listed, call 31 30 60 299 00

Country	Telephone Number	Country	Telephone Number
Belgium	0800 71429	Netherlands	06 0227788
Denmark	800 17309	Norway	800 11376
Finland	0800 113153	Spain	900 983125
France	05 917959	Sweden	020 795482
Germany	0130 821502	U.K.	0800 966197
Ireland	1 800 553117	U.S.	800 876-3266
Italy	1678 79489		

For access to customer service for all 3Com products, call (800) 876-3266.

You can also contact the Integrated Systems Division (ISD) on the Internet by using the e-mail address techsupp@chipcom.com.

Returning Products for Repair

A product sent directly to 3Com for repair must first be assigned a Return Materials Authorization (RMA) number. A product sent to 3Com without an RMA number will be returned to the sender unopened, at the sender's expense.

To obtain an RMA number for Integrated Systems Division products (formerly Chipcom), use the following numbers.

Country	Telephone Number	Fax Number
U.S. and Canada	(800) 724-2447	(508) 787-3400
Europe	(44) (1442) 275860	No Fax
Asia Pacific	(508) 787-5296	(508) 787-3400

Accessing the 3Com MIB

The 3Com Management Information Base (MIB) for the Integrated Systems Division describes commands that enable you to manage 3Com SNMP-based products. The MIB is available over the Internet on an anonymous FTP server. Updates to these MIBs are released as new 3Com products are introduced.

To access Internet versions:

1. FTP to `ftp.chipcom.com` (151.104.9.65).
2. Enter the login name `anonymous`.

3. Enter your full Internet e-mail address as the password (for example, `jdoe@company.com`).
4. Change to the mib or schema directory using the `cd /pub/mibs` or `cd /pub/mibs/schemas` command.
5. To view the 3Com MIB, OID, or schema entries, enter the `dir` command.
 - ❑ To pause the display, press [CTRL-S].
 - ❑ To continue the display, press [CTRL-Q].
6. Copy the MIB, OID, or schema files to your current directory using the appropriate command (for example, `get chipcom.mib`).
7. To exit the FTP session, invoke the `quit` command.

3Com Technical Publications

If you have comments or questions on 3Com Integrated Systems Division Technical Publications documents, please contact the Technical Publications group by FAX (508) 229-1551.

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