

PremNet™ High-Performance Ethernet I/O Module

Installation and Operation

PND850074-1/A 3/97

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About This Manual

Manual Description

The *PremNet High-Performance Ethernet I/O Module Installation and Operation Manual* provides information you need to properly configure, test, and manage High-Performance Ethernet I/O Modules installed in your PremNet network. This manual covers the High-Performance Ethernet I/O Module and the High-Performance Ethernet Bridge I/O Module. This manual has been written with the assumption that you are familiar with basic data communications and networking principles.

The manual is composed of the following sections:

- **Chapter 1 - Overview** provides an introduction to the High-Performance Ethernet I/O Module and the High-Performance Ethernet Bridge I/O Module.
- **Chapter 2 - Installation and Configuration** describes the procedure to use when you add or replace Ethernet I/O modules.
- **Chapter 3 - Ethernet Module Command Menu** describes the options available to manage, configure, and test the High-Performance Ethernet I/O Module.
- **Chapter 4 - Ethernet Bridge Module Command Menu** describes the options available to manage, configure, and test the High-Performance Ethernet Bridge Module.

For further information about the PremNet Broadband Access System, refer to the following manuals:

- *PremNet Broadband Access System Installation and Operation Manual* for information about how to install and configure the PremNet 5000 and PremNet Branch chassis.
- *PremNet 5000 Multi-Ring Network Administrator's Guide* for information about multi-ring networks.

Terminology and Conventions

The following conventions are implemented throughout this manual to aid you in determining what messages are being displayed by the asynchronous terminal versus what you, as an operator, have to input.

Text displayed by the terminal, except what is displayed in screen figures, is shown in this typeface:

Login

Keyboard characters in brackets indicate that you must press a special keyboard key such as [RETURN] or [CTRL].

Characters that must be input by you exactly as indicated are shown in this bold typeface:

Y

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FCC Part 15: Radio/Television Interference

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications to this equipment not expressly approved by Racal-Datacom can void the user's authority to operate this equipment.

For FCC CFR 47 Part 15 compliance, Racal-specified shielded interconnecting cables or their equivalent must be used. See the installation instructions in this manual for Racal part numbers for these cables.

Special Notice

The instructions in this manual involving actions with the device and requiring a tool* for access, must be performed only by qualified service personnel.

- * A tool is defined as any implement used to facilitate a mechanical operation, such as operating a fastener or similar fixing device.

Chaque fois que le manuel d'instructions recommande d'utiliser un outil* pour effectuer une opération à l'intérieur du dispositif, cette opération doit absolument être confiée à un personnel de service qualifié.

- * Un outil est défini tout dispositif utilisé pour faciliter une opération mécanique, p.ex., le fonctionnement d'un organe de fixation ou autre dispositif semblable.

Notice to Canadian Users

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus as set out in the Radio Interference Regulations of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la Class A prescrites dans le règlement sur le brouillage Radioélectrique édicté par le Industrie Canada.

Do not perform internal service or adjustment to the equipment unless another person, capable of rendering first aid and resuscitation, is present.

Do not substitute parts or perform any unauthorized modification to the equipment. Return the equipment to a Racal-Datacom Sales and Service Office for service and repair to ensure that the safety features are maintained.



CAUTION

Two power cords provided. Disconnect both power cords prior to servicing.



VORSICHT

Zwei Netzkabel vorhanden. Vor Öffnen des Gehäuses beide Netzkabel ziehen.



CAUTION

This system contains electrostatic sensitive devices.



VORSICHT

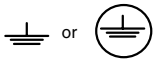
Dieses System enthaelt empfindliche Bauteile!
Achtung fuer Elektrostatischer Aufladung!

Safety Symbols

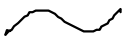
The following safety symbols are used on the equipment:



Indicates that the user should refer to the instruction manual in order to protect against damage to the equipment.



Indicates that the equipment must be connected to ground before operating.



Indicates alternating current power (power line).

Non-Connection Declaration

Equipment which can be connected to the public communications network but is not meant for this purpose (in accordance with article 2, guideline 91/263/EEC) must be provided with the following EC-marking (in accordance with article 11, section 4, guideline 91/263/EEC). See Figure 1.



Figure 1. EC-Marking for Pseudo-Telecommunication Peripherals

Note: Do not connect the PremNet 5000 or the PremNet Branch Broadband Multiplexer system to the public telecommunications network.

The connection of such equipment to a public telecommunications network in a Community Member State is in violation of the national law implementing Directive 91/263/ECC on the approximation of the laws of that Members States concerning telecommunications terminal equipment, including the mutual recognition of their conformity.

Laser Light Warning!

The following warnings relate to modules that utilize Laser Diode Transmitters:

DANGER
LASER LIGHT - AVOID DIRECT EYE EXPOSURE.

CAUTION
LASER LIGHT - DO NOT STARE INTO BEAM.

DANGER
LASER LIGHT EMITTED FROM THIS MODULE
AVOID EXPOSURE.

CAUTION
USE OF CONTROLS OR ADJUSTMENTS OR
PERFORMANCE OF PROCEDURES OTHER THAN THOSE
SPECIFIED HEREIN MAY RESULT IN HAZARDOUS
RADIATION EXPOSURE.

CAUTION
THE USE OF OPTICAL INSTRUMENTS WITH THIS
PRODUCT WILL INCREASE EYE HAZARD.

CLASS 1 LASER PRODUCT

Cable Installation Requirements

To meet FCC Part 15J requirements, you must perform the following steps before you can use your PremNet system.

When you connect a non-shielded RS-232 cable to a PremNet Network Management Module (NMM), a split ferrite core (Part No. 3C144-03SC) must be installed on the RS-232 cable. To install a split ferrite core on the cable, follow these steps:

1. Open the split ferrite core.
2. Place the RS-232 cable in one of the grooves on the split ferrite core. Make sure that the split ferrite core is as close as possible to the 25-pin connector that connects to the NMM.
3. Close the split ferrite core around the RS-232 cable, as shown in Figure 2.

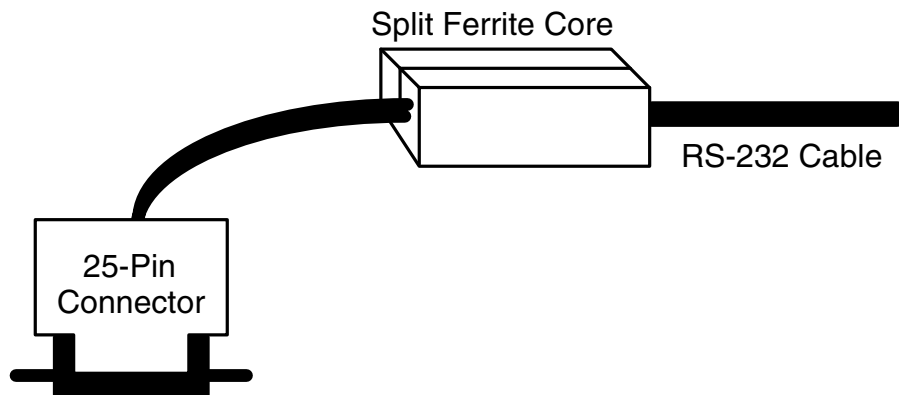


Figure 2. Split Ferrite Core Around RS-232 Cable

Racal-Datacom recommends that you use an RS-232 shielded cable with the PremNet RS-232 4-Port I/O Module.

When you connect an RS-232 cable to a PremNet RS-232 32-port I/O module, the RS-232 cable must be wrapped three times, with a 2-inch diameter (approximate). Secure the cable with tie wraps as close to the I/O module as possible (see Figure 3).

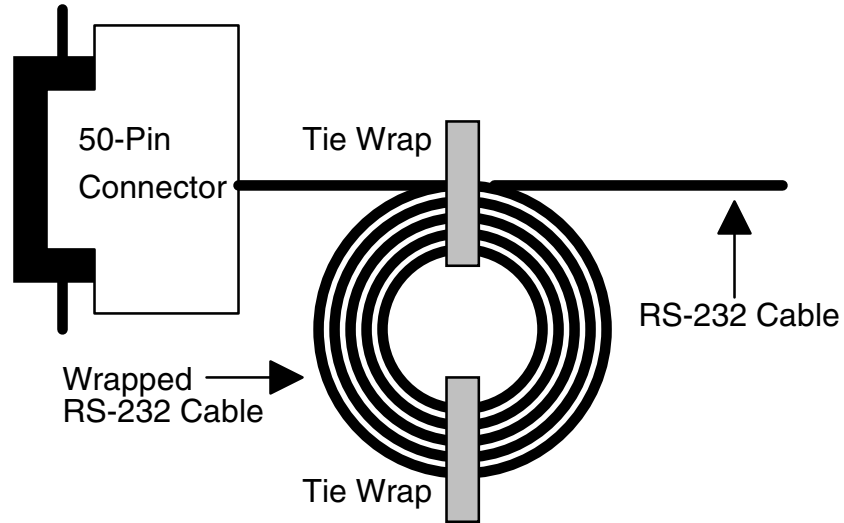


Figure 3. RS-232 Cable with Tie Wraps

When you connect a power cord to the 850007 or 850013 PremNet AC-power supply module, you must install a split ferrite core (Part No. 3C144-04SC) on the power cord. To install a split ferrite core, follow these steps:

1. Open the split ferrite core.
2. Place the cable in one of the grooves on the split ferrite core. Make sure that the split ferrite core is as close as possible to the input connector that connects to the AC-power supply.
3. Close the split ferrite core around the power cord, as shown in Figure 4.

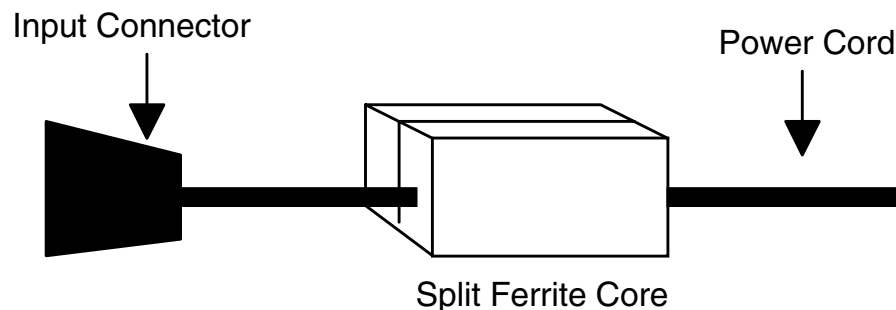


Figure 4. Split Ferrite Core Around Power Cord

Note: The 850014 and 850079 AC-power supply module does not require that you install a split ferrite core around the power cord.

Chapter 1

Overview

Introduction

High-Performance Ethernet I/O modules provide full-bandwidth connectivity among remote Ethernet segments that are connected through the PremNet system. This connection performs as if all connected devices were together on the same logical 10 Mbps network, even though the devices may be separated by long distances.

Two versions of the High-Performance Ethernet modules are available:

- | | | |
|---|--------|-------|
| • High-Performance Ethernet Module | 850074 | ID 33 |
| • High-Performance Ethernet Bridge Module | 850127 | ID 34 |

Both modules have two modes of operation: point-to-point and multipoint.

- Point-to-point mode is selected when only two modules are in a connection.
- Multipoint mode is selected when more than two modules are in a connection. However, the maximum number of High-Performance Ethernet modules that can be used in a connection is 32.

The modules can be configured to use either one, two, three, or four timeslots. However, you can use only four timeslots in point-to-point mode.

The number of timeslots available depends on the number of timeslots in the node (20 or 30) and the number of Ethernet modules in the node. The PremNet 5000 can have up to eight Ethernet I/O modules, and the PremNet Branch can have up to three. For example, a PremNet 5000 node with 20 timeslots can support eight modules configured with two timeslots each.

Ethernet throughput is based on the number of timeslots assigned and the fiber or coax delay of the backbone. Refer to the *PremNet Broadband Access System Installation and Operation Manual* for delay specifications.

The Repeater function is not implemented on these modules, as specified in IEEE 802.3 section 9, due to many microseconds of delay through the PremNet system transport and fiber interconnections. Therefore, the Ethernet frame is retimed at the destination output of each module in the system.

Ethernet Traffic Flow

Ethernet traffic flow through the PremNet system is handled as follows:

- Packets received from the local Ethernet network are moved through the PremNet system packet-by-packet to each of the other Ethernet I/O modules, where they can be transmitted on the segment attached to that module.
- As a packet arrives from the local network, it is stored in a buffer pending transmission onto the PremNet backbone and then to the next Ethernet I/O module connected in the virtual connection.
- In the queue with the packet are other packets received from the local network, as well as packets circulating in the virtual connection. The packet is transmitted to the next Ethernet I/O module in the virtual connection, where it is again stored in a buffer in its entirety.
- The packet from the backbone is queued for transmission on both the local segment and the fiber backbone. The buffer it occupies is not freed until the packet has been transmitted onto both the local segment and the fiber backbone.
- When the next I/O module in the circuit receives the packet, it is again stored, queued for transmission on that local segment, and queued to be forwarded to the next module. It continues in this manner until it arrives back at the module that originated it, where it is received, identified, and destroyed.
- This traffic flow applies to both High-Performance Ethernet modules, unless the bridge filtering option is used on the High-Performance Ethernet Bridge Module. Refer to the High-Performance Ethernet Module and the High-Performance Ethernet Bridge Module sections in this chapter.

Flow Control Mechanism

The peer-to-peer relationship between nodes on the network puts the module at a disadvantage, since all other nodes on the local network have the same priority. For this reason, the module incorporates mechanisms to regulate the instantaneous traffic demands presented by the other nodes on the network.

Each module maintains frame buffers that can store as many as 128 packets to smooth peak traffic demands. However, even though the overall system can absorb simultaneous instantaneous traffic bursts, it is merely masking a collision condition.

If repeaters were used rather than PremNet Ethernet I/O modules, these traffic bursts would be immediately accompanied by collisions, forcing the contending nodes to back off and retry.

To handle this situation, the system provides additional flow-control mechanisms to eliminate these temporary overloads. When the number of packets pending in a module's internal buffers exceeds a given threshold, the Ethernet nodes attached to the local network are forced into a wait state by the module's assertion of a pseudo-carrier sense (jam) on the network. This allows the module to transmit the accumulated packets the system has buffered, thus alleviating the congestion and preventing an internal overflow condition. It also notifies the nodes about the traffic congestion on the network, so that ultimately network administrators can observe the problem and reconfigure the network, if required.

Packet Delays

The latency imposed on Ethernet traffic passing through this system is a minimum of one packet time, due to store-and-forward of the packet as it is received by the first module, plus an additional store-and-forward delay for each other module in the system the packet must pass through. This additional delay is also dependent on the number of timeslots assigned to the virtual connection, as follows:

- 2.1 packet times for one timeslot
- 1.1 packet times for two timeslots
- 0.71 packet times for three timeslots

For example, in a system consisting of six Ethernet I/O modules using two timeslots, the minimum latency from one remote segment to another would be one packet time (from the first module) plus 1.1 packet times for each additional module it had to pass through to get to the other segment. This could range from 2.1 packet times to 6.5 packet times, depending on the relative positions of the segments within the virtual connection. Added delay will be incurred due to processing overhead, internal traffic congestion, and PremNet transport time (including fiber delay).

Figure 1-1 shows the faceplates of the High-Performance Ethernet I/O module (850074) and the High-Performance Ethernet Bridge I/O module (850127).

Note: Except for the part number, the faceplates are identical. Be careful when replacing modules.

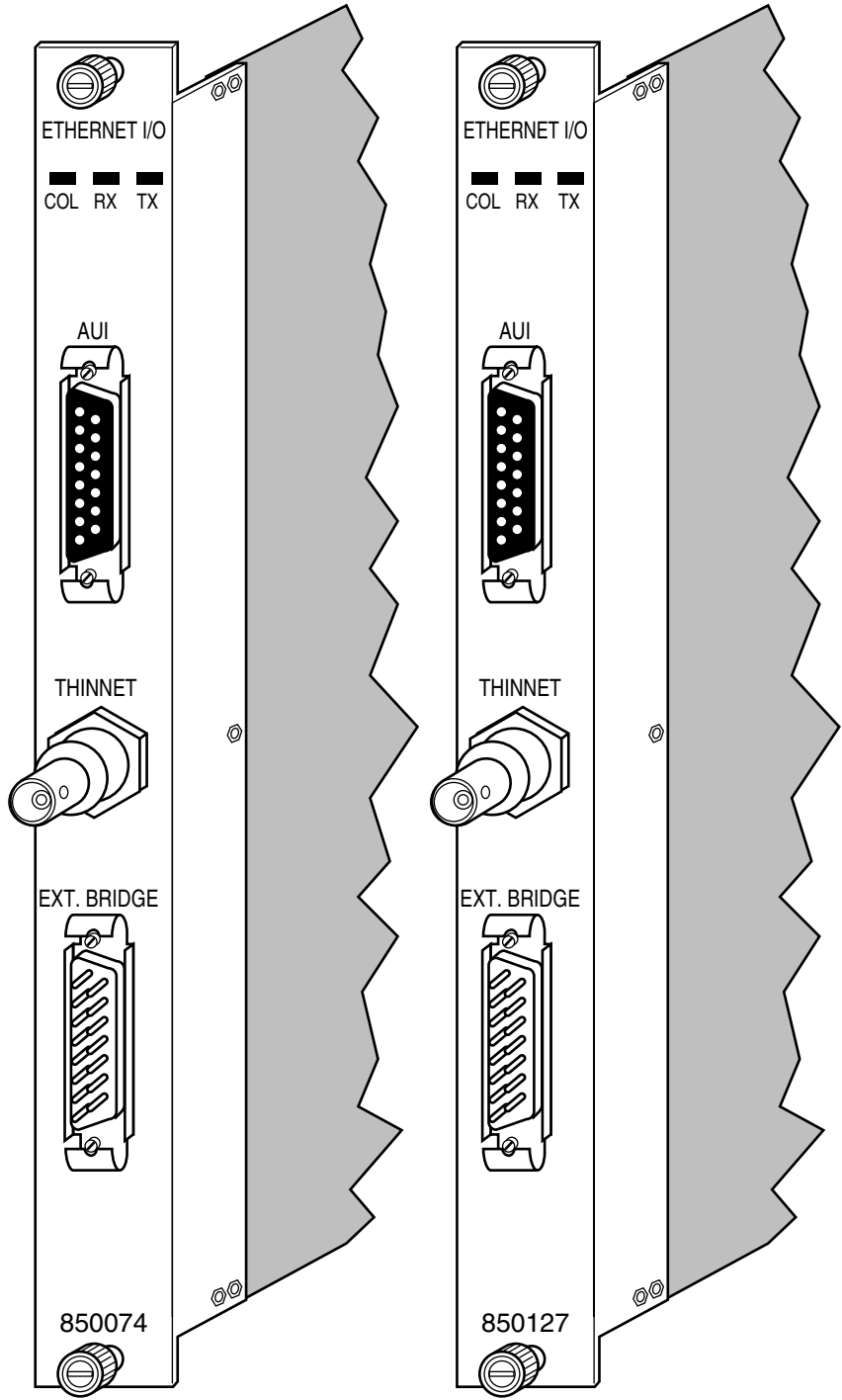


Figure 1-1. High-Performance Ethernet I/O Modules (Faceplates)

High-Performance Ethernet Module

This module is designed to act as a non-filtering bridge; that is, no processing or modification of the data takes place. Known erroneous frames are not forwarded; all others are sent to all destinations, with Ethernet cyclic redundancy checksum (CRC) preserved. Thus, errors are *firewalled* and do not propagate; also the original CRC indicates the quality of transport, just as with cable implementations.

Each segment connected to a High-Performance Ethernet I/O module carries all the traffic presented on all of the remote segments. The module performs like a bridge, by storing and forwarding packets, but also performs in some respects like a repeater, by regenerating all the traffic appearing on all the other segments in the network. Therefore, the module represents all of the other nodes in the network on its local segment.

The High-Performance Ethernet module is ideal for transparent LAN applications where the frames from one LAN are transported to all the other LANs in the PremNet network.

If there are three LANs on a PremNet ring, the frames originating on LAN 1 are transported around the ring to LAN 2 and LAN 3. The frames are removed by the High-Performance Ethernet module when they return to LAN 1. This ensures that all LANs receive the frames from the other LANs on the ring.

High-Performance Ethernet Bridge Module

As a transparent bridge, the Ethernet module examines all the frames received from the attached Ethernet segment and takes one of the following actions for each frame that it receives:

- If the frame has a group destination Media Access Control (MAC) address, the bridge forwards the frame on the backbone. This ensures that all stations attached to all remote segments will see multicast frames.
- If the frame has an individual MAC address, the Ethernet bridge module looks up the address in its MAC address table. If it finds the address and determines that it belongs to a station on the attached segment, it discards the frame and does not copy it to the backbone. If the address is not found in the table, the frame is copied to the backbone.

Upon receiving a frame from the backbone, the Ethernet Bridge I/O examines the MAC address for a match in its MAC address table. It copies frames to the attached segment only if it finds a match in the address table. If a match is not found, it simply copies the frame to the backbone and to the next module in the virtual connection. This continues until the frame reaches its destination. If no match is found on any attached segments, the frame is routed back to the originator of the frame, where it is discarded.

Since there is only one way to get to a destination segment — through the backbone — it is not necessary for the Ethernet Bridge module to learn all destination addresses. It only needs to know all locally attached MAC addresses. For cases where a station is moved from one segment to another, the learning capability described in “Building Address Tables” will resolve this situation.

The Ethernet Bridge module identifies alternate bridges attached to the segment and takes the necessary steps to forward activity to them if a break in the PremNet ring occurs.

Content Addressable Memory (CAM)

The Content Addressable Memory (CAM) is where Media Access Control (MAC) addresses are stored on the High-Performance Ethernet Bridge module.

CAM Operation

CAM operates in converse to Random Access Memory (RAM). Data is applied to the CAM input, and if the same data has been stored in the CAM, the address of that data is generated as a status word within a CAM read register.

When a compare operation is successful, a *match* output signal is generated after the *enable compare* cycle. The CAM allows parallel compare operations to all 1024 x 64 locations of the CAM within one cycle. The bridge module has two CAMs, making a total of 2048 memory locations.

CAM Aging

CAM Aging is the length of time in seconds that MAC addresses are held. This time is software-selectable. For example: If a MAC address has not been accessed in this predetermined length of time, it is purged from the CAM. This is to eliminate stations that are not active, because MAC addresses take up valuable space in the CAM.

Building Address Tables

When the Ethernet Bridge module is powered up and attached to a local Ethernet segment, its MAC address table is empty. It then builds its table, up to 2048 MAC addresses, by examining the source MAC address fields in all frames on the attached local Ethernet segment. MAC addresses are stored in this table for a user-selectable time.

If the Ethernet Bridge module does not receive any frames from a particular station, it removes the address from its table. This takes care of situations where the station may be turned off or removed from the segment. Further, this minimizes the amount of time it takes to look up a MAC address in the table (because the larger the table, the longer it takes to find an entry).

An example is shown in Figure 1-2. If PC-D sends data addressed to PC-A, PremNet Node 2 reads the destination MAC address and puts the data frames on the backbone. PremNet Node 3 receives these data frames and also reads the destination MAC address. However, the MAC address is not in its address table, because PC-A is not on the Ethernet segment of Node 3. Therefore, Node 3 puts the data frames from PC-D back on the backbone, but does not put the frames on the locally attached Ethernet segment.

PremNet Node A then receives the data frames from PC-D and reads the destination MAC address. Since the MAC address is on Node 1's segment, Node 1 passes the data to the segment and does not pass the data on to the backbone. PC-A receives its message.

Note: There could be a situation where a station is quiet for greater than 10 minutes. This causes its entry in the MAC address table to "age" out, thereby preventing frames from reaching it. For most protocols, this is not a problem. When adding a new Ethernet Bridge module, always force it to transmit a frame. This can be done by using the Ping command.

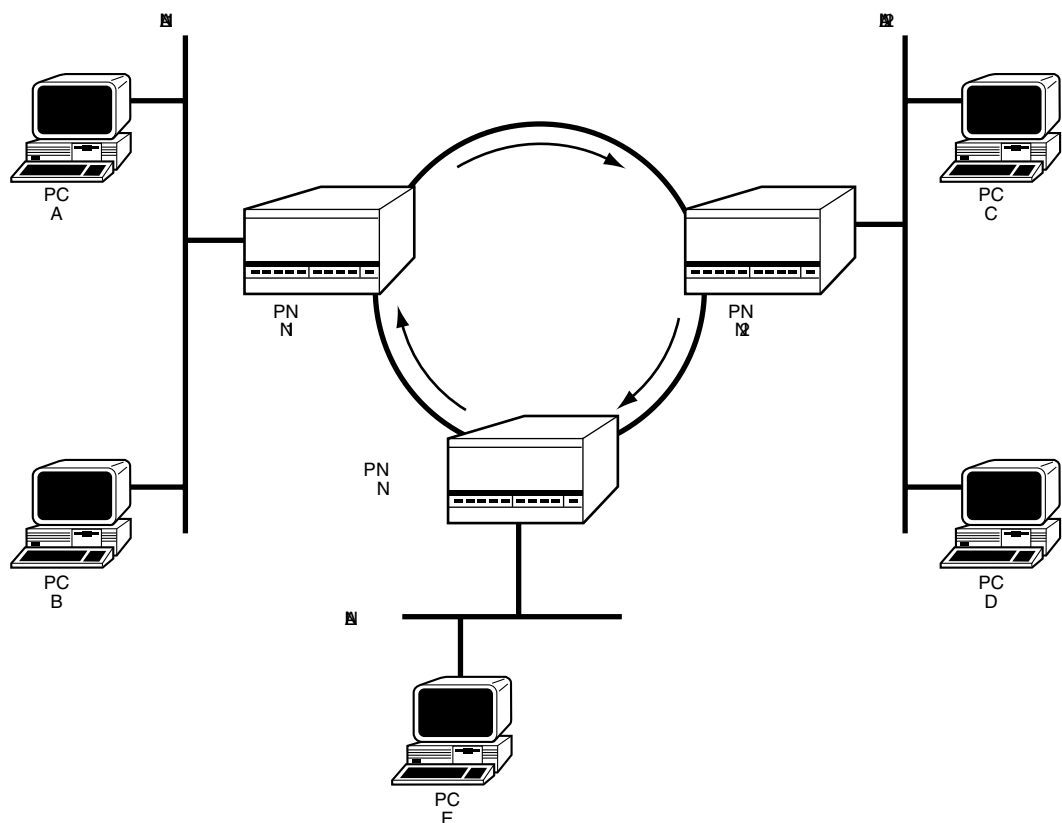


Figure 1-2. Ethernet Bridge Filtering

Redundant Bridges

Bridges are used to interconnect networks. Some network installations use redundant bridges. Figure 1-3 shows an example of this configuration. If PC-D sends a data frame to PC-A, and the PremNet ring is down, the Bridge 1/Bridge 2 forwards the frame to PC-A.

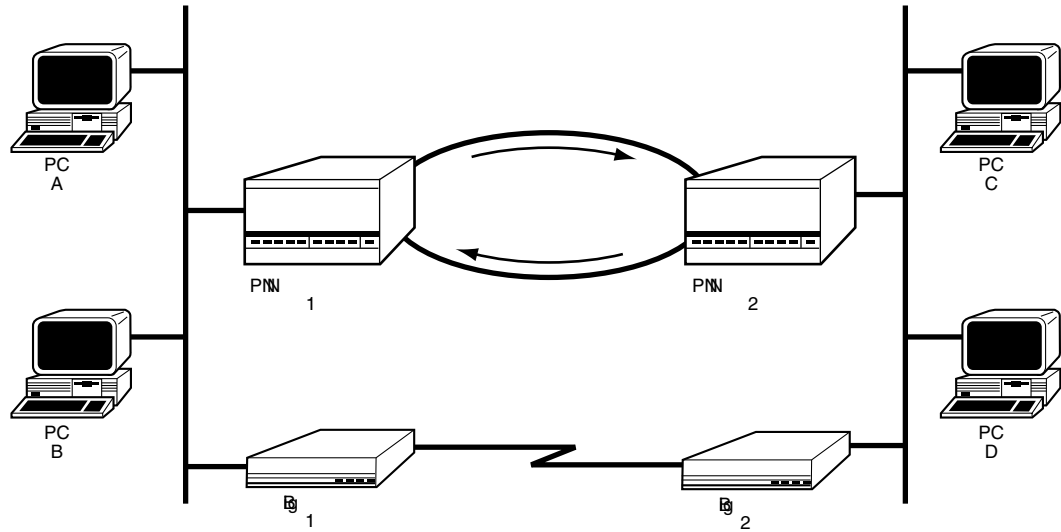


Figure 1-3. Redundant Bridges

LED Display

The LED status indicators for the Ethernet I/O Modules are on the front panel of the PremNet system node. Table 1-1 lists the panel LEDs, along with their meanings.

Table 1-1. Ethernet I/O Module Panel LED Meanings

LED	Meaning
Red	The module is in alarm.
Yellow	Standby. The module is in standby mode.
Green	The module is connected in a virtual connection.

The LEDs on the module faceplate of the PremNet system node indicate the presence of Ethernet traffic on the local segment. These LEDs are indicators only, and their relative brightness does not necessarily reflect the relative levels of received and transmitted traffic on the segment. Table 1-2 lists the LEDs and their meanings for these indicators.

Table 1-2. Ethernet I/O Module Traffic Indicator LED Meanings

LED	Meaning
COL (red)	Collisions are taking place on the local Ethernet segment. This LED may also be lit if the AUI port is connected to a device with SQE (Heartbeat) enabled.
RX (yellow)	Packets are being received from the local Ethernet segment.
TX (green)	Packets are being transmitted on the local Ethernet segment.

Interface Connections

The physical connections to the Ethernet I/O Module depend on the type of interface used. Ethernet I/O Modules provide three different types of connections to the local Ethernet segment:

- Attachment Unit Interface (AUI) Data Terminal Equipment (female DB15) for connection to a AUI-MAU (10Base-5)
- Thinnet coax interface (male BNC) for connection to a 10Base-2 segment

- Attachment Unit Interface (Ext. Bridge) (male DB15) for direct connection to a bridge or other device with an AUI-DTE port (10Base-5)

Table 1-3 lists the pin assignments for the AUI/MAU ports.

Table 1-3. AUI/MAU External Bridge Ports

Pin	Mnemonic	Signal Description	Direction
3	DO-A	Data Out Circuit A	To MAU
10	DO-B	Data Out Circuit B	To MAU
11	DO-S	Data Out Circuit Shield	
5	DI-A	Data In Circuit A	From MAU
12	DI-B	Data In Circuit B	From MAU
4	DI-S	Data In Circuit Shield	
7	CO-A	Control Out Circuit A	N/C
15	CO-B	Control Out Circuit B	N/C
8	CO-S	Control Out Circuit Shield	
2	CI-A	Control In Circuit A	From MAU
9	CI-B	Control In Circuit B	From MAU
1	CI-S	Control In Circuit Shield	
6	Vc	Voltage Common	To MAU
13	VP	Voltage Plus	To MAU
14	VS	Voltage Shield	
Shell	PG	Protective Ground	To MAU

Chapter 2

Installation and Configuration

Introduction

This section outlines the steps you must take to install the High-Performance Ethernet I/O Module or the High-Performance Ethernet Bridge Module into a PremNet chassis and establish a virtual connection.

Configure the I/O Modules using an asynchronous terminal connected to the RS-232 port of the Network Management Module (NMM) or the Enhanced Network Management Module (ENMM) in the desired chassis.

The I/O Modules can reside in any chassis. When a control function is required, the module with the lowest node number is assigned as the primary control module. Unless otherwise noted, all options discussed in this manual are accessed through the (S) Select interface module option on the **Node Command Menu** viewed on the terminal.

Preventing Electrostatic Discharge (ESD)

Before you install or remove parts of the PremNet system, you must be electrically grounded to prevent electrostatic discharge (ESD) damage to the modules.

To electrically ground yourself, complete the following steps:

1. Plug the power cord from the PremNet chassis into an appropriate power source.
2. Place an ESD wrist strap on your wrist.
3. Attach the end of the ESD wrist strap to exposed metal on the chassis or insert the banana connector at the end of the wrist strap into the jack labeled **CHASSIS GND** located at the lower right of the chassis.
4. Follow the instructions included with the wrist strap.

Installing and Removing Modules

This section describes how to install and remove modules from the PremNet chassis. You do not need to power down the node. Plug-in modules are secured in the PremNet chassis by spring-loaded screws located on the modules' front panels. The screws on the modules must be fastened securely to prevent electrostatic discharge (ESD).



Caution: Before you physically remove a module from a PremNet chassis, always delete the module's virtual-circuit connection through the Connection configuration (C) option on the Node Command Menu. Also, make sure the module is in "standby mode"(yellow LED on).

I/O Modules

The PremNet 5000 chassis contains eight slots for the placement of I/O modules. The slots are numbered 1 through 8, left to right, as viewed from the front. The PremNet Branch has three I/O slots. You can reinstall the I/O modules in any I/O slot in any node. Modules communicating with each other do not have to reside in the equivalent slot at the connected node.

Installation

To install an I/O module, complete the following steps:

1. Make sure you are electrically grounded (see ESD section).
2. Remove the module from its anti-static material.
3. Grasp the module bracket, and slide the module into a slot on the front of the PremNet chassis. Make sure the module is inserted into the plastic card guides at the top and bottom of the chassis.
4. Gently push the module in until it plugs into the connector on the backplane.

Note: The module goes into alarm condition (red LED On) for approximately 2 minutes before going into standby (yellow LED On).

5. Fasten the module to the front of the chassis by tightening the spring-loaded screws located at the top and bottom of the module bracket.

Removal

To remove a module, complete the following steps:

1. Make sure the module is not connected in a virtual circuit, and it is in standby mode (yellow LED On).
2. Loosen the two spring-loaded screws on the module bracket until they turn freely.
3. Grasp the screws and slide the module out of the chassis.
4. Place the module back into its anti-static material.

Configuration Procedure

This section outlines the basic configuration procedure you need to follow when you add a new Ethernet I/O module to a PremNet system node. The procedure is for both Ethernet modules. Refer to Chapter 3, “Ethernet Module Command Menu” for detailed instructions to configure the High-Performance Ethernet module. Refer to Chapter 4, “Ethernet Bridge Module Command Menu” for detailed instructions to configure the Ethernet Bridge module.

1. Check the module configuration.
 - a. Select the **Select interface module** option from the Node Command Menu of the node where the module is installed.
 - b. Select the **View configuration** option from the Ethernet Module Command Menu. The system displays the Ethernet Module Configuration Status screen, similar to Figure 2-1.

```
01,03: High-Perf. Ethernet > View Configuration
High-Perf. Ethernet Module Configuration Status:
=====
Node:                1
Channel:             5
Serial Number:       10741
Hardware Revision:   A
Software Revision:   01

Module Status:       ACTIVE without Alarms
Port Type:           AUI
Connection Type:     Multi-Point
Error Reporting:     SAMPLED
Backplane Timeslots: 3
Module Flow Control: ENABLED
Compatibility Mode:  850074-Standard
```

Figure 2-1. High-Performance Ethernet Module Configuration Status Screen

- c. Check the fields on the Configuration Status screen. They should contain the following values:

Module Status

This field should display ACTIVE without Alarms.

- If the status of the module is not active, the module has not been connected to a virtual connection. If there are alarms, there is a problem with the module or with the system that will have to be corrected before you can continue.

Port Type

This field can be either AUI, Thinnet, or Ext Bridge. If you select Thinnet, you must use proper termination for the port to work correctly.

- The fields in Table 2-1 should be the same for each module in a virtual connection. If they are not the same, select the Configuration option from the Module Command Menu and change the settings as required.

Table 2-1. View Configuration Fields

Field	Default	Selections
Connection Type	Multipoint	1. Multipoint 2. Point to Point
Error Reporting	Sampled	1. Totaled 2. Sampled
Backplane Timeslots	3	1, 2, 3, or 4
Module Flow Control	Disabled	1. Enabled 2. Disabled
Compatibility Mode	850074	1. 850038 2. 850067 3. 850074 Standard

- d. Repeat Step 1 for each new High-Performance Ethernet I/O or Ethernet Bridge module.
2. Establish a virtual connection.
 - a. Use the Connection configuration option from the Node Command Menu. You can connect up to 32 High-Performance Ethernet I/O Modules in the same virtual connection.
 - b. Ensure that no active external equipment is attached to the Ethernet Modules or Ethernet Bridge Modules. Otherwise, test frames will be transmitted to that equipment.
 3. Test the new Ethernet Module.

To test the new Ethernet Module:

- a. Select the Select interface module option from the Node Command Menu of the node where the module is installed.
- b. Select the Test option from the Ethernet Module Command Menu or Ethernet Bridge Module Command Menu.
- c. Select the Generate backbone traffic option to run the test.

4. Check the traffic statistics.

While the Generate backbone traffic test is running, select the **Monitor status** option from the Ethernet Module Command Menu. The traffic statistics displayed should report 128 frames per second transmitted and received on the fiber backbone. There should not be any frames transmitted to the local Ethernet segment.

5. Check each module in the virtual connection.

While the Generate backbone traffic test is running, access each of the other Ethernet Modules in the virtual connection, as follows:

- a. Select the Select interface module option from the Node Command Menu of the node where each of the modules is installed.
- b. Select the Monitor status option from the Ethernet Module Command Menu.

The traffic statistics displayed should report 128 frames per second transmitted and received on the fiber backbone, just as displayed on the module generating the test traffic. Additionally, each of these other modules should display 128 frames per second transmitted onto its local Ethernet segment.

Note: If no modules in the circuit are set to **multipoint**, the test data frames do not continue around the circuit.

6. Stop the test traffic.

Access the Ethernet module from which you started the test, and select the Halt current test option in the Test menu to stop the “Generate backbone traffic” test.

7. Connect the cables to the port.

Once each of the virtual connections has been established and verified, connect the cables to the appropriate port on each of the Ethernet modules in the virtual connection, and then complete the following procedure:

- Select one of the Ethernet modules.
- Select the Configuration option and the appropriate port for that module.

Note: If you select the **EXT BRIDGE** port, you might have to enable the Heartbeat or SQE function for the bridge or other devices connected.

To enable these functions, select **SQE** from the Module Configuration Menu and select **Enabled**. If it is not required, select **Disabled**. You must disable the heartbeat *before* you select **EXT BRIDGE** from the Configuration menu. Failure to properly select this option may result in loss of data.

8. Reset the traffic and error counters.

Select the **Reset counts** option to reset the traffic and error counters.

9. View the traffic on the Ethernet segment and the fiber backbone.

Select the **Monitor status** option from the menu. If the segment has live traffic, the following information is displayed:

- The number of packets transmitted and received every second from that segment.

10. Check for errors on either the backbone or Ethernet segment.

Select the **Statistics** option from the Command Menu and check for errors on either the backbone or the Ethernet segment.

- If one or more errors display, stop the “Monitor status” display and go back to the Configuration menu to change the port type back to **AUI** or **EXT BRIDGE** (whichever port is not being used) to avoid corruption of the Ethernet network.

Note: The error display may indicate either “errored” seconds, minutes, and hours, or may indicate the total number of errors, depending on whether error reporting is Sampled or Totaled. For more information, see the Statistics and View Configuration sections in Chapter 3, “Ethernet Module Command Menu,” and see Chapter 4, “Ethernet Bridge Command Menu.”

Chapter 3

Ethernet Module Command Menu

Introduction

The High-Performance Ethernet Module Command Menu, shown in Figure 3-1, enables you to:

- Display alarm information about the High-Performance Ethernet I/O Module.
- Activate the port on the module that you want to use.
- Monitor traffic on the Ethernet backbone and segment.
- Reset the traffic and error counters.
- Modify and display the configuration of the module.
- View the module's status by displaying frame counts and sizes, the number of seconds, minutes, and hours that have elapsed since an error occurred, and the types of errors that occurred.
- Test a new High-Performance Ethernet I/O Module before live data is sent on it.

Accessing the Module Command Menu

To access the High-Performance Ethernet Module Command Menu:

1. Type **S** at the Node Command Menu prompt. A message similar to the following appears:

```
01> Select interface module - enter module position (1-8):
```

2. Enter the slot number of the I/O module you want to configure, and press [RETURN]. The High-Performance Ethernet Module Command Menu appears on the screen, as shown in Figure 3-1.

For more information about selecting interface modules, see the *PremNet Broadband Access System Installation and Operation Manual*.

High-Perf. Ethernet	Module Command Menu
(A)Alarm display	(C)Configuration
(H)Help	(M)Monitor status
(Q)Log off	(R)Reset counts
(S)Statistics	(T)Test
(V)View configuration	(X)Exit
(Z)Timeslot select	(?) or (/) Command menu
(#)Interface Module select	
01,05:High-Perf. Ethernet >	

Figure 3-1. High-Performance Ethernet Module Command Menu

The prompt 01,05:High-Perf. Ethernet> indicates:

- Node number 01
- Slot number 05
- Module type High-Perf. Ethernet

To select an option from the menu, type the character to the left of the menu option and press [RETURN]. To cancel an operation and return to the Ethernet Module Command Menu prompt, press [ESC].

The remainder of this chapter provides specific instructions for using each option from the Ethernet Module Command Menu.

Alarm display (A)

The **Alarm display** option lets you view specific alarm information about the module. To access this option, perform the following steps:

1. Type **A** at the High-Performance Ethernet Module Command Menu prompt. The system displays:

Alarm display - display current alarms

2. Press [RETURN]. The alarm information is displayed on the screen, as shown in Figure 3-2.

Current Module Alarms:
None

Figure 3-2. Ethernet Module Alarm Display Screen

3. Press ? or / to return to the Ethernet Module Command Menu.

Alarm Messages

The following list contains Ethernet alarm messages, their corresponding code numbers, and recommended solutions to the alarm conditions they represent.

Note: For more information about code numbers, refer to Appendix C in the *PremNet Broadband Access System Installation and Operation Manual*.

Backplane Parity Error (Code 1)

Explanation: A receive error is detected on the backplane. A communication problem exists between the switch module and the I/O module.

Solution: Verify node alarm conditions by using the **Alarm display** option on the Node Command Menu. If a *Switch parity* error exists, the problem is not an I/O module error. Replace the switch.

Backplane FIFO Error (Code 2)

Explanation: Data to or from the backplane is overflowing or underflowing the backplane FIFOs.

Solution: Ensure that there are sufficient node timeslots available to support all the I/O modules installed in the node, including this one. The module may be configured for more timeslots than you are aware of, and may be requesting more timeslots than are available. If this is not the problem, replace the module.

Phase Locked Loop Error (Code 3)

Explanation: The phase locked loop on the module is not locking properly to the backplane clock.

Solution: Ensure that there are sufficient node timeslots available to support all the I/O modules installed in the node, including this one. The module may be configured for more timeslots than you are aware of, and may be requesting more timeslots than are available. If this is not the problem, replace the module.

Backplane Receiver Off-Line (Code 4)

Explanation: The controller that controls the flow of data between the module and the backplane is attempting to receive data at a rate faster than it can handle, causing it to go offline and reinitialize itself.

Solution: If the alarm occurs repeatedly, replace the module.

Backplane Transmitter Off-Line (Code 5)

Explanation: The controller that controls the flow of data between the module and the backplane is attempting to transmit data at a rate faster than it can handle, causing it to go offline and reinitialize itself.

Solution: If the alarm occurs repeatedly, replace the module.

Ethernet Receiver Off-Line (Code 6)

Explanation: The Ethernet controller is experiencing congestion with the shared memory.

Solution: If the alarm occurs repeatedly, replace the module.

Ethernet Transmitter Off-Line (Code 7)

Explanation: The Ethernet controller is experiencing congestion with the shared memory.

Solution: If the alarm occurs repeatedly, replace the module.

Configuration (C)

The Configuration option lets you configure the High-Performance Ethernet I/O Module. To access this option, perform the following steps:

1. Type **C** at the High-Performance Ethernet Module Command Menu prompt. The system displays:

```
Configuration - configure module parameters
```

2. Press [RETURN]. The system displays the Module Configuration Menu, as shown in Figure 3-3.

Module Configuration Menu
(1) Connection type
(2) Error reporting
(3) Port type
(4) Compatibility mode
(5) Flow control
(6) SQE
enter (1-6):

Figure 3-3. Module Configuration Menu



Caution: Although you can change the values for Error reporting and Flow control, Milgo recommends that you not modify these parameters.

Connection type (1)

The Connection type option lets you select either a multipoint or point-to-point connection. All modules in the virtual connection must show the same value in this field.

To change the connection type:

1. Type **1** at the Module Configuration Menu and press [RETURN]. A message similar to the following appears:

```
Current connection type = Multi-point
Select connection configuration
(1 = Multi-point, 2 = Point-to-Point):
```

If You Select	Then
(1) Multipoint	The module is connected in a virtual connection with three or more modules. This is the default connection.
(2) Point-to-Point	The module is connected in a virtual connection with only two modules.

Note: You cannot configure the module for 4-timeslot mode unless the connection type is set to Point-to-Point. Likewise, you cannot change the connection type to Multipoint while the module is in 4-timeslot mode.

2. Select the connection type and press [RETURN]. If you press [RETURN] without making a selection, the current configuration is not changed. A message similar to the following appears:

Connection type is POINT-TO-POINT

Error reporting (2)

The Error reporting option lets you change the way errors are displayed. To use this option:

1. Type **2** at the Module Configuration Menu and press [RETURN]. A message similar to the following appears, prompting you to change the way errors are reported:

Error reports are currently SAMPLED
Select error reporting option (1 = TOTALED, 2 = SAMPLED):

Note: You cannot change the error reporting method while the module is in test mode.

If You Select	Then
(1) Totaled	The module displays a true count of the total number of errors of each type that have occurred since the last time the counts were reset. Totaled mode causes an interrupt to occur for every packet received or transmitted, and for every packet error that occurs. Therefore, this selection reduces throughput of the module.

- (2) Sampled The module displays the number of seconds in which those types of errors occurred.

Sampled mode imposes less burden on the microprocessor, enabling it to forward packets at the full Ethernet rates. This is the default.

2. Select the error reporting type and press [RETURN]. If you press [RETURN] without making a selection, the current configuration is not changed. A message similar to the following appears:

Error reports are TOTALED

Port type (3)

The Port type option lets you select the port type to use on the module. To select a port type:

1. Type **3** at the Module Configuration Menu prompt and press [RETURN]. A message similar to the following appears, prompting you to change the port type:

Current port type = Thinnet coax
Select interface port type (1 = AUI, 2 = Thinnet coax, 3 = Ext Bridge):

Select...	To activate the...
(1) AUI	AUI port
(2) Thinnet coax	Thin Ethernet port
(3) EXT Bridge	MAU port

2. Select the interface port type and press [RETURN]. If you press [RETURN] without selecting a port, the current configuration is not changed. The system displays the new configuration in a message similar to the following:

Port type = Thinnet coax



Caution: If you select Thinnet Coax, you must have a properly terminated Thinnet Ethernet cable already attached to the port. Failure to do so will result in the interruption of data traffic through the module. The AUI and the MAU ports may be safely selected even if there is no cable attached to the ports.

Compatibility mode (4)

The Compatibility mode option lets your High-Performance Ethernet I/O module be fully backward-compatible with prior Ethernet modules.

Note: Select this option only when the High-Performance Ethernet I/O module must be connected into a virtual connection with earlier versions. Ignore this section if you do not have earlier Ethernet modules (850038 and 850067).

You cannot modify this option when any of the following conditions occur:

- The module is active (in a virtual connection) and not in a 2-timeslot mode
- The module is in test mode

Any attempt to modify this option when these conditions are present will cause an error message to display. See the Error Messages section later in this chapter for details.

To select this option:

1. Type **4** at the Module Configuration Menu and press [RETURN]. A message similar to the following appears:

```
Current compatibility mode = 850074 - Standard
Warning - Changing mode will cause the module to momentarily lose
communication with the NMM...
Select compatibility mode (1 = 850038, 2 = 850067, 3 = 850074-Standard):
```

If You Select	Then
(1) 850038	The module configures itself in 2-timeslot mode.
(2) 850067	The module configures itself in 2-timeslot mode.
(3) 850074 - Standard	This option is the default. The module can be configured with 1, 2, 3, or 4 timeslots.

2. Select the compatibility mode and press [RETURN]. If you press [RETURN] without making a selection, the current configuration is not changed. A message similar to the following appears:

```
Compatibility mode is 850074-Standard
```

Flow control (5)

The Flow control option lets you enable or disable the flow control mechanism. The flow control mechanism on the PremNet Ethernet module uses the carrier line/signal to prevent further generation of Ethernet frames on the Ethernet network. To select this option:

1. Type **5** at the Module Configuration Menu and press [RETURN]. A message similar to the following appears, prompting you to change flow control:

```
Module Flow control is currently ENABLED
Select module flow control option (1=ENABLED, 2=DISABLED):
```

2. Select the desired option and press [RETURN]. A message similar to the following appears:

```
Module Flow control is DISABLED
```

SQE (6)

The SQE option lets you enable or disable the IEEE 802.3-specified SQE or Heartbeat function for the Ext. Bridge port. The bridge or other device connected to the port may or may not require this function to be enabled. You must configure this option properly prior to connecting a cable to the MAU port, or data loss may occur. To use this option, perform the following steps:

1. Type **6** at the Module Configuration Menu prompt and press [RETURN]. The system displays the current state of the Heartbeat function and a prompt:

```
MAU port heartbeat generation is currently DISABLED
Configure heartbeat generation (1 = DISABLED, 2 = ENABLED):
```

2. To disable Heartbeat, type **1** and press [RETURN]. To enable Heartbeat, type **2** and press [RETURN]. If you do not want to change the current configuration, press [RETURN] without making a selection. The system displays the new state of the Heartbeat function:

```
Heartbeat is DISABLED
```

Configuration Error Messages

This section lists the messages that might display during configuration.

Module must be in point-to-point configuration for 4-timeslot operation !

Explanation: You attempted to configure the module for 4-timeslot mode with the Timeslot select (Z) option while the module connection type was Multipoint.

Solution: Complete the following steps, before proceeding:

1. Type **C** at the Module Command Menu prompt and press [RETURN].
2. Type **1** at the Module Configuration Menu and press [RETURN].
3. Change the connection type to 2 (Point-to-Point) and press [RETURN].

You can now select the Timeslot select (Z) option and change the module to 4-timeslot mode.

Cannot change in 4-timeslot mode - only point-to-point valid

Explanation: You tried to change the connection type from Point-to-Point to Multipoint while the module was in 4-timeslot mode. The 4-timeslot mode is valid only with Point-to-Point connections.

Solution: Use the Timeslot select (Z) option to change the timeslot mode, before switching connection types.

Cannot exercise this function while in test mode - cancel current test first

Explanation: You tried to change one of the following configuration options while in test mode.

- connection type
- error reporting
- compatibility mode
- timeslot operation

Solution: Stop the test mode, as follows:

1. Select the Test (T) option from the Module Command Menu and press [RETURN].
2. Select **3** Halt current test from the Module Test Function Menu and press [RETURN].

You can now change the connection type or error reporting type by first selecting the Configuration option from the Module Command Menu, and then selecting either 1 (Connection type) or 2 (Error reporting) from the Module Configuration Menu.

Cannot change - module is active and not in 2-timeslot mode !

Explanation: You tried to change the compatibility mode while the module was active and not in 2-timeslot mode.

Solution: To change the compatibility mode, complete the following steps:

1. Disconnect the module from the virtual connection.
2. Change the compatibility mode to 850074-Standard mode.

Warning - Changing mode will cause the module to momentarily lose communication with the NMM...

Explanation: You are trying to modify the compatibility mode while the module is in standby mode (not connected into a virtual connection), but the module is in either 1-, 3-, or 4-timeslot mode.

If you press [RETURN], the module loses communication with the NMM and terminal for approximately ten seconds.

Solution: This is only a warning message.

Module is currently active - cannot change !

Explanation: You tried to use the Timeslot select (Z) option while the module was in active status.

Solution: Disconnect the module from the virtual connection.

Cannot change while in 850038 or 850067 compatibility mode !

Explanation: You tried to use the Timeslot select (Z) option while the module was in 850038 or 850067 compatibility mode.

Solution: Change the compatibility mode to 850074 - Standard.

Help (H)

The Help option lets you display a brief description of any of the options available from the Ethernet Module Command Menu. To select the Help option:

1. Type **H** at the Ethernet Module Command Menu prompt and press [RETURN]. The system prompts you to enter the letter of the option for which you want help.

2. Enter a letter or press [RETURN] to display the letters and their corresponding options.

Monitor status (M)

The Monitor status option lets you monitor traffic on the backbone and the segment. When you select this option, the system continuously displays and time-tags the number of packets (or frames) transmitted and received. It also displays the number of frame errors detected on the backbone and the segment. To access this option, perform the following steps:

1. Type **M** at the Ethernet Module Command Menu prompt. The system displays:

Monitor status - monitor module status
2. Press [RETURN]. The system displays a screen similar to Figure 3-4 that automatically scrolls up one line every second. To stop the scrolling display, press any key.

Ethernet (1,3)	Backbone Frames				Segment Frames				Time
	Rx/Sec	Tx/Sec	Rx Utl	Errs	Rx/Sec	Tx/Sec	Rx Utl	Errs	
*	6162	6171	39.9%	0	312	5859	1.7%	0	12:33:45
-	6552	6504	38.2%	0	2878	3626	16.5%	0	12:33:46
*	6327	6327	39.8%	0	2152	4175	12.3%	0	12:33:47
*	6423	6423	37.9%	0	278	6145	1.6%	0	12:33:48
*	5804	5804	39.3%	0	404	5400	2.3%	0	12:33:49
-	6015	6015	41.6%	0	2441	3574	14.0%	0	12:33:50
-	5783	5820	41.7%	0	2684	3136	15.4%	0	12:33:51
*	6305	6268	38.8%	0	1866	4402	10.7%	0	12:33:52
*	5915	5932	38.7%	0	2950	2982	16.9%	0	12:33:53
-	6235	6218	42.8%	0	2639	3579	15.2%	0	12:33:54
*	6107	6107	47.8%	0	0	6107	0.0%	0	12:33:55
-	6331	6331	38.9%	0	2297	4034	13.2%	0	12:33:56
-		6147	38.5%	0	1653	4494	9.5%	0	12:33:57

Figure 3-4. Monitor Module Status Screen

The Monitor Module Status screen displays the following information:

Backbone Frames	Segment Frames
Rx/Sec	Rx/Sec
Tx/Sec	Tx/Sec
Rx/Utl	Rx/Utl
Errs	Errs

where:

Backbone Frames = the number of frames transmitted or received on the fiber or coax PremNet network.

Segment Frames = the number of frames transmitted or received on the local segment through the selected port.

Rx/Sec = the number of Ethernet frames received per second. The Rx/Sec values on the local segment indicate the bursting nature of the data.

Tx/Sec = the number of Ethernet frames transmitted per second.

Rx Utl = the percentage of the total Ethernet bandwidth being used by the traffic received from the Ethernet segment or from the backbone.

Multipoint module: The percentage shown for backbone traffic for a module configured as *multipoint* includes utilization by frames that were originally transmitted by the module. This percentage indicates the load on the local Ethernet segment, because it represents the sum of traffic received from the segment and traffic being transmitted onto the segment.

Point-to-point module: For a module configured as *point-to-point*, the total of percentages from the backbone and segment represent the total percent utilization of traffic on the local Ethernet segment.

Use the following formula to calculate Rx Utl.

$$\text{Rx Utl} = \frac{(\text{Frame Size} + 12 \text{ bytes}) \cdot (\text{Frames per second (Tx + Rx)}) \cdot 8 \cdot 100}{10 \text{ Mbps}}$$

where:

12 bytes = header

8 = bits per byte

Ethernet (1,3) = the node and I/O slot occupied by the module. The symbols underneath this heading indicate the current functional condition of the module, as follows:

Display	Meaning
*	Indicates a normal condition.
X	Indicates an alarm.
-	Indicates flow control invoked.

Errs = the number of errors occurring on the backbone or segment. The number of errors depends on whether errors are Totaled or Sampled. Refer to the Statistics (S) section for more information about errors.

If errors are sampled, the value is either 0 or 1. If errors are totaled, the value reflects the total number of errors detected during that second. A summary of statistics, including errors and peak traffic conditions, is shown on the Ethernet Module Statistics screen (Figure 3-5). The errors are associated with missed frames, overflows, underflows, and bad frames, which are detailed in the statistics screen.

Log off (Q)

To log off the system, perform the following steps:

1. Type **Q** at the Ethernet Module Command Menu prompt. The system displays:

Log off

2. Press [RETURN]. The system logs you off and displays the date and time you logged on and logged off the system. For example:

Log on: 15-JAN-1997 00:01:45

Log off: 15-JAN-1997 12:35:27

To view the PremNet system introduction screen, press [RETURN] again. The screen prompts you to enter the system password.

Reset counts (R)

The Reset counts option lets you reset the traffic and error counters displayed on the Statistics screen (see Figure 3-5). To select this option, perform the following steps:

1. Type **R** at the Ethernet Module Command Menu prompt. The system displays the following message:

Reset counts - zero all counts

2. Press [RETURN]. The system displays the following confirmation prompt:

ARE YOU SURE ? (Y/N):

3. Type **Y** and press [RETURN] to reset the counters; type **N** and press [RETURN] to cancel the operation.

Statistics (S)

The Statistics option lets you view the following High-Performance Ethernet I/O Module statistics:

- Peak and current frame counts
- Maximum and minimum frame sizes
- Peak and current percent utilization by received traffic
- Number of seconds, minutes, and hours during which errors occurred
- Number of errors, broken down and displayed by type

To select this option:

1. Type **S** at the Ethernet Module Command Menu prompt. The system displays the following prompt:

01,03: High-Perf. Ethernet > Statistics - traffic and error counts

2. Press [RETURN]. The system displays a screen similar to the one shown in Figure 3-5.

Ethernet Module Statistics -		Counts Last Reset: @ 12:17:08 24 Jan 1997	
	Fiber Backbone		Ethernet Segment
Peak Rx Frames/Sec:	7104 @ 12:18:14 24 Jan 1997	7024 @ 12:18:14 24 Jan 1997	
Curr Rx Frames/Sec:	6301	5192	
Peak Rx Util:	49.7% @ 02:57:26 24 Jan 1997	40.4% @ 12:18:10 24 Jan 1997	
Curr Rx Util:	38.0%	29.9%	
Max Rx Frm Size:	1518 @ 10:14:15 24 Jan 1997	1480 @ 10:14:15 24 Jan 1997	
Min Rx Frm Size:	64 @ 10:14:15 24 Jan 1997	64 @ 10:14:15 24 Jan 1997	
Error Seconds:	0	1	
Error Minutes:	0	1	
Error Hours:	0	1	
Last Error Second:		@ 21:23:32 24 Jan 1997	
Missed Frames:	0	0	
Overflows:	0	0	
Underflows:	0	0	
Bad Frames:	0	1	

Figure 3-5. Ethernet Module Statistics Screen

The Statistics Screen displays the following information:

Peak Rx Frames/Sec = the maximum number of frames the module has processed in one second since the statistics were last reset.

Curr Rx Frames/Sec = the current number of frames the module has processed in the previous second.

Peak Rx Util = the maximum percentage of Ethernet bandwidth and the time it is calculated.

Curr Rx Util = the current percentage of Ethernet bandwidth being utilized.

Max Rx Frm Size = the size of the largest frame received and the time it was received.

Min Rx Frm Size = the size of the smallest frame received and the time it was received.

Counts Last Reset — The date and time when the counters were last reset.

Error Seconds — The number of seconds in which errors have been detected since the counts were last reset.

Error Minutes — The number of minutes in which errors have been detected since the counts were last reset.

Error Hours — The number of hours in which errors have been detected since the counts were last reset.

The following example discusses how to interpret the data in the *Error Seconds*, *Error Minutes*, and *Error Hours* fields.

Example:

Assume that the error counters were reset 10 hours ago.

- Check the *Error Hours* field. If the value in the field is 10, at least one error has occurred every hour for the past 10 hours.
- Check the *Error Minutes* field. If the value in the field is 60, at least one error occurred in any given minute for a total of 60 minutes in the last 10 hours.
- Check the *Error Seconds* field. If the value in the field is 900, at least one error occurred in any given second for a total of 900 seconds in 60 minutes in 10 hours.

Last Error Second — Displays the date and time of the last second during which an error (or errors) was detected.

Missed Frames, Overflows, Underflows, and Bad Frames — These error counts are displayed as either *totaled* or *sampled*, depending on the module's configuration, as follows:

Sampled Error Counts

When errors are sampled (the default), the module obtains a sample of the errors that occurred during the last second and updates its counts accordingly. Therefore, the displayed values actually indicate the number of seconds in which those types of errors occurred.

Totaled Error Counts

When errors are totaled, the module counts each individual occurrence of an error, and the counts displayed indicate a true count of the total number of errors of each type that have occurred since the last time the counts were reset.

Error Types

Two types of errors are displayed: Fiber Backbone and Ethernet Segment errors.

Fiber Backbone (Backplane) errors are a sum of three errors reported by the HDLC controller chip. These are:

- Missed Packet
- Receiver Overrun
- Transmitter Underrun

Ethernet Segment errors are the sum of four errors reported by the Lance (Ethernet) chip. These errors are:

- Missed Packet
- Receiver Overrun
- Transmitter Underrun
- Bad Frames (Wrong CRC)

Note: The totaled mode causes a greater burden on the module than the sampled mode, and results in reduced traffic throughput. Use the Configuration, error reporting option to change the way errors are counted.

Test (T)

The Test option lets you test a new Ethernet network before live data is sent out onto it. You can generate test traffic onto the local Ethernet segment or onto the PremNet fiber backbone. To access this option, perform the following steps:

1. Type **T** at the Ethernet Module Command Menu prompt. The system displays the following message:

Test - module test

2. Press [RETURN]. The system displays a screen similar to the one in Figure 3-6 that shows the currently selected state of the test function, along with a menu.

```

Module test function —

Status: NO TEST IN PROGRESS — —

(1)      generate ethernet traffic
(2)      generate backbone traffic
(3)      halt current test
enter (1-3):

```

Figure 3-6. High-Performance Ethernet Module Test Menu

(1) generate ethernet traffic

The generate ethernet traffic option generates test traffic on the High-Performance Ethernet I/O Module. You can direct the module's output into another module to simulate live traffic to test that module and all the other modules connected to it in a virtual connection, or you can direct the output onto your own Ethernet network to generate test traffic. The test traffic generated has no adverse effect on the network other than to increase the traffic volume, which in itself may cause problems on the network. Avoid overburdening a live network with test traffic.

To select the generate ethernet traffic option, perform the following steps:

1. Type **1** and press [RETURN]. The system displays:

```

Generate Ethernet Test Traffic
-----

```

```

Input % load (10--85):

```

2. Enter the percentage of bandwidth you want the test traffic to use, and press [RETURN]. Valid values are 10 through 85, inclusive. After you enter an appropriate input value, the following prompt appears:

```

Input # of packets/sec. (min= xx, max= xxxx):

```

3. Enter the number of test traffic packets per second that you want to transmit, and press [RETURN]. The range of valid values are indicated in the min and max fields. This range is determined by the IEEE 802.3-specified minimum and maximum Ethernet packet sizes and the user-specified % load.

The system displays the values you entered in the Input % load and the Input # of packets/sec. fields, and the number of bytes per packet (which is calculated automatically from the load percentage and number of packets per second you entered).

For example, if you entered 30% traffic load at a rate of 3000 packets per second, the number of bytes per packet is 117. (This packet size includes source and destination addresses, type field, data field, and frame check sequence [FCS] bytes.)

Test parameters: xx% load, xxx packet/sec.,xxx bytes/packet
Proceed ? (Y/N)

4. Enter **Y** to run the test; enter **N** to cancel.
 - a. If you enter **Y**, the system displays a warning message that states the test will cause the module to be reinitialized and asks you again if you want to proceed with the test. Enter **Y** to run the test. The system redisplay the Ethernet Module Test menu. The message **ETHERNET TRAFFIC GENERATION IN PROGRESS** appears in the *Status* field.
 - b. If you enter **N**, the system redisplay the Ethernet Module Test menu.

(2) generate backbone traffic

The generate backbone traffic option tests the High-Performance Ethernet I/O Module's ability to transmit Ethernet packets over the backbone to another Ethernet I/O Module in the virtual connection. You can perform this test for each Ethernet I/O Module in each virtual connection to verify the integrity of the connection before it is used to transport live data.

To select the generate backbone traffic option, perform the following steps:

1. Type **2** at the Module test function prompt and press [RETURN]. The system displays a warning message similar to the following:

<p>Warning</p> <p>This test reinitializes the module and burst frames onto the backbone at a rate of 128 per second. Frames received from the backbone or the Ethernet segment will be discarded.</p> <p>Continue? (Y/N)</p>

2. Type **Y** to run the test or **N** to cancel, and press [RETURN].
 - a. If you enter **Y**, the system runs the test and redisplay the Ethernet Module Test Function menu. The following message appears in the *Status* field:

BACKBONE TRAFFIC GENERATION IN PROGRESS
 - b. If you enter **N**, the system redisplay the Ethernet Module Test Function menu.

(3) halt current test

The halt current test option stops whatever test that is running. To halt the current test, perform the following:

1. Type **3** and press [RETURN]. A message similar to the following appears:

Are you sure you want to halt the current test? (Y/N):

2. Type **Y** to cancel or **N** to continue the test.

Note: You must select this option before you can move from one test to another. In addition, stop all tests before connecting active Ethernet devices to the High-Performance Ethernet I/O Modules.

View configuration (V)

The View configuration option displays the configuration of the module, the module serial number, and the hardware and software revision information. To select this option, perform the following steps:

1. Type **V** at the Ethernet Module Command Menu prompt. The system displays the following prompt:

View configuration

2. Press [RETURN]. The system displays a screen similar to Figure 3-7.

Ethernet Module Configuration Status:	
Node:	1
Channel:	5
Serial Number:	10741
Hardware Revision:	A
Software Revision:	01
Module Status:	ACTIVE without Alarms
Port Type:	AUI
Connection Type:	Multi-Point
Error Reporting:	SAMPLED
Backplane Timeslots:	2
Module Flow Control:	DISABLED
Compatibility Mode:	850074-Standard

Figure 3-7. Module Configuration Status Screen

This section lists the field definitions for the High-Performance Ethernet Module Configuration Status screen. The values in the last five fields shown in Figure 3-7 represent the default configuration. Use the Configuration option to modify these values.

Node

Indicates the number of the node in which the Ethernet module is installed. This field may contain an asterisk (*) for up to one minute after the module is initialized, and before the Network Management Module downloads the node identification to the module.

Channel

Contains the node I/O channel slot in which the module is installed.

Serial Number

Indicates the Milgo Solutions serial number assigned to the module.

Hardware Revision

Indicates the revision level of the module hardware.

Software Revision

Indicates the revision level of the module software.

Module Status

Indicates the status of the module. The valid values are:

- *active* (connected into a virtual connection)
- *standby* (not connected into a virtual connection)
- *test* (the module is generating test frames either on the backbone or the local Ethernet segment)

This field also indicates whether the module is currently generating any alarms.

Port Type

Indicates which of the three Ethernet ports is selected. The possible port types are AUI, Thinned coax, and Ext. Bridge.

Connection Type

Indicates whether the module is operating in multipoint or point-to-point mode. All modules in the virtual connection must show the same value in this field.

Error Reporting

Possible values are Sampled or Totaled. For more information, see the Configuration, error reporting and Statistics sections earlier in this chapter.

Backplane Timeslots

Specifies the backplane bandwidth available to the module. Valid values are 1 through 4.

Module Flow Control

Indicates whether the flow control mechanism is enabled or disabled.

Compatibility Mode

Indicates in which mode the module is operating. Enable this field only when the module must be connected into a virtual connection with earlier Ethernet modules.

Exit (X)

The Exit option returns you to the Node Command Menu. To select this option, perform the following steps:

1. Type **X** at the Ethernet Module Command Menu prompt. The system displays the following prompt:

Exit

2. Press [RETURN]. The system exits the Ethernet Module Command Menu prompt and displays the Node Command Menu.

Timeslot select (Z)

The Timeslot select option lets you configure the module for 1, 2, 3, or 4 backplane timeslot operation. You *cannot* use this option when one of the following conditions is present on the module:

- The module is in active mode (in a virtual connection)
- The module is in either 850038 or 850067 compatibility mode
- The module is in test mode
- The module is in multipoint mode and you are trying to select 4 timeslots

To select this option:

1. Type **Z** at the module command prompt. The following message appears:

Timeslot Select - select # of backplane timeslots

2. Press [RETURN]. A message similar to the following appears, prompting you to change the number of timeslots selected:

Current Backplane timeslots = 3

Note: Changing this option will cause the module to momentarily lose communication with the NMM...

Select # of backplane timeslots (1-4)

Table 3-1 lists the equivalent bandwidth for each timeslot selection.

Table 3-1. Timeslot-to-Bandwidth Table

Select	Equivalent Bandwidth
1 timeslot	4.704 Mbps
2 timeslots	9.408 Mbps
3 timeslots	14.112 Mbps
4 timeslots	18.816 Mbps

Each PremNet timeslot provides a bandwidth equivalent to 4.704 Mbps.

3. Select the number of timeslots and press [RETURN]. If you press [RETURN] without making a selection, the current setting is not changed. The system displays a message similar to the following:

Backplane timeslots = 2

Command menu (?) or (/)

To display the options on the Ethernet Module Command Menu, type ? or / at the Ethernet Module Command Menu prompt.

Module select (#)

The Module select option lets you select another I/O module to be configured or viewed. To select this option, perform the following steps:

1. Type # at the Ethernet Module Command Menu prompt. The system displays the following prompt:

Interface module select - enter module position (1-8):

2. Enter the slot position number of the I/O module you want to select, and press [RETURN]. The system selects the new module and displays the **Module Command Menu** for that module. If you enter an invalid (non-existent) module position, an error message is displayed and the current module remains selected.

Chapter 4

Ethernet Bridge Module Command Menu

Introduction

The High-Performance Ethernet Bridge Module Command Menu, shown in Figure 4-1, enables you to:

- Display alarm information about the Ethernet Bridge I/O Module.
- Activate the port on the module that you want to use.
- Monitor traffic on the Ethernet backbone and segment.
- Reset the traffic and error counters.
- Modify and display the configuration of the module.
- Modify and display the configuration of the bridge.
- Modify and display the configuration of the filter.
- View the module's status by displaying frame counts and sizes, the number of seconds, minutes, and hours that have elapsed since an error occurred, and the types of errors that occurred.
- Test a new Ethernet Bridge I/O Module before live data is sent on it.

Note: This chapter refers to the PremNet Ethernet Bridge module and how you can configure and monitor it using the module command menu. This chapter does not describe or explain the functions of network bridges.

Bridge States

The Ethernet bridge has four specific processing times or **states**. These states are:

- Blocking - The bridge does not pass frames, thus preventing frame duplication arising from multiple paths.
- Listening - The bridge takes in or listens to other bridges' configuration information.
- Learning - The bridge learns MAC addresses and determines whether to forward or filter frames.

- Forwarding - The bridge forwards or filters frames.

The bridge can enter the blocking state from any of the other states if necessary. This state switching is transparent to the network.

Accessing the Module Command Menu

To access the Ethernet Bridge Module Command Menu:

1. Type **S** at the Node Command Menu prompt. A message similar to the following appears:

01> Select Interface module - enter module position (1-8):

2. Enter the slot number of the I/O module you want to configure, and press [RETURN]. The Ethernet Bridge Module Command Menu appears on the screen, as shown in Figure 4-1.

For more information about selecting interface modules, see the *PremNet Broadband Access System Installation and Operation Manual*.

Ethernet Bridge	Module Command Menu
(A) Alarm display	(B) Bridge configuration
(C) Configuration	(F) Filtering configuration
(H) Help	(M) Monitor status
(Q) Log off	(R) Reset counts
(S) Statistics	(T) Test
(V) View configuration	(X) Exit
(Z) Timeslot select	(?) or (/) Command menu
(#) Interface module select	
***** ALARM!!! Please see system alarm display. *****	
01,08:Ethernet Bridge >	

Figure 4-1. High-Performance Ethernet Bridge Module Command Menu

The prompt 01,08: Ethernet Bridge> indicates:

- Node number 01
- Slot number 08
- Module type Ethernet Bridge

3. To select an option from the menu, type the character to the left of the menu option and press [RETURN]. To cancel an operation and return to the Ethernet Bridge Module Command Menu prompt, press [ESC].

The remainder of this chapter provides specific instructions for using each option from the Ethernet Bridge Module Command Menu.

Alarm display (A)

The Alarm display option lets you view specific alarm information about the module. To access this option, perform the following steps:

1. Type **A** at the Ethernet Bridge Module Command Menu prompt. The system displays:

Alarm display - display current alarms

2. Press [RETURN] . The alarm information is displayed on the screen, as shown in Figure 4-2.

Current Module Alarms: None

Figure 4-2. Ethernet Bridge Module Alarm Display Screen

3. Press **?** or **/** to return to the Command Menu.

Alarm Messages

The following list contains Ethernet alarm messages, their corresponding code numbers, and recommended solutions to the alarm conditions they represent.

Note: For more information about code numbers, refer to Appendix C in the *PremNet Broadband Access System Installation and Operation Manual*.

Backplane Parity Error (Code 1)

Explanation: A receive error is detected on the backplane. A communication problem exists between the switch module and the I/O module.

Solution: Verify node alarm conditions by using the **Alarm display** option in the Node Command Menu. If a *Switch parity* error exists, the problem is not an I/O module error. Replace the switch.

Backplane FIFO Error (Code 2)

Explanation: Data to or from the backplane is overflowing or underflowing the backplane FIFOs.

Solution: Ensure that there are sufficient node timeslots available to support all the I/O modules installed in the node, including this one. The module may be configured for more timeslots than you are aware of, and may be requesting more timeslots than are available. If this is not the problem, replace the module.

Phase Locked Loop Error (Code 3)

Explanation: The phase locked loop on the module is not locking properly to the backplane clock.

Solution: Ensure that there are sufficient node timeslots available to support all the I/O modules installed in the node, including this one. The module may be configured for more timeslots than you are aware of, and may be requesting more timeslots than are available. If this is not the problem, replace the module.

Backplane Receiver Off-Line (Code 4)

Explanation: The controller that controls the flow of data between the module and the backplane is attempting to receive data at a rate faster than it can handle, causing it to go offline and reinitialize itself.

Solution: If the alarm occurs repeatedly, replace the module.

Backplane Transmitter Off-Line (Code 5)

Explanation: The controller that controls the flow of data between the module and the backplane is attempting to transmit data at a rate faster than it can handle, causing it to go offline and reinitialize itself.

Solution: If the alarm occurs repeatedly, replace the module.

Ethernet Receiver Off-Line (Code 6)

Explanation: The Ethernet controller is experiencing congestion with the shared memory.

Solution: If the alarm occurs repeatedly, replace the module.

Ethernet Transmitter Off-Line (Code 7)

Explanation: The Ethernet controller is experiencing congestion with the shared memory.

Solution: If the alarm occurs repeatedly, replace the module.

Bridge Configuration (B)

The **Bridge Configuration** option lets you configure the bridge parameters of the module.

Note: The default values specified in this section were obtained from the IEEE 802.1D specification, relating to the operation and management of bridges. All the selections in the **Bridge Configuration Menu** have default settings. Milgo Solutions recommends leaving these values at the default settings unless you are an experienced network manager.

To access this option, perform the following steps:

1. Type **B** at the Ethernet Bridge module Command Menu prompt. The system displays:

Bridge configuration - configure bridge

2. Press [RETURN]. The system displays the Bridge Configuration Menu, as shown in Figure 4-3.

Bridge Configuration Menu
(1) Mode (2) Priority (3) Max Age (4) Hello Time (5) Forward Delay (6) Port Priority (7) Path Cost (8) RESET To Default Settings Enter (1 - 8):

Figure 4-3. Bridge Configuration Menu

Mode (1)

The Mode option lets you enable or disable the bridge function.

1. Type **1** at the Bridge Configuration Menu, and press [RETURN]. A message similar to the following appears, prompting you to change the mode:

```
Bridge is ENABLED
Enter bridge mode (0 = DISABLED, 1 = ENABLED):
```

2. Enter the desired mode and press [RETURN]. The system displays the new configuration. If you press [RETURN] without selecting a different mode, the configuration is not changed.

```
Bridge mode SET to DISABLED
```

Priority (2)

The Priority option lets you set a priority value to the bridge. A high priority value (low number) means that this bridge has priority over another in passing data packets.

1. Type **2** at the Bridge Configuration Menu and press [RETURN]. A message similar to the following appears, prompting you to change the priority:

```
Bridge Priority is XXXX
Enter bridge priority <0-65535> (default = 32768):
```

2. Enter the desired priority and press [RETURN]. The system displays the new bridge priority. If you press [RETURN] without entering a new priority number, the priority is not changed.

```
Bridge Priority is XXXX
```

Max Age (3)

The Max Age option lets you set how long (in seconds) the bridge holds information about other bridges in the network.

1. Type **3** at the Bridge Configuration Menu and press [RETURN]. A message similar to the following appears, prompting you to change the setting:

```
Bridge Max Age is XX
Enter max age <6-40> (default = 20):
```

2. Enter the desired max age number and press [RETURN]. The system displays the new configuration. If you press [RETURN] without selecting a different setting, the configuration is not changed.

```
Bridge Max Age is XX
```

Hello Time (4)

The Hello Time option lets you set how often (in seconds) the bridge sends its configuration information out to other bridges on the segment.

1. Type **4** at the Bridge Configuration Menu and press [RETURN]. A message similar to the following appears, prompting you to change the setting:

```
Bridge Hello Timer is XX
Enter hello time <1-10> (default = 2):
```

2. Enter the desired bridge hello time and press [RETURN]. The system displays the new setting. If you press [RETURN] without selecting a different setting, the configuration is not changed.

```
Bridge hello timer SET to XX
```

Forward Delay (5)

The Forward Delay option lets you set how long (time in seconds) the bridge stays in the listening state before moving to the learning state, or from the learning state to the forwarding state.

1. Type **5** at the Bridge Configuration Menu and press [RETURN]. A message similar to the following appears, prompting you to change the setting:

```
Bridge Forward Delay is XX
Enter forward delay <4-30> (default = 15):
```

2. Enter the desired bridge forward delay and press [RETURN]. The system displays the new setting. If you press [RETURN] without selecting a different setting, the configuration is not changed.

Bridge forward delay is XX

Port Priority (6)

The Port Priority option lets you set a value that determines port selection if the path costs on the bridge are the same. The lower the number, the higher the priority.

1. Type **6** at the Bridge Configuration Menu and press [RETURN]. A message similar to the following appears, prompting you to change the setting:

Port: Ethernet Segment Port Priority is XXX
Port: Fiber Backbone Port Priority is XXX

Enter bridge port # (0 = Ethernet, 1 = Backbone):

2. Enter the desired bridge port number (0 or 1) and press [RETURN]. The system displays the following prompt:

Enter port priority <1-255> (default = 128):

3. Enter the desired bridge port priority and press [RETURN]. The system displays the new setting. If you press [RETURN] without selecting a different setting, the configuration is not changed.

Port: Ethernet Segment Port Priority is XXX
Port: Fiber Backbone Port Priority is XXX

Path Cost (7)

The Path Cost option lets you set a value that represents the amount of traffic on a segment. The network tries to select the path of least resistance. The higher the path cost number is, the busier the path. Path cost is based on the formula:

$$\text{Path cost} = 1000 \div \text{LAN speed in Mbps}$$

Therefore, path cost for a 10 Mbps Ethernet segment is default at 100. This default is based on two timeslots of bandwidth. Table 4-1 shows the appropriate path cost values for each timeslot selection. Refer to the Timeslot Select section of this chapter for information about selecting timeslots.

Table 4-1. Timeslot Versus Path Cost

Timeslots	Path Cost Value
1	200
2	100
3	75
4	50

1. Type **7** at the Bridge Configuration Menu and press [RETURN]. A message similar to the following appears, prompting you to change the setting:

```
Port: Ethernet Segment Path Cost is xxx
Port: Fiber Backbone Path Cost is xxx
```

Enter bridge port # (0 = Ethernet, 1 = Backbone):

2. Enter the desired bridge port number (0 or 1) and press [RETURN]. The system displays the following message:

Enter path cost <1-65535> (default = 100):

3. Enter the desired bridge path cost and press [RETURN]. The system displays the new setting. If you press [RETURN] without selecting a different setting, the configuration is not changed.

```
Port: Ethernet Segment Path Cost is XXXX
Port: Fiber Backbone Path Cost is XXX
```

RESET To Default Settings (8)

The RESET To Default Settings option lets you restore the values of all bridge parameters to their default value.

1. Type **8** at the Bridge Configuration Menu and press [RETURN]. A message similar to the following appears, warning you about changing the settings:

```
WARNING -- You are about to reset all bridge parameters to their
default values, including any filtering parameters.
RESET ALL BRIDGE PARAMETER VALUES TO DEFAULT? (Y/N):
```

2. Type **Y** and press [RETURN] to reset to default settings. Type **N** and press [RETURN] to cancel the operation. The system displays the new setting. If you press [RETURN] without selecting a different setting, the configuration is not changed.

Bridge Parameters Reset To Defaults

3. Press [RETURN] and type **? /** to return to the Command Menu.

Configuration (C)

The Configuration option lets you configure the Ethernet Bridge I/O Module. To access this option, perform the following steps:

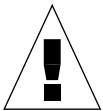
1. Type **C** at the Ethernet Bridge Module Command Menu prompt. The system displays:

Configuration - configure module parameters

2. Press [RETURN]. The system displays the Module Configuration Menu, as shown in Figure 4-4.

Module Configuration Menu
(1) Connection type (2) Error reporting (3) Port type (4) Compatibility mode (5) Flow control (6) SQE Enter (1-6):

Figure 4-4. Module Configuration Menu



Caution: Although you can change the values for *error reporting* and *flow control*, Milgo Solutions recommends that you not modify these parameters.

Connection type (1)

The Connection type option lets you select either a multipoint or point-to-point connection. All modules in the virtual connection must show the same value in this field.

To change the connection type:

1. Type **1** at the Module Configuration Menu and press [RETURN]. A message similar to the following appears:

Current connection type = Multi-point
Select connection configuration (1 = Multi-point, 2 = Point-to-Point):

- (1) Multipoint means the module is in a virtual connection with two or more other modules. This is the default connection.
- (2) Point-to-Point means the module is in a virtual connection with only one other module.

Note: You cannot configure the module for 4-timeslot mode unless the connection type is set to Point-to-Point. Likewise, you cannot change the connection type to Multipoint while the module is in 4-timeslot mode.

2. Select the connection type and press [RETURN]. If you press [RETURN] without making a selection, the connection type is not changed. A message similar to the following appears:

Connection type = POINT-TO-POINT

error reporting (2)

The error reporting option lets you change the way errors are displayed. To use this option:

1. Type **2** at the Module Configuration Menu and press [RETURN]. A message similar to the following appears, prompting you to change the way errors are reported:

Error reports are currently SAMPLED
Select error reporting option (1 = TOTALED, 2 = SAMPLED):

Note: You cannot change the error reporting method while the module is in test mode.

If You Select

Then

- (1) Totaled

The module displays a true count of the total number of errors of each type that have occurred since the last time the counts were reset.

Totaled mode causes an interrupt to occur for every packet received or transmitted, and for every packet error that occurs. Therefore, this selection reduces throughput of the module.

- (2) Sampled The module displays the number of seconds in which those types of errors occurred.

Sampled mode imposes less burden on the microprocessor, enabling it to forward packets at the full Ethernet rates. This is the default.

- 2. Select the error reporting type and press [RETURN]. If you press [RETURN] without making a selection, the configuration is not changed. A message similar to the following appears:

Error reports are TOTALED

Port type (3)

The Port type option lets you select the port type to use on the module. To select a port type:

- 1. Type **3** at the Module Configuration Menu prompt and press [RETURN]. A message similar to the following appears, prompting you to change the port type:

Current port type = Thinnet coax
Select interface port type (1 = AUI, 2 = Thinnet coax, 3 = Ext Bridge):

Select...	To activate the...
(1) AUI	AUI port
(2) Thinnet coax	Thin Ethernet port
(3) EXT. Bridge	MAU port

- 2. Select the interface port type and press [RETURN]. The system displays the new configuration. If you press [RETURN] without selecting a port, the current configuration is not changed. A message similar to the following appears:

Port type = Thinnet Coax



Caution: If you select Thinnet Coax, you must have a properly terminated Thinnet Ethernet cable already attached to the port. Failure to do so will result in the interruption of data traffic through the module. The AUI and the MAU ports may be safely selected even if there is no cable attached to the ports.

Compatibility mode (4)

The Compatibility mode option lets your Ethernet I/O module be fully backward-compatible with prior Ethernet Bridge modules.

Note: Select this option only when the Ethernet Bridge I/O module must be connected into a virtual connection with earlier versions.

You cannot modify this option when any of the following conditions occur:

- The module is active (in a virtual connection) and not in a 2-timeslot mode
- The module is in test mode

Any attempt to modify this option when these conditions are present will cause an error message to display. See the Error Messages section later in this chapter for details.

To select this option:

1. Type **4** at the Module Configuration Menu and press [RETURN]. A message similar to the following appears:

```
Current compatibility mode = 850074 - Standard
Select compatibility mode (1 = 850038, 2 = 850067, 3 = 850074-Standard):
```

Select	Description
(1) 850038	The module configures itself in 2-timeslot mode.
(2) 850067	The module configures itself in 2-timeslot mode.
(3) 850074 - Standard	This option is the default. The module can be configured with 1, 2, 3, or 4 timeslots.

2. Select the compatibility mode and press [RETURN]. If you press [RETURN] without making a selection, the compatibility mode is not changed. A message similar to the following appears:

```
Compatibility mode = 850074-Standard
```

Flow control (5)

The Flow control option lets you enable or disable the flow control mechanism. The flow control mechanism on the PremNet Ethernet Bridge module uses the carrier line/signal to prevent further generation of Ethernet frames on the Ethernet network. To select this option:

1. Type **5** at the Module Configuration Menu and press [RETURN]. A message similar to the following appears, prompting you to change flow control:

```
Module flow control is currently DISABLED
Select Module flow control option (1 = Enabled, 2 = Disabled)
```

2. Select the module flow control option and press [RETURN]. A message similar to the following appears:

```
Module flow control is DISABLED
```

SQE (6)

The SQE option lets you enable or disable the IEEE 802.3-specified SQE or Heartbeat function for the MAU port. The bridge or other device connected to the port may or may not require this function to be enabled. You must configure this option properly prior to connecting a cable to the MAU port, or data loss may occur. To use this option, perform the following steps:

1. Type **6** at the Module Configuration Menu prompt and press [RETURN]. The system displays the current state of the Heartbeat function and a prompt:

```
MAU port heartbeat generation is currently DISABLED
Configure heartbeat generation (1 = DISABLED, 2 = ENABLED):
```

2. To disable Heartbeat, type **1** and press [RETURN]. To enable Heartbeat, type **2** and press [RETURN]. If you do not want to change the current configuration, press [RETURN] without making a selection. The system displays the new state of the Heartbeat function:

```
Heartbeat is DISABLED
```

Configuration Error Messages

This section lists the messages that might display during configuration.

Module must be in point-to-point configuration for 4-timeslot operation !

Explanation: You attempted to configure the module for 4-timeslot mode with the Timeslot select (Z) option while the module connection type was Multipoint.

Solution: Complete the following steps before proceeding:

1. Type **C** at the Module Command Menu prompt and press [RETURN].
2. Type **1** at the Module Configuration Menu and press [RETURN].
3. Change the connection type to 2 (Point-to-Point) and press [RETURN].

You can now select the Timeslot select (Z) option and change the module to 4-timeslot mode.

Cannot change in 4-timeslot mode - only point-to-point valid

Explanation: You tried to change the connection type from Point-to-Point to Multipoint while the module was in 4-timeslot mode. The 4-timeslot mode is valid only with Point-to-Point connections.

Solution: Use the Timeslot select (Z) option to change the timeslot mode, before switching connection types.

Cannot exercise this function while in test mode - cancel current test first

Explanation: You tried to change one of the following configuration options while in test mode.

- connection type
- error reporting
- compatibility mode
- timeslot operation

Solution: Stop the test mode, as follows:

1. Select the Test (T) option from the Module Command Menu and press [RETURN].
2. Select **3** Halt current test from the Module Test Function Menu and press [RETURN].

You can now change the connection type or error reporting type by first selecting the Configuration option from the Module Command Menu, and then selecting either 1 (Connection type) or 2 (Error reporting) from the Module Configuration Menu.

Cannot change - module is active and not in 2-timeslot mode !

Explanation: You tried to change the compatibility mode while the module was active and not in 2-timeslot mode.

Solution: To change the compatibility mode, complete the following steps:

1. Disconnect the module from the virtual connection.
2. Change the compatibility mode to 850074-Standard mode.

Warning - Changing mode will cause the module to momentarily lose communication with the NMM...

Explanation: You are trying to modify the compatibility mode while the module is in standby mode (not connected into a virtual connection), but the module is in either 1-, 3-, or 4-timeslot mode.

If you press [RETURN], the module loses communication with the NMM and terminal for approximately ten seconds.

Solution: This is only a warning message.

Module is currently active - cannot change !

Explanation: You tried to use the Timeslot select (Z) option while the module was in active status.

Solution: Disconnect the module from the virtual connection.

Cannot change while in 850038 or 850067 compatibility mode !

Explanation: You tried to use the Timeslot select (Z) option while the module was in 850038 or 850067 compatibility mode.

Solution: Change the compatibility mode to 850074 - Standard.

Filtering Configuration (F)

The Filter Configuration option lets you set the filter aging timer value. This is the length of time that MAC addresses (maximum 2048) stay in the contents addressable memory (CAM). The value is in seconds.

1. Type **F** at the Ethernet Bridge Module Command Menu prompt and press [RETURN]. The following message appears:

Filtering configuration - configure filtering

2. Press [RETURN]. The system displays the Filtering Configuration Menu, as shown in Figure 4-5.

Filtering Configuration Menu
(1) Set Filter Aging Timer Value
Enter (1):

Figure 4-5. Filtering Configuration Menu

3. Type **1** to enter the desired Filter Aging Timer Value and press [RETURN]. The selections are from 10 to 1 million and the default value is 300 seconds. A message similar to the following appears, prompting you to change the value.

Filter Aging Timer is XXXX
Enter aging timer< 10-1,000,000 > (default = 300):

4. Enter a Filter Aging Timer value and press [RETURN]. The system displays the new Filter Aging Timer Value. If you press [RETURN] without entering a new value, the configuration is not changed.

Filter Aging Time is XXXX

Help (H)

The Help option lets you display a brief description of any of the options available from the Ethernet Bridge Module Command Menu. To select the Help option:

1. Type **H** at the Ethernet Bridge Module Command Menu prompt and press [RETURN]. The system prompts you to enter the letter of the option for which you want help.

01,03: Ethernet Bridge > Help - enter command letter:

2. Enter a letter or press [RETURN] to display the letters and their options.

Monitor status (M)

The Monitor status option lets you monitor traffic on the backbone and the segment. When you select this option, the system continuously displays and time-tags the number of packets (or frames) transmitted and received. It also displays the number of frame errors detected on the backbone and the segment. To access this option, perform the following steps:

1. Type **M** at the Ethernet Bridge module Command Menu prompt. The system displays:

01,03: Ethernet Bridge > Monitor status - monitor module status

2. Press [RETURN]. The system displays a screen similar to Figure 4-6. This screen displays the status with bridge function disabled. The screen automatically scrolls up one line every second. To stop the scrolling display, press any key.

Ethernet (1,3)	Backbone Frames				Segment Frames				Time
	Rx/Sec	Tx/Sec	Rx Utl	Errs	Rx/Sec	Tx/Sec	Rx Utl	Errs	
*	6162	6171	39.9%	0	312	5859	1.7%	0	12:33:45
-	6552	6504	38.2%	0	2878	3626	16.5%	0	12:33:46
*	6327	6327	39.8%	0	2152	4175	12.3%	0	12:33:47
*	6423	6423	37.9%	0	278	6145	1.6%	0	12:33:48
*	5804	5804	39.3%	0	404	5400	2.3%	0	12:33:49
-	6015	6015	41.6%	0	2441	3574	14.0%	0	12:33:50
-	5783	5820	41.7%	0	2684	3136	15.4%	0	12:33:51
*	6305	6268	38.8%	0	1866	4402	10.7%	0	12:33:52
*	5915	5932	38.7%	0	2950	2982	16.9%	0	12:33:53
-	6235	6218	42.8%	0	2639	3579	15.2%	0	12:33:54
*	6107	6107	47.8%	0	0	6107	0.0%	0	12:33:55
-	6331	6331	38.9%	0	2297	4034	13.2%	0	12:33:56
-		6147	38.5%	0	1653	4494	9.5%	0	12:33:57

Figure 4-6. Monitor Module Status Screen

The Monitor Module Status screen displays the following information:

Backbone Frames	Segment Frames
Rx/Sec	Rx/Sec
Tx/Sec	Tx/Sec
Rx/Utl	Rx/Utl
Errs	Errs

where:

Backbone Frames = the number of frames transmitted or received on the fiber or coax PremNet network.

Segment Frames = the number of frames transmitted or received on the local segment through the selected port.

Rx/Sec = the number of Ethernet frames received per second. The Rx/Sec values on the local segment indicate the bursting nature of the data.

Tx/Sec = the number of Ethernet frames transmitted per second.

Rx Utl = the percentage of the total Ethernet bandwidth being used by the traffic received from the Ethernet segment or from the backbone.

Multipoint module: The percentage shown for backbone traffic for a module configured as *multipoint* includes utilization by frames that were originally transmitted by the module. This percentage indicates the load on the local Ethernet segment because it represents the sum of traffic received from the segment and traffic being transmitted onto the segment.

Point-to-point module: For a module configured as *point-to-point*, the total of percentages from the backbone and segment represent the total percent utilization of traffic on the local Ethernet segment.

Use the following formula to calculate Rx Utl.

$$\text{Rx Utl} = \frac{(\text{Frame Size} + 12 \text{ bytes}) \bullet \text{Frames per second (Tx + Rx)} \bullet 8 \bullet 100}{10 \text{ Mbps}}$$

where:

12 bytes = header

8 = bits per byte

Ethernet (1,3) = the node and I/O slot occupied by the module. The symbols underneath this heading indicate the current functional condition of the module, as follows:

Display	Meaning
*	Indicates a normal condition.
X	Indicates an alarm.
-	Indicates flow control invoked.

Errs = the number of errors occurring on the backbone or segment. The number of errors depends on whether errors are Totaled or Sampled. Refer to the Statistics (S) section for more information about errors.

If errors are sampled, the value is either 0 or 1. If errors are totaled, the value reflects the total number of errors detected during that second. A summary of statistics, including errors and peak traffic conditions, is shown on the Ethernet Bridge Module Statistics Screen (Figure 4-9). The errors are associated with missed frames, overflows, underflows, and bad frames, which are detailed in the statistics screen.

Filter = Indicates the number of filtered frames.

If the bridge function is enabled, a screen similar to Figure 4-7 is displayed. This screen is for a point-to-point configuration.

Ethernet (1,3)	Backbone Frames				Segment Frames				Time
	Rx/Sec	Tx/Sec	Filter	Errs	Rx/Sec	Tx/Sec	Filter	Errs	
*	1128	272	436	0	482	692	210	0	12:33:45
-	1102	274	516	0	412	788	138	0	12:33:46
*	1131	208	456	0	419	675	211	0	12:33:47
*	1127	359	486	0	512	641	153	0	12:33:48
*	1135	477	542	0	493	593	186	0	12:33:49
-	1095	279	438	0	524	657	245	0	12:33:50
-	1148	283	472	0	539	676	256	0	12:33:51
*	1164	274	490	0	422	674	148	0	12:33:52
*	1056	357	392	0	522	664	165	0	12:33:53
-	1123	370	401	0	517	722	147	0	12:33:54
*	1145	306	543	0	500	602	194	0	12:33:55
-	1129	252	497	0	495	632	243	0	12:33:56
-		369		0	504		135	0	12:33:57

Figure 4-7. Monitor Module Status Screen (Bridge)

Segment Frames Filtered = Segment Rx/Sec - Backbone Tx/Sec

The number of segment frames filtered is the number of frames that contain a destination address that *was* found in the CAM database, because the destination *is* a device on the local segment.

Backbone Frames Filtered = Backbone Rx/Sec - Segment Tx/Sec

The number of backbone frames filtered is the number of frames that contain a destination address that was *not* found in the CAM database, because the destination is *not* a device on the local segment.

Refer to Figure 4-8 for the following examples:

1. PC-A sends 100 frames/sec. to PC-B and 200 frames/sec. to PC-E. Table 4-2 lists the values you would see in Figure 4-7 at the Ethernet module in each of the three LANs. In Tables 4-2 and 4-3:
 - Backbone Frames Tx/Sec refer to the frames transmitted from a PremNet node to the backbone network.
 - Backbone Frames Rx/Sec refer to the frames received by a PremNet node from the backbone network.
 - Segment Frames Tx/Sec refer to the frames transmitted from a PremNet node to the computers on the Ethernet segment.
 - Segment Frames Rx/Sec refer to the frames received by a PremNet node from the computers on the Ethernet segment.

The Ethernet Bridge Module segment in PremNet Node 1 (LAN 1) receives (**Segment Frames Rx/Sec**) the 300 frames/sec. from PC-A. However, 200 frames/sec. are to go to PC-E in LAN 3. Therefore, 100 frames/sec. are filtered (**Segment Frames Filter**) because they go to PC-B on the same segment. The 200 frames/sec. for PC-E are transmitted out to the backbone (**Backbone Frames Tx/Sec**).

When the 200 frames/sec. reach PremNet Node 2 (LAN 2) (**Backbone Frames Rx/Sec**), their MAC address is checked and found to be not at the correct node, so they are transmitted right back out (**Backbone Frames Tx/Sec**). LAN 2 segment never sees these 200 frames/sec.

When the 200 frames/sec. reach PremNet Node 3 (LAN 3) (**Backbone Frames Rx/Sec**), their MAC address is checked and found to be on that local segment, so the 200 frames/sec. are transmitted (**Segment Frames Tx/Sec**) to the LAN 3 segment (PC-E). PremNet Node 3 does not transmit these frames back out; instead, Node 3 filters them (**Backbone Frames Filter**) because the frames have reached their destination.

Table 4-2. Ethernet Bridge Filtering (Example 1)

	Backbone			Segment		
	Rx/Sec	Tx/Sec	Filter	Rx/Sec	Tx/Sec	Filter
LAN 1	0	200	0	300	0	100
LAN 2	200	200	0	0	0	0
LAN 3	200	0	200	0	200	0

2. PC-E sends 500 frames/sec. to PC-B and 100 frames/sec. to PC-D. Table 4-3 lists the values you would see in Figure 4-7 at the Ethernet module in each of the three LANs.

The Ethernet Bridge Module segment in PremNet Node 3 (LAN 3) receives (**Segment Frames Rx/Sec**) the 600 frames/sec. from PC-E. Node 3 transmits these 600 frames/sec. out to the backbone (**Backbone Frames Tx/Sec**).

When the 600 frames/sec. reach PremNet Node 1 (LAN 1) (**Backbone Frames Rx/Sec**), their MAC address is checked, and 500 frames/sec are found to be at their destination. Therefore, the 500 frames/sec. are filtered (**Backbone Frames Filter**) and transmitted (**Segment Frames Tx/Sec**) to the LAN 1 segment (PC-B). The other 100 frames/sec are not at the correct node, so they are transmitted right back out (**Backbone Frames Tx/Sec**).

When the 100 frames/sec. reach PremNet Node 2 (LAN 2) (**Backbone Frames Rx/Sec**), their MAC address is checked and found to be on that local segment. The 100 frames/sec. are then filtered (**Backbone Frames Filter**) and transmitted (**Segment Frames Tx/Sec**) to the LAN 2 segment (PC-D). PremNet Node 2 does not transmit these frames back out, because they have reached their destination.

Table 4-3. Ethernet Bridge Filtering (Example 2)

	Backbone			Segment		
	Rx/Sec	Tx/Sec	Filter	Rx/Sec	Tx/Sec	Filter
LAN 3	0	600	0	600	0	0
LAN 1	600	100	500	0	500	0
LAN 2	100	0	100	0	100	0

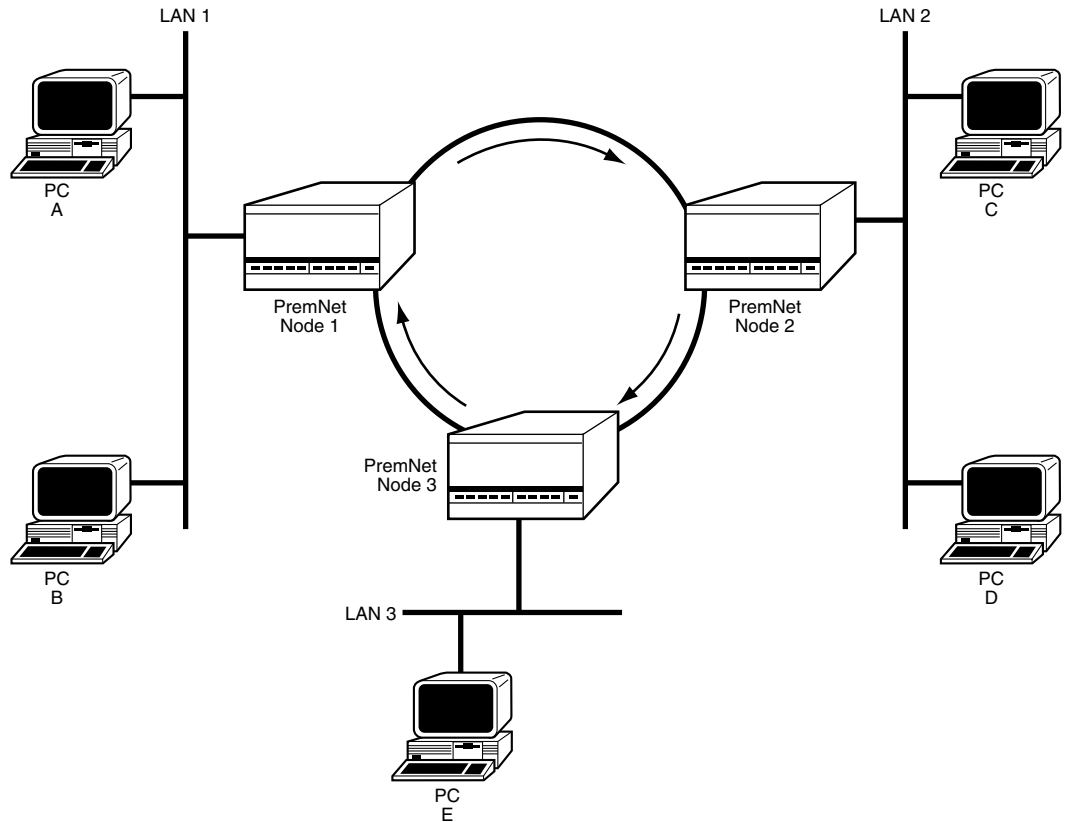


Figure 4-8. Ethernet Bridge Filtering

Log off (Q)

To log off the system, perform the following steps:

1. Type **Q** at the Ethernet Bridge module Command Menu prompt. The system displays:

Log off

2. Press [RETURN]. The system logs you off and displays the date and time you logged on and logged off the system. For example:

Log on: 15-FEB-1997 00:01:45

Log off: 15-FEB-1997 12:35:27

To view the PremNet system introduction screen, press [RETURN] again. The screen prompts you to enter the system password.

Reset counts (R)

The Reset counts option lets you reset the traffic and error counters displayed on the Statistics screen (see Figure 4-9). To select this option, perform the following steps:

1. Type **R** at the Ethernet Bridge Module Command Menu prompt. The system displays the following message:

```
01,03: Ethernet Bridge > Reset counts - zero all counts
```

2. Press [RETURN]. The system displays the following confirmation prompt:

```
ARE YOU SURE ? ( Y/N ):
```

3. Type **Y** and press [RETURN] to reset the counters; type **N** and press [RETURN] to cancel the operation.

Statistics (S)

The Statistics option lets you view the following Ethernet Bridge I/O Module statistics:

- Peak and current frame counts
- Maximum and minimum frame sizes
- Peak and current percent utilization by received traffic
- Number of seconds, minutes, and hours during which errors occurred
- Number of errors, broken down and displayed by type

To select this option:

1. Type **S** at the Ethernet Bridge Module Command Menu prompt. The system displays the following prompt:

```
01,03: Ethernet Bridge> Statistics - traffic and error counts
```

2. Press [RETURN]. The system displays a screen similar to the one shown in Figure 4-9.

Ethernet Bridge Module Statistics -		Counts Last Reset: @ 12:17:08 24 Jan 1997	
Fiber Backbone		Ethernet Segment	
Port Status	FORWARDING	FORWARDING	
Peak Rx Frames/Sec:	7104 @ 12:18:14 24 Jan 1997	7024 @ 12:18:14 24 Jan 1997	
Curr Rx Frames/Sec:	6301	5192	
Peak Rx Util:	49.7% @ 02:57:26 24 Jan 1997	40.4% @ 12:18:10 24 Jan 1997	
Curr Rx Util:	38.0%	29.9%	
Max Rx Frm Size:	1518 @ 10:14:15 24 Jan 1997	1480 @ 10:14:15 24 Jan 1997	
Min Rx Frm Size:	64 @ 10:14:15 24 Jan 1997	64 @ 10:14:15 24 Jan 1997	
Error Seconds:	0	1	
Error Minutes:	0	1	
Error Hours:	0	1	
Last Error Second:		@ 21:23:32 24 Jan 1997	
Missed Frames:	0	0	
Overflows:	0	0	
Underflows:	0	0	
Bad Frames:	0	1	
Packets Filtered	0 @ 10:14:15 24 Jan 1997	71 @ 10:14:15 24 Jan 1997	

Figure 4-9. Ethernet Bridge Module Statistics Screen

The Statistics Screen displays the following information:

Peak Rx Frames/Sec = the maximum number of frames the module has processed in one second since the statistics were last reset.

Curr Rx Frames/Sec = the current number of frames the module has processed in the previous second.

Peak Rx Util = the maximum percentage of Ethernet bandwidth and the time it is calculated.

Curr Rx Util = the current percentage of Ethernet bandwidth being utilized.

Max Rx Frm Size = the size of the largest frame received and the time it was received.

Min Rx Frm Size = the size of the smallest frame received and the time it was received.

Filtered Packets = the number of packets that were filtered and the time they were filtered.

Counts Last Reset — The date and time when the counters were last reset.

Error Seconds — The number of seconds in which errors have been detected since the counts were last reset.

Error Minutes — The number of minutes in which errors have been detected since the counts were last reset.

Error Hours — The number of hours in which errors have been detected since the counts were last reset.

The following example discusses how to interpret the data in the *Error Seconds*, *Error Minutes*, and *Error Hours* fields.

Example:

Assume that the error counters were reset 10 hours ago.

- Check the *Error Hours* field. If the value in the field is 10, at least one error has occurred every hour for the past 10 hours.
- Check the *Error Minutes* field. If the value in the field is 60, at least one error occurred in any given minute for a total of 60 minutes in the last 10 hours.
- Check the *Error Seconds* field. If the value in the field is 900, at least one error occurred in any given second for a total of 900 seconds in 60 minutes in 10 hours.

Last Error Second — Displays the date and time of the last second during which an error (or errors) was detected.

Missed Frames, Overflows, Underflows, and Bad Frames — These error counts are displayed as either *totaled* or *sampled*, depending on the module's configuration, as follows:

Sampled Error Counts

When errors are sampled (the default), the module obtains a sample of what errors occurred during the last second and updates its counts accordingly. Therefore, the displayed values actually indicate the number of seconds in which those types of errors occurred.

Totaled Error Counts

When errors are totaled, the module counts each individual occurrence of an error, and the counts displayed indicate a true count of the total number of errors of each type that have occurred since the last time the counts were reset.

Error Types

Two types of errors are displayed, Fiber Backbone and Ethernet Segment errors.

Fiber Backbone (Backplane) errors are a sum of three errors reported by the HDLC controller chip. These are:

- Missed Packet
- Receiver Overrun
- Transmitter Underrun

Ethernet Segment errors are the sum of four errors reported by the Lance (Ethernet) chip. These errors are:

- Missed Packet
- Receiver Overrun
- Transmitter Underrun
- Bad Frames (Wrong CRC)

Note: The totaled mode causes a greater burden on the module than the sampled mode, and results in reduced traffic throughput. Use the Configuration, error reporting option to change the way errors are counted.

Test (T)

The Test option lets you test a new Ethernet network before live data is sent out onto it. You can generate test traffic onto the local Ethernet segment or onto the PremNet 5000 fiber backbone. To access this option, perform the following steps:

1. Type **T** at the Ethernet Bridge module Command Menu prompt. The system displays the following message:

Test - module test

2. Press [RETURN]. The system displays a screen similar to the one in Figure 4-10 that shows the currently selected state of the test function, along with a menu.

Module test function —	
Status: NO TEST IN PROGRESS — —	
(1)	generate ethernet traffic
(2)	generate backbone traffic
(3)	halt current test
enter (1-3):	

Figure 4-10. High-Performance Ethernet Bridge Module Test Menu

(1) generate ethernet traffic

The generate ethernet traffic option generates test traffic on the Ethernet Bridge I/O Module. You can direct the module’s output into another module to simulate live traffic to test that module and all the other modules connected to it in a virtual connection, or you can direct the output onto your own Ethernet network to generate test traffic. The test traffic generated has no adverse effect on the network other than to increase the traffic volume, which in itself may cause problems on the network. Avoid overburdening a live network with test traffic.

To select the generate ethernet traffic option, perform the following steps:

1. Type **1** and press [RETURN]. The system displays:

```

Generate Ethernet Test Traffic - -
-----
Input % load (10--85):
    
```

2. Enter the percentage of bandwidth you want the test traffic to use, and press [RETURN]. Valid values are 10 through 85, inclusive. After you enter an appropriate input value, the following prompt appears:

```

Input # of packets/sec. (min= xxx, max= xxxx):
    
```

3. Enter the number of test traffic packets per second that you want to transmit, and press [RETURN]. The range of valid values are indicated in the *min* and *max* fields. This range is determined by the IEEE 802.3-specified minimum and maximum Ethernet packet sizes and the user-specified % load.

The system displays the values you entered in the Input % load and the Input # of packets/sec. fields, and the number of bytes per packet (which is calculated automatically from the load percentage and number of packets per second you entered).

For example, if you entered 30% traffic load at a rate of 3000 packets per second, the number of bytes per packet is 117. (This packet size includes source and destination addresses, type field, data field, and frame check sequence [FCS] bytes.)

Test parameters: xx% load, xxxx packet/sec.,
xxx bytes/packet
Proceed ? (Y/N)

4. Enter **Y** and press [RETURN] to run the test; enter **N** and press [RETURN] to cancel.
 - a. If you enter **Y**, the system displays a warning message that states the test will cause the module to be reinitialized, and asks you again if you want to proceed with the test. Enter **Y** to run the test. The system redisplay the Ethernet Bridge module Test menu. The message ETHERNET TRAFFIC GENERATION IN PROGRESS appears in the Status field.
 - b. If you enter **N**, the system redisplay the Ethernet Bridge module Test menu.

(2) generate backbone traffic

The generate backbone traffic option tests the Ethernet Bridge I/O Module's ability to transmit Ethernet packets over the backbone to another Ethernet Bridge I/O Module in the virtual connection. You can perform this test for each High-Performance Ethernet I/O Module in each virtual connection to verify the integrity of the connection before it is used to transport live data.

To select the generate backbone traffic option, perform the following steps:

1. Type **2** at the Module test function prompt and press [RETURN]. The system displays the following warning message:

Warning

This test will reinitialize the module and burst frames onto the backbone at a rate of 128 per second. Frames received from the backbone or the Ethernet segment will be discarded.

Continue ? (Y/N)

2. Type **Y** to run the test or **N** to cancel and press [RETURN].
 - a. If you enter **Y**, the system runs the test and redisplay the Ethernet Bridge module Test Function menu. The following message appears in the Status field:

STATUS: BACKBONE TRAFFIC GENERATION IN PROGRESS - -
 - b. If you enter **N**, the system redisplay the Ethernet Bridge module Test Function menu.

(3) halt current test

The halt current test option stops whatever test that is running. Type **3** and press [RETURN].

STATUS: NO TEST IN PROGRESS - -

Notes: You must select this option before you can move from one test to another. In addition, stop all tests before connecting active Ethernet devices to the Ethernet Bridge I/O Modules.

View configuration (V)

The View configuration option enables you to display the Module, Bridge, or Filtering configuration. To select this option, type **V** at the Ethernet Bridge Module Command Menu prompt, and press [RETURN]. The system displays the menu shown in Figure 4-11.

View Configuration

View Configuration Menu
(1) Module (2) Bridge (3) Filtering Enter (1-3):

Figure 4-11. View Configuration Menu

(1) Module

1. Type **1** and press [RETURN] to view the module configuration. The system displays a screen similar to Figure 4-12.
2. Press [RETURN] and type **V** to return to the View Configuration Menu.

Ethernet Bridge Module Configuration Status:	
Node	: 1
Channel	: 5
Serial Number	: 10741
Hardware Revision	: A
Software Revision	: 01
Module Status	: ACTIVE without Alarms
Port Type	: AUI
Connection Type	: Multi-Point
Error Reporting	: SAMPLED
Backplane Timeslots	: 2
Module Flow Control	: DISABLED
Compatibility Mode	: 850074-Standard

Figure 4-12. Module Configuration Status Screen

This section lists the field definitions for the Ethernet Bridge Module Configuration Status screen. The values in the last five fields shown in Figure 4-11 represent the default configuration. Use the Configuration option to modify these values.

Node

Indicates the number of the node in which the Ethernet module is installed. This field may contain an asterisk (*) for up to one minute after the module is initialized, before the Network Management Module downloads the node identification to the module.

Channel

Contains the node I/O channel slot in which the module is installed.

Serial Number

Indicates the Milgo Solutions serial number assigned to the module.

Hardware Revision

Indicates the revision level of the module hardware.

Software Revision

Indicates the revision level of the module software.

Module Status

Indicates the status of the module. The valid values are:

- *active* (connected into a virtual connection)
- *standby* (not connected into a virtual connection)
- *test* (the module is generating test frames either on the backbone or the local Ethernet segment)

This field also indicates whether the module is currently generating any alarms.

Port Type

Indicates which of the three Ethernet ports is selected. The possible port types are AUI, Thinnet coax, and Ext Bridge.

Connection Type

Indicates whether the module is operating in multipoint or point-to-point mode. All modules in the virtual connection must show the same value in this field.

Error Reporting

Possible values are Sampled or Totaled. For more information, see the Configuration, error reporting and Statistics sections earlier in this chapter.

Backplane Timeslots

Specifies the backplane bandwidth available to the module. Valid values are 1 through 4.

Module Flow Control

Indicates whether the flow control mechanism is enabled or disabled.

Compatibility Mode

Indicates in which mode the module is operating. Enable this field only when the module must be connected into a virtual connection with earlier Ethernet modules.

(2) Bridge

1. Type **2** and press [RETURN] to view the bridge configuration. The system displays a screen similar to Figure 4-13.
2. Press [RETURN] and type **V** to return to the View Configuration Menu.

Bridge Configuration Status	
Mode	: ENABLED
Priority	: 32768
Max Age	: 20
Hello Time	: 2
Forward Delay	: 15
Segment Port Priority	: 128
Backbone Port Priority	: 128
Segment Path Cost	: 100
Backbone Path Cost	: 100

Figure 4-13. Bridge Configuration Status Screen

(3) Filtering

1. Type **3** and press [RETURN] to view the filtering configuration. The system displays a screen similar to Figure 4-14.
2. Press [RETURN] and type **V** to return to the View Configuration Menu.

Filtering Configuration Status	
Filtering Age Time	: 300
Valid Cam	: Yes
CAM Size	: 2048

Figure 4-14. Filtering Configuration Status Screen

Filtering Age Time is the length of time in seconds that the Contents Addressable Memory holds MAC addresses.

Valid CAM indicates whether Contents Addressable Memory (CAM) chips are in the module (yes or no).

CAM Size is the number of bytes of Contents Addressable Memory.

Exit (X)

The Exit option returns you to the Node Command Menu. To select this option, perform the following steps:

1. Type **X** at the Ethernet Module Command Menu prompt. The system displays the following prompt:

01,03: Ethernet Bridge > Exit

2. Press [RETURN]. The system exits the Ethernet Module Command Menu prompt and displays the Node Command Menu.

Timeslot select (Z)

The Timeslot select option lets you configure the module for 1, 2, 3, or 4 backplane timeslot operation.

Note: If you are using the module as a filtering bridge, refer to the Path Cost section of this chapter for more information.

You *cannot* use this option when one of the following conditions is present on the module:

- The module is in active mode (in a virtual connection)
- The module is in either 850038 or 850067 compatibility mode
- The module is in test mode
- The module is in multipoint mode and you are trying to select 4 timeslots.

To select this option:

1. Type **Z** at the module command prompt. The following message appears:

01,03: Ethernet Bridge > Timeslot Select - Select # of backplane timeslots.

2. Press [RETURN]. A message similar to the following appears, prompting you to change the number of timeslots selected:

Current Backplane timeslots = 3

Note: Changing this option will cause the module to momentarily lose communication with the NMM...

Select # of backplane timeslots (1-4)

Table 4-4 lists the equivalent bandwidth for each timeslot selection.

Table 4-4. Timeslot-to-Bandwidth Table

Select	Equivalent Bandwidth
1 timeslot	4.704 Mbps
2 timeslots	9.408 Mbps
3 timeslots	14.112 Mbps
4 timeslots	18.816 Mbps

Each PremNet timeslot provides a bandwidth equivalent to 4.704 Mbps.

3. Select the number of timeslots and press [RETURN]. If you press [RETURN] without making a selection, the number of timeslots does not change. The system displays a message similar to the following:

Backplane timeslots = 2

Command menu (?) or (/)

To display the options on the Ethernet Module Command Menu, type ? or / at the Ethernet Module Command Menu prompt.

Interface Module select (#)

The Interface Module select option lets you select another I/O module to be configured or viewed. To select this option, perform the following steps:

1. Type # at the Ethernet Module Command Menu prompt. The system displays the following prompt:


```
01,03: Ethernet Bridge > Interface module select - enter module position (1-8):
```
2. Enter the slot position number of the I/O module you want to select, and press [RETURN]. The system selects the new module and displays the Module Command Menu for that module. If you enter an invalid (non-existent) module position, an error message is displayed and the current module remains selected.

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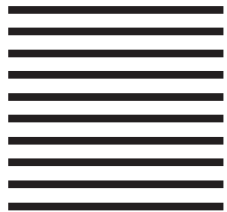
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