CMS™ 400
PremNet™ 5000 Manager

User's Guide

13D29A-7/C 8/95

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Third Edition, August, 1995

Printed in U.S.A.

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About This Manual

Manual Description

The *CMS 400 PremNet 5000 Manager User's Guide* is designed to help you configure and manage your CMS 400 PremNet 5000 Manager Module.

This manual consists of the following chapters:

- **Chapter 1 - Introduction** provides an overview of CMS 400 PremNet 5000 chassis and the supported I/O modules.
- **Chapter 2 - Managing the PremNet 5000 Chassis** provides detailed information for connection, configuration and set up your PremNet 5000 System.
- **Chapter 3 - Managing Specific I/O Modules** provides you with configuration, monitoring, and testing procedures on the supported PremNet 5000 I/O modules.

For further information on PremNet 5000, refer to the following manuals:

- *PremNet Broadband Access System Installation and Operation Manual* (# PND950004-1/A) for information about how to install and configure the PremNet 5000 chassis.
- *PremNet 5000 I/O Module Management Manual* (# 950-1461-00) for information about the specific I/O modules associated with the PremNet 5000 chassis.

Terminology and Conventions

The following conventions are implemented throughout this manual to aid you in determining what messages are being displayed by the CMS 400 System versus what you, as an operator, have to input.

Text displayed by the CMS 400 System is shown in System non-bold type:

```
Login
```

Characters that must be input by you exactly as indicated are shown in System boldface type:

```
Login System
```

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Chapter 1
Introduction

About Your CMS 400 PremNet 5000 System

PremNet 5000 allows logical connections to be established between I/O modules in various nodes. Fiber bandwidth is divided into twenty time slots which may be allocated to these connections. Some connections may require more than one time slot, depending on the type of interface.

The PremNet 5000 System can be managed either from an asynchronous terminal attached to the RS-232 port on the Network Management Module (NMM) installed in the master PremNet 5000 node or through the CMS 400 workstation. This User's Guide describes how to manage your system using the CMS 400 workstation. For information about how to manage PremNet 5000 from a terminal, see the *PremNet 5000 System Installation and Configuration Manual*.

The CMS 400 allows you to manage your PremNet 5000 in various ways. You have the capability to access, view, add, modify, delete, and test the I/O modules within your PremNet 5000 chassis.

The following paragraphs describe the various I/O modules that are installed in the PremNet 5000 Chassis. For more specific information about the various modules, see the *PremNet 5000 System Installation and Configuration Manual* and the *PremNet 5000 I/O Module Management Manual*.

Enhanced Network Management Module

The Enhanced Network Management Module (ENMM) enables you to configure and manage any module in any node in the PremNet 5000 System by issuing commands through either the T7 or RS-232 management ports or through the Ethernet interface ports (AUI or Thinnet) located on the faceplate of the ENMM.

Ethernet I/O Module

The Ethernet I/O Module is a full-forwarding bridge (non-filtering) that allows you to connect multiple Ethernet segments or networks. The Ethernet module provides three types of connections to the local Ethernet segment:

- Attachment Unit Interface (AUI) (female DB15) for connection to a MAU.
- Thin Ethernet coax interface (BNC) for connection to a 10BASE2 segment.
- Media Access Unit interface (MAU) (male DB15) for connection to a bridge or other AUI port.

High-Performance Ethernet I/O Module

The High-Performance Ethernet I/O module provides full bandwidth Ethernet remote connectivity between Ethernet segments or networks connected to the PremNet 5000 System. With this module, you can connect remote Ethernet networks through the PremNet 5000 100 Mbps fiber backbone, which will give you the same functionality as if all connected devices were together on the same logical 10 Mbps network, even though those devices may be separate by long distances.

Token Ring 4/16-Mbps I/O Module

The Token-Ring 4/16-Mbps I/O Module is used to transport Token-Ring Data across the fiber backbone. This module provides four DB9 lobe ports for connecting devices and a RI/RO interface for connecting additional standalone MAUs.

RS-422 I/O Module

The RS-422 I/O Module has asynchronous and synchronous data communication via four DB25 connectors with speeds up to 2.048Mbps. Each port on the module is independently configurable. This module supports four different clock configurations: external synchronization, internal synchronization, slave, and asynchronous.

Note: The RS-422 I/O Module is available as a 2- or 4- port version. The operations for both ports are identical.

V.35 I/O Module

The V.35 I/O Module has asynchronous and synchronous data commu-nication via four V.35 interface ports at speeds of up to 2.048Mbps. Each port on the module is independently configurable. This module supports the standard Winchester connections.

Note: The V.35 I/O Module is available as a 2- or 4- port version. The operations for both ports are identical.

T1/E1 I/O Module

"T1" and "E1" are used to differentiate between the North American and European hierarchical voice/data transmission systems used in the digital telephone network. There are six similar I/O modules that differ only by the number of ports, data rate, and physical interface. These I/O modules provide an interface and transport data to a similar module in another PremNet node. They also provide transparent transmission through the network.

RS-232 4-Port I/O Module

The RS-232 4 Port I/O Module has asynchronous and synchronous data communication via four RS-232 interface ports at speeds up to 38.4Kbps. Each port on the module is independently configurable.

4-Wire Voice Card I/O Module

The 4-Wire Voice Card I/O Module provides a bi-directional analog interface suitable for transporting up to eight voice or voice band-data (300 to 3400 Hz) circuits to an interface module located within a PremNet 5000 network.

3270 8/32-Port I/O Module

The 3270 8/32-Port I/O Module allows you to connect 3270 devices to the PremNet 5000 System. The 3270 interface consists of 32 discreet ports, although it can be multiplexed into four 8-port groups, as in 3299 applications. It has direct transport of up to 8-,16-, or 32-ports of non-multiplexed data to and from the controller and peripheral devices. Transport of four ports of pre-multiplexed data to and from a Terminal Multiplex Adapter (TMA) to a remote node where either a TMA is resident, or 32-port interface module is present in the PremNet 5000 System.

16-Port HDS I/O Module

The 16-Port HDS (Hospital Data Services) I/O Module allows you to transport data between a TDS T1213 Controller TDS terminals over the PremNet 5000 fiber-optic backbone. They also provide transparent transmission through the network.

5250 8-Port and 4-Port I/ O Modules

The 5250 I/O modules transport the 5250 serial bit stream across the fiber backbone using one TDM timeslot. The module is available in either an 8-port RJ-45 type interface or a 4-port Twinax type interface for workstation/controller connectivity. You can connect these modules in a multi-module configuration, such as one controller module with multiple peripheral or multiplexer modules. You can configure the port connection at the module level.

Asynchronous Transfer Mode (ATM) I/O Module

The ATM I/O module is a transmission technique that makes it possible to send vast quantities of video, voice, and computer data over the same circuits at extermely high speeds and can readily "switch" the traffic as the telephone service does with voice traffic.

The PremNet ATM I/O module enables you to send and receive short, fixed-length packets called "cells" using the ATM transport. The PremNet 5000 accepts cell traffic from your premise and carries that traffice back into the carrier's backbone ATM network. The ATM I/O module provides a signalling protocol interface that complies with ATM Forum's User Network Interface (UNI) standard. Although cells carry the data over the ATM interface, the internal transport of the data in the PremNEt system is circuit based. You define the bandwidth that is allocated to carry the traffic between PremNet nodes.

SONET/SDH I/O Module

SONET is the data transmission standard used the the United States and Synchronous Digital Hierarchy (SDH) is the standard used in Europe. The SONET/SDH link module converts PremNet backplace data into SONET or SDH frames (mode is software-selectable), which are transmitted at 155 Mbps over fiber-optic cable.

Video I/O Module

The PremNet 5000 Video I/O module enable you to communicate video/audio information from a central site to groups of users at remote sites. In addition, teleconferencing offers the advantages of transmitting documents, charts, pictures, and other visuals that can be sent over to a standard television monitor.

Accessing the PremNet 5000 Manager via the CMS 400

The Communications Management Series (CMS™) 400 kernel is the base software which contains the software to run non-Microsoft Windows and Microsoft® Windows™ workstations. It also contains the code needed for the hub to manage your PremNet 5000 products.

Although the code for managing your PremNet 5000 products is embedded within the CMS 400 software, it can only be accessed by installing the proper key module which literally "turns on" access to your PremNet 5000 products.

Note: The PremNet 5000 Manager key module is a separately-purchased option to your CMS 400 System.

When a module (key) is installed on a hub, unit types supported by that key may be added to the database. The number of units that may be added is limited by the key.

Refer to the *CMS 400 Installation Manual*, Chapter 3, for instructions on installing key modules.

Chapter 2
Managing the PremNet 5000 Chassis

Introduction

This chapter discusses how to configure and manage each node in your PremNet 5000 System and establish virtual circuits between the modules.

Before you can configure the system, however, you must perform the following tasks:

- Set the dip switches on the NMM. Refer to Chapter 4 of the *PremNet 5000 System Installation and Configuration Manual*.
- Verify that the nodes are linked together using fiber-optic cable and that the common modules are properly installed in the nodes.
- Power-up each PremNet 5000 node and check that no red LEDs are lit.
- Connect the CMS 400 management station to the NMM (see the following procedure, “Connecting the CMS 400 Management Station”).

Connecting the CMS 400 Management Station

The PremNet 5000 connects to a CMS 400 System via a six-pin T7 connector located on the PremNet 5000 master node's NMM panel. A cable from this connector to the CMS 400's EDM provides a 75- through 9600-bps asynchronous channel for monitoring and control. If the PremNet 5000 installation is remotely located at the end of a Milgo modem link, this T7 channel may be accessed via a connector on the back of the modem.

Before you can use the CMS 400 workstation to manage your PremNet 5000 System, you must complete the following steps:

1. Create a database for the PremNet 5000 System. Refer to the *CMS 400 User's Guide* for instructions on creating a database.
2. Specify the address and speed (75- through 9600-bps) of the T7 channel. Refer to Chapter 4 of the *PremNet 5000 System Installation and Configuration Manual* for instructions.
3. Create a channel from the EDM to the PremNet 5000 ring. Refer to the *CMS 400 User's Guide* for more information on using the Component Map to create channels.

4. Define the PremNet ring to the CMS 400 database with a T7 channel and T7 address. Refer to "Adding PremNet 5000 to the CMS 400 Database" within this chapter.

Adding PremNet 5000 to the CMS 400 Database

The master PremNet 5000 node (Node 1) is defined by its T7 address. The CMS 400 System can use the master node to manage all the nodes in your PremNet 5000 ring.

To add a PremNet 5000 ring to the CMS 400 database:

1. Choose F4: Network Map from the CMS 400 Database menu.

2. Select I:nsert.

   The Insert New Unit screen provides fields for the T7 Channel name and several numeric addresses:

   - The channel name represents the 75- through 9600-bps diagnostic channel that is used to access the master PremNet 5000 node.

   - The first numeric address field represents the unique T7 address on that channel, which can range from 1 to 255. This address is set on the PremNet 5000 using the asynchronous terminal interface.

   The master PremNet 5000 node should be defined completely, with a T7 channel, T7 address, and the unit name of the node. The other PremNet 5000 nodes in the ring are automatically defined by the master node.

Verifying Communication

Once the PremNet 5000 rings are defined in Network Map and are physically connected to the T7 channel, verify that CMS 400 can communicate with the master PremNet 5000 node.

1. Place the cursor on the master PremNet 5000 node in Network Map.

2. Select P:oll.

   If the CMS 400 System can communicate with the master node, the message: Target Device Responds to Poll is displayed. If it cannot communicate with the master node, the following message is displayed: Target Device Does Not Respond.

Displaying the PremNet 5000 Ring

To display the PremNet 5000 at the ring level:

1. Select PremNet Control from the LAN Control menu.

   If you have one master node defined in CMS 400, the system immediately displays a graphic representation of your PremNet 5000 ring (see Figure 2-1 for an example).

   If you have more than one master node defined in the CMS 400, you must identify which ring to display.

   - Specify the ring you want to access by entering the master node's T7 channel and T7 address. The master node's unit name may be used as well.

   The screen then displays a graphic representation of the ring. Figure 2-1 shows a sample PremNet 5000 ring with three nodes.

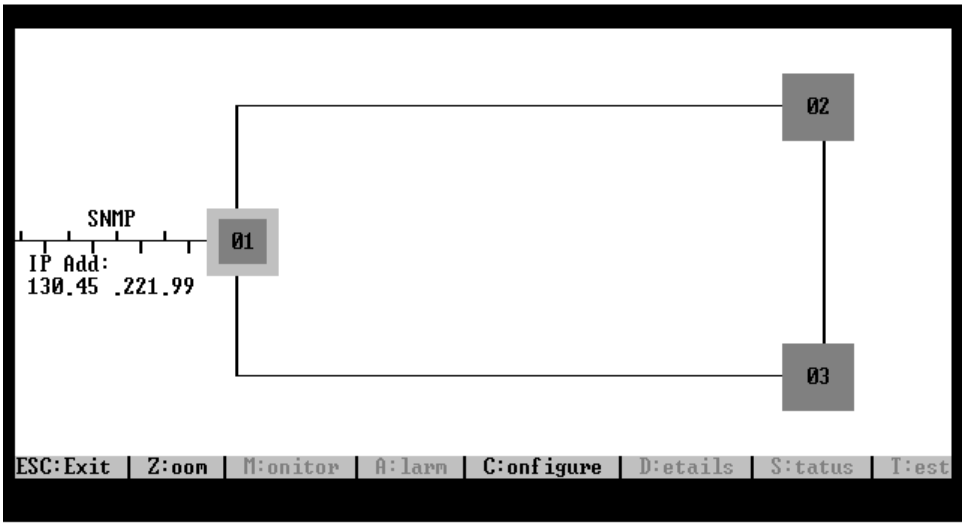

Figure 2-1. PremNet 5000 Ring-Level Screen

The node number and site name (if defined) are displayed on each node in the ring.

Configuring Virtual Connections

Virtual connections are used to create logical paths between I/O modules with a ring. Your network interconnection plan, which defines the physical locations and the logical numbers of the PremNet nodes, and the desired interconnection paths for the various types of transported data, dictates how you establish the virtual connections.

This procedure allows you to assign timeslots by creating a connection between two of the same type of modules installed in two separate nodes.

Note: The PremNet 5000 master node retains vital connection data through a power outage. However, the connection name is not retained and reverts to a default naming convention. You can change the name of each connection without affecting the existing connection.

To configure virtual connections:

1. Display the master node ring as described previously.

2. Select C:onfigure from the bottom key legend.

   The system displays the PremNet 5000 System Configuration screen, as shown in Figure 2-2.

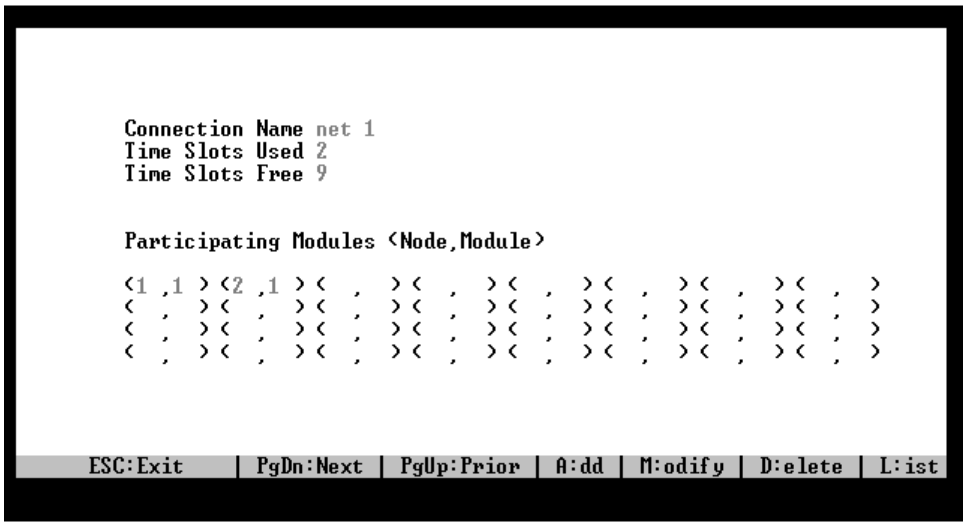

Figure 2-2. PremNet 5000 System Configuration Screen

If connections have not been defined, the fields in the screen are blank. If connections have been defined, the screen shows the name of the defined connection, the number of time slots used, the number of time slots available, and the node and slot numbers of the I/O modules in the connection.

3. Select A:dd .

   The System Configuration screen is refreshed with the cursor positioned next to the Connection Name field.

4. Enter the name you want to use for the connection. The name can be up to 10 alphanumeric characters and press [ENTER].

5. Enter the node number of the I/O module from which you want to make the connection and press [ENTER].

6. Enter the slot number in which the I/O module is installed and press [ENTER].

Note: If you make an invalid connection, an error message is displayed. For example, you cannot assign a connection between modules with different timeselot requirements or assign a connection to a vacant I/O slot in the chassis.

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7. Repeat Steps 5 and 6 for other point-to-point virtual connections desired between the same type of I/O modules in the network.

8. Press [PGDN] to save the virtual connections you created. The system automatically calculates the number of time slots used and the number of time slots available.

Establishing Multiple Connections

All types of I/O modules allow for multiple connections. To establish multiple connections:

1. Establish the initial point-to-point connections, as described in "Configuring Virtual Connections".

2. Select C:onfigure from the bottom key legend.

3. Use [PGDN] and [PGUP] to scroll through the various connections until you locate the connections that you want to modify.

4. Select M:odify.

5. Enter the connection name of the connection you want to modify.

6. Choose A:dd from the bottom key legend.

7. Enter the node number and the slot number of the I/O module you want to add to the existing connection.

8. Repeat Steps 6 and 7 to establish additional connections, as necessary.

Listing Virtual Connections

You can display a list of all of the created connections within the network. To do this:

1. Display the master node ring as described previously.
2. Select C:onfigure from the bottom key legend.

   The system displays the PremNet 5000 System Configuration screen.
3. Select L:ist.

   A list of all the connection names, the modules in the connections, and the number of available time slots for each connection is displayed.
4. Press [ESC] to exit the list. The PremNet 5000 Ring-Level screen is redisplayed.

Deleting Virtual Connections

To delete virtual connections:

1. Display the master node ring as described previously.
2. Select C:onfigure from the bottom key legend.

   The system displays the PremNet 5000 System Configuration screen.
3. Press [PGDN] or [PGUP] to scroll through the connections and locate the one you want to delete.
4. Highlight the connection and select D:elete. The following prompt appears:

   Are You Certain? Press Y to Confirm, Any Other To Cancel
5. Type **Y** to delete the connections; type **N** to cancel the delete request.

Chapter 3
Managing Specific I/O Modules

Introduction

This chapter describes the specific configuration features of the various I/O modules. Become familiar with the procedure "Displaying a PremNet 5000 I/O Module" for instructions on how to display the front view of any module. Then follow the remaining procedures within this chapter for the specific I/O module.

Displaying a PremNet 5000 I/O Module

From the PremNet 5000 Ring-Level screen, you can configure the network or display a detailed graphic representation of a single node. From the node level, you can go one step further and display each module on that node.

To display the node:

1. Press the arrow keys until the white frame surrounds the node you want to view.
2. Select Z:oom.

   The PremNet 5000 front view of the selected node is displayed with all the modules installed. Refer to Figure 3-1 for an example.

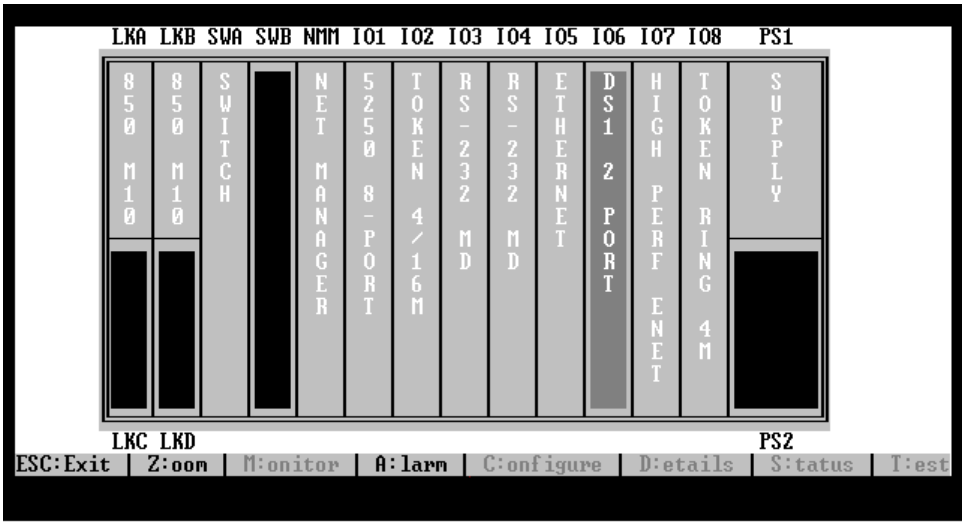

Figure 3-1. Front View of PremNet 5000 Node

Module names appear in various colors to indicate alarm conditions: Major alarms are indicated in red, minor alarms are indicated in yellow. If no alarms are detected, the module name appears in white. Dark rectangular areas represent empty slots.

To display a specific module from the node view:

1. Select a module by pressing the arrow keys until the highlight bar is positioned on your selection.

2. Select Z:oom. An example is shown in Figure 3-2.

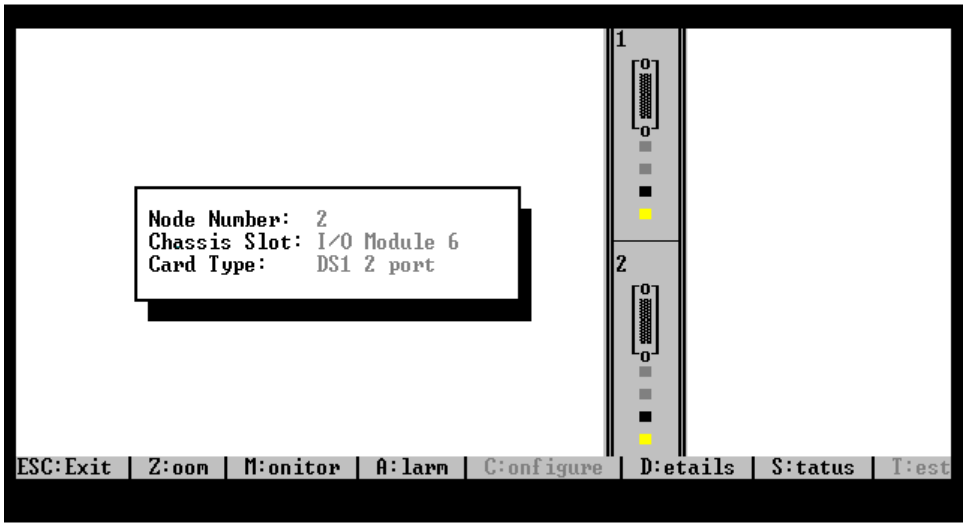

Figure 3-2. Example of the Front View of a DS1 Module

From this level, you can perform various operations on the module by clicking on the operation from the bottom legend of the screen (non-applicable operations are grayed out).

For all of the modules, however, you display alarms and detail about the module in the same way. Those procedures are described in the following paragraphs.

Displaying Detail about an I/O Module

To display the serial number, hardware revision and software revision for a module:

1. Display the front view of the module.

2. Select D:etails from the bottom legend.

   The Serial Number, Hardware Revision and Software Revision for the selected module is displayed (refer to Figure 3-3 for an example).

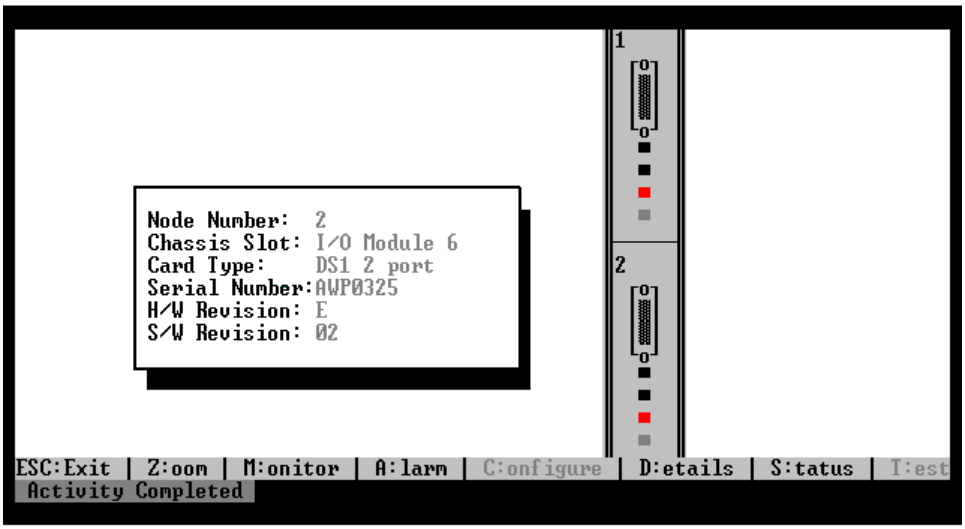

Figure 3-3. Example of DS1 Module Detail Screen

Displaying Alarms Received by an I/O Module

To display alarms received by the various I/O modules:

1. Display the front view of the I/O module.
2. Select A:larms from the bottom legend.

   A secondary legend appears.

   Choose from one of the following operations:

   - C:urrent - displays a listing of all of the current system alarms.
   - H:istory - displays a listing of all of the previous alarms received.
   - C:lear History - Clears all history alarms from database. You will receive a confirmation before the alarms are cleared.

Displaying the Port Level of an I/O Module

To perform operations from the port level of a module:

1. Display the front view of the I/O module.
2. Select Z:oom.

   A screen similar to Figure 3-4 is displayed.

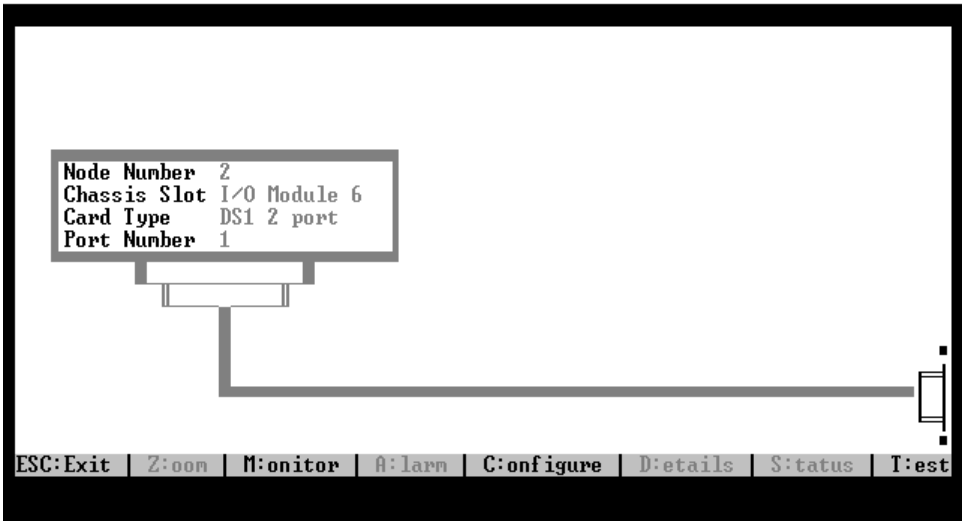

Figure 3-4. Example of Port Level Screen

3. Choose the applicable operation from the bottom legend.

Enhanced Network Management Module

The Enhanced Network Management Module (ENMM) enables you to configure and manage any module in any node in the PremNet 5000 system by issuing commands through either the T7 or RS-232 management ports or through the Ethernet interface ports (AUI or Thinnet) located on the faceplate of the ENMM.

There are ten external alarm outputs and four external alarm inputs on the ENMM. The following procedure allows you to customize the alarm messages as well as set their levels (major or minor) for the four external alarm inputs.

To customize the text for the external signaling alarms:

1. Display the front view of the Network Manager module.

2. Select C:onfigure.

   The current external alarm signaling text strings are displayed. The cursor is positioned on the first textual alarm string.

3. Edit the alarms and set the levels as necessary.

Ethernet I/O Module

The Ethernet I/O Module provides a full-forwarding (non-filtering) bridge function that enables you to connect multiple Ethernet segments or networks. These segments or networks then appear as one segment, with all traffic from any one segment appearing as traffic on all other connected segments.

This section provides specific information on configuring and managing the Ethernet I/O module.

Configuration Strategy

This procedure provides an overall strategy when configuring a new Ethernet I/O module into an existing network. Review the steps carefully. Each step is broken down within this section into a more detailed procedure.

1. **Establish point-to-point virtual circuits between the new Ethernet I/O modules.** You can connect up to 32 Ethernet I/O modules in the same virtual circuit. There should be no external equipment attached to the Ethernet I/O modules at this point. Refer to "Configuring Virtual Connections" in Chapter 2.

2. **Access one of the new Ethernet I/O modules.** Refer to "Displaying a PremNet 5000 I/O Module" within this chapter.

   Check that the fields on the status screen contain the following values:

   Module Status field - ACTIVE without Alarms

   If the status of the module is not active, the module has not been connected to a virtual circuit. 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 field - AUI so that the Ethernet segment is terminated properly.

   The following fields should be the same for each module in a virtual circuit:

   - C*onnection type*
   - *Error Reporting*
   - *Backplane Option*
   - *Flag Words*
   - *Module Flow Control*
   - *850038 Compatibility*

3. **Test the new Ethernet I/O Module.** Refer to "Backbone Test" within this section.

4. **Check the traffic statistics.** While the Backbone test is running, monitor the module. Refer to "Monitoring Statistics" within this section.

   The traffic statistics displayed should report 128 frames per second transmitted and received on the fiber backbone.

5. **Check each Ethernet I/O module in the virtual circuit.** The traffic statistics displayed should report 128 frames per second received from the fiber backbone. Additionally, the module should display 128 frames per second transmitted onto its local Ethernet segment, provided that the segment is properly terminated. Refer to "Monitoring Statistics" within this section.

6. **Stop the Backbone Test on the local I/O module.** Refer to "Halt Current Test" within this section.

7. **Connect the cable to the port.** Once each of the virtual circuits has been established and verified, connect the cables to the appropriate port on each of the Ethernet I/O modules in the virtual circuit and then complete the following procedure:

   - Select one of the Ethernet I/O modules.

   - Select C:onfigure and choose the appropriate port for that module. Refer to "Configuring the Module" within this section.

8. **Reset the traffic and error counters.** Refer to "Resetting Counters" within this section.

9. **Monitor the traffic on the Ethernet segment and the fiber backbone.** Refer to "Monitoring Statistics" within this section.

   If the segment has live traffic, the following information is displayed:

   - The number of packets received every second for that segment.

   - The number of packets transmitted onto the segment every second will also be displayed for other segments connected elsewhere in the system.

   - Backbone traffic (receive and transmit) will be displayed if there is any traffic being received from or transmitted onto the local Ethernet segment.

   - If one or more errors display, stop the Monitor display and change the port type back to AUI or Ext Bridge (whichever port is not being used) to avoid corruption of the Ethernet network.

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

11. **Before you begin using the modules, reset the traffic and error counters.** Refer to "Resetting Counters" within this section.

Configuring the Module

This option allows you to select the connection to the Ethernet I/O module.

From the front view of the Ethernet I/O module:

1. Select C:onfigure.

   The cursor is positioned at the Current Port Type field.

2. Select the interface port type as follows:

To activate the ...	Select ...
AUI port	AUI
Thin Ethernet port	Thinnex coax
MAU port	Ext Bridge

Caution: If you change the port type while live data is being exchanged, the flow of data will be disrupted. Disconnect any cable to the module before you change the port type. After the new port type has been selected, re-connect the cable to the selected port..

3. Press [PGDN] to save the port type.

Monitoring Statistics

This procedure allows you to monitor traffic on the backbone and the segment. The transmit and receive frame information and the number of frame errors detected are continuously displayed and time-stamped for reference.

From the front view of the Ethernet I/O Module:

- Select M:onitor. See Figure 3-5 for an example. Table 3-1 explains the fields.

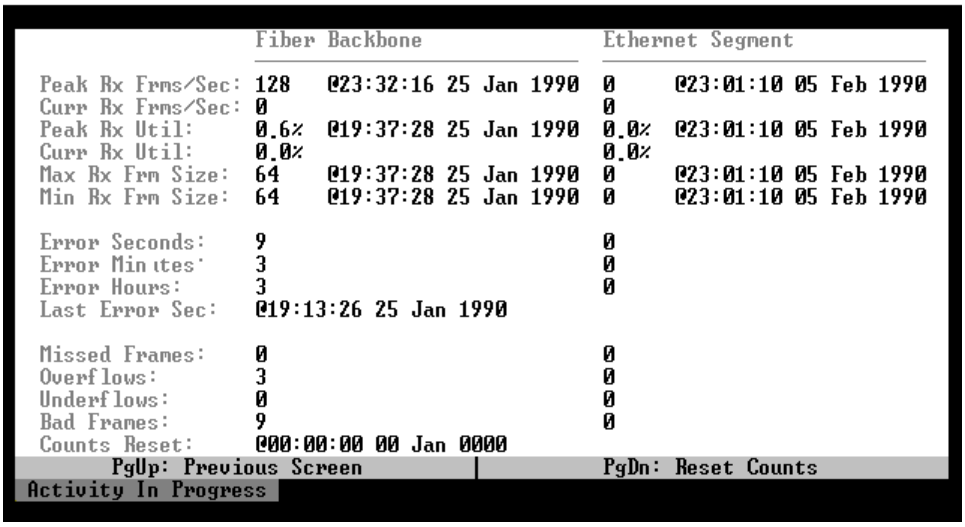

Figure 3-5. Ethernet I/O Module Monitor Screen

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

Example:

The error counters were reset 10 hours ago.

1. Check the Error Hour field. If the value in the field is 10, at least one error has occurred every hour for the past 10 hours.

2. Now 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.

3. 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 (15 minutes) in 60 minutes in a 10 hour span.

   Missed Frames, Overflows, Under flows, and Bad Frames show the total number of such errors that have occurred since the counts were last reset.

Note: You can request that Field Service personnel change the system so that the information displayed in the Missed Frames, Overflows, Under flows and Bad Frames fields represents a sampling of the errors rather than the total number of errors. Field Service personnel perform this task by using the Field Service function that is available from the Ethernet Module Command menu. See the *PremNet 5000 System Installation and Configuration Manual* and the *PremNet 5000 I/O Module Management Manual.*

Table 3-1. Ethernet I/O Monitor Field Descriptions

Field Name	Description
Peak Rx Frms/Sec:	The most number of frames per second in which frames of received data have been detected since the counts were last reset.
Curr Rx Frms/Sec:	The average number of frames per second in which frames of received data have been detected since the counts were last reset.
Peak Rx Util	The highest percentage of the total Ethernet bandwidth being used by the traffic received from the Ethernet segment or from the backbone since the counts were last reset.
Curr Rx Util	The average percentage of the total Ethernet bandwidth being used by the traffic received from the Ethernet segment or from the backbone since the counts were last reset.
Max Rx Frm Size:	The number of received frames per seconds in which the maximum frame size was detected since the counts were last reset.
Min Rx Frm Size:	The number of received frames per seconds in which the minimum frame size was detected since the counts 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.
Last Error Second	Displays the last second that an error (or errors) was detected.
Missed Frames	The total number of missed frame errors which have been detected since the counts were last reset.
Overflows	The total number of overflow errors which have been detected since the counts were last reset.
Underflows	The total number of underflow errors which have been detected since the counts were last reset.
Bad Frames	The total number of bad frame errors which have been detected since the counts were last reset.
Counts Reset	The date and time when the counters were last reset.

Resetting Counters

You can reset the counts to zero by pressing [PGDN] while displaying the Ethernet I/O Module Monitor screen.

Performing Tests

The Test option allows you to test a new Ethernet network before live data is sent out onto it. Test traffic can be generated onto the local Ethernet segment or onto the PremNet 5000 fiber backbone.

To initiate a test:

1. Display the front view of the Ethernet I/O Module.
2. Select T:est.

   The system polls the module for the current test status.
3. Select one of the options from the bottom legend. Choices are:
   - Ethernet Test
   - Backbone Test
   - Halt Current Test

Ethernet Test

This option generates test traffic on the 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 circuit. Or, you can direct the output onto your own Ethernet network to generate test traffic. The test traffic generated will have no adverse effect on the network other than to increase the traffic volume, which, in itself may cause problems on the network. Care must be taken to avoid over-burdening a live network with test traffic.

To initiate the test:

1. Choose E:thernet Test from the bottom legend.

   The following prompt appears on the screen with the cursor positioned in the % Load field.

   ```
   % Load
   Input # (10-85)
   ```

2. Enter the percentage of bandwidth for the test traffic to be used and press [PGDN].

   The following prompt is displayed;

   Frms/Sec

   Input # (81-1724)

3. Enter the number of test traffic packets per second that you want to transmit.

   The range is determined by the IEEE 802.3 specified minimum and maximum Ethernet packet sizes and the user-specified % load.

4. Press [PGDN] to initiate the test.

   While the test is running, the values you entered at the % Load and the Frms/Sec fields appear on the screen. The bytes per packet (which is calculated automatically from the load percentage and number of packets per second you entered) is displayed in the Frm Size field.

   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 FCS bytes.)

5. Press [ESC] twice to display the front view of the PremNet node.

6. Select and monitor the module that is receiving the test traffic to ensure proper module operation. Refer to “Monitoring Statistics” within this chapter.

   You can also monitor other modules in the virtual circuit to ensure system integrity.

Backbone Test

This option is used to test the Ethernet I/O module's ability to transmit Ethernet packets over the backbone to another Ethernet I/O module in the virtual circuit.

Perform this test for each Ethernet I/O module in each virtual circuit to verify the integrity of the connection before it is used to transport live data.

To initiate the test:

1. Choose B:ackbone Test from the bottom legend.

   A message is displayed indicating that the test is in progress.

2. Press [ESC] twice to display the front view of the PremNet node.

3. Select and monitor the module that is receiving the test traffic to ensure proper module operation. Refer to "Monitoring Statistics" within this chapter.

   You can also monitor other modules in the virtual circuit to ensure system integrity.

Halt Current Test

This option stops whatever test is running at the time. It must be chosen before you can move from one test to another. You must stop all tests before connecting active Ethernet devices to the Ethernet I/O modules.

To stop a test, choose H:alt Current Test from the bottom legend of the Test screen.

High-Performance Ethernet I/O Module

The High-Performance Ethernet I/O module provides full bandwidth Ethernet remote connectivity between Ethernet segments or networks connected to the PremNet 5000 System.

This section provides specific information on configuring and managing the High-Performance Ethernet I/O module.

Configuration Strategy

This procedure provides an overall strategy when configuring a new High-Performance Ethernet I/O module into an existing network. Review the steps carefully. Each step is broken down within this section into a more detailed procedure.

1. **Establish a virtual circuit for the new High-Performance Ethernet I/O module**. You can connect up to 32 High-Performance Ethernet I/O modules in the same virtual circuit. There should be no external equipment attached to the High-Performance Ethernet I/O modules at this point. Refer to "Configuring Virtual Connections" in Chapter 2.

2. **Access one of the new Ethernet I/O modules and check the configuration.** Refer to "Displaying a PremNet 5000 Module" within this chapter.

   Check that the fields on the status screen contain the following values:

   Module Status field - ACTIVE without Alarms

   If the status of the module is not active, the module has not been connected to a virtual circuit. 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 field - AUI so that the Ethernet segment is terminated properly. If the port type is not AUI, change it. Refer to Configuring the High-Performance Ethernet I/O Module" within this section.

The following fields should be the same for each module in a virtual circuit:

- *Connection type*
- *Error Reporting*
- *Backplane Timeslots*
- *Module Flow Control*
- *Compatibility Mode*

If they are not the same, change the settings as required.

Repeat Step 2 for each new High-Performance Ethernet I/O module.

3. **Test the new High-Performance Ethernet I/O Module.** Refer to "Backbone Test" within this section.

4. **Check the traffic statistics.** While the Backbone test is running, monitor the module. Refer to "Monitoring Statistics" within this section.

   The traffic statistics displayed should report 128 frames per second transmitted and received on the fiber backbone.

5. **Check each High-Performance Ethernet I/O module in the virtual circuit.** The traffic statistics displayed should report 128 frames per second received from the fiber backbone. Additionally, the module should display 128 frames per second transmitted onto its local Ethernet segment, provided that the segment is properly terminated. Refer to "Monitoring Statistics" within this section.

6. **Stop the Backbone Test on the local I/O module.** Refer to "Halt Current Test" within this section.

7. **Connect the cables to the port.** Once each of the virtual circuits has been established and verified, connect the cables to the appropriate port on each of the High-Performance Ethernet I/O modules in the virtual circuit and then complete the following procedure:

   - Select one of the High-Performance Ethernet I/O modules.
   - Select C:onfigure and choose the appropriate port for that module. Refer to "Configuring the Module" within this section.

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

To enable SQE refer to Table 3-2. If it is not required, select Disabled. You must disable the heartbeat before you select EXT BRIDGE. Failure to properly select this parameter may result in loss of data.

---

8. **Reset the traffic and error counters.** Refer to "Resetting Counters" within this section.

9. **Monitor the traffic on the Ethernet segment and the fiber backbone.** Refer to "Monitoring Statistics" within this section.

   If the segment has live traffic, the following information is displayed:

   - The number of packets received every second for that segment.
   - The number of packets transmitted onto the segment every second will also be displayed for other segments connected elsewhere in the system.
   - Backbone traffic (receive and transmit) will be displayed if there is any traffic being received from or transmitted onto the local Ethernet segment.
   - If one or more errors display, stop the Monitor display and change the port type back to AUI or Ext Bridge (whichever port is not being used) to avoid corruption of the Ethernet network.

10. **Check for errors on either the backbone or High-Performance Ethernet segment.** Refer to "Displaying Statistics" within this section.

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.

Configuring the Module

This option allows you to select the connection to the Ethernet I/O Module.

1. Display the front view of the Ethernet I/O module.

2. Select C:onfigure.

   A screen similar to Figure 3-8 is displayed. Table 3-2 describes the modifiable fields.

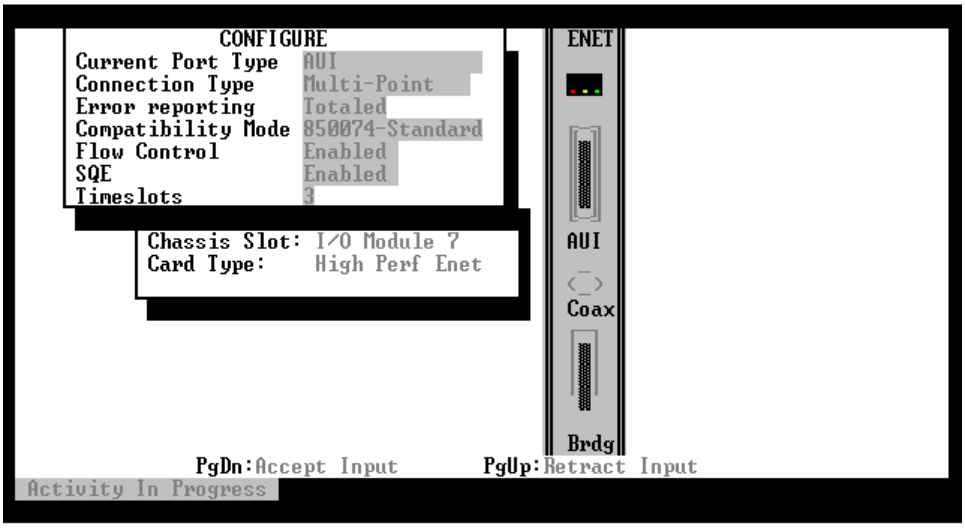

Figure 3-6. High Performance Ethernet I/O Module Configuration Screen

Table 3-2. High-Performance Ethernet I/O Module Configuration Parameters

Field	Description
Current Port Type	Allows you to select the port type to use on the module. **To activate the ...** — **Select ...** AUI port — AUI Thin Ethernet port — Thinnet coax MAU port — Ext Bridge **CAUTION:** If you select Thinnet coax, you must have a properly-terminated Thin 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.
Connection Type	Indicates either a multipoint or point-to-point connection. All modules in the virtual circuit must show the same value in this field. Multipoint - the module is connected in a virtual circuit with three or more modules. Point-to-Point - the module is connected in a virtual circuit 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.
Error reporting	Allows you to change the way errors are displayed. Totaled - displays a true count of the total number of errors or 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. Sampled - displays the number of seconds in which those types of errors occurred. The Sampled mode imposes less burden on the microprocessor, enabling it to forward packets at the full Ethernet rates. This is the default.

Table 3-2. High-Performance Ethernet I/O Module Configuration Parameters (Continued)

Field	Description
Compatibility Mode	Allows the High-Performance Ethernet I/O module be fully backward compatible with prior Ethernet modules. **Note:** Select this only when the High-Performance Ethernet I/O module must be connected to a virtual circuit with earlier versions. You cannot modify this parameter 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 parameter when these conditions occur will cause an error message. 850038 - The module will configure itself in 2-timeslot mode. 850067 - The module will configure itself in 2-timeslot mode. 850074 Standard - The module can be configured with 1, 2, 3, or 4 timeslots.
Flow Control	Enables or disables the flow control mechanism.
SQE	Enables or disables 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 required this parameter to be enabled. You must configure this parameter properly prior to connecting a cable to the MAU port or data loss may occur.

Monitoring Statistics

This procedure allows you to monitor traffic on the backbone and the segment. The transmit and receive frame information and the number of frame errors detected are continuously displayed and time-stamped for reference.

1. Display the front view of the High-Performance Ethernet I/O module.

2. Select M:onitor.

   This procedure is identical to the Ethernet I/O module procedure described previously within this chapter. Refer Figure 3-5 for an example and Table 3-1 for an explanation of the fields.

Resetting Counters

You can reset the counts to zero by pressing [PGDN] while displaying the High-Performance Ethernet I/O Module Monitor screen.

Performing Tests

The Test option allows you to test a new High-Performance Ethernet network before live data is sent out onto it. Test traffic can be generated onto the local High-Performance Ethernet segment or onto the PremNet 5000 fiber backbone.

To initiate a test:

1. Display the front view of the High-Performance Ethernet I/O Module.
2. Select T:est from the bottom legend.

   The system polls the module for the current test status.
3. Select one of the options from the bottom legend. Choices are:
   - Ethernet Test
   - Backbone Test
   - Halt Current Test

This procedure is identical to the Ethernet I/O Module Test procedure previously described within this chapter. Refer to "Performing Tests" within the Ethernet I/O Module section for more detailed information on the specific tests.

Token-Ring 4/16 Mbps I/O Module

The Token-Ring 4/16 Mbps I/O Module connects up to eight token-ring devices to the PremNet 5000 System.

This section provides specific information on configuring and managing the Token-Ring 4/16 Mbps I/O module.

Configuration Strategy

The following procedure provides an overall strategy when configuring a new Token-Ring I/O module into an existing network. Review the steps carefully. Each step is broken down into a more detailed procedure.

1. **Set the I/O data rate to 4 or 16 Mbps**. Refer to "Configuring the Module" within this section.

2. **Perform a Loop Test.** This test must pass to continue. Refer to "Loop Test" within this section.

3. **Discontinue the Loop Test.** Refer to "Reset Loop Test" within this section.

4. **Monitor the module connected to the active ring.** This determines that this network is generating proper frame rates with no errors. Refer to "Monitoring Statistics" within this section.

5. **Connect the Token-Ring 4/16 I/O module to the virtual circuit.** Refer to "Configuring Virtual Connections" in Chapter 2.

6. **Monitor the module just connected to verify proper frame rates.** Refer to "Monitoring Statistics" within this section.

Configuring the Module

This procedure allows you to configure a Token-Ring 4/16-Mbps I/O Module.

From the front view of the Token-Ring 4/16-Mbps I/O Module:

1. Select C:onfigure.

   The system displays a screen similar to the one shown in Figure 3-7. The cursor is positioned in the Current Mode field.

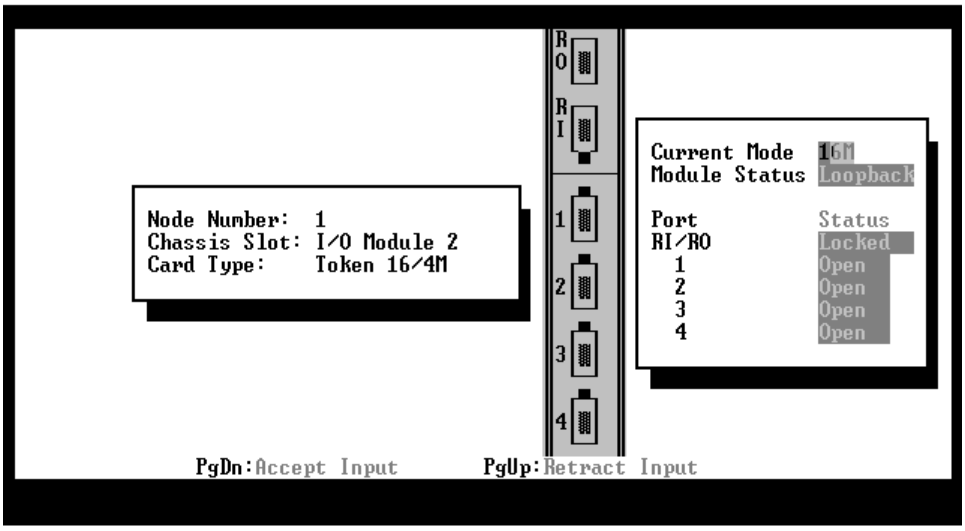

Figure 3-7. Token-Ring 4/16-Mbps I/O Module Configuration Screen

2. Set the I/O data rate.

   - Press [TAB] until the data rate you want (4M or 16M) appears in the Current Mode field.

Note: Before you change the mode of a module, remove the module from its established virtual circuit connection. Refer to "Deleting Virtual Connections" in Chapter 2.

3. Set the module status to Active or Loopback.

   - If you choose Active and the module is not in Loopback mode, a message is displayed indicating that the module is already active. If the module is in Loopback mode, you are prompted for a confirmation.

   - If you choose Loopback, both the ports and the backplane are looped. This option allows you to test the network by isolating the network from the module. While in Loopback, the Token-Ring is disconnected from the network allowing you to monitor the integrity of the inserted data.

     The Token-Ring should be placed in Loopback mode during initialization of the network. This allows you to step through the network and verify the integrity of the system as modules are cut into operation.

     To monitor the Token-Ring network for errors, refer to "Monitoring Traffic" within this section.

4. Choose the port status, either Open or Locked for all of the ports.

5. Press [PGDN] to save the configuration parameters you specified.

Note: If you changed the data rate for the module, the following message appears:

WARNING...You have selected a mode change! All other configuration parameters will be set to default values, and the target module will issue no response for approximately 10 sec's.

Displaying the Status

This procedure allows you to display the status of the four MAU ports on the module.

From the front view of the Token-Ring 4/16-Mbps I/O module:

1. Select S:tatus.

   The system displays a screen similar to the one shown in Figure 3-8.

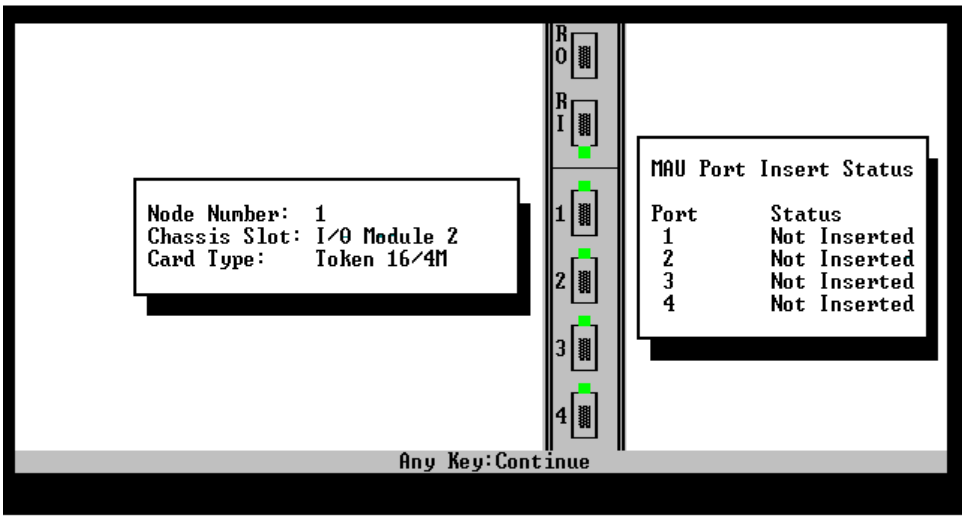

Figure 3-8. Token-Ring 4/16-Mbps I/O Module Status Screen

2. Press any key to return to the previous screen.

Monitoring Traffic

You can monitor the frames and errors appearing on the module. The frames and errors are continuously displayed and time-stamped for reference.

From the front view of the Token-Ring 4/16-Mbps I/O module:

1. Select M:onitor.

   The system displays the monitor screen, as shown in Figure 3-9.

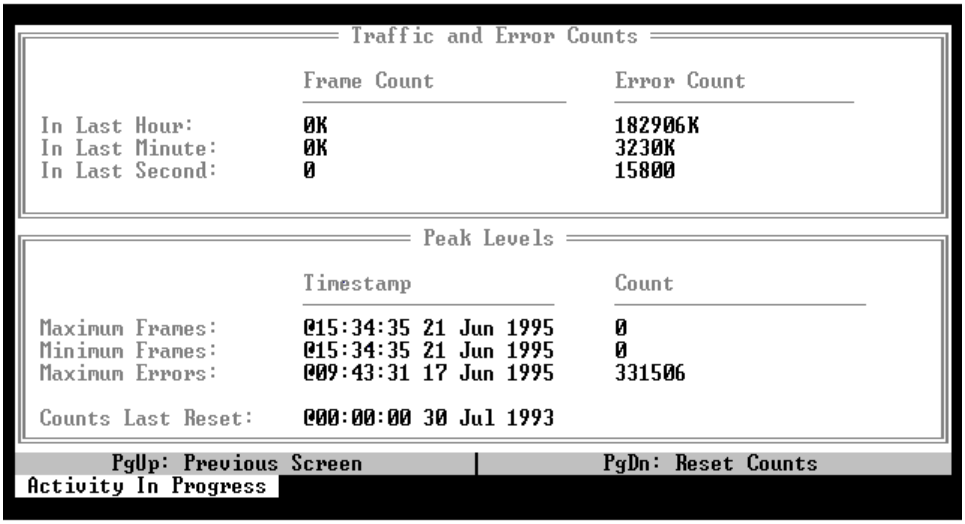

Figure 3-9. Token-Ring 4/16-Mbps I/O Module Monitor Screen

   The screen displays the times when the maximum and minimum number of frames occurred, the maximum and minimum counts for frames and errors, and the time when the maximum number of errors occurred.

2. Press [PGUP] to redisplay the previous screen.

Resetting Counters

You can reset the counts to zero by pressing [PGDN] while displaying the Token-Ring 4/16-Mbps I/O Module Monitor screen.

Performing Tests

The following procedures allow you to test the Token-Ring I/O module before connecting the module into an active ring.

Note: Newly- constructed virtual rings are also tested.

1. Display the front view of the Token-Ring 4/16-Mbps I/O module:
2. Select T:est.

   The system polls the module for the current test status.

   The applicable Token-Ring 4/16-Mbps I/O module tests include:

   - Loop Test
   - Reset Loop Test
   - MAU/Cable Test

Note: These tests are interruptive and will disrupt the normal data flow on the associated unit(s).

Loop Test

The loop test generates an abort frame, which is transmitted through the established ring. The established ring may be either a single I/O module or a multi-point virtual ring. In either case, the loop test places all I/O modules on the ring into loopback with all ports locked out.

Perform a loop test before connecting the module into an active ring.

- Select L:oop Test.

  Each Token-Ring 4/16-Mbps I/O module, in sequence, monitors the incoming abort frames. If the incoming signal is free of errors, the signal is passed to the next module in the ring. If errors are detected, the module notifies the system (with an alarm message) and the test initiation signal is not transmitted to the next module, allowing you to isolate a defective I/O module.

  To identify the defective I/O module, complete the following steps:

  a. As the test continues to run, access each I/O module in the virtual circuit.

  b. View any alarms by selecting A:larm. You can determine the defective I/O module from the alarm messages displayed (or not displayed).

c. Remove the I/O module from the virtual connection and the test continues.

Note: Occasionally, a downstream I/O module transmits errors that cause the upstream I/O module to alarm. Contact your System Administrator to determine whether this is the case.

When the abort sequence is received by the initiating I/O module, each I/O module's MAU ports are tested. The incoming abort frames are copied, transmitted through the MAU ports, and compared with the original incoming signal, using two separate frame counts. The frame counts must be equal (±5 counts) to pass the test.

To monitor the frame counter, choose M:onitor from the Token-Ring 4/16 I/O module front view screen.

- If the frame counts match, the signal is passed to the next I/O module in the ring.
- If the frame counts do not match, the I/O module responds with an alarm message and the signal is not retransmitted. The Frames and Errors displayed should be almost identical.

Note: When the module is in Loop Test, the values under the Frames/Second field represent the number of abort frames sent out and the values under the Errors/Second field represent the number of abort frames received.

Reset Loop Test

The Loop Test continues to run until you select R:eset Loop Test from the Token-Ring Test menu. You may also view the delay time for the ring. Use the delay time to verify that the estimated ring-delay time is accurate. (The estimated ring-delay time is derived by adding up the delay times of each network component)

Mau/Cable Test

To test the cables connected to the RI/RO ports on a Token-Ring 4/16-Mbps I/O module:

- Select M:au/Cable Test.

Note: An active Token-Ring signal must be present on the system in order for you to run this test. The Token-Ring 4/16-Mbps I/O module must also be in loopback. During the test, the MAU ports are locked out.

RS-422 I/O Module

The RS-422 I/O Module offers asynchronous and synchronous data communication through four DB-25 connectors. The maximum data rate for asynchronous mode is 256 Kbps and the maximum data rate for synchronous mode is 2.048 Mbps. You can configure each port on the module independently via the CMS 400.

This section describes how to configure and manage the RS-422 I/O module.

Configuring the Module

This procedure allows you to set the module's time slot and specify the mode of the module.

From the front view of the RS-422 I/O module:

1. Select C:onfigure.

2. Select the mode, either 1 time slot or 2 time slot.

   If you choose 1 time slot, speeds of up to 1024 Kbps per port are allowed.

   If you choose 2 time slot, speeds of up to 2048 Kbps per port are allowed.

Note: Before you change the number of time slots that are assigned to a module, remove the module from its established virtual connection (see "Deleting a Virtual Connection" in Chapter 2).

---

3. Press [PGDN].

   A message is displayed: WARNING you have selected a mode change! All other configuration parameters will be set to default values, and the target module will issue no response for approximately 10 sec's.

4. Press [PGDN] again to accept input.

Monitoring the Status

This procedure allows you to continuously monitor the RS-232 Signals of a RS-422 I/O module. Each line is time-stamped for reference.

From the front view of the RS-422 I/O module:

1. Select Z:oom.

   The connection of the selected module is displayed.

2. Select M:onitor.

   The Time, Port, RxD, TxD, CTS, DSR, DCD, RTS, and DTR signals received by the RS-422 I/O Module are displayed.

3. Press any key to cancel.

Performing Tests

A Local Port Level Test should be performed before a virtual connection has been assigned to the module. The module transmits a test pattern to the backplane. The test pattern is then looped on the backplane and received by the module.

To test the RS-422 I/O module's connection:

Note: The port at the remote end must be looped back for this test to run.

1. Display the front view of the RS-422 I/O module.

2. Select Z:oom.

   The RS422 port level connection screen is displayed.

3. Select T:est.

   The module is polled for the current test status. The message: The port at the remote end must be looped back for this test is displayed.

4. Press [PGDN] to continue.

   A screen is displayed stating that the test has passed or failed.

V.35 I/ O Module

The V.35 4-Port I/O Module offers asynchronous and synchronous data communication through four V.35 interface ports. The maximum data rate for asynchronous mode is 256 Kbps and the maximum data rate for synchronous mode is 2.048 Mbps. You can configure each port on the module independently via the CMS 400.

This section describes the specific configuration features of a V.35 I/O Module.

Configuring the Module

To change the number of timeslots that are assigned to the module:

1. Display the front view of the V.35 I/O module.
2. Select C:onfigure.
3. Enter the mode, either 1 time slot or 2 time slot.

   If you choose 1 time slot, speeds of up to 1024 Kbps per port are allowed.

   If you choose 2 time slot, speeds of up to 2048 Kbps per port are allowed.

Note: Before you change the number of time slots that are assigned to a module, remove the module from its established virtual connection (see "Deleting a Virtual Connection" in Chapter 2).

---

4. Press [PGDN].

   A message is displayed: WARNING you have selected a mode change! All other configuration parameters will be set to default values, and the target module will issue no response for approximately 10 sec's.

5. Press [PGDN] again to accept input.

Changing Data Direction

Each port provides three control lines that automatically reverse direction when you change the direction of the data from DCE to DTE or vice versa.

To change data direction:

1. Display the front view of the V.35 I/O module.
2. Select a port by pressing the arrow keys until the highlight bar is positioned on the port.

3. Select Z:oom.

   The port level connection view of the selected module is displayed.

4. Choose C:onfigure.

5. Choose either DCE or DTE.

Monitoring the Status

To continuously monitor the activity of the control lines:

1. Display the front view of the V.35 I/O module.

2. Select a port by pressing the arrow keys until the highlight bar is positioned on the port you want to monitor.

3. Select Z:oom.

   The port level connection view of the selected module is displayed.

4. Select M:onitor.

   The system displays the Time, Port, TxD, RxD, RTS, DTR, UNA, CTS, DSR, and DCD signals received by the V.35 I/O Module.

5. Press any key to cancel.

Performing Tests

A Local Port Level Test should be performed before a virtual connection has been assigned to the module. The module transmits a test pattern to the backplane. The test pattern is then looped on the backplane and received by the module.

To test the V.35 I/O module's connection:

Note: The port at the remote end must be looped back for this test to run.

1. Display the front view of the V.35 I/O module.

2. Select a port by pressing the arrow keys until the highlight bar is positioned on the desired port.

3. Select Z:oom.

   The port level connection view of the selected module is displayed.

4. Select T:est.

   The system polls the module for the current test status. The message: The Port At The Remote End Must Be Looped Back For This Test is displayed.

5. Press [PGDN] to continue.

   A screen is displayed stating that the test has passed or failed.

T1/E1 I/O Module

T1 and E1 are used to differentiate between North American and European hierarchical voice/data transmission systems used in the digital telephone network.

This section describes how to manage and configure the T1/E1 I/O Module.

Configuring the Module

This procedure allows you to configure the T1/E1 I/O module thresholds, error detection/source, loopback mode, and cable length.

To configure the module:

1. Display the front view of the T1/E1 I/O Module.

2. Select C:onfigure.

   The T1/E1 I/O configuration screen is displayed. The cursor is positioned in the BPVE/Sec threshold field.

3. Select the threshold.

4. Choose the Error Detection, either B8ZS or AMI for the bipolar violation error detector on the port. This must match the type of bipolar signal being transported or errors will be reported. (However, failure to properly select this option will not cause errors to be induced in the actual transported signal.)

5. Choose the Error Source, either Remote or Local.

6. Choose the Loopback Mode, either Remote or Local.

   - Remote allows you to place a far-end port in a loopback state such that it will return data to the near-end. Near-end TX data is then transmitted to the far-end port (that is in the remote loopback mode) loops and gets retransmitted back to the near-end RX port. When invoked, input and output LEDs on the T1/E1 module flash continuously.

- Local loops TX data locally to appear at the local RX port on the connector. When invoked, input and output LEDs on the T1/E1 module flash continuously.

7. Choose the Cable Length (0-133ft, 133-266ft, 266-399ft, 399-553ft or 533-655 ft).

8. Press [PGDN] to accept the configuration.

Monitoring the Status

This procedure allows you to monitor bipolar violation errors (BPVE) relative to real-time and displays the calculated error-free seconds (EFS) and elapsed time (ET) since the last reset occurred.

To monitor the status:

1. Display the front view of the T1/E1 I/O module.

2. Select a port by pressing the arrow keys until the highlight bar is positioned on the desired port.

3. Select Z:oom.

   The port level connection view of the selected module is displayed.

4. Select M:onitor.

   The Time, Port Elapsed Time, and Bipolar Violations signals received by the T1/E1 I/O module are displayed .

5. Press [PGDN] to reset the counts.

   The message is displayed: Are you certain? Press Y to confirm. Any other key to cancel.

6. Press [PGUP] to redisplay the Port Connection screen.

Performing Tests

This operation allows you to perform a complete self test of the established TX and RX circuit paths for the near-end and far-end modules.

Note: The port at the remote end must be looped back for this test to run.

To initiate a test:

1. Display the front view of the T1/E1 I/O Module:
2. Select a port by pressing the arrow keys until the highlight bar is positioned on the desired port.
3. Select Z:oom.

   The port level connection view of the selected module is displayed.
4. Select T:est.

   The message: The port at the remote end must be looped back for this test.. is displayed.
5. Press [PGDN] to continue.

   A pattern is generated at the near-end and is sent to the far end where it is looped back to the near-end and analyzed for error content. When the test is complete, the results are displayed (whether the test passed or failed and whether there were any data or BPV errors).

RS-232 4-Port I/O Module

The RS-232 4-Port Multi-Drop I/O module offers asynchronous and synchronous data communication via four RS-232 interface ports at speeds up to 38.4 Kbps. The module can also be configured to provide multi-drop functionality. You can configure each port on the module independently via the CMS 400.

This section describes how to configure and manage the RS-232 4-Port I/O module.

Configuring the Module

This procedure allows you to set the module's port clocking, port loopback, and to control the module's DTR, RTS, BSY, UNA, DSR, DCD, CTS and RI signals.

From the front view of the RS-232 4-Port I/O module:

1. Select a port by pressing the arrow keys until the highlight bar is positioned on the desired port.
2. Select Z:oom.

   The port level connection view of the selected module is displayed.
3. Select C:onfigure.

   A screen is displayed which allows you to change the configuration. The cursor is positioned in the Standard Setup field.
4. Choose the type of setup, either Factory default, Multidrop Central, Multidrop Remote, or None and press [PGDN].

   The cursor is repositioned at the Clock Mode field.
5. Select the clock configuration of the port and press [🡻].
6. Choose the Loopback Control, either ON or OFF, and press [🡻].
7. Enable or Disable the Streaming Threshold, and press [🡻].
8. Enable or Disable Receiver Enabling, and press [🡻]
9. Press [TAB] to display and select a slave to each control signal. Each interface signal can be slaved to another signal, or tied to a mark or space level.
10. Press [PGDN] to accept the changes.

Monitoring the Status

This procedure allows you to monitor the activity of the control lines.

From the front view of the RS-232 4-Port I/O module or from the port level connection view:

1. Select M:onitor.

   The Time, Port, DTR, RTS, BSY, UNA, DCD, CTS, and RI signals received by the module are displayed.

2. Press [PGUP] to redisplay the previous screen.

4-Wire Voice I/O Module

The 4-Wire Voice I/O module provides bi-directional transport of voice or voiceband data circuits (300 to 3400 kHz) to another 4-Wire Voice I/O module in a PremNet 5000 virtual circuit.

There are three versions of the 4-Wire Voice I/O module:

- Ear and Mouth (E&M)
- Push-To-Talk (PTT)
- Runway Visual Range (RVR)

These versions support a variety of user applications.

This section describes how to configure and manage the 4-Wire Voice I/O module.

Configuring the Module

This procedure enables you to assign voice channels to specific ports on the I/O module. You can assign any one of the 32 channels to any one of the physical ports on the I/O module. To create a point-to-point voice circuit, assign the same channel to each of the two ports. For multiple voice channel drops, assign the same to each physical port on each I/O module that you want to participate in the voice circuit.

From the front view of the 4-Wire Voice I/O module:

1. Select C:onfigure.

   A screen is displayed showing the current channel/port assignments for all of the 4-Wire Voice I/O modules in the virtual circuit.

   - To change the port assignment, choose **Y** (yes).

   A screen is displayed allowing you to enter the channel number of each port. Refer to Figure 3-10. You may select channels 1-32. 0 (zero) equals disabled.

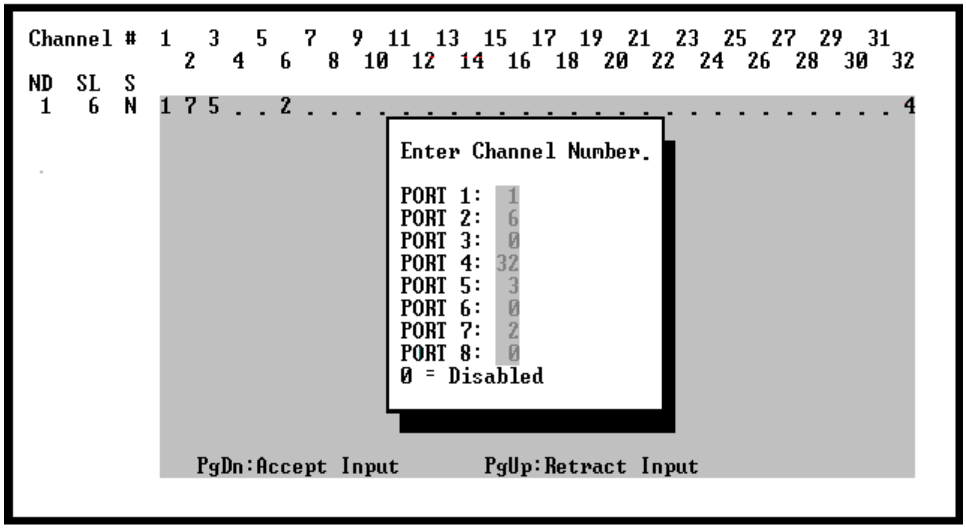

Figure 3-10. Example of Changing the Port Assignment

2. Press [PGDN] to reset the module. A confirmation prompt is displayed.

3. Press **Y** to continue with the reset, or press **N** to redisplay the configuration screen.

Configuring a 4-Wire Voice Card at the Port Level

To configure a 4-Wire Voice I/O module at the port level:

1. Display the front view of the 4-Wire Voice Card module.

2. Select a port by pressing the arrow keys until the highlight bar is positioned on the port you want to configure.

3. Select Z:oom.

   The port level connection view of the selected module is displayed.

4. Select C:onfigure.

   A screen is displayed allowing you to modify the signals.

5. Select the Mouth setting (Free, F0, or F1).

   - If Free, the electrical signal is transmitted at the non-active (0) or the active (1) state, depending on the state of the electrical signal that is transmitted by the attached external equipment.

   - If F0, the electrical signal will be forced to a non-active state.

   - If F1, the electrical signal will be forced to an active state.

6. Type the value for the RX Gain Signal and the TX Gain Signal.

   - RX Gain is added to the Pulse Code Modulation (PCM) signal before it is output to the line.

   - TX Gain is added to the line signal before it is digitized and sent to the PCM channel. The 4-Wire Voice I/O module uses the PCM encoding method of conversion, which uses 0 dBm or 1 milliwatt as its reference. These are the factory-set defaults.

     With 0 dB as the reference, the 4-Wire Voice I/O module has a dynamic range of +2.5 dB to -23 dB, and can receive and transmit signals within this range only without distortion. If the external attached equipment produces a signal with a signal level that is outside these parameters, you may need to adjust the system gain on the data port.

Note: The RX and TX Reference Signal field values are factory-set defaults and provide a 0.0-dB reference of 1 milliwatt. Each number increment represents .1 dB. To maintain this relative calibration, do not change the reference number.

---

7. Choose the µ-Law/a-Law companding method (A-no even bit inv, U-255, A-even bit inv).

   Companding is the process of compressing analog signals for digital transmission and decompressing digital signals for transmission to the attached analog equipment. µ-Law is the standard companding method that is used in the United States. A-law is the standard companding method that is used in Europe.

   - Select A-no even bit inv to set the active companding method to A-law with no Even Bit Inversion.

   - Select U-255 to set the active companding method to µ-Law (µ-255 law is the same as µ-Law)

   - Select A-even bit inv to set the active companding method to A-law, including Even Bit Inversion.

8. Press [PGDN] to save the configuration.

Monitoring the Module

To monitor the current status of all ports on the 4-Wire Voice I/O module:

1. Display the front view of the 4-Wire Voice I/O module.
2. Select M:onitor.

   Motion bars are displayed that represent activity as the current status for all 8 ports that are monitored.

Displaying the Status

To display the status of the Ear (E) and Mouth (M) of each port on the selected 4-Wire Voice I/O module:

1. Display the front view of the 4-Wire Voice Card I/O module.
2. Select a port by pressing the arrow keys until the cursor is positioned on the desired port.
3. Select Z:oom.
4. Select S:tatus.

   A screen displays the Ear-Mouth Style.

3270 8/32-Port I/O Module

The 3270 I/O module enables you to connect 3270 devices to the PremNet 5000 System. 3270 refers to a series of similar interfaces that are common to the 3x7x-series physical and electrical interface protocols.

This section describes how to configure and manage the IBM 3270 32-Port I/O module.

Configuring the Module

To set the 3270 8/32-Port I/O module's mode to control the terminal, 3274 Controller, 3174 Controller, Mux with 3299, and Mux without 3299:

1. Display the front view of the 3270 32-Port I/O module.

2. Select C:onfigure.
3. Press [TAB] until the desired mode appears in the field and press [PGDN].

   The configuration screen is displayed.
4. Enter **Y** (yes) for the Physical Group and press [PGDN].

   This enables the receive bias of a cluster of ports (8-ports) to increase noise immunity. The normal signal sensitivity is decreased.
5. Select the Channel Address (1-31) and press [PGDN].

   This is the logical number used to connect a terminal to the controller.
6. Press **Y** (yes) change the polarity of the specified port from normal to reverse (or reverse to normal) and press TAB.

Note: Applicable for twisted pair only.

7. Press **Y** (yes) to change the transmit delay from active to inactive (or inactive to active) and press TAB.

   This delays the time to enable receiving after transmitting to prevent time.
8. Press **Y** (yes) to activate or deactivate the receive Fast Check and press [PGDN].

   This allows you to select another algorithm to have the port with different connections.
9. Press [PGDN] to save the changes.

16-Port HDS I/O Module

The Hospital Data Services (HDS) I/O module enables you to transport data between a Technical Data Service (TDS) T1213 controller and TDS terminals over the PremNet 5000 fiber-optic backbone.

This section describes how to configure and manage the 16-Port HDS I/O module.

Configuring the Module

To configure the 16-Port HDS I/O module mode and its clock mode:

1. Display the front view of the 16-Port HDS I/O module.

2. Select a port by pressing the arrow keys until the cursor is positioned on the desired port.

3. Select Z:oom.

   The port level connection view of the selected module is displayed.

4. Select C:onfigure

   The 16-Port HDS I/O configuration screen is displayed. You may choose either Module Mode or Clock Mode Select.

   - If Module Mode is selected, you can modify the time slot allocation on the 16-Port HDS I/O module.

   - If Clock Mode is selected, you can modify the clock mode on the 16-Port HDS I/O module.

5. Press [PGDN] to save the configuration.

Displaying the Status

To display the number of timeslots allocated to the 16-Port HDS I/O module and the status of the ports:

1. Display the front view of the HDS I/O module.

2. Select a port by pressing the arrow keys until the cursor is positioned on the desired port.

3. Select Z:oom.

   The port level connection view of the selected module is displayed.

4. Select S:tatus.

   The activity of the 16 data ports is displayed. The registers containing input and output are read every second (refer to Figure 3-11).

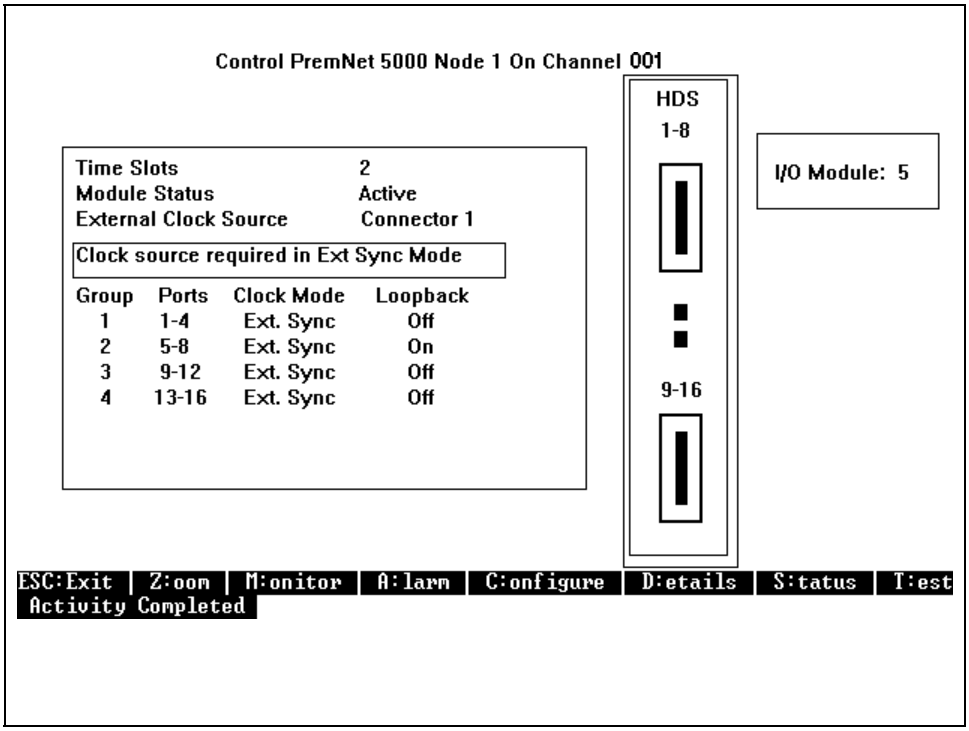

Figure 3-11. 16-Port HDS I/O Module Status Screen

3. Press [PGUP] to redisplay the port connection screen.

Monitoring Port Status

To monitor the Port Groups 1 through 4 of a 16-Port HDS I/O module.

1. Display the front view of the 16-Port HDS I/O module.

2. Select M:onitor.

   Port Groups 1 through 4 are displayed along with the signals received by the 16-Port HDS I/O module. (The letter A indicates activity on the ports.) Refer to Figure 3-12 for an example of the display.

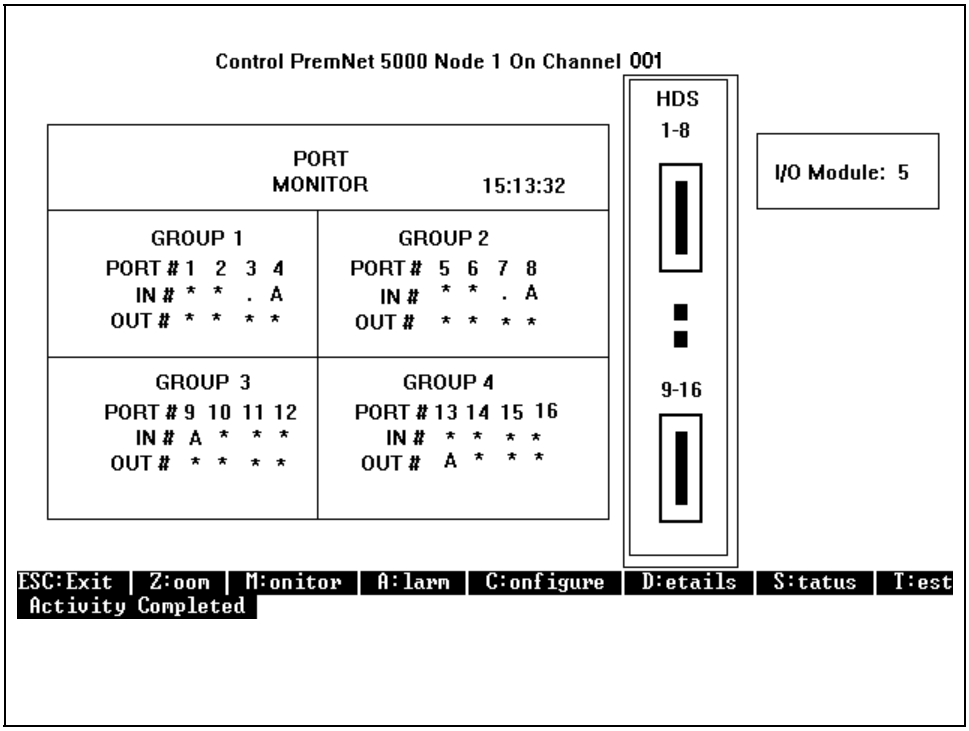

Figure 3-12. 16-Port HDS I/O Module Monitor Screen

5250 8-Port and 4-Port I/O Modules

The 5250 I/O module transports the 5250 serial bit stream across the fiber backbone using one TDM time slot.

This section provides specific information on configuring and managing the 5250 8-Port and 4-Port I/O modules.

Configuration Strategy

The following procedure provides an overall strategy when configuring a new 5250 8-Port/4-Port module into an existing network. Review the steps carefully. Each step is broken down into a more detailed procedure.

1. **Configure the interface type.** Refer to "Configuring the Module" within this section.

2. **Establish a virtual connection.** Refer to "Configuring Virtual Connections" in Chapter 2 for more detail.

3. **Establish port-level connection between the Controller module and the Peripheral modules.** Refer to "Enabling/Disabling All Ports" within this section.

4. **Enable the ports.** Refer to "Changing the Port Configuration" within this section.

Configuring the Module

To change the module type:

1. Display the front view of the 5250 I/O module.

2. Select C:onfigure.

   A secondary legend is displayed at the bottom of the screen.

3. Choose M:odule. A third level legend is displayed.

4. Choose M:odule Type.

5. Select the type of module. Depending on the module type selected, the module will operate in a different manner:

   - Select Peripheral if the connecting workstations or peripheral devices are in a daisy-chain configuration. Each port will extend the Controller's port allowing the same seven devices to be connected in series.

     Each peripheral module connected in the virtual circuit compares the port address of the received backplane data with its port map connection (see "Establishing Port Connections" within this section for port connectivity). If the address compares, the data is received off the backplane and processed to the interface. In all cases, the data received from the backplane is retransmitted onto the backplane in the next available time slot (loop through). The Controller module prevents data from circulating unnecessarily.

   - Select Mux to allow direct connection of workstations to the individual ports. Each port will support one workstation or peripheral device.

   - Select Controller to allow the module to connect to the AS400 workstation controller.

Note: All ports on the Controller module must be physically connected to the same AS400 Controller. Separate controllers cannot share the same module.

Only one Controller module is allowed in the same virtual circuit.

Enabling/Disabling All Ports

To enable or disable all ports:

1. Display the front view of the 5250 I/O module.
2. Select C:onfigure.

   A secondary legend is displayed at the bottom of the screen.
3. Choose P:ort. A screen similar to Figure 3-13 is displayed.

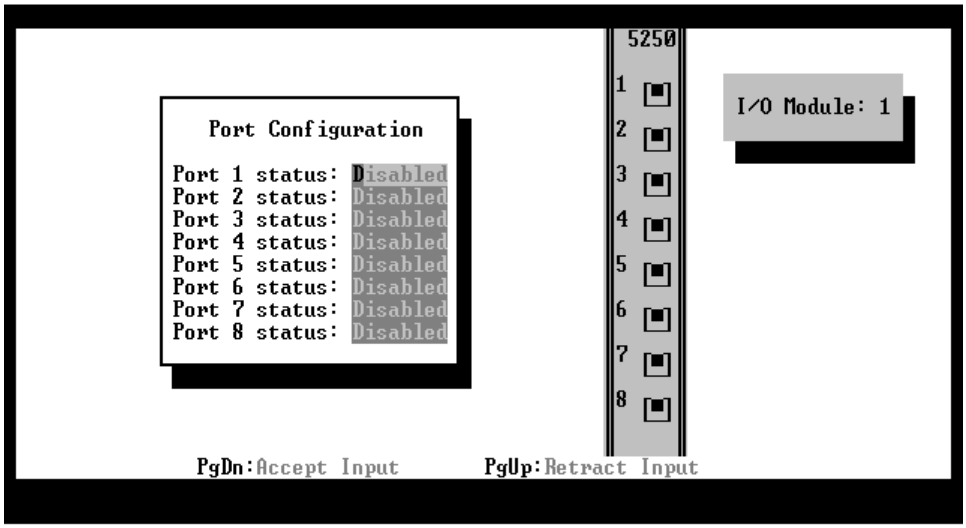

Figure 3-13. Port Configuration

4. Press [TAB] to toggle the fields from Disable to Enable for each applicable port.

Important: Remember to disable all ports on the module when not physically connected to an external device.

Establishing Port Connections

The modules maintain a port-level connection (port 1 to port 1, port 2 to port 2, etc.). This procedure allows you to determine which ports on the Controller module are going to be connected at the different Peripheral modules.

1. Display the front view of the 5250 I/O module.

2. Select C:onfigure.

   A secondary legend is displayed at the bottom of the screen.

3. Choose N:etwork Map. A screen similar to Figure 3-14 is displayed.

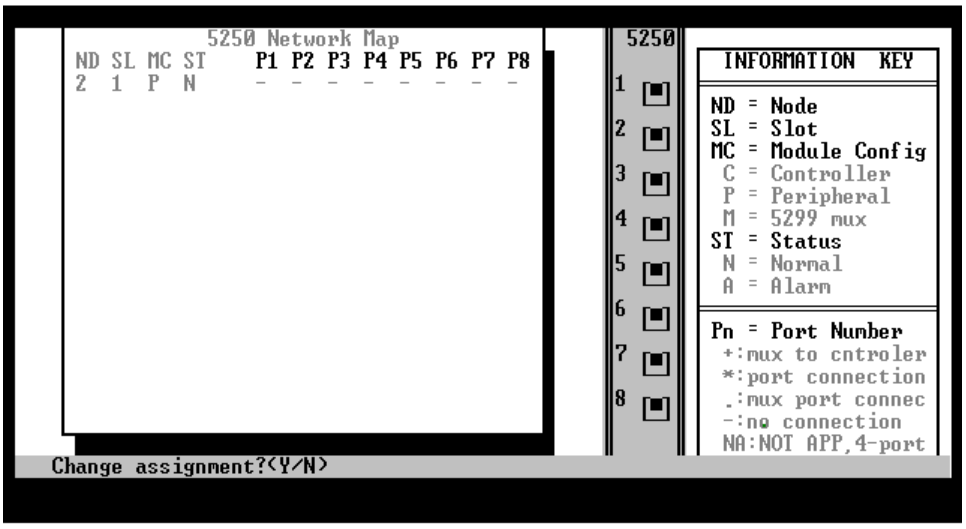

Figure 3-14. Establishing Port Connections

To change port assignments:

1. Choose **Y** for the prompt.

   A second prompt is displayed: Reset module's connections? (Y/N)

2. Choose Y to delete all connections to the module, or choose **N** to continue.

   If N is chosen, the prompt: Enter port number (1-8) is displayed.

Note: If you are displaying a 5250 4-Port I/O module, only Ports 1-4 are available to add or delete the connection.

---

3. Enter the port number and choose [PGDN]. The prompt: Delete or add connection? (D/A) : is displayed.

4. If you select A (add), the screen redisplays showing an asterisk (*) in the port's field indicating port connection. If you select D (delete), the port connection is deleted as indicated by the "-" in the port's field.

Reset Rx Frame Synchronization

To reset the Rx frame synchronization error count:

1. Display the front view of the 5250 I/O module.
2. Select C:onfigure.

   A secondary legend is displayed at the bottom of the screen.
3. Choose M:odule.

   A third-level legend is displayed.
4. Choose R:eset Count.

Monitoring Port Statistics

To monitor the activity of the incoming data at the port level:

1. Display the front view of the 5250 I/O module.
2. Select M:onitor.

   A screen similar to Figure 3-15 is displayed.

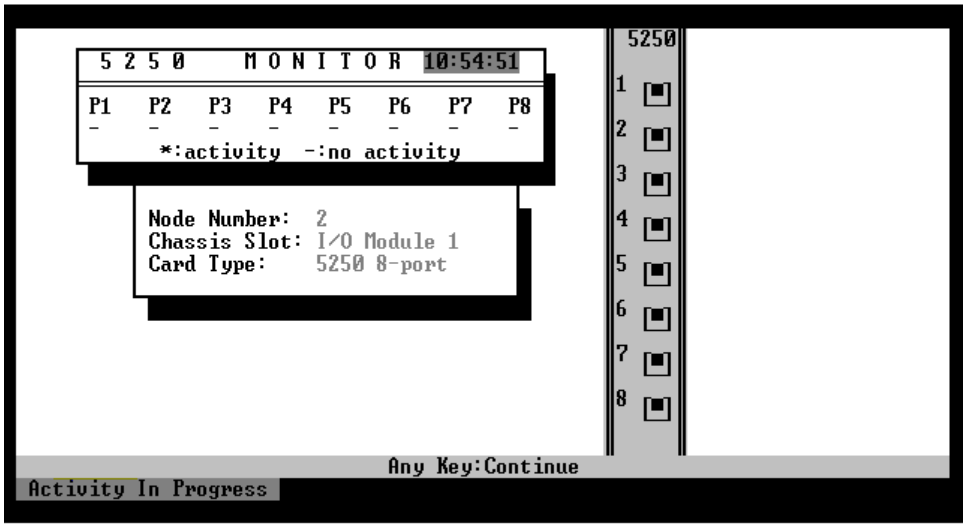

Figure 3-15. 5250 I/O Module Monitor Screen

The activity displayed on the monitoring screen is not a real-time indicator. Because of the bursty nature of the incoming data, the active data needs to be captured in order for the onboard controller to detect and display it.

ATM I/O Module

The Asynchronous Transfer Mode (ATM) I/O module enables you to send and receive short, fixed-length packets called "cells" using the ATM transport.

This section provides specific information on configuring and managing the ATM I/O module.

Configuration Strategy

This procedure outlines the steps you must take to establish a connection in an ATM ring. Review the steps carefully. Each step is broken down within into a more detailed procedure.

1. **Place the ATM I/O Module in Loopback mode**. This test enables you to verify the integrity of the system as modules are put into operation. Refer to "Initiating a Loopback" within this section.

2. **Define the number of time slots and cell-shaping parameters for the ATM I/O modules in the ATM network.** Refer to "Configuring the Module Settings" to specify the anticipated maximum bandwidth requirements for the ATM network.

Note: Once the virtual circuits have been assigned, you cannot change the module's bandwidth without deleting the virtual circuit.

---

3. **Specify the VPI values (cell format) for the ATM ports.** Refer to "Setting the Virtual Path" within this section to define circuits to the ATM I/O module ports.

4. **Establish a permanent virtual circuit (PVC).** In an ATM I/O Module virtual connection, only two ATM I/O modules are required to connect in an ATM I/O ring. Refer to "Setting the Virtual Path" within this section.

Note: Disable the Loopback before establishing a virtual connection.

Configuring the Module Settings

This procedure describes how to specify the following module settings:

- Switch the UNI interface between DS3 (45 Mbps) and Fiber (100 Mbps). This option is applicable to the 850082 module only.

- Specify the number of time slots.

- Specify the module's power setting, line length, and enable/disable the cell payload scrambler (DS3 only).
- Establish the cell-shaping percentage for ATM network.

To configure the module settings:

1. Display the front view of the ATM I/O module.
2. Select C:onfigure.

   A secondary legend is displayed at the bottom of the screen which enables you to perform various levels of status and configurability for the ATM.

3. Choose C:onfiguration from the secondary legend. A screen similar to Figure 3-16 is displayed. Table 3-3 describes the modifiable parameters.

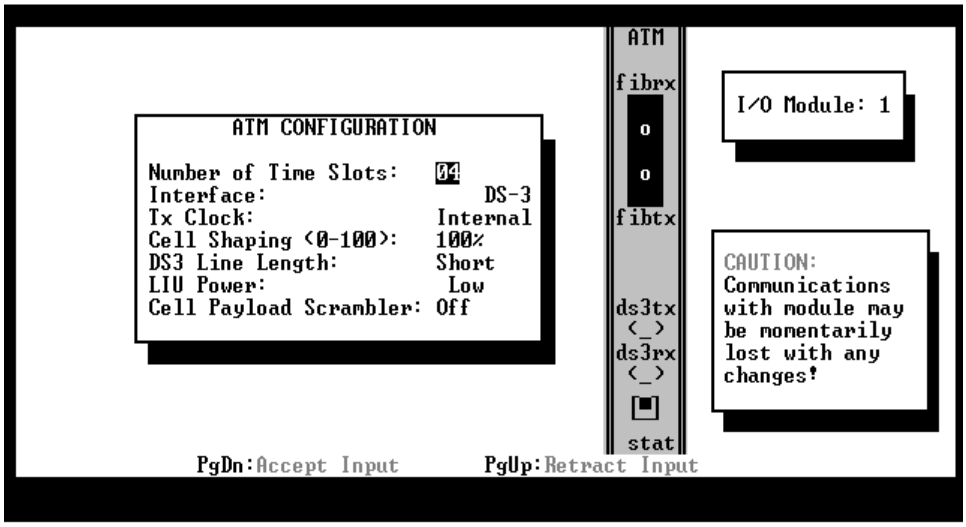

Figure 3-16. ATM I/O Module Configuration Screen

Table 3-3. Configuration Modifiable Parameters

Parameter	Description
Number of Time Slots	Allows you to allocate different bandwidth to the ATM I/O module. This option is only available in Standby mode. **Note:** Changing the time slots causes the module to momentarily lose communication with the Network Management Module (NMM).
Tx Clock	Allows you to specify whether the Tx clock for the module is externally or internally sourced.
Cell Shaping	Allows you to allocate link bandwidth to the module. For example, on the Fiber Tx interface, which operates at 100 Mbps, you can specify cell-rate shaping on the ATM I/O module for up to a maximum of 34.5% of the bandwidth used for non-idle cells. This means that the active cell rate leaving the ATM I/O module port would always be less than or equal to 34.5 Mbps.
DS3 Line Length	Allows you to specify whether you are using a short cable (less than 225 feet) or a long cable (more than 225 feet) for the DS3 connectors.
LIU Power	Allows you to select either a high or low power setting for ATM modules.
Cell Payload Scrambler	Allows you select whether or not to use the payload scrambler. This is available in DS3 mode only.

4. Use the arrow keys to select each parameter for modification. Use [TAB] to scroll through the various options for each parameter.

5. Press [PGDN] to save the configuration changes.

Setting the Virtual Path

To set the virtual path for an ATM I/O module:

1. Display the front view of the ATM I/O module.

2. Select C:onfigure.

   Refer to the Virtual Path Entry area of the secondary legend displayed at the bottom of the screen. This area enables you to display the local virtual path table and add or delete virtual path entries to/from the ATM virtual path table.

To display the current local virtual path table:

- Choose Virtual Path Entry V:iew from the secondary legend. A screen similar to Figure 3-17 is displayed.

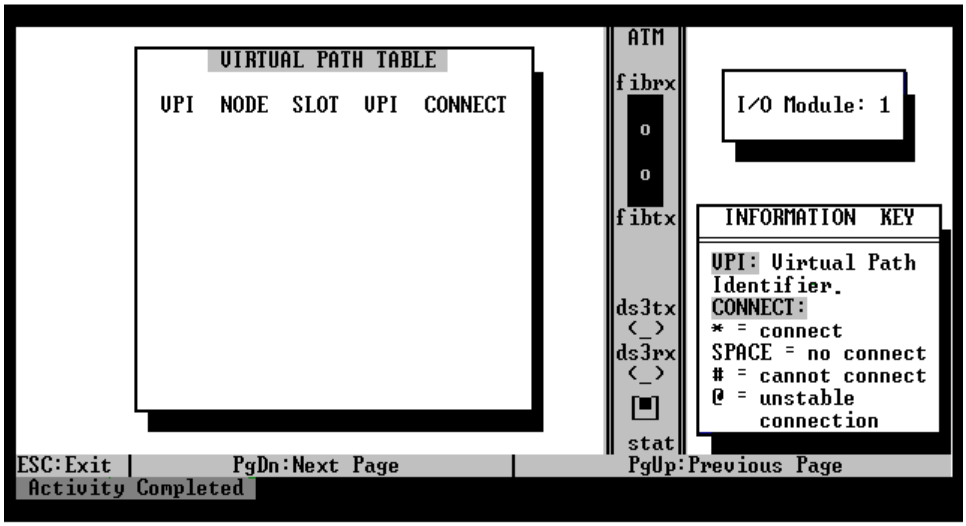

Figure 3-17. Virtual Path Table

Table 3-4 describes the fields within the Virtual Path Table.

Table 3-4. Virtual Path Table Fields

Field	Description
VPI	Virtual Path Connection of originating ATM I/O module.
ND	Node of connected ATM I/O module.
SL	Slot of connected ATM I/O module.
VPI	Virtual Path Connection of connected ATM I/O module.
CONNECT	The status of the connection: * Connect. # Cannot connect. @ Unstable connection. SPACE No connection

To add a virtual path indicator (VPI) to the network:

1. Choose Virtual Path Entry A:dd from the secondary legend.
2. Enter the VPI of the originating ATM module, the remote node, the remote slot, and the remote VPI to which the originating VPI is to be connected.
3. Press [PGDN] to accept the VPI.

To delete a virtual path connection:

1. Choose Virtual Path Entry D:elete from the secondary legend.
2. Enter the VPI to be deleted.
3. Press [PGDN] to delete the VPI.

Installing Connections into the Local Table

This procedure automatically collects information obtained from any remote ATM I/O module and installs the connections into the local table that do not conflict with the local VPI configuration.

1. Display the front view of the ATM I/O module.
2. Select C:onfigure.
3. From the secondary legend, choose M:ore .... A third-level legend is displayed with the following options:
4. Choose O:btain Remote VPIs.

   A message is displayed requiring a confirmation to continue with the installation.
5. Enter **Yes** to confirm the installation.

Deleting All VPI Tables

This procedure allows you to deletes all VPI table entries from the ATM I/O module's database. Use this option only when you are moving a module from a node and/or slot.

1. Display the front view of the ATM I/O module.
2. Select C:onfigure.
3. From the secondary legend, choose M:ore .... A third-level legend is displayed with the following options:
4. Choose W:ipe Module.

   A message is displayed requiring a confirmation to continue with the deletion.
5. Enter **Yes** to confirm the deletion.

Checking the VPI and VCI Entries

This procedure describes how to display the VPI and VCI entries that ILMI is using for SNMP procedures across an ATM interface.

1. Display the front view of the ATM I/O module.
2. Select S:tatus.
3. From the secondary legend, choose I:LMI.

   The VPI and VCI entries are displayed.

Displaying the Current Module's Configuration

To display the configuration data for the current module:

1. Display the front view of the ATM I/O module.
2. Select S:tatus.

   A secondary legend is displayed at the bottom of the screen.
3. Choose C:onfiguration. Figure 3-18 is displayed. Table 3-5 describes the fields.

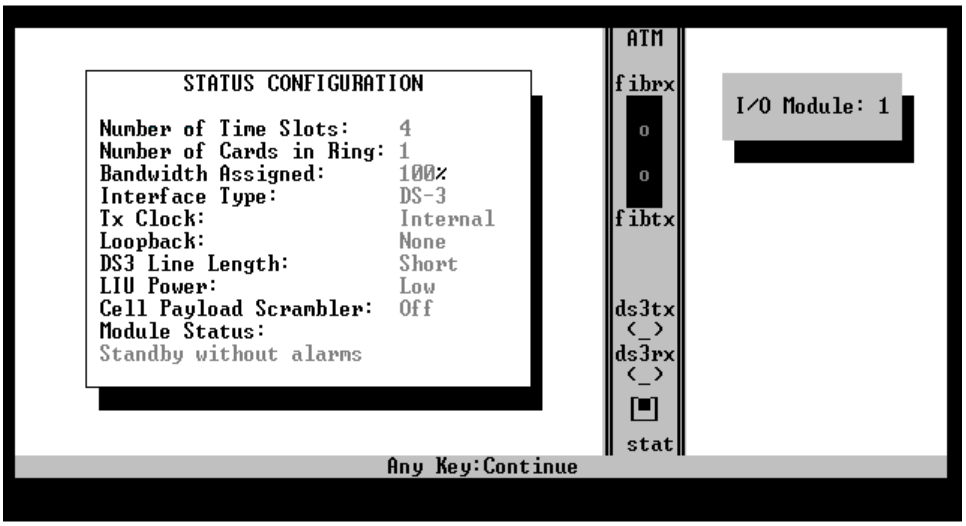

Figure 3-18. Example of Status Configuration Screen

Table 3-5. Status Configuration Field Descriptions

Field	Description
Number of Time Slots	The number of bus time slots allocated to the module.
Number of Cards in Ring	The number of ATM I/O modules in the ring.
Bandwidth Assigned	The percentage of bandwidth assigned to the module.
Interface Type	The module's current interface, either DS3 (45 Mbps) or Fiber (100 Mbps).
Tx Clock	Indicates whether the module's DS3 Tx clock is derived from an internal or external source.
Loopback	Indicates whether or not the module is in Loopback mode.
DS3 Line Length	Indicates whether the module's DS3 line length is short (less than 225 feet) or long (more than 225 feet).
LIU Power	Indicates whether the module's LIU power setting is low or high.
Cell Payload Scrambler	Indicates whether the module's DS3 payload scrambler is enabled (ON) or disabled (OFF).
Module Status	Indicates the status of the module: Standby without alarms Standby with alarms Active without alarms Active with alarms

Monitoring Changing Parameters

To monitor updates to dynamically-changing parameters:

1. Display the front view of the ATM I/O module.
2. Select M:onitor.

   A screen similar to Figure 3-19 is displayed.

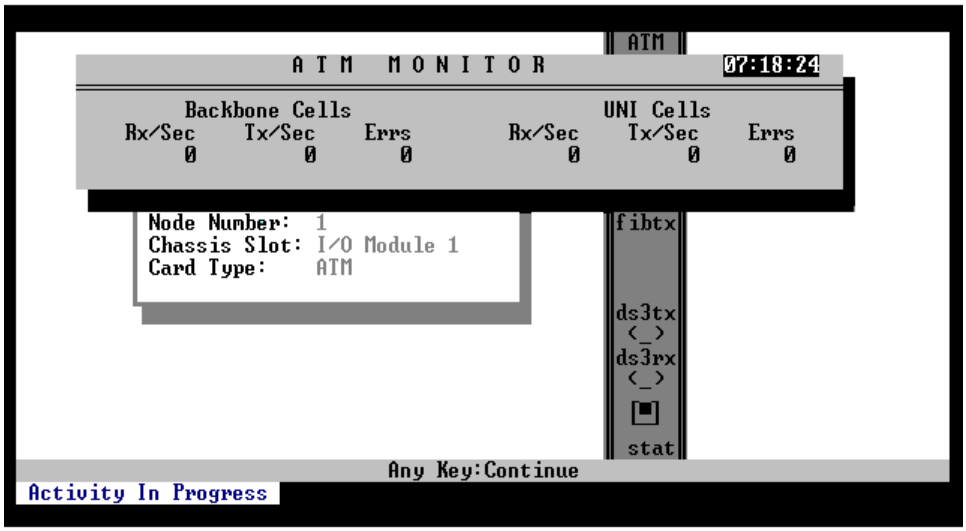

Figure 3-19. Monitor Changing Parameters

Monitoring Statistics

This procedure allows you to view the current module statistics for the ATM network. Statistics are displayed in cumulative totals for the last 1 second, 15 minutes, 1 hour, and 24 hours.

1. Display the front view of the ATM I/O module.
2. Select S:tatus.

   A secondary legend is displayed at the bottom of the screen.
3. Choose Module S:tatistics.

   A third-level legend is displayed at the bottom of the screen.

To display the current status of the UNI port, select U:NI Statistics. A screen similar to Figure 3-20 is displayed.

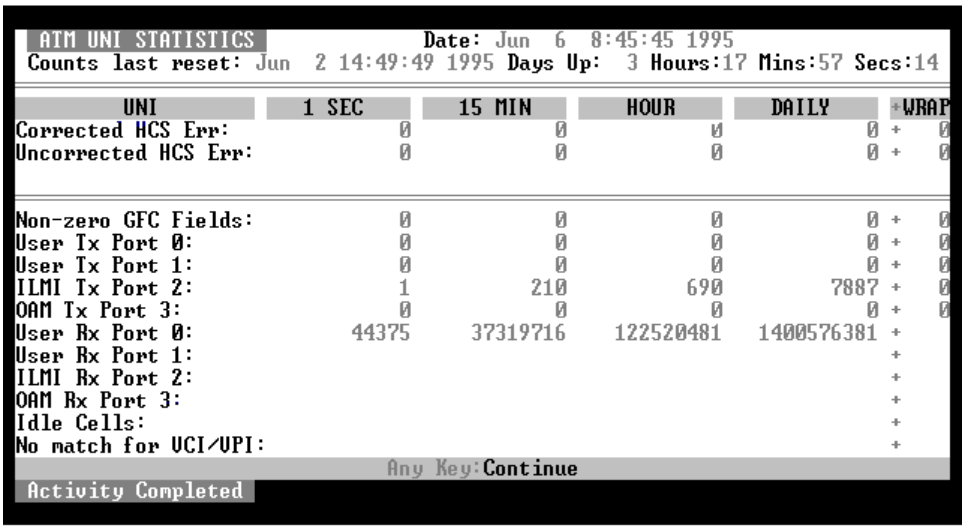

Figure 3-20. Example of UNI Statistics Screen

To display the status of the backbone, select B:ackbone Statistics. A screen similar to Figure 3-21 is displayed.

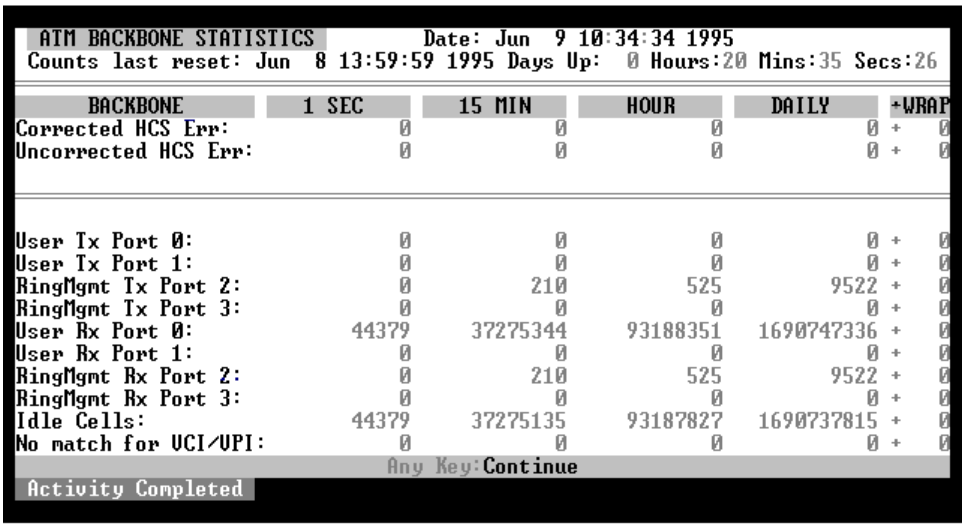

Figure 3-21. Example of Backbone Statistics Screen

The following example describes how to interpret the data is the Seconds, Minutes, Hours, Daily, and +Wrap fields on the statistics screens. Table 3-6 describes the port parameters.

Example:

The error counters were reset 10 hours ago.

- Check the 1 Sec field. If the value in the field is 900, then 900 of the indicated events or errors occurred in the 1-second interval before you selected the Display Statistics option.
- Check the 15 Minute field. If the value in the field is 60, then 60 of the indicated events or errors occurred in the 15-minute interval before you selected the Display Statistics option.
- Check the 1 Hour field. If the value in the field is 10, then 10 of the indicated events or errors occurred in the 1-hour interval before you selected the Display Statistics option.
- Check the Daily field. If the value in the field is 3654, then 3654 of the indicated events or errors occurred in the 24-hour interval before you selected the Display Statistics option.
- Check the +Wrap field. This value indicates how many times the Daily field has exceeded the maximum 999999 count.

Table 3-6. Port Parameter Descriptions

Port Parameter	Description
User Tx/Rx Ports	User Tx ports reflects data path cell counts output to either the UNI interface or the backbone interface. User Rx ports reflects data path cell counts input to either the UNI interface or the backbone interface.
ILMI Tx/Rx Ports	The ILMI Tx ports reflect ILMI cells (VPI = 0, VCI = 16) output toward the UNI interface. The ILMI Rx ports reflect cell counts input from the UNI interface.
OAM Tx/Rx Ports	The OAM Tx ports reflect OAM F4 segment flow cell counts (VCI = 3) output toward the UNI interface. The OAM Rx ports reflect OAM F4 segment cell counts input from the UNI interface.
RingMgt Tx/Rx Ports	The RingMgt Tx ports reflect Ring Management cells (VPI = 0, VCI = 16) output to the backbone interface. The RingMgt Rx ports reflect Ring Management cells input from the backbone interface.

Resetting the Error Counters

To reset the traffic and error counters displayed on the Statistics screen to zero:

1. Display the front view of the ATM I/O module.
2. Select C:onfigure.
3. From the secondary legend, choose M:ore ....
4. Choose R:eset all Counts.

   A message is displayed requiring a confirmation to continue with the reset.
5. Enter **Yes** to confirm the reset.

Displaying the Connection Status for Each Module

To display the connection status for each module by node and slot on the ATM network:

1. Display the front view of the ATM I/O module.
2. Select S:tatus.

   A secondary legend is displayed at the bottom of the screen.
3. Choose N:etwork Map.

   A screen similar to Figure 3-22 is displayed.

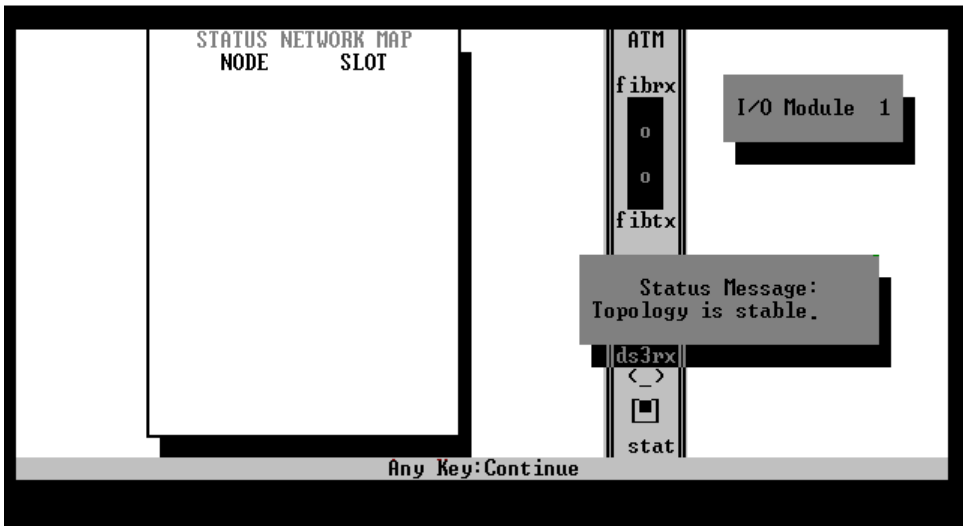

Figure 3-22. Example of Connection Status for Modules

Testing the Module

This procedure describes how to reinitialize the ATM I/O module causing it to reset the entire module and run power-on diagnostics.

1. Display the front view of the ATM I/O module.
2. Select T:est

   A secondary legend is displayed at the bottom of the screen.
3. Choose I:nitiate Test.

   You are prompted to run the test. Additionally, the following warning is displayed:

   CAUTION: Running this test will RESET the ATM card and interrupt all traffic associated with it!
4. Choose **Yes** to initiate the test.

To view the results of the last test run, choose D:iagnostics Results from the secondary Test legend.

Initiating a Loopback

To perform loopback testing on either the ports or the backplane of the current ATM I/O module:

1. Display the front view of the ATM I/O module.
2. Select C:onfigure.
3. From the secondary legend, choose M:ore ....
4. Choose L:oopback.
5. Now choose one of the following options:
   - Bus - the loopback is activated at the backplane (i.e., the bus is looped towards the line).
   - Port - the loopback is activated at the port level (i.e., the line is looped towards the bus).
   - None - the loopback mode is deactivated.

SONET/SDH Link Module

The SONET/SDH (OC3) link module converts PremNet backplane data into SONET or SDH frames (mode is software-selectable), which are transmitted at 155 Mbps over fiber-optic cable.

Configuration Strategy

This procedure outlines the steps you must take to configure and manage the SONET/SDH link module. Review the steps carefully. Each step is broken down into a more detailed procedure.

1. **Select the target link module**. Refer to “Displaying the PremNet I/O Module” within this chapter.
2. **Set the link module to the desired operating mode.** Select either SONET (United States) or SDH (Europe). Refer to “Configuring the Module” within this section.
3. **Select the type of ring topology for your network.** Configure the ring to single-link (one link per node) or counter-rotating ring (two links per node). Refer to “Configuring the Module” within this section.

4. **Initialize unused overhead bytes**. Refer to "Configuring the Module" within this section.

5. **Select the timing clocks for the target link module.** Specify/change the timing clock source for the link module. Refer to "Setting the Timing" within this section.

6. **Display overhead byte information for the target module.** View the overhead-byte contents of a single received SONET frame. Refer to "Displaying the Frame Overhead" within this section.

7. **Display performance monitoring statistics and change threshold values.** View error statistics and set threshold values for error monitoring. Refer to "Configuring PM Statistics" within this section.

8. **Display alarms and clear alarm history buffer.** Refer to "Displaying Alarms" at the beginning of this chapter to view current alarms and alarm history, and to clear alarms for this module.

9. **Run SONET/SDH link module diagnostic tests.** Refer to "Testing the Module" within this section to display the current test status, test line connections, insert BIP errors, and run terminal and facility loopback.

Configuring the Module

To configure the SONET/SDH link module:

1. Display the front view of the SONET/SDH link module.

2. Select C:onfigure.

   A secondary legend is displayed.

3. Choose C:onfiguration.

   A third-level legend is displayed with the following options:

   - R:ing Mode - This option allows you select a single-link configuration or a counter-rotating topology (with two or more links).

Note: Single-link configurations do not support protection switching or the Bellcore performance monitoring requirements.

In a PremNet node that has two link modules installed (either in Slots A-B or in C-D), do not attempt to configure one or both links on Single-link ring. This is not a valid configuration and may cause system problems.

- L:ink Mode - This option allows you to specify the operating mode for the link module. Select SONET for U.S. (STS-3c frame format), or select SDH for Europe (STM-1 frame format).
- O:verhead Bytes Initialization - This option allows you to "stuff" the SONET overhead bytes that are not used by the link module. According to Bellcore specifications, these bytes must be filled with either zeros (0s) or ones (hexadecimal FFs).

Setting the Timing

To select the timing clock source for the SONET/SDH link module:

1. Display the front view of the SONET/SDH link module.
2. Select C:onfigure.

   A secondary legend is displayed.
3. Choose Sonet/SDH T:iming.
4. Select one of the following options:

   - Line Timing - The transmit SONET/SDH clock source is the clock recovered from the received signal.
   - Internal Clock - The transmit SONET/SDH clock source is the module's internal 20 ppm oscillator.
   - BITS Clock (SONET only) - The transmit SONET clock source is the clock recovered from the BITS clock input. This option is not displayed if the link module is set to SDH mode.

     If you select the BITS clock, the new timing mode becomes effective immediately.

Configuring Performance Monitoring (PM) Statistics

To configure the alarm and error statistics:

1. Display the front view of the SONET/SDH link module.
2. Select C:onfigure.

   A secondary legend is displayed.

3. Choose Sonet/SDH S:tatistics.

   The current statistics and values set for the overhead bytes are displayed in the Section, Line, and Path segments of the SONET STS-3c frame. Refer to Figure 3-23. The xxxxx on the display represent the number of digits displayed in those fields. The fields display the threshold values for the current 15-minute and current 1-day PM data and the error statistics. Table 3-7 describes the fields on the display.

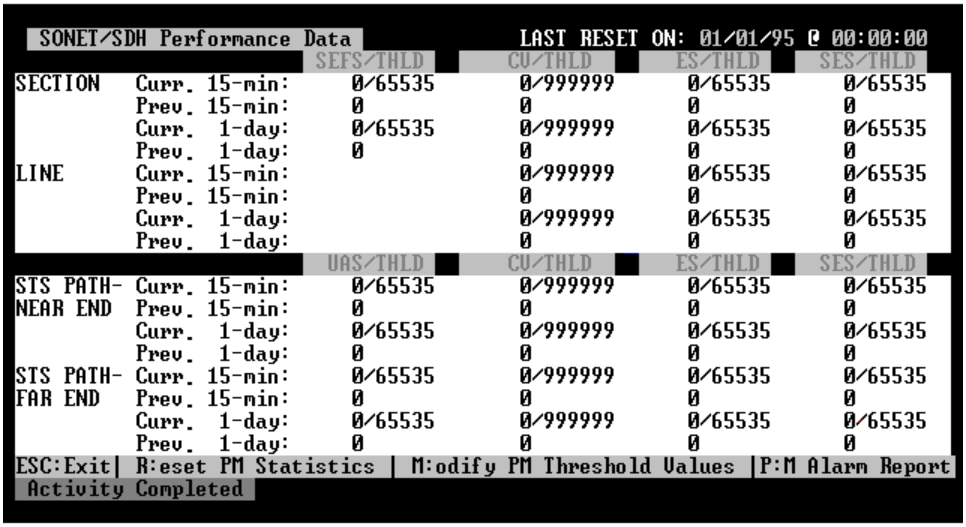

Figure 3-23. Example of Sonet PM Statistics Display

Table 3-7. PM Statistics Display Fields

Field	Description
LAST RESET ON mm/dd/yy @ hh:mm:ss	Last date and time module's PM statistics were cleared and reset.
SECTION	Section overhead (9 bytes) in frame.
LINE	Line overhead (18 bytes) in frame.
STS PATH-NEAR END	Near end parity bit errors (B2) inserted by transmitter.
STS PATH-FAR END	Far end bit errors (FEBEs in B3) accumulated at the received end of the line.
SEFS/THLD	Severely errors framing second/threshold.
CV/THLD	Coding violation/threshold.
ES/THLD	Errored seconds/threshold.
SES/THLD	Severely errored second/threshold.
UAS/THLD	Unavailable seconds/threshold.

4. Choose from one of the following options:

   - R:eset PM Statistics - Use this option to clear all PM statistics data and start error monitoring from the new reset time.

   - M:odify PM Threshold Values - Use this option to change the "current 15-minute" and current 1-day" threshold values for the Section, Line, and Path (near and far ends) overhead segments in the SONET STS-3c frame.

Note: These threshold values are PM alarm threshold values that can be used to generate a minor alarm if enabled. When enabled, an alarm occurs when the corresponding PM statistic count is equal to or greater than the respective threshold value.

The PM alarms, if enabled, are not logged in the alarm history because these alarms, if they occur, remain as "current" alarms until you clear (reset) them.

   - P:M Alarm Report - Use this option to enable or disable PM alarm reporting for the selected link module.

Note: A PM alarm, if active, can only be cleared by either resetting the PM statistics or by setting the respective threshold value to be higher than the PM count.

Displaying Performance Monitoring (PM) Statistics

To display the alarm and error statistics:

1. Display the front view of the SONET/SDH link module.

2. Select S:tatus.

   A secondary legend is displayed.

3. Choose Sonet/SDH PM S:tatistics.

   Refer to Figure 3-23 for an example.

   To configure the PM statistics, refer to "Configuring PM Statistics".

Displaying the Frame Overhead

To display the contents of the 81 transport overhead bytes and the nine path overhead bytes in a single received SONET frame:

1. Display the front view of the SONET/SDH link module.
2. Select S:tatus.

   A secondary legend is displayed.
3. Choose Sonet/SDH Frame O:verhead.

   The Section and Line Overhead byte contents are displayed. The actual overhead byte values appear as two hexadecimal digits, not as A1, C1, B2, etc.

Note: This information is read from the link module's internal receive-overhead RAM.

Testing the Module

To perform SONET/SDH tests:

1. Display the front view of the SONET/SDH link module.
2. Select T:est.
3. Choose from the following test options:

   - Signal I:D - Choose this test to view, change, and report the contents of the transmitted Path Trace message. This test is useful in isolating fiber breaks and other line problems.
   - B:IP Error Insertion - This error-monitoring test allows you to insert Bit Interleaved Parity (BIP) errors in the Section, Line, and Path overhead bytes in the SONET STS-3c frame.

     Enter the number of errors to insert: For B1 and B3 tests, enter 1 - 8 or 0 to stop the test. For B2 test, enter 1 - 24 or 0 to stop the test.
   - T:erminal LB - This test connects the signal to be transmitted to the incoming receiver. It is used to test the local SONET data path and associated hardware.
   - F:acility LB - This test is run between two link modules and tests the fiber-optic lines between them. It also tests the receive/transmit electronics on the module in loopback mode.
   - S:tatus - This option displays the state of the tests.

Video I/O Module

The PremNet Video I/O modules enable you to communicate video/audio information from a central site to groups of users at remote sites. The Video modules come in three types: 2-Way Video, 1-Way Video Input, and 1-Way Video Output. This section covers all three types.

Configuration Strategy

This procedure provides the steps necessary to establish a virtual connection in a Video I/O ring. The Video I/O modules can reside in any node.

1. **Verify bandwidth requirements.** Refer to "Configuring the Module" within this section to select the bandwidth required by the application. The default setting is six time slots (compression 12:1).

Note: Once the virtual circuits have been assigned, you cannot change the module's bandwidth without deleting the virtual circuit.

---

2. **Establish a virtual connection.** In a video module virtual connection, only two video modules are required to connect in a Video I/O ring. Refer to "Configuring Virtual Connections" in Chapter 2.

Note: Disable the Audio Loopback Testing function before you establish a virtual connection.

---

3. **Set up the Video Module for the application configuration.** Refer to "Configuring the Module" within this section.

Configuring the Module

To configure any of the Video I/O modules:

1. Display the front view of the Video I/O module.
2. Select C:onfigure.

   A secondary legend is displayed.
3. Choose C:onfigure.

   A screen similar to Figure 3-24 is displayed. Table 3-8 describes the modifiable parameters.

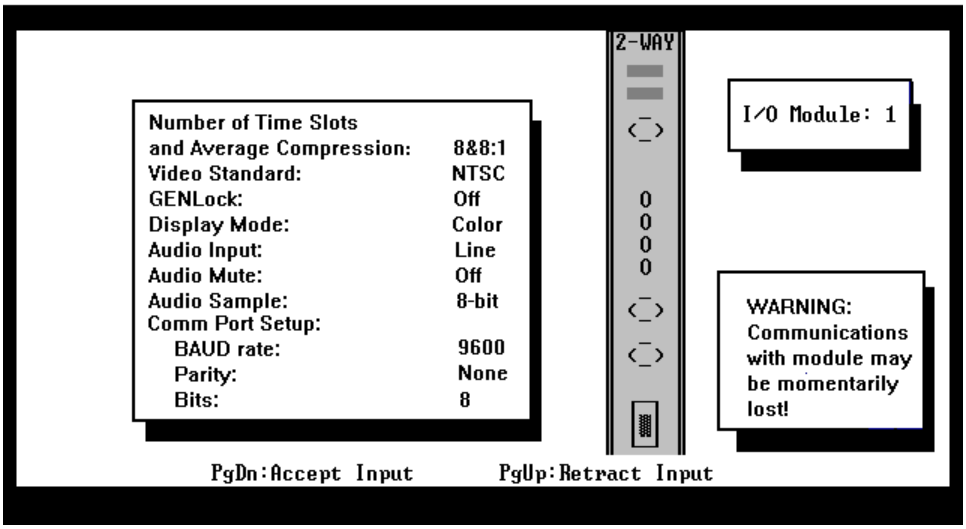

Figure 3-24. Example of Video I/O Module Configure Screen

Table 3-8. Configure Video I/O Module Parameter Descriptions

Field	Description
Number of Time Slots and Average Compression	This field allows you to allocate different bandwidths to the Video I/O module and display the average compression ratio. This is available only in Standby mode. There are four time slot selections available: 2, 4, 6, and 8. The default time slot of six provides enough bandwidth to produce quality images.
Video Standard	The video standard displayed on the screen depends on the module's display format (NTSC or PAL). You cannot change this option.
Video Source	This field allows you to change the Input port from Video In to Camera 2 or Camera 3.
GENLock	This field allows you to enable or disable the internal synchronized clock that is used to synchronize video.
Display Mode	This field allows you to toggle between color and black and white, depending on what the input source transmits.
Audio Input	This field allows you to change the input port that will be used to receive sound. These ports are standard ¼-inch stereo audio jacks.
Audio Mute	This field allows you to enable or disable the audio signal that is being received.
Audio Sample	This field allows you to select between 8-bit companded or 16-bit companded.
Comm Port Setup	This field allows you to change the baud rate, parity, and bits of the communication port.

Setting the Passthru

This procedure allows the video, audio, and communication to be "T'ed" at the module. Enable this setting when configuring the video application for multipoint.

Note: You must disable Audio Loopback Testing before you can enable the Passthru setting.

To enable or disable passthru:

1. Display the front view of the Video I/O module.
2. Select C:onfigure.

   A secondary legend is displayed.
3. Choose PassT:hru.
4. Select On or Off to enable or disable Passthru.

Starting or Stopping a Broadcast Session

To change the Broadcast setting:

1. Display the front view of the Video I/O module.
2. Select C:onfigure.

   A secondary legend is displayed.
3. Choose B:roadcasting.
4. Select On or Off to start or stop a broadcast.

Note: This option is not applicable for 1-Way Video Output.

Resetting the Video Interface

Use this operation if you experience freeze-frame in the video.

To reset the video interface:

1. Display the front view of the Video I/O module.
2. Select C:onfigure.

   A secondary legend is displayed.
3. Choose R:eset.
4. Select Yes to reset the interface.

Audio Loopback Testing

Audio Loopback testing allows you to set the loopback control of the audio port. It enables or disables a unidirectional loopback towards the local output port. Loopback enables users on both ends to check and adjust audio signals before a video conferencing session begins.

Note: Disable Audio Loopback testing before you establish a virtual connection.

To enable or disable audio loopback:

1. Display the front view of the Video I/O module.
2. Select C:onfigure.

   A secondary legend is displayed.
3. Choose L:oopback.
4. Select On or Off to enable or disable testing.

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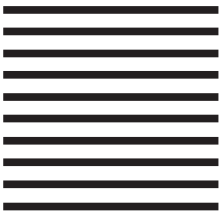

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