

PremNet™ 4-Wire Voice I/O Module

Installation and Operation

PND850060-1/A 8/98

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Milgo Solutions requires a Return Material Authorization (RMA) prior to the return of any equipment under the provisions of the warranty. Please contact your authorized reseller or the nearest Milgo support center for details.

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About This Manual

Manual Description

The *PremNet Voice I/O Module Installation and Operation Manual* provides information you need to properly configure, test, and manage the following I/O modules:

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

installed in your PremNet 5000 or PremNet Branch network. This manual has been written with the assumption that you are familiar with basic data communications principles.

The manual is composed of the following sections:

- **Chapter 1 - Overview** provides an introduction to the 4-Wire Voice I/O modules.
- **Chapter 2 - Applications** describes examples of networks that use the voice I/O modules.
- **Chapter 3 - Installation and Configuration** provides information about installing and removing the I/O Modules.
- **Chapter 4 - 4-Wire Voice I/O Module Command Menu** describes the options available to manage, configure, and test the 4-Wire Voice I/O modules

Related Manuals

For further information about the PremNet 5000 or PremNet Branch, refer to the following manuals:

- *PremNet Broadband Access System Installation and Operation Manual* for information about how to install and configure the PremNet chassis.
- *PremNet System Multi-Ring Network Configuration Manual* for information about multi-ring networks.

Terminology and Conventions

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

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

Login

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

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

Y

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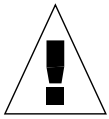
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Appendix A – Technical Specifications

Appendix B – Regulatory Information

Important Safety Instructions

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Use caution when installing or modifying telephone lines.
5. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
6. Do not use the telephone to report a gas leak in the vicinity of the leak.



Caution: To ensure compliance with government regulations, do not install or operate this product until you have read the information contained in Appendix B.

Chapter 1

Overview

Introduction

The 4-Wire Voice I/O Module provides bidirectional transport of voice or voiceband data circuits (300 to 3400 KHz) to another 4-Wire Voice I/O module in a PremNet system virtual circuit. The PremNet broadband access system assigns one timeslot (backplane) to each 4-Wire Voice I/O Module. Each timeslot is divided into 32 full-duplex, 64-Kbps voice channels. You can assign any one of the 32 channels to any one of the eight physical ports on each I/O module. Connecting eight 4-Wire Voice I/O modules in a virtual circuit supports 32 full-duplex, 64-Kbps voice channels. Although you can configure up to 16 4-Wire Voice I/O modules in a virtual circuit, you can only use half of these modules' physical ports to support point-to-point voice channels.

Note: You can also configure a multi-drop 4-wire connection. However, because no side-tone or loop-through functions are available at the port, you must provide these functions externally.

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 I/O module versions support a variety of user applications. All of the 4-Wire Voice I/O module versions provide a VF channel and support an additional in-band signaling channel. Figure 1-1 shows the three versions of the 4-Wire Voice I/O module.

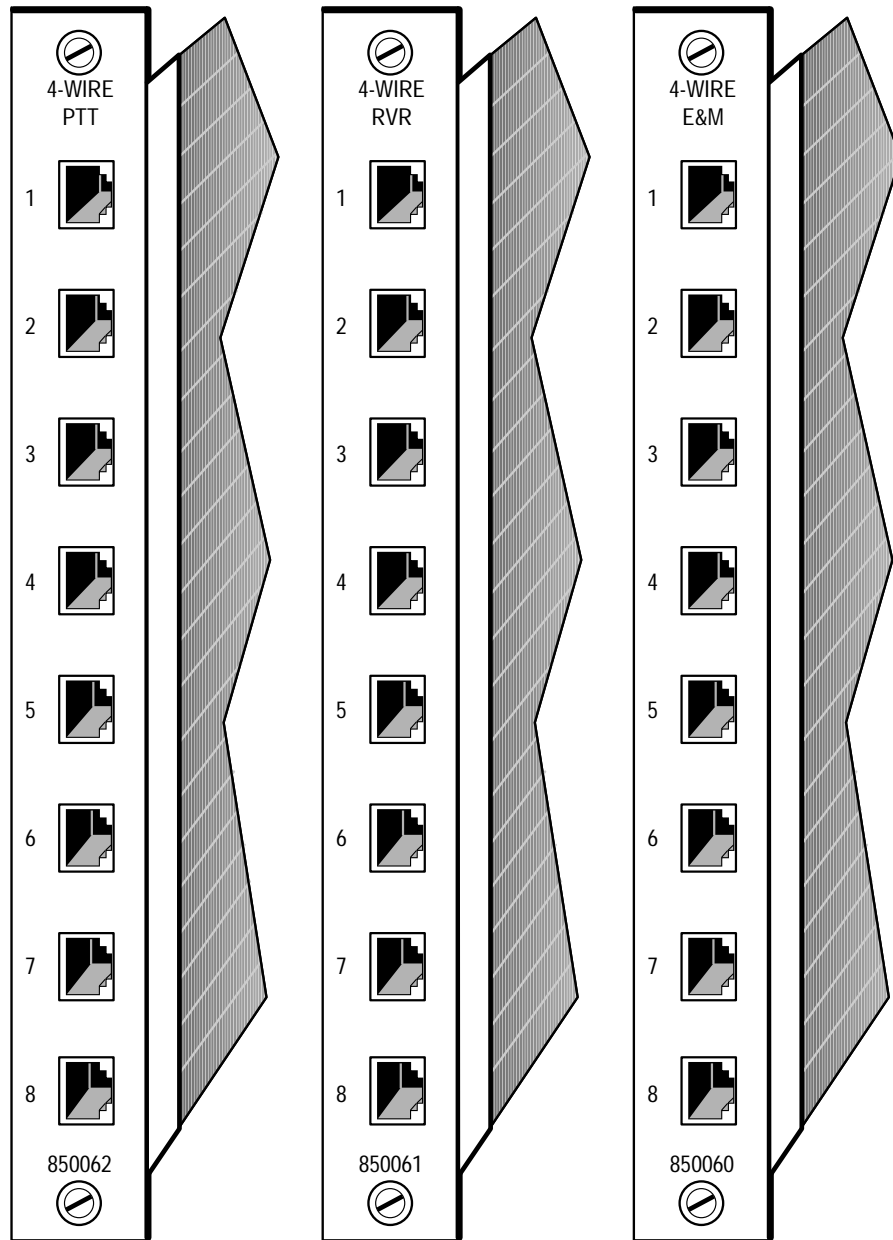


Figure 1-1. 4-Wire Voice I/O Modules

E&M I/O Module

The E&M version transports voice channels between Private Branch Exchanges (PBXs). The E&M (Type 1) is ear-originated. The signaling channel detects the application of office battery voltage (-48 Vdc), causing a relay closure at the other end of the channel. This relay closure indicates to the PBX at the other end that an "off-hook" condition exists so that the PBX knows to listen to the incoming VF signal.

RVR I/O Module

The RVR version transports voice and telemetry information over the voice channels between remote equipment. The RVR signaling channel detects the application of an external -12 V signal at one end and duplicates it at the other end, causing the attached equipment at the other end to detect and respond to the -12 V signal.

PTT I/O Module

The PTT version is used to interface with a remote radio. The signaling channel detects a switch closure, causing a relay closure at the other end of the channel. This relay is then used to turn on the radio transmitter.

LED Display

The LED status indicators for the I/O modules are on the front panel of the PremNet node. Each module has three LED indicators. Table 1-1 lists each LED, along with a brief description.

Table 1-1. 4-Wire I/O Module Panel LED Meanings

LED	Meaning
Alarm	The module is in an alarm condition.
Stdby	Standby. The module is operational but is not connected to any other module.
Active	The link connection is assigned and the module is functioning properly.

Module Connections

Each 4-wire voice I/O module offers eight physical ports (RJ-45 connectors) for transporting data. Figures 1-2 through 1-4 show the RJ-45 jack/plug signals. Table 1-2 lists the pin assignments for each port.

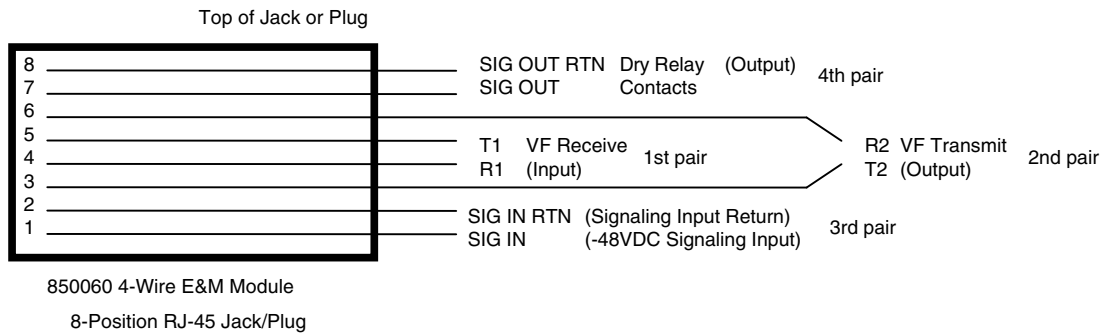


Figure 1-2. RJ-45 Jack/Plug Arrangement for the 850060 4-Wire E&M Module

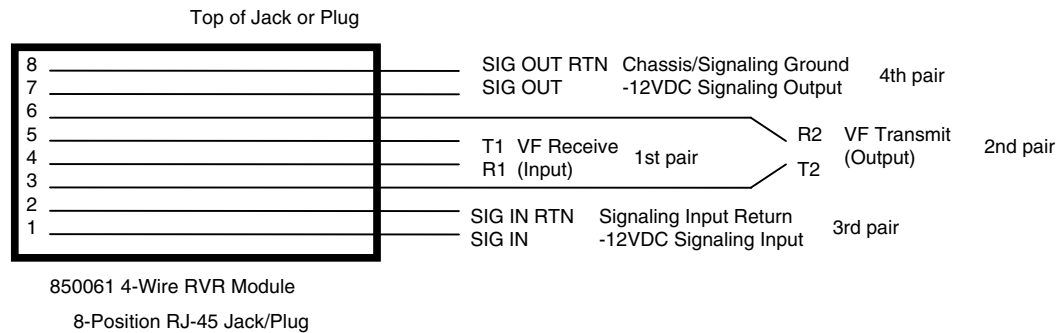


Figure 1-3. RJ-45 Jack/Plug Arrangement for the 850061 4-Wire RVR Module

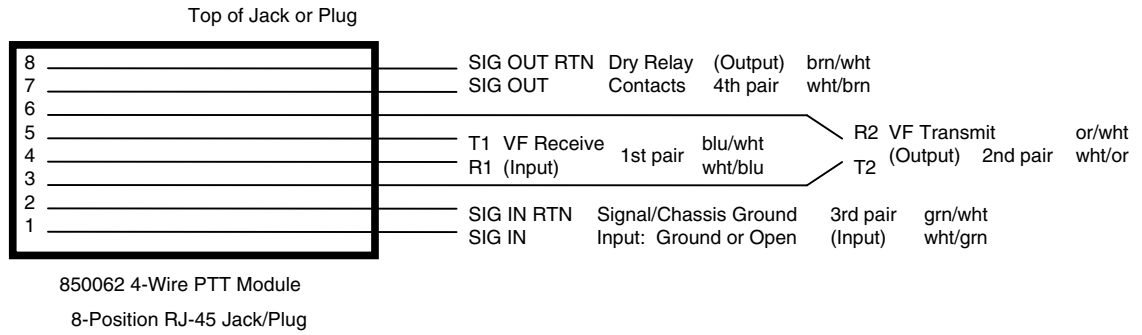


Figure 1-4. RJ-45 Jack/Plug Arrangement for the 850062 4-Wire PTT Module

Table 1-2. 4-Wire Voice Pin Assignments

Pin Number	Signal Name	Signal Direction
1	SIG IN	IN
2	SIG IN RTN	IN
3	T2	OUT
4	R1	IN
5	T1	IN
6	R2	OUT
7	SIG OUT	OUT
8	SIG OUT RTN	OUT

Channel-Associated Signaling

Three electrical interfaces are available for this signaling channel: E&M, RVR, and PTT.

E&M

E&M signaling is received on pins 1 and 2 (ear leads) and is "active" with a nominal -48 Vdc signal on pin 1 relative to pin 2 at 30 ma. maximum (5.0 ma. minimum required). This active state (originating on the ear leads) causes a dry 2 form C relay contact to close between pins 7 and 8 (mouth leads) at the other end of the virtual circuit. High-frequency bypassing is provided across these relay contacts for transient suppression.

Because of the mechanical relay, the E&M signal has 5 msec of uncertainty. Figure 1-5 shows the signal termination for the E&M module.

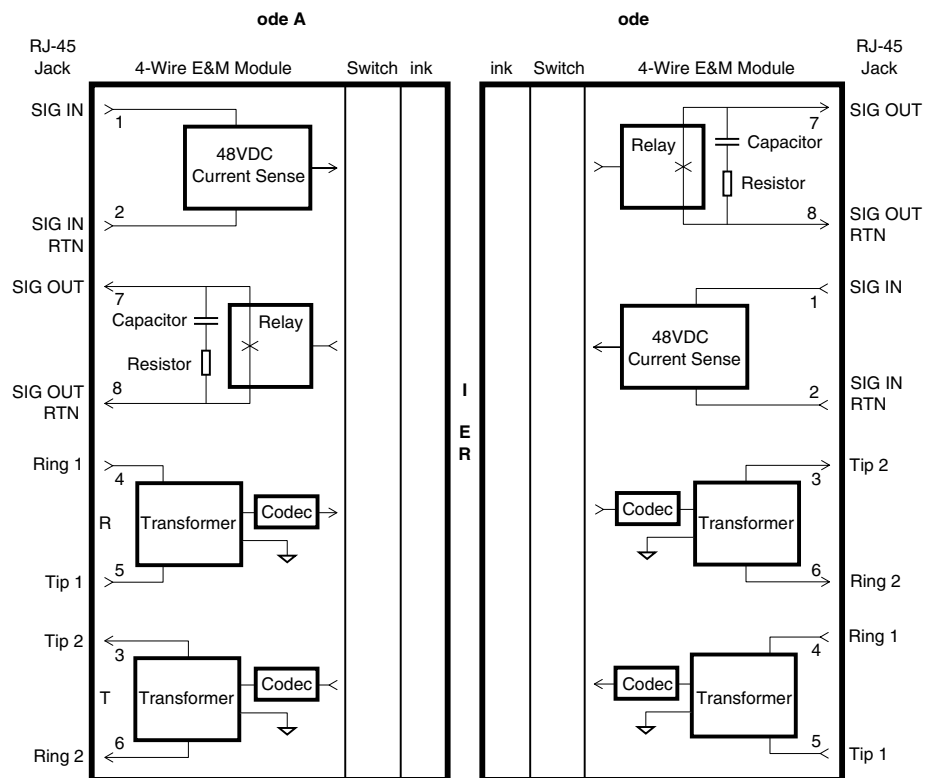


Figure 1-5. E&M Module Signal Termination Diagram

RVR

RVR signaling is received on pins 1 and 2 and is active with a -12 Vdc signal on pin 1 relative to pin 2 at 12 ma. maximum (5.0 ma. minimum required). This active state causes an output at the other end of the virtual circuit on the 7,8 pair. Pin 7 is driven to -12 Vdc relative to pin 8 (20.0 ma. maximum short circuit output drive). In this mode, pin 8 is electrically tied to chassis ground.

Internally, this signal is sampled at an 8-KHz rate. This sampling function generates a 125 µsec jitter to this signal. If this signal is externally looped at the far end of the virtual circuit, the returning signal has a 250 µsec uncertainty (jitter). Figure 1-6 shows the signal termination for the RVR module.

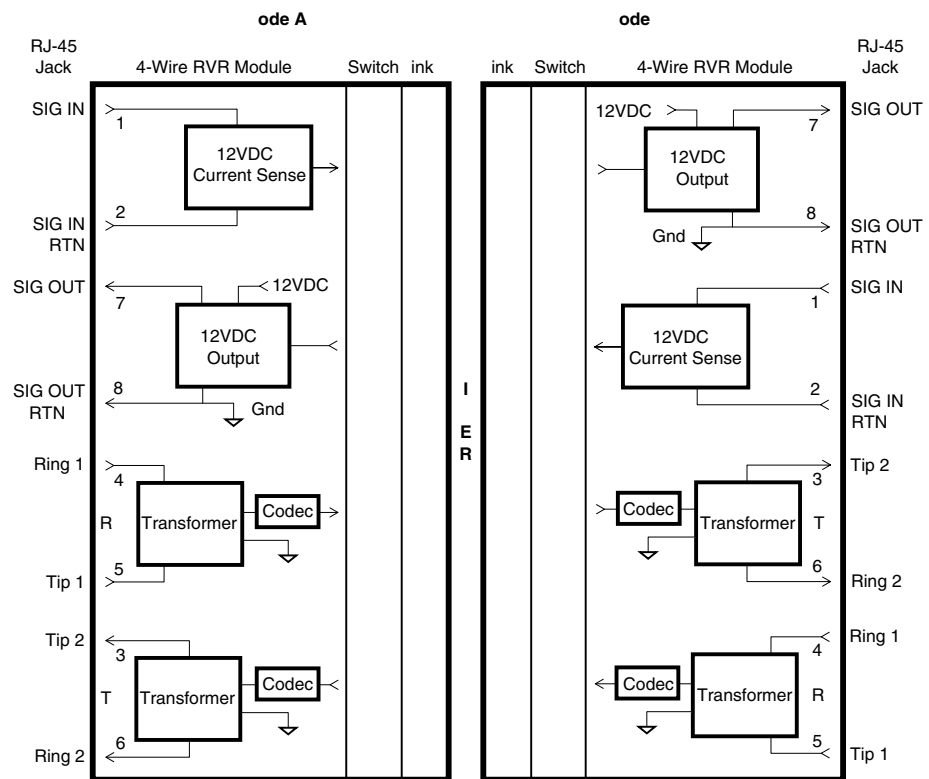


Figure 1-6. RVR Module Signal Termination Diagram

PTT

PTT signaling is received on pins 1 and 2 and is active with a low impedance path between pins 1 and 2. An external connection, less than 500 ohms, must be provided to activate the path. In this mode, pin 2 is electrically tied to chassis ground and pin 1 is internally tied to +12 Vdc through a 1K resistor. This active state causes a dry 2 form C relay contact to close between pins 7 and 8 at the other end of the virtual circuit. High-frequency bypassing is provided across the relay contacts for transient suppression.

Because of the mechanical relay, the PTT signal has 5 msec of uncertainty. Figure 1-7 shows the signal termination for the PTT module.

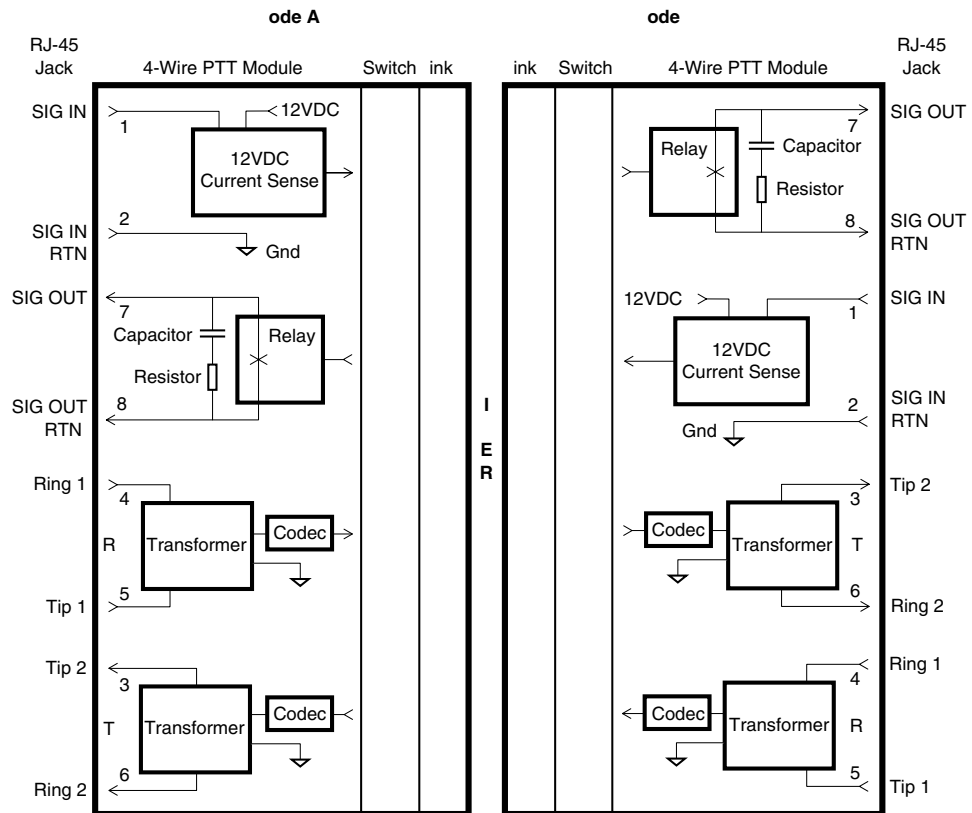


Figure 1-7. PTT Module Signal Termination Diagram

Chapter 2

Applications

Ear and Mouth (E&M)

This module transports voice channels between private branch exchanges (PBXs) and is ear-originated. The signaling channel detects the application of office battery voltage (-48 Vdc), causing a relay closure at the other end of the channel. This signals an "off-hook" condition that alerts the PBX to an incoming VF signal.

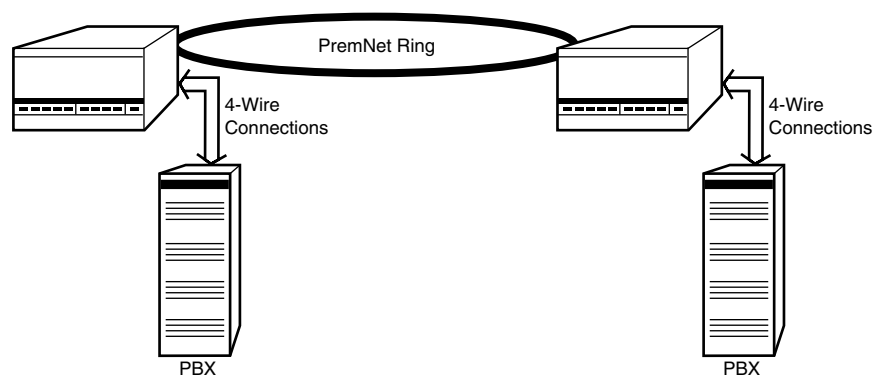


Figure 2-1. Ear and Mouth (E & M) Application

Runway Visual Range (RVR)

This module transports voice and telemetry information over the voice channels between remote equipment. The RVR signaling channel detects the application of an external -12 V signal at one end and duplicates it on the other end, causing the attached equipment to detect and respond to the signal.

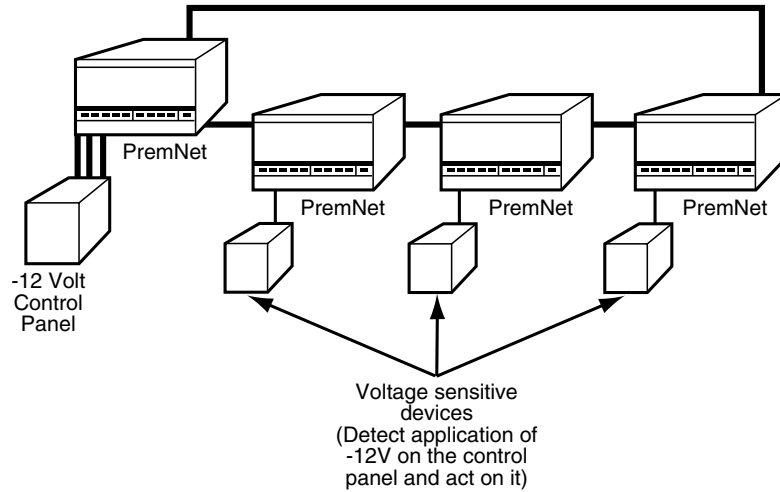


Figure 2-2. Runway Visual (RVR) Application

Push to Talk (PTT)

This module is used to interface with remote radio. The signaling channel detects a switch closure, causing a relay closure at the other end of the channel. This relay is then used to turn on the radio transmitter.

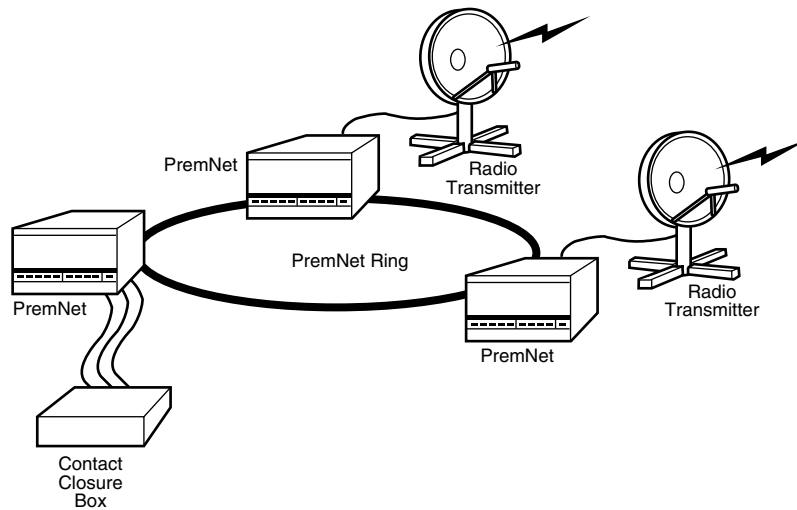


Figure 2-3. Push to Talk (PTT)

Chapter 3

Installation and Configuration

Introduction

This section outlines the steps you must take to install an 4-Wire Voice module into a PremNet chassis and establish a virtual connection.

Configure the I/O modules using an asynchronous terminal connected to the 4-Wire Voice port of the Network Management Module (NMM) or the Enhanced Network Management Module (ENMM) in the desired chassis. You can also configure the modules using the Milgo CMS™ 400 SNMP management station. See the *CMS 400 SNMP PremNet 5000 Manager User's Guide* for specific information.

The 4-Wire Voice Modules can reside in any chassis. When a control function is required, the module with the lowest node number is assigned as the primary control module. Unless otherwise noted, all options discussed in this manual are accessed through the (S) Select interface module option on the Node Command Menu viewed on the terminal.

Preventing Electrostatic Discharge (ESD)

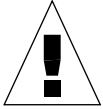
Before you install or remove parts of the PremNet system, you must be electrically grounded to prevent electrostatic discharge (ESD) damage to the modules.

To electrically ground yourself, complete the following steps:

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

Installing and Removing Modules

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



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

The PremNet 5000 chassis contains eight slots for the placement of I/O modules. The PremNet Branch chassis contains three slots. The slots are numbered 1 through 8 (1 through 3 for the Branch), left to right, as viewed from the front. You can install the I/O modules in any I/O slot in any node. Modules in different nodes communicating with each other do not have to reside in the same physical slot in all nodes.

Installing Modules

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

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

Note: The module will go into alarm condition (red LED on) for approximately two minutes before going into standby (yellow LED on).

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

Removing Modules

To remove a module, complete the following steps:

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

Configuration

Prior to adding a new 4Wire Voice module, make sure the PremNet ring is up and running.

Complete the following steps every time you add a new 4-Wire Voice module to an active ring. All options are selected from the appropriate Module Command Menu unless otherwise noted. Refer to the module-specific Module Command Menu for details.

From the Module Command Menu:

- Select View Configuration (V) to see how the module is configured before making changes to the settings.
- Select Port Select (P) to configure each port of the module.
- Select Connection map (C) to assign voice channels to specific ports on the I/O module.
- Select Interface module select (#) to select another I/O module in the chassis.

After the new I/O module is installed, configured, and tested, select Configuration (C) from the Node Command Menu to create the necessary connections.

Chapter 4

4-Wire Voice Module Command Menu

Introduction

To access the 4-Wire Voice I/O Module Command Menu:

1. Type **S** at the prompt in the Node Command Menu and press [ENTER].
2. Type the slot number of the 4-wire voice I/O module you want to configure and press [ENTER]. The 4-Wire Voice Module Command Menu appears (see Figure 4-1).

Refer to the *PremNet Broadband Access System Installation and Operation Manual* for information about accessing and using the Node Command Menu.

Accessing the Menu

```
=====
(A) Alarm display           (C) Connection map
(H) Help                   (M) Monitor status
(P) Port select           (Q) Log off
(V) View configuration     (X) Exit
(?) or (/) Command menu  (#) Interface module select
01,02:4-Wire PTT>
```

Figure 4-1. 4-Wire Voice Module Command Menu

The prompt 0101,02:4-Wire PTT> indicates that:

- 01 is the ring number
- 01 is the node number
- 02 is the slot number
- 4-Wire PTT is the module type

Note: For single ring networks, the ring number is not displayed.

Alarm Display (A)

In Figure 4-1, the Alarm display option enables you to view specific alarm information about the module. To access this option:

Type **A** at the 4-Wire PTT> prompt and press [ENTER]. The alarm information is displayed on the screen, as shown in Figure 4-2.

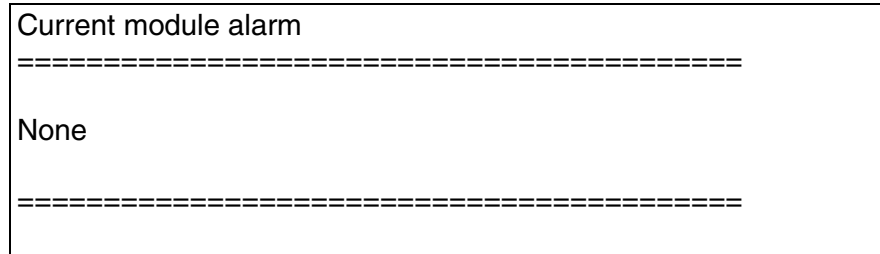


Figure 4-2. Sample Current Module Alarm Screen

Alarm Messages

Table 4-1 contains possible 4-Wire Voice I/O module alarm messages that can appear at the I/O module or port levels, their corresponding code numbers, and recommended solutions to the alarm conditions they represent.

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

Table 4-1. Alarm Messages

Error Message	Explanation	Suggested Action
Module-Level Alarm Messages		
Backplane Parity Error (Code 1)	A receive error is detected on the backplane. A communication problem exists between the switch module and the I/O module.	Verify node alarm conditions by using the Alarm display option from the Node Command Menu. If a <i>Switch parity</i> error exists, the problem is not an I/O module error. Replace the switch.

Table 4-1. Alarm Messages (Continued)

Error Message	Explanation	Suggested Action
Backplane TX Data Error (Code 2)	The data from the fiber is overflowing or underflowing the backplane FIFO.	The I/O module showing the alarm is defective. Replace the I/O module.
Backplane RX Data Error (Code 3)	The data from the port or ports is overflowing or underflowing the backplane FIFO.	If this alarm does not appear with the <i>Backplane TX Data</i> error, the I/O module showing the alarm is probably defective. Replace the I/O module.
Phase Lock Loop Error (Code 4)	Indicates that this module has a timing fault or that the upstream module is not driving data into the backplane at the correct rate.	Locate and replace the defective I/O module.
Master Receives Beacons Error (Code 6)	Indicates that a module upstream from the master module is not receiving proper data on its inband Universal Asynchronous Receiver/Transmitter (UART) communication channel, and has sent a beacons message to the master.	Locate and replace the upstream module that is experiencing the error.
Communication Channel Failure (Code 7)	Indicates that the module is not receiving proper data on its in-band UART communication channel.	The I/O module is defective. Replace the I/O module.
Card Missing in the Ring List Error (Code 8)	Indicates that a module in the virtual circuit is not responding to in-band UART signals.	The I/O module is defective. Replace the I/O module.
Communication Channel Beacons (Code 9)	Indicates that an upstream module is not receiving proper data on its inband UART communication channel.	Locate and replace the upstream module that is experiencing a <i>Channel Communication Failure</i> error.
Communication error between cards (Code 10)	Indicates that the master module is not receiving proper data on its inband UART communication channel from another module in the network. The error will identify the cards which are not communicating.	Locate and replace the module that is not processing messages correctly.

Table 4-1. Alarm Messages (Continued)

Error Message	Explanation	Suggested Action
Port-Level Alarms		
Port 1-8 Codec write fail (Code 1-8)	The codec for the port indicated is unable to store information in its memory.	The port is not functioning properly. Disable the port and switch the external equipment to another port. Replace the module as soon as possible.

Connection Map (C)

In Figure 4-1, the Connection map option 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.

Note: You can also configure a multi-drop 4-wire connection. However, because no side-tone or loop-through functions are available at the port, you must provide these functions externally.

To select the Connection map option:

1. Type **C** at the 4-Wire PTT prompt and press [ENTER]. The system displays a screen with the current channel/port assignments for all of the 4-Wire Voice I/O modules in the virtual circuit. Figure 4-3 shows an example of point-to-point virtual circuit.

```

=====
Channel #          1  3  5  7  9 11 13 15 17 19 21 23 25 27 29 31
                  2  4  6  8 10 12 14 16 18 20 22 24 26 28 30 32

RN, ND, SL  ST          PORT:
1   1   2   N          .....1..2.....6.....7.....
1   2   6   N          .....6..3.....8.....7.....

RN=Ring Number; ND=Node, SL=Slot Number, ST=Status
Status: N=Normal, A=Alarm
=====
Change assignment? (Y/N):
    
```

Figure 4-3. 4-Wire Voice Connection Map Screen

Table 4-2 lists the channel number assignments.

Note: If the module is being used in a multi-ring network and is located in the Interconnect Node, the ring, node and slot numbers indicated in Figure 4-3 may not be the same as in the connection table. The module always assumes that it is on the child ring and therefore the node number will always be displayed as one: 01.

Table 4-2. 4-Wire Voice I/O Module Channel Number Assignments - Port 1

Channel Number	Ring	Node	Slot	Port
17	1	1	2	1
17	1	2	6	6
19	1	1	2	2
19	1	2	6	3
24	1	1	2	6
24	1	2	6	8
28	1	1	2	7
28	1	2	6	7

2. In Figure 4-3, type **Y** or **N** at the Change assignment prompt and press [ENTER].

a. If you type **Y**, the system displays the following prompt.

Enter port number:

Go to Step 3.

b. If you type **N**, the current assignments are not changed. The system redisplay the 4-Wire PTT > prompt. Go to Step 6.

3. Type the port number you want and press [ENTER]. The system displays the current channel number assigned to the selected port and prompts you to change the channel number:

Current channel number: xx
 Please input new channel number.
 1 to 32, 0 to disable port:

4. Type the channel number you want to assign to the port and press [ENTER]. The system redisplay the Enter port number prompt. For example, to change port number 1 from 17 to 9, do the following:

- a. At the prompt:
 Enter port number:
 enter **1**. The system displays:
 Current channel number: 17
 Please input new channel number.
 1 to 32, 0 to disable port:
- b. Enter **9**. The system displays Figure 4-4.

```

=====
Channel #          1  3  5  7  9 11 13 15 17 19 21 23 25 27 29 31
                  2  4  6  8 10 12 14 16 18 20 22 24 26 28 30 32

RN, ND, SL  ST          PORT:
1   1   2   N          .....1.....2.....6.....7.....
1   2   6   N          .....6..3.....8.....7.....

RN=Ring Number; ND=Node, SL=Slot Number, ST=Status
Status: N=Normal, A=Alarm
=====
Change assignment? (Y/N):
    
```

Figure 4-4. 4-Wire Voice Connection Map Screen - Port Changed

Note: If the module is being used in a multi-ring network and is located in the Interconnect Node, the ring, node and slot numbers indicated in Figure 4-3 may not be the same as in the connection table. The module always assumes that it is on the child ring and therefore the node number will always be displayed as one: 01.

- 5. Repeat Steps 3 and 4 for each port that you want to assign a channel number.
- 6. To return to the 4-Wire PTT > prompt, press [ESC].

Note: To change the channel assignment of a port on a 4-wire voice I/O module that is installed in another node, you must first access that node and I/O module through the Node Command Menu.



Caution: Although a new module shipped from the factory should not have any channels assigned to its ports, verify that there are no channels assigned before assigning the I/O module to an existing virtual circuit. Failure to verify this may disrupt existing circuits when you add an I/O module.

Monitor Status (M)

In Figure 4-1, the Monitor status option enables you to view the status of the Ear (E) and the Mouth (M) of each port on the selected 4-Wire Voice I/O module. To access this option:

Type **M** at the 4-Wire PTT> prompt and press [ENTER]. A screen similar to the one shown in Figure 4-5 is displayed.

4-Wire (1,2)	Port1 E M	Port2 E M	Port3 E M	Port4 E M	Port5 E M	Port6 E M	Port7 E M	Port8 E M
*	0..F0	0..0	0..0	1..1	1..F1	1..1	1..1	0..0
*	0..F0	0..0	0..0	1..1	1..F1	1..1	1..1	0..0
*	0..F0	0..0	0..0	1..1	1..F1	1..1	1..1	0..0
*	0..F0	0..0	0..0	1..1	1..F1	1..1	1..1	0..0
*	0..F0	0..0	0..0	1..1	1..F1	1..1	1..1	0..0
*	0..F0	0..0	0..0	1..1	1..F1	1..1	1..1	0..0
*	0..F0	0..0	0..0	1..1	1..F1	1..1	1..1	0..0

Figure 4-5. Monitor Status Screen

There are four possible E M (Ear Mouth) settings:

This setting	Indicates
0	A non-active electrical signal.
1	An active electrical signal.
F0	The electrical signal will be forced to a non-active state.
F1	The electrical signal will be forced to an active state.

The Mouth setting is the status of the electrical signal that is output from the 4-Wire Voice I/O module. You can configure this setting using the Mouth setting option, which is described later in this chapter. The Ear setting is the status of the electrical signal that is input from the attached external equipment.

View Configuration (V)

In Figure 4-1, the View configuration option enables you to display the current status of all of the ports on the selected I/O module. The information displayed includes the channel assignments made through the 4-Wire Voice Connection Map screen (Figure 4-3) and the operating parameters that can be configured through commands available from the 4-Wire Voice Port Command Menu. To access the View configuration option:

Type **V** at the 4-Wire PTT> prompt and press [ENTER]. A screen similar to the one shown in Figure 4-6 is displayed.

Port #	channel #	EarMouth	RX Gain/dB	μ/A-law	1k-tone
1	1	RVR	0.0	μ-255	OFF
2	2	RVR	0.0	μ-255	OFF
3	0	RVR	0.0	μ-255	OFF
4	0	RVR	0.0	μ-255	OFF
5	0	RVR	0.0	μ-255	OFF
6	6	RVR	0.0	μ-255	ON
7	0	RVR	0.0	μ-255	OFF
8	32	RVR	0.0	μ-255	OFF

Figure 4-6. View Configuration Screen

Note: If a zero (0) displays in the channel # column, the port is not assigned.

Help (H)

In Figure 4-1, the Help option enables you to display a brief description of any of the options available from the 4-Wire Voice Module Command Menu. To select the Help option:

1. Type **H** at the 4-Wire PTT > prompt and press [ENTER]. The system prompts you to enter the letter of the option for which you want help.
2. Type a letter and press [ENTER], or simply press [ENTER] to display the letters and their corresponding options.

Log Off (Q)

In Figure 4-1, to log off the system:

1. Type **Q** at the 4-Wire PTT > prompt and press [ENTER]. The system displays the date and time you logged off the system.
2. Press [ENTER]. The system displays the PremNet introduction screen and prompts you to enter the system password.

Exit (X)

In Figure 4-1, to return to the Node Command Menu:

Type **X** at the 4-Wire PTT > prompt and press [ENTER].

Command Menu (?) or (/)

In Figure 4-1, to display the options in the 4-Wire Voice Module Command Menu:

Type **?** or **/** at the 4-Wire PTT > prompt and press [ENTER].

Interface Module Select (#)

In Figure 4-1, the Interface module select option enables you to select another I/O module in the chassis to be configured or viewed. To access this option:

1. Type **#** at the 4-Wire PTT > prompt and press [ENTER].

The following prompt is displayed:

enter module position (1-8):

2. Type the I/O slot number in which the desired module is installed.

Port Select (P)

In Figure 4-1, the Port select option enables you to view and configure specific port-level parameters. To access the Port select option:

Type **P** at the 4-Wire PTT > prompt and press [ENTER]. See “4-Wire Voice Port Command Menu” later in this chapter for detailed information about using these options.

4-Wire Voice Port Command Menu

This section describes each option available on the 4-Wire Voice Port Command Menu. In Figure 4-1, to access this menu:

Type **P** at the 4-Wire PTT > prompt and press [ENTER]. The 4-Wire Voice Port Command Menu displays as shown in Figure 4-7.

```
4-Wire Voice      Port Command Menu
=====
(E) Ear and Mouth Status      (G) RX Gain and TX Gain
(H) Help                      (L) μ-law/a-law
(M) Mouth setting            (Q) Log off
(T) 1 khz tone               (X) Exit
(?) or (/) Command menu     (#) Port select
01,02:4-Wire PTT,1>
```

Figure 4-7. 4-Wire Voice Port Command Menu

The prompt 01,02:4-Wire PPT,1> indicates that:

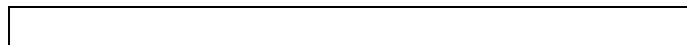
- 01 is the node number
- 02 is the slot number
- 4-Wire PTT is the module type
- 1 indicates the port number

Note: The same 4-Wire Voice Port Command Menu is displayed for all of the 4-wire voice interfaces.

Ear and Mouth Status (E)

In Figure 4-7, the Ear and Mouth Status option enables you to view the current type and setting of the Ear/Mouth interface of the selected port. To access this option:

Type **E** at the 4-Wire PTT,1> prompt and press [ENTER]. A screen similar to the one shown in Figure 4-8 is displayed.



Current status: Ear-Mouth style: PTT Ear = 0 Mouth = 0

Figure 4-8. Ear/Mouth Status Screen

Ear-Mouth Style

The Ear-Mouth style refers to the port's interface type (E&M, PTT, or RVR). Possible settings for Ear and Mouth are:

This setting	Indicates
0	A non-active electrical signal.
1	An active electrical signal.
F0	The electrical signal will be forced to a non-active state.
F1	The electrical signal will be forced to an active state.

For more information about the settings, see "Mouth Setting (M)". You can configure this setting using the Mouth setting option, which is described later in this chapter. The Ear setting is the status of the electrical signal that is input from the attached external equipment.

RX Gain and TX Gain (G)

In Figure 4-7, the RX Gain and TX Gain option enables you to adjust the system gain on the data port you selected.

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

TX Gain -- 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 of these parameters, you may need to adjust the system gain on the data port.

To access the RX Gain and TX Gain option, type **G** at the 4-Wire PTT,1> prompt and press [ENTER]. A screen similar to the one shown in Figure 4-9 is displayed.

```
1- RX Gain:    0.0 dB
2- TX Gain    0.0 dB
3- RX Reference:                231
4- TX Reference:                182
Select item or enter RETURN to exit:
```

Figure 4-9. RX/TX Gain Menu

To change the RX Gain:

1. Type **1** and press [ENTER]. The system displays the following prompt:
RX Gain:
2. Type the value you want and press [ENTER].

To change the TX Gain:

1. Type **2** and press [ENTER]. The system displays the following prompt:
TX Gain:
2. Type the value you want and press [ENTER].

RX Reference and TX Reference

In Figure 4-7, the RX Reference and TX Reference field values are factory-set defaults and provide a 0.0-dB reference of 1 milliwatt. Each number increment represents 0.1 dB. To maintain this relative calibration, do not change the reference number.

Help (H)

In Figure 4-7, the Help option enables you to view a brief description of any of the options from the 4-Wire Voice Port Command Menu. To access the Help option:

1. Type **H** at the 4-Wire PTT,1> prompt and press [ENTER]. The system prompts you to enter the letter of the option for which you want help.
2. Type a letter and press [ENTER], or simply press [ENTER] to display the options and their corresponding letters.

μ -law/a-law (L)

In Figure 4-7, the μ -law/a-law option enables you to view the current companding method and change it. 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. To access this option:

Type **L** at the 4-Wire PTT,1> prompt and press [ENTER]. A screen similar to the one shown in Figure 4-10 is displayed.

```

Current Status:  $\mu$ -255 law

1- Set  $\mu$ -255 law
2- Set A-law, including Even Bit Inversion
3- Set A-law, no Even Bit Inversion
Select item or enter RETURN
to exit:

```

Figure 4-10. μ -law/a-law Menu

<u>Select</u>	<u>To</u>
1	Set the active companding method to μ -law (μ -255 law is the same as μ -law).
2	Set the active companding method to a-law, including Even Bit Inversion.
3	Set the active companding method to a-law with no Even Bit Inversion.

Note: You must use the same companding method for each 4-Wire Voice I/O module in the virtual circuit.

Mouth Setting (M)

In Figure 4-7, the Mouth setting option enables you to view and change the current status of the electrical signal. To access this option:

Type **M** at the 4-Wire PTT,1> prompt and press [ENTER]. A screen similar to the one shown in Figure 4-11 is displayed.

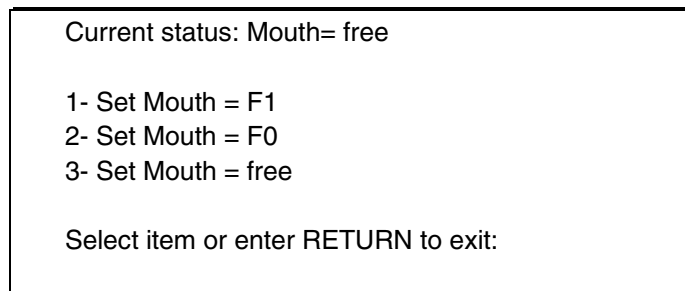


Figure 4-11. Mouth Setting Menu

<u>Select</u>	<u>To</u>
1	Force the electrical signal to an active state. <i>F1</i> represents "force-to-1."
2	Force the electrical signal to a non-active state. <i>F0</i> represents "force-to-0."
3	Transmit the electrical signal as 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.

Note: For normal operation, set the Mouth state to *free* (option 3).

Log Off (Q)

In Figure 4-7, to log off the system:

Type **Q** at the 4-Wire PTT,1> prompt and press [ENTER]. Press [ENTER] to display the PremNet Introduction screen.

1 KHz Tone (T)

In Figure 4-7, the 1 khz tone option enables you to test the alignment of the port's transmit (TX) and receive (RX) signals to the digital channel. When this option is activated, a digital milliwatt is transmitted to the port. A voltmeter can be attached to the port being tested to verify the alignment. One digital milliwatt with 600-ohm impedance should yield 0.775 volts rms (root-mean-square).

Note: To use the 1 khz tone option, the port must be assigned to one of the 32 channels.

To access the 1 khz tone option:

1. Type **T** at the 4-Wire PTT,1> prompt and press [ENTER]. A prompt similar to the one shown below is displayed.

Current status: 1 khz tone inactive...activate? (Y/N)

2. Type **Y** or **N** and press [ENTER].
 - a. If you type **Y**, the 1-KHz tone is either activated or deactivated, depending on the current state of the tone. The system redisplay the 4-Wire PTT,1> prompt.
 - b. If you type **N**, the state of the tone is not changed. The system redisplay the 4-Wire PTT,1> prompt.

Exit (X)

In Figure 4-7, the Exit option enables you to redisplay the 4-Wire Voice Module Command Menu. To execute this option:

Type **X** at the 4-Wire PTT,1> prompt and press [ENTER]

Command Menu (?) or (/)

In Figure 4-7, the Command menu option enables you to redisplay the 4-Wire Voice Port Command Menu. To execute this option:

Type **?** or **/** at the 4-Wire PTT,1> prompt.

Port Select (#)

In Figure 4-7, the Port select option enables you to select a different port to configure. To select this option:

Type **#** at the 4-Wire PTT,1> prompt. The system prompts you to type the number of the port you want to configure. The 4-Wire Voice Port Command Menu for the selected port appears.

Appendix A

Technical Specifications

	E & M	RVR	PTT
Part Numbers	PN850060	PN850061	PN850062
Nominal Impedance	600 Ω		
Amplitude Levels	TX (TX by ext equip): adjustable from +18 to -7 dBm ($\pm .5$ dB)		
	RX (RX from ext equip): adjustable from +2.5 to -23 dBm ($\pm .5$ dB)		
Interface Connectors	8 RJ-45 connectors (E&M, RVR and PTT). Each connector provides the interface for 4 physical pairs: TX VF, RX VF, TX Signaling, and RX Signaling.		
Frequency Response	300 to 3,400 Hz, within 1.5 dB of the reference level at 1,004 Hz		
Configuration Maximums	8 modules per node, 16 nodes per PremNet "ring"; total of 128 modules per PremNet ring		
	16 Modules per virtual connection		
Signaling	E&M: nominal -48 Vdc input, connect pin 2 to return; relay output PTT: Driven +12 V input expects contact closure pin 1 to 2; relay output RVR: -12 V input, connect pin 2 to return; driven -12 V transistor output		
Network Management	All versions are managed via the standard PremNet integrated system, SNMP-compliant network management, or the Milgo Management System.		
Environmental	Operating temperature	32° to 122° F (0° to 50° C)	
	Storage temperature	-40° to 158° F (-40° to 70° C)	
	Humidity	95% noncondensing	

Appendix B

Regulatory Information

FCC Part 15: Radio/Television Interference

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

Changes or modifications to this equipment not expressly approved by Milgo Solutions can void the user's authority to operate this equipment.

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

Special Notice

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

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

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

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

Notice to Canadian Users

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

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

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

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



CAUTION

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



VORSICHT

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



CAUTION

This system contains electrostatic sensitive devices.



VORSICHT

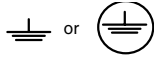
Dieses System enthaelt empfindliche Bauteile!
Achtung fuer Elektrostatischer Aufladung!

Safety Symbols

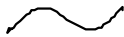
The following safety symbols are used on the equipment:



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



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



Indicates alternating current power (power line).

Non-Connection Declaration

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



Figure 1. EC-Marking for Pseudo-Telecommunication Peripherals

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

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

Laser Light Warning!

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

DANGER
LASER LIGHT - AVOID DIRECT EYE EXPOSURE.

CAUTION
LASER LIGHT - DO NOT STARE INTO BEAM.

DANGER
LASER LIGHT EMITTED FROM THIS MODULE
AVOID EXPOSURE.

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

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

CLASS 1 LASER PRODUCT

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We want your feedback.

To better serve our customers, Milgo Solutions welcomes your comments concerning this manual. Please take the time to fill out the following questionnaire, remove it from your manual, and drop it in the mail or FAX it to us at (954) 846-3244. We also welcome your comments via e-mail at address *techdoc@milgo.com*.

Name of Manual/Document No./Date:

PremNet 4-Wire Voice I/O Module Installation and Operation Manual, PND850060-1/A, 8/98

Was the information in this manual presented in a logical order?

_____ Excellent _____ Good _____ Fair _____ Poor

How easy was it to locate specific information?

_____ Very easy _____ Moderately easy _____ Difficult

Rate the technical level of information presented in this manual:

_____ Too technical _____ Suitable technical level _____ Not technical enough

Are technical terms clearly defined?

_____ Excellent _____ Good _____ Fair _____ Poor

Rate the quality of the illustrations:

_____ Excellent _____ Good _____ Fair _____ Poor

Are the manual's instructions clearly written?

_____ Excellent _____ Good _____ Fair _____ Poor

Rate the quantity of the illustrations in this manual:

_____ Too many _____ Suitable amount _____ Not enough

Does this manual contain all the information you require? (Y/N)

If not, what would you suggest we add to make the manual more useful?

Did you find any errors in this manual? (Y/N)

If yes, please note the error and page number in the space provided below:

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

TELEPHONE NO. () _____

Tape Here

- FOLD



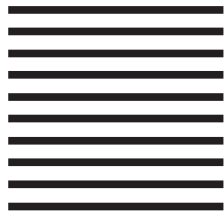
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