

WMTS OPENNET LAN PROGRAMMING AND DIAGNOSTICS

Note: The information in this section is only applicable for Wireless Medical Telemetry Service (WMTS) version of PatientNet.

About this Section

This section includes instructions for the following tasks:

- defining the Device Master (page 103)
- viewing OpenNet diagnostics (page 116)
- configuring the OpenNet LAN (page 104)
- setting Access Point parameters (page 106)
- assigning transceivers (page 135)

Accessing the OpenNet LAN screen

To access the OpenNet LAN screen:

1. Access the Service Screen (page 63).
2. Click the **Service** button on the System Setup screen.
3. Click the **OpenNet** button on the Service screen to open the OpenNet LAN screen. If the OpenNet LAN is not enabled on your system, then the OpenNet Status screen (page 136) will display instead of the OpenNet LAN screen.

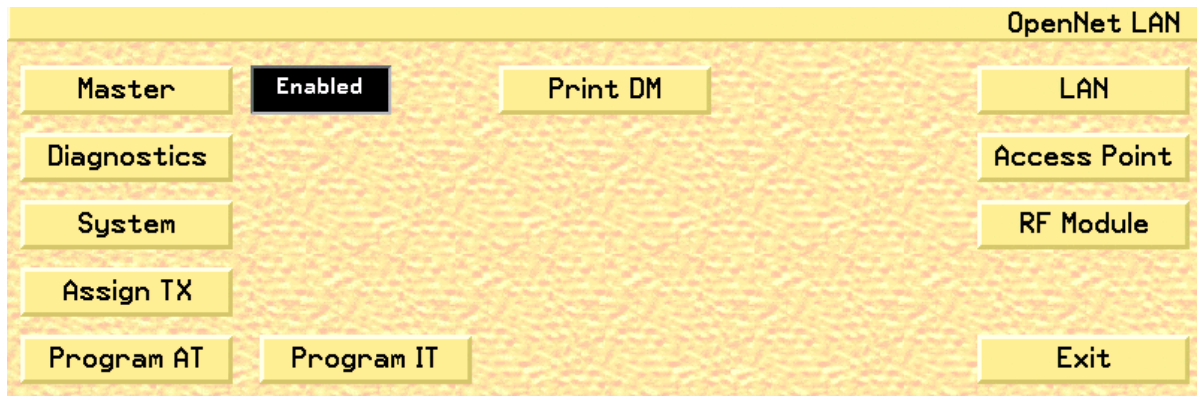


Fig. 60. OpenNet LAN Screen

4. Click the **Exit** button to close the OpenNet LAN screen and return to the Service screen.

Description of Buttons and Functions

The following section describes the buttons and functions of the OpenNet LAN Screen. Subsequent sections will discuss each function in detail.

Button	Function
Master	Designates the system as the Device Master, which controls the user defined parameters on systems throughout the OpenNet LAN (page 103).
Diagnostics	Displays the OpenNet Diagnostics screen (page 116).
System	Displays the OpenNet System Configuration screen (page 104).
Assign TX	Displays the Assign Transceiver screen. (page 135)
Program AT	Displays the Ambulatory Transceiver (AT), programming screen. (page 123). See the <i>Programming Transceivers (page 122)</i> section for details.
Program IT	Displays the Instrument Transceiver (IT), programming screen. (page 129). See <i>Programming Transceivers (page 122)</i> for details.
Print DM	Prints the Device Master report, which displays the global, as well as individual, parameters for each Access Point.
LAN	Displays the OpenNet LAN Configuration screen, which is allows you to set the OP Band, Ext Sync, and update Access Points (page 104). <ul style="list-style-type: none"> This button is only available on the Device Master system.
Access Point	Displays the Access Point Settings screen, which allows you to configure the Access Point settings (page 106). <ul style="list-style-type: none"> This button is only available on the Device Master system.
RF Module	Displays the RF Module screen, which allows you to configure the RF Module settings (page 111). <ul style="list-style-type: none"> This button is only available on the Device Master system.

Designating a Device Master

The Device Master is the system on the OpenNet LAN that controls the user defined parameters.

To designate the system as the Device Master:

1. Click the **Master** button to toggle between Enabled and Disabled (see fig. 60 on page 101).
 - Selecting **Enabled** defines the system as the Device Master.

Note: Only one Device Master is allowed on the network at one time. To enable a new Device Master, you must first disable the original Device Master, then enable the new Device Master.

- Selecting **Disabled** defines the system as not being the Device Master.
2. Click the **Exit** button to close the OpenNet LAN screen and return to the Service screen.

Printing the Device Master Report

The Device Master Report displays the global, as well as individual, parameters for each Access Point.

To print the Device Master Report:

1. Click the **Print DM** button on the OpenNet LAN screen to print the Device Master Report.
2. Click the **Exit** button to close the OpenNet LAN screen and return to the Service screen.

Configuring the Device Master

You can configure global parameters for the Device Master in the OpenNet LAN Configuration screen.

To configure the OpenNet LAN parameters:

Note: In order to view the LAN button, the Central Station must be designated as the device master (see “Designating a Device Master” on page 103).

1. Click the **LAN** button to open the OpenNet LAN Configuration screen (fig. 61).

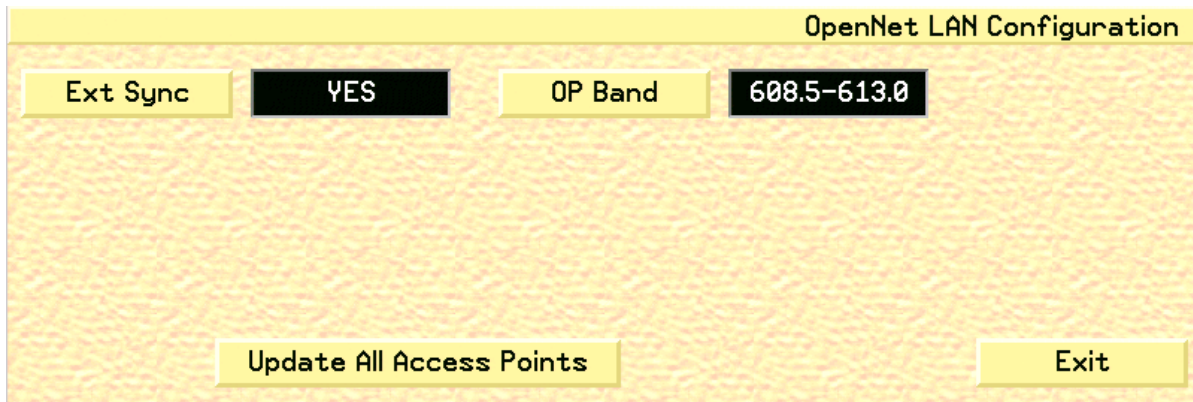


Fig. 61. OpenNet LAN Configuration Screen

2. Click the **Ext Sync** button to toggle the Access Point synchronization source between Yes and No.
 - Selecting **Yes** will designate an external source for providing the synchronization of each Access Point.
 - Selecting **No** will designate a single Access Point the task of providing its own synchronization.

Note: You can only set the **Ext Sync** to **No** for a single Access Point system.

3. Click the **OP Band** button to set the operating band that will be used by the Access Point.
 - Typically, the 608.5-613.0 OP Band is selected. However, where the Patient-Net System operates in the same hospital as another system (or systems) that also use(s) the 608-614 MHz WMTS band, it will be necessary to select one of the sub-bands. The sub-band should coordinate with the hospital's spectrum policy.
 - Additional sub-bands include: 608.5-609.7, 609.6-610.8, 610.7-611.9, and 611.8-613.0

WARNING: All transceivers must be programmed to the same OP Band as the Access Points. This is an administrative procedure only. Do not attempt to program the transceivers with the selected OP Band.

4. Click the **Update All Access Points** button to update any allocated Access Points on the OpenNet LAN with the current configuration data from the Device Master.

WARNING: Selecting *Update All Access Points* will re-configure all Access Points on the network and will affect proper system operation. Do not activate this button on a live system.

5. Click the **Exit** button to close the OpenNet LAN Configuration screen and return to the OpenNet LAN screen.

Setting Access Point Parameters

You can view and edit the settings for all Access Points on the network with the Access Point Settings screen.

To view and edit Access Point settings:

Note: In order to view the Access Point button, the system must be designated as the device master (see “Designating a Device Master” on page 103).

1. Click the **Access Point** button on the OpenNet LAN screen to open the Access Point Settings screen (fig. 62).

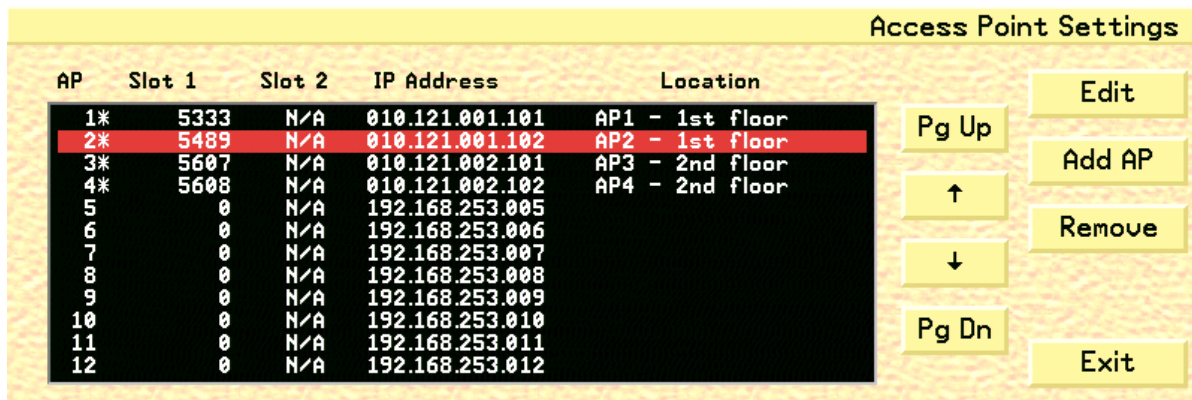


Fig. 62. Access Point Settings Screen

2. Click the **Pg Up**, **Pg Dn**, and **arrow** buttons to select each Access Point and view its current settings.
3. Click the **Edit** button to open the Access Point Configuration screen (see “Configuring Access Point Parameters” on page 108). This will allow you to change the selected Access Point’s parameters.
4. Click the **Add AP** button to open the Access Point Configuration screen and configure the settings for the next available Access Point in sequence (see “Configuring Access Point Parameters” on page 108).
5. Click the **Remove** button to remove a selected Access Point from the Access Point Settings screen and the OpenNet LAN.
 - A warning popup will display requesting you to click either **Yes**, which will remove the selected Access Point, or **No**, which will close the popup and leave the Access Point unchanged.

6. Click the **Exit** button to close the Access Point Settings screen and return to the OpenNet LAN screen.

The columns in the Access Point Settings screen are described below

AP displays the access point for each configured RF Module on the Open-Net LA.

Note: An asterisk (*) next to the AP number indicates that the Access Point is active in the Device Master.

Slot 1 displays the 24 bit ID number for the RF Module that is located in the first slot of the Access Point

Slot 2 displays the 24 bit ID number for the RF Module that is located in the second slot of the Access Point

IP Address displays the IP address for an Access Point

Location displays each Access Point's location.

Configuring Access Point Parameters

You can configure the parameters for each Access Point on the OpenNet LAN with the Access Point Configuration screen. This screen also allows you to configure the parameters for Access Points that have been added to the network.

To configure Access Point parameters:

Note: In order to view the **Access Point** button, the system must be designated as the device master (see “Designating a Device Master” on page 103).

1. Click the **Access Point** button on the OpenNet LAN screen to open the Access Point Settings screen (see fig. 62 on page 106).
2. Select the Access Point that you would like to configure and click the **Edit** button to open the Access Point Configuration screen (fig. 63).

Note: Clicking the **Add AP** button on the Access Point Settings screen displays the Access Point Configuration screen for the next available, currently unassigned, Access Point on the system. This allows you to configure and add the new AP to the system.

Access Point Configuration					
↑	2	↓	IP Address	10.121.1.102	Defaults
RF Modules	1	Location	AP2 - 1st floor	Mod Config	
					Update AP
					Next
					Exit

Fig. 63. Access Point Configuration Screen

3. Select the desired Access Point number by clicking the **up** and **down** arrows, which will cycle through the available Access Points and update the fields with settings for each selected Access Point.
4. Click the **RF Modules** button to toggle the RF Module setting between **1** and **2**. The RF Module setting defines the number of RF Modules that reside in the selected Access Point.
5. Click the **IP Address** button to open a keypad with which you can set the IP address for the selected Access Point.

6. Click the **Location** button to open the Location popup (fig. 64), which allows you to enter the Access Point's location



Fig. 64. Access Point Default Location Popup

7. Click the **Defaults** button to return the selected Access Point's settings to the system default configuration.
8. Click the **Mod Config** button to open the RF Module Configuration screen (see "Configuring RF Module Parameters" on page 113), which allows you to configure the RF Module for the selected Access Point.
9. Click the **Update AP** button to update the selected Access Point device with the new configuration data.

Note: During the Update process, the Access Point will not be active.

10. Click the **Next** button to display the Access Point Configuration Page 2 screen (page 110).
11. Click the **Exit** button to close the Access Point Configuration screen and return to the Access Point Settings screen.

Configuring Access Point Parameters - Part 2

The second page of the Access Point Configuration screen allows you to configure additional Access Point parameters.

1. Click the **Next** button on the Access Point Configuration screen (see “Access Point Configuration Screen” on page 108) to open the Access Point Configuration Page 2 screen (page 110).

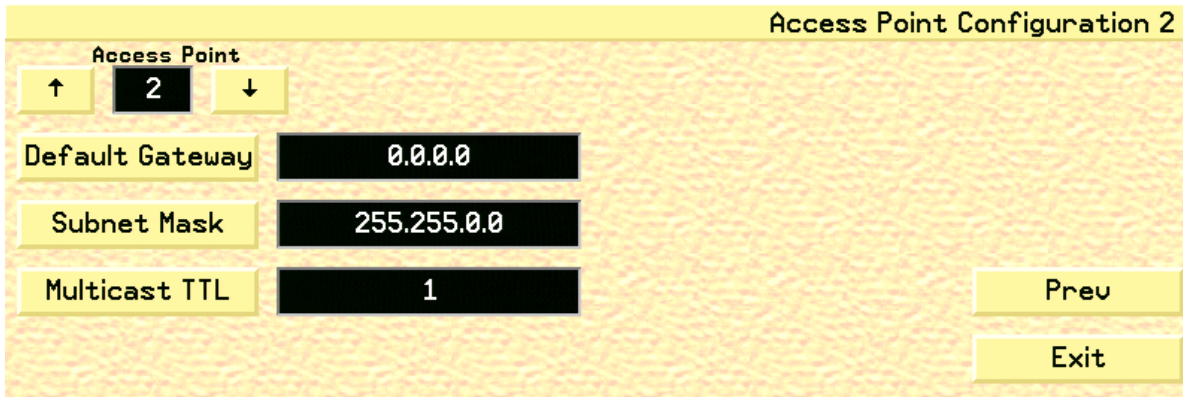


Fig. 65. Access Point Configuration Screen - Part 2

2. Select the desired Access Point number by clicking the **up** and **down** arrows, which will cycle through the available Access Points and update the fields with settings for each selected Access Point.
3. Click the **Default Gateway** button to open a keypad that allows you to set a valid gateway address for the selected Access Point. This button is for administrative purposes only. Do not attempt to set the Default Gateway.
4. Click the **Subnet Mask** button to open a keypad with which you can enter the OpenNet LAN subnet mask for the system. This button is for administrative purposes only. Do not attempt to set the Subnet Mask.
5. Click the **Multicast TTL** button to open a keypad that allows you to set a valid Multicast Time to Live (TTL) for the selected Access Point. Valid values are between 1 and 255. Set the Multicast TTL to 1 unless instructed to do otherwise. This button is for administrative purposes only. Do not attempt to set the Multicast TTL.
6. Click the **Prev** button to return to the Access Point Configuration screen (page 108).
7. Click the **Exit** button to close the Access Point Configuration screen and return to the Access Point Settings screen.

Configuring RF Modules

You can view the current RF Module configurations for each Access Point on the network with the RF Module Settings screen.

To view RF Module settings:

1. Access the OpenNet LAN screen (page 101).
2. Click the **RF Module** button to open the RF Module Settings screen (fig. 66), or you can click the **Mod Config** button on the Access Point Configuration screen (see “Configuring Access Point Parameters” on page 108).

The screenshot shows the 'RF Module Settings' screen. It features a table with columns: RF Module, AP, Slot, Table, Hop, Roam, Bias, Ant 1, Ant 2, and Diversity. The row for RF Module 5489 is highlighted in red. To the right of the table are navigation buttons: Pg Up, Pg Dn, an up arrow, a down arrow, Status, Remove, and Exit.

RF Module	AP	Slot	Table	Hop	Roam	Bias	Ant 1	Ant 2	Diversity
5333	1	1	1	32	Omni	Omni	Omni	Auto	
0	1	2	1	32	Omni	Omni	Omni	Auto	
5489	2	1	1	32	Omni	Omni	Omni	Auto	
0	2	2	1	32	Omni	Omni	Omni	Auto	
5607	3	1	1	32	Omni	Omni	Omni	Auto	
0	3	2	1	32	Omni	Omni	Omni	Auto	
5608	4	1	1	32	Omni	Omni	Omni	Auto	
0	4	2	1	32	Omni	Omni	Omni	Auto	
0	5	1	1	32	Omni	Omni	Omni	Auto	

Fig. 66. RF Module Settings

3. Click the **Status** button to open the RF Module Status screen (see fig. 67 on page 112), which allows you to view the current status of each RF Module in the blackboard.
4. Click the **Remove** button to remove a selected RF Module from the RF Module Settings screen and the OpenNet LAN.
 - A warning popup will display requesting you to click either **Yes**, which will remove the selected RF Module, or **No**, which will close the popup and leave the RF Module unchanged.
5. Click the **Exit** button to close the RF Module Settings screen and return to the OpenNet LAN screen.

Viewing RF Module Status

Clicking the **Settings** and **Status** buttons will allow you to toggle between the RF Module Settings and RF Module Status screens. The RF Module Status screen allows you to view the current status of each RF Module on the RF Module Settings blackboard.

To view the status of each RF Module:

1. Access the RF Module Settings screen (see “Configuring RF Modules” on page 111).
2. Click the **Status** button on the RF Module Settings screen to open the RF Module Status screen (fig. 67).

The screenshot shows the 'RF Module Status' screen. It features a table with the following columns: RF Module, AP Slot, of, Pkts out of Sync, Pkt Drops, CRC Errs, Frm Errs, Tx Lat Avg, and Tx Lat Max. The table lists several RF modules, with the one having ID 5489 highlighted in red. To the right of the table are several control buttons: Pg Up, Pg Dn, an up arrow, a down arrow, Settings, Select, Remove, Reset, and Exit.

RF Module	AP Slot	of	Pkts out of Sync	Pkt Drops	CRC Errs	Frm Errs	Tx Lat Avg	Tx Lat Max
5333	1	0	0	0	0	0	0	0
0	1	1	0	0	0	0	0	0
5489	2	0	0	0	0	0	0	0
0	2	1	0	0	0	0	0	0
5607	3	0	0	0	0	0	0	0
0	3	1	0	0	0	0	0	0
5608	4	0	0	0	0	0	0	0
0	4	1	0	0	0	0	0	0
0	5	0	0	0	0	0	0	0

Fig. 67. RF Module Status Screen

3. Click the **Settings** button to return to the RF Module Settings screen.
4. Use the **Pg Up**, **Pg Dn**, and **arrow** buttons to select a RF Module to configure.
5. Once you have highlighted (selected) a RF Module, click the **Select** button to open the RF Module Configuration screen (see “Configuring RF Module Parameters” on page 113). The blackboard reflects the current RF Module configurations.
6. Click the **Remove** button to remove a selected RF Module from the RF Module Settings screen and the OpenNet LAN.
 - A warning popup will display requesting you to click either **Yes**, which will remove the selected RF Module, or **No**, which will close the popup and leave the RF Module unchanged.
7. Click the **Reset** button to return the status blackboard values to zero.
8. Click the **Exit** button to close the RF Module Status screen and return to the OpenNet LAN screen.

Configuring RF Module Parameters

You can configure the parameters for each RF Module on each Access Point that is on the OpenNet Network with the RF Module Configuration screen.

To configure RF Module parameters:

1. Access the OpenNet LAN screen (page 101).
2. Access the RF Module Settings screen (page 111), highlight the RF Module that you would like to configure, and click the **Select** button on the RF Module Status screen to open the RF Module Configuration screen (fig. 68).
 - From the Access Point Configuration screen (page 108), click the **Mod Config** button to access the RF Module Configuration screen (fig. 68).

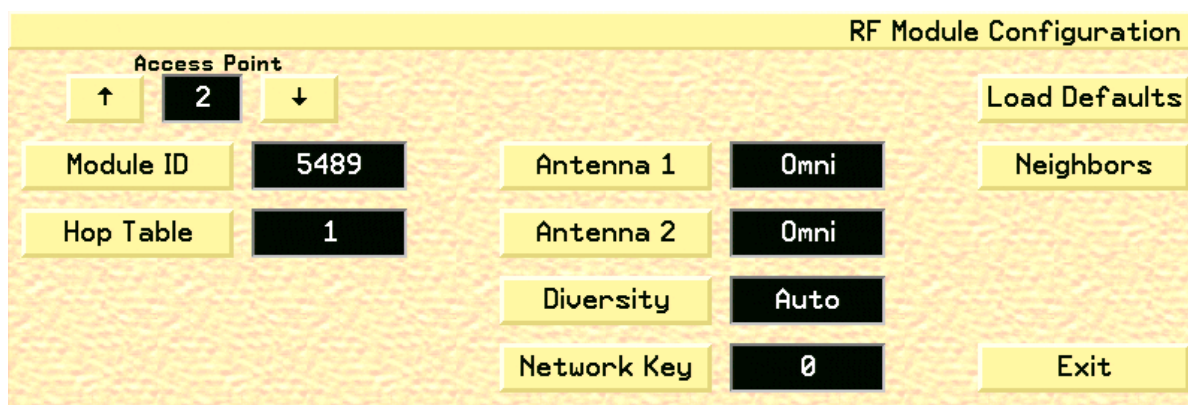


Fig. 68. RF Module Configuration Screen

3. Select the desired Access Point number by clicking the **up** and **down arrows**, which will cycle through the available Access Points and update the fields with the settings for each Access Point.
4. Click the **Module ID** button to open a keypad that allows you to set the RF Module's 24 bit identification number.
5. Click the **Hop Table** button to define the hop table for the RF Module. The available values are 0 to 31.
6. Click **Antenna 1** button to cycle through the available antenna types for the first RF Module. The available antennas consist of the following:
 - Omni (always select Omni)
 - Patch (future release)
 - Peanut (future release)

7. Click **Antenna 2** button to cycle through the available antenna types for the RF Module. The available antennas consist of the following:
 - Omni (always select)
 - Patch (future release)
 - Peanut (future release)
8. Click the **Diversity** button to define the diversity setting for both antenna 1 and 2. The available settings consist of the following:
 - a. **Antenna 1**
 - Auto
 - Ant A1
 - Ant A2
 - b. **Antenna 2**
 - Auto
 - Ant B1
 - Ant B2

Note: Select Auto unless instructed to do otherwise.

9. Click the **Network Key** button to open a keypad that allows you to set the network key for the RF Module. The Network key values can be set from 0 to 255.

WARNING: All Access Points must be programmed to the same Network Key as the transceivers. This is an administrative procedure only. Do not attempt to program the Access Points with the Network Key.

Note: The Network key can be configured for each module slot.

10. Click the **Load Defaults** button to return the RF Module parameters to their default values.
11. Click the **Neighbors** button to open the RF Module Neighbors Configuration screen (see “Configuring RF Module Neighbors” on page 115).
12. Click the **Exit** button to close the RF Module Configuration screen and return to the RF Module Status screen.

Configuring RF Module Neighbors

You can configure up to eight neighbors for each RF Module in each configured Access Point on the OpenNet LAN.

To configure the neighbors of a RF Module:

1. Access the RF Module Configuration screen (page 113).
2. Click the **Neighbors** button on the RF Module Configuration screen to open the RF Module Neighbors Configuration screen (fig. 69).

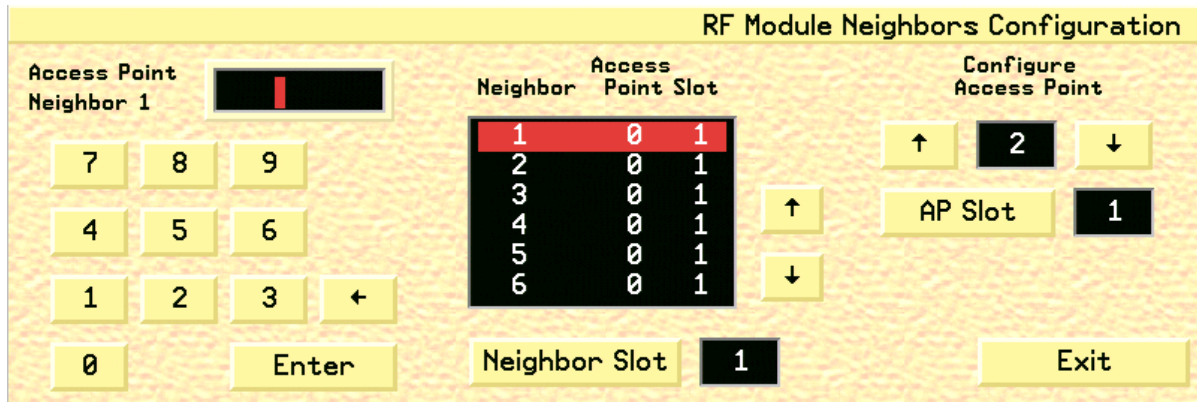


Fig. 69. RF Module Neighbors Configuration Screen

3. To assign a neighbor to the currently selected Access Point, type in the number of the **Neighbor Access Point** with the displayed keypad. The Neighbor Access Point number will then appear in the blackboard under the **Access Point** column.
4. Use the up and down **arrows** to highlight and select the Access Point Neighbor that you would like to configure.
5. Click the **Neighbor Slot** button to define the desired slot, either 1 or 2, of the selected access point's neighbor.
 - Only Access Point slots that have already been configured on the OpenNet LAN can be selected as a Neighbor slot. Only Neighbor Slot 1 is currently available.
6. Click the up and down **arrows** under the **Configure Access Point** heading to define which Access Point is currently selected.
 - Only Access Point that have already been configured on the OpenNet LAN can be selected.
7. Click the **AP Slot** button to select the desired slot of the selected Access Point. Only AP Slot 1 is currently available.
8. Click the **Exit** button to close the RF Module Neighbors Configuration screen and return to the RF Module Configuration screen.

Viewing OpenNet LAN Diagnostics

You can view, and configure, the OpenNet LAN Diagnostics on the OpenNet Diagnostics screen.

To View the OpenNet LAN Diagnostics:

1. Click the **Diagnostics** button on the OpenNet LAN screen to open the OpenNet Diagnostics screen (fig. 70).

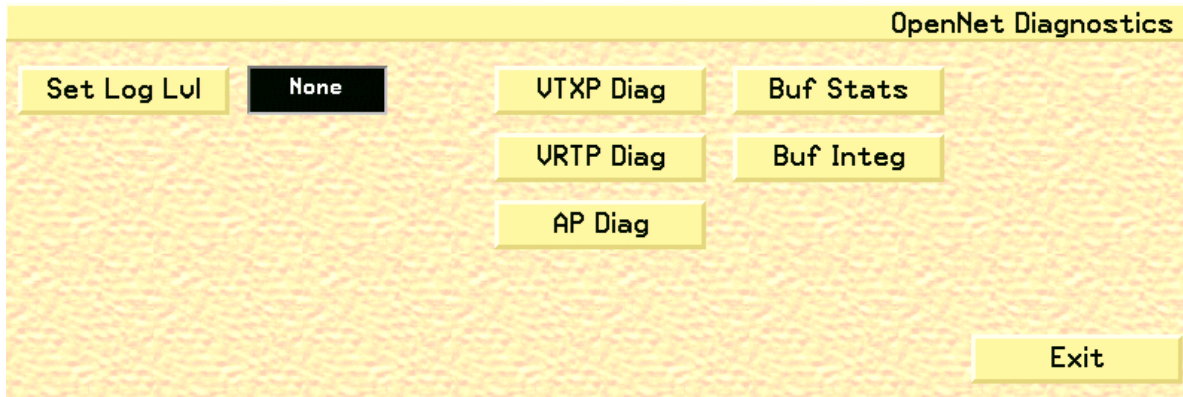


Fig. 70. OpenNet Diagnostics Screen

2. Click the **Set Log Lvl** button to toggle through the valid Set Log Level settings. The set level defines the logging event criteria for the OpenNet LAN diagnostic network for a Central Station. The options are **None**, **Fatal**, **Error**, **Warning**, **Info**, and **Debug**.

WARNING: This button is for administrative purposes only. Do not attempt to set the Log Level.

Note: This feature is only available for the Admin Administration level.

3. Click the **Buf Stats** button to check the buffer status by outputting the buffer status to the mlog utility. This button is for administrative purposes only.

Note: The *Set Log Lvl* field must be set to a value other than None in order for the status to be sent.

4. Click the **Buf Integ** button to check the buffer integrity by outputting the buffer status to the mlog utility. The setting will output the data if the buffer integrity is questionable. This button is for administrative purposes only.

Note: The *Set Log Lvl* field must be set to a value other than None in order for the status to be sent.

- Clicking the **VTXP Diag** button will open the VTXP Diagnostics screen (fig. 71).

OpenNet LAN Diagnostics									
Ch	RX	TX	Buffer		Errors				
			Last	Avg	CRC	Frm	Seq	O/R	U/R
41	323848	2623	718	0	0	0	390	3296	4170
42	1091582	8842	670	0	2	0	1008	11606	12299
43	330048	2674	693	0	0	0	284	3009	3432
44	240186	1945	649	0	0	0	325	3696	1755
45	330145	2675	692	0	1	0	415	5130	3557
46	323072	2617	674	0	0	0	454	4754	5282
47	1096985	8886	667	0	2	0	286	3047	2364
48	239579	2082	654	0	0	0	302	3328	1616

Fig. 71. VTXP Diagnostics Screen

The columns in the VTXP Diagnostics screen are described below.

Ch	channel number
RX	the number of good VTXP packets that have been received for each channel
TX	the number of good VTXP packets that have been transmitted to each channel
Buffer Last	displays the number of bytes that were contained in the last good received VTXP packet for each channel
Buffer Avg	displays the running average for the received buffer for each channel
Errors CRC	displays the number of VTXP CRC errors detected for each channel
Errors FRM	displays the number of VTXP frame errors detected for each channel
SEQ	displays the number of VTXP sequence errors detected for each channel
O/R	displays the number of over run errors detected for each channel
U/R	displays the number of under run errors detected for each channel
Reset	the Reset button will return each statistical value to zero
Exit	the Exit button returns you to the OpenNet Diagnostics screen

- Clicking the **VRTP Diag** button will open the VRTP Diagnostics screen for each Central Station (fig. 72).

The screenshot shows a window titled "OpenNet LAN Diagnostics". Inside, there is a table with the following data:

Ch	RX	CRC	Frn	Seq	ReXmit
41	62972	0	0	0	0
42	162214	0	0	0	0
43	221236	0	0	6	5
44	55880	0	0	0	0
45	245135	0	0	0	0
46	227022	0	0	0	0
47	370060	0	0	0	0
48	29846	0	0	0	0

At the bottom right of the screen, there are two buttons: "Reset" and "Exit".

Fig. 72. VRTP Diagnostics Screen

The columns in the VRTP Diagnostic screen are described below.

Ch	channel number
RX	the number of VRTP packets that have been received for each channel
CRC	displays the number of VRTP CRC errors detected for each channel
FRM	displays the number of VRTP frame errors detected for each channel
SEQ	displays the number of VRTP sequence errors detected for each channel
ReXmit	displays the number of VRTP re-transmissions that were detected for each channel
Reset	the Reset button will return each statistical value to zero
Exit	the Exit button returns you to the OpenNet Diagnostics screen

- Clicking the **AP Diag** button will open the Access Point Diagnostic screen for each Central Station (fig. 73).

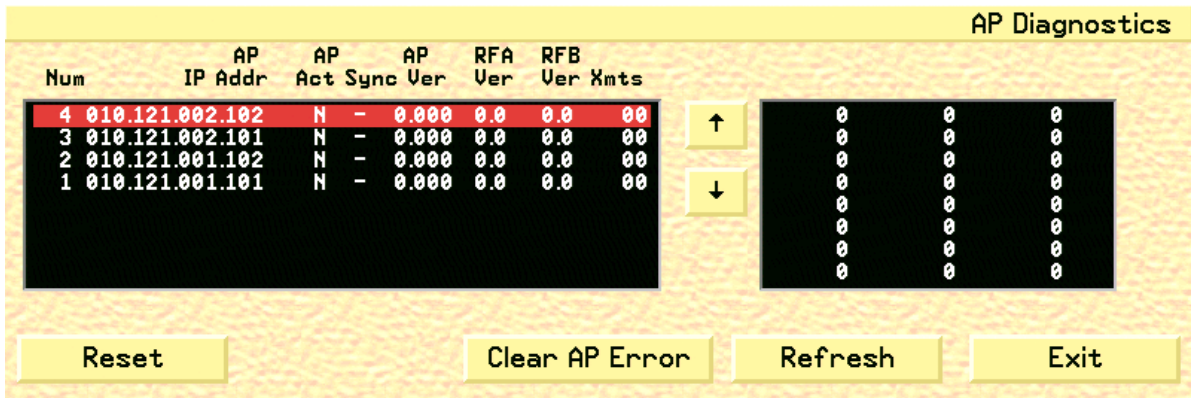


Fig. 73. AP Diagnostics Screen

The columns on the left side of the AP Diagnostic blackboard screen are described below.

- Num** displays the Access Point number in the Device Master database that is associated with the data
- IP Address** displays the IP address for a given Access Point
- AP Act** displays the Access Point active state: Y = Yes, N = No
- AP Sync** displays the Access Point sync state: Y = Yes, N = No sync detected
 - a dash (-) is displayed when an AP is not active.
- AP Ver** displays the firmware version for each Access Point
- RFA Ver** displays the RF Module A firmware for each Access Point
- RFB Ver** displays the RF Module B firmware for each Access Point (this function will be available in future software release)
- Xmts** displays the number of transceivers that are currently attached to the Access Point
- Blackboard** displays the transceiver IDs for all transceivers attached to each Access Point. Use the up and down arrows to navigate through the listed IDs

The buttons in the AP Diagnostic screen are described below.

- Refresh** this button will refresh all Access Point active and sync status values with the current values that are received from each Access Point
- Clear AP Error** this button will clear the currently active VRTP Protocol error
- Reset** this button clears the blackboard, requests all Access Points to identify themselves, updates their status, and displays the received status information on the blackboard
 - Allow at least 1 minute for large systems reset
- Exit** the Exit button returns you to the OpenNet Diagnostics screen

8. Click the **Exit** button to close the OpenNet Diagnostics screen and return to the OpenNet LAN screen.

Configuring the OpenNet System

You can configure the OpenNet LAN parameters that are specific to each WMTS Central Station with the OpenNet System Configuration screen.

To configure the OpenNet system:

1. Click the **System** button on the OpenNet LAN screen to open the OpenNet System Configuration screen (fig. 74).

OpenNet System Configuration			
IP Address	10.121.0.224	Default Gateway	0.0.0.0
Subnet Mask	255.255.0.0	Multicast TTL	1
Set AP Defaults			
Exit			

Fig. 74. OpenNet System Configuration Screen

2. Click the **IP Address** button to open a keypad with which you enter the OpenNet LAN IP address for the system.
3. Click the **Subnet Mask** button to open a keypad with which you can enter the OpenNet LAN subnet mask for the system.
4. The **Default Gateway** button will be available in future releases.
5. The **Multicast TTL** button will be available in future releases.
6. Click the **Set AP Defaults** button to open the Access Point Default Configuration screen (see “Configuring Access Point Defaults” on page 121).
7. Click the **Exit** button to close the OpenNet System Configuration screen and return to the OpenNet LAN screen.

Configuring Access Point Defaults

You can configure the default settings for all Access Points in the Access Point Default Configuration screen.

To configure Access Point defaults:

1. Access the OpenNet System Configuration screen (page 120).
2. Click the **Set AP Defaults** button to open the Access Point Default Configuration screen (fig. 75).

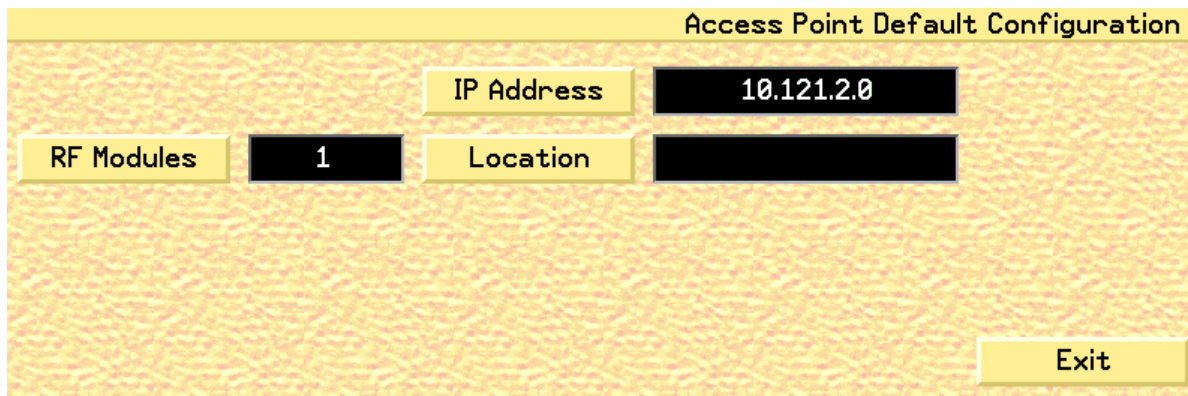


Fig. 75. Access Point Default Configuration Screen

3. Click the **RF Modules** button to toggle the RF Module setting between 1 and 2. The RF Module setting defines the default number of RF Modules that reside in each Access Point.
4. Click the **IP Address** button to open a keypad with which you can set the default IP address for the Access Points.
5. Click the **Location** button to open the Location popup (see fig. 76 on page 121), which allows you to enter the default location of the Access Points.

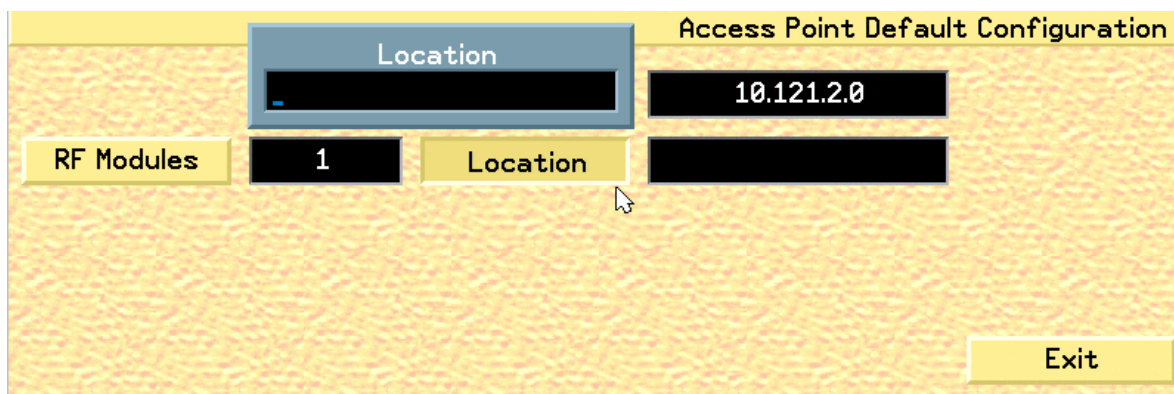


Fig. 76. Access Point Default Location Popup

6. Click the **Exit** button to close the Access Point Default Configuration screen and return to the OpenNet System Configuration screen.

Programming Transceivers

You can program DT-4500 and DT-7000/7001 transceivers with a programming cable connected to the I/O board of any Central Station unit.

Required Items

- 9 V Battery for DT-4500
- Power Supply for DT-7000/DT-7001 transceiver
- Programming cable for DT-4500 or DT-7000/7001 Transceivers
- DT-4500 or DT-7000/DT-7001 transceivers

Attaching Transceiver Programming Cables

For the DT-4500

1. Attach the programming cable to the Port 2 connector on the MSIO board on the rear of the unit.
2. Remove the battery from the DT-4500 transceiver.
3. Remove and save the port plug, if in place. Connect the other end of the programming cable to the connector on the DT-4500 transceiver.
4. Place the 9 V battery into the transceiver, with the power contacts facing down into the transceiver.

For the DT-7000

1. Attach the programming cable to the Port 3 connector on the MSIO board on the rear of the unit.
2. Connect the other end of the programming cable to Port 1 on the DT-7000/DT-7001 transceiver.
3. Connect the DT-7000/DT-7001 power supply to the DT-7000/DT-7001 Power Connector and to the 120 VAC/60 Hz wall power.

Note: The Port numbers listed above are the default ports. If you change the programming port parameter in the software, then you must also connect the programming cable to the appropriate MSIO port based on the selection.

Programming Ambulatory Transceivers (DT-4500)

To program the DT-4500:

1. Access the OpenNet LAN screen (page 101).
2. Click the **Program AT** button to open the Ambulatory Transceiver Programming screen (fig. 77).

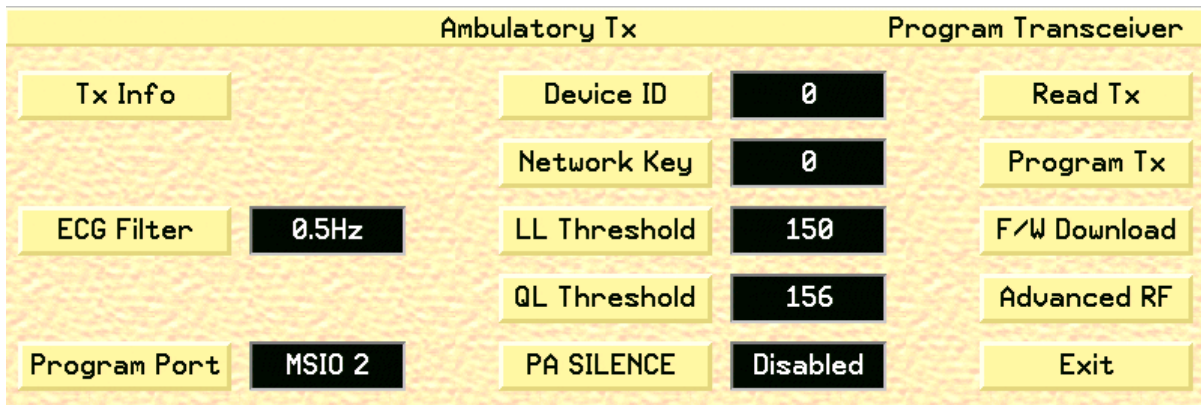


Fig. 77. Ambulatory Transceiver Programming screen

3. If the “**No response from transceiver**” popup appears, check the programming cable connections and the transceiver battery. To re-attempt, wait until the I/O LED on the DT-4500 stops flashing, and then select the **Read TX** button.
4. Click the **Tx Info** button to open the Transceiver Information popup (fig. 78), which displays the current information for the attached transceiver. Click **OK** to close the popup

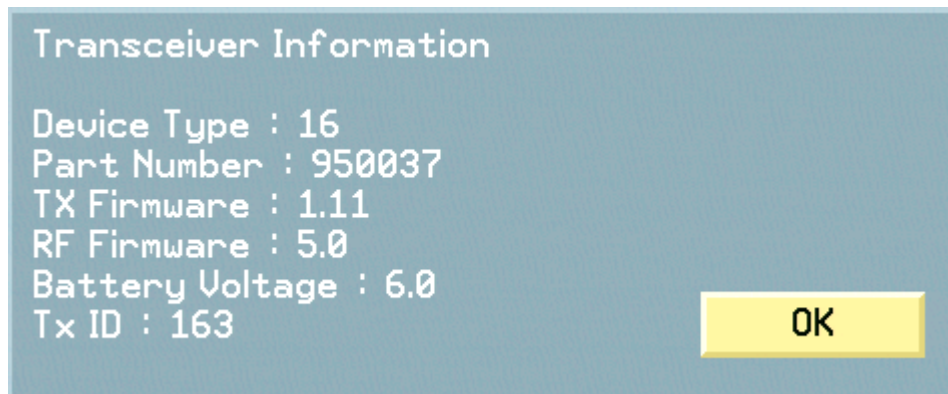


Fig. 78. Transceiver Information popup

5. Click the **Read TX** button to read the currently programmed information located on the transceiver and update the fields on the Program Transceiver screen.

6. Toggle **ECG Filter** (frequency response) to 0.5 or 0.05 MHz. This determines how fast the ECG lead is adjusted after baseline changes.

WARNING: Program the DT-4500 transceiver to 0.05 Hz if you are performing ST analysis. Otherwise, unpredictable and inaccurate analysis will result. You may use 0.5 Hz if you are not using ST analysis.

7. Click the **Program Port** button to select the MSIO port that will be used for the transceiver programming interface. Clicking the button will cycle through following options:
 - MSIO 1
 - MSIO 2 (DT-4500 default)
 - MSIO 3
 - MSIO 4
 - None

Note: The **Program Port** field will only display the ports that are currently available for the system. Thus, if all four ports are selected, and you decide to change ports, none of the ports are available. You must select **None** on one port in order to make it available (as the ports are mutually exclusive), and then assign the available port to another device. Selecting **None** prevents **Port lockout**.

8. Click the **Device ID** button to open a keypad that allows you to set the transceiver's device identification number (0 - 1000).
9. Click the **Network Key** button to open a keypad that allows you to set the transceiver's network number (0 - 255).

WARNING: All transceivers must be programmed to the same Network Key as the Access Points. This is an administrative procedure only. Do not attempt to program the transceivers with the Network Key.

10. Click the **LL Threshold** button to open a keypad that allows you to set the transceiver's **Loose Lead Threshold** value (100-200). Electrode impedance values below this threshold trigger a **Lead Off** alarm for all leads dependent on the electrode violation. 150 is the default value.
11. Click the **QL Threshold** button to open a keypad that allows you to set the transceiver's **Quality Lead Threshold** value (100 - 200). This parameter defines whether an electrode's LED on the DT-4500 will illuminate when the **Attendant Present** buttons are pressed. 156 is the default value.

Transceiver Impedance Values

The DT-4500 Ambulatory Transceivers electrode impedance values, which are displayed on the OpenNet Transceiver Status screen (see fig. 86 on page 136), indicate the *quality* of the signal connection and are not the *actual* impedance values that are measured by the system. The electrode impedance values range from 100 to 200 (optimal). The typical values range between 180 and 200.

If the electrode's impedance value is greater than the defined Quality Threshold value, then its LED is illuminated. The DT-4500 stores the Quality Threshold value and uses this value to determine whether or not the electrode LED should be illuminated when the Attendant Present buttons are pressed. See the *PatientNet Operator's Manual* for details on the DT-4500 Buttons and LED indicators.

Note: A Lead Off alarm will occur when an electrode's impedance value drops to, or below, the current Loose Lead Threshold value.

12. Click the **PA SILENCE** button to enable or disable the Procedure Alarm Silence function for the transceiver. See the *PatientNet Operator's Manual* for details on the Procedure Alarm Silence function.
13. Click the **Program TX** button to program a transceiver with the new parameters and read the programmed information back for validation. The transceiver is now programmed.

Note: The attached device (AT or IT) is only programmed with the new parameters when the Program TX button is pressed. Simply changing a parameter's value does not program the device. Programming is a two-step process: (1) modify the desired parameter(s); (2) press the Program TX button.

Note: An error message that reads "Programming failure" is displayed when the parameters read back from the transceiver differ from the parameters that were written to the transceiver.

14. Click the **F/W Download** button to display the Advanced Program Transceiver Firmware Download screen (see fig. 79 on page 126).
15. Click the **Advanced RF** button to display the Advanced Program Transceiver RF Module screen (see fig. 80 on page 127).
16. Click the **Exit** button to close the Ambulatory Transceiver Programming screen and return to the OpenNet LAN screen.

Downloading Ambulatory Transceiver (DT-4500) Firmware

You can download firmware modules for the DT-4500 and RF Module through the Firmware Download Advanced Program Transceiver screen.

To download transceiver firmware:

1. Access the OpenNet LAN screen (page 101).
2. Access the Ambulatory Transceiver Program screen (page 123).
3. Click the **F/W Download** button to display the Advanced Program Transceiver Firmware Download screen (fig. 79).

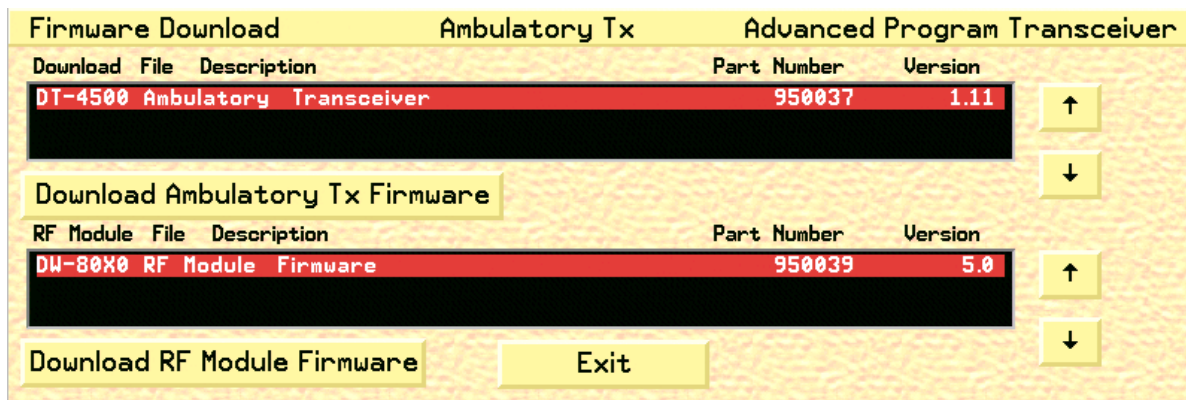


Fig. 79. Firmware Download Advanced Program Transceiver Screen, AT

Note: If no Firmware Download Modules appear in the blackboard, then call your technical support representative to order the appropriate Download Firmware Module Disk.

4. Use the up and down arrows to view the available transceiver firmware download modules in the **Download File Description** field. Select the appropriate download module for the transceiver type.
5. Click the **Download Ambulatory Tx Firmware** button to download the DT-4500 firmware. The DT-4500 battery voltage is checked and verified prior to downloading.
 - If the voltage check fails, then the transceiver programming is aborted.
 - If ample voltage is available, then the DT-4500 is powered off and the downloading popup appears. Click **Continue** to proceed with downloading the new firmware. Click **Cancel** to abort the download and the transceiver's firmware is not modified.
6. Click the **Download RF Module Firmware** button to download the RF Module's firmware. Click **Continue** or **Cancel** when the downloading popup appears.
 - Select **Continue** to proceed with downloading the new RF Module firmware.
 - Click **Cancel** to abort the download and the firmware is not modified.
7. Click the **Exit** button to return to the Ambulatory Transceiver Programming screen.

Programming RF Modules for Ambulatory Transceivers

You can program the RF Modules of Ambulatory Transceivers (AT), DT-4500s, with the RF Module Advanced Program Transceiver screen.

To program AT RF Modules:

1. Access the OpenNet LAN screen (page 101).
2. Access the Ambulatory Transceiver Program screen (page 123).
3. Click the **Advanced RF** button to display the RF Module Advanced Program Transceiver screen (fig. 80).

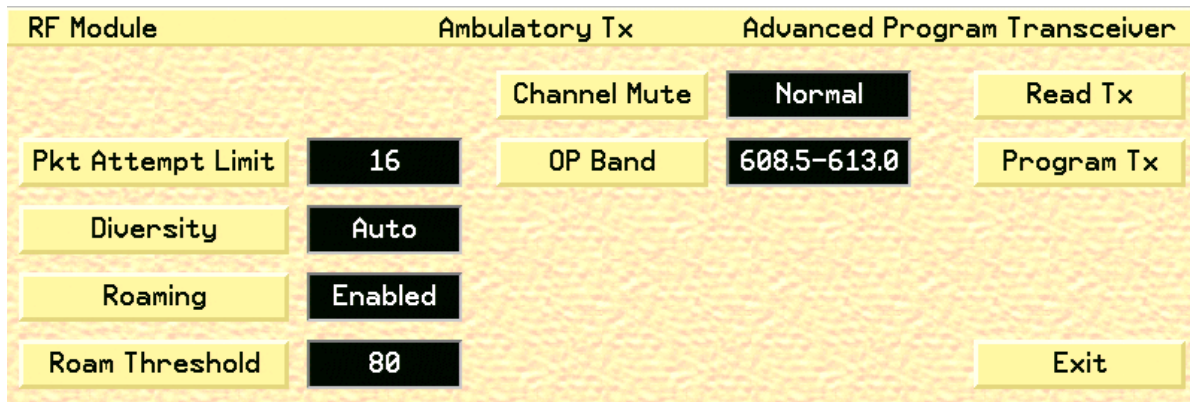


Fig. 80. RF Module Advanced Programming screen, AT

4. Click the **Read TX** button to read the currently programmed information located on the transceiver and update the fields.
5. Click the **Pkt Attempt Limit** button to open a keypad that allows you to set the number of packet attempts limit for the selected RF module. The available settings are between 0 and 22.
6. Click the **Diversity** button to toggle between Ant A, Ant B, or Auto, which sets the transceiver's diversity setting.
7. Click the **Roaming** button to toggle between Enabled and Disabled, which sets the transceiver's roaming capabilities.
8. Click the **Roam Threshold** button to open a keypad that allows you to enter the transceiver's roam threshold value. The available settings are between 0 and 255.
9. Click the **Channel Mute** button to set the transceiver's Channel Mute frequency. 32 frequencies are available based on the RF Modules hardware.

10. Click the **OP Band** button to set the operating band that will be used by the RF Module.
 - Typically, the 608.5-613.0 OP Band is selected. However, where the Patient-Net System operates in the same hospital as another system (or systems) that also use(s) the 608-614 MHz WMTS band, it will be necessary to select one of the sub-bands. The sub-band should coordinate with the hospital's spectrum policy.
 - Additional sub-bands include: 608.5-609.7, 609.6-610.8, 610.7-611.9, and 611.8-613.0

WARNING: All transceivers must be programmed to the same OP Band as the Access Points. This is an administrative procedure only. Do not attempt to program the transceivers with the selected OP Band.

11. Click the **Program TX** button to program a transceiver and read the programmed information back for validation. The transceiver is now programmed.
12. Click the **Exit** button to return to the Ambulatory Transceiver Programming screen.