User Guide

Terminal Web User Interface

Evolution Release 4.1.x

iDirect 9-Series and iQ Desktop Satellite Routers

January 25, 2018

iDIRECT

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Document Name: UG_TerminalWUI_Evo4.1.x_T0000946_RevB_01252018.pdf

Document Part Number: T0000946

Revision History

The following table shows all revisions for this document. To determine if this is the latest revision, check the Technical Assistance Center (TAC) Web site. Refer to *Getting Help* on page x for TAC access information.

Revision	Date	Updates
A	11/15/2017	Initial release of the document for iDX Release 4.1.x.
B	01/25/2018	Removed all CX780 references from the document since it is no longer supported in Evolution platform.

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About

This chapter contains the following sections:

- *Intended Audience*
- *Manual Contents*
- *Document Conventions*
- *Related Documents*
- *Related Training Services*
- *Getting Help*

Intended Audience

The *Terminal WUI User Guide* is for iDirect network operators or installers to connect directly to an iQ Desktop satellite router. This may include installers responsible for Terminal commissioning, network operators connecting remotely, or on-site personnel working with iDirect to troubleshoot network problems.

Manual Contents

In addition to the information in this chapter, this manual also includes the following:

- Chapter 1, *Introduction* on page 1, provides information about what the terminal WUI is, the supported routers, the login details, and the LED information.
- Chapter 2, *Terminal Web User Interface* provides information on how to connect to the terminal WUI and provides information on the terminal WUI and explains each one of the tabs in-detail.
- Chapter 3, *Commissioning a Terminal* provides information on how to commission a new remote using the terminal WUI.

NOTE: A basic list of acronyms and abbreviations can be found in Appendix A, *Acronyms and Abbreviations*.

Document Conventions

This section illustrates and describes the conventions used throughout this document.

Convention	Description	Example
Command	Used when the user is required to enter a command at a command line prompt or in a console.	Enter the command: `cd /etc/snmp/`

`Terminal Output`	Used when showing resulting output from a command that was entered at a command line or on a console.	`crc report all`
		
		`8350.3235 : DATA CRC [   1]`
		`8350.3502 : DATA CRC [5818]`
		`8350.4382 : DATA CRC [  20]`

Screen Reference	Used when referring to text that appears on the screen on a Graphical User Interface (GUI). Used when specifying names of commands, menus, folders, tabs, dialogs, list boxes, and options.	1. To add a Terminal to an in route group, right-click the In route Group and select **Add Terminal**. The Terminal dialog box has a number of user-selectable tabs across the top. The **Information** tab is visible when the dialog box opens.
Hyperlink	Used to show all hyperlinked text within a document or external links such as web page URLs.	For instructions on loading Option Files using the Terminal, see *Loading Option Files using the Terminal WUI* on page 20.

WARNING: A *Warning* highlights an essential operating or maintenance procedure, practice, condition, or statement which, if not strictly observed, could result in injury, death, or long term health hazards.

CAUTION: A *Caution* highlights an essential operating or maintenance procedure, practice, condition, or statement which, if not strictly observed, could result in damage to, or destruction of, equipment or a condition that adversely affects system operation.

NOTE: A *Note* is a statement or other notification that adds, emphasizes, or clarifies essential information of special importance or interest.

Related Documents

The following iDirect documents are available at http://tac.idirect.net and contain related information. Consult these documents for additional information about iDirect systems and equipment:

- *Quick Start Guide (QSG), included in package with router*
- *Installation, Support, and Maintenance* (ISM) Guide
- *iDirect Evolution™ Software Release Notes*
- *iBuilder User Guide*

- *iMonitor User Guide*
- *iDX Technical Reference Guide*

Related Training Services

iDirect offers scheduled classroom training at various global training centers, as well as eLearning, in the installation, operation, maintenance and management of iDirect satellite networks. For training course descriptions and available training dates visit the iDirect web site *Training and Services* at: http://www.idirect.net/Training-and-Services.aspx or call +1 (800) 648-8240 for class registration and information.

Getting Help

The iDirect Technical Assistance Center (TAC) and the iDirect Government Technical Assistance Center (TAC) are available to provide assistance 24 hours a day, 365 days a year. Software user guides, installation procedures, FAQs, and other documents that support iDirect and iDirect Government products are available on the respective TAC Web site:

- Access the iDirect TAC Web site at http://tac.idirect.net
- Access the iDirect Government TAC Web site at http://tac.idirectgov.com

The iDirect TAC may be contacted by telephone or email:

- Telephone: 703.648.8151
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1 Introduction

This chapter provides a general overview of the Terminal Web User Interface (WUI).

1.1 Supported Routers

The Terminal WUI is supported on the iDirect 9-Series and iQ Desktop Satellite Routers.

1.2 Terminal Web User Interface

The Terminal Web User Interface (WUI) provides users with secure means to monitor satellite routers from the local area network (LAN) side.

The Terminal WUI also provides configuration and real-time status and statistical information about the satellite routers. Terminal WUI provides interaction with the satellite router, enabling configuration, commissioning, and monitoring without a direct connection with the iVantage NMS. The level of functionality available to the user is determined by the login access (admin or user).

1.2.1 Terminal WUI Features

Terminal WUI provides the following features:

- LED indicators that display real-time status of the satellite router
- A dashboard view of high-level satellite router information (for example, displays if a satellite router is in network or locked to the satellite)
- A status and monitoring view that provides status and monitoring information about the satellite router in real-time for modem information, events, Ethernet receive and transmit connections, and Internet Protocol (IP) configuration and information
- Administration tools for loading software packages and options files
- A wizard for commissioning new remotes

1.3   Terminal Web User Interface Login

The Terminal WUI supports two levels of log-in; a generic user level, and an administrator level. The log-in screen is shown in Figure 1-1.
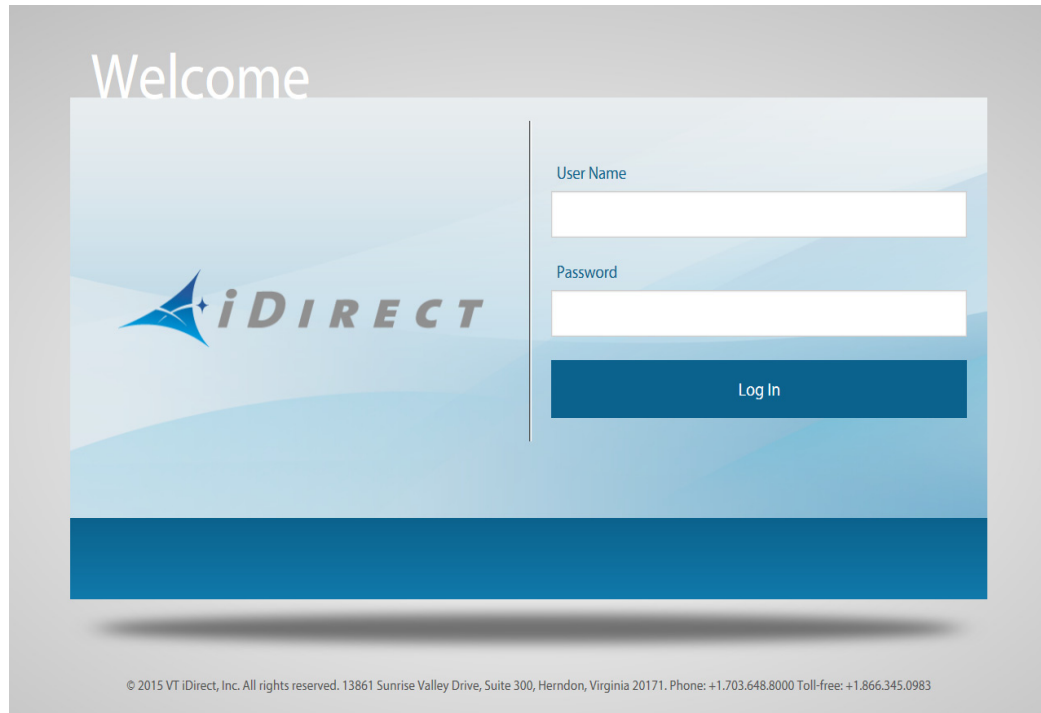
Figure 1-1. WUI Log-In Screen

The default login credentials for the two configured user accounts admin and user are:

Username: admin

Password: iDirect

NOTE: The password specified above is just an example and the actual password is the one that is configured in iBuilder. Username and password are both case sensitive.

1.4   Connecting to the Terminal WUI

Terminal WUI may be used at any time to access the Satellite Routers. All that is necessary is the IP address assigned to the satellite router and a physical Ethernet connection to the LAN port.

Default factory settings for the Satellite Routers are shown below:

*   LAN IP Address: 192.168.0.1
*   Subnet mask: 255.255.255.0

1.4.1 Manually Configuring the Windows Host to Connect to the Satellite Router

1. Click **Start** > **Control Panel** > **Network and Sharing Center.**
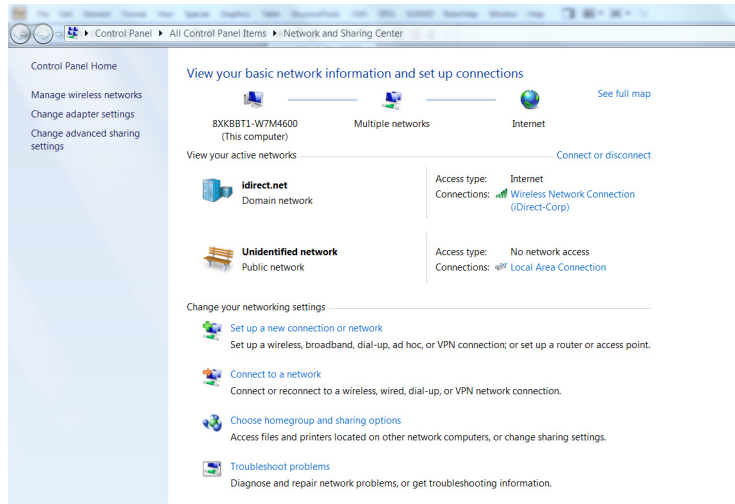
Figure 1-2. Network and Sharing Center

2. Under **View your active networks**, click **Local Area Connection**.

    The **Local Area Connection Status** window is displayed.
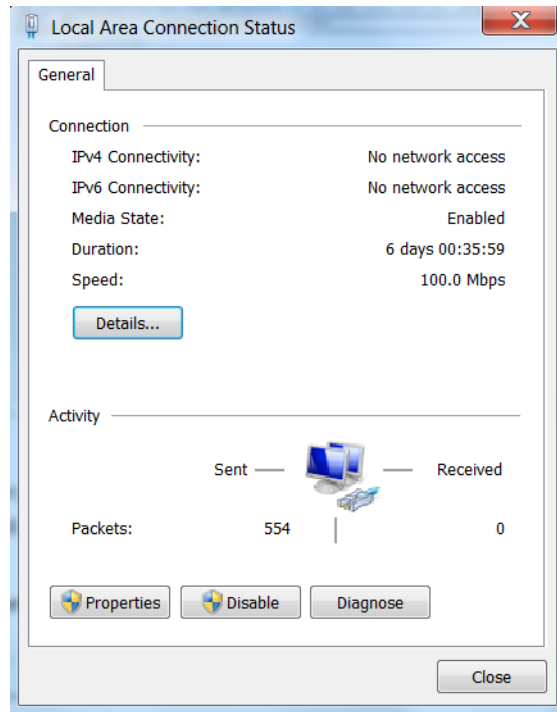
Figure 1-3. Local Area Connection Status

3. Click **Properties**.

    The **Local Area Connection Properties** window is displayed.
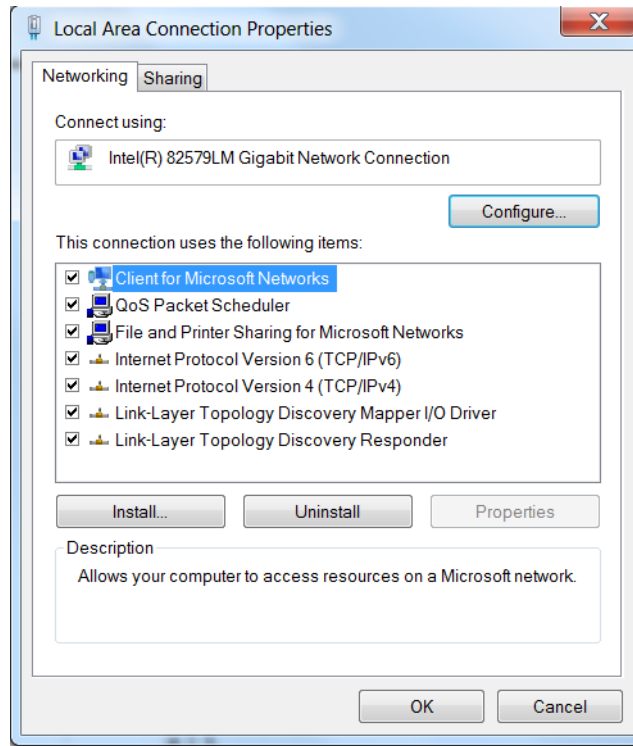
Figure 1-4. Local Area Connection Properties Window

4.   Select the **Internet Protocol Version 4 (TCP/IPv4)** check box, and click **Properties**.

The **Internet Protocol Version 4 (TCP/IPv4) Properties** window is displayed.
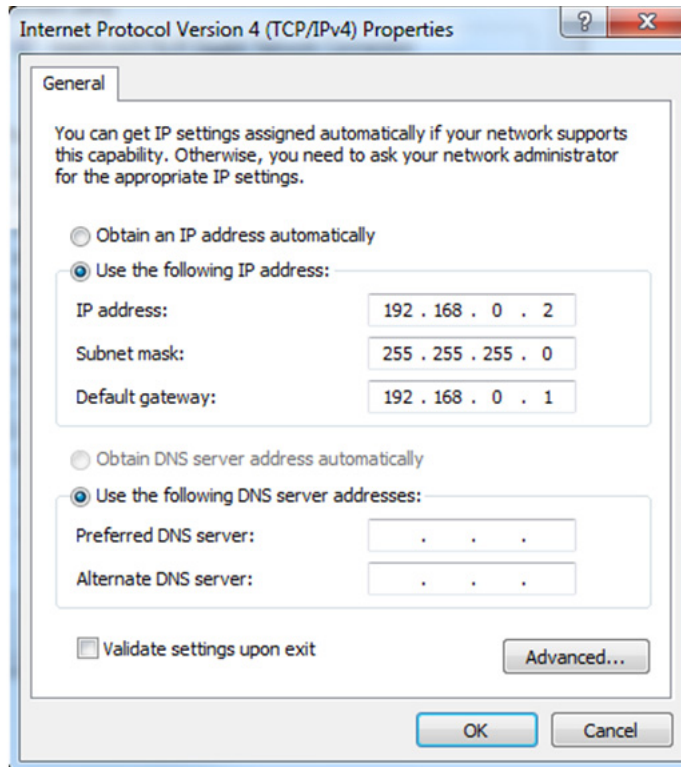
Figure 1-5. Internet Protocol Version 4 Properties

5. Select **Use the following IP address**, and enter the following:
    - **IP address**-Enter an unused IP address on the same subnet as the router.
    - **Subnet mask**-Enter the IP address, and the subnet mask is automatically retrieved.
    - **Default gateway**-This field is optional.

6. Click **OK**.

1.5 Starting a Terminal WUI Session

The Web view is compatible with Internet Explorer 10 and above, or latest Mozilla Firefox and Chrome browsers.

The Terminal WUI has two default user accounts:

• **admin**: Provides full access to WUI functionality

• **user**: Provides restricted access to WUI functionality

To launch the Terminal WUI, perform the following:

1. Connect the personal computer (PC) LAN port to the satellite router local area network (LAN) Port 1 using an Ethernet cable.

2. Launch the Web browser of choice.

On the address bar, enter the IP address of the satellite router into the address field.

The login terminal as seen in Figure 1-1 is displayed.

3. Enter the Username and Password as follows:

Username - admin

Password - iDirect

4. Click **Login**.

The Web User Interface dashboard as seen in Figure 1-6 is displayed.
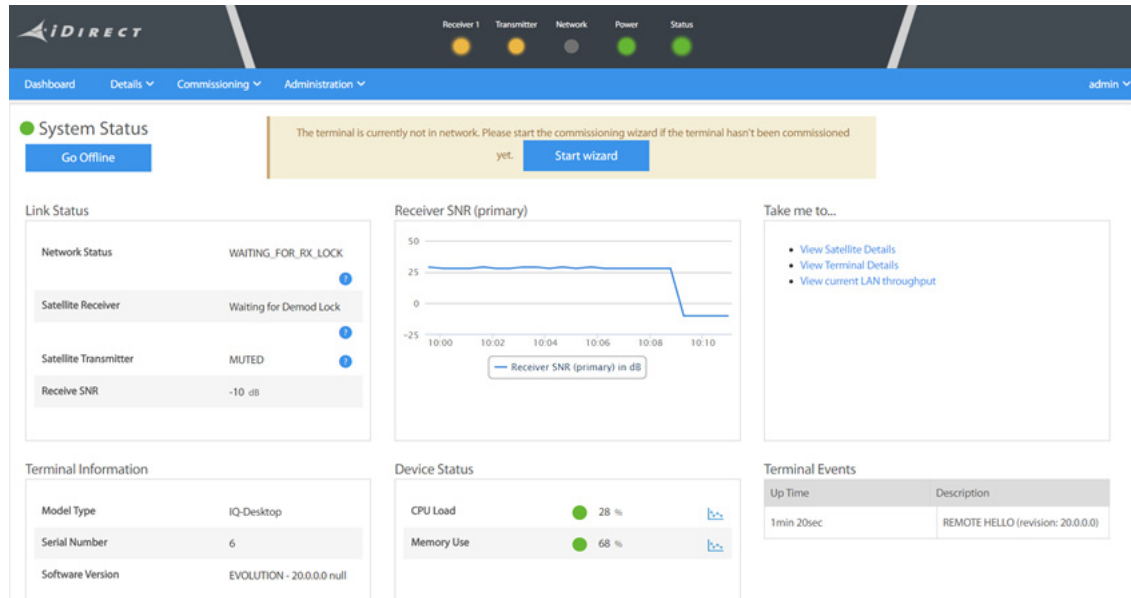
Figure 1-6. Terminal WUI Dashboard

1.5.1   Simulated LEDs

The menus in the Terminal WUI display simulated LEDS (see Figure 1-7). For detailed information on the LED color and function, see the routers *Installation, Support, and Maintenance Guide*.
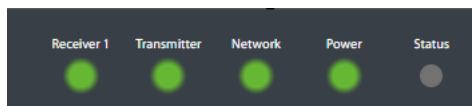
Figure 1-7. LED Indicators

2 Terminal Web User Interface

This chapter introduces the Terminal Web User Interface (WUI) provided on iDirect Satellite Routers. It contains the following sections:

2.1 Dashboard

The Dashboard page provides key information about the Satellite Routers that have an established connection.

The Dashboard page is the default landing page of the Terminal Web UI. See Figure 2-1.
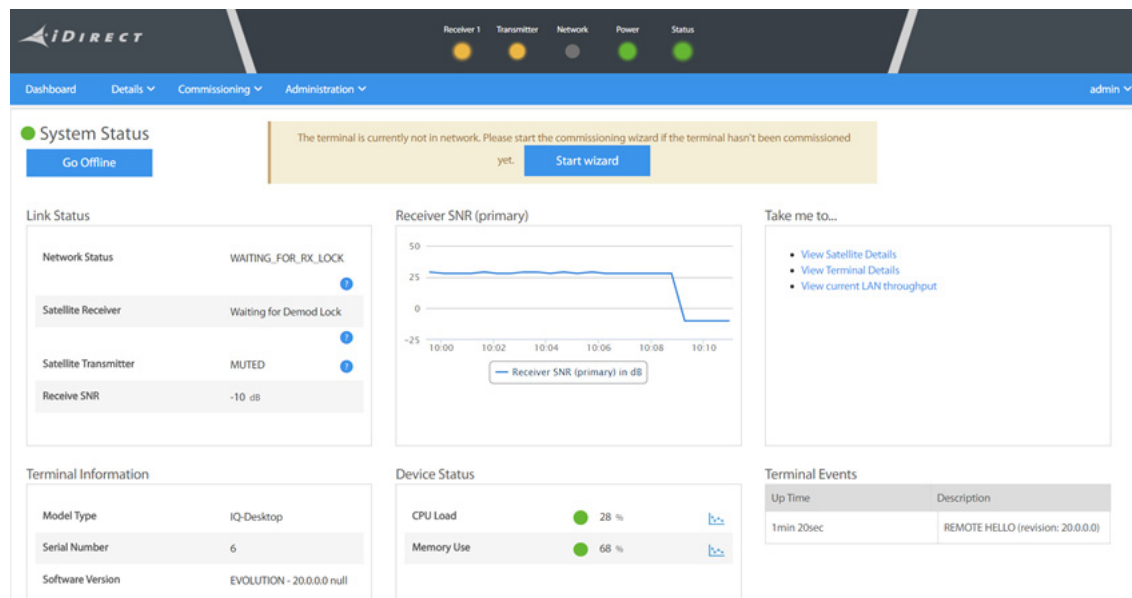
Figure 2-1. Dashboard Menu

Table 2-1 displays the field descriptions for the dashboard.

Table 2-1. Dashboard Menu Items

Menu Item	Sub-menu Item	Description
System Status		Displays the overall status of the Terminal system.
Link Status		Displays the status of all the network links.
	Network Status	Displays if the router is in the network.
	Satellite Receiver	Displays if the router is enabled to receive information.
	Satellite Transmitter	Displays if the router is enabled to transmit information.
	Receive SNR	Displays the SNR of the received downstream.
Terminal Configuration		Displays the configuration of the terminal.
	Model Type	Displays the model type of the terminal.
	Serial Number	Displays the serial number of the terminal.
	Software Version	Displays the current software version that is running.
Receive SNR		Displays the receive carriers signal to noise ratio.
Device Status		Displays the status of the terminal.
	CPU Load	Displays the current CPU load.
	Memory Use	Displays the current memory in use.
Take me to...	View Satellite Details	Displays the details of the satellite.
	View Terminal Details	Displays the details of the terminal.
	View current LAN throughput	Displays the details of the LAN ports.
Terminal Events		Displays the events sent to the NMS.
	Up Time	Displays the amount of time falcon was running when an event occurred.
	Description	Displays the content of the event.

2.2 Details Menu

Use the Details Menu page to report and view satellite, terminal, LAN, and external equipment information.
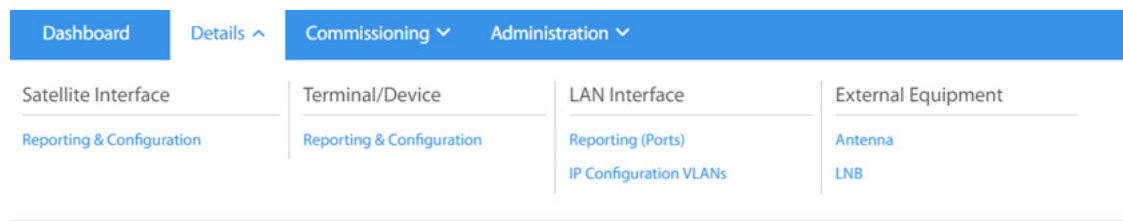
Figure 2-2. Details Menu

2.2.1 Satellite Interface

The Satellite Interface displays information on the satellite.

2.2.1.1 Satellite Interface - Reporting and Configuration

Click **Details** > **Satellite Interface** > **Reporting & Configuration** to view the satellite information.
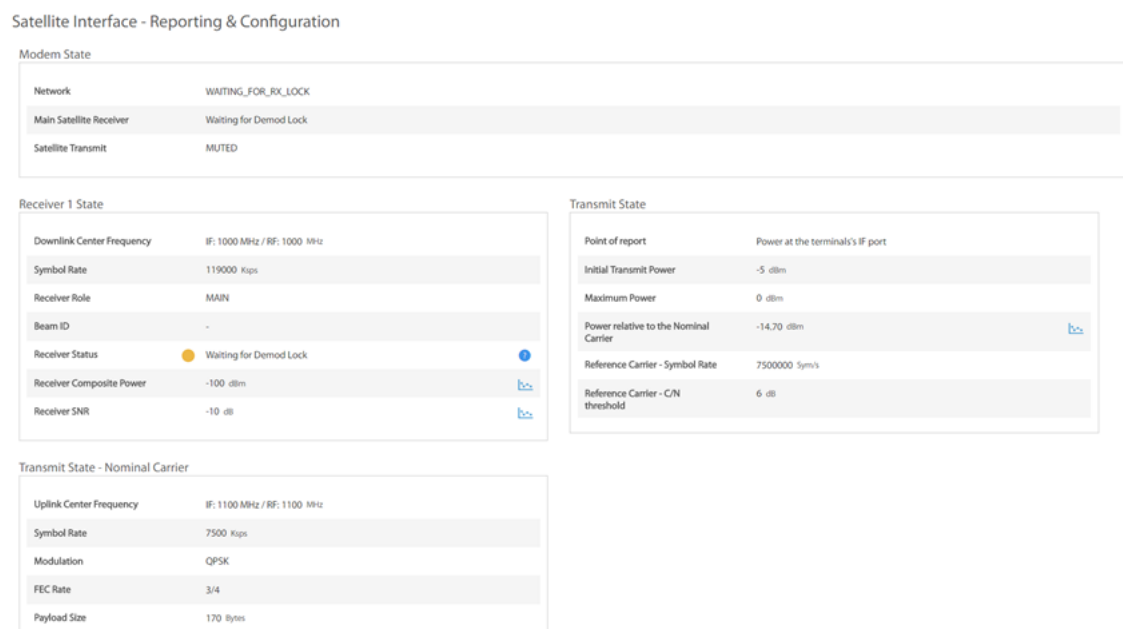
Figure 2-3. Satellite Interface - Reporting and Configuration

Table 2-2 displays the field descriptions for the satellite interface.

Table 2-2. Satellite Interface - Reporting and Configuration Field Descriptions

Menu Item	Sub-menu Item	Sub-menu Item	Description
Satellite Interface-Reporting and Configuration			
	Modem State		Displays the status of the modem.
		Network	Displays if the modem is connected to the network.
		Main Satellite Receive	Displays one of the following: • Locked • Waiting for NCR Lock—Third and final stage of the receiver lock. • Waiting for Demod Lock—Second stage of the receiver lock. • Waiting for Tuner Locktuner_locked—First stage of the receiver lock. • Off
		Satellite Transmit	Displays the state as either MUTED or UNMUTED. The transmitter can be muted by any of the following conditions: • not in network • external mute signal • OpenAMIP mute command **NOTE:** The above conditions are not exhaustive.
	Transmit State		Displays the status of the transmitter.
		Point of Report	Indicates the point for which the terminal's transmit power is reported. This point could be either at the output of the satellite router's transmit output, or at the BUC flange.
		Initial Transmit Power	Displays the initial transmit power of the satellite router.
		Maximum Power	Displays the configured max power of the satellite router's transmitter.
		Power Relative to the Nominal Carrier	Displays the current transmit power relative to the nominal carrier.
		Reference Carrier - Symbol Rate	Displays the symbol rate of the reference carrier.
		Reference Carrier - C/N threshold	Displays the threshold of the reference carrier.

Menu Item	Sub-menu Item	Sub-menu Item	Description
	Transmit State - Nominal Carrier		
		Uplink Center Frequency	Displays the uplink center frequency of the carrier.
		Symbol Rate	Displays the symbol rate of the carrier.
		Modulation	Displays the modulation.
		FEC Rate	Displays the FEC rate.
		Payload Size	Displays the payload size.
	Receive 1 State		Displays the status of the first receiver.
		Downlink Center Frequency	Displays the router listening frequency.
		Symbol Rate	Displays the symbol rate.
		Receiver Role	Displays the receiver role as MAIN or AUXILIARY.
		Beam ID	Displays the Beam ID.
		Receiver Status	Displays the status of the receiver.
		Receive Composite Power	Displays the total power at the front end.
		Receiver SNR	Displays the signal noise ratio measured in the terminal.

2.2.2   Terminal/Device

The Terminal Device page displays details of the terminal.

2.2.2.1   Terminal Device - Reporting and Configuration

Click **Details** > **Terminal/Device** > **Reporting & Configuration** to view the terminal information.
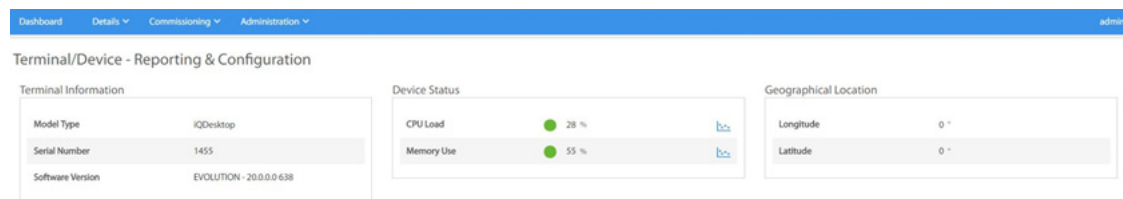
Figure 2-4. Terminal Device - Reporting and Configuration

Table 2-3 displays the field descriptions for the terminal device.

Table 2-3. Terminal Device - Reporting and Configuration Field Descriptions

Menu Item	Sub-menu Item	Sub-menu Item	Description
Terminal/Device-Reporting and Configuration			Displays information about the terminal or device.
	Terminal Information		Displays information about the terminal.
		Model Type	Displays the model type of the terminal.
		Serial Number	Displays the serial number.
		Software Version	Displays the software version that is active on the terminal.
	Device Status		Displays the status of the terminal.
		CPU Load	Displays the CPU load.
		Memory Use	Displays the amount of memory used by the device.
	Geographical Location		Displays the geographic location of the terminal.
		Longitude	Displays the longitude in decimal notation E or W.
		Latitude	Displays the latitude in decimal notation N or S.

2.2.3 LAN Interface

The LAN Interface page displays information on ports and VLANs.

2.2.3.1 LAN Interface - Reporting (LAN Ports)

Click **Details** > **LAN Interface** > **Reporting (Ports)** to view information on ports.
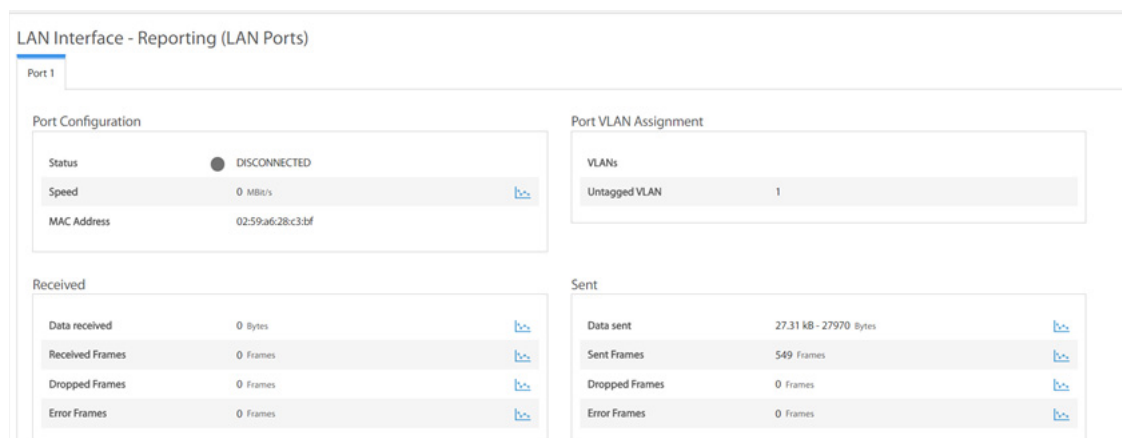
Figure 2-5. LAN Interface - Reporting (LAN Ports)

Table 2-4 displays the field descriptions for the LAN interface.

Table 2-4. LAN Interface - Reporting (LAN Ports) Field Descriptions

Menu Item	Sub-menu Item	Sub-menu Item	Description
LAN Interface - Reporting (LAN Ports)			Displays information about the terminal Ethernet port(s).
	Port Configuration		Displays the status of the port.
		Status	Displays the status of the port as connected, disconnected or disabled.
		Speed	Displays the speed of the port in 10, 100, or 1000 Mbps.
		MAC Address	Displays the MAC address of the LAN interface.
	Port VLAN Assignment		Displays information about the various Ports and VLANs assigned to those ports.
		VLANs	Displays the VLANs configured on the port.
		Untagged VLAN	Displays the VLAN that is not tagged with any VLAN ID.
	Received		

Menu Item	Sub-menu Item	Sub-menu Item	Description
		Data Received	Displays the number of packets received.
		Received Frames	Displays the frames of ethernet data received through the port.
		Dropped Frames	Displays the number of dropped frames.
		Error Frames	Displays the number of error frames.
	Sent		
		Data Sent	Displays the number of packets sent.
		Sent Frames	Displays the frames of ethernet data sent through the port.
		Dropped Frames	Displays the number of dropped frames.
		Error Frames	Displays the number of error frames.

2.2.3.2   LAN Interface - IP Configuration VLANs

Click **Details** > **LAN Interface** > **IP Configuration VLANs** to view the VLAN information.
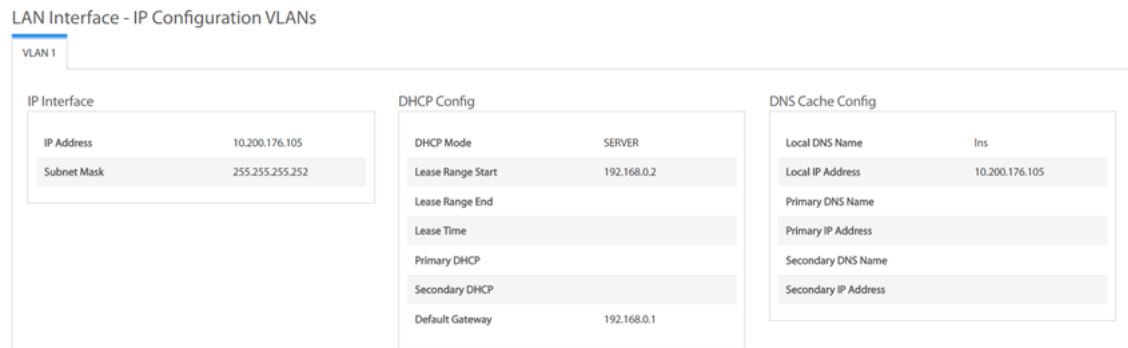
Figure 2-6. LAN Interface - IP Configuration VLANs

Table 2-5 displays the field descriptions for the VLANs.

Table 2-5. IP Configuration VLANs Field Descriptions

Menu Item	Sub-menu Item	Description
IP Interface		Displays the IP address/mask of the Ethernet interface of the management VLAN.

Menu Item	Sub-menu Item	Description
	IP Address	Displays the IP address.
	Subnet Mask	Displays the subnet mask address.
DHCP Config		Displays the DHCP configuration information.
	DHCP Mode	Displays the DHCP mode as either Server, Client, or Relay.
	Lease Range Start	Displays the DHCP servers lease range start.
	Lease Range End	Displays the DHCP servers lease range end.
	Lease Time	Displays the DHCP servers lease time.
	Primary DHCP	Displays the primary DHCP server.
	Secondary DHCP	Displays the secondary DHCP server.
	Default Gateway	Displays the default gateway.
DNS Config		
	Local DNS Name	Displays the local DNS name.
	Local IP Address	Displays the local IP address.
	Primary DNS Name	Displays the DNS server name.
	Primary IP Address	Displays the primary DNS server IP address.
	Secondary DNS Name	Displays the DNS secondary name.
	Secondary IP Address	Displays the secondary DNS server IP address.

2.2.4   External Equipment

The External Equipment page displays information on the BUC, LNB, and Antenna.

2.2.4.1   External Equipment - Antenna
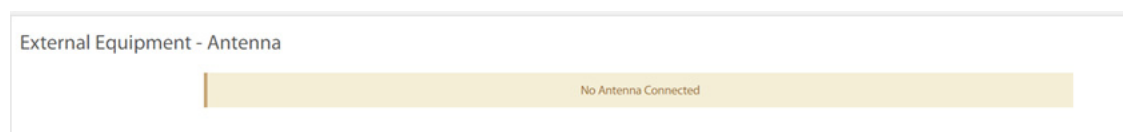
Figure 2-7. External Equipment - Antenna

2.2.4.2   External Equipment - LNB

Click **Details** > **External Equipment** > **LNB** to view the LNB information.
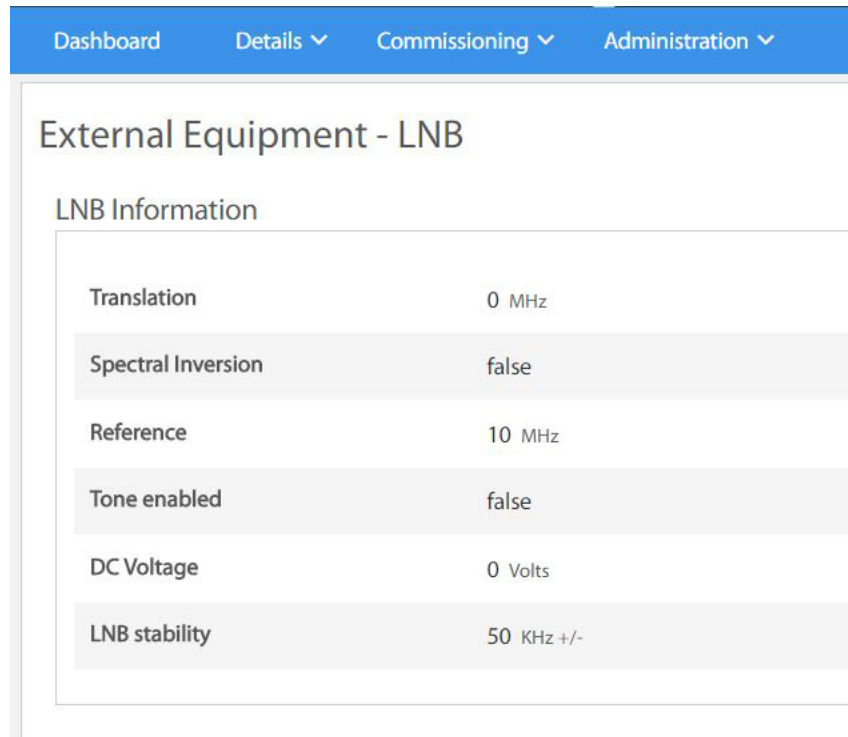
Figure 2-8. External Equipment - LNB

Table 2-6 displays the field descriptions for the LNB.

Table 2-6. LNB Field Descriptions

Menu Item	Sub-menu Item	Sub-menu Item	Description
External Equipment -LNB			
	LNB Information		Displays LNB information.
		Translation	Displays the LNBs LO frequency.
		Spectral Inversion	Displays the value as True or False if enabled in the options file. This is the function of the BUC or LNB where it mirror images the signal that helps in decoding the signal.
		Reference	Displays the LNB's reference clock in MHz.

Menu Item	Sub-menu Item	Sub-menu Item	Description
		Tone enabled	Displays the value as True or False if enabled in the options file. This is the control tone to the LNB.
		DC Voltage	Displays the power output to the LNB in volts.

2.3 Administration

The Administration page displays the software and configuration information. See Figure 2-9.
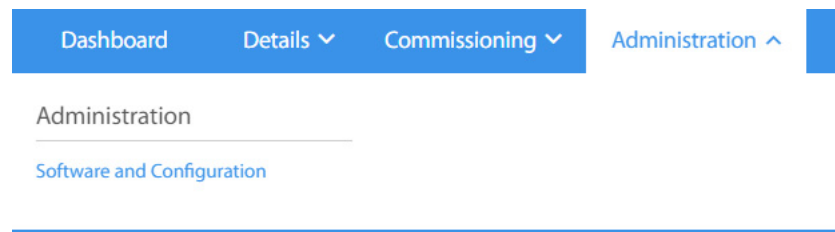
Figure 2-9. Administration Menu

2.3.1 Software and Configuration

Use this tab to load the latest software packages or option files.

2.3.1.1 Loading Packages using the Terminal WUI

Use the terminal WUI to upload the latest software packages. To upload the latest software package, perform the following:

1. On the terminal WUI, click **Administration**> **Software and Configuration**. The **Administration - Software & Configuration** page is displayed.

Figure 2-10. Upload Software Packages

2. Under **Manage Software Packages**, click **Select Files** and browse to the location where the packages are stored on the local system and click **Open**. The upload progress is seen on the right-hand corner. and the software package will be uploaded and listed under Upload Software Package.

   The current Partition number, Type, Description, and Version are displayed.

3. To activate the latest software, click **Activate Software Package** against the required partition.

4. After updating the latest software on the partition, a message to reboot the terminal is displayed. Click **Reboot Terminal** to restart the terminal.

2.3.1.2 Loading Option Files using the Terminal WUI

Use the terminal WUI to upload the latest option files.

To load the option files, perform the following:

1. On the terminal WUI, click **Administration** > **Software and Configuration**. The **Administration - Software & Configuration** page is displayed. See Figure 2-10.

2. Under **Configuration Files**, click **Download Configuration File** to download the existing configuration file and click **Upload Configuration File** to upload a new configuration file from your system.

   falcon.opt—This is the complete set of options. When changes are made to this option file, the changes are applied only after a reboot.

   After updating the latest software on the partition, a message to reboot the terminal is displayed. Click **Reboot Terminal** to restart the terminal.

   All the configuration files that are currently uploaded are displayed with the Description, Filename, Version, Date, and Size.

2.4 Commissioning

This section describes the procedure to bring a terminal into network using the Terminal WUI. Commissioning is the process of preparing a terminal to be able to properly transmit in a network. See Figure 2-11.
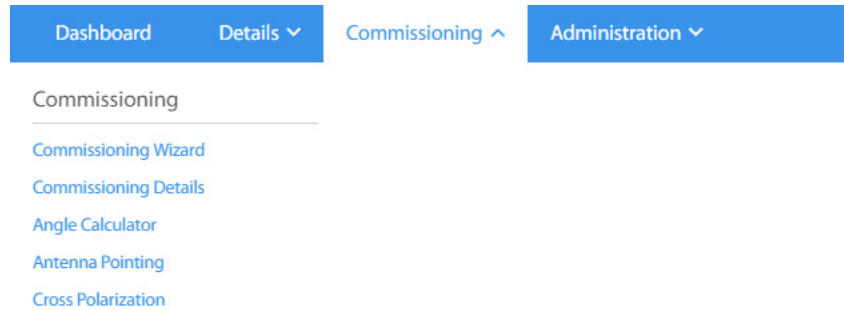
Figure 2-11. Commissioning Menu

2.4.1 Commissioning Wizard

For information on commissioning the terminal using the commissioning wizard, see *Commissioning a Terminal* on page 27.

2.4.2 Commissioning Details

The tab displays the commissioning details of the terminal.
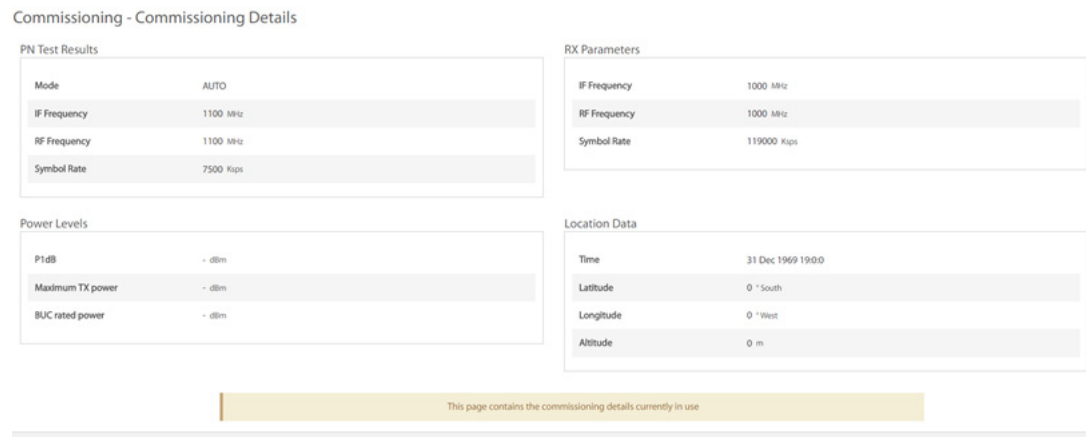
Figure 2-12. Commissioning Details

Table 2-8 provides the descriptions for the fields in the commissioning details page.

Table 2-7. Commissioning Details

Menu Item	Sub-menu Item	Description
PN Test Results		
	Mode	Displays the mode as Pseudo-random Noise (PN).
	IF Frequency	Displays the IF frequency.
	RF Frequency	Displays the RF frequency.
	Symbol Rate	Displays the symbol rate of the carrier.
Power Levels		
	P1dB	Displays the P1dB level at which the BUC output begins to saturate.
	Maximum TX Power	Displays the maximum allowed transmit power.
	BUC rated power	Displays the BUC rated power.
RX Parameters		
	IF Frequency	Displays the IF frequency.
	RF Frequency	Displays the RF frequency.
	Symbol Rate	Displays the symbol rate of the carrier.
Location Data		
	Time	Displays the time taken to retrieve the longitude and latitude time during commissioning.
	Latitude	Displays the latitude in decimal notation N or S.
	Longitude	Displays the longitude in decimal notation E or W.
	Altitude	Displays the altitude of the terminal.

2.4.3 Angle Calculator

Use this tab to calculate the antenna settings to be used for initial, and manual pointing of the antenna.

Figure 2-13. Angle Calculator

Table 2-8 provides the descriptions for the fields in the angle calculator page.

Table 2-8. Angle Calculator

Menu Item	Sub-menu Item	Description
Remote Position		
	Remote Latitude	Displays the latitude of the terminal.
	Remote Latitude Direction	Indicates whether the latitude is in the North or South direction.
	Remote Longitude	Displays the longitude of the terminal.
	Remote Longitude Direction	Indicates whether the longitude is in the North or South direction.
Antenna		
	Elevation Offset	The offset angle of the antenna (that is, the degree to which the mechanical axis of the antenna feed is different from the optical axis).
Calculated coarse antenna pointing		
	Elevation Actual	The calculated elevation of the mechanical axis of the antenna reflector.
	Azimuth True	The calculated true azimuth to the spacecraft, referenced to geographic North (does not include magnetic variation).

Menu Item	Sub-menu Item	Description
	Polarization Offset	The calculated polarization skew angle.
	Elevation True	The angle to the spacecraft if the antenna had no offset at all. This value is derived from the site geo-coordinates and the spacecraft longitude. It does not include antenna offset.
Satellite Position		
	Satellite Longitude	Displays the longitude of the satellite.
	Satellite Longitude Direction	Displays the satellite longitude direction.

2.4.4   Antenna Pointing

Use this tab to set the parameters needed to receive a downstream that will be used to fine-point the antenna.
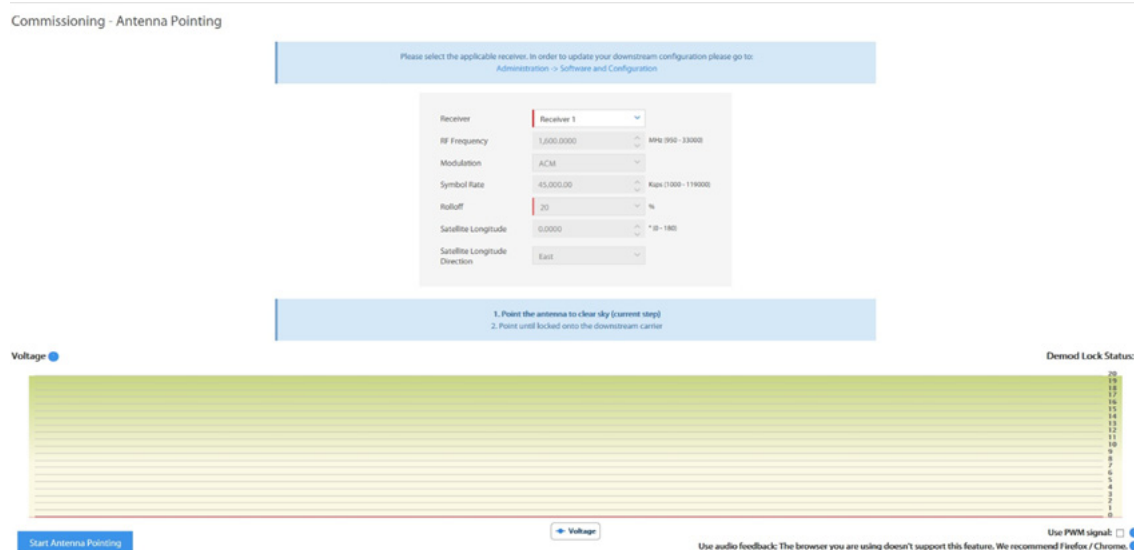
Figure 2-14. Antenna Pointing

Table 2-9 provides the descriptions for the fields in the antenna pointing page.

Table 2-9. Antenna Pointing

Menu Item	Description
Receiver	Displays the receiver type.
RF Frequency	Describes the RF frequency used.
Modulation	Displays the modulation options.

Menu Item	Description
Symbol Rate	Displays the symbol rate selected by the installer.
Rolloff	Displays the roll-off value.
Satellite Longitude	Displays the longitude of the satellite.
Satellite Longitude Direction	Displays the satellite longitude direction.

2.4.5 Cross Polarization/P1dB

Use this option to control the transmission of a test signal (either a CW or a PN modulated carrier) that can be used to find the P1dB compression point of the BUC or to adjust the polarization alignment and check the separation between the cross polarizations.
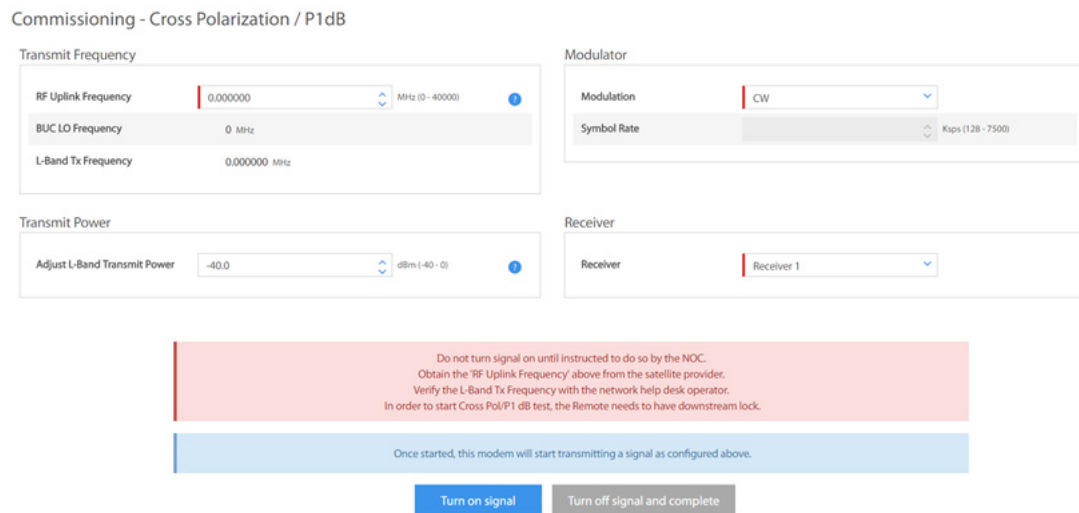
Figure 2-15. Cross Polarization

Table 2-10 describes the fields in the cross polarization page.

Table 2-10. Cross Polarization

Menu Item	Sub-menu Item	Description
Transmit Frequency		
	RF Uplink Frequency	Displays the Transmit RF Uplink Frequency at which the router would transmit.
	BUC LO Frequency	Displays the BUC LO Frequency that is automatically populated from the terminal option file.

Table 2-10. Cross Polarization

Menu Item	Sub-menu Item	Description
	L-Band Tx Frequency	Displays the L-Band Tx Frequency that is calculated based on the RF uplink frequency and BUC LO frequency.
Transmit Power		
	Adjust L-Band Transmit Power	Displays the power value set by the installer.
Modulator		
	Modulation	Displays the modulation options.
	Symbol Rate	Displays the symbol rate selected by the installer.
	Receiver	Displays the receiver type.

3 Commissioning a Terminal

This chapter describes how to commission a satellite router. Commissioning is the process of preparing a satellite router to be able to properly transmit in a network.

This chapter includes the following sections:

3.1 Introduction

Commissioning is the process of preparing a terminal to be able to properly transmit in a network.

NOTE: For commissioning a remote with manual antenna, see *Manual Antenna Pointing (without OpenAMIP)* on page 28. For commissioning a remote with automatic antennas, see *Cross-Polarization Test* on page 33.

To commission a remote using the Terminal WUI, click **Commissioning** > **Commissioning Wizard**. See Figure 3-1.
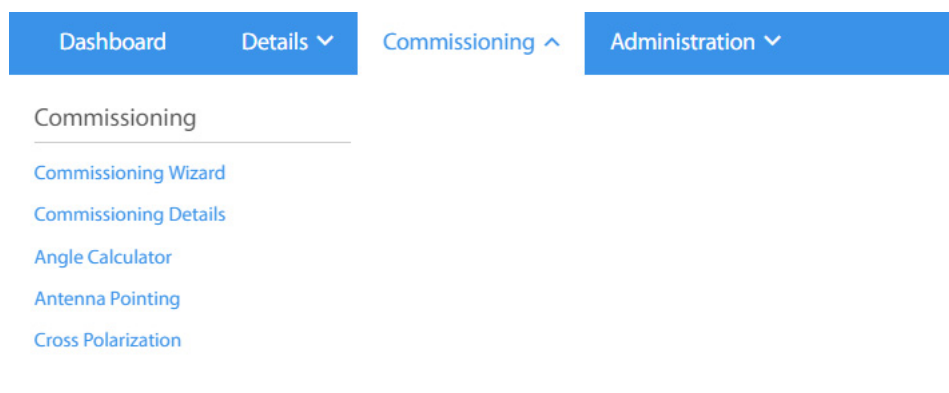
Figure 3-1. Commissioning Menu

Once the user clicks the Commissioning Wizard, the commissioning procedure starts with the following page:
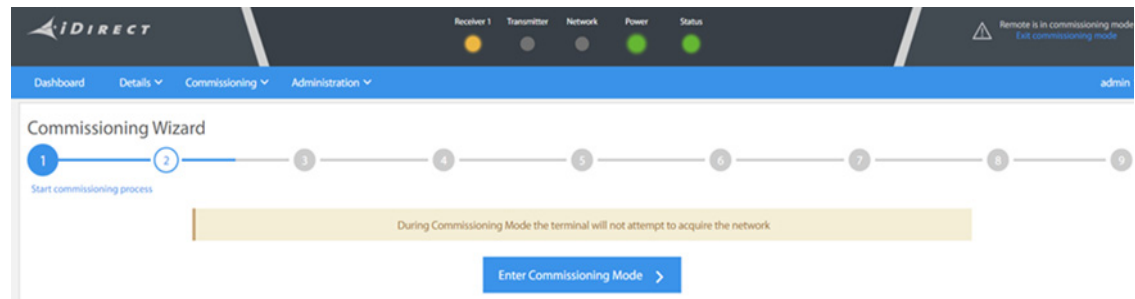
Figure 3-2. Commissioning Wizard

3.2 Software Upgrade

See *Loading Packages using the Terminal WUI* on page 19 and *Loading Option Files using the Terminal WUI* on page 20.

3.3 Manual Antenna Pointing (without OpenAMIP)

Follow the procedure in this section only if a remote is being commissioned with a manual antenna.

Selecting a Site

A comprehensive site survey is beyond the scope of this guide. However, keep the following general guidelines in mind when selecting the site:

- Select a level surface that is approximately 10 feet by 10 feet.
- Avoid proximity to other transmitters.
- Avoid exposing others to incident radiation.
- Verify a clear line-of-sight to the satellite.
- Consider availability of electrical power and routing of cables (power, IFL, LAN).
- Verify that the coaxial IF cables (Tx, Rx) can reach the Satellite Router from the selected antenna location. RG-6 cable may be used up to a distance of 250 feet. If the run is longer, RG-11 cable must be used up to a maximum distance of 500 feet.
- Ensure that cables do not cross roads or foot-traffic areas.

Assembly

Assemble the antenna and mount by following the manufacturer's assembly instructions. After installation, ensure that:

- The antenna base is fixed on a stable surface that will not shift.
- Ballast is installed on the antenna base (to combat wind).

- The mast pipe is plumb.

Orientation

The following section describes antenna orientation principles generally applicable to all site installations, illustrated with a typical VSAT antenna configuration. Magnetic variation and elevation offset principles are discussed in detail.

NOTE: The antenna may not be identical to the antenna used in this example. See the antenna manufacturer's instructions for specific information.

Magnetic Variation

Magnetic variation (also referred to as "declination") is the difference between the true heading referenced to the geographic North Pole, and the magnetic heading as registered on a magnetic compass. The magnitude and direction of magnetic variation differs depending upon the geographic location. Magnetic variation changes slowly with time.

Figure 3-3 illustrates magnetic variation in the United States. More detailed, up-to-date maps are available on the Internet, and must be consulted for the latest data.

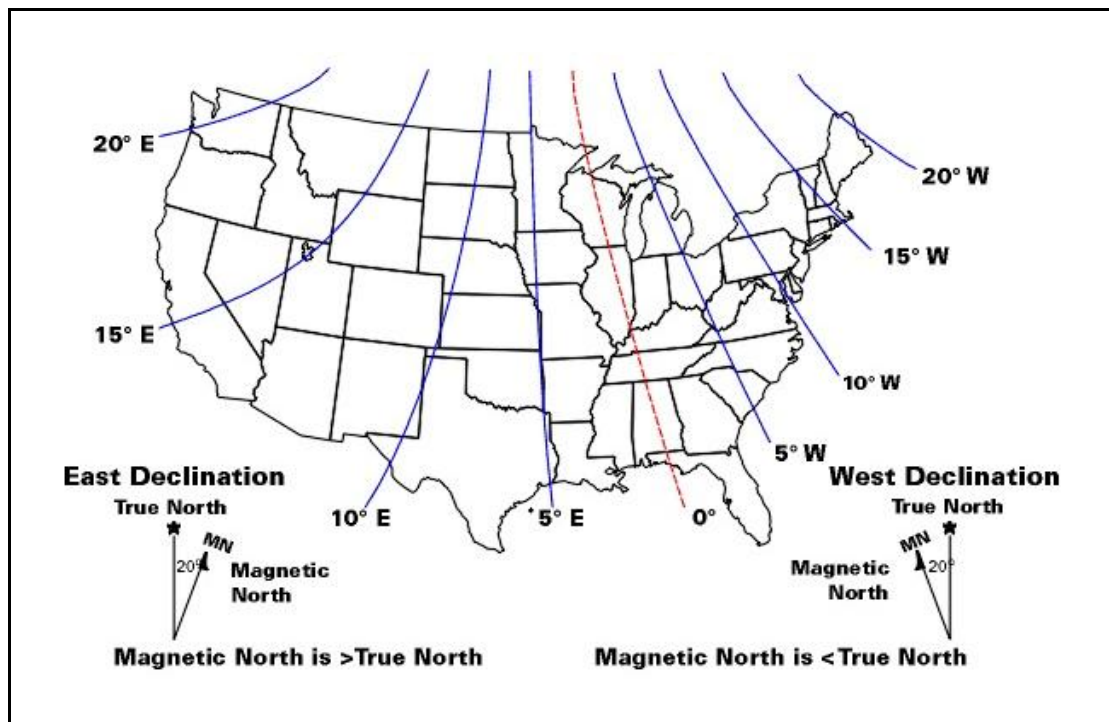**Figure 3-3. Example: Magnetic Declination**

Magnetic variation alters the reading of a magnetic compass with respect to true North. Maps and map display systems, including the output of the iDirect **Look Angle Calculator**, are referenced to true geographic North. Therefore a correction factor must be applied to

readings taken by a magnetic compass to obtain the correct value, referred to as the true heading.

Magnetic variation is specified in degrees East or West of the *agonic line* (line of zero variation), shown as a red dotted line in Figure 3-3. As depicted in the figure, East declination causes the compass to be deflected to the right of the true heading, while West declination causes the compass needle to deflect to the left of the true heading. Consequently, add West declination, and subtract East declination, from the compass reading to obtain the true heading.

For example, the illustration depicts the 10° West isogonic line passing through Baltimore, MD. In that location, 10 degrees must be added to the compass indication to obtain the true heading.

Sighting Antenna Azimuth

When sighting the antenna to determine azimuth, it is important to consider the effect of large metal objects nearby, which could influence the compass measurement.

Measure from behind the antenna, looking in the direction of the feed horn. Walk around behind the antenna and watch the compass to determine if the field is uniform or if anomalies exist.

Use an object in the far background as a target to align the compass. Sight along a line perpendicular to the plane of the reflector. The back plate of the reflector assembly can serve as a reference.

Add or subtract the declination in your location to the compass reading. This is the true heading of the antenna. When aligning the antenna to the value determined by the **Look Angle Calculator**, mark the position with a line drawn across the lower section of the azimuth mount and the pole using an indelible marker.

Elevation Offset

An offset antenna has the virtue of unobstructed antenna aperture, especially beneficial for VSAT terminals. Reflector optics are modified from a parabola, allowing the feed to be placed off the mechanical axis. The resulting beam (optical) axis is offset by an angle equal to the angle between the feed and the mechanical axis. See Figure 3-4.

A typical 1.8 meter antenna has a 22.6° offset, while a typical 1.2 meter antenna has a 17° offset. For example, the antenna reflector elevation required to achieve a beam angle of 50° relative to the horizon is calculated as follows for a 1.8 meter antenna:

50° - 22.6° = 27.4°

The reflector back plate is perpendicular to the mechanical axis of the antenna. When the back plate is vertical (90°), the beam elevation is 22.6°. To move the beam axis to the desired 50° elevation angle as in the example above, the antenna back plate is elevated from 90° to 117.4° (90 + 27.4) or, depending on the type of inclinometer used, a reading of 62.6° (90 - 27.4).

Always refer the original equipment manufacturer's (OEM) installation instructions when installing the antenna and mount. Consult the OEM specifications to determine the offset angle for the particular antenna being installed.
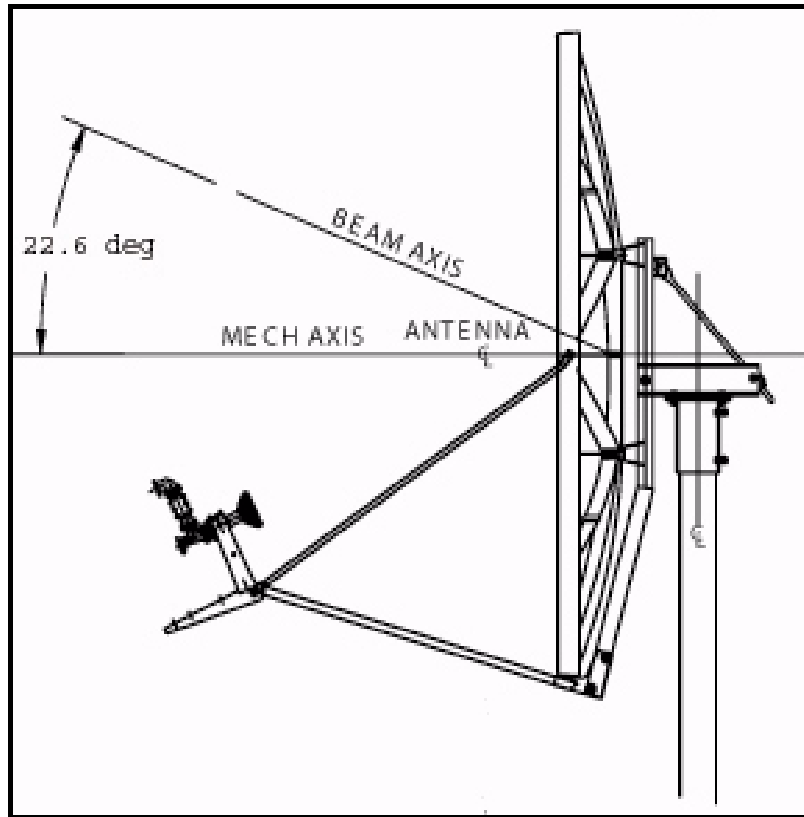
Figure 3-4. Antenna Elevation Offset

Using the Terminal WUI

On the terminal WUI, click **Commissioning** > **Commissioning Wizard**. On the **Coarse Antenna Pointing** page (see Figure 3-5), read the values on the right-hand side of the page and use those values to physically point the antenna. Click **Save Remote Location and Continue.**

Figure 3-5. Antenna Pointing

On the **Configure Downstream** page (see Figure 3-6), ensure the frequency and other parameters are correct. Click **Continue**. To change the frequency or any other parameter, click **Administration** > **Software and Configuration**.

Figure 3-6. Configure Downstream

NOTE: Before pointing the antenna to the satellite, ensure the highlighted step in the **Fine Antenna Pointing** page is followed. Always point the antenna to clear sky first and mark the measurement.

On the **Fine Antenna Pointing** page (see Figure 3-7), physically position the antenna to point to the satellite.
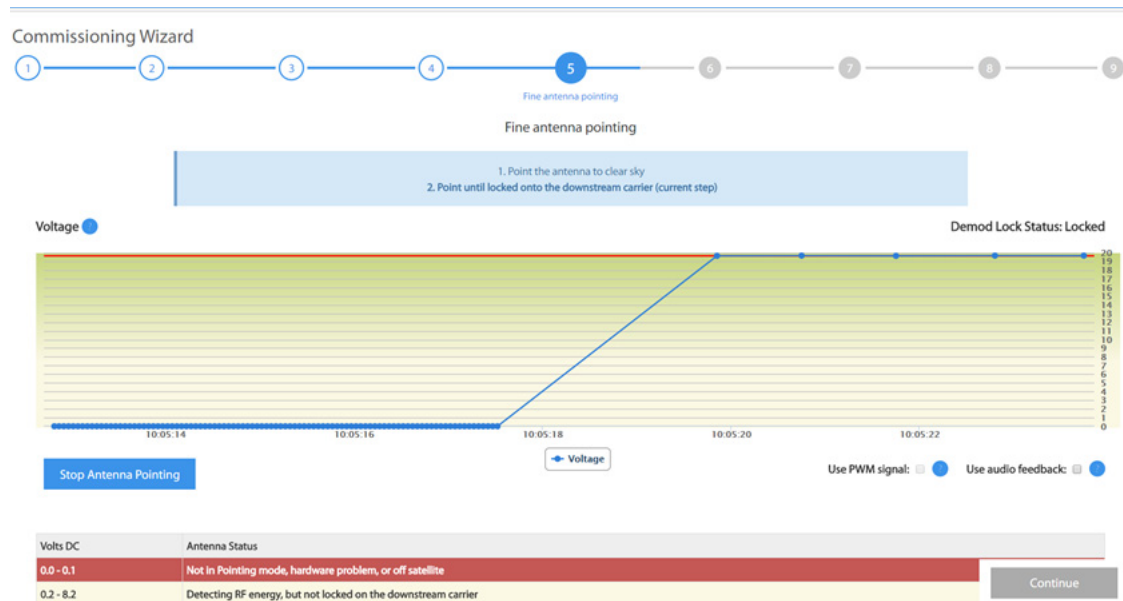
Figure 3-7. Antenna Pointing

Point the antenna (satellite dish) towards the clear sky. Click **Start Antenna Pointing** to initialize the graphing of the received signal. Physically start rotating/moving the antenna towards the direction of the satellite (as calculated in the coarse pointing page). The graph starts to display an increase in received signal. Direct the antenna to the direction where the graph displays the highest voltage.

When the **Demod Lock Status** displays **Locked,** click **Continue**.

3.4   Cross-Polarization Test

Overview

Cross-pol isolation is measured over-the-air by the satellite access control center. Be prepared to contact the Network Operator by telephone.

Transmit cross-pol isolation is maximized in order to limit interference to users on the opposite polarity of linearly-polarized satellite transponders. Typically, the spacecraft operator requires a minimum of 30 dB of isolation. To measure this, the terminal must transmit at a power level at least 30 dB above the noise floor of the transponder. The satellite access control center measures and compares the received co-pol and cross-pol energy to determine if the site meets polarity isolation standards.

VSAT terminals using circularly-polarized feed systems need not perform cross-pol tests.

To Prepare for Cross-Pol Adjustment:

1. Disconnect power from the Satellite Router.

2. Disconnect the receive IF cable from the Satellite Router.

3. Connect the transmit IF cable to the BUC Tx input.

4. Connect power to the Satellite Router.

5. Connect to the satellite router's web user interface using a Web browser.

6. Log in as **Admin** and click **Commissioning** > **Cross Polarization/P1dB**. See Figure 3-8.

Figure 3-8. Terminal WUI Cross Polarization Page

Satellite Access

WARNING: Do not click the **Turn on Signal** until instructed to do so by the satellite access control center. Clicking the **Turn on Signal** causes the Satellite Router to transmit a continuous-wave (CW) signal to the satellite.

While still connected to the Satellite Router, call the Network Operator. The Network Operator will establish a conference call with the satellite access control center. The access controller will assign an uplink frequency for performing the cross-pol isolation adjustment. For a Satellite Router that transmits an SCPC return channel, the assigned test frequency may be the same as the final operating frequency. For TDMA terminals, cross-pol must be measured at a test frequency different from the traffic-carrying channel.

Preparation

Follow the steps below to prepare for satellite access and cross-pol adjustment:

To Prepare for Satellite Access:

1. Loosen the fasteners securing the feed, as well as the hose clamp on the BUC, so that the entire assembly (feed, BUC, and LNB) rotates freely.

2. Provide the final antenna pointing voltage reading to the Network Operator. The Network Operator records the value.

3. Obtain the test frequency from the satellite access controller.

4. Under **Commissioning** > **Cross Polarization/P1dB**, under **RF Uplink Frequency** (Figure 3-8) enter the test frequency.

> *NOTE:* The BUC LO Frequency is read from the options file loaded on the Satellite Router. Using the RF Uplink Frequency and BUC LO Frequency, the L-band TX Frequency is calculated automatically.

5. Verify with the Network Operator that the displayed **L-band TX Frequency** is correct.

6. In **Adjust Transmit Power**, set power to **-35 dBm**.

Performing Cross-Pol Adjustment

During adjustment of the antenna feed, the satellite access controller observes the transmitted signal on a spectrum analyzer, switching from co-pol to cross-pol to compare levels. The controller will ask for power to be increased until sufficient energy is available to detect the cross-pol signal. At that time a polarity adjustment is made. The controller may ask for more changes in transmit power and additional polarity adjustments as needed until the required level of isolation is achieved.

The access controller will not specify a transmit power in absolute terms, such as -35 dBm or -20 dBm. Instead, the controller will ask for power increases or decreases in relative terms, such as a 1 dB increase, or a 2 dB decrease. Perform the following procedure when instructed by the access controller.

To Start the CW Carrier and Adjust TX Polarity Isolation:

1. On the Terminal WUI, click **Turn On Signal** (Figure 3-8).

2. In the terminal WUI, adjust the transmit power as instructed by the access controller by selecting the appropriate power value in the **Transmit Power** section of the Cross Polarization screen. (See Figure 3-8)

3. At the instruction of the access controller, rotate the feed slowly in one direction. Move the assembly in small (1/2°) increments.

4. Wait for the access controller to make a measurement. The access controller may say to continue moving the feed in the same direction, or to reverse direction. Continue as directed until the required isolation is achieved.

5. Secure all fasteners and the hose clamp.

It may be necessary to re-peak azimuth and elevation in order to achieve sufficient cross-pol isolation. The access controller may ask for fine adjustments in azimuth or elevation before repeating the cross-pol adjustment. Follow the directions of the access controller. Securely fasten all antenna axes after peaking and isolation have been optimized.

After Securing the Antenna

Wait for the access controller to verify that cross-pol isolation and peaking did not change due to tightening of the antenna axis fixing hardware. Confirm that the Network Operator has recorded the final cross-pol isolation value.

When directed to modulate the test carrier, perform the following:

1. Using the Terminal WUI, on the **Cross Polarization/P1dB** page (see Figure 3-8):

    a. In the **Modulation** field of the **Modulator** section, select **BPSK**.

    b. Enter the **Symbol Rate** as directed.

    c. Click **Turn On Signal**.

Using the Terminal WUI

On the Terminal WUI, click **Commissioning** > **Commissioning Wizard**. On the **Cross Polarization test** page (see Figure 3-9), under **CW Transmit Frequency**, enter the **RF Uplink Frequency**. The **BUC LO** and **L-Band Tx Frequency** are automatically displayed.

Figure 3-9. Cross Polarization test

NOTE: The satellite provider should provide the RF Uplink Frequency and the NOC operator should provide the Adjust L-Band Transmit Power.

Under **Transmit Power**, select the **Adjust L-Band Transmit Power** from the drop-down box.

Click **Turn on Signal** once the RF Uplink Frequency and Adjust L-Band Transmit Power are entered. The router starts transmitting CW (continuous waves) at the specified frequency and transmit power.

The user can increase or decrease the frequency and transmit power. Once the CW is transmitted accurately at the desired level, click **Turn off signal and Complete** to stop transmitting CW**.**

Click **Continue**. The **Exit Commissioning Mode** page is displayed.
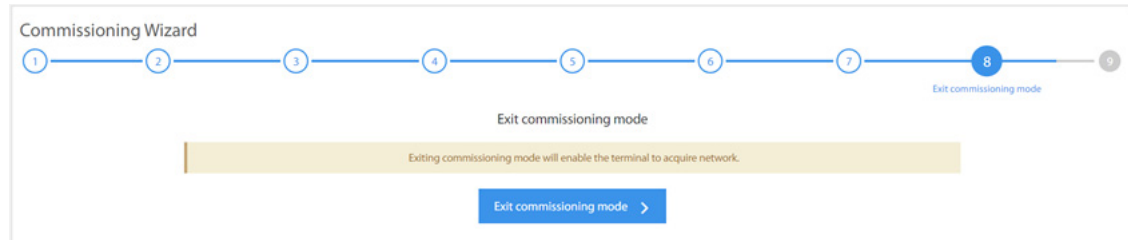
Figure 3-10. Exit Commissioning Mode

Click **Exit Commissioning Mode** to complete commissioning the terminal.
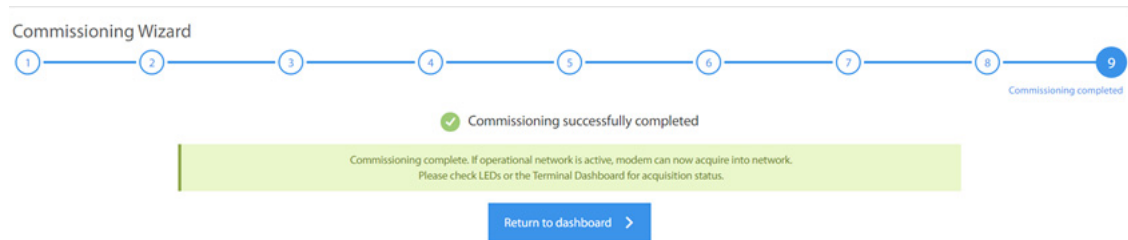
Figure 3-11. Commissioning Complete

Appendix A   Acronyms and Abbreviations

The list in this appendix is meant to be generic and may contain acronyms and abbreviations not found in this manual and some terms may not be defined based on industry standards of knowledge.

0...9

16APSK	Sixteen Amplitude and Phase Shift Keying
8PSK	Eight Phase Shift Keying

A

A-TDMA	Adaptive Time Division Multiple Access
ABS	Automatic Beam Switching
AC	Alternating Current
ACM	Adaptive Coding and Modulation
ACS	Antenna Control System
AES	Advanced Encryption Standard
APSK	Amplitude and Phase-shift keying
AWG	American Wire Gauge
AZ	Azimuth

B

BB	BaseBand
BIM	Below-Decks Interface Module
BIST	Built-In Self-Test
BITE	Built-In Test Equipment
BPN	BUC Part Number
BPSK	Binary Phase Shift Keying
BSN	BUC Serial Number

BTP	Burst Time Plan	EMI	ElectroMagnetic Interference
BUC	Block Up Converter	ETSI	European Telecommunications Standards Institute

C

C/N	Carrier to Noise ratio		
CBIT	Continuous Built In Test	**F**	
CDR	Critical Design Review	FCC	Federal Communication Commission
CIR	Committed Information Rate	FEC	Forward Error Correction
CPE	Customer Premise Equipment	FID	Functional ID
CPU	Central Processing Unit	FMECA	Failure Mode Effects Criticality Analysis
CRC	Cyclic Redundancy Check	FPGA	Field Programmable Gate Array
CSA	Canadian Space Agency	FS	Functional Specification

D

G

DAC	Digital to Analog Converter	G/T	Gain over Temperature
dB	deciBel	GHz	GigaHertz
dBi	deciBel isotropic	GPIO	General-Purpose Input/Output
dBm	deciBel milli-Watt	GPS	Global Positioning System
dBW	deciBel Watt		
DC	Direct Current	**H**	
DDR	Double Data Rate	HCP	High-Capacity Payload
DHCP	Dynamic Host Configuration Protocol		
DNS	Domain Name Service	**I**	
	DVB-S2	IBIT	Initiated Built In Test
	Digital Video Broadcasting over Satellite, Second Generation	ICD	Interface Control Document
		ICMP	Internet Control Message Protocol
		iDX	Evolution Software System
E		IEC	International Electrotechnical Commission
EIRP	Effective Isotropic Radiated Power	IFL	Inter-Facility Link
Eb/N0	Bit Energy to Noise Power Spectral Density ratio	IF	Intermediate-frequency
EEPROM	Electrically Erasable Programmable Read-Only Memory	IP	Ingress Protection
		IP	Internet Protocol
EL	Elevation	IR	Information Rate
EMC	ElectroMagnetic Compatibility		

J

K

kbps	kilobit per second
kHz	kilohertz
KRFU	Ku/Ka-band Radio Frequency Unit
ksps	kilosymbol per second

L

LAN	Local Area Network
LDPC	Low-Density Parity Coding
LED	Light Emitting Diode
LNB	Low Noise Block Converter
LOS	Loss of Signal
LRU	Line-Replaceable Unit

M

Mbps	Megabits per second
Mcps	Megachips per second
MES	Mobile Earth Station
MF-TDMA	Multi-Frequency TDMA
MHz	Megahertz
MID	Manufacturer ID
MIL-STD	US Military Standard
MODCOD	Modulation and Coding
Msps	Mega Symbols per Second
MTBF	Mean Time Between Failures
MTBUR	Mean Time Between Unscheduled Removals

N

NAND	Not AND
NF	Noise Figure
NOR	Not OR

NMS	Network Management System

O

OAE	Outside Antenna Equipment
ODU	Outdoor Unit
OEM	Original Equipment Manufacturer
OMT	Orthogonal-Mode Transducer
OpenAMIP	Open Antenna-Modem Interface Protocol
OTA	Over The Air
OTP	One Time Programmable

P

PA	Power Amplifier
PAST	Person-Activated Self-Test
PCB	Printed Circuit Board
PC	Personal Computer
PDR	Preliminary Design Review
PLL	Phased Locked Loop
PSK	Phase Shift Keying
PSU	Power Supply Unit

Q

QEF	Quasi Error Free
QoS	Quality of Service
QPSK	Quadrature Phase Shift Keying

R

RF	Radio Frequency
RGMII	Reduced Gigabit Media Independent Interface
RMS	Root Mean Square
RoHS	Restriction of Hazardous Substances
ROM	Read-Only Memory
RSSI	Receive Signal Strength Indication

| RTP | Real-Time Protocol |
| Rx or RX | Receive |

S

SAS	Satellite Access Station
SCPC	Single Channel Per Carrier
SGMII	Serial Gigabit Media Independent Interface
SIM	Subscriber Identity Module
SNR	Signal to Noise Ratio
SRS	Systems Requirement Specification
SRU	Shop Replaceable Unit
SSB	Single Side Band

T

TBD	To Be Defined
TCP	Transmission Control Protocol
TDMA	Time Division Multiple Access
TFI	Terminal Functional ID
TMI	Terminal Manufacturer ID
TPCFEC	Turbo Product Code FEC
TPN	Terminal Part Number
TSN	Terminal Serial Number
TTC	Terminal Transmit Control
Tx or TX	Transmit

U

| UDP | Universal Data Protocol |
| UL | Underwriters Laboratories |

V

VAC	Volts Alternating Current
VDC	Volts Direct Current
VSAT	Very Small Aperture Terminal

W

| WFQ | Weighted Fair Queuing |
| WGS | Wideband Global SATCOM |

X

X

Z

Appendix B Remote Locking

Soft, temporary, and hard locking for an iQ Desktop remote requires a unique Locking Key for each satellite router in combination with a Network Key and a randomly generated Confirmation Word to securely lock satellite routers to a network.

An iQ Desktop can be configured with a hard (permanent) lock. However, during the configuration of a hard lock, the network operator may choose to create a temporary lock. This is to allow a network operator to test the lock for the first iQ Desktop in order to verify operation, and to record the Netkey Fingerprint that is returned.

A hard locked satellite router cannot be unlocked; it must be returned to iDirect for a Non-Warranty RMA hardware replacement. A Netkey Fingerprint can help to avoid errors when locking the satellite router. The fingerprint identifies the network for the satellite router without revealing the Network Key on the satellite router.

A remote locked with a Soft Lock can be unlocked by entering the Confirmation Word provided when the lock was performed. If the Confirmation Word is lost, the soft lock cannot be disengaged. In order to unlock the remote, it must be returned to iDirect for a Non-Warranty RMA hardware replacement.

Remote locking is performed at the operator's own risk. Non-Warranty RMA charges (plus all shipping) apply to all satellite routers returned to iDirect for the purpose of removing a network lock.

> **WARNING:** It is possible to remove a soft lock or temporary lock using the Terminal WUI. However, it is not possible to remove a hard lock using the Terminal WUI. Removing a hard lock requires returning the satellite router to iDirect for a Non-Warranty RMA hardware replacement.

> **NOTE:** Non-Warranty RMA and shipping charges apply to all satellite routers returned to iDirect for the purpose of removing a network lock.

This appendix contains the following sections:

- *Performing a Hard Lock* on page 48
- *Non-Warranty RMA Required to Remove Remote Locks* on page 49

B.1   Locking an iQ Desktop

Temporary, Soft, and/or Hard locking an iQ Desktop requires the following:

1. Creating the Network Key at the network level in iBuilder, and applying the changes. See *Configuring the Network Key* on page 44.

2. Connecting to the satellite router to be locked and entering the Network Key.

3. Generating the Netkey Fingerprint and Confirmation Word, and recording their values.

4. Entering the Confirmation Word and locking the remote.

B.2   Configuring the Network Key

Remote Locking of any sort requires the creation of a Network Key before locking the satellite routers to a network. Create the Network Key by configuring the following custom key on the Custom tab for the network in iBuilder:

```
[NETWORK_DEFINITION]
   net_key = <Network Key>
```

where `<Network Key>` is a string of between 5 and 64 alphanumeric characters.

After configuring the custom key in iBuilder, propagate the key to all satellite routers in the network by applying the changes to the network.

During operation, if a locked satellite router receives a Network Key message containing a Network Key that is different from the key set on the satellite router, the satellite router immediately stops sending upstream messages.

B.3   Performing a Temporary Lock

Performing an optional Temporary Lock allows a network operator to test the locking of the first iQ Desktop, to verify operation, and to record the Netkey Fingerprint that is returned. Perform the following steps to temporarily lock the first iQ Desktop in a network.

1. Using a Web browser, connect to the satellite router to be locked and log on as *developer*. See Figure 1-1.

> *NOTE:* Locking a satellite router requires an *developer* login.

2. In the browser address bar, type **/#admin-netlock** to the right of the IP address. For example:

   https://192.168.0.1/#admin-netlock

   The **Admin Netlock** page is displayed. See Figure B-1.

NOTE: If the satellite router is locked, only the **Lock Status** section of the page appears.

Figure B-1. Network Lock Page

3. In the **Lock Status** section, verify **State** is listed as **Unlocked**.

4. In the **Netkey** field, enter the Network Key obtained at *Configuring the Network Key* on page 44.

5. Click **Lock**. The **Lock Remote** section expands to show the following fields:

- **Netkey**
- **Netkey Fingerprint**
- **Confirmation Word**

NOTE: When locking the satellite router, use the Netkey Fingerprint to catch typographical errors and prevent accidentally locking the satellite router to the wrong network. Record the Netkey Fingerprint value returned when locking the first satellite router to a network. When locking subsequent satellite routers, verify that the Netkey Fingerprint has the same value before confirming the lock.

6. Perform the following actions:

a. Verify the **Netkey**.

b. Record the value of the **Netkey Fingerprint**.

c. Record the Confirmation Word that appears.

See Figure B-2.

Figure B-2. Entering the Confirmation Word

7. Click **Confirm**. The **Lock Status** section displays the **State** as **Temporarily locked**.

B.4   Performing a Soft Lock

Perform the following steps to soft lock the first iQ Desktop to a network.

1. Using a Web browser, connect to the satellite router to lock and log on as *developer*. See Figure 1-1.

NOTE: Locking a satellite router requires *developer* privileges.

2. In the browser address bar, type **/#admin-netlock** to the right of the IP address. For example:

   https://192.168.0.1/#admin-netlock

   This **Network Lock** page appears. See Figure B-1.

NOTE: If the satellite router is locked, only the **Lock Status** section of the page appears.

3. In the L**ock Status** section, verify **State** displays **Unlocked**.

4. In the **Lock Remote** section, select **Soft** from the **Lock type** drop-down list.

5. In the **Netkey** field, enter the Network key obtained at *Configuring the Network Key* on page 44. See Figure B-3.

Admin Netlock

— Lock Status

State	Soft lock in progress
Netkey	qwert
Netkey Fingerprint	ISAJAQ

— Lock Remote

Lock Type	soft
Netkey	qwert
Netkey Fingerprint	ISAJAQ
Confirmation Word	X8n89bWFy

Figure B-3. Soft Lock Admin Netlock

6. Click **Lock**. The **Lock Remote** section expands to show the following fields:

   • **Netkey Fingerprint**

   • **Confirmation Word**

NOTE: When locking the satellite router, use the Network Key Fingerprint to catch typographical errors and prevent accidentally locking the satellite router to the wrong network. Record the Network Key Fingerprint value returned when locking the first satellite router to a network. When locking subsequent satellite routers, verify that the Network Key Fingerprint has the same value before confirming the lock.

7. Perform the following actions:

   a. Review the warning at the bottom of the page

   b. Verify the Netkey.

   c. Verify the value of the Netkey Fingerprint matches the value recorded in Section A3, Step 7.b.

   d. Record the Confirmation Word.

WARNING: Recording the Confirmation Word is critical. Without the Confirmation Word, the unit will have to be returned to iDirect under Non-Warranty RMA repair.

> *NOTE:* Each remote has a unique Conformation Word. It may necessary to maintain and table/database of each remote model, serial number, and Confirmation Word.

    e. Enter the Confirmation Word in the designated area.

8. Click **Confirm**. The **Lock Status** section shows the **State** is Soft locked.

B.5   Performing a Hard Lock

A hard lock permanently burns the Locking Key into the remote hardware using the generated Confirmation Word.

> *WARNING:* It is possible to remove a soft lock or temporary lock using the Terminal WUI. However, it is not possible to remove a hard lock using the Terminal WUI. Removing a hard lock requires returning the satellite router to iDirect for a Non-Warranty RMA hardware replacement.

To hard lock a remote into the network, do the following:

1. In a Web browser, connect to the satellite router to be locked and log on as *developer* at the Terminal WUI. See Figure 1-1.

> *NOTE:* Locking a satellite router requires an *developer* login.

2. In the browser address bar, type **/#admin-netlock** to the right of the IP address. For example:

    https://192.168.0.1/#admin-netlock

This Network Lock appears. See Figure B-4.

Admin Netlock

Lock Status	
State	Unlocked

Lock Remote	
Lock Type	hard
Netkey	

By pressing the Lock button above you will perform the first step of a two-step process of locking this remote to a specific network.

Lock

Figure B-4. Network Lock Page

NOTE: If the satellite router is locked, only the **Lock Status** section of the page appears.

3. In the **Lock Status** section, verify State displays Unlocked.

4. In the Remote Lock section, select **Hard** from the Lock type drop-down list.

5. At the Netkey field, enter the Network Key obtained in *Locking an iQ Desktop* on page 44.

6. Click **Lock**. The Lock Status section expands to display the following fields:

    •   Netkey

    •   Netkey Fingerprint

    •   Confirmation Word

NOTE: When locking the satellite router, use the Network Key Fingerprint to catch typographical errors and prevent accidentally locking the satellite router to the wrong network. Record the Network Key Fingerprint value returned when locking the first satellite router to a network. When locking subsequent satellite routers, verify that the Network Key Fingerprint has the same value before confirming the lock.

7. Perform the following actions:

    a. Review the warning at the bottom of the page

    b. Verify the Netkey.

    c. Verify the value of the Netkey Fingerprint matches the value recorded in *Performing a Temporary Lock*

    d. Enter the Confirmation Word in the designated area.

WARNING: The following step will permanently lock the satellite router to the network. Only a hardware replacement can reverse this lock.

8. Click Confirm. A window opens showing the lock status of the satellite router.

NOTE: Repeat these procedures to lock additional remotes.

B.6   Non-Warranty RMA Required to Remove Remote Locks

It is not possible to change or remove a lock on an iQ Desktop. In order to unlock the satellite router, return it to iDirect for a Non-Warranty RMA hardware replacement.

> *NOTE:* RMA and shipping charges apply to all satellite routers returned to iDirect for the purpose of removing a network lock.