Installation, Support, and Maintenance Guide

iQ Desktop+ Satellite Router

July 1, 2019

iDIRECT

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iDirect Government™, created in 2007, is a wholly owned subsidiary of iDirect and was formed to better serve the U.S. government and defense communities.

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Revision History

The following table shows all revisions for this document. To determine if this is the latest revision, check the TAC Web site at http://tac.idirect.net.

Revision	Date	Updates
A	July 01, 2019	Initial release of the document.

Contents

Figures

Tables

About

This manual provides important safety information and explains how to install and maintain the iDirect iQ Desktop+ Satellite Router.

This chapter contains the following sections:

Intended Audience

This manual is intended for use by the VSAT (Very Small Aperture Terminal) equipment installer, System Engineer, and Network Operator responsible for maintaining the iDirect Network. Only qualified service personnel should install the iQ Desktop Satellite Router. Familiarity with cabling and wiring practices is beneficial.

Manual Contents

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

- Chapter 1, *Introduction* on page 1, provides an overview and description of the iQ Desktop Satellite Router
- Chapter 2, *Specifications* on page 3 describes the mechanical, environmental and RF specifications of the iQ Desktop Satellite Router
- Chapter 3, *Interfaces* on page 7 provides connector descriptions of the iQ Desktop Satellite Router
- Chapter 4, *Installation* on page 13 describes procedures for installing the iQ Desktop Satellite Router

- Chapter 5, *Maintenance* on page 19 describes maintenance procedures for the iQ Desktop Satellite Router

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

Document Set

The following iDirect documents are available at TAC and contain information relevant to installing and using iDirect satellite network software and equipment. Refer to *Getting Help* on page x for TAC access information.

- *iDX iBuilder User Guide*
- *iDX iMonitor User Guide*
- *Terminal WUI User Guide*
- *Satellite Router Installation and Commissioning Guide*
- Evolution Release Notes
- *Evolution Technical Reference Guide*
- *Quick Start Guide (QSG), included in package with router*
- *iDirect Velocity™ Release Notes*
- *Configuring Velocity Networks Using Pulse*
- *Terminal Web User Interface User Guide (iDirect Velocity)*

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 Direct Government products are available on the respective TAC Web site:

- Access the iDirect TAC Web site at http://support.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
- E-mail: tac@idirect.net

The iDirect Government TAC may be contacted by telephone or email:

- Telephone: (703) 648.8111
- Email: tac@idirectgov.com

iDirect and iDirect Government produce documentation that are technically accurate, easy to use, and helpful to our customers. Please assist us in improving this document by providing feedback. Send comments to:

- iDirect: techpubs@idirect.net
- iDirect Government: techpubs@idirectgov.com

For sales or product purchasing information contact iDirect Corporate Sales at the following telephone number or e-mail address:

- Telephone: (703) 648.8000
- E-mail: sales@idirect.net

Warranty, RoHS, WEEE, Declaration of Conformity

Complete iDirect hardware product statements for the iQ Desktop Satellite Router are available at these Web sites:

- http://www.idirect.net/warranty, for the hardware warranty
- http://www.idirect.net/rohs, for the RoHS statement of compliance
- http://www.idirect.net/weee, for the WEEE statement of compliance
- http://www.idirect.net/doc, for the Declaration of Conformity

1 Introduction

The iQ Desktop+ is iDirect's next-generation DVB-S2/DVB-S2X remote based on a common, future-proof hardware with software-defined architecture for maximum flexibility and expansion. The iQ Desktop+ is highly scalable and can be upgraded to higher capabilities and additional features as network size and performance demands grow over time.This chapter contains the following sections:

This manual explains how to safely install and maintain the iQ Desktop+ Satellite Router. The iQ Desktop+ Satellite Router is shown in Figure 1-1.

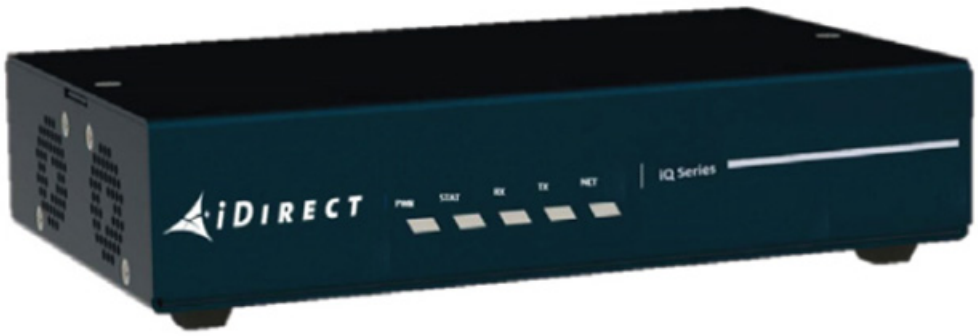


Figure 1-1. iQ Desktop+ Satellite Router

1.1 Features

Highlights:

- Single DVB-S2X (100 Msps) demodulator
- Single A-TDMA (7.5Msps) modulator
- Two independent Gig-E LAN Ports
- Console port for NMEA GPS input
- Web GUI / Web Services support

1.2 Power Supply Option

The iQ Desktop+ Satellite Router is available with the following power supply configurations:

- **Option 1**: 100-240 VAC Single Phase to 24 VDC, 65 W
- **Option 2**: 100-240 VAC Single Phase to 24 VDC, 90 W
- **Option 3**: 65 W DC Power Supply

2 Specifications

This chapter describes the mechanical, environmental, power, RF specifications for the iQ Desktop Satellite Router, and contains the following sections:

2.1 Mechanical and Environmental Specifications

The installation site must be able to accommodate the iQ Desktop Satellite Router mechanical and environmental specifications. The mechanical and environmental specifications are listed in Table 2-1.

Table 2-1. Mechanical and Environmental Specifications

Category	Description
Dimensions	W 7.2 in (18.28 cm) x D 4.4 in (11.17 cm) x H 1.75 in (4.44 cm)
Weight	0.91 lbs (0.41 kg)
Heat Dissipation	15W average
Airflow	Forced Air Cooling; Venting to be unobstructed
Ambient Temperature Operational	65 W AC PSU: • 0° to +50° C (32° to 122° F) with up to 53 W max power consumption • 0° to +40° C (32° to 104° F) with up to 65 W max power consumption 65 W DC PSU: • 0° to +50° C (32° to 122° F) with up to 65 W max power consumption 90 W AC PSU: • 0° to +50° C (32° to 122° F) with up to 75 W max power consumption • 0° to +40° C (32° to 104° F) with up to 90 W max power consumption
Storage	-40° to 85° C (-40° to +185°F)

Table 2-1. Mechanical and Environmental Specifications (continued)

<table>
<tr><th>Category</th><th>Description</th></tr>
<tr><td>Temperature Gradient</td><td></td></tr>
<tr><td>Operational</td><td>1.0° C per minute</td></tr>
<tr><td>Storage</td><td>1.0° C per minute</td></tr>
<tr><td>Relative Humidity</td><td></td></tr>
<tr><td>Operational</td><td>10 to 90%, non-condensing</td></tr>
<tr><td>Storage</td><td>5 to 95%, non-condensing</td></tr>
<tr><td>Altitude</td><td></td></tr>
<tr><td>Operational</td><td>≤ 10,000 ft (3,048 m)</td></tr>
<tr><td>Storage</td><td>≤ 35,000 ft (10,668 m)</td></tr>
<tr><td>Shock</td><td></td></tr>
<tr><td>Operational</td><td>≤ 10 G, 0.3 ms, half-sine</td></tr>
<tr><td>Survival</td><td>≤ 50 G, 1.3 ms, half-sine</td></tr>
<tr><td>Vibration</td><td></td></tr>
<tr><td>Operational</td><td>Remains operational when exposed to 0.21 Grms with the following profile:
<table>
<tr><th>Frequency</th><th>Slope</th><th>PSD</th></tr>
<tr><td>5 to 350 Hz</td><td>0</td><td>0.0001 g^2/Hz</td></tr>
<tr><td>300 to 500 Hz</td><td>-6 dB/oct</td><td></td></tr>
<tr><td>500 Hz</td><td>0</td><td>0.00005 g^2/Hz</td></tr>
</table></td></tr>
<tr><td>Survival</td><td>Survives but may not meet its operational specifications when exposed to 2.09 Grms with the following profile:
<table>
<tr><th>Frequency</th><th>Slope</th><th>PSD</th></tr>
<tr><td>5 to 100 Hz</td><td>0</td><td>0.015 g^2/Hz</td></tr>
<tr><td>100 to 137 Hz</td><td>-6 dB/Oct</td><td></td></tr>
<tr><td>137 to 350 Hz</td><td>0</td><td>0.0080 g^2/Hz</td></tr>
<tr><td>350 to 500 Hz</td><td>-6 dB/Oct</td><td></td></tr>
<tr><td>500 Hz</td><td>0</td><td>0.0039 g^2/Hz</td></tr>
</table></td></tr>
</table>

2.2 Power Specifications

The iQ Desktop Satellite Router power specifications are listed in Table 2-2.

Table 2-2. Power Specifications

Category	Description
Power Supply Input Voltage Range and Power	Option 1: 100-240 VAC Single Phase to 24 VDC, 65 W Option 2: 100-240 VAC Single Phase to 24 VDC, 90 W Option 3: 65 W DC Power Supply
Frequency	Option 1: 47-63 Hz Option 2: 50-60 Hz
Power Supply Unit Consumption	Option 1: 1.4 A (MAX) Option 2: 1.2 A (MAX) Option 3: 9 A (MAX)
iQ Desktop+ DC Consumption	Option 1 and 3: 65 W (MAX) Option 2: 90 W (MAX)
DC Power (Out) @ TX Output Connector	+24 VDC @ 2.3 A (MAX) over operating temperature
DC Power (Out) @ RX Connector	13, 18, 21 VDC @ 500mA (Max)
Protection	Internal, inside power supply Over voltage protection Over current protection Short circuit protection
AC Power Cord	Supplied, per country of use
Efficiency of the Power Supply	Option 1 and 2: 88% (AVG) Option 3: 87% (AVG)
Input Transient Response	0.5mS for 50% Load Change Typical
Power Supply Input Power Connector	Option 1 and 2: IEC-320-C6 Option 3: Phoenix 1757488

2.3 RF Specifications

The iQ Desktop+ Satellite Router RF specifications are listed in Table 2-3.

Table 2-3. RF Specifications

Category	Description
LNB Support	22 kHz tone for High / Low Band
IF Interface, Impedance	Type “F”, Zo = 75 ohms

Table 2-3. RF Specifications (continued)

<table>
<tr><th>Category</th><th>Description</th></tr>
<tr><td>Frequency Range</td><td></td></tr>
<tr><td>Transmit</td><td>950 - 2400 MHz</td></tr>
<tr><td>Receive</td><td>950 - 2150 MHz</td></tr>
<tr><td>RF Power</td><td></td></tr>
<tr><td>Transmit</td><td>Pmax of +0 dBm to Pmin of -35 dBm</td></tr>
<tr><td>Receive</td><td>Max composite wide band receive level:
a) Symbol rates ≤ 45 Msps: -5 dBm
b) Symbol rates > 45 Msps: -23 dBm or 10 dB above signal power level, whichever is smaller
Minimum Receive Level (single carrier):
QPSK - 32APSK: -125 + 10*log (Fsym(sps)) dBm
64APSK- 256APSK: -115 + 10*log (Fsym(sps)) dBm</td></tr>
<tr><td>Tx SSB Phase Noise</td><td><table><tr><th>Frequency</th><th>Phase Noise</th></tr><tr><td>1 KHz</td><td>-85 dBc/Hz</td></tr><tr><td>10 KHz</td><td>-95 dBc/Hz</td></tr><tr><td>100 KHz</td><td>-90 dBc/Hz</td></tr><tr><td>1 MHz</td><td>-110 dBc/Hz</td></tr></table></td></tr>
<tr><td>Transmit Carrier Suppression</td><td>-35dBc (max) over operating temperature and frequency band</td></tr>
<tr><td>Spurious & Harmonic Content</td><td>In-band (900-2400MHz), with output at -30dBm ≤ -35dBc</td></tr>
<tr><td>Transmitter Muting</td><td>50 dB (min) between carrier on and off states within 0.1 us at the same attenuation state</td></tr>
<tr><td>Modulator Spectral Shaping</td><td>DVB-S2 (ETSI EN 302 307-1) and DVB-S2X (ETSI EN 302 307-2)</td></tr>
</table>

3 Interfaces

This chapter describes the iQ Desktop+ Satellite Router physical interfaces and LEDs, and contains the following sections:

3.1 iQ Desktop+ Satellite Router Front LEDs

The iQ Desktop+ Satellite Router front panel is shown in Figure 3-1.

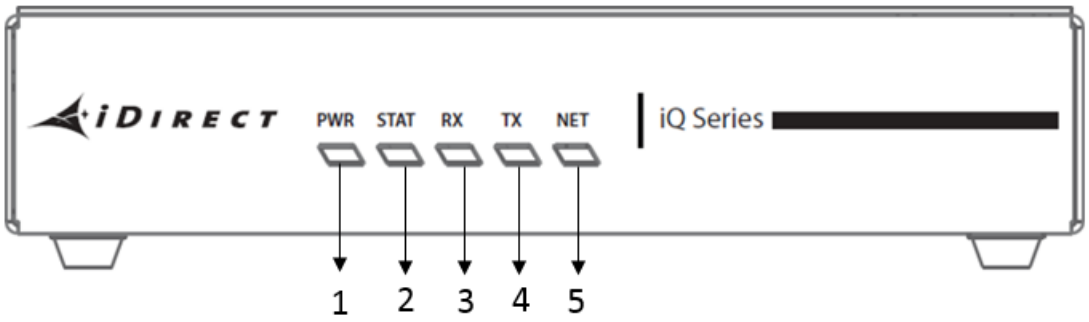


Figure 3-1. iQ Desktop+ Satellite Router Front Panel LED Display

NOTE: The descriptions of the LEDs may vary between iDX Software Releases. Check the release specific *Terminal WUI User Guide, and Release Notes* for details.

3.2 iQ Desktop+ Front Panel LED Status Descriptions

Descriptions for states of LEDs may vary between iDX Software Releases. Check the release specific *Terminal WUI User Guide, and Release Notes* for details. Figure 3-1 on page 8 shows the front panel and Table 3-1 describes the front panel LED color and status information:

Table 3-1. iQ Desktop+ Satellite Router Front Panel LED Descriptions

Label	Signal Color/Type	Definition
POWER		Indicates iQ Desktop+ power status and any power-related problems
	Off	No or low power input to the modem
	Solid Green	The modem is powered on
STATUS		Boot Sequence and Overall Hardware Status
	1/2 second flashing Green	Remote initializing
	Solid Green	Initialization complete
RX		Provides downstream receive status
	Solid Amber	Downstream carrier configured, demodulator not yet locked
	1 second flashing Amber	Downstream carrier configured, demodulator locked to downstream carrier, Network Clock Reference (NCR) not yet locked

Table 3-1. iQ Desktop+ Satellite Router Front Panel LED Descriptions (continued)

Label	Signal Color/Type	Definition
	Solid Green	Downstream carrier configured, demodulator and NCR locked to downstream carrier
TX		Indicates the state of the transmitter
	Solid Amber	Transmitter is disabled
	1 second flashing Amber	Transmitter acquiring upstream connection
	Solid Green	Transmitter upstream connection acquired
NET		Modem Network Status: Indicates the state of the satellite network connection
	1 second flashing Green	Network acquisition in progress
	Solid Green	Network acquired

3.3 iQ Desktop+ Satellite Router Rear Panel Description

The iQ Desktop+ Satellite Router rear panel is shown in Figure 3-2 and defined in Table 3-2 on page 10.

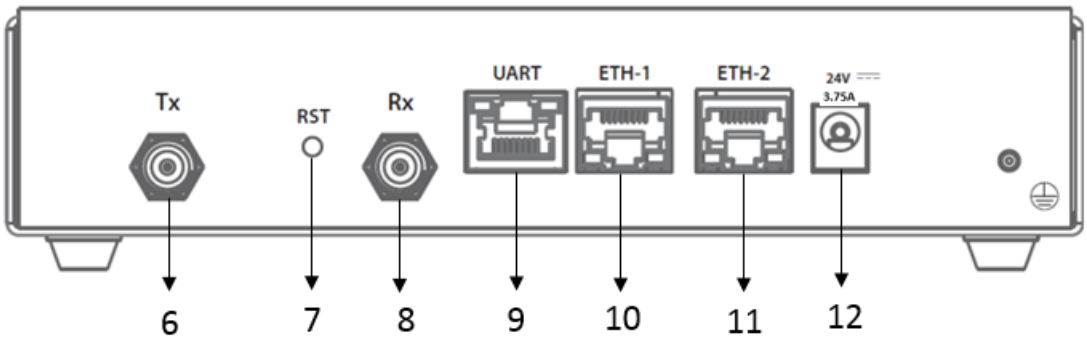


Figure 3-2. Rear Panel Description

Table 3-2. iQ Desktop+ Satellite Router Rear Panel Connector Descriptions

Callout	Label	Interface Definition and Connector Type
6	**TX**	L-Band Transmit signal to Block Up Converter (BUC) capable of 10 MHz or 50 MHz Reference; 75 Ohm, F-Type
7	**Reset**	iQ Desktop+ internal reset button
8	**RX**	L-Band Receive signal from Low Noise Block Down Converter (LNB); 75 Ohm, F-Type
9	**UART (Console)**	iQ Desktop+ console port, RJ-45
10	**ETH1**	Ethernet Communications Port, RJ-45 10/100/1000 Ethernet ports, 802.1q VLAN
11	**ETH2**	Ethernet Communications Port, RJ-45 10/100/1000 Ethernet ports, 802.1q VLAN
12	**+24V DC Power Supply** **3.75A**	DC Power Inlet

3.4 Detecting a Tx IFL Over-current Condition

Table 3-3 displays the LED status of the iQ Desktop+ when the TX IFL port detects a over-current.

Table 3-3. iQ Desktop+ Front Panel LEDs During Over-current

Remote Status	BUC Supply	LNB Supply	Label	Signal Color/Type
In-network (Normal operation)	On	On	PWR	Green (Solid)
			STAT	Green (Solid)
			Rx	Green (Solid)
			Tx	Green (Solid)
			Net	Green (Solid)
Tx IFL Over-current condition Detected (will remain in this state for 5 minutes or until user intervention)	Off	On	PWR	Green (Solid)
			STAT	Red (flash 1 sec)
			Rx	Yellow (flash 1 sec)
			Tx	Yellow (flash 1 sec)
			Net	Off
Listening Mode (waiting for user intervention)	Off	On	PWR	Green (Solid)
			STAT	Green (Solid)
			Rx	Green (Solid)
			Tx	Yellow (Solid)
			Net	Off

See *Troubleshooting the iQ Desktop+ Router* if the Tx IFL over-current is detected or listen-only mode.

4 Installation

This chapter describes the guidelines and procedures for installing the iQ Desktop+ Satellite Router and contains these sections:

NOTE: See *Document Set* on page x for a description of the warning icons that are used in this manual.

4.1 Installation Steps at a Glance

CAUTION: Only trained and qualified personnel should be allowed to install or replace this equipment.

The following steps must be followed for successful installation of the iQ Desktop+ Satellite Router. Each step refers to other sections or appendices, as appropriate, with more detailed information.

4.1.1 Pre-Installation Guidelines

iQ Desktop+ Satellite Router installation guidelines:

- When selecting the site, consider accessibility, power availability, signal, network connections, and the possibility of future expansion
- Carefully examine the work area for possible hazards, such as wet floor, ungrounded power extension cables, and missing safety grounds
- Install the iQ Desktop+ Satellite Router in a location where access is unobstructed
- Ensure the iQ Desktop+ Satellite Router has adequate ventilation
- Do not install the iQ Desktop+ Satellite Router on the floor
- Select a suitable dust free location
- To protect the equipment and to avoid personal injury, observe the physical and environmental considerations below when installing an iQ Desktop+ Satellite Router:
  - **Power Cord Protection**

    Route power supply cords so they will not be walked on or pinched; pay particular attention to cords at plugs, convenience receptacles, and at the exit points
  - **Overloading**

    Do not overload wall outlets, extension cords, or integral convenience receptacles
  - **Heat**

    Do not place the iQ Desktop+ Satellite Router near heat sources, such as radiators, heat registers, stoves, or other products (including amplifiers) that produce heat
  - **Attachments**

    Do not use attachments unless recommended by the manufacturer
  - **Grounding**

    Never defeat the ground conductor or operate the equipment without a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if it is uncertain that suitable grounding is available

4.1.2 Installation Checklist

1. Unpack the router according to the unpacking instructions in Section 4.3, *Unpacking iDirect Equipment* on page 15.
2. Account for all components for the installation. A typical list is given in Section 4.4, *Components Typically Included in an Order* on page 16.
3. The recommended tools should be available for installation. See Section 4.2, *Tools and Supplies Required for Installation* on page 15.
4. Prepare the coax cables as directed in Section B.1, *Coax Cable Preparation* on page 25 to connect to **RX IN** and **TX Out.**

CAUTION: Do not connect or disconnect the Tx or Rx IFL cable while the satellite router is powered on; this action may result in damage to the BUC, LNB, and/or iQ Desktop+ Satellite Router.

ATTENTION: Ne pas connecter ou déconnecter les câbles « Tx IFL » ou « Rx IFL » quand le routeur est sous tension, sous risque de dommage au BUC, au LNB, et/ou au routeur iQ Desktop+ Satellite Router.

5. Prepare the Ethernet cable(s) and connector(s) as described in Section B.2, *Ethernet Port Pinouts* on page 30. For connection to the management interface, use **ETH 2** port with an RJ-45 cable as described in Section B.2.2, on page 31.
6. Monitor front and rear panels during startup. See Section 3.1, *iQ Desktop+ Satellite Router Front LEDs* on page 8 and Section 3.3, *iQ Desktop+ Satellite Router Rear Panel Description* on page 10.
7. Prepare PC for iQ Desktop+ Satellite Router connection as specified in Section 4.5, *Preparing the PC for Connection to the iQ Desktop+ Satellite Router* on page 16.
8. Login to the user interface using the PC.
9. Install the firmware and configure the satellite router as specified in Section 4.7, *Configuring the iQ Desktop+ Satellite Router* on page 17.
10. If the router needs repacking or maintenance see Chapter 5 on page 19.
11. When the iQ Desktop+ satellite Router is physically installed, the firmware and configuration of the satellite router need to be completed. Refer to the *iDX Satellite Router Installation and Commissioning Guide* for the release of software installed on the system and for instructions.

4.2 Tools and Supplies Required for Installation

Appendix A, *Tools Needed* on page 23 specifies recommended tools and supplies used when installing the iQ Desktop+ Satellite Router.

4.3 Unpacking iDirect Equipment

The satellite router and related equipment may be shipped in one or more shipping containers. Once all of the boxes have been received, perform the following tasks:

- Confirm the boxes are facing upward (refer to the box orientation arrows on the shipping container)
- Inspect all shipping containers
- If any damage or other signs of mishandling are evident, inform the carrier and either iDirect or the reseller
- Remove the tape and any exterior covering from the box lid

Save the iQ Desktop+ Satellite Router shipping boxes after unpacking the system. These boxes will be needed in the event of moving or shipping the system in the future. See Section 5.4, *Repacking the iQ Desktop+ Satellite Router* on page 21 for repacking information.

Remove items from the box only as needed. Verify all of the proper iQ Desktop+ Satellite Router components and accessory items listed in the order have been received, including the optional equipment ordered. See Section 4.4, *Components Typically Included in an Order* on page 16.

4.4 Components Typically Included in an Order

Prior to installation, account for all necessary components for a complete VSAT installation. If any items are missing or damaged, contact the Network Operator/Distributor for replacement.

A typical installation includes the following items:

- 1 (one) iQ Desktop+ Satellite Router
- 1 (one) Quick Start Guide (11 X 17 inch brochure)
- Additional components normally required are available in several sizes and types. Consult the iDirect Account Manager for details. The components typically are:
  - One antenna
  - IFL (Inter Facility Link) or coaxial cable appropriate for the installation
  - One appropriate feed assembly for the antenna (OMT)
  - One BUC (Block Up Converter)
  - One LNB (Low Noise Block Converter)

4.5 Preparing the PC for Connection to the iQ Desktop+ Satellite Router

See Section 3.1, *iQ Desktop+ Satellite Router Front LEDs* on page 8 for more information about the LEDs, as well as either the *iDX Release Notes* and *iDX Satellite Router Installation and Commissioning Guide, and Terminal WUI User Guide*.

Confirm the PC:

- Use Management port ETH 2 (192.168.0.1) for initial configuration
- Has a Web browser installed
- Has an IP address that is on the same subnet of the iQ Desktop+ Satellite Router
- Includes a Network Interface Card (NIC) connected with a CAT 5 Ethernet cable

4.6 Installation with AC (Option 1 and 2) or DC (Option 3) Power Supplies

This section describes installation with either an AC power Supply (Option 1 and 2) or DC Power supply (Option 3).

4.6.1 Installation with AC Power Supply (Option 1 and 2)

Perform the steps below with an AC power supply:

NOTE: iDirect recommends that the chassis be powered from a low noise, low transient AC power source.

1. Connect the AC power cord.
2. Turn on power.

4.6.2 Installing with DC Power Supply (Option 3)

CAUTION: If negative voltages are used such as Telecom -48VDC, the negative most voltage is always connected to –ve terminal (in the Telecom case this would be -48V) and the positive most voltage is always connected to the +ve terminal (in the Telecom case this would be 0VR). The Chassis can be referenced to +ve, -ve or left floating (that is, not connected to either +ve or –ve) as required because the power module is fully isolated input to chassis.

NOTE: The DC source to DC Power Module rating and capacity must be 12-36 V DC, 9 A.

NOTE: Per IEC60950-1, the Input voltage is SELV: double/reinforced insulation must be provided between AC Mains and SELV.

For an iQ Desktop+ using the DC power supply (Option 3), see Appendix C, *DC Power Supply Installation* on page 33 for assembly details:

1. Set the iQ Desktop+ power module switch to the OFF position (0).
2. Strip approximately 1/4 inch (.6 cm) of insulation from the ends of three appropriately sized (14-18 AWG) DC input wires. For details see Appendix C, *DC Power Supply Installation* on page 33.
3. Loosen the three screws on the terminal block plug (included, P/N Phoenix 1754465). Insert DC (-), DC (+), and ground wires into the corresponding terminals of the DC terminal block plug. Fasten securely. Do not over-tighten. For details see Appendix C, *DC Power Supply Installation* on page 33.
4. Assemble the cable entry housing (included for cable strain relief, P/N 1803947 DigiKey 277-5758-ND) around the three DC wires and terminal block plug, locking pieces securely with the provided cable tie. Appendix C, *DC Power Supply Installation* on page 33.
5. Insert the finished terminal block plug, with the cable entry housing, into the terminal block header in the power supply.
6. Set the iQ Desktop+ power module switch to the ON position (1).

4.7 Configuring the iQ Desktop+ Satellite Router

When the iQ Desktop+ Satellite Router is physically installed, downloading the software and configuration of the satellite router need to be completed. Refer to the *Terminal WUI User Guide* for the release of software installed on the system and for instructions. To download the guide, go to http:\\tac.idirect.net and click **Satellite Routers**.

4.8 Using the iQ Desktop+ Satellite Router

Change the PC's Ethernet cable from the Management port ETH 2 to the Data port ETH 1. The IP address is individually assigned to this port through the remote configuration file. This port serves the user with access to the Internet.

4.9 Commissioning the iQ Desktop+ in DVB-S2 Mode

To commission the iQ Desktop+ in DVB-S2 mode, follow the steps below:

1. Remove the iQ Desktop+ from the box.
2. Upload the software using the Terminal WUI. For information on how to upload the software, see the **Software and Configuration** section in the *Terminal WUI User Guide*.
3. Upload the option files using the Terminal WUI. For information on how to upload the software, see the **Software and Configuration** section in the *Terminal WUI User Guide*.
4. Reboot the remote.
5. Commission the remote using the Terminal WUI. For information on how to commission the remote, see the **Commissioning a Terminal** chapter in the *Terminal WUI User Guide*.
6. Once the commissioning is complete, upload the updated option files (with updated Tx power value) using the Terminal WUI. For information on how to upload the software, see the **Software and Configuration** section in the *Terminal WUI User Guide*.

5 Maintenance

This chapter describes the required maintenance procedures for the correct functioning of the iQ Desktop+ Satellite Router.

This chapter contains the following sections:

5.1 Safety Guidelines to Observe During Servicing

WARNING: Do not attempt to service the router internal assemblies. Opening and removing covers may expose personnel to dangerous voltages or other hazards. There are no user serviceable parts inside.

When an iQ Desktop+ Satellite Router requires service, observe the safety guidelines in this section.

5.1.1 Servicing

Do not attempt to service the iQ Desktop+ Satellite Router internal assembly. Opening and removing covers exposes dangerous voltages and/or other hazards. There are no user serviceable parts inside. Opening the units will void the warranty. Refer all servicing to qualified service personnel.

5.1.2 Conditions Requiring Service

Disconnect the iQ Desktop+ Satellite Router from the power source and refer servicing to qualified service personnel if any of the following conditions occur:

- The power supply cord or plug is damaged
- The iQ Desktop+ Satellite Router does not operate normally when following the operating instructions (adjust only those controls that are covered by the operating instructions)
- The iQ Desktop+ Satellite Router has been dropped or if the chassis has been damaged

- The iQ Desktop+ Satellite Router exhibits a distinct change in performance

5.2 Maintaining the iQ Desktop+ Satellite Router

The iQ Desktop+ Satellite Router requires basic maintenance to keep it running efficiently and to prolong its life.

WARNING: This unit is not serviceable. Return unit to provider for all servicing issues.

ATTENTION: Cette unité n'est pas réparable sur site. Renvoyer au fournisseur pour tout réparation.

5.2.1 Temperature Control

The iQ Desktop+ Satellite Router has a built-in temperature sensor which measures the actual circuit board temperature. If the board temperature exceeds a defined threshold, the iQ Desktop+ Satellite Router shuts down. See Table 2-1 on page 3, for the proper temperature range.

Elevated internal temperature may be caused by:

- Objects blocking the enclosure
- Dust accumulated on the enclosure
- Ambient temperature elevated over the specified limits

5.3 Troubleshooting the iQ Desktop+ Router

Table 5-1 describes the most common iQ Desktop+ Satellite Router troubleshooting events and actions to take. Consult with the iDirect TAC when considering a reset. Reset functions are described in Section D.1, *Level 0 Reset* on page 37.

Table 5-1. Troubleshooting Events and Actions to Take

Event	Action
Router not functioning	Check status LEDs. Compare LEDs to Table 3-1 on page 8.
Router cannot be accessed by the Terminal Web User Interface	Router may have a bad options file, settings, or software package. 1. Power down and restart the router to see if that resolves the issue. 2. Perform a Level 1 reset (Boot into Recovery mode) and manually load the correct options file and a software package that is appropriate; and the user interface will be accessed through the Management port ETH 2 with the default IP address 192.168.0.1. See Appendix D, *iQ Desktop+ Satellite Router Reset* on page 37 for more information on Reset

Table 5-1. Troubleshooting Events and Actions to Take (continued)

Event	Action
Lost or forgot IP address of the Router	1. Visually check the Ethernet port to ensure there is no physical damage. 2. Perform a Level 1 reset (Boot into Recovery mode) so that the iQ Desktop+ Satellite Router Management port ETH 2 will have the default IP address 192.168.0.1. Load new package / options / configuration files with a new IP address, if desired. 3. Reboot with a Level 0 reset, and connect with the current / known IP address. See Appendix D, *iQ Desktop+ Satellite Router Reset* on page 37 for more information on Reset.
iQ Desktop+ is in the Tx IFL over-current mode	The user can perform one of the following: • Remove source of over-current • Power cycle at the 24V power connector. **NOTE:** In this mode, the downstream is not processed by the remote. The remote remains in this state for 5 minutes for the installer to understand that there is a over-current condition detected and the BUC power is off.
iQ Desktop+ is in *listen only* mode	The installer must ensure the over-current condition is removed and the hub operator can send the software, options file or reset commands to the remote, if necessary. **NOTE:** In this mode, the iQ Desktop+ will not enable Tx IFL power until the remote is power cycled.

5.4 Repacking the iQ Desktop+ Satellite Router

If the iQ Desktop+ Satellite Router system is damaged or if the chassis needs to be moved to another location, the unit needs to be repacked in the original shipping boxes.

To repack the system:

1. Disconnect all cables.
2. Place the iQ Desktop+ Satellite Router inside the original foam cutout in the shipping box.
3. Properly seal the box with packing tape.

For warranty service, obtain a Return Material Authorization (RMA) number from the reseller or iDirect prior to shipping. Direct customers of iDirect, may contact the iDirect TAC directly to obtain an RMA number and shipping instructions. Follow the shipping instructions, complete the RMA form, and attach the form to the outside of the shipping box.

Appendix A Tools Needed

Figure A-1 and Table A-1 specify recommended tools and supplies for a typical installation. Additional tools and equipment may be required to install related equipment and cables. Test equipment may be required to check signal, power levels, and communication links.

Figure A-1. Recommended Installation Tools

Table A-1. Recommended Installation Tools and Equipment

Quantity	Tool
1	Number 2 Phillips screwdriver
1	F-type Compression Tool
1	RG-6 Coax Stripper or RG-11 as required
1	Coax / Wire Cutter
Length as Needed	RG-6 or RG-11 solid copper conductor coax outdoor rated cable

Appendix B Cable Preparation

This appendix describes the cable preparation details and has these sections:

B.1 Coax Cable Preparation

NOTE: The procedures in this section, for preparing coaxial cables, are meant to be generic. Cables and connectors should be installed per manufacturer's requirements specific to the brands preferred. In general, specific and detailed instructions are for RG-6 cables and connectors, only.

Use high quality coaxial outdoor cable to connect the iQ Desktop+ Satellite Router to the Outdoor Unit (ODU) equipment. iDirect recommends that a solid copper center conductor, coaxial cable be used with a minimum of 60% + 40% braid and double foil shield to connect the equipment, such as:

NOTE: The cable lengths mentioned below are only guidelines and the actual performance depends on the quality of the coaxial cable used and the installation.

- RG-6 — 0.04 inch (1 mm), outdoor rated, Quad Shielded, solid bare copper center conductor, for cable lengths less than or equal to 170 feet (52 meters)
- RG-11 — 0.064 inch (1.6 mm), outdoor rated, Quad Shielded, solid bare copper center conductor, for cable lengths less than or equal to 260 feet (79 meters)

Before connecting the cables, connectors on each end must be installed.

The center conductor must be straight and extend 1/8 inch (3.2 mm) beyond the end of the F-connector, and the connector should be securely crimped to the cable.

NOTE: iDirect does not recommend using RG-59 with solid bare copper center conductor. RG-6 or RG-11 Quad Shield or other outdoor quality, 75-ohm type of coax can be used.

If different types of coaxial cable are used other than the recommended quad shield RG-6 or RG-11, the following problems can occur:

- **Co-channel Interference** – If signals at the same frequency are carried on long, parallel runs of coaxial cable (for example, in cable trays, or riser) interference can occur between the signals
- Higher quality cable helps to prevent this with better shielding
- Co-channel interference causes degradation and higher packet loss rate
- **Good return loss** – High quality cable and correct connectors help ensure an optimal return loss of 10 dB or more

NOTE: Excessive DC Resistance – will result in excessive voltage drop across the IFL cable. Hence, the voltage at the BUC may be too low to operate properly.

NOTE: Appendix A, *Tools Needed* on page 23 lists all of the recommended tools for terminating coax cables.

To terminate the cables with F-Type connectors:

1. Cut off each end of the coax cable squarely, using the proper cable cutter as shown in Figure B-1.

Figure B-1. Coax Cable Cutting Technique

WARNING: Wear protective eye wear while cutting cables and terminating connectors.

WARNING: The center conductor must be straight and cylindrical without any burrs. Failure to do so can damage the satellite router, BUC, and/or LNB input connector.

2. Remove the jacket material and foam insulation according to the length defined under **Length A** in Table B-1. For RG-6, use a two-step Coax Stripper such as the LC-CST 1257 from Paladin Tools.

Table B-1. Coax Trim Dimensions

	Length A (inch (mm))	**Length B** (inch (mm))	**Length C** (inch (mm))
RG-6	5/8 (15.9)	1/4 (6.4)	3/8 (9.5)
RG-11	13/32 (10.3)	3/32 (2.4)	13/32 (10.3)

3. Remove any foil in the braid as shown in Figure B-2.

Figure B-2. Cutting Technique for Removing Foil in the Braid

4. Fold the braid back over the jacket and trim the braid to the length as defined under **Length C** in Table B-1 on page 27 and Figure B-3.

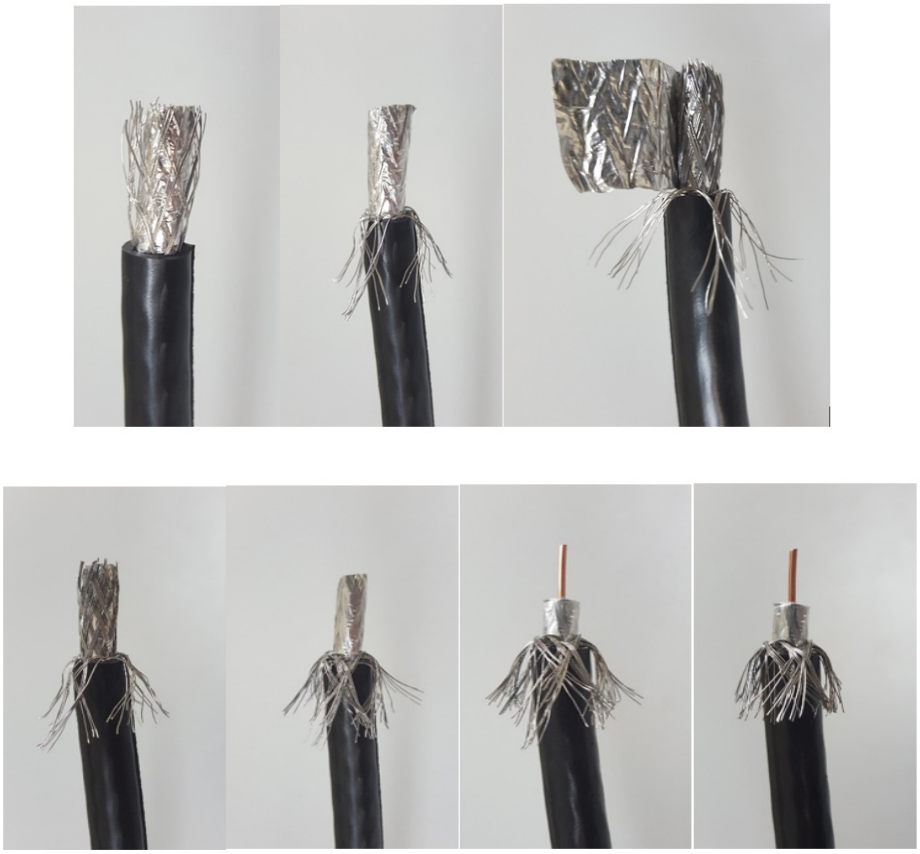


Figure B-3. Procedure to Cut the Quad Shield Cable

5. Flare the inner, outer braids and the outer foil shield only. Do not flare the inner foil shield (last foil around dielectric).
6. (If using a coax stripper, skip this step.) Being careful not to cut into the copper of the center conductor, remove the foil and cut the dielectric to the length shown under **Length B** in Table B-1 on page 27. Remove any dielectric residue.
7. If the conductive foil is burred, then smooth out the burr so that the edge (area where the dielectric material was removed) is smooth and provides a lead-in for the connector mandrel.
8. Install the RG-6 connector compression sleeve, or mandrel, (top left (A) in Figure B-4) over foil and underneath the braid. A good, weatherproof outdoor connector mandrel should have a visible O-Ring (bottom right (B) Figure B-4).

NOTE: The white colored inner dielectric insulation should be flush with the inner rear surface of the connector. Refer to the picture on the right (C) in Figure B-4 for an RG-6/RG-11 termination.

NOTE: Since the RG-11 connector has a built-in center pin, ensure that the coax center pin makes contact to the internal seizing pin of the connector. Refer to Figure B-4.

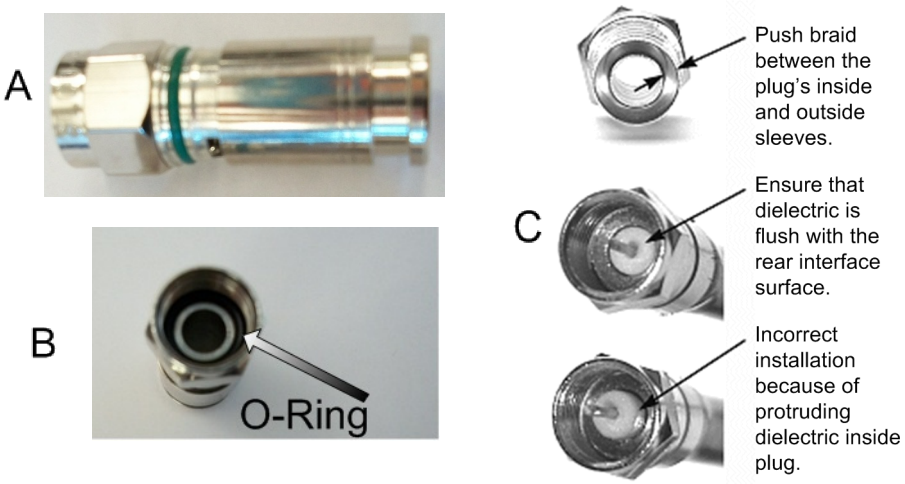


Figure B-4. Attaching the Compression fitting F-type Connector

9. Finish connecting the cable to the connector with the compression tool connector, such as Holland Compression Tool 1855 as shown in Figure B-5.

Figure B-5. Compression fitting F-Type Weatherproof Plug and Tool

10. Inspect and ensure that the copper center conductor only protrudes 1/8 inch (3.2 mm) nominally beyond the rim of the F-connector. Trim if necessary.

CAUTION: The center conductor length must be a minimum of 1/16 inch (1.6 mm) to a maximum of 1/8 inch (3.2 mm) protrusion beyond the rim of the F type connector. It must be straight and cylindrical without any burrs at the end. Failure to follow this technique could result in damage to the satellite router, BUC, LNB connector and/or possible intermittent service.

B.2 Ethernet Port Pinouts

The iQ Desktop+ Satellite Router is capable of Universal Cable Recognition or auto-MIDX (auto-sensing) and will connect to a PC with the straight through Ethernet cable for using the user interface.

ETH 2 port is the recommended port to connect the Ethernet cable to the Ethernet port on the PC running the user interface.

Either crossover or straight through cables may be used with the iQ Desktop+ Satellite Router. It is not necessary for the PC to auto-sense. Details of the iQ Desktop+ Satellite Router LAN/Ethernet port pinouts are described in Section B.2.1 and Section B.2.2 defines straight through and crossover cables.

B.2.1 Ethernet Port Pinouts

Table B-2 lists the pinouts for the Ethernet ports (labeled **ETH-1, ETH-2)** of the iQ Desktop+ Satellite Router and the pinout order is shown in Figure B-6.

Table B-2. Ethernet Port Pinouts

RJ-45 Pin	Description
1	MDI0+
2	MDI0-
3	MDI1+
4	MDI2+
5	MDI2-
6	MDI1-
7	MDI3+
8	MDI3-

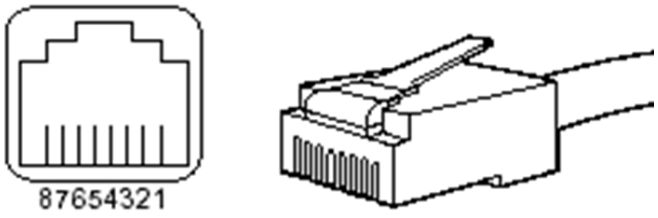


Figure B-6. RJ-45 Cable Connectors: Receptacle and Plug

The iQ Desktop+ Satellite Router supports 1 Gbps Ethernet IEEE802.3ab; 100 Mbps IEEE802.3u; and 10 Mbps Ethernet 802.3i.

B.2.2 Straight Through and Crossover RJ-45 Cables

To confirm the RJ-45 cable type, hold the cable ends as depicted in Figure B-7. The sequence of the colored wires should be as follows:

- Straight through — The colored wires are in the same sequence at both ends of the cable
- Crossover — The first (far left) colored wire at one end of the cable is the third colored wire at the other end of the cable, and the second colored wire at one end of the cable is the sixth colored wire at the end of the cable

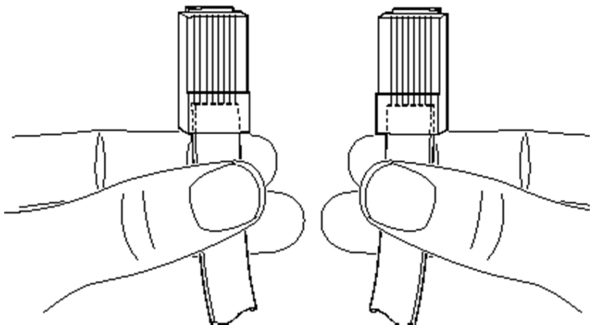


Figure B-7. Holding the RJ-45 Cable Connectors

Appendix C DC Power Supply Installation

This appendix describes the installation of the DC power supply wiring for the iQ Desktop+, Option 2.

A summary of the parts are listed in Table C-1. Follow the at a glance instructions in Figure C-1and for detailed instructions in Table C-2.

CAUTION: If negative voltages are used such as Telecom -48VDC, the negative most voltage is always connected to –ve terminal (in the Telecom case this would be -48V) and the positive most voltage is always connected to the +ve terminal (in the Telecom case this would be 0VR). The Chassis can be referenced to +ve, -ve or left floating (i.e. not connected to either +ve or –ve) as required because the power module is fully isolated input to chassis.

Table C-1. iQ Desktop+ DC Power Module Connector Parts

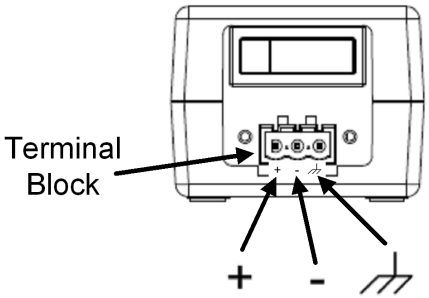
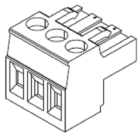
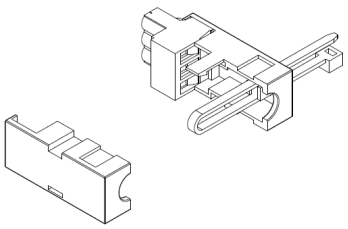
Name	Description	Diagram or Reference
DC Terminal block	Rear panel, DC terminal block area	
3 DC input wires	Appropriately labeled wires, such as: • red = positive + • black = negative - • blue = ground -	14-18 AWG (American Wire Gauge) Reference: http://en.wikipedia.org/wiki/American_wire_gauge

Table C-1. iQ Desktop+ DC Power Module Connector Parts

Name	Description	Diagram or Reference
Terminal block plug	Included in kit, P/N Phoenix 1754465	
Cable Entry Housing Strain Relief and Cable Tie	Cable Entry Housing Strain Relief and Cable Tie, included in kit, P/N 1803947, and cable tie	

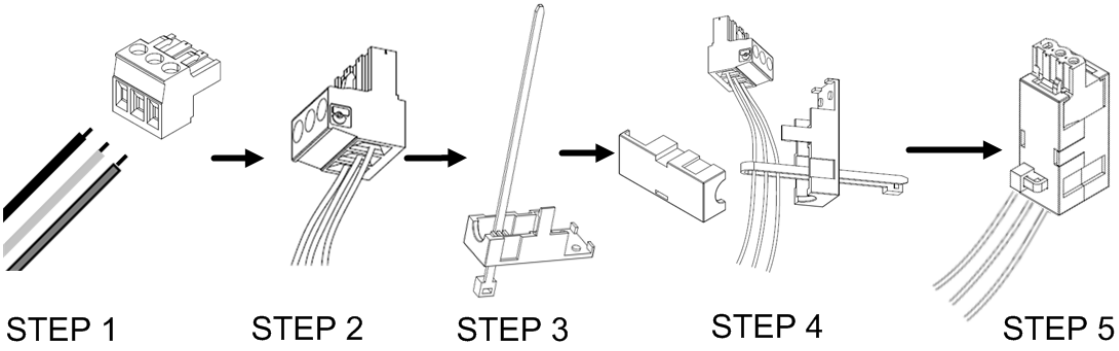


Figure C-1. DC-DC Power Supply Assembly at a Glance

Table C-2. Power Module Power Cable Installation Instructions Detail

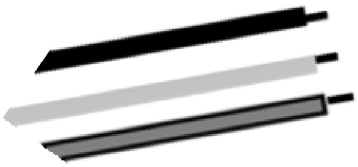
Step	Instructions	Diagram
1.	Strip approximately 1/4 inch of insulation from the ends of three appropriately sized (14-18 AWG) DC input wires.	

Table C-2. Power Module Power Cable Installation Instructions Detail

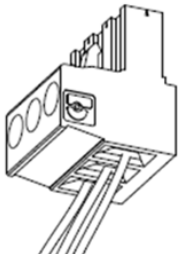
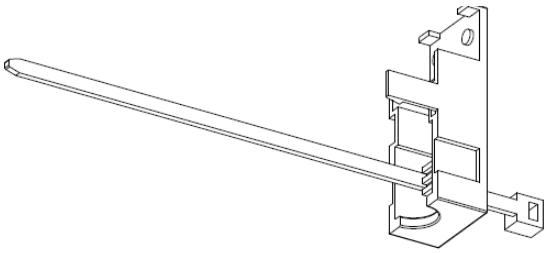
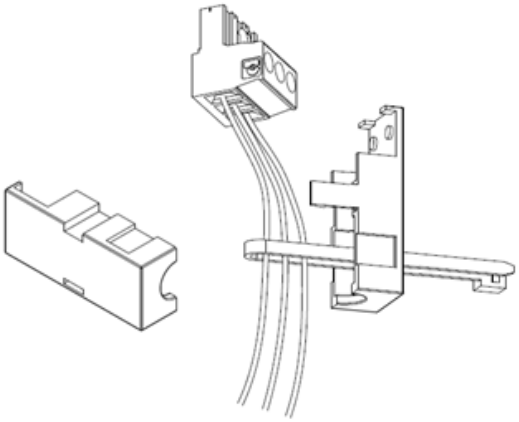
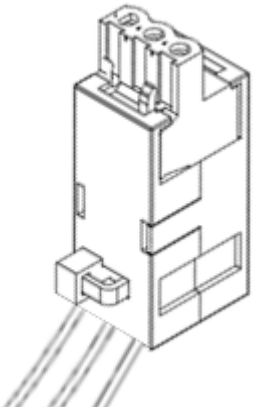
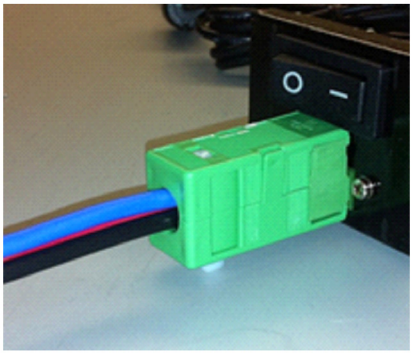
Step	Instructions	Diagram
2.	Loosen the three screws on the terminal block plug . Insert DC (-), DC (+), and ground wires into the corresponding terminals of the DC terminal block plug. Fasten securely. Do not over-tighten.	
3.	Insert the cable tie through one of the holes in the right half of the strain relief clip.	
4.	1. Wrap the cable tie around the wires, and tighten. 2. Insert the “three screw end” of the terminal block plug into the half of the strain relief clip. Be sure the two end screw holes fit securely into the two small protruding screw holders.	
5.	Clip the other half of the strain relief clip around the cable entry housing and tighten the cable tie.	

Table C-2. Power Module Power Cable Installation Instructions Detail

Step	Instructions	Diagram
6.	Insert the finished terminal block plug, with the cable entry housing, into the terminal block header in the power supply.	

Appendix D iQ Desktop+ Satellite Router Reset

The iQ Desktop+ Satellite Router has two types of reset functions: Level 0, and Level 1. Each type has a different effect on the router. Contact the iDirect TAC center for more information.

NOTE: Refer to the *Terminal WUI User Guide* for more information. It is good practice to clear browser history, and turn off Web page caching, before accessing the user interface.

D.1 Level 0 Reset

Level 0 reset provides a basic reset function with the following features:

- Initiated by:
  - Router powering up
  - Briefly pressing the reset button for 10 seconds or less. See Section 3.3, *iQ Desktop+ Satellite Router Rear Panel Description* on page 10 for the reset button location
  - In the user interface, select the Administration > Software and Configuration > Reboot Terminal
- Used to boot to a newly-loaded software image and configuration
- Recovery: initiate a Level 0 reset

D.2 Level 1 Reset

Level 1 reset provides a means of returning the router to factory default settings.

NOTE: This reset must not be used unless there is an intent to reconfigure or reload the software and options. There is no recovery once this reset occurs. New options file, software, and configuration must be loaded using the Terminal WUI once this reset has been initiated.

Level 1 reset features:

- Initiated by: Pressing the reset button and keeping it pressed for more than 10 seconds, see Section 3.3, *iQ Desktop+ Satellite Router Rear Panel Description* on page 10 for the reset button location

- Intended for recovery of modem, only, and new options file, configuration, and software must be loaded
- Router boots with factory default image (default options file, software, and passwords), access to Terminal WUI is available at the Management port ETH 2 at 192.168.0.1
- Recovery: none - reload software, options file, configuration

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