

# Installation, Support, and Maintenance Guide

iQ LTE Satellite Router

**Router Products**

Evolution

November 20, 2019



---

---

Copyright © 2019. ST Engineering iDirect, Inc. dba iDirect, 13861 Sunrise Valley Drive, Suite 300, Herndon, VA 20171, USA.

All rights reserved. Reproduction in whole or in part without permission is prohibited. Information contained herein is subject to change without notice. The specifications and information regarding the products in this document are subject to change without notice. All statements, information and recommendations in this document are believed to be accurate, but are presented without warranty of any kind, express, or implied. Users must take full responsibility for their application of any products. Trademarks, brand names and products mentioned in this document are the property of their respective owners. All such references are used strictly in an editorial fashion with no intent to convey any affiliation with the name or the product's rightful owner.



ST Engineering iDirect, Inc. dba iDirect, a Delaware corporation and subsidiary of ST Engineering North America, with its headquarters in Herndon, Virginia, is a global leader in satellite communications providing technology and solutions that enable our partners worldwide to optimize their networks, differentiate their services and profitably expand their businesses. For more than 20 years, ST Engineering iDirect has focused on meeting the economic and technology challenges across the satellite industry. Today, the product portfolio, branded under the name iDirect, sets new standards in performance and efficiency, making it possible to deliver voice, video and data connectivity anywhere in the world. ST Engineering iDirect is the world's largest TDMA enterprise VSAT manufacturer and is the leader in key industries including mobility and military/government. In 2007, iDirect Government was formed to better serve the U.S. government and defense communities. For more information please visit [www.idirect.net](http://www.idirect.net).

Company Web site: [www.idirect.net](http://www.idirect.net) - Main Phone: 703.648.8000

TAC Contact Information: Phone: 703.648.8151 - Email: [tac@idirect.net](mailto:tac@idirect.net) - Web site: [tac.idirect.net](http://tac.idirect.net)



**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.

Company Web site: [www.idirectgov.com](http://www.idirectgov.com) - Main Phone: 703.648.8118

TAC Contact Information: Phone: 703.648.8111 - Email: [tac@idirectgov.com](mailto:tac@idirectgov.com) - Web site: [tac.idirectgov.com](http://tac.idirectgov.com)

Document Name: ISM\_iQLTE\_T0001047\_RevA\_11\_20\_19

---

---

# Revision History

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

Revision	Date	Updates
A	November 20, 2018	Initial release of the document.



---

---

# Contents

<b>About</b>	<b>xi</b>
Intended Audience	xi
Manual Contents	xi
Document Set	xiii
Related Training Services	xiii
Getting Help	xiii
Warranty, RoHS, WEEE, Declaration of Conformity	xiv
<b>1 Introduction</b>	<b>1</b>
1.1 iQ LTE Series Common Features	1
1.2 iQ LTE Series Models	2
1.3 Power Supply Options	3
<b>2 Specifications</b>	<b>5</b>
2.1 Mechanical and Environmental Specifications	5
2.2 Power Specifications	6
2.3 iQ LTE Series Common VSAT Specifications	7
2.3.1 Satellite Module	7
2.3.2 LTE Module Specifications	8
<b>3 Interfaces</b>	<b>11</b>
3.1 iQ LTE Satellite Router Front LEDs	11
3.2 iQ LTE Satellite Router Front Panel LED Status Descriptions	12
3.3 iQ LTE Satellite Router Rear Panel Descriptions	15

<b>4 Installation</b>	<b>17</b>
4.1 Installation Steps at a Glance	17
4.1.1 Pre-Installation Guidelines	17
4.1.2 Installation Checklist	18
4.2 Tools and Supplies Required for Installation	19
4.3 Unpacking iDirect Equipment	19
4.4 Components Typically Included in an Order	20
4.5 Mounting the iQ LTE Satellite Router	20
4.5.1 Installing With an AC Power Supply (Option 1)	22
4.5.2 Installing With a 36-76 VDC Power Supply (Option 2)	23
4.5.3 Installing the SIM Card(s)	23
4.6 Preparing the PC for Connection to the iQ LTE Satellite Router	25
4.7 Configuring the iQ LTE Satellite Router	25
4.8 Connecting a Cradlepoint LTE Device to the Network	25
4.8.1 Connecting a Cradlepoint LTE Device to a Local Network	25
4.9 Loading iDirect SDK File to Cradlepoint Device	27
<b>5 Maintenance</b>	<b>29</b>
5.1 Safety Guidelines to Observe During Servicing	29
5.1.1 Servicing	29
5.1.2 Conditions Requiring Service	29
5.2 Maintaining the iQ LTE Satellite Router	30
5.2.1 Temperature Control	30
5.2.2 90 day maintenance	30
5.3 Troubleshooting the iQ LTE Satellite Router Rackmount Router	31
5.4 Removing and Replacing the Power Module	32
5.5 Repacking the iQ LTE Satellite Router	32
<b>Appendix A Acronyms and Abbreviations</b>	<b>33</b>
<b>Appendix B Tools Needed</b>	<b>37</b>
<b>Appendix C Cable Preparation</b>	<b>39</b>
C.1 Coax Cable Preparation	39
C.2 Ethernet Port Pinouts	43

---

---

C.2.1 Ethernet Port Pinouts . . . . .	43
C.2.2 Straight Through and Crossover RJ-45 Cables . . . . .	44
C.3 Console Port Connection . . . . .	45
<b>Appendix D DC Power Supply Installation . . . . .</b>	<b>47</b>
<b>Appendix E iQ LTE Satellite Router Reset . . . . .</b>	<b>51</b>
E.1 Level 0 Reset . . . . .	51
E.2 Level 1 Reset . . . . .	51
<b>Appendix F Cradlepoint IBR900 and NetCloud Manager References . .</b>	<b>53</b>

---

---

## Figures

Figure 1-1. iQ LTE Router . . . . .	1
Figure 3-1. iQ LTE Satellite Router Front Panel LED Display . . . . .	11
Figure 3-2. iQ LTE Satellite Router Rear Panel Description. . . . .	15
Figure 4-1. SIM Card Module. . . . .	23
Figure 4-2. SIM Card Access Panel with L-Bracket . . . . .	24
Figure B-1. Recommended Installation Tools. . . . .	37
Figure C-1. Coax Cable Cutting Technique . . . . .	40
Figure C-2. Cutting Technique for Removing Foil in the Braid. . . . .	41
Figure C-3. Procedure to Cut the Quad Shield Cable. . . . .	41
Figure C-4. Attaching the Compression fitting F-type Connector. . . . .	42
Figure C-5. Compression fitting F-Type Weatherproof Plug and Tool . . . . .	43
Figure C-6. RJ-45 Cable Connectors: Receptacle and Plug . . . . .	44
Figure C-7. Holding the RJ-45 Cable Connectors . . . . .	44
Figure C-8. RJ-45 to DB-9 Female DTE Adapter . . . . .	46
Figure D-1. DC-DC Power Supply Assembly at a Glance . . . . .	48

---

---

## Tables

Table 1-1. Power Supply Configurations .....	3
Table 2-1. Mechanical and Environmental Specifications.....	5
Table 2-2. Power Specifications .....	6
Table 2-3. Satellite Module RF Specifications .....	7
Table 2-4. LTE Module RF Specifications .....	8
Table 3-1. iQ LTE Satellite Router Front Panel Descriptions .....	12
Table 3-2. iQ LTE Satellite Router Front Panel LED Descriptions .....	12
Table 3-3. iQ LTE Satellite Router Rear Panel Descriptions .....	15
Table 5-1. Troubleshooting Events and Actions to Take .....	31
Table 5-2. Removing and/or Replacing the Power Module .....	32
Table B-1. Recommended Installation Tools and Equipment.....	37
Table C-1. Coax Trim Dimensions.....	40
Table C-2. Ethernet Port Pinouts .....	43
Table C-3. RJ-45 to DB-9 Pinouts .....	45
Table D-1. X7 Router DC Power Module Connector Parts .....	47
Table D-2. Power Module Power Cable Installation Instructions Detail.....	48



---

---

# About

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

This chapter contains the following sections:

- [Intended Audience](#)
- [Manual Contents](#)
- [Document Set](#)
- [Related Training Services](#)
- [Getting Help](#)
- [Warranty, RoHS, WEEE, Declaration of Conformity](#)

## 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 LTE 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 LTE Satellite Router.
- [Chapter 2, Specifications on page 5](#) describes the mechanical, environmental and RF specifications of the iQ LTE Satellite Router.
- [Chapter 3, Interfaces on page 11](#) provides connector descriptions of the iQ LTE Satellite Router.
- [Chapter 4, Installation on page 17](#) describes procedures for installing the iQ LTE Satellite Router.

- [Chapter 5, Maintenance on page 29](#) describes maintenance procedures for the iQ LTE 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 xiii](#) for TAC access information.

- *iDX iBuilder User Guide*
- *iDX iMonitor User Guide*
- *Web iSite 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*

## 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](mailto:tac@idirect.net)

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

- Telephone: (703) 648.8111
- Email: [tac@idirectgov.com](mailto: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](mailto:techpubs@idirect.net)
- iDirect Government: [techpubs@idirectgov.com](mailto: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](mailto:sales@idirect.net)

## Warranty, RoHS, WEEE, Declaration of Conformity

Complete iDirect hardware product statements for the iQ LTE 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 LTE Series combines iDirect's next-generation DVB-S2/S2X satellite connectivity with 4G-LTE creating a converged solution able to deliver reliable and persistent communications across a wide range of use cases. Featuring an integrated Cradlepoint LTE cellular router, the solution offers fully automated VSAT/LTE failover and failback, WAN link affinity steering, advanced VPN connectivity, and SD-WAN configuration options for robust enterprise grade communications.

This chapter contains the following sections:

- [Section 1.1, iQ LTE Series Common Features on page 1](#)
- [Section 1.3, Power Supply Options on page 3](#)

This manual explains how to safely install and maintain the iQ LTE Router. The iQ LTE Satellite Router is shown in [Figure 1-1](#).



Figure 1-1. iQ LTE Router

## 1.1 iQ LTE Series Common Features

The iQ LTE Satellite Router Series supports the following features:

- Single DVB-S2X (>100 Msps) demodulator
- Single A-TDMA (15 Msps) modulator
- Dual Image support
- OpenAMIP Mobility Support
- AES Encryption
- One Gig-E LAN Port dedicated for user traffic (subject to hybrid path management)
- One Gig-E LAN Port dedicated for dedicated SAT-only applications and management
- Console port for NMEA GPS input
- Web GUI / Web Services support

## 1.2 iQ LTE Series Models

The iQ LTE Satellite Router series consists of three different models.

### iQ LTE



**NOTE:** The iQ LTE Satellite Router is not currently available and will be released pending regional certification. Updates on availability will be provided by iDirect Product Management.

The iQ LTE Satellite Router is an entry-tier LTE throughput model that is ideal for financial service markets or for restricted WIFI use-cases.

The iQ LTE Satellite Router is pre-installed with Cradlepoint IBR-650C module

- CAT-4 LTE Device
- Regional LTE module solution based on existing certification of 600 Series units

### iQ LTE+



**NOTE:** The iQ LTE+ is available in regions where the embedded IBR900-600M is certified. Check <https://cradlepoint.com/product-certifications> for the latest status.

The iQ LTE+ Satellite Router is a mid-tier LTE throughput model that is suitable for mid-market solution for Mobility markets such as:

- Maritime (OSV/Pleasure)
- Enterprise, Government, Oil/Gas
- Land Mobility Commercial Fleet

The iQ LTE+ Satellite Router is pre-installed with Cradlepoint IBR-900-600M module

- CAT 11 Worldwide LTE Radio/Dual-SIM
- WIFI On-Board
- External GPS Input

### iQ LTE Pro



**NOTE:** The iQ LTE Pro is available in regions where the embedded IBR900-1200M and IBR900-1200M-B are certified. Check <https://cradlepoint.com/product-certifications> for the latest status.

The iQ LTE Pro Satellite Router is the highest tier LTE throughput model in the iQ LTE series that provides a top-tier solution for First Responder or higher throughput requirements using Gigabit LTE-Advanced Pro with Band 14 support.

The iQ LTE Pro Satellite Router is pre-installed with Cradlepoint IBR-900-1200M or IBR90 1200M-B modules.

- AT&T FirstNet Ready™/Verizon
- CAT 18 Worldwide LTE Radio/Dual-SIM
- WIFI On-Board
- External GPS input

## 1.3 Power Supply Options



**NOTE:** The iQ LTE Router can be ordered in any of the two configurations specified in [Table 1-1](#). The Power Supply Unit (PSU) is a Field Replaceable Unit (FRU) and can be swapped with the same PSU version (AC with AC and DC with DC) in the field.

The iQ LTE Router is available with the power supply configurations in the table below.

**Table 1-1. Power Supply Configurations**

Power Supply Option	Description
100-240V AC +24V Power Supply (Standard)	This AC power module for the iQ LTE Router is standard with a single +24V power support for the BUC.
36-76V DC +24 V Power Supply <b>NOTE:</b> DC power supply is not currently available. It will be available for future support.	This DC power module for the iQ LTE Router comes with a +24V power support for a +24V BUC.



---

---

# 2 Specifications

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

- [Section 2.1, Mechanical and Environmental Specifications on page 5](#)
- [Section 2.2, Power Specifications on page 6](#)
- [Section 2.3, iQ LTE Series Common VSAT Specifications on page 7](#)

## 2.1 Mechanical and Environmental Specifications

The installation site must be able to accommodate the iQ LTE Satellite Router mechanical and environmental specifications listed in [Table 2-1](#).

**Table 2-1. Mechanical and Environmental Specifications**

Category	Description
Dimensions	W 44.5 cm (17.5 in) x D 32 cm (12.6 in) x H 4.45 cm (1.75 in)
Weight	5.4 kg (11.9 lbs)
Heat Dissipation	17 W average
Airflow	Front Panel Fan Assist (2 fans), Power Supply (1 fan), Rear Exhaust, No Filter
Ambient Temperature	
Operational	+32°F to +140°F (0°C to +60°C)
Storage	-40°F to +185°F (-40°C to +85°C)
Temperature Gradient	1.0 C per minute
Relative Humidity	
Operational	≤ 93%, non-condensing
Storage	5% to 93% condensing
Shock	
Operational	≤ 10 G
Survival	≤ 18 G
Vibration	
Operational	ETSI 300 019-2-6 Class 6.1, 5-200Hz

## 2.2 Power Specifications

The iQ LTE Satellite Router power specifications are listed in [Table 2-2](#).



**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). Chassis can be referenced to +ve, -ve or left floating (i.e., not connected to either +ve or -ve) as required as the power module is fully isolated input to the chassis.

**Table 2-2. Power Specifications**

Category	Description
Input Voltage Range	Option 1: 100-240 VAC, Auto-Ranging Option 2: 36-76 VDC
Frequency	Options 1: 50-60 Hz, Auto-Ranging
Remote Power Consumption	150 W (with 4 A BUC and 0.5 A LNB) MAX
AC PSU Current Rating	Option 1: 2.7 A, 270 W (Power Supply capability)
DC PSU Current Rating	Option 2: 8.3 A, 310 W (Power Supply capability)
DC Power @ TX Output Connector	+24 V @ 4.0 A (Max)
DC Power @ RX Input Connector	13, 18, 21 VDC @ 500mA (Max)
Protection	Over-Voltage Protection for LNB and BUC DC Over-Current Limiting for LNB and BUC DC Options 1: Primary AC fuse within PS module (250 VAC, T6.3 A) Option 2: Primary DC fuse within PS module (250 VDC, 16 A)
AC Power Cord	Supplied, per country of use
DC Input Connector	Self-capturing terminal block, 14-18 AWG
Efficiency of the Power Supply	87% (MIN)

## 2.3 iQ LTE Series Common VSAT Specifications

The iQ LTE Satellite Router Series common VSAT specifications are listed in this section.

### 2.3.1 Satellite Module

Table 2-3. Satellite Module RF Specifications

Category	Description										
LNB Support	22 kHz tone for High / Low Band										
IF Interface, Impedance	Type "F", $Z_0 = 75 \Omega$										
Frequency Range	Transmit 950 - 2150 MHz Receive 950 - 2150 MHz										
Tuning Step Size	Transmit 10 Hz Receive 55 KHz										
RF Power	Transmit Pmax of +0 dBm to Pmin of -35 dBm Receive, Maximum Max composite wide band receive level: a) -5 dBm for symbol rates. 45 Msps b) 10 dB above wanted signal power level for symbol rates > 45 Msps Receive, Minimum Minimum Receive Level: $-115+10*\log(F_{sym}(sps))$ single carrier Receive adjust-ability- AGC Dynamic Range adjustment										
Tx SSB Phase Noise	<table border="1"> <thead> <tr> <th>Frequency</th> <th>Phase Noise</th> </tr> </thead> <tbody> <tr> <td>1 KHz</td> <td>-75 dBc/Hz</td> </tr> <tr> <td>10 KHz</td> <td>-85 dBc/Hz</td> </tr> <tr> <td>100 KHz</td> <td>-95 dBc/Hz</td> </tr> <tr> <td>1 MHz</td> <td>-105 dBc/Hz</td> </tr> </tbody> </table>	Frequency	Phase Noise	1 KHz	-75 dBc/Hz	10 KHz	-85 dBc/Hz	100 KHz	-95 dBc/Hz	1 MHz	-105 dBc/Hz
Frequency	Phase Noise										
1 KHz	-75 dBc/Hz										
10 KHz	-85 dBc/Hz										
100 KHz	-95 dBc/Hz										
1 MHz	-105 dBc/Hz										
Receiver Noise Figure	15 dB										
Transmit Carrier Suppression	$\leq -35$ dBc										
Discrete Spurs and Harmonic Content	In-band (900-2150 MHz), with output at -30 dBm: -35 dBc										
Transmitter Muting	50 dB (min) between carrier on and off states within 0.1 us at the same attenuation state										

## 2.3.2 LTE Module Specifications

Table 2-4. LTE Module RF Specifications

Category	Description
LTE Module based on iQ LTE variants	<p><b>iQ LTE</b> Specific IBR-650C capabilities TBA based on regional certification.</p> <p><b>iQ LTE+</b> COR IBR900-600M: LTE Advanced 600 Mbps LTE/HSPA+ (SIM-based, Auto-carrier Selection for all North American, European, and Asia Pacific carriers; includes support for 700 MHz Band 28 in Asia Pacific)</p> <p><b>iQ LTE PRO</b> COR IBR900-1200M or IBR900-1200M-B: LTE Advanced Pro, 1 Gbps LTE/HSPA+ (SIM-based, Auto-carrier Selection for North American) - FirstNet Ready; includes support for Band 14</p>
WAN	<p>Dual-modem capable</p> <p>Failover/Failback</p> <p>Load Balancing</p> <p>WAN/LAN Affinity and Traffic Steering</p> <p>Two LAN/WAN switchable 10/100/1000 Gigabit Ethernet ports - one default WAN (cable/DSL/T1/satellite/Metro Ethernet)</p> <p>WiFi as WAN with WPA2 Enterprise Authentication, Metro WiFi; 2X2 MIMO “N” 2.4 GHz or 5 GHz; 802.11 a/b/g/n/ac wave 2 *</p>
LAN	<p>Dual-band, dual-concurrent WiFi; 802.11 a/b/g/n/ac wave 2 *</p> <p>Serial console support for Out-of-Band Management of a connected device</p>
Management	<p>Cradlepoint NetCloud Manager</p> <p>Web UI, API, CLI</p> <p>Active GPS support *</p>
VPN & Routing	<p>IPsec Tunnel - up to ten concurrent sessions</p> <p>GRE Tunnel</p> <p>OSPF/BGP/RIP</p> <p>Route Filters (Access Control Lists, Prefix Filters, Route Maps, Communities for BGP)</p> <p>Per-Interface Routing</p> <p>Policy-based Routing</p> <p>NEMO/DMNR *</p> <p>VRRP</p>

Table 2-4. LTE Module RF Specifications (continued)

Category	Description
Security	<ul style="list-style-type: none"> <li>RADIUS and TACACS+ support</li> <li>802.1x authentication for Ethernet</li> <li>Zscaler integration</li> <li>Certificate support</li> <li>MAC Address Filtering</li> <li>IP, basic content and website Filtering</li> <li>Zone-Based Object Firewall with host address (IP or FQDN), port, and MAC address</li> </ul>
<p>* Available only for iQ LTE+ with IBR900-600M and iQ LTE PRO with IBR900-1200M.</p>	



**NOTE:** Complete features and specifications, including specific carrier bands, are available online at [Cradlepoint.com](http://Cradlepoint.com). Cradlepoint holds the sole responsibility and may change the specifications without notice



**NOTE:** The Cradlepoint router is ordered with a license that enables all the features and the NetCloud capabilities. There are three license options for 1, 3, or 5 years. Users will be notified when their licenses are expiring and up for renewal.



---

---

# 3 Interfaces

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

- [Section 3.1, iQ LTE Satellite Router Front LEDs on page 11](#)
- [Section 3.2, iQ LTE Satellite Router Front Panel LED Status Descriptions on page 12](#)
- [Section 3.3, iQ LTE Satellite Router Rear Panel Descriptions on page 15](#)

## 3.1 iQ LTE Satellite Router Front LEDs

The iQ LTE Satellite Router front panel is shown in [Figure 3-1](#) and defined in [Table 3-1](#).

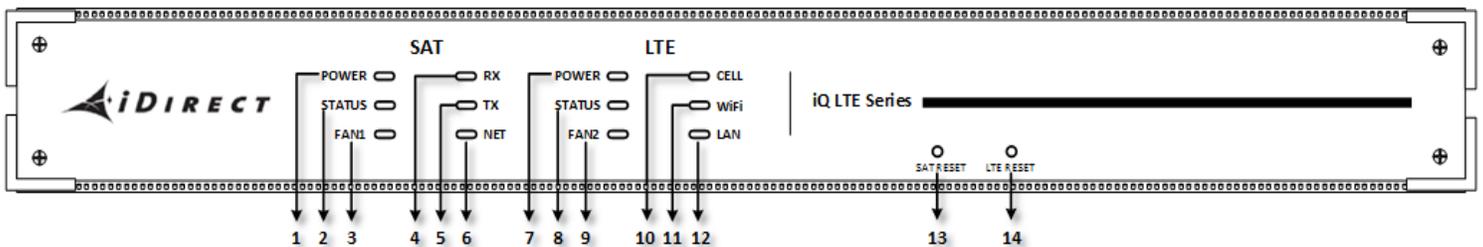


Figure 3-1. iQ LTE Satellite Router Front Panel LED Display



**NOTE:** The descriptions of the LEDs may vary between software releases. Check the release-specific *Terminal WUI User Guide and Release Notes* for details.

**Table 3-1. iQ LTE Satellite Router Front Panel Descriptions**

Callout - Label	Description
1 - POWER (SAT)	Indicates power supply status and any power-related problems for the satellite module
2 - STATUS (SAT)	Indicates basic operational state and problems with the satellite module
3 - FAN1	Provides fan status for the primary fan
4 - RX (SAT)	Indicates the state of the satellite module receiver
5 - TX (SAT)	Indicates the state of the satellite module transmitter
6 - NET (SAT)	Indicates the state of the satellite network connection
7 - POWER (LTE)	Indicates power supply status and any power-related problems for the LTE module
8 - STATUS (LTE)	Indicates operational state and status with the LTE module GPS Lock and SIM installation
9 - FAN2	Provides fan status for the secondary fan
10 - CELL (LTE)	Indicates signal strength of the cellular network
11 - WiFi (LTE)	Indicates configuration mode (AP or WAN) status and activity of the WIFI connection
12 - LAN (LTE)	Indicates status of the LTE connection
13 - SAT RESET	Reset button for the satellite module
14 - LTE RESET	Reset button for the LTE module

## 3.2 iQ LTE Satellite Router Front Panel LED Status Descriptions

Descriptions for states of LEDs may vary between software releases.

Check the release- specific *Terminal WUI User Guide and Release Notes* for details. [Figure 3-1 on page 11](#) shows the front panel and [Table 3-2](#) describes the front panel LED color and status information:

**Table 3-2. iQ LTE Satellite Router Front Panel LED Descriptions**

Label	Signal Color/Type	Definition
FAN1/FAN2		Indicates the fan status
	Solid Green	Indicates the correct operation of the fan
	Red	Indicates either the fan and/or temperature is at-fault
POWER (SAT)		Indicates satellite module power status and any power-related problems
	Off	No or low power input to the satellite module
	Solid Green	The satellite module power is on

Table 3-2. iQ LTE Satellite Router Front Panel LED Descriptions (continued)

Label	Signal Color/Type	Definition
STATUS (SAT)		Boot Sequence and Overall Status of the Satellite Module
	1/2 second flashing Green	Satellite module is initializing
	Solid Green	Initialization complete
RX (SAT)		Provides satellite module downstream 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
	Solid Green	Downstream carrier configured, demodulator and NCR locked to downstream carrier
TX (SAT)		Provides satellite module upstream status
	Solid Amber	Transmitter is disabled
	1 second flashing Amber	Transmitter acquiring upstream connection
	Solid Green	Transmitter upstream connection acquired
NET (SAT)		Satellite Network Status: Indicates the state of the satellite network connection
	1 second flashing Green	Network acquisition in progress
	Solid Green	Network acquired
POWER (LTE)		Indicates LTE module power status and any power-related problems
	On, steady	LTE module is receiving power
	Off	LTE module is not receiving power
STATUS (System Status)	Solid	GPS locked (for units iQ LTE+/Pro) SIM installed and system healthy (for iQ LTE)
	Blinking	LTE Module Boot Sequence and Overall Status
	Blinking fast (continuously)	8 times a second - indicates CPU temperature above 90°C
	Blinking slow (with pause in between)	1 blink per second with 0.8 second pause. Indicates NO GPS LOCK.
	Blinking slow (with pause in between)	3 blinks a second with 0.8 second pause. Indicates BOTH SIM cards are not installed.
WiFi (LTE)		Indicates WIFI Configuration and Activity
	On, steady	WiFi radio is enabled and in AP mode or WIFI-as-WAN currently linked
	Off	WiFi radio is disabled or no link in WIFI-as-WAN mode

**Table 3-2. iQ LTE Satellite Router Front Panel LED Descriptions (continued)**

<b>Label</b>	<b>Signal Color/Type</b>	<b>Definition</b>
<b>CELL (LTE)</b>		Indicates strength of the cellular network
	On, steady	Highest signal strength (4th bar)
	Flashing follow by a pause	Indicates the signal strength level (1, 2, 3). Flashing rate of 1, 2 or 3 times per second and pause for a minimum of 0.8 seconds
	Off	No signal detected
<b>LAN (LTE)</b>		WAN Cellular Network Status: Indicates the state of the WAN Cellular network connection
	On, steady	Cellular is connected and no activity over WAN
	Flashing	Cellular is connected with activity over WAN
	Off	Cellular is not connected or disabled

### 3.3 iQ LTE Satellite Router Rear Panel Descriptions

The iQ LTE Satellite Router rear panel is displayed in [Figure 3-2](#) and defined in [Table 3-3](#) on [page 15](#).

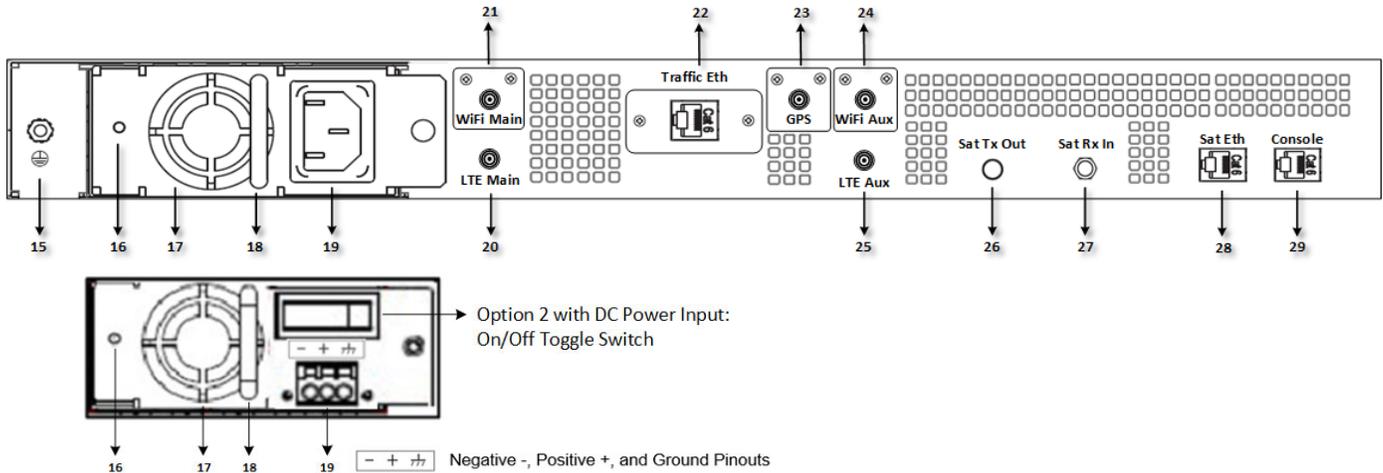


Figure 3-2. iQ LTE Satellite Router Rear Panel Description

Table 3-3. iQ LTE Satellite Router Rear Panel Descriptions

Callout	Label	Interface Definition and Connector Type
15		Grounding stud, #6-32tpi
16	no label	Power Supply Module LED OFF - No valid output Green - Valid DC output
17	no label	Fan
18	no label	Power supply extraction handle
19	no label	Terminal Block Header Option 1: AC input connector IEC-320-C13 Option 2: DC input terminals - Negative, Positive, and Ground; 14-16 AWG
20	LTE Main	SMA connector
21	WiFi Main	R-SMA connector <b>NOTE:</b> This interface only presents on the iQ LTE+ and iQ LTE PRO models.
22	Traffic Eth	Ethernet port - RJ-45, 10/100/1000 port, 802.1q VLAN
23	GPS	SMA connector

Table 3-3. iQ LTE Satellite Router Rear Panel Descriptions (continued)

Callout	Label	Interface Definition and Connector Type
24	WiFi Aux	R-SMA connector <b>NOTE:</b> This interface only presents on the iQ LTE+ and iQ LTE PRO models.
25	LTE Aux	SMA connector <b>NOTE:</b> This interface only presents on the iQ LTE+ and iQ LTE PRO models.
26	Sat Tx Out	L-Band Transmit signal to Block Up Converter (BUC) capable of 10 MHz or 50 MHz Reference; 75 Ω, F-Type; +24 V @ 4.0 A (Max)
27	Sat Rx In	L-Band Receive signal from Low Noise Block Down Converter (LNB); 75 Ω, F-Type; 13, 18, 21 VDC @ 500mA (Max)
28	Sat Eth	Default port for Sat module management Ethernet Communications Ports, RJ-45 10/100/1000 Ethernet ports, 802.1q VLAN <b>NOTE:</b> Initial support is for Sat-Only traffic. Additional traffic support beyond VLAN management will be available in Q4, 2019.
29	Console	Console Communications Port, RS-232 Serial, RJ-45

---

---

# 4 Installation

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

- [Section 4.1, \*Installation Steps at a Glance\* on page 17](#)
- [Section 4.2, \*Tools and Supplies Required for Installation\* on page 19](#)
- [Section 4.3, \*Unpacking iDirect Equipment\* on page 19](#)
- [Section 4.4, \*Components Typically Included in an Order\* on page 20](#)
- [Section 4.5, \*Mounting the iQ LTE Satellite Router\* on page 20](#)
- [Section 4.6, \*Preparing the PC for Connection to the iQ LTE Satellite Router\* on page 25](#)
- [Section 4.7, \*Configuring the iQ LTE Satellite Router\* on page 25](#)



**NOTE:** See [Document Set](#) on page [xiii](#) 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 LTE Satellite Router. Each step refers to other sections or appendices, as appropriate, with more detailed information.

### 4.1.1 Pre-Installation Guidelines

iQ LTE 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 LTE Satellite Router in a location where access is unobstructed.

- Ensure the iQ LTE Satellite Router has adequate ventilation.
- Do not install the iQ LTE 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 LTE Satellite Router:
  - **Ventilation**

A single-core protective vent on the back of the chassis provides pressure equalization and allows reliable operation of the product. To protect the chassis from overheating do not place this product in a built-in installation, such as a bookcase or enclosed rack, unless proper ventilation is provided or the manufacturer instructions have been followed.
  - **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 LTE 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



**NOTE:** The iQ LTE Satellite Router is designed to be installed in a sheltered environment per environmental specifications. See [Section 2.1, on page 5](#).



**NOTE:** Where applicable, mating connectors must be prepared for installation. See [Appendix C, Cable Preparation on page 39](#) and [Appendix D, DC Power Supply Installation](#) (for routers with DC power supply options, only).

1. Unpack the router according to the unpacking instructions in [Section 4.3, Unpacking iDirect Equipment on page 19](#).
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 20](#).
3. The recommended tools should be available for installation. See [Section 4.2, Tools and Supplies Required for Installation on page 19](#).
4. Prepare the coax cables as directed in [Section C.1, Coax Cable Preparation on page 39](#) to connect to **RX IN** and **TX Out**.

5. Prepare the Ethernet cable(s) and connector(s) as described in [Section C.2, Ethernet Port Pinouts on page 43](#). For connection to the user interface, use ETH1 port with an RJ-45 cable as described in [Section C.2.2, on page 44](#).
6. If using the **Console** port for servicing, prepare the console port cable and connector as described in [Section C.3, Console Port Connection on page 45](#).
7. Mount the router as directed in [Section 4.5, Mounting the iQ LTE Satellite Router on page 20](#).
8. Connect the power as directed for either AC or DC power supplies:
  - See [Section 4.5.1, Installing With an AC Power Supply \(Option 1\) on page 22](#)
  - See [Section 4.5.2, Installing With a 36-76 VDC Power Supply \(Option 2\) on page 23](#)
9. Monitor front and rear panels during startup. See [Section 3.1, iQ LTE Satellite Router Front LEDs on page 11](#) and [Section 3.3, iQ LTE Satellite Router Rear Panel Descriptions on page 15](#).
10. Prepare PC for iQ LTE Satellite Router connection as specified in [Section 4.6, Preparing the PC for Connection to the iQ LTE Satellite Router on page 25](#).
11. Login PC to the user interface.
12. Install the firmware and configure the satellite router as specified in [Section 4.7, Configuring the iQ LTE Satellite Router on page 25](#).
13. If the router needs repacking or maintenance see [Chapter 5, Maintenance on page 29](#).
14. When the iQ LTE Device is physically installed, the firmware and configuration of the satellite router needs to be completed. Refer to the *Terminal WUI User Guide* for the release of software installed on the system and for instructions.

## 4.2 Tools and Supplies Required for Installation

[Appendix B, Tools Needed on page 37](#) specifies recommended tools and supplies used when installing the iQ LTE 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 LTE 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 5.5, Repacking the iQ LTE Satellite Router on page 32](#) for repacking information.

Remove items from the box only as needed. Verify all of the proper iQ LTE 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 20](#).

## 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 LTE Satellite Router with installed AC or DC power supply
- 2 (two) hardware mounting ear kits
- 1 (one) LAN Ethernet cable
- 1 (one) Quick Start Guide (11 X 17 inch brochure)
- For DC (option 2), 1 (one) connector kit containing: one cable tie, one terminal block plug (P/N Phoenix 1779848), one cable strain relief, P/N 1803947
- 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)



**NOTE:** LTE, WIFI, GPS antennas and accessories are not included.



**NOTE:** SIM cards are not included. Please acquire SIM cards from your service provider with appropriate service plan.

## 4.5 Mounting the iQ LTE Satellite Router

This section describes the mounting of the iQ LTE Satellite Router. Follow the pre-installation guidelines, see [Pre-Installation Guidelines on page 17](#) before attempting to install.

The iQ LTE Satellite Router requires a minimum of one rack unit (1.75 inches) of vertical rack space. Measure the proposed rack location before mounting. If the iQ LTE Satellite Router is mounted in an enclosed rack, the router must have adequate ventilation. An enclosed rack should have louvered sides and top with fans to provide cooling air. Before using a particular rack, check for obstructions that could impede installation.

1. All mating connectors must be prepared correctly for installation. See [Appendix C, Cable Preparation on page 39](#) (for all routers) and [Appendix D, DC Power Supply Installation](#) (for routers with DC power supply options, only).
2. Attach the rack ears (included) to the iQ LTE Satellite Router with the hardware provided.

3. Mount the iQ LTE Satellite Router in the rack.
4. Follow installation procedures for power supply options:
  - Option 1 ([Section 4.5.1, on page 22](#)) for AC power supply
  - Or, Option 2 ([Section 4.5.2, on page 23](#)) for DC power supply

## 4.5.1 Installing With an AC Power Supply (Option 1)

For an iQ LTE Satellite Router with an AC power supply Option 1, follow these steps:



**CAUTION:** Direct connections to the power source should only be made by a properly licensed electrician. Installation must meet applicable electrical codes.



**CAUTION:** Improper power source rating, excessive noise or transients, or undersized circuit breaker will result in service interruption.



**CAUTION:** If power must be removed from the chassis, ensure the power cord is disconnected first.



**CAUTION:** The BUC power requirement must match the proper voltage. The BUC may sustain damage when used with incorrect power supply.



**NOTE:** Install an easily accessible socket-outlet near the equipment.

1. First, perform steps 1-6 of the Installation Checklist, [Section 4.1, on page 17](#).
2. Connect the TX and RX coax cables to the iQ LTE Satellite Router and secure but do not over-tighten. See [C.1, Coax Cable Preparation on page 39](#) for preparation details.
3. Connect LTE antenna
4. Connect GPS and WIFI (if present)
5. Connect the AC power cord to the power source. This will power ON the iQ LTE Satellite Router.
6. Monitor the front and rear panel lights during power on startup. See [Section 3.1, iQ LTE Satellite Router Front LEDs on page 11](#).
7. Prepare PC for iQ LTE Satellite Router connection as specified in [Section 4.6, Preparing the PC for Connection to the iQ LTE Satellite Router on page 25](#).
8. Login PC to the user interface. See [Preparing the PC for Connection to the iQ LTE Satellite Router](#).
9. Install the firmware and configure the satellite router as specified in [Section 4.7, Configuring the iQ LTE Satellite Router on page 25](#).

### 4.5.2 Installing With a 36-76 VDC Power Supply (Option 2)

For an iQ LTE Satellite Router using a 36-76 VDC power supply (Option 2):

1. First, perform steps 1-6 of the Installation Checklist, [Section 4.1, on page 17](#).
2. Set the iQ LTE Satellite Router power switch to the OFF position (0).
3. Prepare the power cables per the instructions in [Appendix D, DC Power Supply Installation on page 47](#) and connect the power cables.



**CAUTION:** The BUC power requirement must match the proper voltage. The BUC may sustain damage if used with the incorrect power supply.

4. Set the iQ LTE Satellite Router power switch to the ON position (1).
5. Upon powering up, a Level 0 Reset occurs. Reset options are available in [Appendix E, iQ LTE Satellite Router Reset on page 51](#).
6. Monitor front and rear panel lights during startup. See [Section 3.1, iQ LTE Satellite Router Front LEDs on page 11](#).
7. Prepare PC for iQ LTE Satellite Router connection as specified in [Section 4.6, Preparing the PC for Connection to the iQ LTE Satellite Router on page 25](#).
8. Login PC to the user interface. See [Preparing the PC for Connection to the iQ LTE Satellite Router](#).
9. Install the firmware and configure the satellite router as specified in [Section 4.7, Configuring the iQ LTE Satellite Router on page 25](#).

### 4.5.3 Installing the SIM Card(s)

To install the SIM cards (not included with the hardware):

1. Ensure that the iQ LTE Satellite Router is unplugged.
2. Turn the iQ LTE router upside down.
3. Open the bottom cover panel and locate the SIM card module (see [Figure 4-1](#)).



Figure 4-1. SIM Card Module

4. There is an L bracket that holds the SIM access panel in place. Remove this bracket first, then remove the access panel.

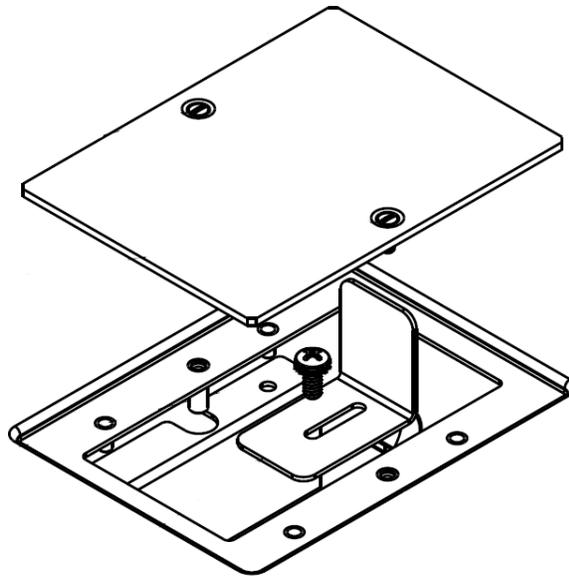


Figure 4-2. SIM Card Access Panel with L-Bracket

5. Unscrew the 2 screws on the SIM card module cover panel to expose the SIM card slots.



**CAUTION:** The screws used to secure the SIM cards module cover panel are very small and easily misplaced. Make sure to keep them in a safe place after removing them from the cover panel.

6. Insert the SIM cards notch-end first with the metal contact down in the appropriate slot (SIM-1 is on top, and SIM-2 is on the bottom). It will click into place. Depress again to remove.
7. Fasten the SIM card module with the cover panel using the 2 screws.
8. Place the SIM access panel and the L bracket that holds it and screw back the bottom cover.



**WARNING:** The Cradlepoint SIM card cover panel must be in place, otherwise, the device will not power up. Insure the side L bracket located within the SIM card access panel is securely in place against the cover.



**NOTE:** Due to the uniqueness of every installation, no external antennas are included with iQ LTE.

For more information on antenna options and installation, refer to the following documents and/or contact your Authorized Cradlepoint Partner.

- [Antenna Ordering and Installation Guide](#)
- [Cradlepoint Certified Antennas for Mobile](#)

## 4.6 Preparing the PC for Connection to the iQ LTE Satellite Router

For more information on LEDs, see [Section 3.1, iQ LTE Satellite Router Front LEDs on page 11](#).

Confirm the PC:

- Has a Web browser installed
- Has an IP address that is on the same subnet of the iQ LTE Satellite Router
- Includes a Network Interface Card (NIC) connected with a CAT 5 Ethernet cable

## 4.7 Configuring the iQ LTE Satellite Router

When the iQ LTE Satellite Router is physically installed, the downloading the firmware and configuration of the satellite router need to be completed. For information on installing software packages, see the *Terminal WUI User Guide*. To download the guide, go to <https://support.idirect.net> and click **Satellite Routers**.

## 4.8 Connecting a Cradlepoint LTE Device to the Network

Cradlepoint devices are centrally configured and managed by a cloud-based system called NetCloud Manager. Once devices are sold, they will be created in a customer account on the NetCloud Manager. Key users will be given accounts that will enable them to configure and manage devices on NetCloud Manager.

Once you have access to NetCloud Manager, you can start configuring your devices based on your use case.

When devices are activated and can communicate with NetCloud (via the SIM or a WiFi network or even satellite connection), they will load the configuration from the NetCloud.

You can also configure single devices locally by accessing the NCOS user interface. Changes made using the NCOS user interface will be synced with the NetCloud Manager and vice versa. It is highly recommended that you become familiar with the NetCloud system prior to deployment.

There are multiple resources available online from the Cradlepoint knowledge base. See [Appendix F, Cradlepoint IBR900 and NetCloud Manager References](#) for more information.

### 4.8.1 Connecting a Cradlepoint LTE Device to a Local Network

Connecting the Cradlepoint LTE Device to a local network does not require the SIM card installation. Perform all steps describe in this section to connect the internal Cradlepoint LTE Device to the local network via the Traffic Ethernet Port.

#### Step 1. Connecting to the Cradlepoint IBR locally via NCOS

1. Connect your PC to the iQ LTE traffic Eth port and open an Internet browser.
2. Enter the IP address of the Cradlepoint module.

If this is the first time configuring the IBR, the default IP address of the Cradlepoint module is 192.168.0.1.

3. Log in to the Cradlepoint module.

The default username is admin and the password is the device serial #.

In older versions, the password is the last eight alpha-numeric characters of the Cradlepoint device LAN port's MAC address (e.g., if the MAC Address is 00:30:44:18:9E:BA, the password is 44189eba).

It is recommended to change the default password after the initial setup.

For additional information, see the [IBR900 Mobile Router Quick Start Guide](#).

## Step 2. Configuring and Managing Cradlepoint LTE Device Using NetCloud

The Cradlepoint module embedded with the iQ LTE comes with access to NetCloud Manager (NCM), which allows users to configure and manage the device remotely. The Cradlepoint device was added to your NetCloud Account when it was shipped from Cradlepoint.

1. Log into NCM to configure and manage your device via NetCloud.
2. Open a Web browser to go to [cradlepointecm.com](http://cradlepointecm.com) and log in using the NCM credentials assigned to your account.
3. Navigate to “**Devices**” from the left tab and then “**Routers**” from the top tab to configure the router.

Alternatively, to manage the router in a group, perform the following:

1. Click on “**Groups**” from the left tab and then “**Router Groups**” from the top tab.
2. Create a new group by clicking “**Add**”
3. Assign a group name and choose the model and NetCloud OS (NCOS) version.  
Once the group is created it can be configured with settings that will apply to all routers assigned to it.
4. Navigate back to “**Devices**” from the left tab and then “**Routers**”, check the box next to the router(s) you want assigned to the group, select “**Move**” from the top and select your group

The selected routers will now be moved to the group and will sync the group configuration, when they first come on line, or the next time they connect to NCM.

5. Once the device connects to a network through the SIM or via satellite, it will connect to NCM to obtain its configuration.



**NOTE:** As part of configuration, the Cradlepoint LTE device must load the SDK script to enable the external LED and power functions via GPIO.

To verify the SDK script has successfully loaded, log in to the Cradlepoint LTE device via NCOS and go to the GPIOs menu. The GPIOs should be enabled with actions have been appropriately assigned.

## Additional Resources for the Cradlepoint LTE Device

For further instructions, refer to Cradlepoint documentation online with following link as a starting point:

<https://customer.cradlepoint.com/s/article/IBR900-Getting-Started>

## 4.9 Loading iDirect SDK File to Cradlepoint Device

The iQ LTE uses a GPIO cable to transfer signals from the Cradlepoint device to the front panel LED for device status and also reset function. An SDK script developed by iDirect is required to activate this functionality. You will need to download the script file iDirect\_IQ\_LTE\_SDK.tar.gz from the TAC Customer Portal in the supplementary software section to your local PC and then load the script to your NetCloud Manager account. See [Getting Help on page xiii](#) for information about contacting iDirect TAC.

Once the script has been loaded to your NetCloud manager, it can be applied to multiple devices via the group. Subsequent updates to the SDK maybe be deployed in the same manner described below.



**NOTE:** If the SDK is not loaded, all the front panel LEDs from the Cradlepoint module will be constantly illuminated. The LEDs will reflect status only after the SDK is properly loaded.

### Perform the following:

1. Prior to the script installation, verify that the device is not in Development Mode.
2. In NetCloud manager, select your device and click on “Tools” on the left-hand side.
3. Add the software to the router.
4. From the “Tools” tab, click “Add” button under “Available Apps.”
5. Select the `.tar.gz` file corresponding to the script to be installed.
6. Create a new group for IQ LTE devices to run the iDirect SDK.
7. Click on “Groups” on the left-hand side.
8. Click “Add” button and fill in the group name and NetCloud OS.
9. Add the script to the group.
10. Select the newly created group and select “Manage NCOS SDK Applications” from the menu above the group list.
11. Click the “Add” button and add the desired script to the group.



**NOTE:** Additional instructions are available at the link: <https://customer.cradlepoint.com/s/article/How-to-install-an-SDK-application-to-a-group>.



**NOTE:** If you create more than one group, you need to ensure that all of them have the script loaded.



---

---

# 5 Maintenance

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

This chapter contains the following sections:

- [Section 5.1, \*Safety Guidelines to Observe During Servicing\* on page 29](#)
- [Section 5.2, \*Maintaining the iQ LTE Satellite Router\* on page 30](#)
- [Section 5.3, \*Troubleshooting the iQ LTE Satellite Router Rackmount Router\* on page 31](#)
- [Section 5.4, \*Removing and Replacing the Power Module\* on page 32](#)
- [Section 5.5, \*Repacking the iQ LTE Satellite Router\* on page 32](#)

## 5.1 Safety Guidelines to Observe During Servicing



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

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

### 5.1.1 Servicing

Do not attempt to service the iQ LTE 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 LTE Satellite Router from the power source and refer servicing to qualified service personnel if any of the following conditions occur:

- When the power supply cord or plug is damaged
- If the iQ LTE Satellite Router does not operate normally when following the operating instructions (adjust only those controls that are covered by the operating instructions)
- If the iQ LTE Satellite Router has been dropped or if the chassis has been damaged
- When the iQ LTE Satellite Router exhibits a distinct change in performance

## 5.2 Maintaining the iQ LTE Satellite Router

The iQ LTE 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 LTE Satellite Router has a built-in temperature sensor which measures the actual circuit board and LTE module temperature. If the board temperature exceeds a defined threshold, the iQ LTE Satellite Router PCB shuts down and allows the unit to cool before restarting. See [Table 2-1 on page 5](#), for the proper temperature range.

Elevated internal temperature may be caused by:

- Objects blocking the vent
- Dust accumulated on the enclosure or the vent
- Ambient temperature elevated over the specified limits 90 Day Regular Maintenance

### 5.2.2 90 day maintenance

Typically, the only maintenance needed to be performed on the unit, is to maintain the temperature of the iQ LTE Satellite Router and keep its external areas free from moisture, dust or dirt, which are included in a 90-day maintenance cycle.

Perform the following procedures every 90 days:

- Keep the staging area clear and free of dust during and after installation
- Make sure that no objects are blocking the vents
- If there are objects blocking the vents, remove them safely so there is at least 6 inches (15 cm) from the unit
- Make sure that no dust has accumulated on the enclosure or the vent. If dust has accumulated use a soft brush to remove dust
- Make sure that the ambient temperature remains within the specified limits

## 5.3 Troubleshooting the iQ LTE Satellite Router Rackmount Router

Table 5-1 describes the most common iQ LTE Satellite Router troubleshooting events and actions. Consult with the iDirect TAC when considering a reset. Reset functions are described in Section E, *iQ LTE Satellite Router Reset on page 51*.

Table 5-1. Troubleshooting Events and Actions to Take

Event	Action
Router not functioning	Check status LEDs. Compare LEDs to <a href="#">Table 3-1 on page 12</a>
POWER LED ON and Router not functioning	<p>When the root-cause (external or internal) of the issue in the router is not known, perform the following steps:</p> <ol style="list-style-type: none"> <li>1. Power down and restart the router to see if that resolves the issue.</li> <li>2. When the problem still exists, disconnect the external cabling apart from the power and console cables.</li> <li>3. Connect to the console port and during the boot process, check if the PCB passes the POST boot-up tests.</li> <li>4. Check if the router gets to the login prompt.</li> <li>5. Check if all the option files are in the correct location under <code>/sysopt/config/sat_router</code>.</li> </ol> <p><b>NOTE:</b> Option files varies in each revision of the software.</p> <ol style="list-style-type: none"> <li>6. Check the status LEDs. Compare LEDs to <a href="#">Table 3-1 on page 12</a>.</li> </ol>
SAT router cannot be accessed by Web User Interface	<p>Router may have a bad options file, settings, or software package.</p> <ol style="list-style-type: none"> <li>1. Power down and restart the router to see if that resolves the issue.</li> <li>2. Perform a Level 2 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 with the default IP address: 192.168.0.1.</li> </ol> <p>See <a href="#">Appendix E, iQ LTE Satellite Router Reset on page 51</a> for more information on Reset.</p>
Lost or forgot IP address of the SAT router	<ol style="list-style-type: none"> <li>1. Visually check the Ethernet port to ensure there is no physical damage.</li> <li>2. Perform a Level 2 reset (Boot into Recovery mode) so that the iQ LTE will have the default IP address: 192.168.0.1. Load new package / options / configuration files with a new IP address, if desired.</li> <li>3. Reboot with a Level 0 reset, and connect with the current / known IP address.</li> </ol> <p>See <a href="#">Appendix E, iQ LTE Satellite Router Reset on page 51</a> for more information on Reset.</p>
All front panel LEDs are constantly illuminated.	<ol style="list-style-type: none"> <li>1. Load the SDK script per <a href="#">Loading iDirect SDK File to Cradlepoint Device on page 27</a>.</li> </ol>

## 5.4 Removing and Replacing the Power Module



**WARNING:** Before installing or working on the outdoor equipment, unplug the power cord from the power source. Ensure you always check if power is disconnected.

In the event the Power Module must be removed and/or replaced, [Table 5-2](#) describes the steps to take.

**Table 5-2. Removing and/or Replacing the Power Module**

Event	Steps to Take
Removing the Power Module	<ul style="list-style-type: none"><li>• Make sure power cord is unplugged</li><li>• Unscrew chassis screw</li><li>• Pull firmly but gently on the handle pull of the power supply to extract the power module from the slot</li></ul>
Replacing the Power Module <b>NOTE:</b> Must replace with similar power supply	<ul style="list-style-type: none"><li>• Slide in power supply</li><li>• Make sure the power supply is securely pushed in and flush</li><li>• Tighten screw</li><li>• Plug power cord into power supply input receptacle</li></ul>

## 5.5 Repacking the iQ LTE Satellite Router

If the iQ LTE 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 LTE 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 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
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
BUC	Block Up Converter

## C

C/N	Carrier to Noise ratio
CBIT	Continuous Built In Test
CDR	Critical Design Review
CIR	Committed Information Rate
CPE	Customer Premise Equipment
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CSA	Canadian Space Agency

## D

DAC	Digital to Analog Converter
dB	decibel
dB <sub>i</sub>	decibel isotropic
dB <sub>m</sub>	decibel milli-Watt
dBW	decibel Watt
DC	Direct Current
DDR	Double Data Rate

---

DHCP	Dynamic Host Configuration Protocol	<b>I</b>	
DNS	Domain Name Service	IBIT	Initiated Built In Test
	DVB-S2	ICD	Interface Control Document
	Digital Video Broadcasting over Satellite, Second Generation	ICMP	Internet Control Message Protocol
		iDX	Evolution Software System
<b>E</b>		IEC	International Electro-technical Commission
EIRP	Effective Isotropic Radiated Power	IFL	Inter-Facility Link
Eb/NO	Bit Energy to Noise Power Spectral Density ratio	IF	Intermediate-frequency
EEPROM	Electrically Erasable Programmable Read-Only Memory	IP	Ingress Protection
EL	Elevation	IP	Internet Protocol
EMC	ElectroMagnetic Compatibility	IR	Information Rate
EMI	ElectroMagnetic Interference	<b>J</b>	
ETSI	European Telecommunications Standards Institute	<b>K</b>	
<b>F</b>		kbps	kilobit per second
FCC	Federal Communication Commission	kHz	kilohertz
FEC	Forward Error Correction	KRFU	Ku/Ka-band Radio Frequency Unit
FID	Functional ID	ksps	kilosymbol per second
FMECA	Failure Mode Effects Criticality Analysis	<b>L</b>	
FPGA	Field Programmable Gate Array	LAN	Local Area Network
FS	Functional Specification	LDPC	Low-Density Parity Coding
<b>G</b>		LED	Light Emitting Diode
G/T	Gain over Temperature	LNB	Low Noise Block Converter
GHz	GigaHertz	LOS	Loss of Signal
GPIO	General-Purpose Input/Output	LRU	Line-Replaceable Unit
GPS	Global Positioning System	<b>M</b>	
<b>H</b>		Mbps	Megabits per second
HCP	High-Capacity Payload	Mcps	Megachips per second
		MES	Mobile Earth Station
		MF-TDMA	Multi-Frequency TDMA

---

---

MHz	Megahertz	<b>Q</b>	
MID	Manufacturer ID	QEF	Quasi Error Free
MIL-STD	US Military Standard	QoS	Quality of Service
MODCOD	Modulation and Coding	QPSK	Quadrature Phase Shift Keying
MspS	Mega Symbols per Second		
MTBF	Mean Time Between Failures	<b>R</b>	
MTBUR	Mean Time Between Unscheduled Removals	RF	Radio Frequency
		RGMI	Reduced Gigabit Media Independent Interface
<b>N</b>		RMS	Root Mean Square
NAND	Not AND	RoHS	Restriction of Hazardous Substances
NF	Noise Figure	ROM	Read-Only Memory
NOR	Not OR	RP-SMA	Reverse Polarity SMA
NMS	Network Management System	RSSI	Receive Signal Strength Indication
		RTP	Real-Time Protocol
<b>O</b>		Rx or RX	Receive
OAE	Outside Antenna Equipment		
ODU	Outdoor Unit	<b>S</b>	
OEM	Original Equipment Manufacturer	SAS	Satellite Access Station
OMT	Orthogonal-Mode Transducer	SCPC	Single Channel Per Carrier
OpenAMIP	Open Antenna-Modem Interface Protocol	SGMI	Serial Gigabit Media Independent Interface
OTA	Over The Air	SIM	Subscriber Identity Module
OTP	One Time Programmable	SMA	SubMiniature version A
		SNR	Signal to Noise Ratio
<b>P</b>		SRS	Systems Requirement Specification
PA	Power Amplifier	SRU	Shop Replaceable Unit
PAST	Person-Activated Self-Test	SSB	Single Side Band
PCB	Printed Circuit Board		
PC	Personal Computer	<b>T</b>	
PDR	Preliminary Design Review	TBD	To Be Defined
PLL	Phased Locked Loop	TCP	Transmission Control Protocol
PSK	Phase Shift Keying	TDMA	Time Division Multiple Access
PSU	Power Supply Unit	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 Tools Needed

Figure B-1 and Table B-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 B-1. Recommended Installation Tools

Table B-1. Recommended Installation Tools and Equipment

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



---

---

# Appendix C Cable Preparation

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

- [Section C.1, Coax Cable Preparation on page 39](#)
- [Section C.2, Ethernet Port Pinouts on page 43](#)
- [Section C.3, Console Port Connection on page 45](#)

## C.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 LTE 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:

- RG-6 – 0.04 inch (1 mm), outdoor rated, Quad Shielded, solid bare copper center conductor, for cable lengths less than or equal to 225 feet (68.5 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 400 feet (121.9 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, 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 B, Tools Needed on page 37](#) 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 C-1](#).



**Figure C-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 C-1](#). For RG-6, use a two-step Coax Stripper such as the LC-CST 1257 from Paladin Tools.

**Table C-1. Coax Trim Dimensions**

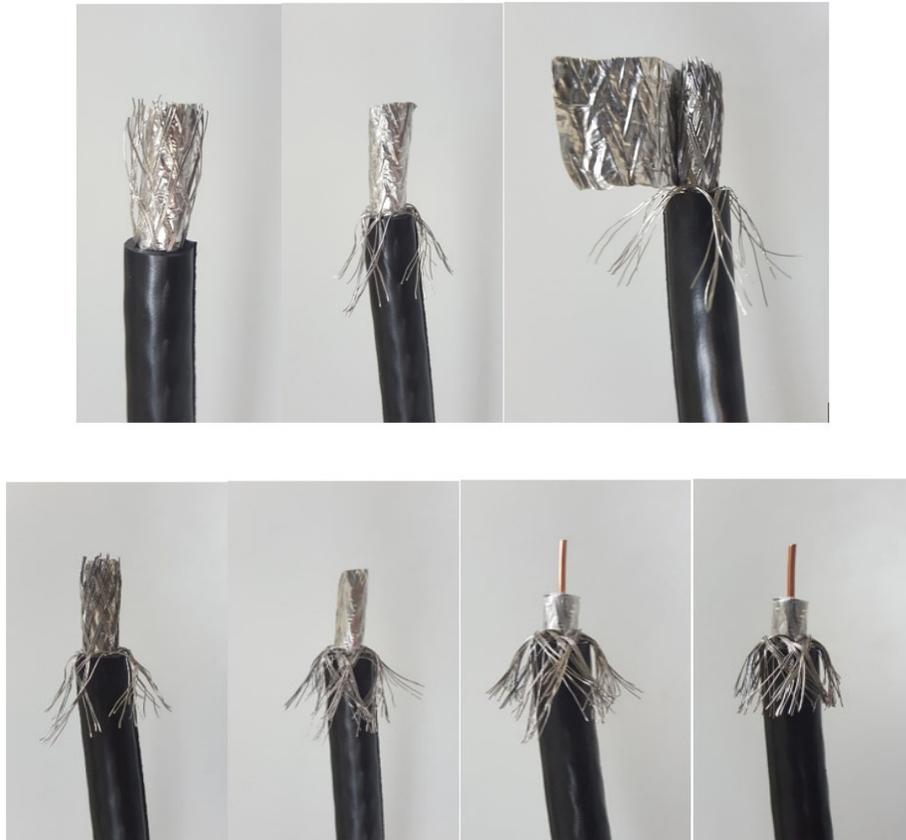
	Length A (inch (mm))	Length B (inch (mm))	Length C (inch (mm))
RG-6	5/8 (15.9)	1/4 (6.4)	3/8 (9.5)
RG-11	13/32 (10.3)	3/32 (2.4)	13/32 (10.3)

3. Remove any foil in the braid as shown in [Figure C-2](#).



**Figure C-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 C-1](#) on [page 40](#) and shown in [Figure C-3](#).



**Figure C-3. Procedure to Cut the Quad Shield Cable**

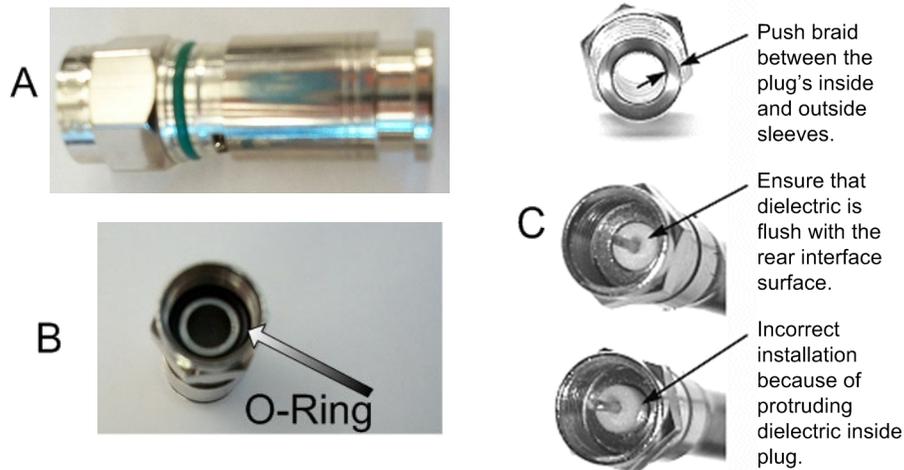
5. Flare the inner, outer braids and the outer foil shield only. Do not flare the inner foil shield (last foil around dielectric).
6. (If using a coax stripper, skip this step.) Being careful not to cut into the copper of the center conductor, remove the foil and cut the dielectric to the length shown under **Length B** in [Table C-1 on page 40](#). 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 C-4](#)) over foil and underneath the braid. A good, weatherproof outdoor connector mandrel should have a visible O-Ring (bottom right (B) [Figure C-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 C-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 C-4](#).



**Figure C-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 C-5](#).



Figure C-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.

## C.2 Ethernet Port Pinouts

The Ethernet cable included in the order is typically a straight through cable typically used for connection to a PC. The X7 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.

LAN 1 port is the recommended port to connect the Ethernet cable to the Ethernet port on the PC running the user interface.

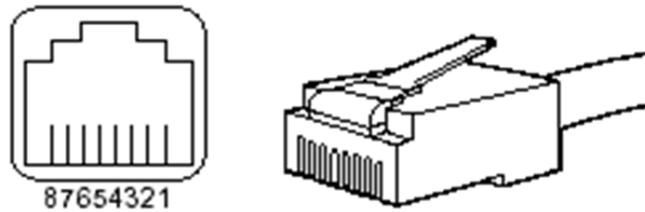
Either crossover or straight through cables may be used with the X7 Router. It is not necessary for the PC to auto-sense. Details of the X7 Router LAN/Ethernet port pinouts are described in [Section C.2.1](#) and [Section C.2.2](#) defines straight through and crossover cables.

### C.2.1 Ethernet Port Pinouts

[Table C-2](#) lists the pinouts for the Ethernet ports (labeled LAN 1-2) of the X7 Router and the pinout order is shown in [Figure C-6](#).

Table C-2. Ethernet Port Pinouts

RJ-45 Pin	Description
1	Tx+
2	Rx+



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

The 10 Base-T/100 Base-T Fast Ethernet ports support IEEE 802.3 and IEEE 802.3u specifications for the 10-Mbps and 100-Mbps transmission over Unshielded Twisted-Pair (UTP) cables. Use Category-3 or Category-5 UTP cable with RJ-45 connectors to attach the 10/100 Base-T Ethernet LAN ports on the iQ LTE Satellite Router chassis to the customer provided LAN Hub or switch.

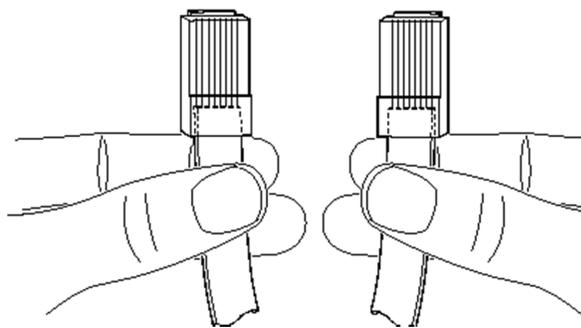


**NOTE:** iDirect supplies one 7-foot Category 5 UTP cable to connect the X7 Router to the LAN hub or switch. If additional cables or different lengths are needed, they may be bought commercially.

### C.2.2 Straight Through and Crossover RJ-45 Cables

To confirm the RJ-45 cable type, hold the cable ends as depicted in [Figure C-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 C-7. Holding the RJ-45 Cable Connectors**

## C.3 Console Port Connection

The Console port is used for servicing the X7 Router.

Connect as follows:

1. Connect an RJ-45 to RJ-45 straight through cable, such as the Ethernet cable included, to LAN 1 port on the X7 Router.
2. Connect the opposite end of the Ethernet cable to an RJ-45 to DB-9 female DTE adapter, or a USB dongle (such as a Trendnet TU-S9).
3. Connect to a PC running terminal emulation software.

PC serial port settings should be:

- asynchronous mode
- 115200 baud
- eight (8) data bits, no (N) parity bit, and one (1) stop bit, (115200/8-N-1)

The signal and pinouts for the asynchronous serial **Console** port (RS-232) of the X7 Router and an RJ-45 to DB-9 female DTE adapter are listed in [Table C-3](#). A picture of the RJ-45 to DB-9 Female DTE adapter is shown in [Figure C-8 on page 46](#).

**Table C-3. RJ-45 to DB-9 Pinouts**

Console Port (DTE)	RJ-45 Pin	Color Code	RJ-45 to DB-9 Terminal Adapter	Console Device
RTS	1	Blue	8	CTS
DTR	2	Orange	6	DSR
TxD	3	Black	2	RxD
GND	4	Red	NC	GND
GND	5	Green	5	GND
RxD	6	Yellow	3	TxD
DSR	7	Brown	4	DTR
Rx-RF-Power	8	White/Grey	9	Not Connected

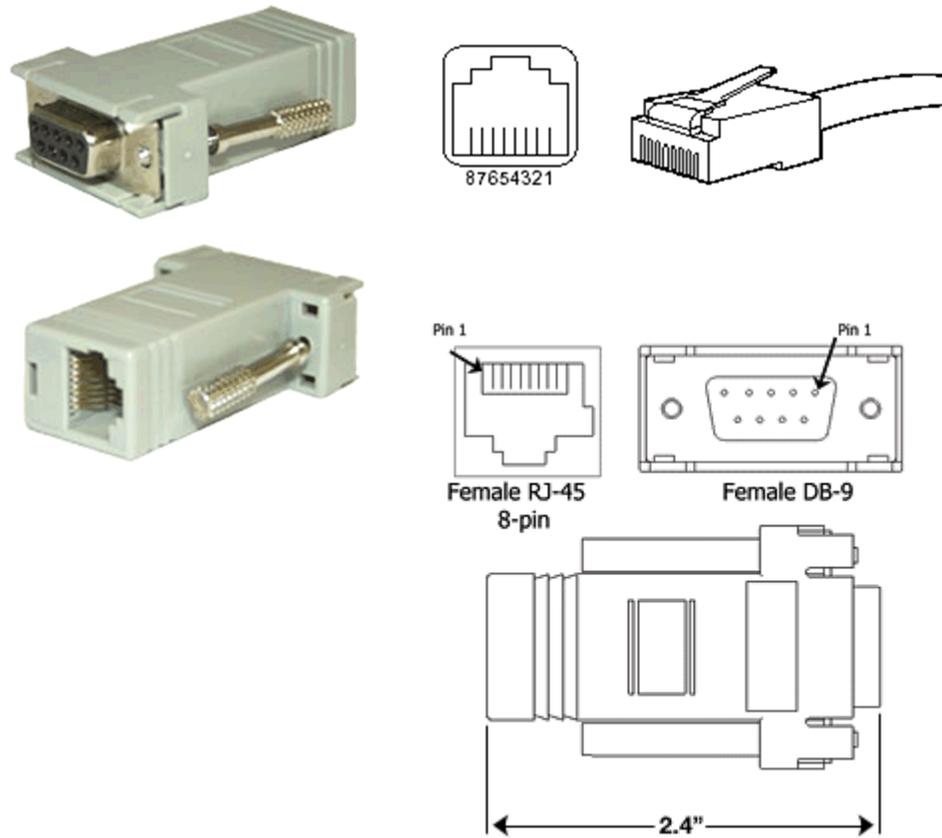


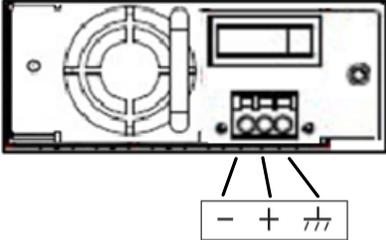
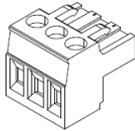
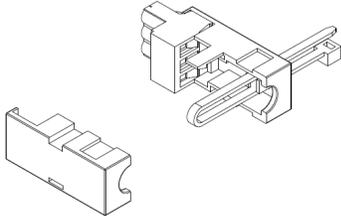
Figure C-8. RJ-45 to DB-9 Female DTE Adapter

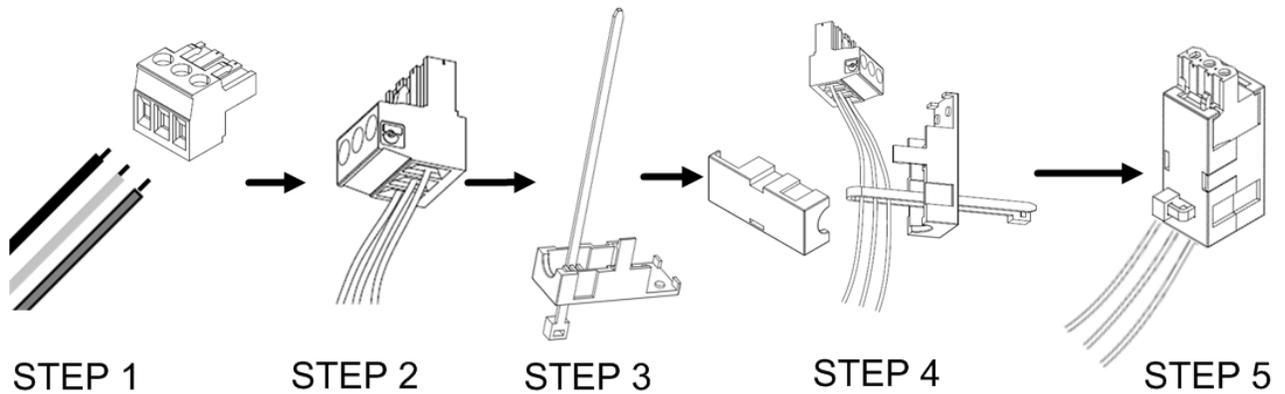
# Appendix D DC Power Supply Installation

This appendix describes the installation of the DC power supply wiring for Option 2.

Make sure all items are available to prepare the cable entry housing. Descriptions and diagrams of the items included with the router or necessary for the DC wiring are found in [Table D-1](#). “At a Glance” instructions are in [Figure D-1 on page 48](#) with corresponding detailed steps in [Table D-2 on page 48](#).

**Table D-1. X7 Router DC Power Module Connector Parts**

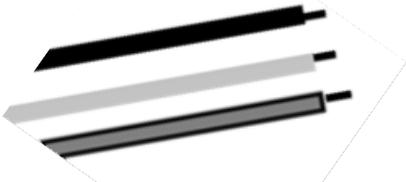
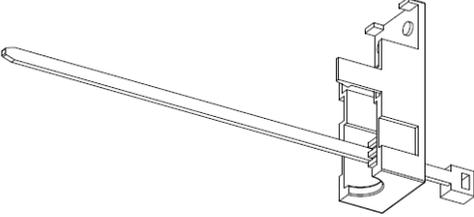
Name	Description	Diagram or Reference
DC Terminal block	Rear panel, DC terminal block area	
3 DC input wires	Appropriately labeled wires, such as: <ul style="list-style-type: none"> <li>• red = positive +</li> <li>• black = negative -</li> <li>• blue = ground - </li> </ul>	14-18 AWG (American Wire Gauge) Reference: <a href="http://en.wikipedia.org/wiki/American_wire_gauge">http://en.wikipedia.org/wiki/American_wire_gauge</a>
Terminal block plug	Included in kit, P/N Phoenix 1779848	
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	



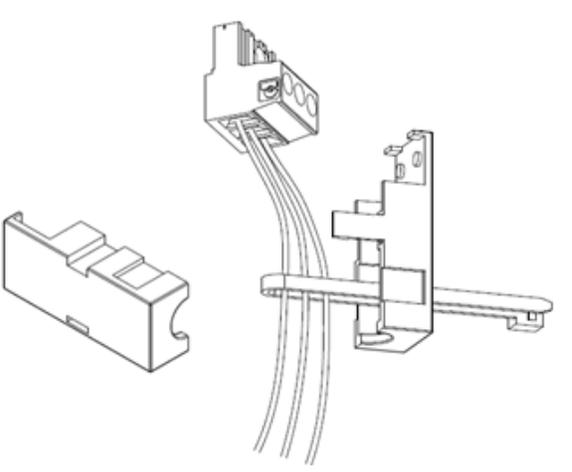
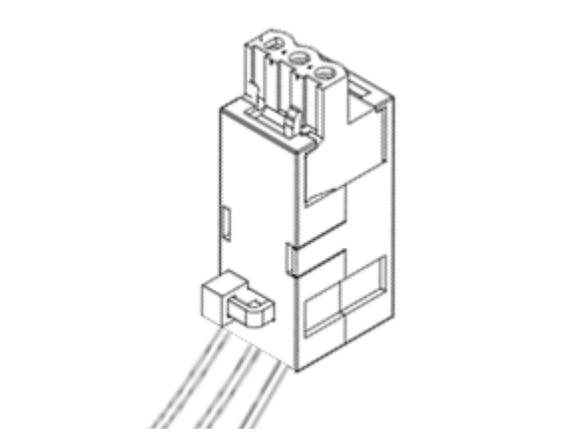
**Figure D-1. DC-DC Power Supply Assembly at a Glance**

DC-DC Power Supply Assembly at a Glance

**Table D-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.	
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 the three screws securely. Do not over-tighten.	
3.	Insert the cable tie through one of the holes in the right half of the strain relief clip.	

**Table D-2. Power Module Power Cable Installation Instructions Detail**

Step	Instructions	Diagram
4.	<ol style="list-style-type: none"><li data-bbox="289 342 836 394">1. Wrap the cable tie around the wires, and tighten.</li><li data-bbox="289 394 836 520">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.</li></ol>	
5.	<ol style="list-style-type: none"><li data-bbox="289 825 836 898">1. Clip the other half of the strain relief clip around the cable entry housing and tighten the cable tie.</li><li data-bbox="289 898 836 1003">2. Insert the finished terminal block plug, with the cable entry housing, into the terminal block header in the power supply.</li></ol>	



---

---

# Appendix E iQ LTE Satellite Router Reset

The iQ LTE 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.

## E.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 LTE Satellite Router Rear Panel Descriptions on page 15](#) 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

## E.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 LTE Satellite Router Rear Panel Descriptions on page 15](#) for the reset button location
- Intended for recovery of the remote only, and new options file, configuration, and software must be loaded

## *Level 1 Reset*

---

- 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

---

---

# Appendix F Cradlepoint IBR900 and NetCloud Manager References

This appendix provides links to information for the Cradlepoint COR IBR900 Series router and NetCloud Manager.

- General Information  
See <https://cradlepoint.com/products/cor-ibr900-series>
- Cradlepoint IBR900 Series Spec Sheet  
See <https://cradlepoint.com/content/ibr900-spec-sheet>
- Cradlepoint NetCloud Manager  
See <https://customer.Cradlepoint.com/s/article/NCM-Overview>
- Firmware (Modem/Router NCOS)  
See <https://customer.cradlepoint.com/s/article/NCOS-How-to-update-the-firmware-of-a-Cradlepoint-router>
- Networks/VLANs  
See <https://customer.cradlepoint.com/s/article/NCOS-VLAN-Trunking-Configuration>
- Firewall  
See <https://customer.cradlepoint.com/s/article/NCOS-Zone-Firewall>
- NTP, DNS, port 8001  
See <https://customer.cradlepoint.com/s/article/NetCloud-Manager-Configure-Your-Firewall-to-Allow-Cradlepoints-Access-to-NCM-on-Private-Network>
- DMVPN (IPsec/GRE/NHRP)  
See <https://customer.cradlepoint.com/s/global-search/DMvpn>
- Knowledge base  
See [https://customer.cradlepoint.com/s/Knowledge?popup=false&retURL=%2Fapex%2FknowledgeSearch&c=All\\_Products&lang=en\\_US](https://customer.cradlepoint.com/s/Knowledge?popup=false&retURL=%2Fapex%2FknowledgeSearch&c=All_Products&lang=en_US)
- Cradlepoint YouTube Channel  
See <https://www.youtube.com/user/CradlepointTech/videos>





**iDirect**

13861 Sunrise Valley Drive  
Herndon, VA 20171

+1 703.648.8000

+1 866.345.0983

[www.idirect.net](http://www.idirect.net)

*Advancing a Connected World*