

Remote Satellite Data Module

RST600 Installation and User Manual



Beam Communications Pty Ltd

RST600 Installation and User Manual

Beam Communications Pty Ltd

**8 Anzed Court, Mulgrave,
Victoria, 3170, AUSTRALIA**

Information furnished by Beam Communications Pty Ltd (Beam) is believed to be accurate and reliable. However, no responsibility is assumed by Beam for its use, or for any infringement of patents or other rights of third parties, which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of Beam. Beam reserves the right to change specifications at any time without notice.

Copyright © 2007 Beam Communications Pty Ltd. All rights reserved

Product name: RST600 Installation & User Manual

Manual revision: 03

Part Number USRMAN000703

Issue Date: Feb 2007

Contents

CONTENTS	3
SAFETY INFORMATION	5
WELCOME	ERROR! BOOKMARK NOT DEFINED.
ABOUT BEAM COMMUNICATIONS	6
CONVENTIONS IN THIS MANUAL	7
WHAT IS THE RST600?	8
RST600 OVERVIEW.....	9
<i>The Complete Terminal</i>	<i>Error! Bookmark not defined.</i>
<i>The RST600 Connectors</i>	<i>Error! Bookmark not defined.</i>
PACKAGE CONTENTS.....	10
OPTIONAL BEAM ACCESSORIES.....	10
GETTING STARTED	11
WHAT IS A SIM CARD?	11
SIM CARD PROTECTION.....	11
INSTALLING/REMOVING THE SIM CARD.....	11
INSTALLING THE RST600	12
CONNECTING THE UNIT	12
CONNECTING THE POWER CABLE	12
CONNECTING A LAPTOP TO THE RST600	13
CONNECTING THE ANTENNA CABLE	14
INSTALLING THE ANTENNA	15
PLANNING THE ANTENNA INSTALLATION	15
INSTALLATION OPTIONS.....	16
ANTENNA INSTALLATION GUIDES	17
EXAMPLES	17
<i>Maritime Installations</i>	17
<i>Fixed Home Installations</i>	17
<i>Mobile / Transport Installations</i>	18
<i>Inner City Installations</i>	18
INSTALLING ANTENNA CABLES.....	19
PROTECTING THE ANTENNA FROM LIGHTNING	20

ASSURING QUALITY OF IRIDIUM SERVICE.....	21
OBSTRUCTIONS.....	21
CABLING.....	21
RF INTERFERENCE.....	22
SYMPTOMS OF RF INTERFERENCE.....	22
MITIGATION OF RF INTERFERENCE.....	22
<i>Recommended Operating Distances:</i>	<i>Error! Bookmark not defined.</i>
<i>Inmarsat Mini-M</i>	<i>Error! Bookmark not defined.</i>
<i>Inmarsat M-4</i>	<i>Error! Bookmark not defined.</i>
<i>Inmarsat-C (CAPSAT)</i>	<i>Error! Bookmark not defined.</i>
SPECIFICATION SUMMARY	24
RS232 SPECIFICATION.....	25
PHYSICAL CONNECTION	25
RS232 PORT SIGNAL SUPPORT AND HANDSHAKING	25
RS232 PORT ELECTRICAL PARAMETERS	26
TROUBLESHOOTING THE RST600.....	27

Safety Information



Note: Read the following information before installing and using the BEAM RST600.

Your RST600 is a low power radio transmitter and receiver. When it is ON, it receives and sends out radio frequency (RF) signals.

The design of your RST600 system complies with international safety standards.

Refer to the appropriate section of the *RST600 User Manual* for additional relevant safety information.



Warning:

Do not open equipment. There are no user-serviceable parts inside.
If a DC power supply is to be used, its output must comply with the Safety Extra Low Voltage (SELV) requirements of IEC60950.

All connectors except the Line and Accessory sockets must only be connected to equipment ports which comply with the Safety Extra Low Voltage (SELV) requirements of IEC60950.”

About BEAM Communications



Beam Communications, is an authorised manufacturer of Iridium Satellite products.

Beam develops subscriber products that utilise the Iridium satellite network of Low Earth Orbit satellites, known as LEOs. The Iridium network is extensively used around the world by commercial enterprises and defence agencies.

Beam products address the needs of individuals, communities, government agencies and the corporate sector, providing voice and data access without the need for traditional wire-line or mobile phone infrastructure.

As the Iridium satellite network is global, Beam's products address global markets, across the spectrum of rural and remote users, including households, motor vehicles, telemetry, maritime and emergency services.

Beam Communications Pty Ltd

**8 Anzed Court, Mulgrave,
Victoria, 3170, AUSTRALIA**

Web: www.beamcomm.net

Info: info@beamcomm.net

Support: support@beamcomm.net

Tel: +61 3 8851 0400

Fax: +61 3 9560 9055

Conventions in this Manual

Warnings, cautions and notes appear throughout this manual.

They are represented by following conventions.



Warning: This symbol and associated text indicate a warning note providing information to prevent personal injury or damage to equipment.



Note: This symbol and associated text indicate a note providing general operating information.



Interference: All wireless phones may get interference, which could affect performance.

What is the RST600?



The RST600 is a Remote Satellite Data Only Module designed to provide a reliable and cost effective data service connection when a wired connection is not available.

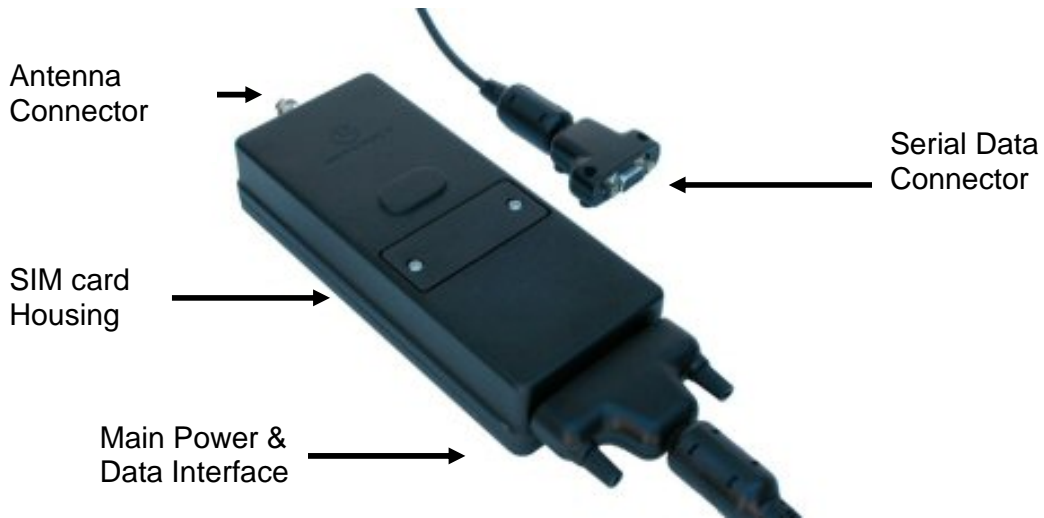
It does this by providing a standard interface to the Iridium network — a satellite-based, wireless communications network that enables remote communication. The RST600 allows the connection of standard data terminals and other telecommunications devices.

The RST600 from Beam Communications brings you all the convenience and ease of use of a Data Service anywhere in the world using the Iridium Satellite system.

The data services available on the RST600 terminal include

- Circuit Switched Data
- Short Message Service
- Short Burst Data

RST600 Overview



The terminal can be powered either by the supplied International AC Plug-pack that provides 4.4Volt DC power to the Iridium transceiver unit. Or the DC – DC converter, which allows an 11 – 32V DC input.

The DB9 Connector provides the Communications Serial port to the Iridium Transceiver terminal. This connects directly to the Computer or communicating terminal device.

The Plastic Molex connector connects directly to the power output from the AC plug pack or the DC – DC converter

The unit should be installed to ensure that the connectors remain accessible after installation for ease of service or disconnection when required.



Note: Only the supplied AC pug pack should be used, do not attempt to use any other AC power supply as this will cause damage to the unit not covered under warranty

Package Contents

The RST600 package contains:

- 1 RST600 Data & Power Interface cable assembly
- 1 Iridium L-Band Transceiver
- 1 universal plug-pack power adapter, 110-240V AC – 4.4V DC
- 1 Dc – DC converter to supply 4.4VDC to the transceiver
- 1 9-pin-to-9-pin RS-232 cable
- 1 user manual in hard copy
- 1 Beam software and documentation CD, AT command set

Optional Beam Accessories

RST910 Fixed Mast Antenna

RST915 Magnetic Mount Antenna

RST920 Bolt Mount Antenna

See your Service Provider for pricing and availability of these optional accessories



Note: The RST requires an approved SIM to be inserted into the transceiver prior to operation.

Getting Started

What is a SIM Card?

A SIM Card (Subscriber Identity Module) is a small smart card that carries your identity for accessing the network and receiving calls. It functions as the digital brain of the RST600 and also stores your personal information, including received SMS messages.

SIM Card Protection

Scratching or bending the SIM card can easily damage the card or its metal contacts. So handle the SIM card with care. Avoid exposing the card to static electricity, water or dirt.

Installing/Removing the SIM Card

The SIM card is stored in a recess in the SIM card compartment located at the top of the L-Band transceiver.

If your service provider does not preinstall the SIM card, perform the following steps to install it.



Warning: Make sure the RST600 is switched off before you insert or remove the SIM card. If you do not, the memory on your SIM card may be damaged.

1. Using an Alan key, remove the holding screws and keep them in a safe place whilst you install the SIM card into the unit.



2. Insert the SIM card into the slot. Make sure that the golden connectors are facing downwards.
3. Replace the cover into its place.
4. Screw the holding screw back.

Installing the RST600



Warning: Make sure the RST600 is switched off before you install the cables. If you do not, the RST600 may be damaged.

Connecting Power

Connecting AC power to the unit

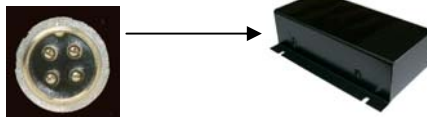
1. Make sure the AC power switch supplying the RST600 power pack is off.
2. Plug the power connector into the white Molex connector from the main cable assembly. Ensure that it has been securely connected.



3. Plug the cable into the power source outlet.
4. Turn the power switch on.

Connecting DC power to the unit

1. Using the cable provided connect the 4 way screw connector to the DC – DC converter.



2. This cable assembly then allows connection to both the RST600 main unit as well as the DC power source which should not exceed 32V DC.
3. Connect the White Molex connector to the main cable assembly of the RST600 you will see a corresponding Molex connector.
4. Then connect the wired terminals to the DC power source



5. Once the DC power source is active the RST600 unit is now powered and ready for operation.

Connecting a Laptop to the RST600

1. Plug the laptop cable into the DB9 Connector, Communications port.



2. Follow instructions from your Service Provider on accessing the Iridium Data Services via your Comm's port of the RST600.
3. A full set of Iridium AT Commands are provided on the installation CD provided with this terminal

Connecting the Antenna Cable

1. Plug the antenna cable into the antenna jack located on the top of the L-Band Transceiver.
2. Ensure that the cable being used is long enough to reach from the RST600 to the Antenna location.
3. It may be necessary to use an extension lead to get power to the unit or alternatively find a more appropriate location for the terminal and antenna to ensure minimum distance for the antenna cable
4. The following Antenna installation specifications are very important to successful operation of the terminal unit and to ensure maximum signal strength.
5. Consult your Service Provider for more information on the installation requirements if required.



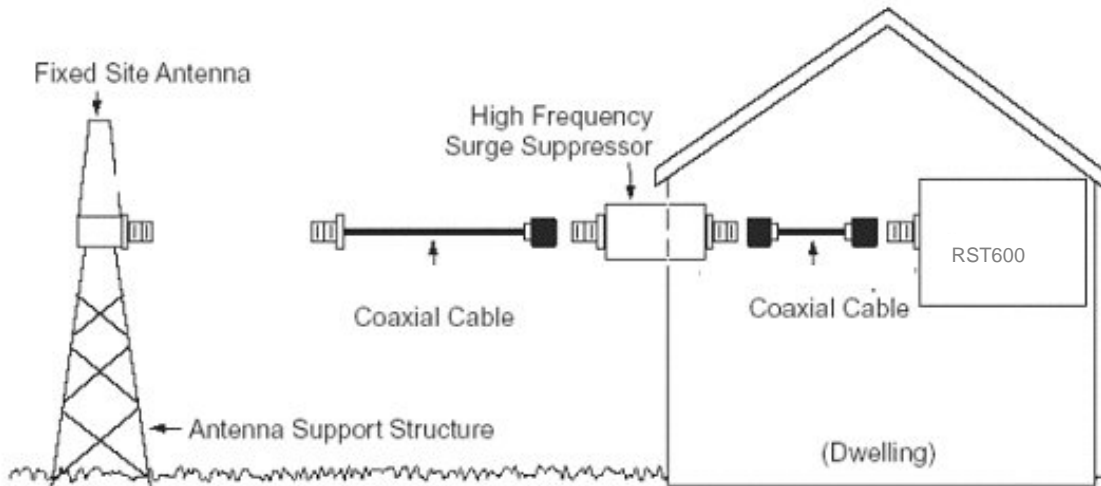
Installing the Antenna

Planning the Antenna Installation

The fixed site antenna system consists of a fixed mount antenna and a coaxial cable system that connects the antenna to the RST600.

The antenna system is suitable for both marine and terrestrial applications and is designed to meet Iridium System performance requirements when installed according to the instructions in this guide.

The following figure shows a typical terrestrial application:



The Fixed Site Antenna is an antenna contained within a weatherproof housing. It is intended to be mast-mounted without any type of ground plane. For proper performance in the Iridium System:

- The antenna must have a clear line to the sky from the horizon up
- Mount the antenna vertically
- Position the antenna so that it is reasonably clear of nearby metal obstructions
- Minimize horizontal obstructions as much as possible because they can create areas of poor system coverage. These areas of poor coverage can decrease or possibly eliminate the user's ability to operate the RST600 with predictability.

A specialised coaxial cable system is required to connect the Fixed Mast Antenna and RST600. This cable system is offered as an option to the Fixed Site Antenna.

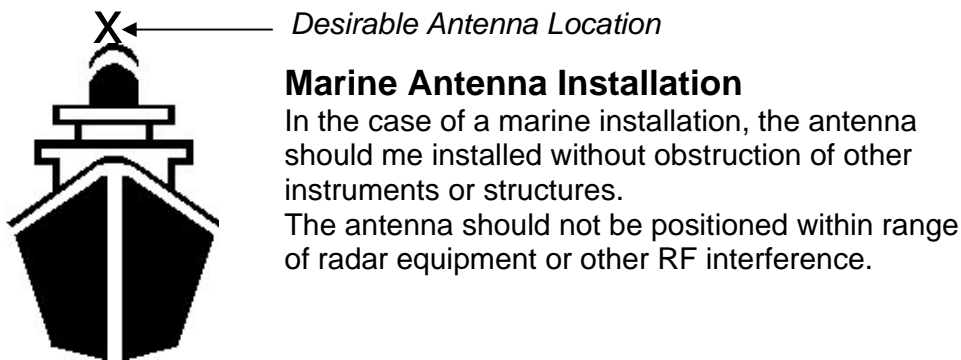
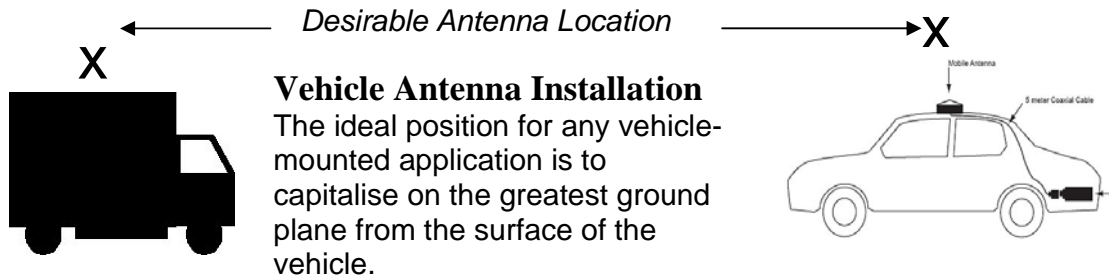
To minimize the loss of radio signal from the antenna to the RST600, the coaxial cable system between the antenna and the other component should be less than 3db including connector loss.

Installation Options

The fixed site antenna system consists of a fixed mount antenna and a coaxial cable system that connects the antenna to the Satellite Terminal Equipment. Ensure that the antenna cable being used does not exceed 3DB loss.

The antenna system is suitable for marine, vehicle and fixed applications and is designed to meet Iridium System performance requirements when installed according to the instructions in this guide.

The following figure shows typical Installations:



Antenna Installation Guides

The following example will provide guidance for antenna installation techniques for specific applications. Proper antenna installation is critical for the successful operation of your Beam terminal equipment.

Whilst it is not always possible to gain clear line of sight to the horizon in all situation due to poor access or environmental conditions, every effort should be made to achieve maximum visibility at all times.

As there is a wide range of antenna options available it is always best to talk with your Service Provider about the most appropriate antenna installation for your application.

Examples

Maritime Installations



Fixed Home Installations



Mobile / Transport Installations



Inner City Installations



Installing Antenna Cables

When you install the cables, follow these guidelines:

- Route and restrain cables to prevent them from vibrating or moving under normal conditions, which could result in damage to the antenna, Beam terminal, or the coaxial cable connections.
- Wherever the cables contact structures, protect the cables from chafing or abrasion.
- When you must bend a cable, avoid kinking it, and ensure that each bend radius follows the cable supplier's recommended limits.
- Use coaxial sealant, shrink-wrap tubing, electrical tape, or another suitable product to seal all cable connections appropriately to prevent moisture and corrosion damage from weather exposure.
- Connectors should be tightened as shown below in the absence of manufacturer advice specific to your cable:
 - Tighten Type N connectors to a torque of 0.68 to 1.13 N-m (6 to 10 inch-lbs).
 - Tighten Type TNC connectors to a torque of 0.45 to 0.68 N-m (4 to 6 inch-lbs).
- Use only specified cables for the Iridium network as supplied by Beam or refer to the specification table below.

Protecting the Antenna from Lightning

Antennas mounted in fixed installations can be exposed to lightning strikes in certain geographical and climatological environments. It is not possible to protect the RST600, the antenna, or surrounding and/or connected equipment or structures from damage from a direct lightning strike.

Incorporating specialized lightning arrestor/surge suppression components into the antenna system should provide additional protection. Install this suppressor at either of the following locations:

- Nearest the point at which the coaxial cable enters a building structure
- Where the cable first passes close to a grounded structure

Make the connections to the suppressor according to the installation instructions supplied by the suppressor manufacturer.

If you use antenna cables from an alternate source, you must still consider incorporating a device into the antenna cable system to provide protection from lightning strikes and power surges. If you are uncertain about selecting an appropriate method for protection against lightning strikes and power surges, employ the services of a professional antenna installer.

Assuring Quality of Iridium Service

Iridium is committed to providing users around the world consistent, reliable, quality voice and data access all day every day. The Iridium satellite system is monitored for call performance from numerous locations 24 hours a day, 7 days a week in order to achieve this.

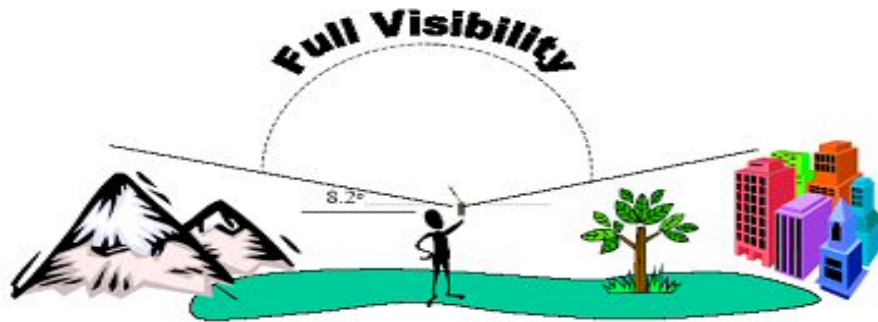
Iridium continually strives to provide high quality voice and data communication links for its subscribers. However, there are conditions that can compromise the quality of the service you may receive.

There are three common factors regarding the user's environment that can lead to degraded service quality. Obstructions, Cabling and Interference

Obstructions.

For best performance, the user's antenna must be able to "see" the entire sky from approximately 8 degrees above the horizon. Nearby tall buildings or similar structures, heavily leafed trees, mountains, etc. can degrade performance as they block the signal between the equipment's antenna and the satellites. Having a completely open view of the sky plays a very important role in maximizing performance, as the Iridium satellites cross the sky from horizon to horizon during a call connection.

A good rule of thumb is that all surrounding obstructions should be lower than the top of a fist which is extended at arms length and the bottom of the fist placed on the horizon. Note that Iridium performance is immune from natural environments such as clouds, fog, rain, snow, wind and smoke.



Cabling.

Using an externally (outside) mounted antenna provides an ideal solution for many applications. If you have or plan to install an external antenna, note that it is very important that the cables used for these installations must meet the guidelines that Iridium has established for proper performance.

For optimal performance, we recommend using the shortest length of cable and the fewest number of connectors possible.

RF Interference.

All wireless devices, including satellite telephones, are susceptible to RF (radio frequency) interference from other electronic devices. This problem is especially evident when numerous antennas and broadcasting devices are located within close proximity to each other.

A good example would be onboard a ship. It is important that certain considerations be taken into account for best performance when an Iridium system is installed.

Causes of RF Interference

Some subscribers have contacted Iridium regarding the loss of signal quality when they operate their equipment near active INMARSAT terminals. The power with which INMARSAT units transmit can overpower the Iridium unit's ability to properly maintain a quality connection with the Iridium satellite constellation. INMARSAT terminals are often found in the same locations as Iridium subscribers, such as harbors, airports and especially onboard ships.

The location of the INMARSAT unit's antenna in relation to the Iridium unit's antenna plays a significant role in determining the degree of signal degradation that an Iridium subscriber can expect to experience. All Iridium units are susceptible to this interference, regardless of the type of antenna being used.

Generally speaking, an Iridium unit, be it a handset using its integral antenna or a fixed terminal when attached to an externally mounted antenna and located within 15 and 45 meters (50 to 150 feet, respectively) of an operating INMARSAT mini-M or Standard-C terminal, will likely experience degraded performance.

Other sources of RF interference such as Globalstar units, radar devices and broadcast stations can provide interference for Iridium units, but usually are not encountered as frequently as INMARSAT terminals.

Symptoms of RF Interference

Symptoms of RF interference often resemble those that arise when an Iridium phone is being operated with an obstructed view of the sky.

Some of these symptoms include; erratic or no signal strength indication, dropped calls or warbled or otherwise distorted voice.

These symptoms may be intermittent or persistent, depending largely on the interference source, its distance, strength and frequency relative to the Iridium unit.

Mitigation of RF Interference

Degradation of service due to RF interference to the Iridium unit can be significantly improved by either or both of the following:

- a) Increasing the distance and moving the Iridium antenna off axis from the source of the interference, and
- b) Using an external band pass filter and an external antenna.

In determining the optimal location for mounting an external Iridium antenna in a location where INMARSAT antennas are also located, be certain that the Iridium antenna is mounted either to the side or behind the INMARSAT antenna, and above or below it.

Also note that the length of the feed line (the cable running from the Iridium unit to the antenna) plays an important role in the performance of the unit.

In addition to installing the Iridium antenna off-axis and away from the INMARSAT antenna, installing a band pass filter between the Iridium unit and its external antenna will provide the best protection from RF interference and degraded performance. The use of a band pass filter, which at the present time is designed for fixed installations only, will significantly improve the overall performance of the Iridium terminal.

Specification Summary

Electrical	
Power	4.4V DC
Plug-pack (if provided)	90-250VAC 50/60Hz input
Power Consumption (Aver	4.4 Volt Only
Standby Mode	0.1A
Talk/Transmit Mode	0.A
Modem Type	Hayes Compatible
Speed	2400 bps
EMC Compliance	C-Tick and A-Tick, CE mark
Environmental	
Operating Temperature Range	-20°C to +55°C ambient
Operating Humidity Range	<85% RH non-condensing
Storage temperature	-40C to +70C
Weight	0.6 kg / 600 grams
Dimensions	200x1100x40mm

RS232 Specification

The RST600 is provided with an RS232 serial ports for data connection. The 9-pin D-type (female) sockets, wired DCE for connection to a standard PC with a 1:1 cable.

Physical Connection

The pin-out of both connectors is described in the following table:

Pin	Signal	Direction	Description
1	DCD	RST PC	Data Carrier Detect
2	RXD	RST PC	Received Data
3	TXD	PC RST	Transmitted Data
4	DTR	PC RST	Date Terminal Ready
5	GND		Signal Ground (Common)
6	DSR	RST PC	Data Set Ready (CTS and DCD)
7	RTS	PC RST	Request to Send
8	CTS	PC RST	Clear to Send
9	RI	RST PC	Ring Indicate

RS232 Port Signal Support and Handshaking

The Data port supports full software XON/XOFF handshaking on data (AT commands bypass this as usual for Hayes modems) or full hardware handshaking on RTS/CTS with DCD carrier indication.

RS232 Port Electrical Parameters

The LBT Data Port conform to the RS232 interface specification with the following parameters:

Parameter	Specification
Communication Rate	220 to 115,200 Baud
Protocol	1 start bit, 8 data bits, no parity, 1 stop bit, asynchronous.
Voltage Levels and Sensitivity	RS232 compliant

Troubleshooting the RST600

This chapter provides information to help you troubleshoot problems you may encounter while running the RST600.

Q No power on RST600

A Check power is connected and AC available to the plug pack

Q RST600 fails to register with the Iridium service after 30 seconds

A Check power connection
Check Antenna connection and location
Ensure SIM is inserted
Check correct power supply is being used

Q PC cannot connect to RST600

A Check that the correct cable is used on the correct port, and that the bit rate is set the same for both PC and RST600

Q You can't make calls.

A Check that the antenna is properly mounted.
Do you have a clear view of the sky?
Did you enter the number in international format?
All calls made from the Iridium System require a special calling sequence; please refer to your Service Provider for these details.
Check the signal strength meter. If the signal is weak, move the antenna to a more open area.
Check the Network Selection settings.
Check your Operator coverage map.
Is Restricted displayed? Check the Call Barring setting.
Has a new SIM card been inserted?

Q You can't receive calls

A Check to see that your phone is powered on.
Check the antenna. Is it properly mounted?
Do you have a clear view of the sky?
Check the signal strength. If the signal is weak, move the antenna to a more open area.
Check the Call Forwarding and Call Barring settings.

Q You can't make international calls.

A Have you included the relevant codes? Press and hold the (+) key to display the international dialling prefix (+), and then enter the appropriate country code, followed by the phone number.

Q Your PIN is blocked

A Enter the PIN unblocking key (PUK1) or contact your service provider

Q Your PIN2 is locked.

A Enter the PIN2 unblocking key (PUK2) or contact our service provider.

Q Your SIM card won't work.

A

- Is the card inserted the correct way?
- Is the SIM gold chip visibly damaged or scratched? Return the card to your service provider.
- Check the SIM and phone contacts. If they are dirty, clean them with an antistatic cloth.

Q You can't cancel call forwarding or call barring

A Wait until you are in an area with good network coverage and try again.

Q Your PIN is blocked

A

- Check Card or Insert Card.
- Check the card is inserted correctly
- Check the contacts of the card are clean
- Clean the chip with a soft cloth
- See your Service Provider if continues



Beam Warranty Conditions

Beam Communications gives this express warranty (along with extended warranty endorsements, where applicable) in lieu of all other warranties, express or implied, including (without limitation), warranties of merchantability and fitness for a particular purpose. This constitutes our sole warranty and obligation with regard to our products as well as the Customer's sole remedy.

Beam Communications expressly disclaims all liability and responsibility for any special, indirect or consequential damages or any further loss of any kind whatsoever resulting from the use of our product(s). The Customer's sole and exclusive remedy and the limit of Beam's liability for any loss whatsoever, shall not exceed the purchase price paid by the Customer for the product to which a claim is made.

All products manufactured by Beam Communications are warranted to be free from defects in material and workmanship in accordance with and subject to the following terms and conditions:

1. This warranty is limited to the original Customer only. It cannot be transferred or assigned to third parties unless the intent to transfer to a third party is expressly indicated in a purchase order and/or warranty-processing arrangements have been agreed upon in writing by Beam.
2. Beam Communications does not warrant any installation, maintenance or service of the Products not performed by Beam, nor does it warrant the use of Products with unapproved ancillary products.
3. Beam Communications will correct any defects in material or workmanship of products manufactured by Beam which appear within (12) months, from the date of shipment by Beam Communications to the Customer. Beam Communications will repair or replace, at our option, any defective product, provided that our analysis and/or inspection discloses that such defects developed under normal and proper use.
4. This warranty does not extend to goods subjected to liquid or particulate ingress, extreme humidity, misuse, neglect, accident or improper installation, or to maintenance or repair of products that have been altered or repaired by anyone except Beam Communications unless otherwise stated in writing.
5. The warranty is a return-to-base warranty and freight is paid by the sender.
6. A charge of USD150 including return freight will be made for testing returned product which is not defective or is found to be defective as the result of improper use, maintenance or neglect.
7. Beam Communications will not accept responsibility for any invoiced goods or services that are not covered by a Beam Communications written purchase order. Under no circumstances does Beam Communications agree to pay for labour or other related expenses associated with the troubleshooting and/or repair of our product without prior specific written authorization.
8. Information in our descriptive literature is based on product specifications that are current at the time of publication. Product specifications, designs and descriptive literature are subject to change as improvements are introduced. Although we announce changes as they occur, we cannot guarantee notification to every Customer. Beam Communications warrants delivered product to conform to the most current specifications, designs and descriptive literature.
9. This warranty policy may be expanded or limited, for particular categories of products or Customers, by information sheets published as deemed appropriate by Beam Communications. In particular, the warranty for third party Products is that of the third party and not Beams warranty.