CHAPTER 2

SYSTEM SETUP AND TEARDOWN

2.1 ITEMS INCLUDED WITH RF-7800B BGAN TERMINAL

The standard items included with the Broadband Global Area Network (BGAN) terminals are described below. Refer to Paragraph 1.9 for optional accessories.

RF-7800B-VU104 Land Mobile BGAN Terminal includes the following. See Figure 2-1.

- 12043-0833-A010 BGAN to Ethernet Cable, 10 feet
- 12043-0843-A015 Automobile 12 VDC Power Cable, 15 feet
- 12091-0040-10 BGAN Terminal, Class 10 Land Mobile, Tan

RF-7800B-DU024 Land Portable BGAN Terminal includes the following. See Figure 2-2.

- 12043-0833-A010 BGAN to Ethernet Cable, 10 feet
- 12043-0844-A1 AC to DC Power Supply (includes international plug adaptor kit). Refer to Paragraph 2.5.3.
- 12091-0020-10 BGAN Terminal, Class 2 Land Portable, Tan

NOTE

For BGAN network access, contact your service provider for a Universal Mobile Telecommunications System (UMTS) Subscriber Identification Module (SIM) (USIM) and its Personal Identification Number (PIN), and Satellite Terminal configuration instructions.

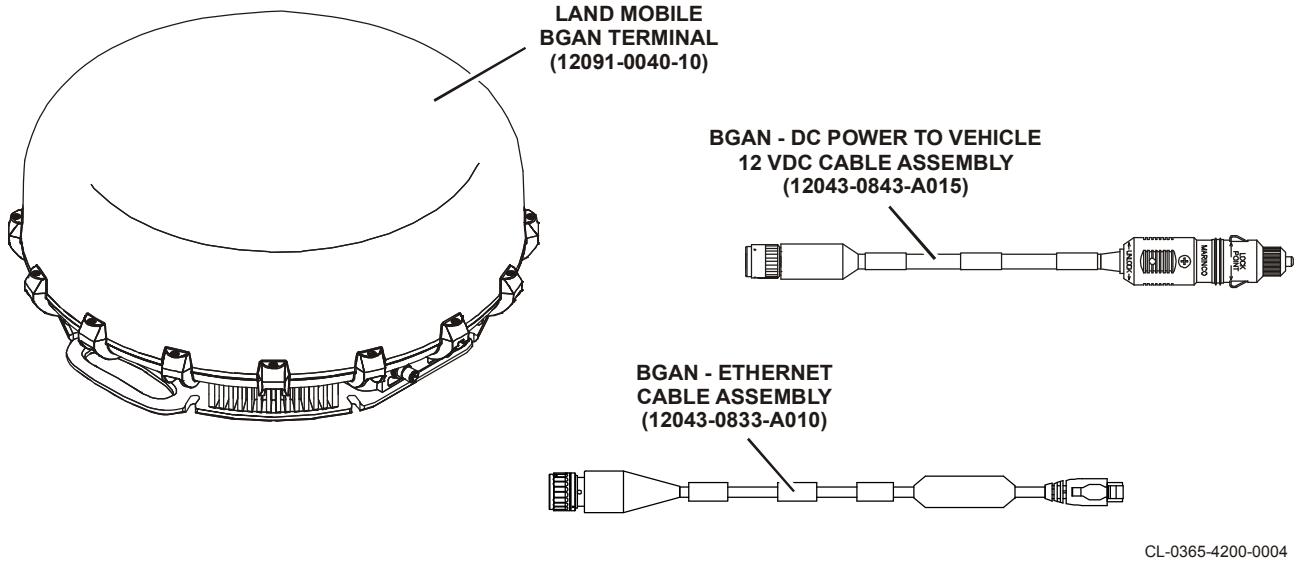

Figure 2-1. Items Included with RF-7800B-VU104

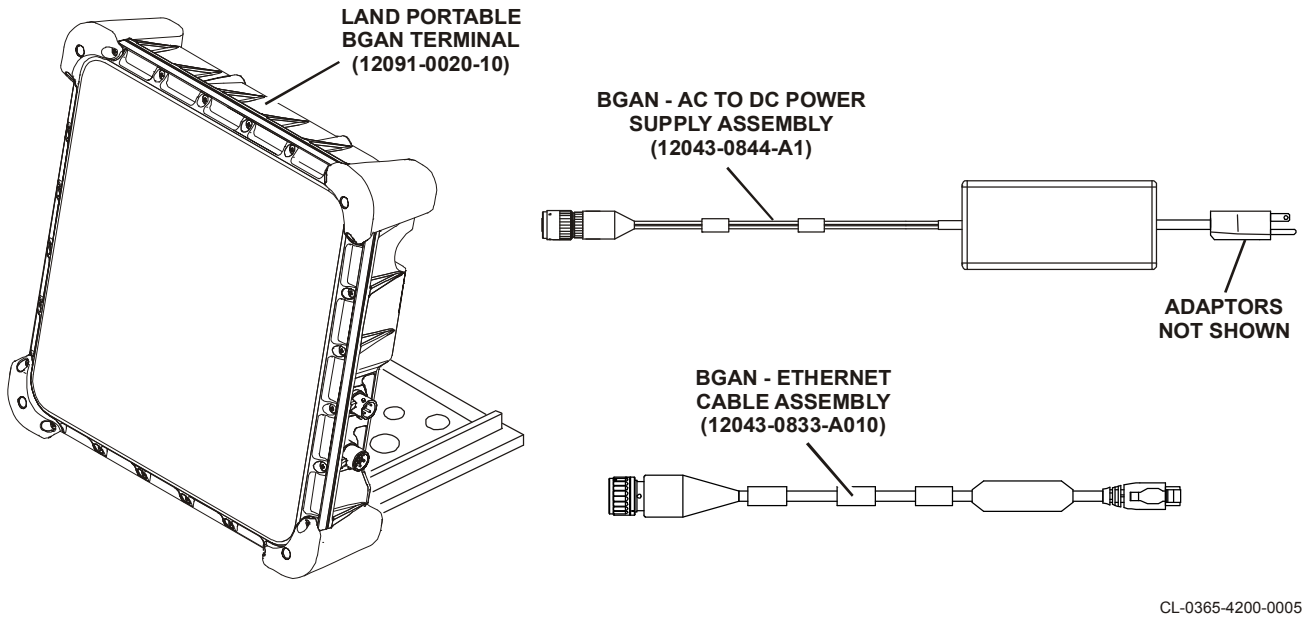

Figure 2-2. Items Included with RF-7800B-DU024

2.2 INSTALLATION GUIDELINES

The information contained here provides general guidelines for installing the BGAN terminal. Read this chapter in its entirety before beginning installation.

2.2.1 Environmental

The BGAN terminal will perform in the environment specified in Table 1-1.

WARNING

Do not operate the BGAN terminal during electrical storms. Disconnect the terminal from the computer and radio and store the unit indoors if lightening is anticipated in the area of operation. Electrocution may result in severe personal injury or death.

WARNING

Never use the BGAN terminal where blasting work is in progress. Observe all restrictions and follow any regulations or rules. Do not use the terminal while at a fuel filling station, do not use near fuel or chemicals. areas with potentially explosive environments are often, but not always, clearly marked.

CAUTION

Avoid placing BGAN terminal near any source of heat such as an open flame or cigarettes.

2.2.2 Dimension and Weight Information

Refer to Table 1-1 for the dimensions and weights.

2.2.3 Power Requirements

Refer to Table 1-1 for power requirements. Refer to Paragraph 1.9 for the various optional power cables available.

2.2.4 Grounding

Neither the RF-7800B-VU104 or RF-7800B-DU024 require mounting on a ground plane for performance.

2.3 UNPACKING AND REPACKING

Equipment is packed in corrugated boxes. A two-piece foam enclosure protects the equipment against corrosion and rough handling. Boxes and packing materials should be retained in case the equipment is reshipped.

2.3.1 Unpacking

Perform the following procedure to unpack the BGAN terminal:

a. Inspect the exterior of the box for signs of damage during shipment. Document any problems and report them to the proper authority.

b. Move the boxed equipment to the general location where it is to be installed.

c. After removing the equipment, check the contents against the packing slip to see that the shipment is complete. Report discrepancies to Harris/RF Communications Product Service Department (telephone: 585-244-5830, toll free: 866-264-8040, web: https://premier.harris.com/rfcomm).

2.3.2 Repacking

Perform the following procedure to repack the BGAN terminal:

a. Use the original box, if it was retained. If not, use a box that allows at least three inches of clearance on all sides of the BGAN terminal components.

b. Use the original packing material, if it was retained. If not, use foam packing material to fill the space between the BGAN terminal components and the box. Surround the entire unit with several inches of foam packing material.

c. Use a good quality packing tape (or straps) to seal the box after closing.

2.4 BGAN TERMINAL SETUP

After receiving the USIM card from your BGAN service provider, install the card into the BGAN terminal.

2.4.1 Installing USIM in RF-7800B-DU024

Perform the following procedure to install the USIM/SIM in RF-7800B-DU024:

a. Position the BGAN terminal so that the bottom surface is facing you.

b. Remove the four screws and the USIM plate to access the USIM card holder. See Figure 2-3.

c. Put your index finger on the USIM holder and rotate counterclockwise to open. See Figure 2-4.

d. Lift the USIM card holder up in order to place the USIM card in the holder. See Figure 2-5.

NOTE

Do not bend or damage the USIM/SIM. Damaged contacts may cause the card not to work.

CAUTION

USIM cards are sensitive to electrostatic discharges.

e. Install the USIM card in the card holder making sure the gold contacts are facing down. The angled part of the USIM is in the upper right-hand corner. See Figure 2-5.

f. With the card in place, push the holder down and with your index finger, rotate the locking mechanism clockwise to lock card in place. See Figure 2-6.

g. Put the USIM plate back on and tighten the four screws. See Figure 2-3.

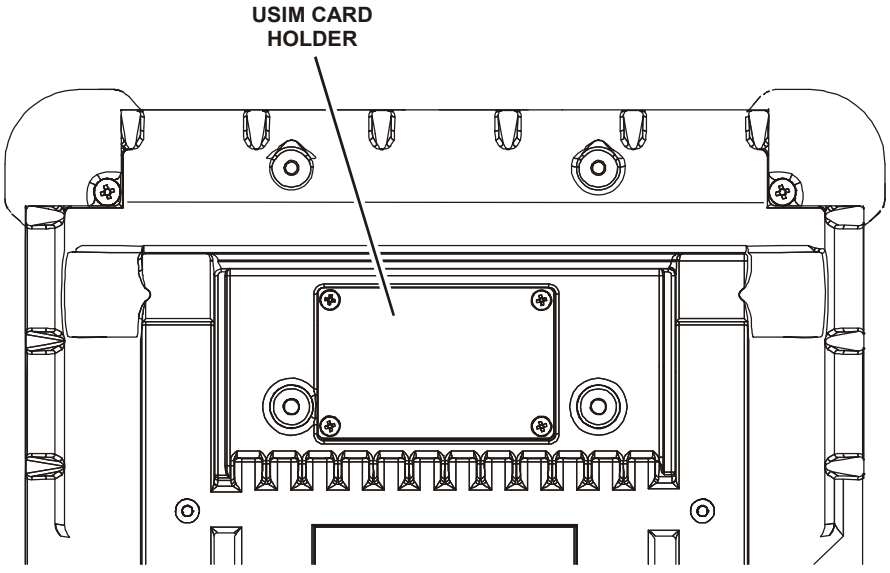

Figure 2-3. Accessing the USIM Card Holder on RF-7800B-DU024

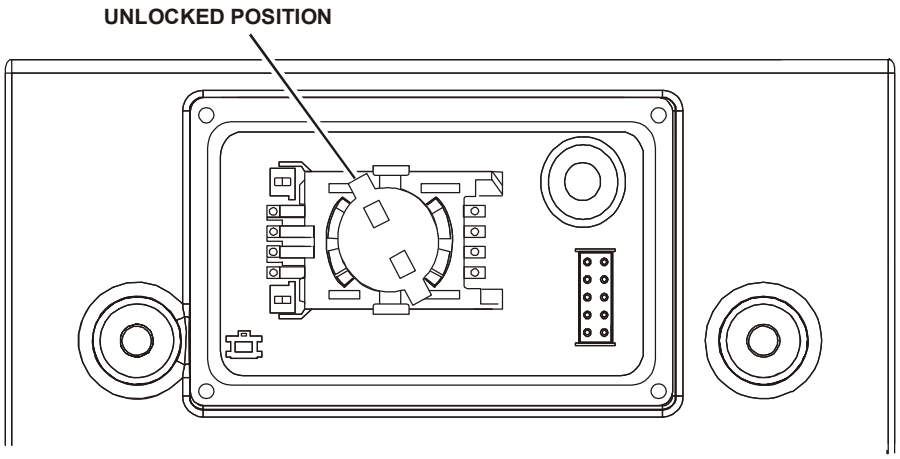

Figure 2-4. Opening the USIM Card Holder on RF-7800B-DU024

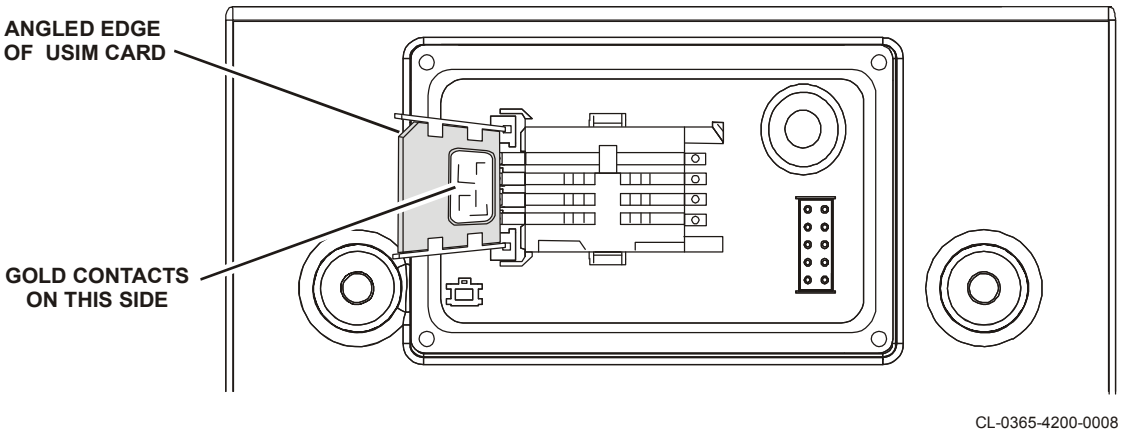

Figure 2-5. Placing the USIM Card in Holder on RF-7800B-DU024

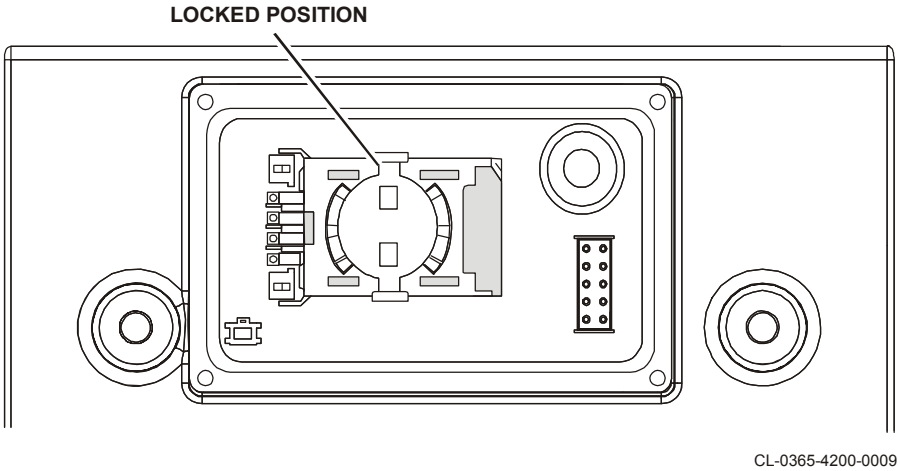

Figure 2-6. USIM Card Located in Holder on RF-7800B-DU024

2.4.2 Installing USIM in RF-7800B-VU104

Perform the following procedure to install the USIM/SIM in the RF-7800B-VU104:

a. Position the BGAN terminal with the topside down onto a smooth/soft surface to prevent scratching the radome and with the bottom surface facing you.

b. Remove the four screws and the USIM plate to access the USIM card holder. See Figure 2-7.

c. Put your index finger on the USIM holder and rotate counterclockwise to open.

d. Lift the USIM card holder up in order to place the USIM card in the holder. See Figure 2-8.

NOTE

Do not bend or damage the USIM/SIM. Damaged contacts may cause the card not to work.

CAUTION

USIM cards are sensitive to electrostatic discharges.

e. Install the USIM card in the card holder making sure the gold contacts are facing down. The angled part of the USIM is in the upper right-hand corner. See Figure 2-8.

f. With the card in place, push the holder down and with your index finger, rotate the locking mechanism clockwise to lock card in place.

g. Put the USIM plate back on and tighten the four screws. See Figure 2-7.

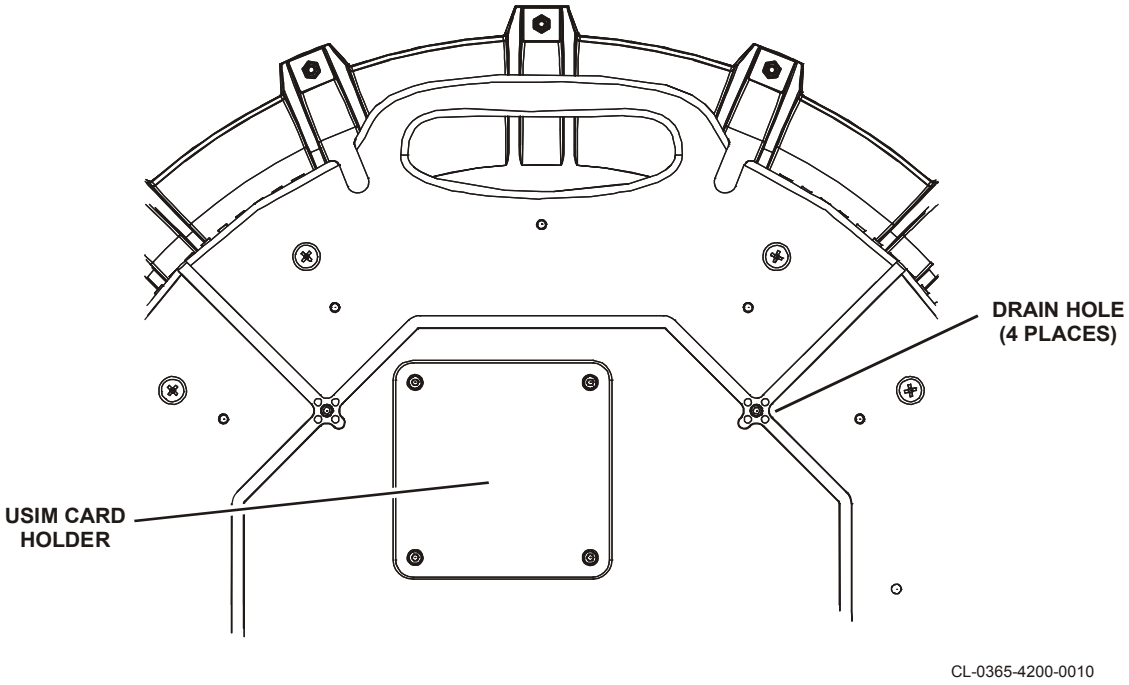

Figure 2-7. Accessing the USIM Card Holder and Drain Holes on RF-7800B-VU104

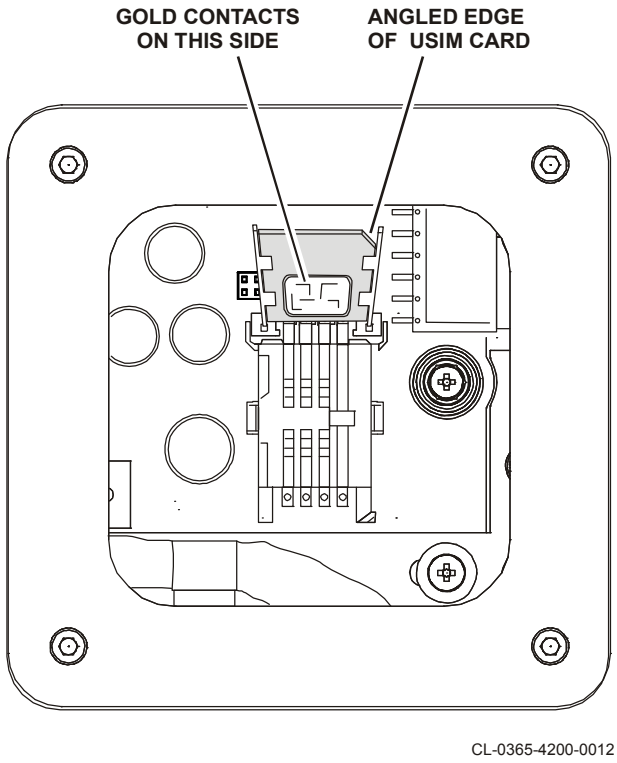

Figure 2-8. Placing the USIM Card in Holder on RF-7800B-VU104

2.5 INSTALLATION PROCEDURES

The paragraphs that follow describe the installation of an BGAN terminal.

2.5.1 RF-7800B-VU104 Installation

RF-7800B-VU104 is intended for installation onto a vehicle roof. Some installation hardware may need to be installer furnished. Tools and installation materials will vary for each application.

a. The four drain holes on the bottom of the RF-7800B-VU104 are shipped in the open position. See Figure 2-7. This allows any moisture from condensation to drain out. If the operational conditions require that these be closed, periodic maintenance to open these and drain any moisture will be required. Refer to Paragraph 5.1.

b. If using a magnetic mount, place BGAN terminal on roof of vehicle. Make sure the area is clear before mounting the antenna using the magnetic mounts. If the mounting area is dirty or covered with snow or ice, the strength of the magnetic mounts may be compromised.

c. If mounting the BGAN terminal on a flat surface using 0.213 - 0.312 inch bolts with 5/16-inch hole stainless steel flat washers, and 5/6-inch nut, do the following:

   1. Make hole pattern template from RF-7800B-VU104 mounting holes.

   2. Place template on flat mounting surface and drill holes.

   3. Mount RF-7800B-VU104 using 0.213 - 0.312 inch bolts with 5/16-inch hole stainless steel flat washers, and 5/6-inch nut.

d. If mounting the BGAN terminal using a pole mount mast assembly, do the following:

   1. Mount the base of the pole mount on a standard 4-bolt antenna base which can support up to 50 pounds (22.68 kg). See Figure 2-9.

   2. Mount the BGAN terminal to the pole mount mast.

e. Make data and power connections. Refer to Paragraph 2.5.3.

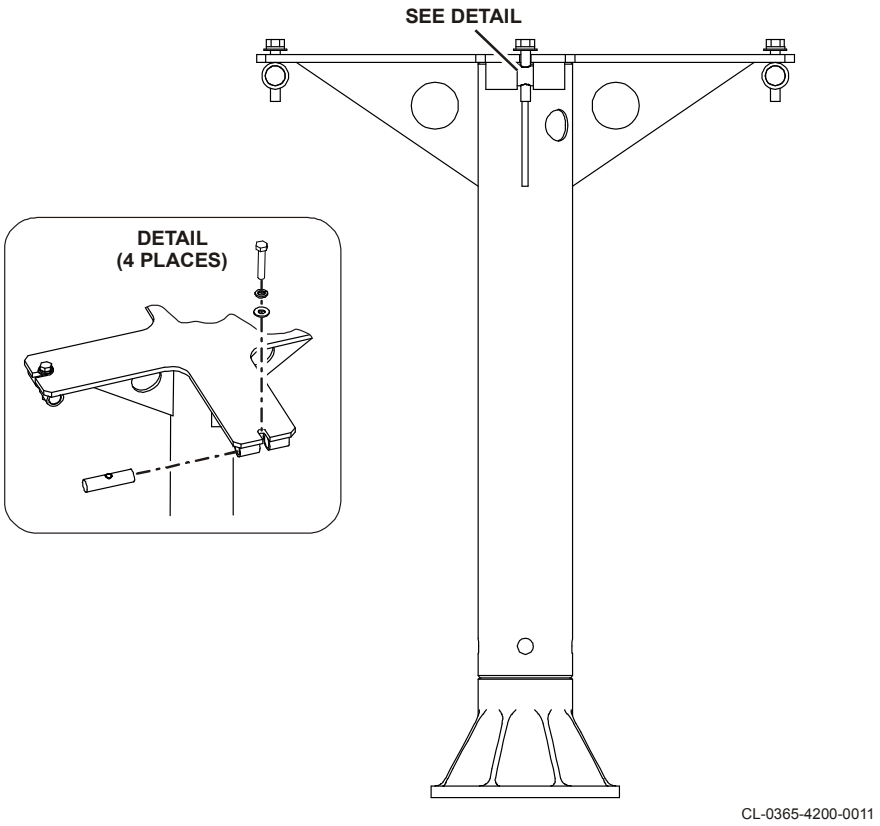

Figure 2-9. Pole Mount Option

2.5.2 RF-7800B-DU024 Fixed/Semi-fixed Installation

The Land Portable BGAN Terminal can be mounted on a pole or flat surface (such as a wall or roof) using the Fixed Mount Kit, 12091-4150-01. See Figure 2-10. This kit includes a universal pole mount, incline bracket, bubble level indicator and holder, pole ground cable, and four terminal mounting screws. Items required to mount the universal pole mount to a structure are customer furnished. Proper installation ensures that the BGAN terminal is always correctly pointed at the satellite. The BGAN terminal can then be left alone for an extended period of time without having to be re-pointed or set-up. The fixed mount kit accessory can be re-used to install the BGAN terminal in different locations.

When mounted in a location where access to the BGAN terminal may not be straightforward (for example, mounted high on a wall), set the BGAN terminal to recover automatically after a power outage. To permit this fixed installation, modify the following BGAN terminal properties using the embedded Web interface. See Figure 4-2.

- Auto Power On mode is enabled
- Bypass Antenna Pointing is enabled

The following items are found in the Fixed Mount Kit, 12091-4150-01. Mount to a suitable surface.

- Fixed Mount Screws
- Mounting bracket and shaft
- Level
- Grounding strap

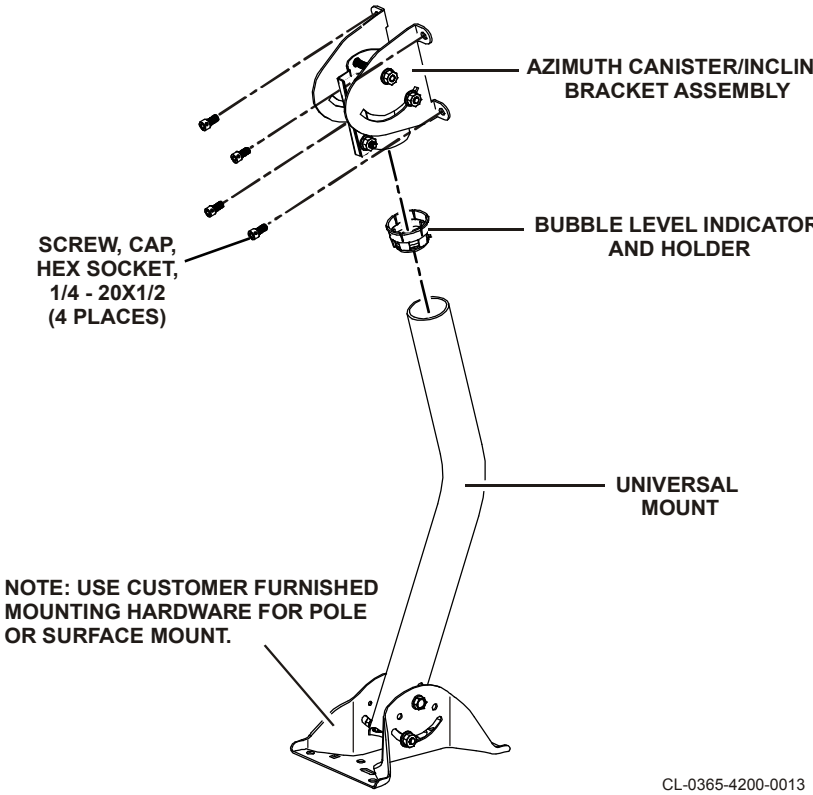

Figure 2-10. Fixed Mount Option

2.5.3 Cable Connections

For connector pinouts, refer to Paragraph A.1. See Figure 2-11 for some installation options. Refer to Paragraph 3.3 for detailed connection information. In general, install the following:

- Data cable between BGAN terminal and computer
- Power cable between BGAN terminal and power source. For the RF-7800B-DU024 using the BGAN, AC to DC Power Supply Assembly with plug kit, use one of the following plugs:
  - ST-5: United States, Canada, Japan, China, Taiwan
  - ST-7: United Kingdom, Hong Kong, Singapore
  - ST-9: Germany, France, Indonesia, Korea
  - ST-16: Australia, New Zealand, China
  - ST-9C: European Union, United Arab Emirates, South America

NOTE

Do not use excessive force when connecting the data and power cables to the BGAN terminal. Connectors are keyed.

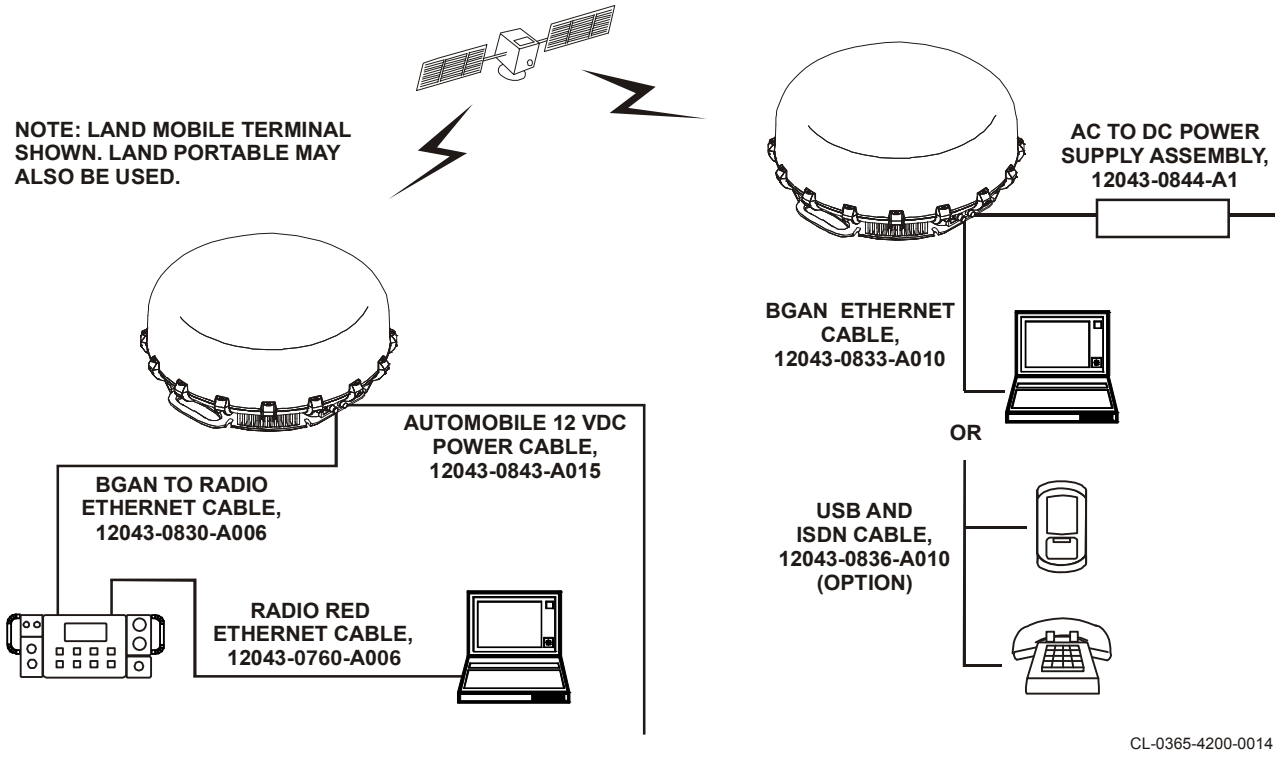

Figure 2-11. Cabling Options

2.5.4 Protecting Connectors

If connectors are to be exposed to a wet or humid environment for extended periods of time, protect the exposed connectors as follows:

a. Silicone Grease (Dow Corning DC-5 or Similar Corrosion Preventative Compound)

Coat all ground connections with silicone grease or an equivalent dielectric compound. Apply a coating approximately 1/8-inch (0.32 cm.) thick. This coating will prevent deterioration of the antenna connection and its associated hardware. This will also protect the insulator from conductive contaminants that could degrade the insulating properties of the connector system, such as oil, dirt, dust, and corrosive material from the atmosphere. This is especially important in a salt-laden air environment.

b. Electrical Tape (3M Company 33+, Permacel 29R or similar)

Wrap connectors exposed to weather with several layers of weather-resistant electrical tape or similar product (3M Company 33+, Permacel 29R). Wrap the tape as close as possible to the case, and far enough up the cable to prevent moisture from contacting any part of the connector.

2.6 INITIAL TURN-ON / CHECK

Once the system is installed, verify that the BGAN terminal is operational. Perform the following:

a. Make sure the data cable is connected to BGAN terminal and computer.

b. Make sure the power cable is connected to BGAN terminal and power source.

c. Use a web page to log into BGAN terminal using its Internet Protocol (IP) address. Default is http://192.168.128.100.

d. If necessary, the network connection of a Microsoft Windows computer can be set up to accept a dynamic IP address as follows (BGAN terminal acts as a Dynamic Host Configuration Protocol (DHCP) server:

   1. Select **Start > Settings > Networks and Connections**.

   2. Select Local Area Connection and select **Properties** from the context menu.

   3. Select the Transmission Control Protocol/Internet Protocol (TCP/IP) connection and select the **Properties** button.

   4. Select **Obtain an IP address automatically** from the General tab of the TCP/IP Properties page.

   5. Select **OK** to close the TCP/IP Properties page and **OK** again to close the Local Area Connection Properties page.

CHAPTER 3

OPERATION

3.1 INTRODUCTION

The Broadband Global Area Network (BGAN) terminal contains an integrated Global Positioning System (GPS) receiver that is used to provide location information to the BGAN system. GPS location information is required to register with the BGAN system, and the BGAN terminal automatically tries to get a GPS position fix every time it is powered up.

The GPS antenna is located in the main antenna. For optimum GPS signal reception, make sure the BGAN Terminal is placed in a horizontal position pointed towards the sky. Since the GPS receiver needs to see at least three satellites, it should have visibility of a large part of the sky without obstructions from buildings, mountains or trees. So it might be necessary to take the BGAN terminal out to a clear space to obtain a new GPS location. It may be possible to obtain a new GPS location in a less favorable circumstance, but the time to get the fix may be longer.

3.2 OPERATIONS TASK SUMMARY

Perform the following task to begin using the BGAN terminal that has been setup with a Subscriber Identity Module (SIM) card.

- Make cable connections
- Position the Land Portable BGAN Terminal (RF-7800B-DU024)
- Turn on the BGAN terminal and use pointing tones to locate satellite
- Verify connection to the BGAN network

RF-7800B-VU104 has no controls or indicators.

RF-7800B-DU024 has a power switch on the side .Refer to Paragraph 3.5. Switch positions are: Off, On, and On with Pointing Tones. On with Pointing Tones is used to accurately point the terminal toward the satellite for optimal data throughput.

3.3 MAKE CABLE CONNECTIONS

Connectors for RF-7800B-VU104 are shown in Figure 3-1. Connectors for RF-7800B-DU024 are shown in Figure 3-2. Connect the power and data cables to the BGAN terminal. Engage the connector locking mechanism to secure the cable to the BGAN terminal.

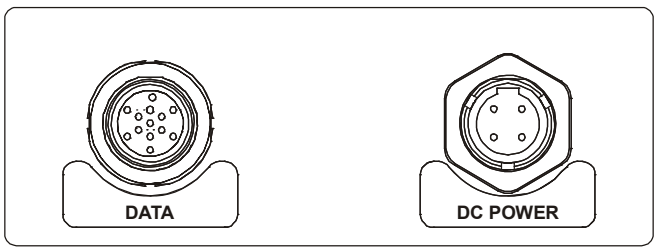

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Figure 3-1. RF-7800B-VU104 Connectors

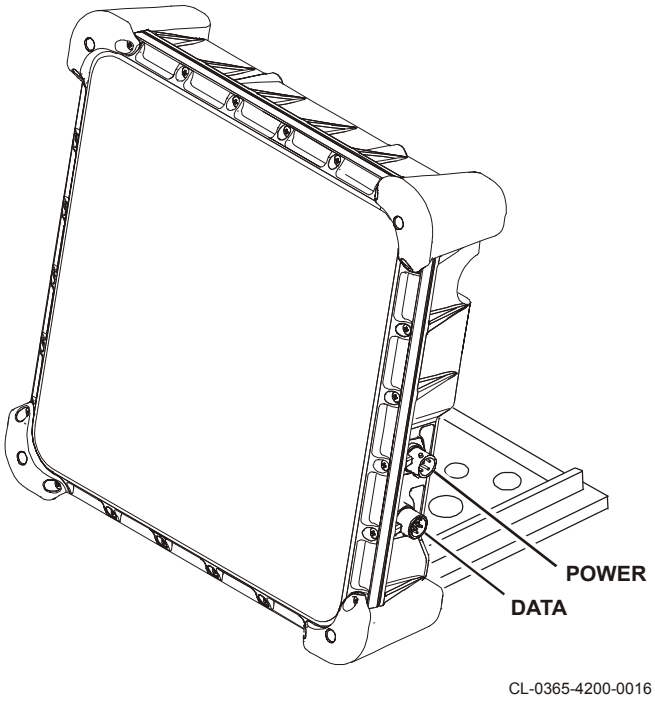


Figure 3-2. RF-7800B-DU024 Connectors

3.3.1 Data Connections

Make a data connection to a computer, radio, an Internet Protocol (IP) encryption device, or an ISDN device. The Data Extension Cable for Ethernet & ISDN, 12043-0837-A0xx, can be used to extend the terminal data connection out 15, 25, or 50 feet (4.57, 7.62, or 15.24 meters).

- Ethernet
- Universal Serial Bus (USB)
- Integrated Services Digital Network (ISDN)

3.3.1.1 Connect Data by Ethernet

Connect the BGAN terminal to the computer Ethernet port using an Ethernet cable supplied with the BGAN terminal or another Ethernet cable option.

- See Figure 3-3 for BGAN Ethernet Cable, 12043-0833-A010 (supplied with BGAN terminal).
- Standalone Ethernet, ISDN, USB Cable, 12043-0832-A010 (optional).
- See Figure 3-4 for Standalone Ethernet and ISDN Cable, 12043-0834-A010 (optional).

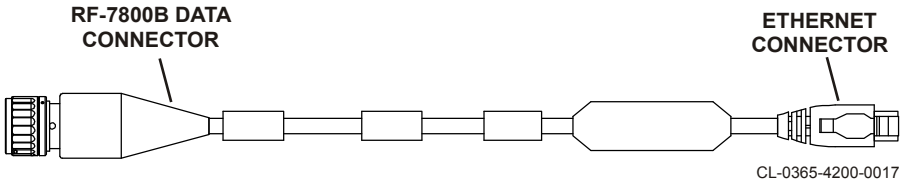


Figure 3-3. BGAN Ethernet Cable, 12043-0833-A010

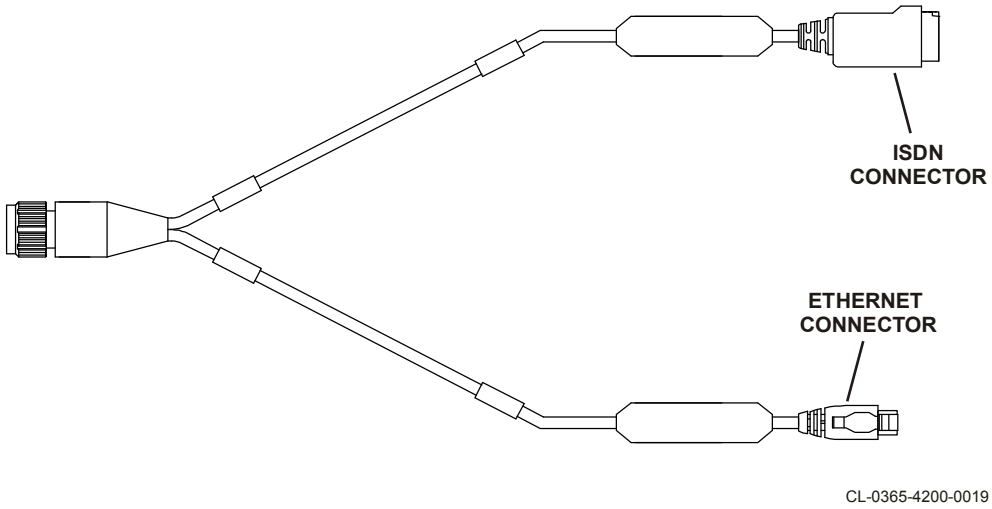


Figure 3-4. Standalone Ethernet and ISDN Cable, 12043-0834-A010 (Optional)

3.3.1.2 Connect Data by USB

Connect the BGAN terminal to the computer USB port using a USB cable option. Use Standalone Ethernet, ISDN, USB Cable, 12043-0832-A010, or Standalone USB and ISDN Cable, 12043-0836-A010 (see Figure 3-5). On first use of the USB port, the computer will detect that new USB hardware has been connected. Follow the installation instructions for the USB Local Area Network (LAN) LINK driver software.

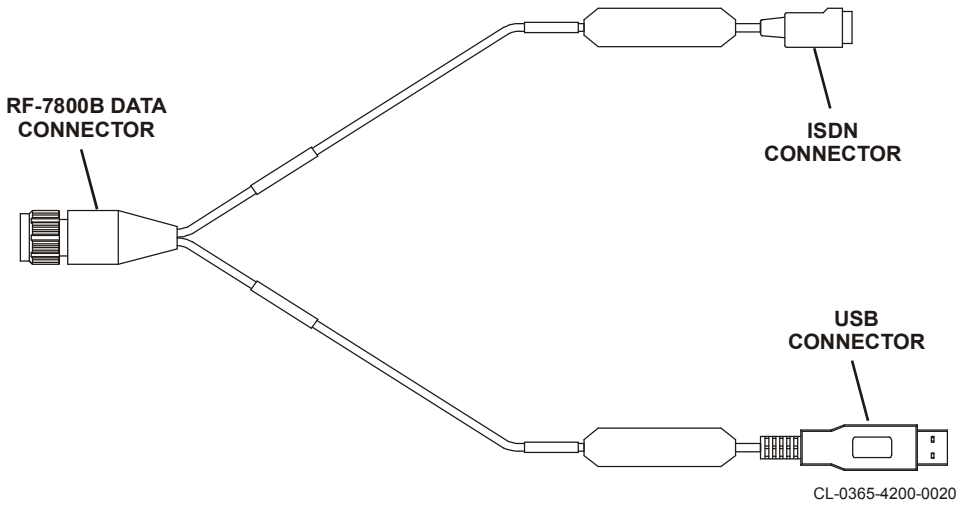


Figure 3-5. Standalone USB & ISDN Cable, 12043-0836-A010 (Optional)

3.3.1.3 Connect Data by ISDN

Connect the BGAN terminal to the computer or phone ISDN port using an ISDN cable option.

- Standalone Ethernet, ISDN, USB Cable, 12043-0832-A010.
- See Figure 3-4 for Standalone Ethernet and ISDN Cable, 12043-0834-A010.
- See Figure 3-5 for Standalone USB and ISDN Cable, 12043-0836-A010.
- See Figure 3-6 for Standalone ISDN Cable, 12043-0835-A010.

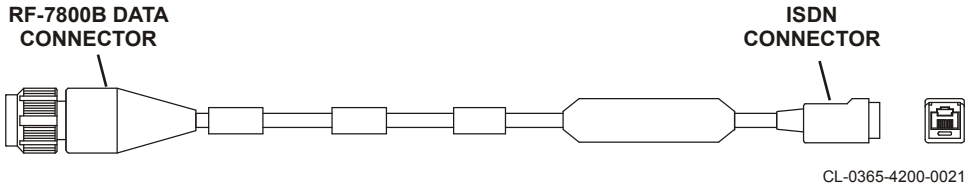


Figure 3-6. Standalone ISDN Cable, 12043-0835-A010 (Optional)

3.3.1.4 Connect Data to Radio

Connect the BGAN terminal to a radio using cable option.

- See Figure 3-7 for BGAN to Radio Black Ethernet Cable, 12043-0830-A0xx (optional).
- See Figure 3-8 for BGAN to Radio Black Ethernet and ISDN Cable, 12043-0831-A0xx (optional).

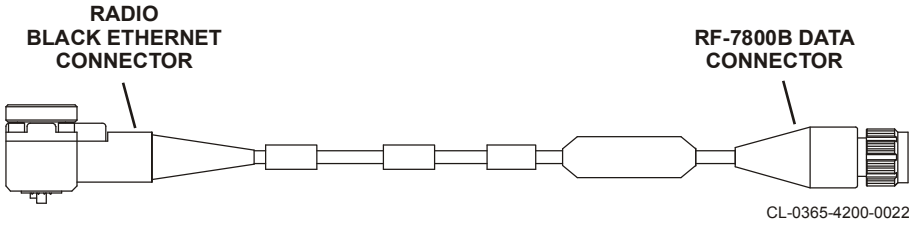


Figure 3-7. BGAN to Radio Black Ethernet Cable, 12043-0830-A006 (Optional)

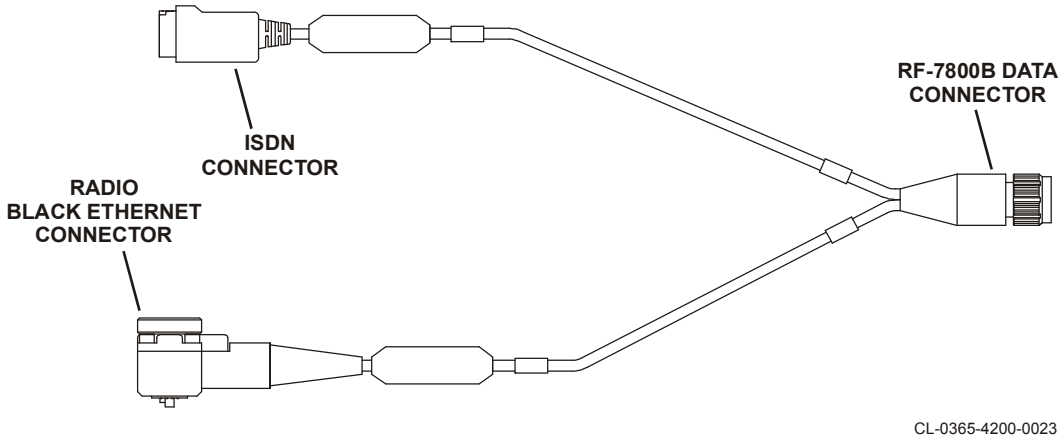


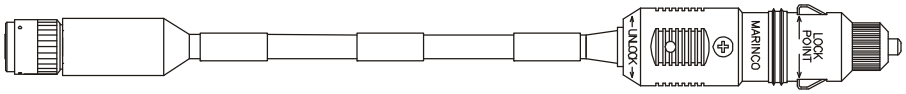
Figure 3-8. BGAN to Radio Black Ethernet and ISDN Cable, 12043-0831-A006 (Optional)

3.3.2 Power Connections

Connect the BGAN terminal to a power source as described in this section. Each of these power connection options can be extended using the BGAN DC Power Extension, 12043-0845-A015, -A025, or -A050 (includes activation). For power sources which do not have built-in current limiting or fuses, it is suggested to procure the F03-0008-906 Fuse Holder along with the F15-0012-003 Automotive Fuses (Automotive Blade, 5 A 32 V).

3.3.2.1 Connect BGAN Terminal Power to Commercial Vehicle 12 VDC

Connect BGAN terminal to a vehicle using 12043-0843-A015 Cable Assembly, BGAN, DC Power to Vehicle 12 VDC. See Figure 3-9.

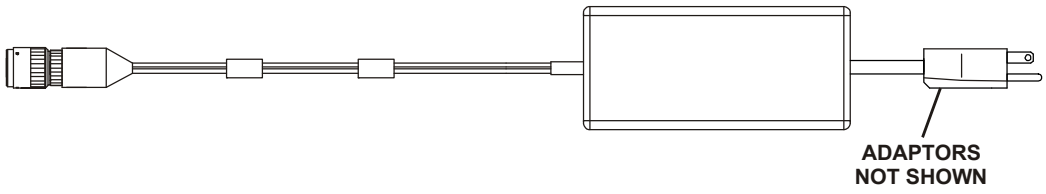


CL-0365-4200-0026

Figure 3-9. BGAN, DC Power to Vehicle 12 VDC, 12043-0843-A015

3.3.2.2 Connect BGAN Terminal Power to AC to DC Power Supply

Connect BGAN terminal to a power supply using 12043-0844-A1 Power Supply Assembly, BGAN, AC to DC. See Figure 3-10. Plug kit (not shown) includes five black plugs. Refer to Paragraph 2.5.3.



CL-0365-4200-0027

Figure 3-10. BGAN, AC to DC Power Supply Assembly, 12043-0844-A1

3.3.2.3 Connect BGAN Terminal Power to Battery

Connect BGAN terminal to a battery using 12043-0846-A010, or -A015 Cable Assembly, BGAN DC Power to 2 Leads. See Figure 3-11.

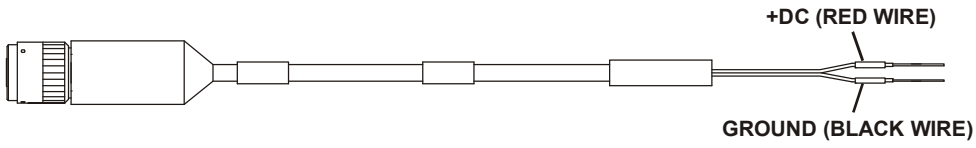


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Figure 3-11. Cable Assembly, BGAN DC Power to 2 Leads, 12043-0846-A0xx

Optionally, for RF-7800B-VU104, use the 12043-0840-A010, or -A015 Cable Assembly, BGAN DC Power to 4 Leads as follows: red (+dc), black (ground), orange (power control signal), brown (ground). See Figure 3-12. The Power Control Signal allows the BGAN terminal to be remotely powered on/off. Connecting the power control signal to ground will turn the power on to the BGAN terminal.

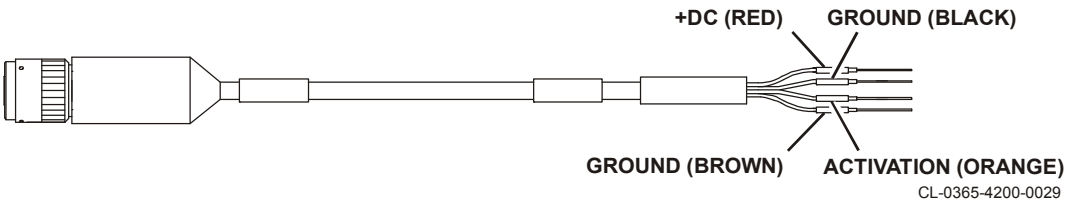


Figure 3-12. Cable Assembly, BGAN DC Power to 4 Leads, 12043-0840-A0xx

3.3.2.4 Connect BGAN Terminal Power to 26 VDC Power Supply

Connect BGAN terminal to a 26 VDC power supply (RF-505X-PS) using 12043-0841-A006, or -A015 BGAN DC Power to 26 VDC. Connect power to RF-505X-PS J15 or J16. See Figure 3-13.

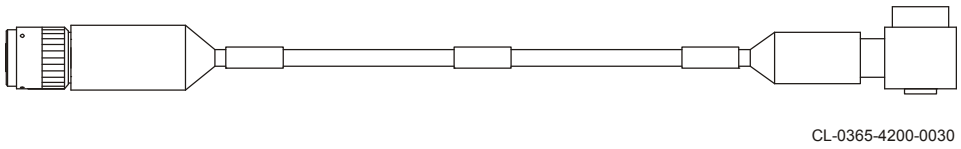


Figure 3-13. AC/DC Power Supply Cable (RF-505X-PS), 12043-0841-A0xx

Optionally, for RF-7800B-VU104, use the 12043-0842-A006, or -A015 Cable Assembly, BGAN DC Power to 26 VDC with remote On-Off as follows: P2 (26 VDC Power Supply), orange (power control signal), brown (ground). This can also be used with the 12043-0845 Power Extension Cable (extension cable plugs into BGAN power). See Figure 3-14. The power control signal allows the BGAN terminal to be remotely powered on/off. Connecting the power control signal to ground will turn the power on to the BGAN terminal.

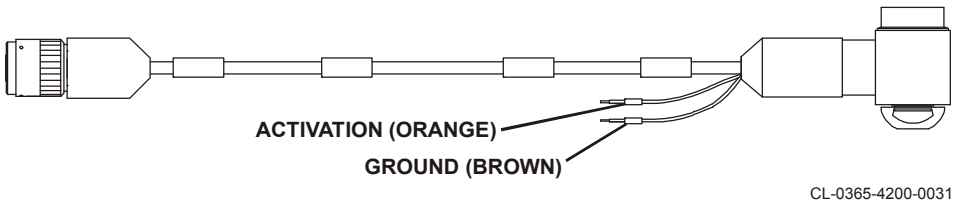
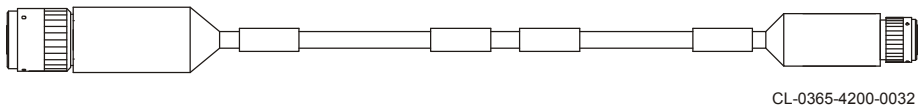


Figure 3-14. BGAN DC Power to 26 VDC/Remote On/Off, 12043-0842-A0xx

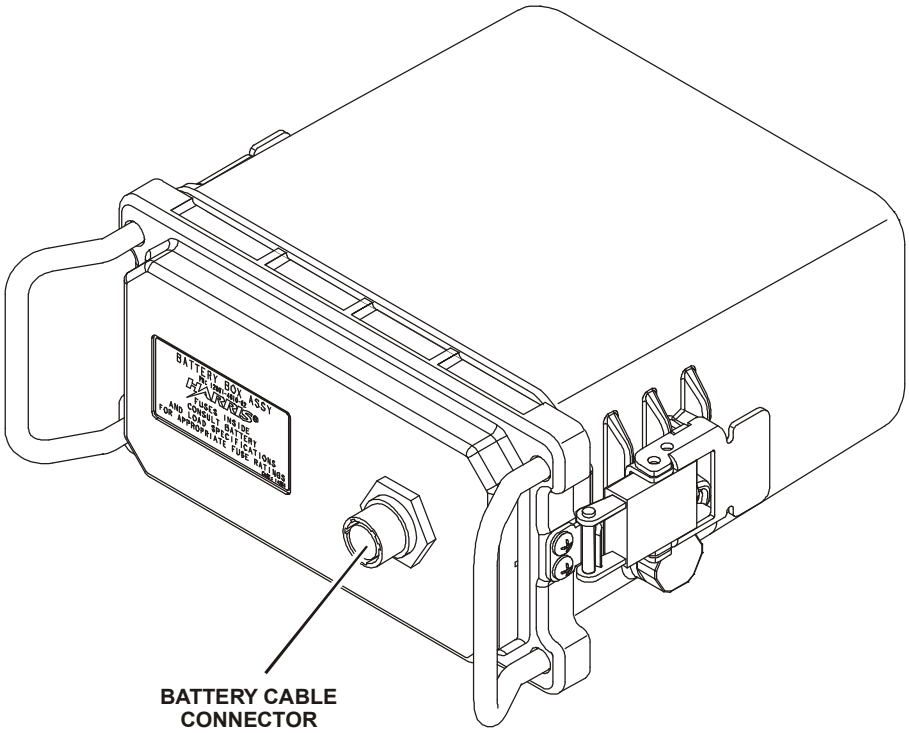
3.3.2.5 Connect RF-7800B-DU024 Power to BGAN Battery Box Kit

Connect RF-7800B-DU024 to BGAN Battery Box Kit, 12091-4010-01, using 12043-0850-A006 BGAN DC Power to Battery Box cable. See Figure 3-15. Refer to Paragraph 5.3 for information on batteries. See Figure 3-16 for Battery Box.



CL-0365-4200-0032

Figure 3-15. Battery Box Cable, 12043-0850-A006



CL-0365-4200-0037

Figure 3-16. Battery Box Kit, 12091-4010-01

3.4 USING RF-7800B-DU024 TERMINAL STAND

The Land Portable BGAN terminal stand is used to position the terminal in the correct direction.

a. Place the Satellite terminal face down on a flat surface to open up the stand. See Figure 3-17.

b. Open the stand by placing your index finger in the upper right (or upper left) hand corner of the unit and placing your other hand on the side of the unit and pulling upwards.

c. Slide out the front stabilizer. See Figure 3-18.

d. Set the Terminal back on a flat surface for pointing.

e. Make adjustments as necessary. Normally there is no need to tighten the stand using the two screws located underneath the stand. If the stand no longer can stand at the angle required for best pointing elevation, tighten the stand using the two screws located underneath the stand. See Figure 3-18.

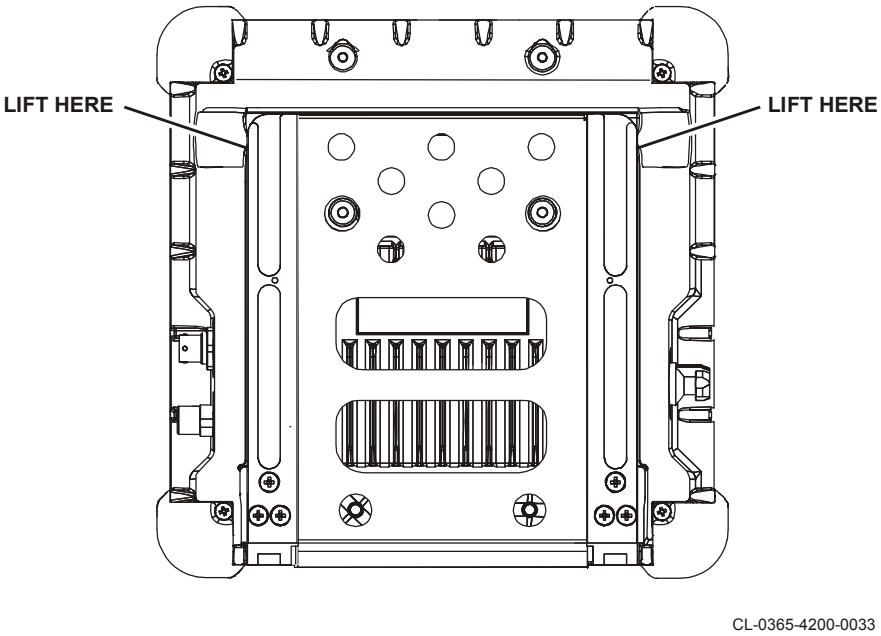


Figure 3-17. Open RF-7800B-DU024 Terminal Stand

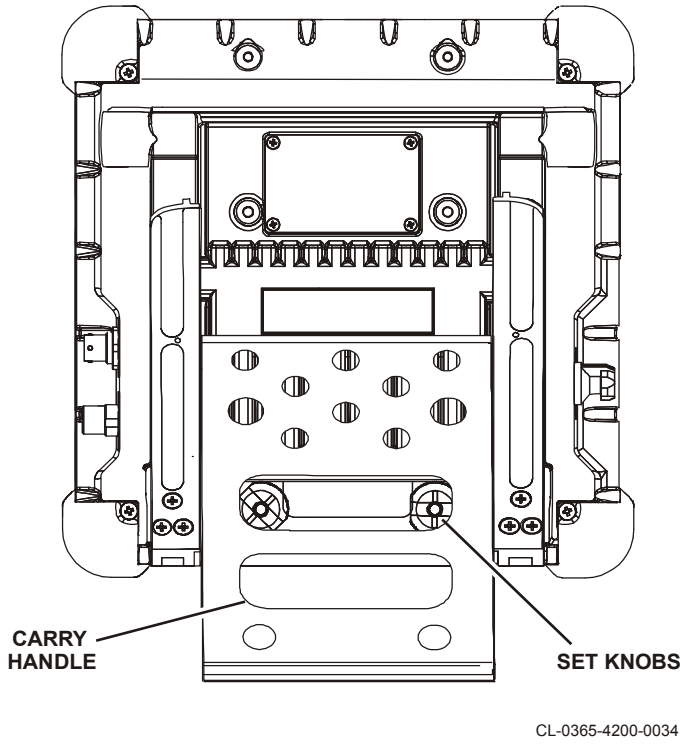


Figure 3-18. Slide Out Stabilizer

3.5 RF-7800B-DU024 INITIAL SETTINGS AND TURN-ON

Perform the following to point RF-7800B-DU024 Land Portable BGAN terminal and get a GPS fix.

CAUTION

Do not stand in front of the BGAN terminal. The BGAN terminal emits radio frequency energy when in operation. Do not stand or place objects in front of the antenna when the BGAN terminal is operational. Maintain a distance of two meters or more from the front of the antenna.

a. Take the Land Portable BGAN Terminal outside and lay it down flat. Verify that the unit has an open view of the sky to get a GPS fix.

b. Power up the BGAN terminal by rotating the ON/OFF knob to either ON or AUDIO. To get a GPS fix only (without using pointing tones), use ON. See Figure 3-19. Typically, a GPS 3D fix can be successfully attained in less than 90 seconds.

c. If using audio, point the terminal in the general direction of a satellite to get a beeping tone. Point the BGAN terminal towards the equator, pointed South if in the Northern Hemisphere, and pointed North if in the Southern Hemisphere. As the terminal is aimed more directly at the satellite, the tones will increase in frequency.

d. Connect the BGAN terminal to a computer and power source.

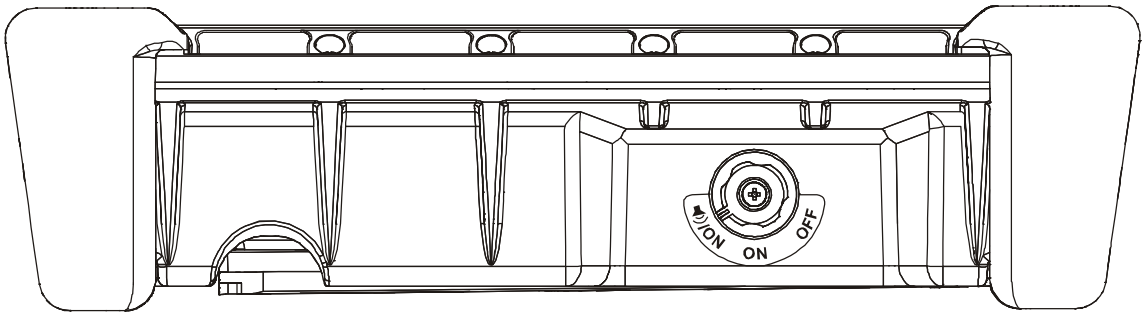
e. Access the Web interface.

1. Open a web browser and type in the internal IP address of the BGAN terminal (default is http://192.168.128.100). The web interface opens up to the Properties page. See Figure 4-1.

2. Monitor the Web interface PROPERTIES page **GPS Position** information to determine when a GPS Fix is obtained. Refer to Paragraph 3.7.1.

NOTE

The BGAN terminal will not achieve optimal capabilities if there is excessive RF interference on its operational or adjacent channels. For maximum performance, a clear Line of Sight (LOS) path should exist to satellites. Refer to Paragraph 4.3.4 to reactivate a connection.



CL-0365-4200-0035

Figure 3-19. RF-7800B-DU024 ON, OFF, AUDIO Switch

3.6 RF-7800B-VU104 INITIAL SETTINGS AND TURN-ON

Perform the following to point RF-7800B-VU104 Land Mobile BGAN Terminal and get a GPS fix.

a. Move the vehicle with Land Mobile BGAN Terminal outside. Verify that the unit has an open view of the sky to get a GPS fix.

b. Connect the BGAN terminal to a computer and power source.

c. Power up the BGAN terminal.

After power is applied, RF-7800B-VU104 begins a start-up sequence. The tracking antenna searches for BGAN satellites and the antenna motors may be heard during this time. After locking onto a BGAN satellite, some minor adjustments are made to acquire optimum signal strength. Eventually, an optimum position is reached.

d. Access the Web interface.

1. Open a web browser and type in the internal IP address of the BGAN terminal (default is http://192.168.128.100). The web interface opens up to the Properties page. Refer to Paragraph 2.6 if a dynamic IP address needs to be set up. See Figure 4-1.

2. Monitor the Web interface PROPERTIES page **GPS Position** information to determine when a GPS Fix is obtained. Typically, a GPS 3D fix can be successfully attained in less than 90 seconds. Refer to Paragraph 3.7.1.

Automatic tracking keeps the antenna pointed towards the satellite once the vehicle starts moving. During short outages (while driving under a bridge, for example), the antenna will remain in the same position and will pick up the satellite signal immediately upon exiting the blockage. For longer outages, the antenna may need to repeat the search pattern to reacquire the satellite signal.

Circuit switched and packet switched connections will recover from signal outages, as the antenna will perform a 360 degree rescan every 15-20 seconds. In this case, the BGAN terminal will still remain Registered on the network. For outages longer than 60 minutes, the BGAN terminal will need to re-register prior to activating additional circuit or packet switched connections. Refer to Paragraph 4.3.4 to reactivate a connection.

3.7 BGAN SERVICES

BGAN requires GPS for registration with the BGAN network, for both circuit and packet switched connections. For emergency circuit switched voice connections, GPS is not required. Both the RF-7800B-DU024 and the RF-7800B-VU104 BGAN terminals contain an embedded GPS receiver. The BGAN terminal keeps a record of its last GPS fix acquired between power cycles. If the BGAN terminal has not moved far since it last acquired a GPS fix (i.e., remained in the same spot beam), then it can register from the stored GPS position. If the BGAN Terminal attempts to register before it acquires a new GPS fix, it will attempt to register and connect based on the stored GPS fix. If the stored GPS fix does not allow it to connect successfully, the BGAN terminal will wait for a new GPS fix and then complete the registration and connection.

3.7.1 Obtaining a GPS Fix

In normal operation, a GPS receiver needs to be able to receive signals from at least four satellites so that it can then calculate a latitude, a longitude and an altitude. This position fix is referred to as a 3-dimensional or 3-D fix. If only three GPS satellites can be seen by the GPS receiver, then the last available altitude measurement is assumed and the GPS receiver calculates a position fix based on latitude and longitude only. This simpler position fix is referred to as a 2-dimensional or 2-D fix and is quicker and easier to obtain than a 3-D fix, but may be less accurate.

The embedded GPS receiver, with a clear view of the sky, normally takes between 60 and 90 seconds to attain a 3-D GPS fix. How quickly the GPS receiver is able to acquire a fix can also be affected by the visibility that the GPS receiver has of the GPS satellites. The GPS system is relatively tolerant of atmospheric conditions such as heavy cloud or rainfall. However, physical blockages, such as tall buildings or terrain can significantly degrade the ability of the GPS receiver to obtain a fix. For this reason, ensure that the GPS receiver has a clear view of as much open sky as possible.

3.7.2 GPS and BGAN Registration

The BGAN terminal uses the GPS information to perform both Registration, as well as the creation of packet and circuit switched voice and data connections. BGAN Terminal Registration is performed in a Regional Beam, whereas voice and data connections utilize BGAN Spot Beams. The GPS information instructs which Regional Beam to register on, as well as what spot beam the BGAN terminal will create the voice or data connection on. If a packet switched connection has been inactive for some time, the BGAN network may remove the connection, placing the BGAN terminal back in a Registered state. When additional IP data is required to be transferred from the BGAN terminal to the network, the terminal will automatically recreate the packet switched connection. This will place the terminal back into a connected state.

For the RF-7800B-VU104, traveling from one spot beam to another, GPS information will be used to allow a seamless spot beam transition, without the end user even knowing.

Finally, there are Universal Mobile Telecommunications System (UMTS) Subscriber Identification Module (USIM) cards known as “Discreet SIM cards”, which do not provide specific coordinates of the BGAN terminal to the BGAN Network. These USIM cards will only provide the Regional or Spot Beam Identification (ID) to the network. Speak to your BGAN Service Provider for provisioning of these types of cards.

3.7.3 ISDN Voice Telephony Services

The Satellite Terminal provides an ISDN interface to connect devices for Circuit Switched voice and data services. It is a Basic Rate (also known as 2B+D) interface and uses the European ISDN protocol. Service for only one 64 kbps B-channel is provided at a time.

The BGAN terminal has been successfully tested with the following ISDN handsets:

- ASCOM Eurit 33 plus
- SwissVoice Eurit 25
- Nera ISDN handsets (old Fleet and new WorldPro handsets)
- Siemens Gigaset SX255
- ISDN to Plain Old Telephone System (POTS) Converter, 12091-4160-01, using any 2-wire analog handset

Before the handset can accept incoming voice calls, program a Mobile Subscriber Number (MSN) using the same number as programmed in the terminal (default is 1). Refer to Paragraph 4.3.1. This ensures that incoming voice calls are directed to the handset. The handset's instruction manual will explain how to do this. Emergency calls can be made without the correct MSN programmed into the handset.

3.7.3.1 Dialing

As the ISDN numbering system follows the same pattern as the normal telephone system, dialing is carried out in exactly the same manner as making a normal telephone call. The subscriber number is used with the same international and area codes as any other telephone network.

3.7.3.2 Multi-Subscriber Numbering (MSN)

ISDN supports MSN which allows more than one telephone number to be allocated to an ISDN line. The BGAN Satellite Terminal assigns different MSNs for 4 k Voice, 3.1 kHz Audio, 64 k Unrestricted Digital Information (UDI) and 56 k Restricted Digital Information (RDI) devices. Each incoming call will be directed to the appropriate MSN depending on the type of call. This allows proper routing of incoming calls to the correct ISDN device (e.g. ISDN phone, data card or Fax).

3.7.4 Data Services

The five types of Packet Switched data connections, known as Packet Data Protocol (PDP) Connections, consist of a Background data service, and four Quality of Service (QoS) Streaming services.

Background Service: A Background connection shares the bandwidth of the satellite spot beam with all the other active background connections in the spot beam, minus all the bandwidth allocated to streaming connections. Background connections can reach up to 492 kbps for the RF-7800B-VU104, and up to 432 kbps for the RF-7800B-DU024. For usage such as Email and Internet browsing, usually a Background connection operates at a higher data rate and less cost than a Streaming connection. Background service rates are charged by the amount of MegaBytes transferred across the network.

Streaming Service: A Streaming data connection acquires a dedicated amount of bandwidth from the satellite spot beam to ensure a minimum amount of guaranteed QoS of data throughput for that connection. The Streaming Service allows the ability for data rates of 32 kbps, 64 kbps, 128 kbps, or 256 kbps. The RF-7800B-VU104 can operate at Streaming rates of up to 256 kbps, whereas the RF-7800B-DU024 can operate at streaming rates of up to 128 kbps.

Streaming channels may be preferred when transferring video teleconferencing across the network. Streaming service rates are charged by the amount of minutes the connection is up on the network. Refer to your BGAN Service Provider for associated costs.

It should be noted, that International Marine/Maritime Satellite (INMARSAT) guarantees the QoS of the stream up to where their private network meets the public Internet. It is up to the customer to make arrangements to maintain the QoS over the Internet to the final destination.

Each device connected to the BGAN terminal can have its own primary PDP context (e.g. background or streaming connection). Up to 11 devices may be connected to one BGAN terminal at a time. Each device will have a separate global IP address to the network.

3.7.5 Virtual Private Network (VPN) Connections

When a computer establishes a VPN connection from their computer, through the BGAN terminal, to a remote network, all data going to or through the BGAN terminal will be encrypted. Thus, after the VPN is established, that same computer will not be able to remotely control the BGAN terminal using the embedded Web interface. Thus, ensure all BGAN terminal settings are as required prior to establishing the VPN connection.

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CHAPTER 4

CONFIGURATION

4.1 INTRODUCTION

This chapter describes the configuration parameters of the Broadband Global Area Network (BGAN) Terminal and any tasks performed to configure the terminal for different operations.

4.2 CONFIGURATION CAPABILITIES

The following capabilities are common to both the RF-7800B-VU and RF-7800B-DU BGAN Terminals:

- Configure and initiate Packet Data Protocol (PDP) connections for Internet Protocol (IP) data transfer, for either Background operation or Streaming operation reserving from 32, 64, 128, 256 kbps of data throughput. Up to 11 simultaneous connections are possible.
- Modify the IP address and Dynamic Host Configuration Protocol (DHCP) Server settings of the terminal.
- Enable/Disable Bypass Antenna Pointing Mode and Automatic Power On recovery mode for Land Portable use in fixed installations
- Enable/Disable 24/7 Automatic BGAN Connection Keep Alive mode, keeping any data connection always up.
- Ability to chose automatic or manual satellite selection, when in areas of two satellite coverage.
- Ability to configure the terminal to operate in a network mode to Network Address Translation (NAT) Mode (for normal computer connections) or Modem Mode (for router connections).
- Configuration of the Streaming Inactivity timer, allowing the automatic shutdown of any Streaming connection when not in use for a specific duration.
- View and reset the terminal's air-time usage meters.
- Configure the Integrated Services Digital Network (ISDN) settings of the terminal.
- Perform a diagnostic self-test of the BGAN terminal.
- Note that the ISDN, Universal Serial Bus (USB), and Ethernet interface are active when the unit is turned on.

4.2.1 RF-7800B-VU104 Land Mobile BGAN Terminal

RF-7800B-VU104 is equipped with a tracking antenna. Additional capabilities are:

- Bypass Antenna Pointing (On) and automatically register with the network: The BGAN terminal will automatically attempt to register with the network once the tracking antenna has acquired the satellite signal and obtained a Global Positioning System (GPS) fix.

4.2.2 RF-7800B-DU024 Land Portable BGAN Terminal

RF-7800B-DU024 additional capabilities are:

- ISDN Power: The ISDN interface provides power to the connected ISDN device. If there is no operational device connected to it within five minutes, the ISDN power will be turned off, in order to save power. The ISDN interface can be re-enabled from the Web interface when an ISDN device is connected.

4.3 CONFIGURATION PARAMETERS

The BGAN terminal includes its own internal web interface. To access the web interface,

a. Open a compatible Web Browser.

b. Type in the internal IP address of the BGAN terminal (for example, http://192.168.128.100). The web interface opens up to the Properties page. See Figure 4-1.

4.3.1 Properties Page

See Figure 4-1. The Properties page shows the current status of the BGAN terminal. The three status items in the top left-hand corner of the screen update automatically when the status of that item changes:

- Carrier-to-Noise ratio (C/No): Satellite Signal Strength
- BEAM: beam Identification (ID)
- BATT: battery status

The remaining properties page items are described below. The first two items under Current Status show the Network Status.

Registration Status: Shows as Registered with the Network or Not Registered. If not registered, select the **Register with Network** button. If the BGAN terminal is not registered, but the Register button is greyed out, then the terminal is actively attempting to register. Please wait. Additionally, the BGAN terminal must be registered prior to sending IP data or creating ISDN calls.

NOTE

RF-7800B-VU104 has Bypass Antenna Pointing turned on by default. It automatically registers with the Network each time.

PS Attach Status: Indicates whether the BGAN terminal is Packet Switch (PS) attached with the Network. PDP Contexts, either Background or Streaming, must be set up to transfer IP data.

CS Attach Status: Indicates whether the BGAN terminal is Circuit Switch (CS) attached with the Network. CS calls can be made once the BGAN Terminal is Registered with the network.

GPS Position: Displays the current GPS position status. The terminal will always report whether the GPS Fix Quality is **Acquiring**, **2D**, or **3D**, and the **Last Update** time, using Greenwich Mean Time (GMT). The GPS display policy, which comes from the satellite, determines whether or not the **Longitude** and **Latitude** information will be displayed to the user.

Emergency Call Numbers: Displays the Emergency call numbers that can be used with the BGAN terminal.

Software Version: Displays the current version of software that is running on the BGAN terminal.

Satellite Modem IMEI: Displays the International Mobile Equipment Identity (IMEI) number of the BGAN terminal.

Satellite Modem IMSI: Displays the International Mobile Subscriber Identity (IMSI) number of the Universal Mobile Telecommunications System (UMTS) Subscriber Identification Module (USIM) card in the BGAN terminal. If the IMSI is not displayed, it indicates that there is a problem reading the Subscriber Identification Module (SIM) card. Possible problems could be: no SIM, SIM installed incorrectly, or Personal Identification Number (PIN) must be entered.

USIM PIN Status: Displays the PIN status as Ready if a valid PIN code is entered. The PIN code is used to unlock the USIM every time the terminal is powered up or reset. Entering a PIN code into the Web interface stores the PIN in the terminal (see Figure 4-2). If the USIM requires a PIN code at startup, the terminal will use the stored PIN.

USIM APN Name: Displays the default Access Point Name (APN) that has been provisioned on the USIM card. Some USIM cards may have multiple APN's provisioned on them.

MS-ISDN 1 thru 4: Every USIM card has four separate Mobile Subscriber Integrated Services Digital Network (MS-ISDN) numbers if the USIM has been provisioned for these services.

- MS-ISDN 1 is for 4 k Speech
- MS-ISDN 2 is for 3.1 kHz Audio (facsimile)
- MS-ISDN 3 is for 64 k Unrestricted Digital Information (UDI) data
- MS-ISDN 4 is for 56 k Restricted Digital Information (RDI) data

Extract System Log: Click this button to automatically extract a system log from the BGAN terminal and save the file to a location on the computer for debugging purposes. This file can be e-mailed to Harris directly for fault analysis.

Restore factory Defaults: Click this button to restore the BGAN terminal back to factory defaults and delete any parameters that have been changed. Try all possible debug procedures before using this feature. Contact Harris for additional help if necessary.

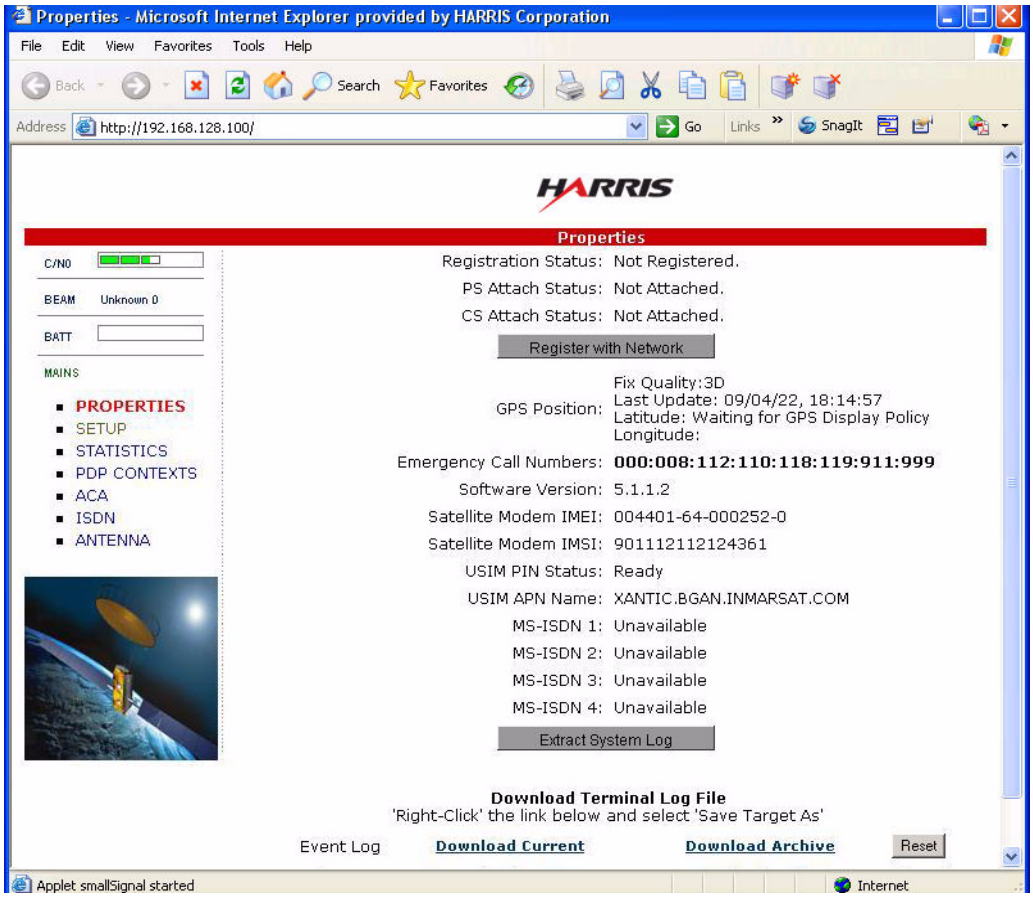

Figure 4-1. BGAN Terminal Properties

4.3.2 Setup Page

See Figure 4-2. The Setup page is used to configure the following BGAN terminal parameters.

Terminal Local IP Address: Use this to change the local IP address of the BGAN terminal from the default 192.168.128.100 IP address. All four octets are available to change. Select **Apply** after changing the local IP address on this page. The IP address ranges for the DHCP server, the PDP Context page and Automatic Context Activation (ACA) page will also be changed automatically. Changes to this field take affect after the BGAN terminal is rebooted.

DHCP Server (On/Off): Use this to allow an automatic IP address allocation to the computer(s) connected to the BGAN Terminal.

NOTE

The IP address of the terminal can be modified along with disabling the DHCP Server. If the IP address of the terminal is forgotten, remove the USIM card and restart the BGAN terminal. With the USIM card not present, the DHCP Server will automatically be enabled, allowing the user to configure the BGAN Terminal's IP address and DHCP Server settings.

DHCP Address Range: The DHCP Server address range (default of 192.168.101.X/24) are provided to the connected computers which have been configured for dynamic Transmission Control Protocol/Internet Protocol (TCP/IP) addressing. If the DHCP server is turned **Off**, then devices connected to the BGAN terminal must be configured to be in the same IP subnet address space as the BGAN terminal IP address.

Idle-mode DHCP Lease Time: Use this to change the default time (60 seconds) that the DHCP lease to the computer is good for when the BGAN terminal is not connected to the network. This parameter helps solve a problem with some models of Cisco routers that will not accept a short DHCP lease time. The longer the Idle-mode DHCP lease time, the longer it will take the Network/BGAN terminal to update the computer with the correct Domain Name System (DNS) servers for web browsing after establishing a PDP context.

Connected-mode DHCP Lease Time: The Connected-mode DHCP Lease Time refers to the DHCP lease time when the BGAN terminal is connected to the network. Normally, there is no need to change this parameter.

PIN and PUK Number (Attempts Left): A 4-8 digit PIN may be used to enable use of the BGAN terminal for non-emergency functions. If the USIM card has previously been utilized to require a PIN number, each time the terminal is powered up, a PIN number will be required by the SIM Card. The PIN number entered here is stored in the BGAN terminal, and provided to the SIM card upon power up. If the wrong PIN is typed in more than three times, the SIM card becomes locked. When a PIN is locked, enter a Personal Unblocking Key (PUK) provided by the service operator and press the Apply button. This will revert the USIM card to the original unlocked state without a PIN. If a wrong PUK is entered ten times in a row, the SIM will become permanently blocked and unrecoverable, requiring a new SIM card. The attempts left is a read only indication of the number of remaining attempts at entering a PIN number and a PUK number.

Bypass Antenna Pointing: Use **On** to bypass antenna pointing and have the BGAN terminal go straight into Registering with the Network. This is set to On as default for the RF-7800B-VU104. Enabling this for the RF-7800B-DU024 allows the Land Portable terminal to be mounted in fixed installation, and automatically connect to the network following a power failure.

Auto Power On: The Auto Power On feature applies only to the RF-7800B-DU024, when the external power switch is in an ON position, and power to the terminal is interrupted and then restored. When enabled, and mounted in fixed installation, the RF-7800B-DU024 will automatically power on, allowing connection to the network following a power failure. If this feature is Off and the power to the terminal is interrupted and restored, then the unit must be manually switched off and back on again to restore normal operations.

24/7 PDP Keep Alive: Set this to **On** to keep the PDP Context(s) active. If the BGAN network terminates a PDP Context due to inactivity, the BGAN Terminal will automatically recreate the PDP context. Use this feature when there is time critical IP data, when the IP data must be sent immediately and cannot wait any delays for a subsequent PDP Context to be made.

Satellite Selection: Use this parameter within a satellite overlap region to override the default satellite (AUTO selects a satellite based upon elevation angle/GPS location). The change to a different satellite does not take effect until the BGAN terminal is reset.

Net mode: Configure the Net Mode for **NAT Mode** (default) for use when connecting to one or more computers. In this mode, the BGAN terminal will perform a NAT capability, converting the private IP addresses from the multiple computers connected to the single BGAN Satellite public IP address. Use **Modem Mode** when connecting to a single router, where once the single BGAN Satellite public IP address is received from the network, this same IP address will be provided to the attached router via the BGAN Terminal's DHCP Server.

Streaming Activity Timer: Given that Streaming contexts are billed by the minute, this allows the ability to limit unnecessary usage charges independently on each Streaming connection. The default timer is set to tear down a streaming context after two hours of inactivity.

Emergency Call Numbers: Use this to update the emergency call number that is applicable in that part of the world where the BGAN terminal is being used.

Use **Apply**, **Cancel**, and **Restart Terminal** buttons to make changes, cancel changes, or reboot BGAN terminal. Any changes made to the above fields are not programmed into the BGAN terminal until the **Apply** button is pressed. The **Cancel** button discards any changes made to the values on the web page and leaves the settings stored in the BGAN terminal unchanged.

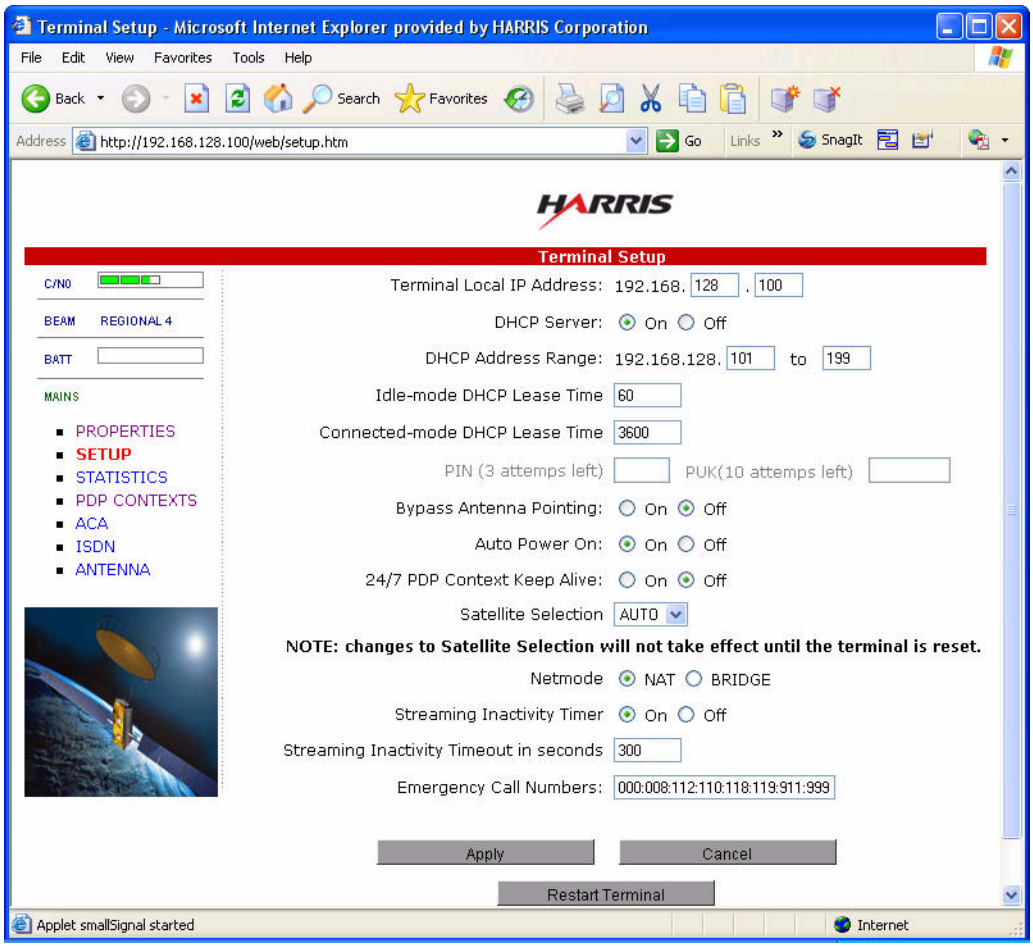

Figure 4-2. BGAN Terminal Setup