BT-2010

GPRS Standard GPS Modem

Product Manual

BlueTree Wireless
BT-2010 GPRS Standard GPS Modem

Product Manual

November 2003

UG-02010

Patents

Portions of this product are covered by some or all of the following patents:

US 6,278,442	6,271,605	6,219,694
6,075,470	6,073,318	D445,428
D416,256		

Declaration of Conformity

FCC Compliance Statement (USA)

This section applies to the BlueTree Wireless Data modem BT-2010.

The device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

⚠ **Caution**: Unauthorized modifications or changes not expressly approved by BlueTree Wireless Data, Inc. could void compliance with regulatory rules, and thereby your authority to use this equipment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instructions, may cause interference harmful to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

⚠️ **Warning**: "Antenna must not exceed 5.15 dBi. This device must be used in mobile configurations. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. Users and Installers must be provided with antenna installation instruction and transmitter operating conditions for satisfying RF exposure compliance" ⚠️

Liability Notice

While every effort has been made to achieve technical accuracy, information in this document is subject to change without notice and does not represent a commitment on the part of BlueTree Wireless Data, Inc., or any of its subsidies, affiliates, agents, licensors, or resellers. There are no warranties, express or implied, with respect to the content of this document.

Safety

Do not operate the BlueTree Wireless Data BT-2010 modem in areas near medical equipment, where blasting is in progress, where explosive atmospheres may be present, or near any equipment that may be susceptible to any form of radio interference.

Contents

Appendix B: Reference Information

Appendix C: Modem Specifications

Introduction

Welcome

Thank you for choosing the BT-2010, BlueTree's GPRS wireless data modem with integrated GPS.

Product Description

Modem

The rugged BT-2010 modem gives today's mobile organization the reliable, instant access to information that is critical for its teams.

The unit is a fully integrated GSM modem, which adds wireless GPRS functionality to remote and mobile applications. Its design makes it ideal for in harsh environment installations.

The modem is based on RIM's 1902G radio module, and intended for use with a host platform such as a computer or remote terminal data unit.

The modem provides:

• Compatibility with GSM and GPRS wireless services

• Support for 850 and 1900 MHz frequency bands

• Short Message Service functionality – for both mobile originate as well as terminate messaging

• GPS location capability so organizations can easily integrate location-based applications into the workflow.

• Support for TSIP, TAIP and NMEA0183 data output

Software

The modem package also includes BlueVue, the BlueTree software that makes configuring and operating your modem simple and quick. With BlueVue, modem operators can:

• Configure basic operating parameters

• Establish packet data connections

- Monitor status information

is equipped with a Trimble Lassen™ SQ GPS (Global Positioning System) receiver. The receiver's GPS information is available to host computers via a serial port.

Host computers can communicate with the GPS receiver using one of the following data protocols via the AUX serial port.

Protocol	Description
TSIP	Trimble Standard Interface Protocol - Binary, bidirectional - Default protocol of GPS receiver
TAIP	Trimble ASCII Interface Protocol· - Uses printable character based "sentences"
NMEA 0183	National Marine Electronics Association Protocol - ASCII character based - Unidirectional (from receiver only)

What you will need

Before you install the modem you will need the following:

Cellular antenna

To comply to FCC and Industry Canada regulations, cellular antennas must meet the following specifications:

- Rated gain of 3dBd
- Minimal cable loss of 0.5dB
- Dual-band 800 & 1900 MHz
- Nominal 50 ohm impedance
- Male TNC connector
- Coil style cellular whip
- Mount designed for a horizontal metal surface of vehicle

> ⚠️ **Warning**: Antenna must not exceed 5.15 dBi. This device must be used in mobile configurations. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instruction and transmitter operating conditions for satisfying RF exposure compliance. ⚠️

> ⚠️ **Warning**: Only approved antennas may be connected to the modem. Unauthorized antennas, modifications, or attachments could impair data quality, damage the modem, or result in the violation of FCC regulations. ⚠️

Please contact Bluetree for a list of compatible cellular antennas.

GPS antenna GPS antennas meet the following specifications:

- Active antenna with 3.3 volt preamplifier
- 50 Ohm
- SMA connector
- 1575 MHz range

BlueTree offers a range of GPS and combination Cellular-GPS antennas. Please contact Bluetree for more information.

GSM SIM card Available from your local wireless network service provider.

Serial cables You will need two serial cables (one for the data port, the other for the GPS port) of suitable length to extend from the modem to the computer, to a maximum length of 25 feet. If you are connecting the modem to a PC you will also need a DB9 female connector.

Tools and hardware
- Small Phillips screwdriver
- Four screws suitable for the material you will mount the modem to.

Available COM ports **USB serial adapters**

BlueTree has tested USB-Serial adapter solutions from FTDI (http://www.ftdichip.com) that have worked properly with our modems. Single USB-Serial adapters and USB-Dual Serial adapters have been tested and work properly.

More product information can be found at FTDI distributors websites (http://www.ftdichip.com/FTDisti.htm).

Checking for port conflicts

If you are connecting the modem to a PC, confirm that the computer does not have any software loaded that could interfere with the COM port that will be designated for the modem.

For example, HotSync - software used for communicating with the PalmPilot can occupy the COM port even if the PC does not have PalmPilot connected to that COM port.

Check any software that loads when your computer starts up, any software that appears as an icon on your Windows task bar, and disable or close any applications that normally use a COM port.

Is another modem installed on the PC? Older internal modems can cause COM port conflicts. PC Card (PCMCIA) modems in laptops can switch the COM port number of your built-in COM port.

Chapter 1: Installing the Modem

Installing the modem is a seven-step process:

1. Unpack the modem
2. Install the SIM card
3. Install the modem
4. Install the antenna
5. Install the power cable
6. Connect the data cables
7. Install the BlueVue software

Unpacking the Modem

When the modem arrives, check that the package contains the following items:

- BT-2010 modem
- 15-foot power cable with 2A inline fuse
- BlueTree installation CD (includes the BT-2010 Product Manual, and the BlueVue 2.0 software)

If any items from this list are missing, please call our service department toll-free at 1-877-422-9110.

Installing the SIM Card

Note: Before inserting the SIM card be sure the power cable is disconnected from the modem.

To install the SIM card:

1. Remove one of the screws on the SIM CARD cover plate, located at the back of the modem casing.

Remove this screw

2. Loosen the remaining screw, then flip the plate over so you can access the SIM slot.

3. Slide the SIM card (gold on top) into the slot until you feel it snap into place.

4. Flip the SIM CARD cover plate back to its original position, replace the screw in the open hole, then tighten both screws.

The SIM card is now installed.

Installing the Modem

Choosing the mounting location for the modem

When mounting the modem, choose a location that:

• Allows access to the connectors on the front and rear panels

• Meets temperature and humidity specifications for the modem

• Protects the modem from liquids. (The modem is not a sealed unit.)

There are 2 ways to mount the BT-2010 modem:

   a) Use the 4 mounting holes (3/16") on the sides of the modem

   b) Use the din rail (1.4") on the bottom of the modem

As shown below, the modem includes four mounting holes.
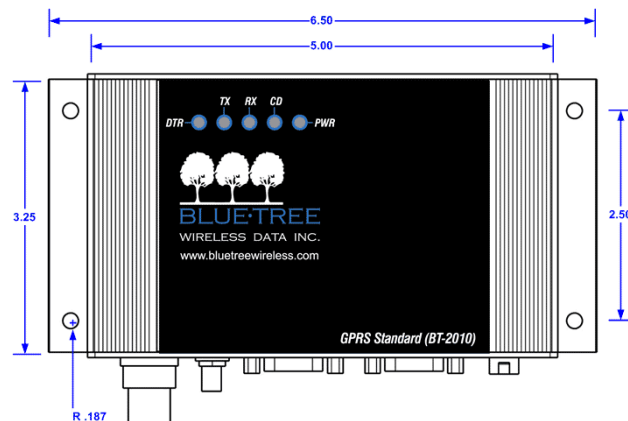
Installing the Antenna

Choosing the location for the cellular band antenna

- Mounting location should be at least 20 cm (8 inches) from occupants or bystanders.

- The separation between the antenna for the modem antenna and other mobile radio antennas should be as great as is practical. Antennas should always be mounted greater than 30 cm (1 foot) from another antenna.

- For optimal performance and safety, mount the antenna on the roof of a vehicle instead of the trunk.

- The length of the antenna cable may affect the signal strength. Choose the appropriate cable type and length.

- The antenna should have a ground plane of at least 15cm (6") of metal in all directions.

> ⚠️ **Warning**: Antenna must not exceed 5.15 dBi. This device must be used in mobile configurations. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter. Users and installers must be provided with antenna installation instruction and transmitter operating conditions for satisfying RF exposure compliance. ⚠️

To install the cellular band antenna:

1. Thread the antenna cable through the vehicle so the cable can reach the front plate of the modem.

2.

Connect the cable here.
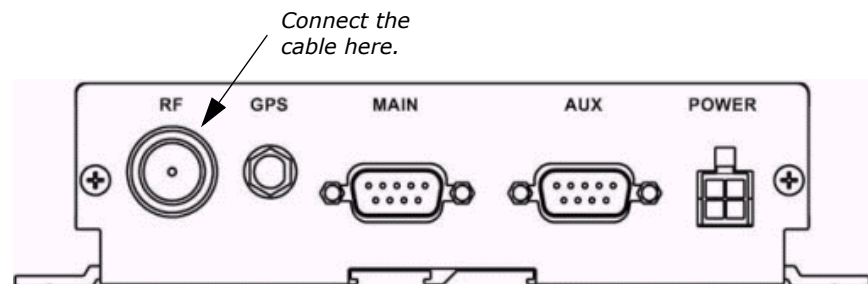
Choosing the location for the GPS antenna

The antenna receives the GPS satellite signals and passes them to the receiver. The GPS signals are spread spectrum signals in the 1575 MHz range and do not penetrate conductive or opaque surfaces. Therefore, to function, the antenna must be located outdoors with an unobstructed view of the sky.

To install the GPS antenna:

1. Thread the antenna cable through the vehicle so the cable can reach the front plate of the modem.

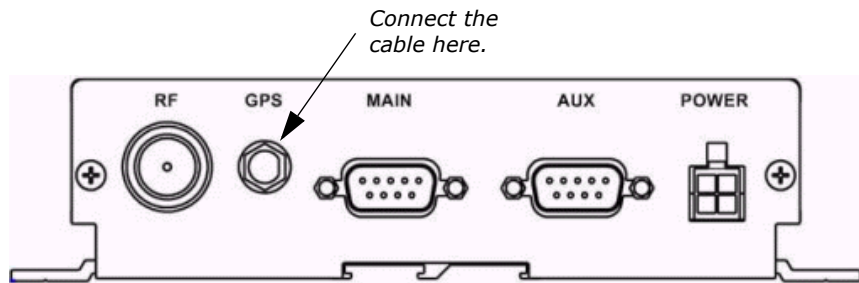2. Connect the cable to the SMA connector.

Connect the cable here.

Installing the Power Cable

The modem includes a 15-foot power cable with 2A inline fuse.

Connects to modem.

Connects to 12 volt DC power supply.
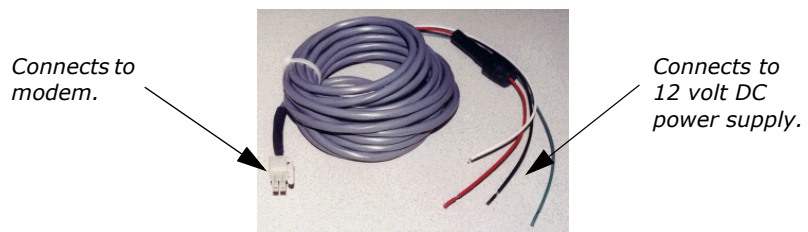
Power cable connector

As shown below, the power cable connects to the modem through a Molex type connector.

- Connector part number: 39-01-2040 (alternative part number 39-01-2045).

- Connector pin part number: 39-00-0039.

IGN (ignition sense) White conductor

OUT (future use) Green conductor

POS (+8 to +30 Vdc) Red conductor

GND (ground) Black conductor
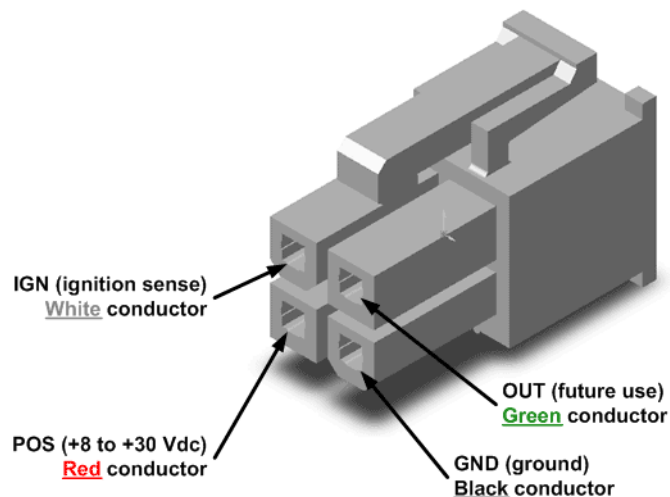
The modem's power ON/OFF is controlled by the ignition sense line (white wire). When this line is pulled high (8 to 30 volts), the modem will power on. The modem shuts down when the ignition sense line is pulled low (less than 7 volts).

Pin designations for the connector are shown below.

Pin	Annotation	Color	Description
1	GND	Black	Ground
2	POS	Red	Power supply input 8 to 30 Vdc
3	IGN	White	Ignition input
4	OUT	Green	Digital output (not connected)

Powering up the modem

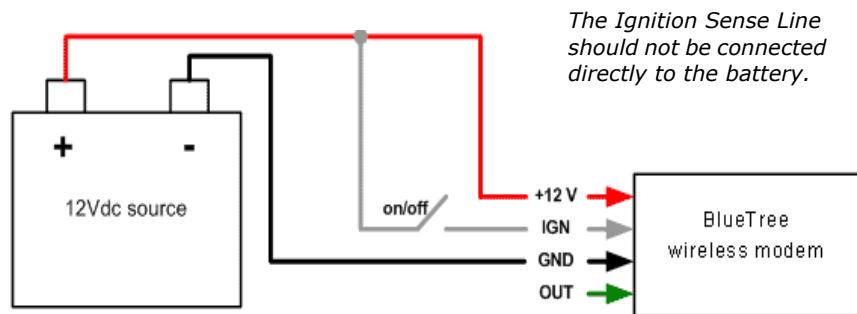The ignition sense wire of the power harness must be connected according to how the modem is to be powered on and off.

The Ignition Sense Line should not be connected directly to the battery.

To connect the power cable:

Your options are:

• Connect the ignition sense wire to the vehicle's ignition such that the modem is powered up only when the ignition key is switched to 'On'. The modem is then ON, only when the engine is on.

• Connect the ignition sense wire to the vehicle's ignition such that the modem is powered ON when the ignition is switched to 'Accessories'. This way the modem can be turned on even when the engine is off.

• Connect the ignition sense wire to a separate switch mounted under the dashboard so you can turn the modem ON or OFF regardless of the position of the ignition key.

Note: *Make sure that the antenna is connected to the modem before powering-up.*

To test the power connection:

1. Check the modem's LED indicators.

• If the PWR or Power indicator is turned on or if it flashes, the modem is powered.

• If the PWR or Power indicator is not turned on, review the installation procedures or see "Modem Help" on page 31.

2. Open Windows HyperTerminal and run the AT commands shown in "Configuring the HyperTerminal session" on page 23.

Battery back-up

The modem is equipped with a 3.6 volt lithium back-up battery that power the real-time clock when the receiver's prime power is turned

off, and keeps the module's RAM alive. RAM stores the GPS almanac, ephemeris, and last position.

User configuration data, including port parameters and receiver processing options can be stored in non-volatile memory which does not require back-up power. By using battery back-up, time to first fix is typically reduced to 20 seconds.

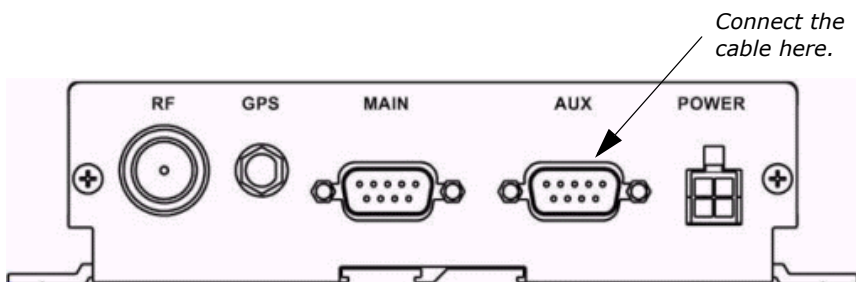## Connecting the Data Cables

To connect the MAIN data cable:

1. Attach one end of a serial cable to the modem at the connector labeled MAIN.

Connect the cable here.
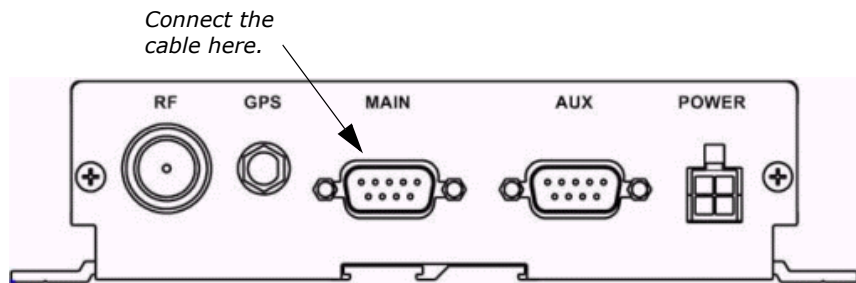
2. Attach the other end of the serial cable to an available COM port.

To connect the GPS data cable:

1. Attach one end of the second serial cable to the modem on the connector labeled AUX.

Connect the cable here.

2. Attach the other end to an available COM port on the computer.

Installing the BlueVue software

BlueVue is BlueTree's powerful software that makes configuring and operating your modem simple and quick. Your modem includes a BlueVue installation CD-ROM.

Installing BlueVue

Users must have administrator access rights with their Windows logon account to install BlueVue. You will not be able to make connections with a "Guest" account.

A command line option is available to system administrators or IT personnel so that they can quickly install BlueVue on multiple computers using, for example, a batch operation. Please see "AT Commands" on page 48 for more information.

USB Serial Adapter

If you are using a USB to Serial adapter for a COM serial port, ensure that the adapter cable is plugged into the USB port before installing and using BlueVue.

> ⚠️ **Caution**: The USB-Serial adapter cable must be inserted into your PC in order to successfully complete the installation. If the USB-Serial adapter cable is not installed, BlueVue software will not operate correctly.

To install BlueVue:

1. Install the BlueVue installation CD in your PC.

The main BlueVue installation screen appears as shown below.

2. From the main BlueVue setup screen click **Install BlueVue 2.0 Software** to start the installation wizard.

3. On the Welcome screen click **Next**.

4. On the License Agreement screen select **I accept the terms in the license agreement**, and then click **Next**.

5. On the Select Your Configuration screen, in the **Please select your model number** list, select your modem. If you don't know the model number of the modem, you can find it on the product label located on the bottom of the modem.

6. On the COM Port Selection screen, in the **Select Primary (Data) COM Port** list, select an available COM port that will be used for transferring data. The selection corresponds to the port on the modem labeled MAIN.

> ⚠️ **Caution**: If you are using a USB-to-Serial adapter instead of an integrated serial port, make sure the adapter is inserted into the USB socket before continuing. If the USB-to-Serial adapter is not plugged in, the installation wizard will not detect all available COM ports.

7. In the Select GPS COM Port list, select an available COM port for the GPS receiver. The selection corresponds on the modem to the port labeled AUX.

8. Click **Next**.

9. On the Ready to Install the Program screen click **Install**.

10. On the Software Installation warning screen, click **Continue Anyway**. BlueTree has done extensive testing of the software to ensure its reliability and as part of the submission for Windows certification.

11. On the Hardware Installation warning screen, click **Continue Anyway**. Again, BlueTree has done extensive testing of the software to ensure its reliability and as part of the submission for Windows certification.

12. On the BlueTree Installation Wizard Complete screen select **Launch the program** if you want the installation wizard to start the application, and then click **Finish**.

BlueVue 2.0 is now installed on your PC and operates as an element of the Windows operating system. You will notice:

- On the Windows task bar a BlueTree icon appears.

- A new item appears in the Control Panel: BlueTree Wireless Data.

Chapter 2: Activating the Modem

The BT-2010 connects to the wireless network the same way a cell phone does. Each modem is an account on the wireless network. The network service provider assigns the modem a phone number, a user name and password, an access point name, and in some cases a static IP address.

This chapter shows you two ways to activate the modem:

- Using BlueTree's BlueVue software
- Using AT commands

Using BlueVue

Activating the modem

To enter the account information:

1. Single-click the BlueTree icon on the Windows task bar and then select **Settings** from the menu.

2. In the BlueTree Modem Properties box select the Connection Manager tab and then click **New**.

3. In the Connection Profile Properties box, enter the account information supplied by your service provider into the appropriate fields.

The content for the Name field under Profile Details is not supplied by the service provider. This is simply the name you give to the profile. For example, you could name it GPRS or give it a longer name that identifies the service provider. The IP Address Details fields are normally left blank, unless your modem is assigned static IP and DNS addresses.

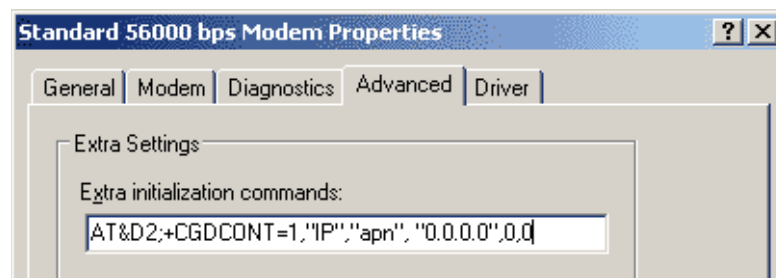BlueVue is now ready to connect to the wireless network.

Using Microsoft DUN (Dial-Up Networking)

When the modem has been activated, you can create a DUN to make the connection. Creating a DUN is a two-part process. First you add the modem to the system, then you create the DUN profile.

Adding the modem

To add a modem in Windows 2000 or XP

1. Click Start > Settings > Control PanelStart > Settings > Control Panel > Phone and Modem Options.

2. Select the COM port, and then click **Next**.

3. On the Phone and Modem Options box, click the Modems tab and then:

    a) Select **Standard 56000 bps Modem**.

    b) Click **Add** and then click **Properties**.

4. On the Standard 56000 bps Modem Properties box:

    a) Click the Advanced tab.

    b) In the Extra Initialization Commands field, type
       `AT&D2;+CGDCONT=1,"IP","apn","0.0.0.0",0,0`

The important elements of the string are as follows:

String element	Function
AT&D2	Sets the modem to switch from data modem to command mode when DTR is dropped.
"apn"	Placeholder for the exact Access Point Name supplied to you by the service provider.
"0.0.0.0"0,0	"0.0.0.0" is the IP address and 0.0. is the DNS address. The values are left at 0 to enable the service provider to assign the modem a dynamic IP address (in quotes) and then the PDP Data compression option and PDP Header compression option for your session. If your service provider assigns the modem a static IP address and DNS address, replace the 0 values with those supplied by the service provider.

    c) Click **OK**.

The modem is now configured.

Creating the DUN profile

To create a Windows XP DUN connection:

1. Click Start > Settings > Control Panel > Network Connects > New Connection Wizard.

2. On the New Connection Wizard welcome box click **Next**.

3. On the Network Connection Type box select **Connect to the Internet**, and then click **Next**.

4. On the Getting Ready box select **Set up my connection manually**, and then click **Next**.

5. On the Internet Connection box select **Connect to a dialup modem**, and then click **Next**.

6. On the Select a Device box select the **56000bps** modem and then click **Next**.

7. On the Connection Name box, type in a name for the connection (for example: GPRS) and then click **Next**.

8. On the Phone Number to Dial box type the phone number, as supplied by your CDMA service provider for the GPRS supplied by your service provider. For example, type *99#

9. On the Internet Account Information box, type the username and password in the corresponding fields and then click **Next**.

The DUN connection is now set up and ready to connect to the wireless network.

Using AT Commands

You can also activate the modem using AT commands. HyperTerminal sessions to the transceiver are run using AT commands as shown below. For complete AT commands, please see "Reference Information" on page 35.

Configuring the HyperTerminal session

The modem can be activated using the OTSAP or Over The Air Service Provisioning method with AT commands. If you use OTSAP, make sure that you are in Verizon Wireless coverage.

To configure the HyperTerminal session:

1. Click Start > Programs > Accessories > Communications > HyperTerminal

2. Run AT commands as shown below.

Command	Function
ATRIMRADIO=1 OK	Turns ON the module
AT+IPR=115200 OK	Sets the serial DCE speed
AT+CPIN? +CPIN: READY	Checks the SIM card
AT+CREG? +CREG: 0,1	Checks that the modem is registered on the network. A response of +CREG: 1,1 indicates that the modem is registered with the network.
AT+FCLASS=0 OK	Puts in data mode
AT+CGDCONT=1,"IP","apn","0.0.0.0",0,0 OK	Establishes the PDP context. Note that there are no spaces in the string.
AT+CGQREQ=1,0,0,0,0,0 OK	Requested quality of service profile
AT+CGQMIN=1,0,0,0,0,0 OK	Minimum quality of service profile

Command	Function
AT+CGACT=1,1 OK	Activates PDP context
AT+CGATT? +CGATT: 1	Verifies that the modem is GPRS attached. If the +CGATT: value is not 1, type AT+CGATT=1 and wait for the connection to be established.
AT+CSQ +CSQ: <rssi>,<fer>	Checks the signal strength. An rssi value of 5 or higher indicates a usable signal. If the value is lower than 5, move the antenna or the modem to a location where you know the signal quality is strong.
AT+RCIQ? OK	Checks cell parameter information. If the device is not registered with the network when a query is made, the user is notified that the radio modem has not yet been registered with the network.

Chapter 3: Connecting to the Wireless Network

Connecting to the wireless network is simple, whether you use BlueVue, Dial-Up Networking, or AT commands.
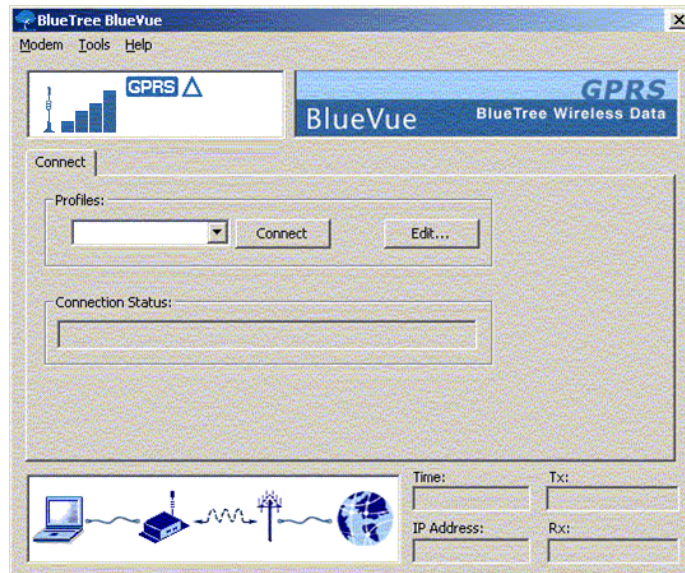
Using BlueVue

Starting BlueVue

You can start BlueVue one of two ways:

- Double-click the BlueTree icon on the Windows task bar
- Click Start > Programs > BlueTree > BlueVue GPRS

BlueVue's main window appears.

Connecting to the network

To connect to the wireless network:

1. From the Profiles list select a connection profile.

2. Click **Connect**.

Watch the bottom-left area. In a few moments this modem status field displays the globe symbol. The lower-right area displays the connection statistics for your wireless session. You are now connected to the wireless network.

For more information on the BlueVue interface and BlueVue functionality, please see "BlueVue Configuration Options" on page 36.

Using Microsoft DUN (Dial Up Networking)

A DUN connection is started from the Network Connections directory on your system. You can open the directory and start your DUN session one of two ways: from the Start menu, or from the My Network Places icon on your desktop.

From the Start menu

To connect to the wireless network:

1. Click Start > Settings > Control Panel > Network Connections

2. In the Network Connections directory, under Dial-Up, double-click the icon of the GPRS connection.
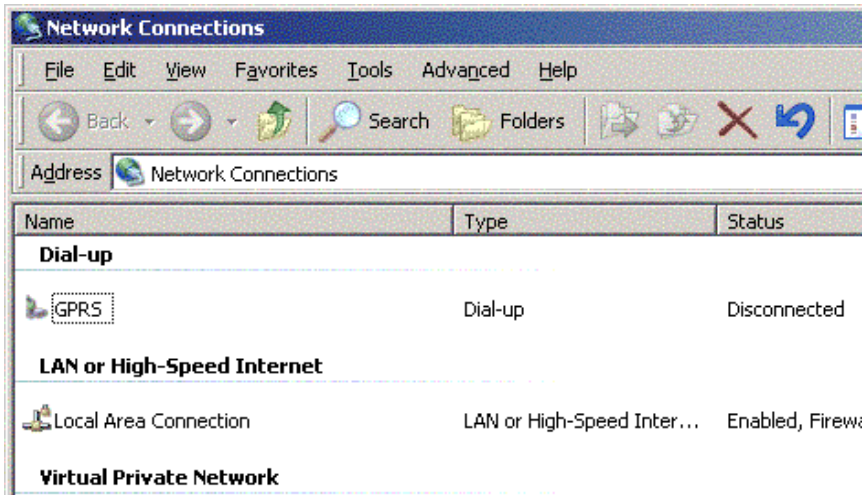
You are now connected to the wireless network. You will see the connection icon on the Windows task bar.

From the My Network Places icon

To connect to the wireless network:

1. On your desktop, right-click the My Network Places icon and click **Properties**.

2. In the Network Connections directory, under Dial-Up, double-click the icon of the GPRS connection.

You are now connected to the wireless network. There is no visual feedback to verify the connection.

Using AT Commands

To connect to the wireless network:

1. Click Start > Programs > Accessories > Communications > HyperTerminal

2. Configure the HyperTerminal session to connect to the wireless network (please see "Configuring the HyperTerminal session" on page 23).

3. Type `ATD*99#`

The application must dial this string to establish the connection to the wireless network. This will invoke the PPP protocol.

Note: *For a summary of AT commands, see "AT Commands" on page 48.*

Chapter 4: Using the GPS Features

GPS Features Overview

Your modem is equipped with a Trimble Lassen SQ™ GPS receiver module that functions completely independently from the GPRS wireless data component of the modem.

As long as the GPS receiver can detect satellite signals, you will be able to obtain location information even when the modem is beyond GPRS service coverage.

Hardware

The 8-channel parallel tracking GPS module is designed to operate with the L1 frequency, standard position service, Coarse Acquisition code. When connected to the external GPS antenna, the receiver will track up to 8 GPS satellites and compute location, speed, heading and time.

The BT-2010 outputs the GPS location data through the unit's auxiliary port using TSIP (Trimble Standard Interface Protocol), TAIP (Trimble ASCII Interface Protocol), and NMEA 0183 (National Marine Electronics Association protocol).

Software

You can interact with the GPS receiver data one of two ways:

- Using BlueVue as the functional and graphical interface
- Using Trimble GPS commands directly to the serial port

For comprehensive hardware and software reference information, please see "GPS Reference" on page 53.

Power-Up and Initialization

Although the GPS receiver functions independently from the data modem, it does run on the same power supply, so it powers up at the same time as the modem. The module does need to be fully initialized to function properly.

Initializing the GPS receiver the first time

To initialize the GPS receiver:

1. Power-up the modem.
2. Do not power down for at least 15 minutes.

The first time the GPS receiver is powered up, it searches for satellites from a cold start because it has no almanac (database of available satellites).

The receiver begins to compute position solutions within the first two minutes, however the receiver must continuously track satellites for approximately 15 minutes in order to download a complete almanac. This initialization process should not be interrupted.

Everyday initialization

When the unit has completed its first initialization and established a complete satellite almanac, the almanac data is stored in the unit's battery memory. In subsequent sessions, the time to first satellite fix typically shortens to less than 45 seconds and the receiver will respond to commands almost immediately after power-up.

Note: *The GPS receiver is ready to accept TSIP commands approximately 2.1 seconds after power-up. If a command is sent to the receiver within this 2.1 second window, the receiver will ignore the commands.*
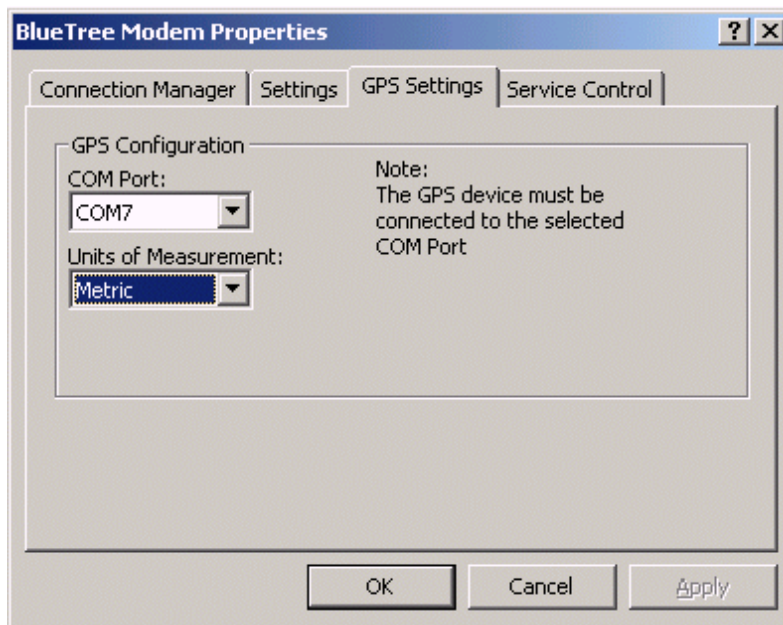
Using BlueVue

Configuring the default TSIP data settings

Several BlueVue settings need to be configured to enable the GPS Location features.

To configure the default TSIP settings:

1. Single-click the BlueTree icon located on your system's task bar, and then click **Settings**.

2. On the BlueTree Modem Properties box click the **GPS Settings** tab.

3. In the COM Port list, select the COM port on the PC that will be attached to the GPS port (AUX) on the modem.

4. In the Units of Measurement list, select the appropriate units in which to display the GPS data. The table below describes the options:

List item	Measures speed in	Measures elevation in
Imperial	mph, Miles per hour	Feet
Metric	km/h, Kilometers per hour	Meters
Nautical	kts, knots	Feet

5. Click **OK**.

BlueVue is now configured to display the GPS data in the main BlueVue window.

Changing the default protocol to TAIP or NMEA

The modem can be manually configured to output GPS data in:

• Trimble ASCII Interface Protocol (TAIP) and

• National Marine Electronics Association Protocol (NMEA)

For complete instructions and AT commands, please see "Changing the default data settings" on page 54.

Tracking GPS location

GPS information is displayed in BlueVue's work space on the GPS Location tab.

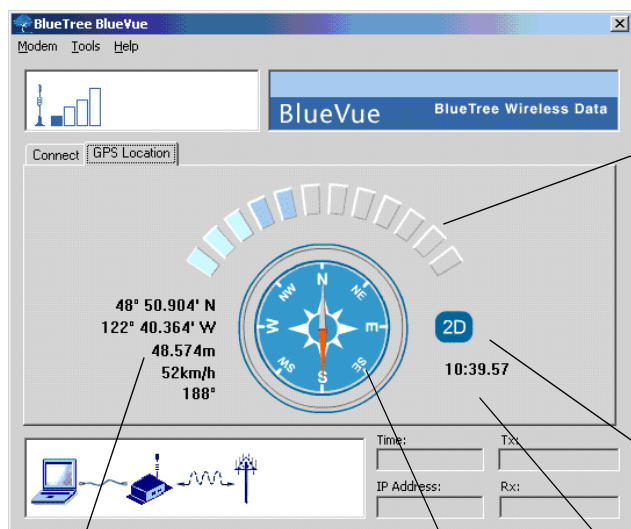**To see the GPS location data:**

1. Start BlueVue.

*   Click Start > Programs > BlueVue or

*   Double-click the BlueTree icon located on your system's task bar.

The main BlueVue screen appears.

2. Click the GPS Location tab.

The GPS Location work space appears, as shown below.

Understanding the GPS Location work space

Satellite Tracking

Bars represent the number of satellites currently being tracked. The GPS receiver is capable of tracking 8 satellites in orbit. BlueVue displays 12 bars to accommodate the maximum number of satellites that can be detected according to the GPS specifications.

Display	Represents
	Eight satellite signals received.
	No signals received from any satellite.

Time of last satellite fix

Position Coordinates

Unit	Value
Latitude	Degrees north or south of equator.
Longitude	Degrees east or west of Greenwich meridian.
Elevation	Elevation from mean sea elevation. Units: meters or feet.
Speed	Speed of GPS receiver in motion.Units: kilometers/hour, miles/hour, knots.
Track	Direction of travel of GPS receiver in degrees (true).

Compass

The direction of the red compass needle corresponds to the direction of travel. The direction is reported in degrees true by the Track value located in the main GPS screen.

The compass has a granularity of 16 positions. As soon as the GPS receiver has directional information, i.e. you are in motion, the compass will be updated.

As shown at left, the compass appears as inactive if directional information has not been calculated or if the GPS receiver is not in motion,

Signal Quality

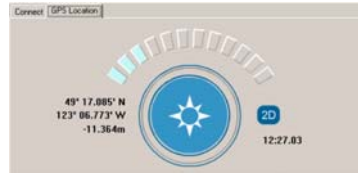| Symbol	Description
	No satellite signals detected.
2D	Partial satellite information available. Incomplete data received. Only latitude and longitude location data will be available, i.e. 2 dimensions only. Accuracy is low because calculations are based on last known altitude.
3D	All GPS information has been received. Three-dimensional location information is available including elevation.

GPS screen examples　　The following graphical images represent the various screens that you will typically encounter using BlueVue with GPS.

Display	GPS State
	Modem has just powered on. No satellite signals have been detected.
	GPS receiver has detected 3 satellites and has enough data to calculate your position. Note that the GPS receiver is stationary. The 2D symbol indicates that the elevation value may not be correct. Only 2-dimensional positioning information is available. The coordinates therefore may also be inaccurate.
	Five satellites have been detected and you are in motion, heading south. The speed and track (direction in true degrees) are now available and displayed accordingly.
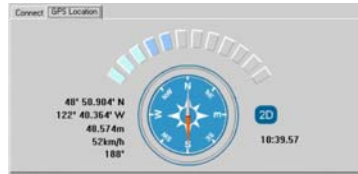
Chapter 5: Troubleshooting

This chapter helps you manage commonly reported issues when dealing with your BlueTree Wireless Data Modem and BlueVue software.

Modem Help

Issue	Possible cause	Suggestion
Low or no network signal strength	Cellular antenna is disconnected from the modem.	Check that the antenna cable is connected properly to the TNC connector labeled MAIN on the modem.
GPS signal strength seems low.	The length of the cable may be affecting the signal strength.	Choose the appropriate cable for your installation.
No GPS signal	GPS antenna is disconnected from the modem.	Check that the antenna cable is connected properly to the SMA connector labeled AUX on the modem.

BlueVue Help

Issue	Possible cause	Suggestion
The Network Status Display shows a blank screen.	Modem is powered off.	Check modem's power cable.
	Modem's serial cable is disconnected from PC.	Check modem's serial cable.
	COM port baud rate setting is invalid.	Check the COM Port setting and select the one that the modem is connected to.
	Service is stopped.	Go to BlueTree Modem Properties and select Service Control. Then click the Start button.
The Network Status Display doesn't show the name of a service provider.	No service is available.	
	You are outside the network coverage area.	Contact your service provider.
	Your antenna is not installed correctly.	Check your service provider's coverage map to verify if you have service in your immediate area.
	Your signal is lost (you are in a tunnel or behind a building preventing the modem from receiving a signal)	Verify that your antenna cable is connected to the modem.
	Your account has not been activated by your service provider.	Change your location.
Another application cannot access the COM port used by the modem.Pop-up dialog message indicates that selected COM port is unavailable.	BlueVue service is running and is currently using the COM port.	Open BlueVue and select the Tools menu. Click on Pause to pause the Agent and release the COM port.

Issue	Possible cause	Suggestion
Cannot establish a data connection.	Your user profile has incorrect entries.	Go to the Connection Manager and open the profile. Ensure that you have the correct entries as supplied by your service provider.
	You are outside the network coverage area.	Change your location to regain a received signal.
	Your account is not activated.	Contact your service provider.
	Your signal is lost (you are in a tunnel or behind a building preventing the modem from receiving a signal).	Change your location to regain a received signal
	BlueVue service is stopped	Go to BlueTree Modem Properties page, select the Service Control tab and click the Start button.
	BlueVue Agent is paused.	Resume BlueVue Agent.
Information in the BlueVue screen takes time to be refreshed.	This is normal behavior.	Information from the modem takes a few moments to collect and process.
Modem not detected using my USB-Serial Adapter.	Service is stopped because the USB-Serial Adapter cable was inserted after Windows and BlueVue were started.	Restart Windows or go to the BlueTree Modem Properties page and select Service Control. Click the Start button.
Cannot close or exit BlueVue while disconnecting a data session.	This is normal behavior.	It takes a few moments for BlueVue to complete the disconnection process.
Incorrect COM port selected during installation.		Re-install BlueVue.
		Open Control Panel, delete and then add BlueTree GPRS modem on the correct COM port.

Appendix A: Warranty and Customer Support

Warranty

Bluetree Wireless Data Inc. warrants the BT-2010 cellular modem against all defects in materials and workmanship for a period of one (1) year from the date of purchase.

The sole responsibility of Bluetree Wireless Data Inc. under this warranty is limited to either repair or, at the option of Bluetree Wireless Data Inc., replacement of the cellular modem. There are no expressed or implied warranties, including those of fitness for a particular purpose or merchantability, which extend beyond the face hereof.

Bluetree Wireless Data Inc. is not liable for any incidental or consequential damages arising from the use, misuse, or installation of the BT-2010 cellular modem.

This warranty does not apply if the serial number label has been removed, or if the cellular modem has been subjected to physical abuse, improper installation, or modification.

The unit is automatically registered for warranty at the date it is purchased and/or shipped.

Customer Support

Help desk	Toll-free	1-877-422-9110 ext. 496
	Phone	(514) 422-9110 x496
	Hours	09:00 - 17:00 Eastern Time
	Email	support@bluetreewireless.com
Sales desk	Phone	(514) 422-9110
	Hours	09:00 - 17:00 Eastern Time
	Email	info@bluetreewireless.com
Mail	BlueTree Wireless Data, Inc. 2405 46th Avenue Lachine, QC, Canada H8T 3C9	
Fax	(514) 422-3338	
Web	www.bluetreewireless.com	

This page intentionally left blank.

Appendix B: Reference Information

Modem Reference

The BT-2010 is a rugged modem for the GPRS wireless data network.

Features

• Compatible with GSM and GPRS wireless services
• Supports 850 and 1900 MHz frequency bands
• SMS capable – for both mobile originate and terminate messaging
• Data transfer with a host platform through an RS-232 serial interface
• Modem control protocol: AT commands
• Supports GPS (TSIP, TAIP and NMEA 0183 data transfer protocols)

LED indicators

LED	Condition	Corresponding State
DTR	ON	Data Terminal Ready detected. (PC ready to exchange data.)
TX	ON	Transmitting data.
RX	ON	Receiving data.
CD	ON	Data Carrier detected (configurable to indicated coverage as per AT+RSCI)
PWR	ON	Modem is on

Data connection

The serial cable data connection on the modem is configured as shown in the illustration below.
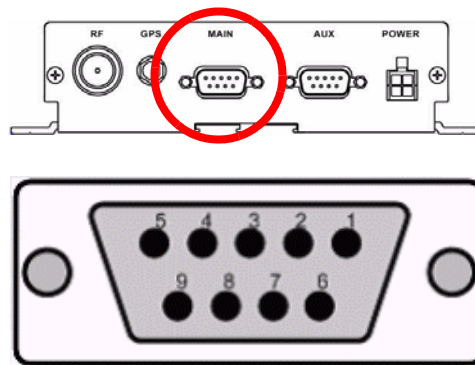
Data connection serial port pin-outs

| Pin number	Name	Description	Direction
1	DCD	Data Carrier Detect	Modem PC
2	RXD	Receive Data	Modem to PC
3	TXD	Transmit Data	PC to Modem
4	DTR	Data Terminal Ready	PC to Modem
5	GND	Ground	Common
6	DSR	Data Set Ready	Modem to PC
7	RTS	Request To Send	PC to Modem
8	CTS	Clear To Send	Modem to PC
9	RI	Ring Indicator	Modem to PC

BlueVue Configuration Options

Modem Settings

After you successfully installed BlueVue software, you must configure several settings by either selecting the menu option Modem > Settings or by opening the Windows Control Panel. Both methods will allow you change your modem settings by accessing the BlueVue Control Panel applet.

To configure BlueVue and your modem:

1. Click Start > Settings > Control Panel.

2. Double-click **BlueTree Wireless Data**.

3. On the BlueTree Modem Properties box click the Settings tab. You can now modify the modem settings.
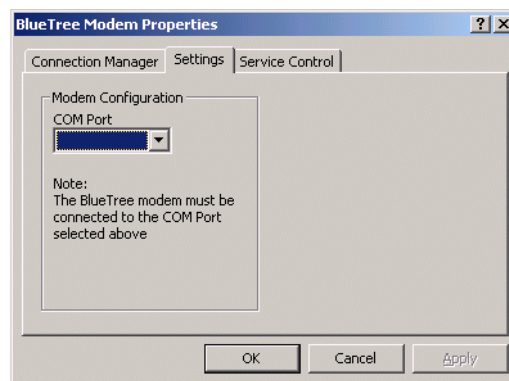
During the software installation process the modem has been installed and attached to a COM port. You do not need to change the COM port settings unless you manually install the modem on another serial port.

> ⚠ **Warning**: The default baud rate value for the serial communication port is 115200 bps (bits per second). The number of data bits, parity and number of stop bits are permanently set to 8N1 respectively. Modifying the baud rate, number of data bits, parity and stop bit parameters for the serial communication port will prevent the modem from operating correctly. ⚠

Service Control

BlueVue is composed of two components: a graphical application or Client and a service or Agent that runs continuously in the background. While you have the BlueTree Modem Properties page open, you will notice a tab labeled Service Control.

You can stop and start the service manually, but this should only be done by the system administrator.

Starting and stopping the service takes a few moments to complete. The BlueVue screen will be updated after a brief period.

> ⚠ **Caution**: The following information is intended for system administrators. Under normal operating conditions, you do not need to access the Service Control tab.

To stop or start the service:

1. Click the Service Control tab to access the following screen:
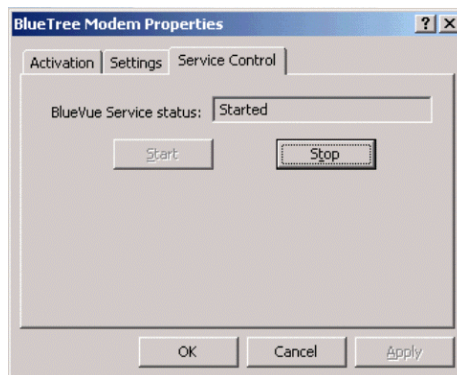
2. Click on Start or Stop to control the service.

> ⚠ **Warning**: Stopping the service will cause BlueVue to stop operating. BlueVue will indicate that the modem is no longer detected and network status information is unavailable.Stopping the service will take a few moments to complete. ⚠

Connection Manager (wireless account logon configuration)

Before you can send and receive data with your modem, you need to configure several items in order to use your wireless network account.

To configure the wireless network account:

1. In the BlueTree Modem Properties box, click the Connection Manager tab. The Connection Manager allows you to maintain a set of user profiles.
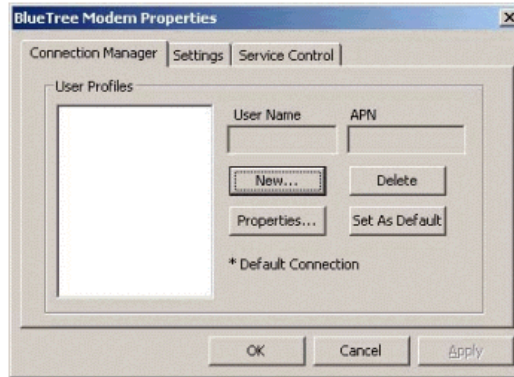

The User Profiles area lists account information in order for you to access the Internet using the GPRS network.

You need at least one profile in the list so you can access the GPRS network.

Connection Manager tab elements

Profile Options	Description
New	Click New to add a new profile.
Properties	To modify an existing profile, highlight it in the list box and then click Properties.(See below).
Delete	To delete a user profile entry, highlight it and click Delete.
Set As Default	After creating a new User Profile, you can select it as the preferred or default data connection. Highlight the user profile entry and click Set As Default. An '*' or asterisk symbol will appear to the left of the user profile entry.

2. On the Connection Profiles Properties box, click **New**.
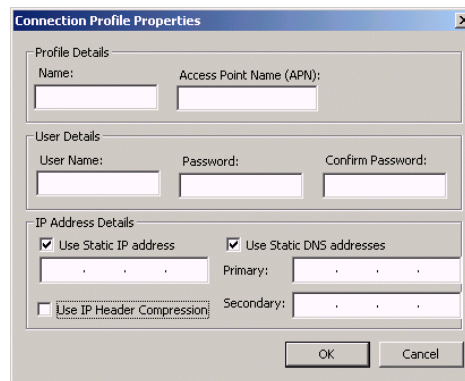
The Connection Profile Properties dialog box allows you to create a new User Profile or modify an existing one.

The values for most of the edit boxes or entry fields are available from your wireless service provider.

**Connection Profiles Properties elements**

Field	Description
Name	Enter an arbitrary profile name such as "Service1" to describe the specific service or provider you plan to use.
APN Access Point Name	Enter the Access Point Name that you obtained from your service provider. This is the name of the system located at the base station on the GPRS network that maintains connections with networks such as the Internet.
User Name	Name or ID of GPRS account supplied by your wireless service provider.
Password	Password of GPRS account supplied by your wireless service provider.
Use Static IP Address	(optional) Some wireless networks do not assign a static IP address. Select this box if your service provider supplied a static IP address.
Static IP Address	(optional) Enter the static IP address supplied by your wireless service provider.
Use Static DNS Addresses	(optional) Some wireless networks do not automatically assign a DNS or Domain Name Server address. Select this box if you must enter the DNS addresses manually.
Primary/ Secondary	(optional) Enter the Primary and/or Secondary DNS addresses supplied by your wireless service provider.
Use IP Header Compression	(optional) Select this box if your wireless service provider supports Internet Protocol header compression.

GPS Settings

Several options in BlueVue need to be defined to enable the GPS Location features.

To set the GPS option settings:

1. In the BlueTree Modem Properties box, click the GPS Settings tab.

2. Select the COM port that will be attached to the GPS port on the modem.
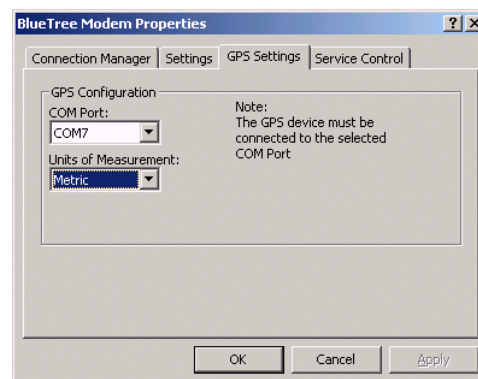
The Units of Measurement option allows you to view GPS data in Imperial, Metric or Nautical values.

Units of Measurement	Speed	Elevation
Imperial	mph, Miles per hour	Feet
Metric	km/h, Kilometers per hour	Meters
Nautical	kts, knots	Feet

BlueVue Basics

This section helps you navigate around the BlueVue application and its various components.

System tray icon

Once installed, BlueVue runs in the background as a continuous service or process called BlueVue Agent and in the foreground as the BlueVue Client or graphical user interface. You will know that BlueVue is available by the BlueTree icon located in the Windows System Tray.

Place the mouse pointer over the icon. The tool-tip caption will display BlueTree Wireless BlueVue.

Double left click the icon to open or display the main BlueVue window.

System tray menu

To access BlueVue's features without having to open the main screen, single right or left click the icon to bring up the following menu options:


System tray menu elements

Element	Description
(the top portion)	Contains the names of the previously entered User Profiles. Simply click on the desired User Profile to select a new data connection.
Connect	Establishes a GPRS data connection with the default User Profile. Once connected, the label will change to Disconnect to allow you to close the current GPRS data connection.
Radio Off	Allows you to disable the radio transmitter. Once disabled, the label will change to Radio On to allow you to enable the radio transmitter.
Settings	Opens the BlueTree Modem Properties page so that you re-configure the modem and software.
Pause Agent	Allows you to pause the BlueVue Agent in order to disconnect it from the attached COM port. Once paused, the label will change to Resume Agent to allow you to continue using BlueVue.
Open BlueVue	Opens the application.
Exit	Closes the BlueVue application.

You can also launch BlueVue from the Start button by clicking Start > Programs > BlueTree > BlueVue GPRS.

BlueVue main screen   The main BlueVue screen comprises several functional areas as shown below.
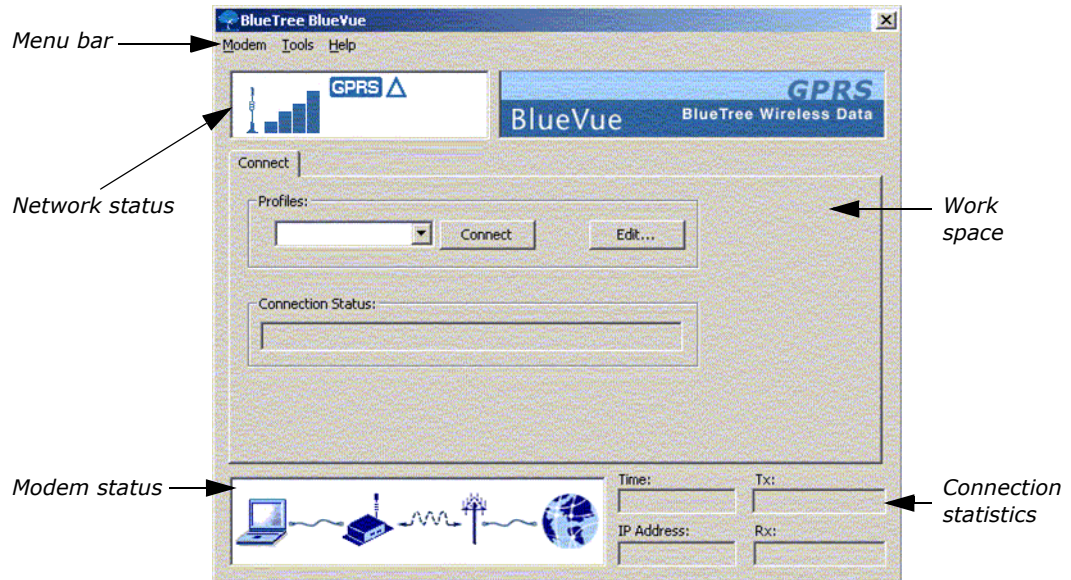
Section	Description
Menu Bar	Collection of pull-down menus to access various features.
Network Status Display	Current state of modem's registration with the wireless network.
Work Space	Main area containing primary functions that can be selected using tabs.
Modem Status Display	Current status of modem's data connection with computer and data network.
Connection Statistics	Current statistics of the existing data connection session.

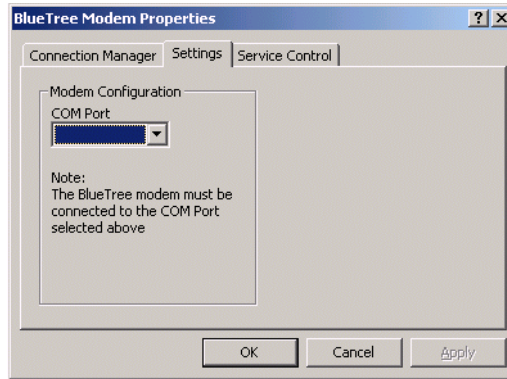Each of these functional areas are described in detail below.

Menu bar
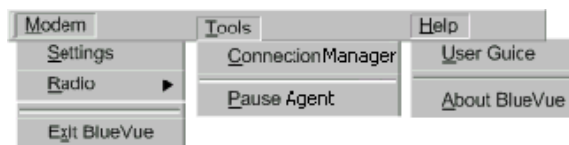
Modem menu

The Modem menu includes three submenu items: Settings, Radio, and Exit BlueVue.

Settings. You can modify any or all of your modem's settings by selecting the Modem > Settings menu option. This opens the BlueTree Modem Properties box.

Radio. If you are mobile and approach a location where you are required to stop transmitting for safety reasons, you can turn the radio transmitter off by selecting Modem > Radio > Off.

- Turning the radio transmitter off:
- Disconnects the existing data connection
- Prevents you from establishing a new data connection
- Displays Transmitter is disabled in the Connection Status field

Note: *Remember to turn the radio back on when it is safe to do so; otherwise you will not be able to establish a data connection.*

Exit BlueVue. You can stop the BlueVue Client application by selecting Modem > Exit BlueVue.

Exiting BlueVue only closes the Client - the Agent will continue to run in the background.

Tools menu

The Tools menu includes two submenu items: Connection Manager, and Pause Agent.

Connection Manager. For complete details, see "Work space" on page 47.

Pause/Resume Agent (Releasing COM Port). The BlueVue Agent can be paused in order to disconnect it from the attached COM port. This allows you to run a terminal application such as HyperTerminal in

order to access the modem directly. Once paused, the menu option will change to Resume so you can continue using BlueVue.

When you pause the agent, the Connection Status field reads: Agent is paused.

Pausing the agent prevents you from establishing new connections and obtaining new status information.

Once paused, the menu option will change to Resume so that you can continue using BlueVue.

Note: *Pausing the Agent takes a few moments to complete. You cannot resume the agent until it has paused completely.*

Pausing the BlueVue Agent is not necessary unless you need to execute another application that requires direct access to the modem's COM port such as a Fax application, another serial device, etc.
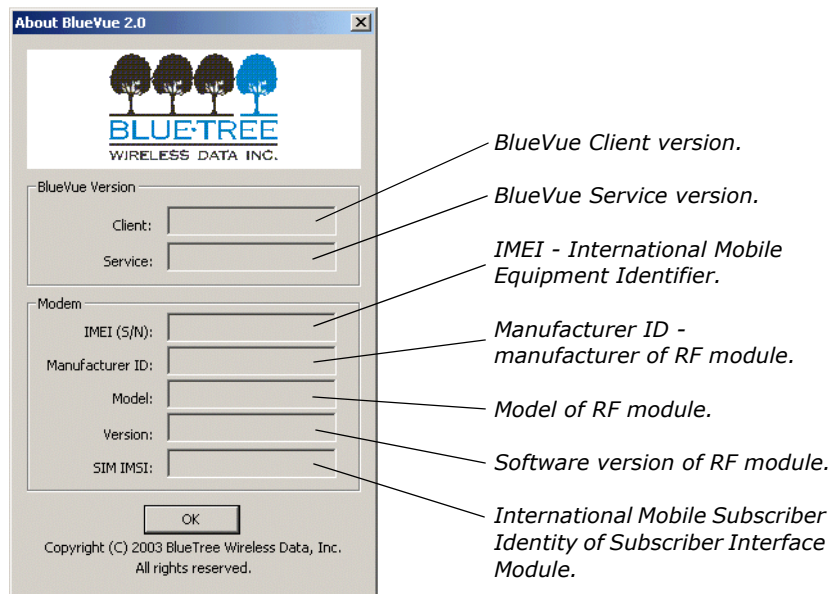
Help menu

This menu option maintains a collection of utilities that provide additional information about the product. The Help menu includes two submenu items: Product Manual, and About BlueVue.

Product Manual. A product manual can be accessed directly from BlueVue by selecting the Help > Product Manual menu option. The product manual is maintained in PDF file format.

Product Information. You can obtain product information such as model number, revision number, product ID's and others by selecting Help > About BlueVue.

This information is useful when contacting your wireless service provider or technical support for assistance with the modem.

BlueVue reads information from the modem and displays it in the About BlueVue 2.0 box as shown below.

BlueVue Client version.

BlueVue Service version.

IMEI - International Mobile Equipment Identifier.

Manufacturer ID - manufacturer of RF module.

Model of RF module.

Software version of RF module.

International Mobile Subscriber Identity of Subscriber Interface Module.

Network status display

The Network Status Display area presents a set of symbols that represent various conditions of the modem's connection with the wireless network.

Network Status information is available when the modem is powered on and connected to your computer.

Symbol descriptions

Symbol	Description
	Received signal strength indicator. 4 bars represent excellent signal reception. No visible bars indicate a very poor signal.
	No service.This symbol indicates that you are no longer in an area covered by your GSM/GPRS service provider. This occurs when the modem no longer receives a signal.
	GPRS or General Packet Radio Service indicates that packet data service is available.
	Roaming. If you are roaming outside of your service provider's home coverage area, then this symbol appears.

Reading the full display

| Display	Modem connection condition
	If you are within in your service provider's "home" coverage area, the name of your service provider is displayed.
	If you are roaming, then the next line will display the country code and ID of the service provider you are using. There will be conditions when status information will not be available in the Network Status Display.
	When a data connection is established, Network Status information is not available during the entire data session. Status icons will be replaced with Data Call.
	A blank screen indicates that network status information is not available. This will occur when the modem is not powered or connected to your computer.
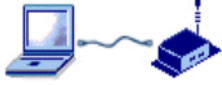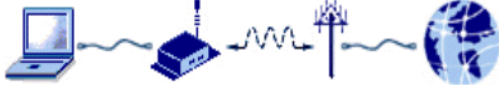
Modem status display

The current state of the modem's data connection between your computer and the wireless network is always available in the Modem Status Display located at the bottom of the main BlueVue window.

The status indicates the state of the modem's end-to-end data connection between your computer, the wireless data network and the remote system.

Symbol	Description	Symbol	Description
	Your laptop or personal computer.		Your BlueTree Wireless Data modem.Powered and connected to your computer.
	Wireless network or service provider is available.		Remote connection: Internet, server, ISP, etc.
	Wireless link between the modem and cellular network.		Wired data connection.

Modem connection states

Display	Modem connection condition
	Modem Not Detected BlueVue is not communicating with the modem. The Network Status Display will display an empty screen. This indicates that status information will not be available until the modem is powered and reconnected to your computer. The Connection Status field in the Connect tab will show Modem Not Detected. You will not be able to establish a data connection until the modem is properly connected to your computer.
	No Wireless Service BlueVue has detected the modem and is receiving its status. However, the modem is not registered with the wireless network. This may be caused by not receiving a carrier signal (out of service coverage area) or not being registered with the wireless service provider (your SIM card is not inserted). Relocate the modem into an area where service is available.
	The signal strength indicator in the Network Status Display will show indicating no service. The Connection Status field in the Connect tab will show No Wireless Service. You will also see this condition if your account with your wireless service provider is not properly activated.
	Modem Is Ready To Connect When your BlueTree modem is powered and connected to your computer, activated, registered with the network and you are within the wireless service provider's coverage area, the Modem Status Display will show: In this scenario, no data session is established. The modem is in command mode; it is ready to accept commands from BlueVue. The Connection Status field in the Connect tab will show Ready To Connect. You may now proceed to establish a data connection.
	Data Connection Established When the modem has successfully established a data connection using GPRS packet data service, the Modem Status Display will show: The "globe" symbol represents the Internet.

Connection statistics   Whenever you establish a data connection, current statistical information is available in the Connection Statistics area of the BlueVue main window.

Field	Description
Time:	Duration of the connection session in hours, minutes and seconds.
Tx:	Number of bytes of data sent from the computer to the modem.
Rx:	Number of bytes of data sent from the modem to the computer.
IP Address:	Current Internet Protocol address assigned to the modem/ computer.

The information in these fields is cleared or reset to 0 whenever data connections are released.

Work space

This chapter describes BlueVue's primary features that are used on a regular basis. They are available to you through the use of "tabbed" screens located in the middle of the BlueVue window.

Data Connections

Data sessions are established using the Connection tab. This is the default tab function presented to you whenever you start BlueVue.

Click on the Connect tab to bring up the following dialog box:

Making a data connection

To establish a data connection, first select a User Profile from the drop-down list box (if a default profile has not already been selected).

The default profile that you selected during configuration will always be displayed in the list box.

- To establish a data connection, click **Connect**.

- Clicking the Connect button will invoke the modem to establish GPRS packet data connection.

- Click **Edit** if you want to add, delete or modify a data connection profile. The label on the Connect button will change to Disconnect after the modem has established a data connection.

- Click the Disconnect button to end the data connection.

> *Note: If GPRS service is unavailable (your modem does not receive a signal or service is unavailable in your coverage area), then the Connect button will be disabled and you will not be able to establish a data connection.*

Connection status

The Connection Status field will display the following data connection states:

Status Indicator	Description
Ready To Connect	Modem is ready for you to establish a data connection with the network.
Modem Not Detected	Modem is either not powered or not connected to your computer.
No Wireless Service	No wireless service is available.
Transmitter is disabled	The radio transmitter has been manually turned off.
Agent is paused	BlueVue Agent is paused.
<supplementary info>	Additional Windows data networking information will be displayed during the progress of establishing the data connection.

Microsoft DUN (Dial-Up Networking)

Visit www.microsoft.com for detailed information on Dial-Up Networking.

AT Commands

The list of AT commands below can be used with the modem. For syntax, input variables and expected results for the custom RIM commands, please see "Key RIM AT commands" on page 39.

Command	Description
A	Answer a call
D	Mobile-initiated call to dialable number
E	Set echo mode
H	Disconnect existing connection
I	Display product identification information
O	Switch from command mode to data mode
Q	Set result code presentation mode
SO	Set number of rings before auto answering the incoming call
S3	Set termination character for a command prompt
S4	Set response formatting character
S5	Set editing character for a command prompt
S6	Set pause before blind dialing
S7	Set number of seconds to wait for connection to complete

Command	Description
S8	Set number of seconds to wait when there is a comma dial modifier
S10	Set disconnection delay after indicating the absence of data carrier
S12	Set the escape code guard time
S13	Set the disconnection delay after a call has been terminated
V	Set result code format mode
X	Set CONNECT result code format and call monitoring
Z	Set all current parameters to a user defined profile
&C	Set circuit Data Carrier Detect DCD function mode
&D	Set circuit Data Terminal Ready DTR function mode
&F	Set all current parameters to manufacturer defaults
&V	Display current configuration
&W	Store current parameter to user defined profile
+GCAP	Request complete terminal adapter capabilities list
+GMI	Request Manufacturer ID
+GMM	Request TA Model ID
+GMR	Request TA Revision ID
+GSN	Request TS Serial Number ID
+ICF	Set TE-TA Control Character Framing
+IFC	Set TE-TA Local Data Flow Control
+IPR	Set Fixed Local Rate
+CBST	Select Bearer Service Type
+CGMI	Request Manufacturer ID
+CGMM	Request Model Identification
+CGMR	Request Revision ID
+CGSN	Request Product Serial Number ID
+CIMI	Request International Mobile Subscriber ID
+COPS	Operator Selection
+CREG	Network Registration
+CSQ	Signal Quality Report
+CMGD	Delete SMS Message
+CMGF	Select SMS Message Format
+CMGL	List SMS Messages from Preferred Store
+CMGR	Read SMS Message
+CMGS	Send SMS Message

Command	Description
+CMGW	Write SMS Message to Memory
+CMSS	Send SMS Message From Storage
+CMGC	Send SMS Command
+CNMI	New SMS Message Indication
+CPMS	Preferred SMS Message Storage
+CRES	Restore SMS Settings
+CSAS	Save SMS Settings
+CSCA	SMS Service Centre Address
+CSCB	Select Cell Broadcast SMS Messages
+CSDH	Show SMS Text Mode Parameters
+CSMP	Set SMS Text Modem Parameters
+CSMS	Select Message Service
+CGDCONT	Define the PDP Context
+CGQREQ	Quality of Service Profile
+CGQMIN	Quality of Service Profile (Minimum accept.)
+CGACT	PDP Context Activate or Deactivate
+CGATT	GPRS Attach or Detach
+CPADDR	Show the PDP Address
+CGCLASS	GPRS Mobile Station Class
+CGREG	Network Registration Status
+CGSMS	Select Service for MO SMS Messages
+FCLASS	Select Mode: Data or Fax

Key RIM AT commands

ATRIMRADIO	Turn the radio on or off using the software
ATRIMDEVICE	Perform a hard reset of the modem
+ICCID	Return ICCID (integrated circuit card identification) from the SIM Card
+RCIQ	Query cell parameter information
+RSCI	RIM Select Coverage Indicator. Indicates which network is providing coverage.

ATRIMRADIO
Description: Turn the radio on or off using the software.

Execute command

Syntax	ATRIMRADIO? or ATRIMRADIO=1
Response	TA turns on or off the radio. OK ERROR

Parameters	=1	Turns the radio on.
	=0	Turns the radio off.
	?	Queries the status of the radio (ON-1, OFF=0).
	=?	Lists all possible settings.

ATRIMDEVICE

Description Perform a hard reset of the modem.

Execute command

Syntax	ATMRIMDEVICE=? or ATRIMDEVICE=0
Response	Response The reset line is pulled low, which performs a hard reset of the modem processor and the flash memory. The registers are reloaded from their defaults. OK ERROR

Parameters	=0	Resets the radio modem.
	?	Returns RIMDEVICE: (0) OK.

AT+ICCID

Description Return integrated circuit card identification (ICCID) from the SIM card.

Execute command

Syntax	AT+ICCID or AT+ICCID?
Response	TA reads ICCID and returns the value OK ERROR

Parameters		Returns the ICCID from the SIM card.
	?	Returns the ICCID from the SIM card.

AT+RCIQ

Description Query cell parameter information. If the device is not
registered with the network when a query is made, the user is notified
that the radio modem has not yet been registered with the network.

Execute command

Syntax	AT+RCIQ=? or AT+RCIQ?
Response	TA returns the cell parameter based on the input. OK ERROR

Serving cell information

Cell parameters	Returned parameters
Base Transceiver Station Identity Code (BSIC)	t
Traffic Channel (TCH)	u
Received Signal Strength Indicator (RSSI)	v dBm
Location Area Code (LAC)	w
Cell ID	x

Dedicated channel information

Cell parameters	Returned parameters
Traffic Channel (TCH)	y
Channel Mode	z

Parameter	Description
=?	Lists possible settings (0 to 6).
?	Queries all cell parameters in one command.
=0	Queries serving cell BSIC (parameter t from above).
=1	Queries serving cell TCH number (u).
=2	Queries serving cell RSSI in dBM (v).
=3	Queries serving cell LAC (w).
=4	Queries serving cell Cell ID (x).

Parameter	Description
=5	Queries dedicated channel TCH number (y).
=6	Queries dedicated channel mode (z)\.

AT+RSCI

Description RIM select coverage indicator. Indicates which network is providing coverage.

Test command

Syntax	AT+RSCI=?
Response	+RSCI: (list of supported <network>s) OK
Parameters	Refer to set command.

Read command

Syntax	AT+RSCI?
Response	+RSCI: <network> OK
Parameters	Refer to set command.

Set command

Syntax	AT+RSCI=[<network>]
Response	TA sets the coverage indicator to turn on when attached to the specified network. OK ERROR

Parameters	=0	Sets coverage indicator to turn on when in GSM coverage (default).
	=1	Sets coverage indicator to turn on when in GPRS coverage.
	?	Queries current setting returning .GPRS. (if set to 1) or .GSM. (if set to 0).
	=?	Lists possible settings for command. Returns error.

GPS Reference

Overview

The BT-2010:

- Utilizes the Trimble Lassen™ SQ GPS receiver module

- Tracks up to 8 GPS satellites and computes location, speed, heading and time

- Supports 3 communication protocols: TSIP (default), TAIP and NMEA 0183

- BlueVue supports the GPS receiver by providing the user with location information in digital and graphical formats.

Changing the default data settings

The default data output protocol for the BT-2010 is Trimble Standard Interface Protocol (TSIP), a binary, bi-directional protocol.

The modem can also be configured to output GPS data using one of two other protocols: Trimble ASCII Interface Protocol (TAIP), and National Marine Electronics Association Protocol (NMEA 0183).

TAIP is a Trimble-specified digital communication interface based on printable ASCII characters over a serial data link. TAIP interface provides the means to configure the Lassen SQ GPS receiver to output various sentences in response to query or on a scheduled basis. TAIP messages may be scheduled for output at a user specified rate starting on a given epoch from top of the hour. For communication robustness, the protocol optionally supports checksums on all messages. It also provides the user with the option of tagging all messages with the unit's user specified identification number (ID). This greatly enhances the functional capability of the unit in a network environment.

NMEA 0183 is a simple, yet comprehensive ASCII protocol which defines both the communication interface and the data format. The NMEA 0183 protocol was originally established to allow marine navigation equipment to share information. Since it is a well established industry standard, NMEA 0183 has also gained popularity for use in applications other than marine electronics. The latest release of NMEA 0183 is Version 3.0 (July 1, 2000). Trimble Navigation supports both version 2.1 and version 3.0. The primary change in release 3.0 is the addition of the mode indicators in the GLL, RMC, and VTG messages.

For those applications requiring output only from the GPS receiver, NMEA 0183 is a popular choice since, in many cases, an NMEA 0183 software application code already exists.

To obtain the NMEA 0183 protocol specification, please visit http:// www.nmea.org/pub/0183/index.html

Changing from TSIP to TAIP or NMEA 0183

To change the protocol mode of the module to either TAIP or NMEA, you will need Trimble's tsipchat.exe utility. Download this utility from:

http://www.trimble.com/lassensq_ts.asp?Nav=Collection-9590

To change the default from TSIP to TAIP:

1. Run 'tsipchat.exe' in a DOS command prompt.

```
>tsipchat –c2
```

Where -c<n> is the com port connected to the GPS receiver

2. (Optional) Run command 0x7e ('a') and follow the prompts to set TAIP output variables (time offset, messages reported and unit ID).

3. Run command 0xBC ('U') and follow prompts to set parameters to TAIP values.

The unit is now set to output GPS data using the TAIP protocol.

Parameter	Value
Speed	4800
Bits	8
Parity	N
Stopbits	1
Protocol in:	TAIP
Protocol out:	TAIP

To change the default from TSIP to NMEA 0183:

1. Run 'tsipchat.exe' in a DOS command prompt.

```
>tsipchat –c2
```

Where -c<n> is the com port connected to the GPS receiver

2. Run command 0x7A ('q') and follow prompts to set parameters to NMEA values.
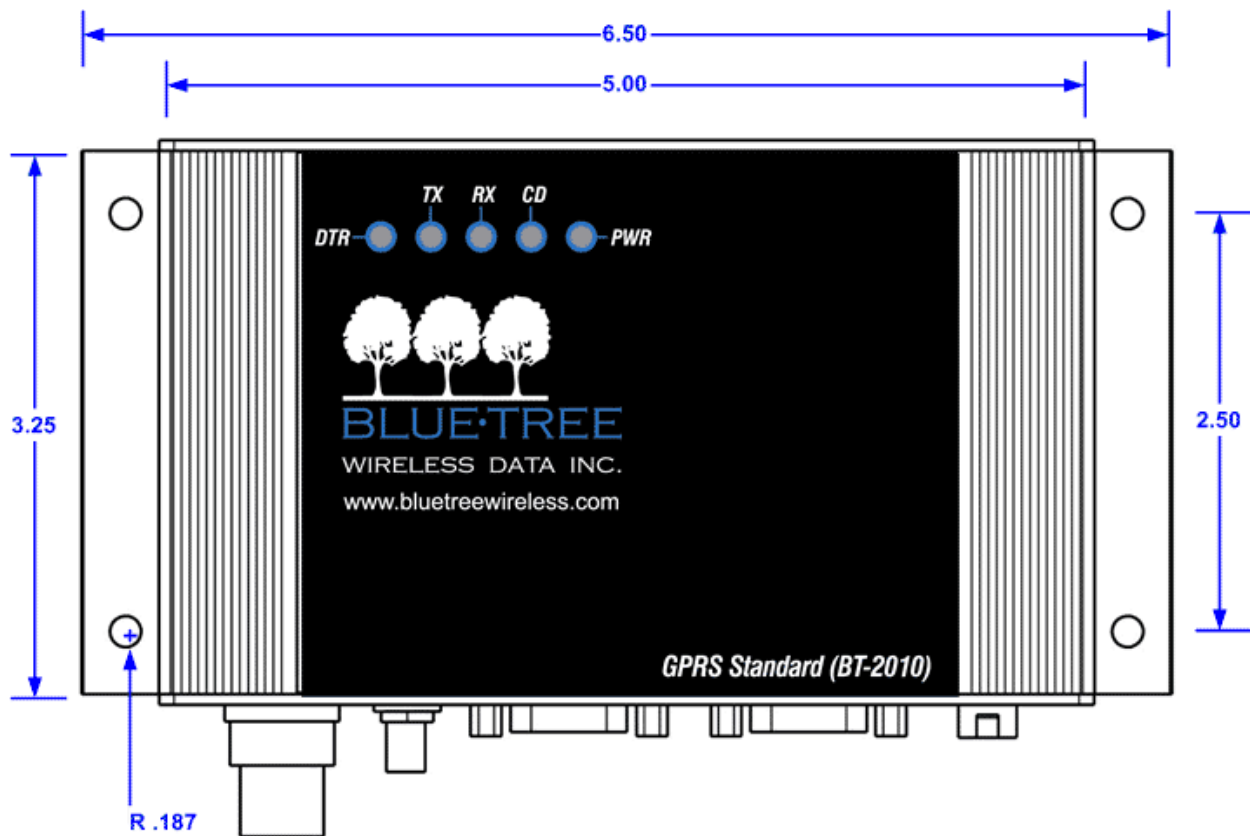
Parameter	Value
Speed	4800
Bits	8
Parity	N
Stopbits	1
Protocol in:	TSIP
Protocol out:	NMEA

The unit is now set to output GPA data using the NMEA protocol.

Appendix C: Modem Specifications

Physical Dimensions

Top view

Bottom view

Part number under which the modem was ordered.

FCC and Industry Canada identifiers

Hardware unique identifier. Used for tracking purposes.

RF module unique identifier. Represents the IMEI number in decimal and barcoded (International Mobile Equipment Identification).

Model number of the modem.
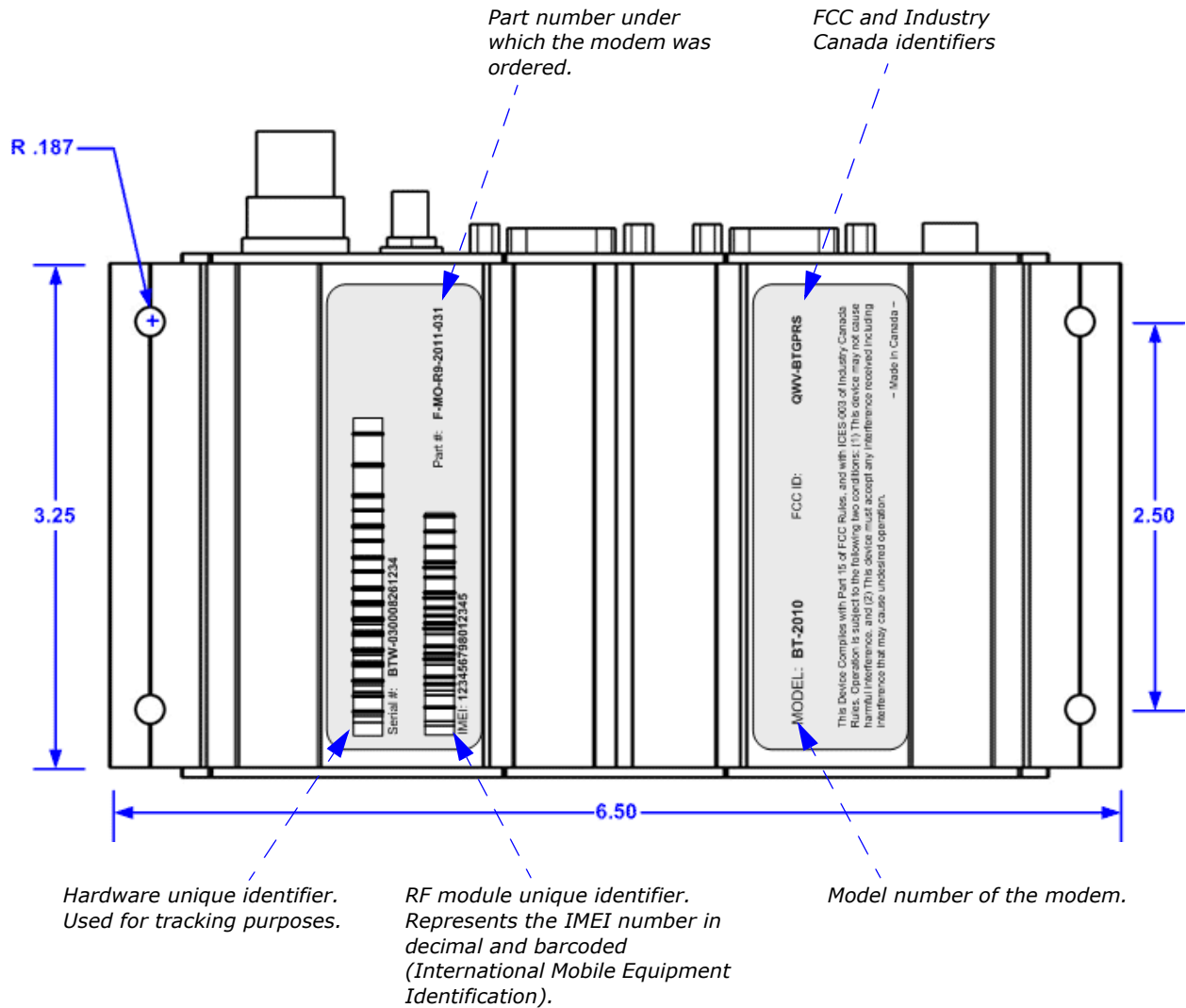
Front view
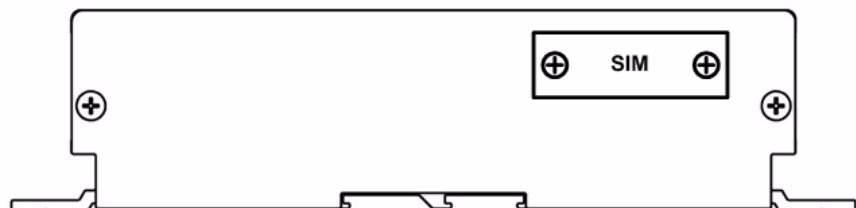
Back view
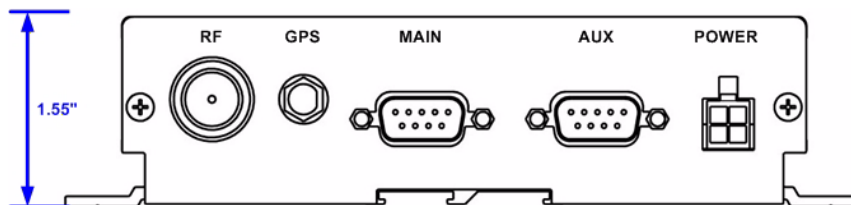
Product Specifications

Category	Specification
Wireless Interface	GSM
	GPRS
Frequency Bands	850/1900 MHz
Host Interface	RS-232 Serial
Interface Connector	DB-9 (female)
Programming / Setup	AT Commands
Enclosure	Extruded aluminum
	W:3.25" H:1.55" L:5.5" + 1.0"
Antenna Connection	TNC 50 ohm male
Serial Port Data Rates	1200 to 115200 bps
Multislot Class	8
Effective Peak Rate	53 Kbps
GPS	Trimble Lassen SQ
	TSIP, TAIP, NMEA
Power Input	8 - 30VDC
	12 VDC nominal
Current @12VDC	Peak (Tx): 150 mA
	Standby: 40 mA
	Ignition off: 0.4 mA
Effective Radiated Power	0.394 W - 1900 MHz
	0.676 W - 850 MHz

Power Consumption

Current measured at 12VDC

Mode	State
Active Mode	Transmitting data
	150 mA with peaks of 300 mA

Mode	State
	Need to re-establish RF link ~3 secs.
	40 mA
Standby Mode	40 mA with peaks of 70 mA
Power Down Mode (Ignition off)	All interface circuits are inactive (UARTs, etc.)
	0.4 mA

Certification

Category	Specification
FCC	Part 15 Class B
	850/1900 MHz
	QWV-BTGPRS
Operating Temperature	-40° C to +85° C
	MIL-STD-810F, method 501.4, procedure II
	MIL-STD-810F, method 502.4, procedure II
	SAE J1455 - 1994, Section 4.1.3.1
Storage Temperature	-40° C to +85° C
	MIL-STD-810F, method 501.4, procedure I
	MIL-STD-810F, method 502.4, procedure I
	SAE J1455 - 1994, Section 4.1.3.2
Humidity Range	95% non-condensing
	MIL-STD-810F, method 507.4
	MIL-STD-202G, method 103, Test cond. A, (SAE sect. 4.2)
Industry Canada	ICES 003
Health Canada	Safety Code 6
	Limit 6.3cm with 5.15 dBi antenna
Vibration	Cyclic and random
	MIL-STD-810F method 514.5, procedure I, Random Vibrations, Operating Mode
	MIL-STD-202G method 214A, Test cond. I
Shock	Sawtooth peak of 40g
	MIL-STD-810F, method 516.5, procedure I, Operating mode
	MIL-STD-810F, method 516.5, procedure V, Crash Hazard
	MIL-STD-202G method 213B