BT-2010

GPRS Standard GPS Modem

Product Manual

BLUE·TREE
WIRELESS DATA INC.

BlueTree Wireless
BT-2010 GPRS Standard GPS Modem

Product Manual

July 2004

GPRSUG-02010

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Patents

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

For BT-2000 or BT-2010 with RIM 1902G module:

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)

FCC ID: QWV-BTGPRS (for GPRS modems with RIM 1902G module)

FCC ID: QWV-BT2000 (for GPRS modems with Wavecom Q2426 module)

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 30 cm or 12 inches 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.

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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 or Wavecom's Q2426 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

The modem 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 3dB (5.15dBi)
- 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 30cm or 12 inches 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 (optional)

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
- Quick Start Guide
- BlueTree installation CD (includes the Product Manual along with BlueVue software)
- BlueVue software is available from our web site at http://www.bluetreewireless.com

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. The SIM card will not be detected if inserted with power applied to 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.

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.

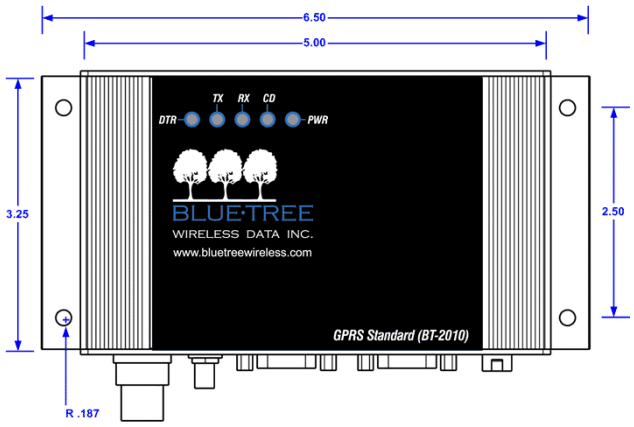
Installing the Modem

There are 2 ways to mount the 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

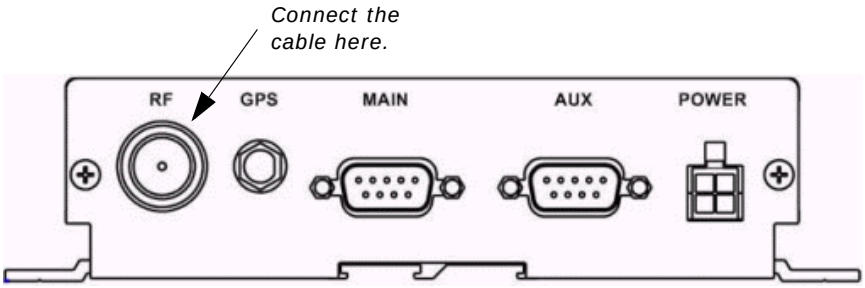
- Cellular band antennas should be mounted more than 30 cm (12 inches) from other antennas.
- Do not install the antenna in a closed metallic enclosure (such as a cabinet or the trunk of a car).
- For safety reasons, mount the antenna at least 30 cm (12 inches) away from the body of a person.
- The length of the antenna cable may affect the signal strength. Choose the appropriate cable type and length.

> ⚠ **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 30 cm or 12 inches 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 to the TNC connector finger tight. Do not use tools.



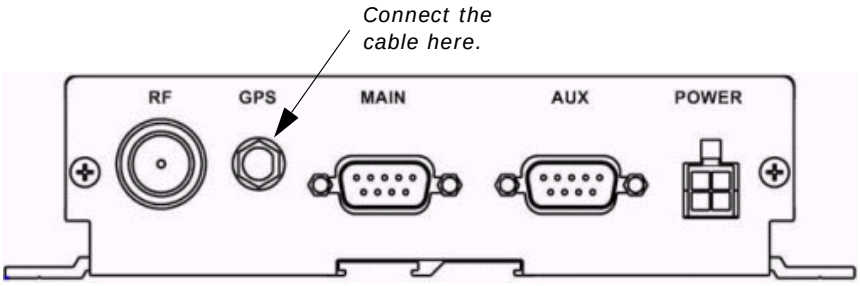
Choosing the location for the GPS antenna

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:

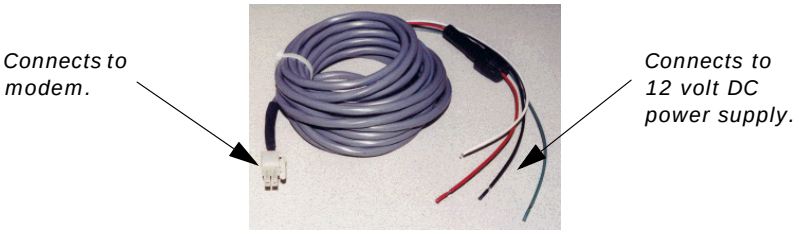
1. Thread the antenna cable through the vehicle so the cable can reach the front plate of the modem.

2. Connect the cable to the SMA connector.



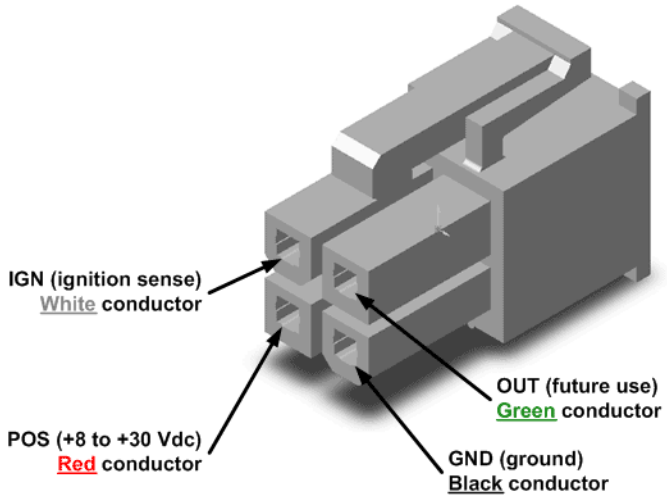
Installing the Power Cable

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



Power cable connector

As shown below, the power cable connects to the modem through a Molex type connector (MiniFit 4-pin).

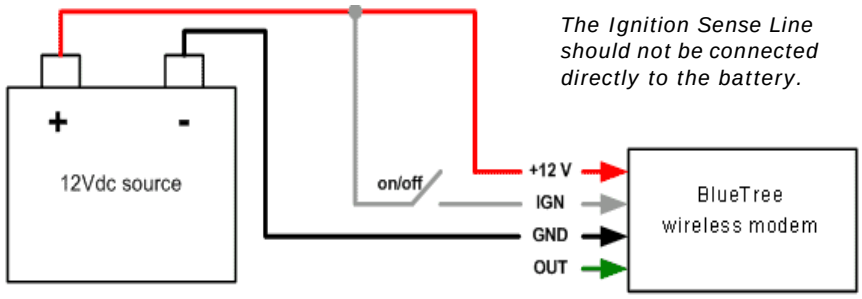


The ignition sense line (white wire) acts as an ON/OFF power switch. The modem will turn on when the ignition sense line is set between 8 and 30 volts DC. The modem will turn off if the ignition sense line is less than 7 volts DC.

Pin designations for the connector are shown below.

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

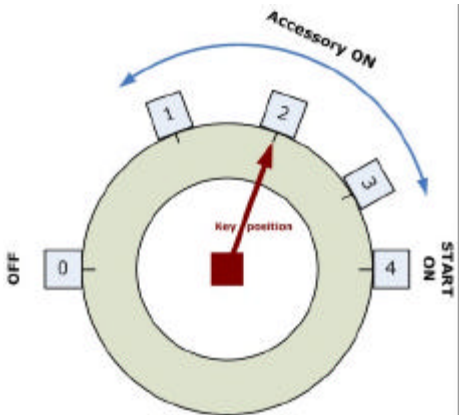
Powering up the modem



Note: *Make sure that the antenna is connected to the modem before applying power.*

To connect the power cable:

- Connect the red wire directly to the baterry's positive (+) terminal or to a source of 8-to-30Vdc.
- Connect the black wire directly to the battery's negative (-) terminal or to ground (GND).
- The white wire must be connected to either:
  a) a switch for manually turning on and off the modem,
  b) the vehicle's "Accessory for position 2", for turning ON the modem without turning on the engine,
  c) the vehicle's "Accessory for position 3", for turning ON the modem only when the engine is turned on.



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 39.

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

Battery back-up

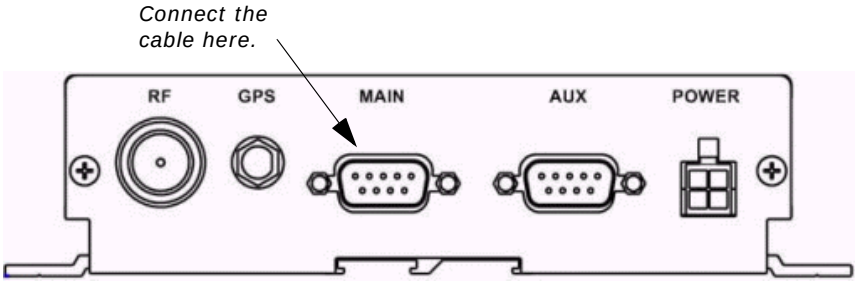
The modem is equipped with a 3.6 volt lithium back-up battery that power the real-time clock when the receiver's prime power is turned off, and keeps the module's RAM alive. RAM stores the GPS almanac, ephemeris, and last position.

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:

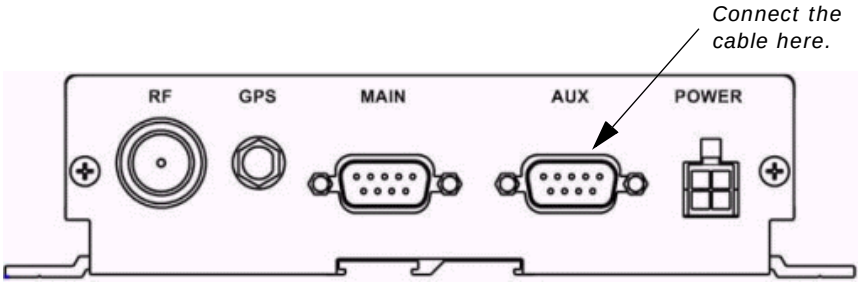
1. Attach one end of a serial cable to the modem at the connector labeled MAIN.



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.



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

Installing the BlueVue software

BlueVue is BlueTree's modem management software that makes configuring and operating your modem simple and quick. Your modem includes a BlueVue installation CD-ROM.Visit BlueTree's web site at http://www.bluetreewireless.com for the latest release of software.

Installing BlueVue

Users must have full local administrator access rights with their Windows logon account to install BlueVue. Regular "User" accounts will be able to use BlueVue and make connections. "Guest" accounts will not be able to make connections.

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 refer to the "BlueVue User Guide" 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. The USB to Serial adapter must be inserted into your PC before starting Windows.

> **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.x Software** to start the installation wizard.

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

4. gprsOn 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. Select the wireless service provider that you have an account with from the list box, and then click **Next**.

7. 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. Your selection must correspond to the serial port connected to the modem labeled MAIN.

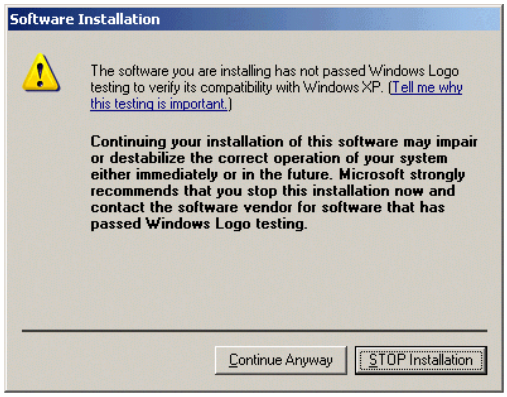
> **Caution**: If you are using a USB-to-Serial adapter instead of an integrated serial port, make sure the adapter is inserted into the USB socket before continuing. If the USB-to-Serial adapter is not plugged in, the installation wizard will not detect all available COM ports.

8. 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.

9. Click **Next**.

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

11. 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.



12. 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.

13. 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.x 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.

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Chapter 2: Activating the Modem

TheBT-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 user name and password, an access point name, and in some cases a static IP address and others.

This chapter shows you how to activate the modem:

- Using BlueTree's BlueVue software,
- Using AT commands.

It also shows you how to setup a:

- Windows Dial-Up Networking session,
- HyperTerminal session to check that the modem is operating correctly.

Using BlueVue

Activating the modem

To access your service provider's GPRS wireless data network, you need a User Profile. User Profiles contain configuration settings such as APN (Access Point Name), userid and others.

BlueVue provides User Profiles for various GPRS service providers. User Profiles are automatically configured and available when you select the specific GPRS service provider during the installation of BlueVue.

No further activation is required once you start BlueVue.

Using Microsoft DUN (Dial-Up Networking)

NOTE: The following section is only required if you do not intend to use BlueVue to manage your data connections.

You can create a DUN script to establish data connections. Using 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 Panel > Phone and Modem Options.

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

a) Click **Add**.

b) Check the box labelled "**Don't detect my modem;**..." and then click **Next**.

c) Select the **Standard 33600 bps Modem** and click **Next.**

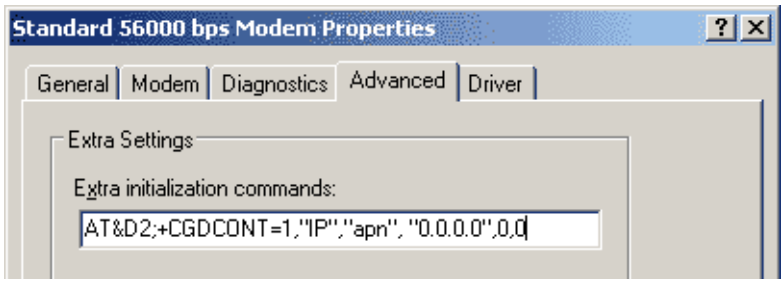
d) Select the **COM** port that the modem is attached to then click **Next**.

e) Click **Finish** to complete the addition of the modem in Windows.

3. Select the **Standard 33600 bps Modem** and click **Properties**.

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 the **Modem** tab and confirm that the Maximum Port Speed is set to 115,200.

d) Click **OK**.

The modem profile 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 **33600bps** 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 wireless 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 enter AT commands to activate the modem and verify its registration status with the wireless network. AT commands are entered into the modem using the Microsoft HyperTerminal application.

Configuring the HyperTerminal session

To configure HyperTerminal:

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

2. Enter a name for this connection. For example: BlueTree.

3. In the **Connect to** window in the **Connect using** field, select the COM port that your modem is attached to.

4. Click **OK**.

5. Select 115200bps, 8, None, 1, Hardware. Click **OK**.

6. Save the session for future use. From the menu bar, select File and "Save As". Enter a name and click **OK.**

7. Run AT commands as shown below.

Note: *GPRS modems do not need activation by AT commands. They are activated with a SIM card. The AT commands below are used for the purposes of determining if the modem is registered with the GPRS data network.*

Command	Function
ATRIMRADIO=1 OK	Turns ON the transmitter module NOTE: Only for modems with RIM 1902G modules.
AT+IPR=<baud rate> OK	Sets the serial DCE speed (baud rate of modem). Valid baud rate values: 0 (auto-baud), 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200

Command	Function
AT+ICF=<format>[,<parity>] OK	Sets the serial DTE-DCE character framing. <format> 0: auto-detect 1: 8 Data 0 Parity 2 Stop 2: 8 Data 1 Parity 1 Stop 3: 8 Data 0 Parity 1 Stop 4: 7 Data 0 Parity 2 Stop 5: 7 Data 1 Parity 1 Stop 6: 7 Data 0 Parity 1 Stop <parity> 0: Odd 1: Even 2: Mark 3: Space 4: None
AT+CPIN? +CPIN: READY	Checks the SIM card
AT+CREG? +CREG: 0,1 OK	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
AT+WGPRS=0,0 OK	Sets modems for automatic attachment. For Wavecom 2426 modules only.
AT+CGACT=1,1 OK	Activates PDP context
AT+CGATT? +CGATT: 1 OK	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.

Command	**Function**
AT+CSQ? +CSQ: <rssi>,<fer> OK	Checks the signal strength. The RSSI value range is from 0 (lowest) to 31 (highest). A value of 10 or higher indicates a usable signal. If the value is lower than 10, move the antenna or the modem to a location where you know the signal quality is strong. An RSSI value of 99 indicates no signal.
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. RIM 1902G module only.

Chapter 3: Connecting to the Wireless Network

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

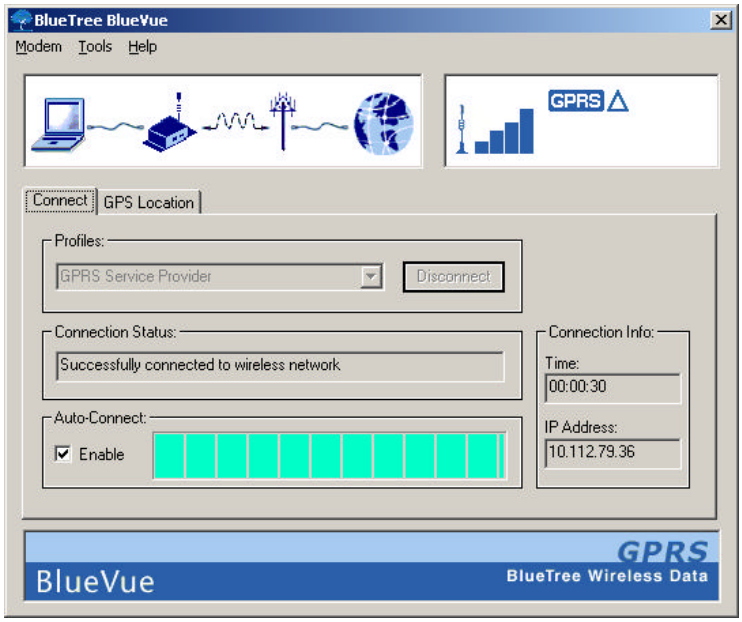
Using BlueVue

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:

Manually

1. From the Profiles list select a connection profile.

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

Auto-Connect and Auto-Reconnect

If the Auto-Connect **Enable** box is checked, then BlueVue will automatically establish a data connection when Windows starts and before you log on.

BlueVue will automatically attempt to re-connect a data link if a previous data session was broken due to loss of signal.

1. Click the **Enable** box in the Auto-Connect section to enable the feature.

For more information on the BlueVue interface, refer to the **BlueVue User Guide**.

Using Microsoft DUN (Dial Up Networking)

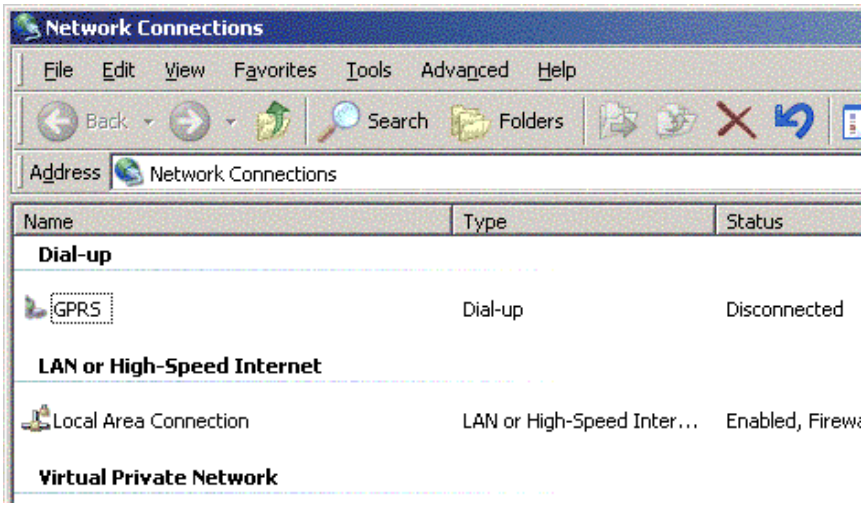
A DUN connection is started from the Network Connections directory on your system. You can open the directory and start your DUN session one of two ways: from the Start menu, or from the My Network Places icon on your desktop.

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 (or the name you chose earlier).



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.

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 65.

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

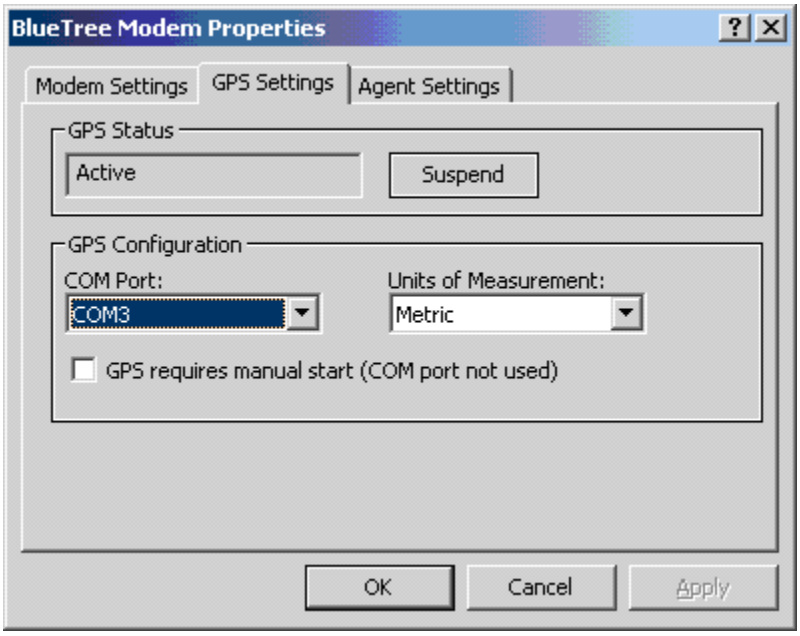
Configuring the default TSIP data settings

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 GPS Status, you can manually suspend the GPS manager even after it has been installed and running.

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

5. 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

6. The GPS manager can be selected to start automatically or manually when BlueVue starts. Click the **GPS requires manual start** check-box if you do not want the BlueVue to process the GPS data stream on the COM port only until to start it manually.

7. 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 65.

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.

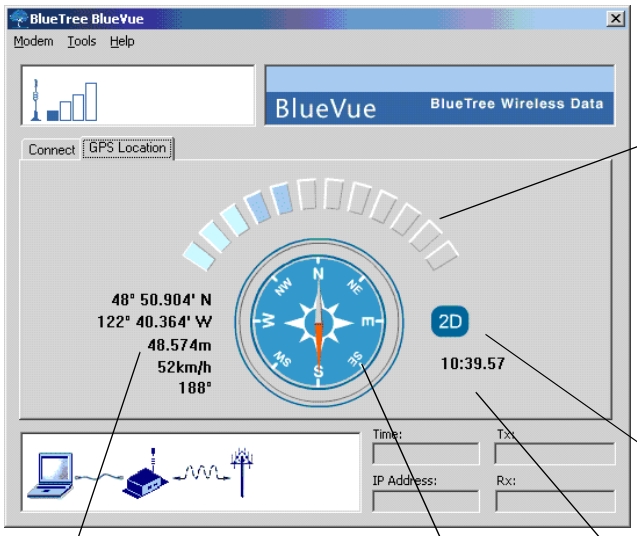
- Click Start > Programs > BlueVue or
- Double-click the BlueTree icon located on your system’s task bar.

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.

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).

Time of last satellite fix

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.

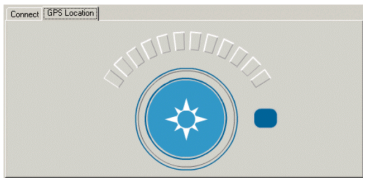
As shown at left, the compass appears as inactive if directional information has not been calculated or if the GPS receiver is not in motion,

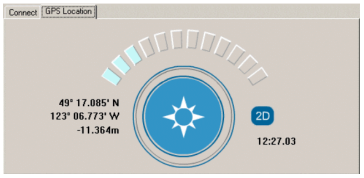
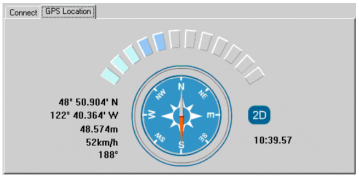
Signal Quality

Symbol	Description
	No satellite signals detected.
	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.
	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. PWR LED is flasing. The modem does not communciate with the network. CD LED is OFF.	Cellular antenna is not properly connected to the modem.	Check that the antenna cable is connected properly to the TNC connector labeled RF on the modem.
	No service.	Check to see if you are within your service provider's coverage area. Use BlueVue to read the signal strength. If no signal, then move to an area known to have a signal.
		Check your authentication credentials. Check your password.
		Check if the SIM card is properly inserted into the modem.
PWR LED is OFF	No power to the modem.	Check to see if the fuse is not blown.
		Is the power connector plugged securely to the modem?
		Check the 12 volts supply. Is it reversed?
		Is the ignition sense cable connected: White to +12 volts.
		Are you using the power cable supplied by BlueTree?
		Modem is defective. Contact BlueTree technical support.
DTR LED is OFF.	No software application is using the COM port.	Check if your application or BlueVue is running and using the modem's COM port.
	Serial cable attached to incorrect port.	Move your serial cable to the correct COM port on your computer.
DTR LED is ON but no response from modem. TX LED is flashing. RX LED if OFF.	Serial port data speed is incorrect.	Use HyperTerminal or your application to change the baud rate of the COM port.
	Echo response is OFF or result code is OFF.	Using HyperTerminal, enter ATE1Q0V1.

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 that the serial cable is connected to the proper COM port on your computer and the other end connected to MAIN.
	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.	Check with your service provider.
	You are outside the network coverage area.	Check your service provider's coverage map to verify if you have service in your immediate area.
	Your antenna is not installed correctly.	Verify that your antenna cable is connected to the modem.
	Your signal is lost (you are in a tunnel or behind a building preventing the modem from receiving a signal)	Change your location.
	Your account has not been activated by your service provider.	Check with your service provider.
Another application cannot access the COM port used by the modem.	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.
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.

Issue	Possible cause	Suggestion
	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.
Agent (service) will not start.	BlueTreeStandard CDMA Modem is not installed in Windows.	Re-install BlueVue or go to “Start > Settings > Control Panel > Phone and Modem Options “ and add BlueTree GPRS Standard Modem.
	Another modem is installed using the same COM port as BlueTree CDMA Standard Modem	Go to “Start > Settings > Control Panel > Phone and Modem Options” and remove the modem configured with the same COM as BlueTree’s.
		Open “Start > Settings > Control Panel > Administrative Tools > Event Viewer”. In the Application section, check for any error events generated by BlueVue. If one exists, then read the information in the report. This will inform you of the possible problem.
Multiple BlueTree dial-up profiles displayed in Network Connections.	A latency with Windows causes multiple profiles to be displayed.	Press the “F5” key to refresh the screen and remove the redundent connection profiles.
BlueVue displays: “The remote computer did not respond”	Incorrect dial-in number was entered.	Change the connection profile and re-enter the dial-in number. e.g. *99#
BlueVue displays: “Access was denied. The username and/or password is invalid.”	Connection profile contains incorrect network access credentials.	Change the connecion profile and enter new userid and password.

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	

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Appendix B: Reference Information

Modem Reference

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

Features

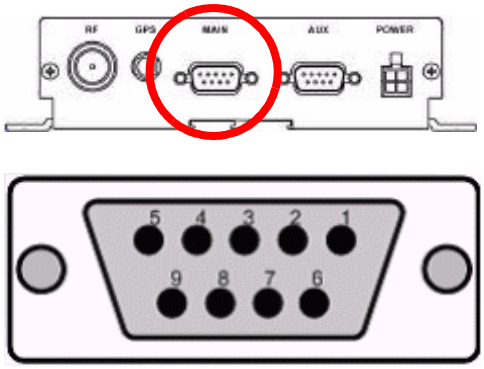
- Compatible with GSM and GPRS wireless services
- Supports 850 and 1900 MHz frequency bands
- SMS capable – for both mobile originate and terminate messaging
- Data transfer with a host platform through an RS-232 serial interface
- Modem control protocol: AT commands
- Supports GPS (TSIP, TAIP and NMEA 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
PWR	ON	Modem is ON. (RIM module).
PWR	ON	Modem is ON, but not registered with network. (Wavecom module).
PWR	Slow FLASH 200 mS ON 2 Sec OFF	Modem is ON and registered with network. (Wavecom module).
PWR	Quick FLASH 200 mS ON 600 mS OFF	Modem is ON, registered with network and data call is in progress over GSM. (Wavecom module).

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

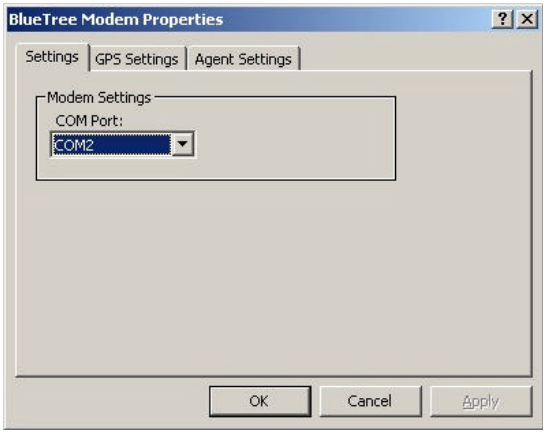
BlueVue Configuration Options

Modem Settings

Use Modem Settings to configure the modem to connect to the computer and the wireless network.

To configure the modem settings

- Right-click the BlueTree icon in the Windows system tray, and then click **Settings**.



Field	Description
COM Port	You can manually select the COM port assigned to the modem. Note that the COM port is assigned during software installation. You don't have to manually change the COM port unless you move the serial cable.

After you successfully installed BlueVue software, you can configure several settings by either selecting the menu option Tools > Settings or by opening the Windows Control Panel. Both methods will allow you

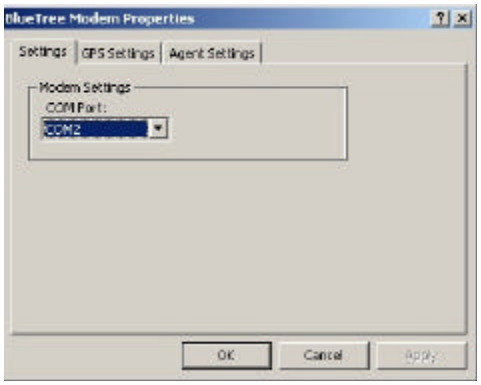
change your modem settings by accessing the BlueVue Control Panel applet.

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.

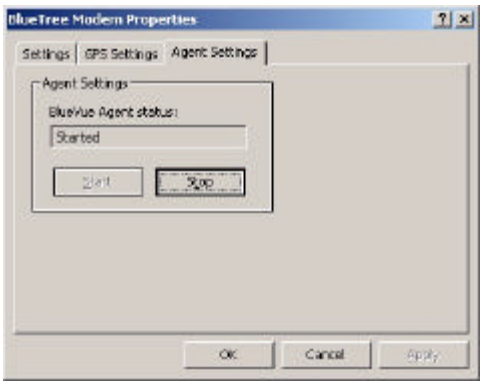
You can stop and start the service manually, but this should only be done by the system administrator.

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.

GPS Settings

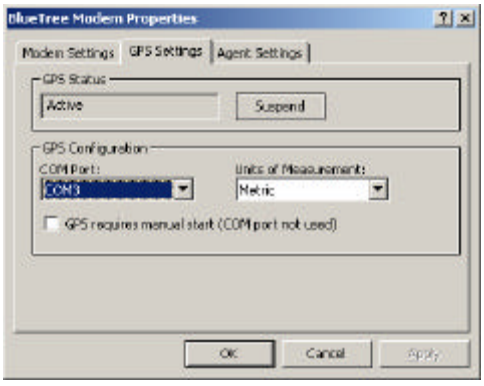
Several options in BlueVue need to be defined to enable the GPS Location features.

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.

3. You can configure BlueVue such that the GPS manager is suspended when BlueVue is launched. You must then manually activate the GPS manager. This feature allows other applications to attach to the GPS receiver's COM port without conflicts.



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

Units of Measurement	Speed	Elevation
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

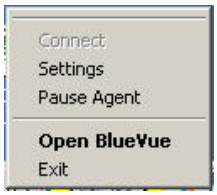
Once installed, BlueVue runs in the background as a continuous service or process called BlueVue Agent and in the foreground as the BlueVue Client or graphical user interface. You will know that BlueVue is available by the BlueTree icon located in the Windows System Tray.

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

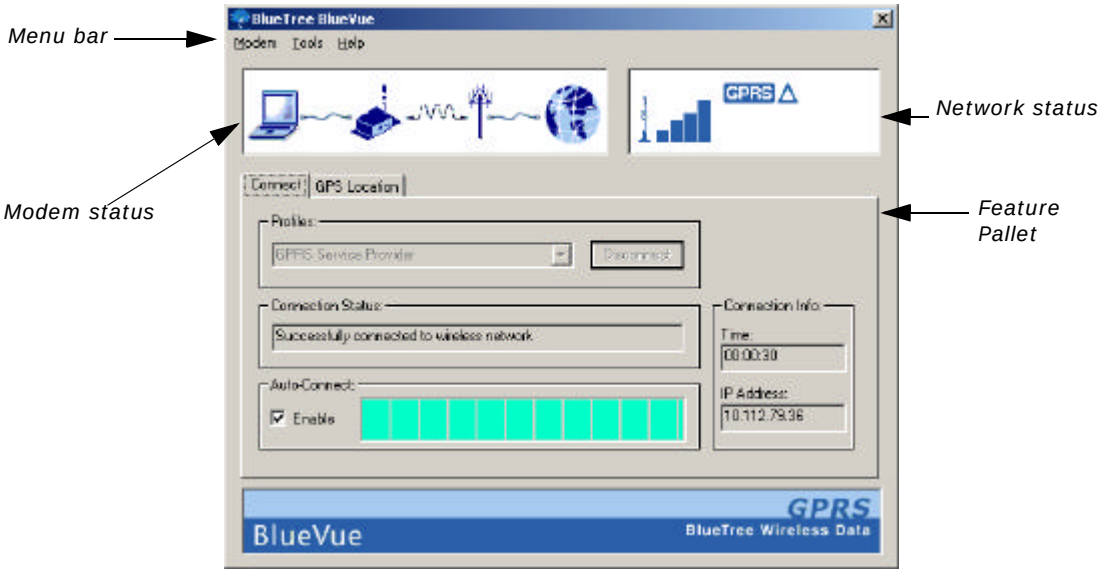
Element	Description
(the top portion)	Contains the names of the previously entered User Profiles. Simply click on the desired User Profile to select a new data connection.
Connect	Establishes a GPRS data connection with the default User Profile. Once connected, the label will change to Disconnect to 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.

Element	Description
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.
Feature Pallet	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.

Each of these functional areas are described in detail below.

Menu bar

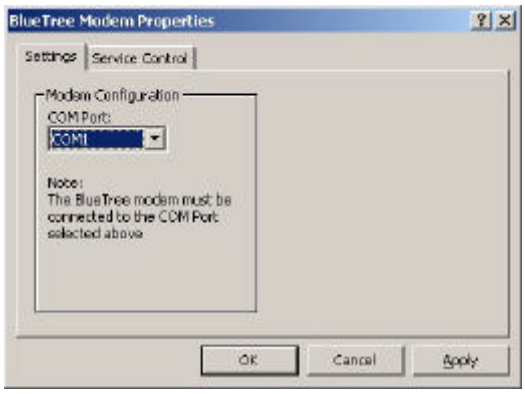
Modem menu

The Modem menu includes the following submenu items:

- Settings
- Radio
- 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 the following submenu items:

- Connection Manager
- GPS Manager
- Pause Agent
- Activation Wizard

Connection Manager. For complete details, see “Feature Pallet” on page 58.

GPS Manager. This will bring the GPS Manager to the foreground.

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.

Activation Wizard. This will launch the Activation Wizard.

Help menu

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

User Guide. The **BlueVue User Guide** can be accessed directly from BlueVue by selecting the Help > User Guide menu option. The user guide is maintained in PDF file format.

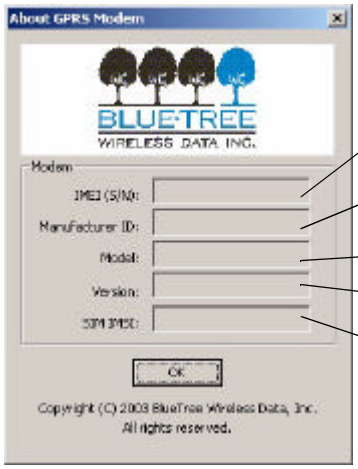
Product Information. You can obtain BlueVue and modem version information such as model number, revision number, product ID's and others by selecting Help > About BlueVue or Help > About Modem.

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

BlueVue reads information from the modem (when the modem is in AT command mode) and displays it in the About BlueVue 2.x box as shown below. (This information is not available during a data call.)

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.

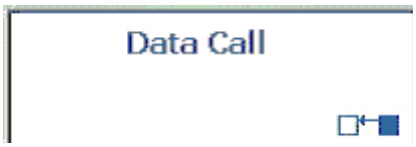
Network Status information is available when the modem is powered on and connected to your computer.

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.
	A data connection has been established.
	Data traffic activity indicators. During a data call, either one of these symbols will appear. When data is exchanged between your computer and the wireless network, these symbols will alternate on the screen. If there is no data, then only one of these symbols will be displayed.

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.

Display	Modem connection condition
	When a data connection is established, Network Status symbols are relaced with Data Call. The symbols located at lower right indicate data traffic.
	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

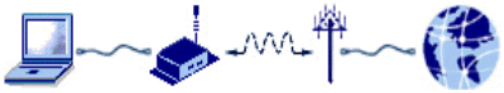
The current state of the modem's data connection between your computer and the wireless network is always available in the Modem Status Display located at the bottom of the main BlueVue window.

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.

Display	Modem connection condition
	**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 a data network such as the Internet.

Connection Information

Whenever you establish a data connection, current statistical information is available in the Connection Info area of the Connection Manager window.

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

Field	Description
Time:	Duration of the connection session in hours, minutes and seconds.
IP Address:	Current Internet Protocol address assigned to the modem/ computer.

Feature Pallet

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 Manual Data Connection

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

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 a GPRS packet data connection.
- 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 GPRSservice 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.*

Automatic data connections (Auto-Connect)

The Auto-Connect feature is used to maintain a persistent data session with the wireless network.

Once enabled, BlueVue will automatically establish a data connection when you start and log onto Windows (and your modem is attached and powered on). BlueVue will also automatically attempt to re-connect if an existing data session is dropped.

- Click the **Auto-Connect** checkbox to enable the feature.

Auto-Connect checks for a set of conditions before attempting to connect. These conditions include:

- Default User Profile is set,
- Minimal signal strength,
- GPRS service is available,
- Modem is registered with GPRS service.

You can check the state of the Auto-Connect feauture but its progress indicator.

Progress Indicator	Description
	Gray indicates that the Auto-Connect feature is disabled.
	A red progress bar (moving from left to right) indicates that the Auto-Connect feature is working but is unable to establish a connection due to conditions such as insufficient received signal or GPRS service is not available.
	A yellow progress bar (moving from left to right) indicates that the conditions to connect have been fulfilled - BlueVue is attempting to establish a connection.
	Green indicates that all of the conditions have been met - a data connection has been established.

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
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

Command	Description
+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
+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

Command	Description
+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).
=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.

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

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

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.

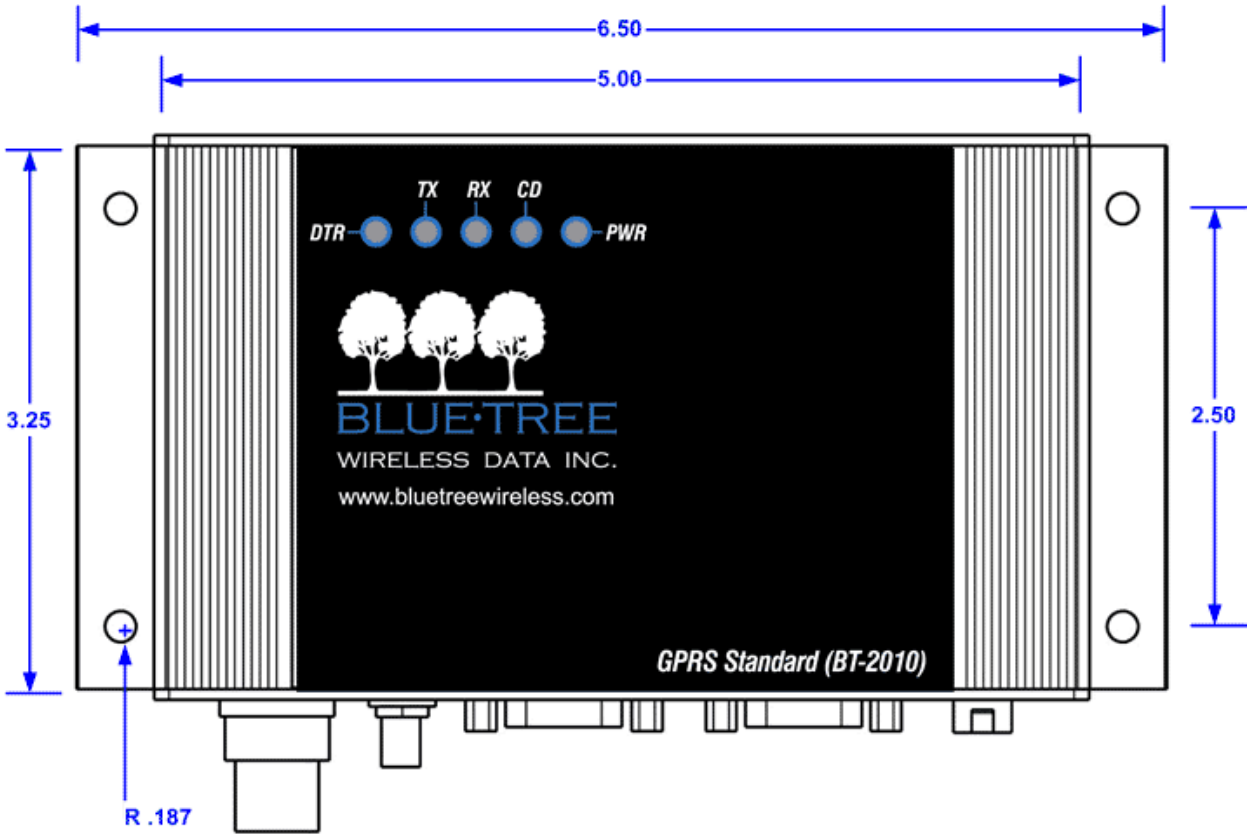
The unit is now set to output GPS data using the NMEA protocol.

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

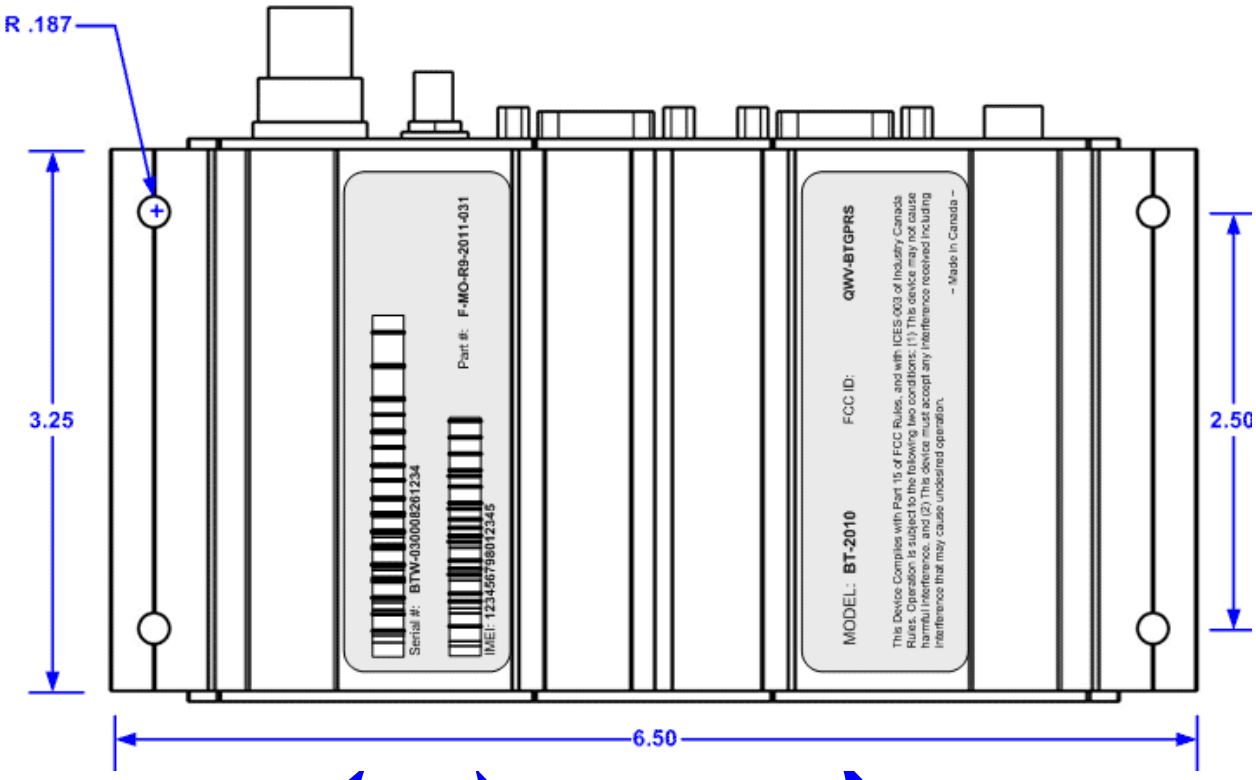
Appendix C: Modem Specifications

Physical Dimensions

Top view



Bottom view

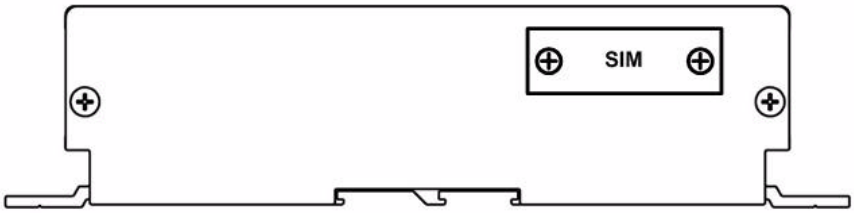


Hardware unique identifier. Used for tracking purposes.

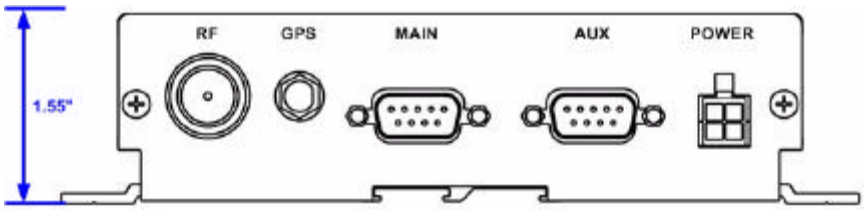
RF module unique identifier. Represents the IMEI number in decimal and barcoded (International Mobile Equipment Identification).

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	40 to 86 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
	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
FCC ID	QWV-BTGPRS (RIM 1902G module) QWV-BT2000 (Wavecom Q2426 module)
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)
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

Category	Specification
	MIL-STD-810F, method 516.5, procedure V, Crash Hazard
	MIL-STD-202G method 213B