
MultiModem®
Wireless Modems
EDGE, GPRS, CDMA
with GPS Functionality



MTCBA-E-GP
MTCBA-G-GP-Fx
MTCBA-C-GP-Nx

Quick Start Guide



Quick Start

MultiModem® Wireless Modem with GPS Functionality
MTCBA-E-GP, MTCBA-G-GP-Fx, MTCBA-C-GP-Nx
82010060L, Revision A

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Record of Revisions

Revision	Date	Description
A	03/07/06	Initial release.

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Introduction

The MultiModem GPRS wireless modem with GPS (Global Positioning System) incorporates an internal Trimble® Lassen® iQ GPS module providing 12-channel GPS functionality. It delivers complete position, velocity, and time (PVT) solutions. The GPS functionality provides dual sensitivity modes allowing it to automatically switch to a higher sensitivity when satellite signals are weak.

Safety Warnings

Handling Precautions

All devices must be handled with certain precautions to avoid damage due to the accumulation of static charge. Although input protection circuitry has been incorporated into the devices to minimize the effect of this static build up, proper precautions should be taken to avoid exposure to electrostatic discharge during handling and mounting.

Safety Recommendations for Rack Installations

- Ensure proper installation in a closed or multi-unit enclosure by following the recommended installation as defined by the enclosure manufacturer.
- If installing the wireless modem in a closed or multi-unit enclosure, ensure adequate airflow so that the maximum recommended ambient temperature is not exceeded.
- Do not place the device directly on top of other equipment or place other equipment directly on top of this device.
- Ensure that the device is properly connected to earth ground via a grounded power cord. If a power strip is used, ensure that the power strip also provides adequate grounding.
- Ensure that the main supply circuit is capable of handling the load. See the power label on the device for requirements.
- Maximum ambient temperature is 70 degrees Celsius.
- This device should be installed by qualified personnel.
- Only connect like circuits; e.g., connect SELV (Secondary Extra Low Voltage) circuits to SELV circuits and TN (Telecommunications Network) circuits to TN circuits.

Ship Kit Contents

The single wireless modem is shipped with the following:

- One MultiModem GPRS/EDGE/CDMA wireless modem with GPS functionality.
- One fused DC power cable.
- Four rubber feet for desktop placement.
- One printed Quick Start Guide.
- One MultiModem CD that provides documentation, two GPS utility programs (iQ Monitor.exe and iQ Chat.exe), and Adobe Acrobat Reader.
- Printed Activation Customer Notices (for Cingular, Sprint, Verizon networks, and general CDMA activation).

The GPS Developer Kit is shipped with the following:

- Three power cords.
- One fused DC power cable.
- One universal power supply.
- Two serial cables.
- Some international kits may have three antennas (two wireless antennas and one GPS antenna).
- One printed Quick Start Guide.
- One MultiModem CD that provides documentation, two GPS utility programs (iQ Monitor.exe and iQ Chat.exe), and Adobe Acrobat Reader.
- Printed Customer Activation Notices (for Cingular, Sprint, Verizon networks, and general CDMA activation).

LEDs

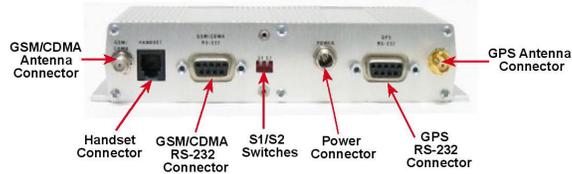
- PWR** POWER.
- GPS** GPS. Blinks to show GPS is active.
- IP** IP FUNCTION. This LED blinks when the IP function of the modem is operating normally. It shows a steady light when powering-up, initializing, or flashing the firmware.

Modem LEDs

- TD** TRANSMIT DATA. This LED blinks when the modem is transmitting data to your wireless carrier.
- RD** RECEIVE DATA. This LED blinks when the modem is receiving data from your wireless carrier.
- CD** CARRIER DETECT. This LED lights when the modem detects a valid carrier signal from a wireless carrier.
- TR** (DATA) TERMINAL READY. This LED lights when the modem is trying to establish a wireless connection.
- LS** LINK STATUS. This LED blinks when there is a valid wireless signal. When it is on or off, the wireless strength is low.

Back Panel of the MultiModem with GPS

The back panel view is included to help you set up MultiModem.



S1/S2 Switches

The switches as shown in the diagram above are located behind a cover plate that can be removed when you need to change the switch settings.

- S1:**
 - Down** puts the MultiModem in reset state.
 - Up** runs the MultiModem properly.
 - Toggle** the S1 switch down and back up to reset the MultiModem.
- S2:**
 - Up** keeps the GPS data signals separate from the wireless modem.
 - Down** allows GPS data from Port 1 to flow to the wireless modem's **data in** signal.

Configure the Wireless Modem Side of the MultiModem

1. Hardware Setup

- 1.1 Using an RS-232 cable, connect a workstation to the GSM/CDMA connector on the MultiModem.
- 1.2 Attach both antennas. The GPS antenna is a 50 ohm SMA antenna. The GSM/CDMA antenna is a standard SMA antenna.
- 1.3 Switches S1 and S2 should be in the default positions – both up.

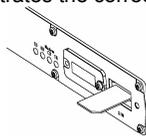
Plug one end of the power cord into the MultiModem and the other end into a live power outlet. PWR LED lights up.

Warning: Do not connect your wireless modem directly to a vehicle's battery for your power source. Doing so may cause power spikes. If you wish to use the battery as a power source, add a filtering device to the DC input.

2. SIM Card for GPRS or EDGE

The wireless modem requires the power supply connection to begin operation. It also requires a SIM card (Subscriber Identity Module) to operate on a GPRS or EDGE network. To install the SIM card:

- 2.1 Use a small screwdriver to remove the screw closest to the outside edge of the modem. Then swing the loosened SIM slot cover up and over to the left.
- 2.2 Insert the SIM card into the SIM card slot. The following graphic illustrates the correct SIM card orientation.



SIM AT Commands

SIM Commands for GPRS – SIM commands are included in the *GPRS AT Commands Reference Guide*.

SIM Commands for EDGE – SIM commands are covered in a separate guide entitled *SIM Application Toolkit – AT Commands Reference Guide*.

3. Establish a Wireless Account

Obtain a wireless account through a Wireless Service Provider. This will allow you to use the service provider's network; for example, Cingular, Sprint, and Verizon.

Cingular and Sprint

Contact Multi-Tech, a certified national activation agent for Cingular and Sprint to set up one of these accounts.

Verizon and Others

For Verizon and other accounts, contact their activation agents directly.

Activations Instructions

See the Cingular, Sprint, Verizon, and general Customer Activation Customer Notices included with your modem for a list of the information you must give to the activation agent. You will receive, depending upon your provider, one or two phone numbers and a service programming code or lock code. Write these numbers down as you will have to use them to configure the wireless modem.

If you have any questions or want to set up your account, contact Multi-Tech Systems, Inc. at:

800-972-2439 or 763-717-5863.

4. Establish Internet Access

Using GSM with GPRS or CDMA 1x Data

A single dial-up networking (DUN) number is generally used by all of a wireless provider's subscribers throughout its area of coverage – regional, nationwide, continental, etc. Rather than being a literal phone directory number, this is a code that gives the modem Internet access.

Using GSM without GPRS or CDMA Point-to-Point Data

A circuit-switched data connection is used. Use the dial-up-network (DUN) to make a conventional V.32 modem connection to any terminating modem at the other end. The phone number specified in the DUN can be one supplied by the wireless service provider or another phone number related to a different dialup modem service (e.g., a dialup modem service phone number from any commercial or private dialup network).

5. Login Using TTY

5.1 Use TTY to configure the IP module for the first time.

Configure the host serial port using these defaults:

Baud: 115.2K **Data:** 8
Parity: N **Stop:** 1
Flow-Control: None

5.2 Press the Enter key three times to get to the Login prompt.

5.3 At the Login prompt, type *admin*.

5.4 At the Password prompt, type *admin*.

Important: User name and password are case sensitive. They must be typed in lowercase letters.

5.4 Then type **dialout serial s1** to start a dialout session.

Dialout serial s1 is used to initiate a dialout session to the modem. You can now enter AT commands to test your modem.

6. Using AT Commands to Test Your Modem

6.1 Check the signal quality.

This command determines the received signal strength indication (<rssI>)

Type AT+CSQ.

Modem responds with the received signal strength.

Response 0 means	-113 dBm or less
Response 1 means	-111 dBm
Response 2 to 30 means	-109 to -53 dBm
Response 31 means	-51 dBm or greater
Response 99 means	not known or detectable

6.2 Check the identity of the modem.

Use command: ATI

(AT is followed by the capital letter i).

- Type ATI0 (The command ends in a zero).
Manufacturing data displays: *Wavecom Modem 800 1900*
- Type ATI3
Software version displays. Ex: *S/W VER: xxxxx*
- Type ATI6
Capability data displays. Ex: *+CGSM, +CIS707, ...*

6.3. Check the network registration and roaming status.

Type AT+CREG?

The modem will respond in one of these ways:

+CREG: 0,0	(this tells you the modem is not registered on any network)
+CREG: 0,1	(this tells you the modem is registered on the home network)
+CREG: 0,5	(this tells you the modem is registered on a network but it is roaming)

Configuring the GPS Side of the MultiModem

1. Port Configuration

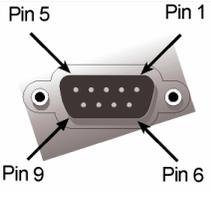
The GPS receiver module has two I/O ports. The table below provides the default protocols and port configurations for the receiver, as delivered from the factory. TSIP IN/OUT is the default protocol on Port 1 and RTCM-IN and NMEA-OUT is the default protocol on Port 2.

Default Protocols and Port Configurations

Port	Input Protocol	Default Setup	Output Language	Default Setup
1	TSIP	Baud Rate: 9600 Data Bits: 8 Parity: Odd Stop Bits: 1 No Flow Control	TSIP	Baud Rate: 9600 Data Bits: 8 Parity: Odd Stop Bits: 1 No Flow Control
2	RTCM	Baud Rate: 4800 Data Bits: 8 Parity: None Stop Bits: 1 No Flow Control	NMEA	Baud Rate: 4800 Data Bits: 8 Parity: None Stop Bits: 1 No Flow Control

The GPS Receiver can also be configured to output TAIP messages. The standard port characteristics for TAIP are:

Baud Rate: 4800 Data Bits: 8 Parity: None
Stop Bits: 1 No Flow Control

	<p>GPS DB-9:</p> <p>Pin 2 = Port 1 Transmit Data from GPS</p> <p>Pin 3 = Port 1 Receive Data into GPS</p> <p>Pin 6 = Port 2 Transmit Data from GPS</p> <p>Pin 4 = Port 2 Receive Data into GPS</p> <p>Pin 5 = GND</p>
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Any standard serial communications program, such as Windows Hyper-Terminal or PROCOMM, can be used to view the NMEA or TAIP output messages. TSIP is a binary protocol and outputs raw binary serial data that cannot be read when using Windows Terminal or PROCOMM. To view the output of the TSIP protocol in text format, use the **iQ_CHAT** or the **iQ_Monitor** program. These programs are included on the CD-ROM as part of the MultiModem GPS Developer's Kit.

About iQ_Monitor and iQ_Chat Utilities

The **iQ_Monitor.exe** and **iQ_Chat.exe** files plus a Developer's Guide entitled *Developing a Software Interface for the GPS Module in the Multi-Tech MultiModem* are included on the CD as part of the MultiModem Developer's Kit.

iQ_Monitor

iQ_Monitor is used to verify GPS is functioning. The Developer Guide explains how to setup and use this utility.

It is a 32-bit Windows application that interfaces with a TSIP-speaking receiver through the GPS serial port. The program accepts TSIP reports and displays these fields in a window:

*Position, Velocity, Time, Receiver Status, and
Satellite Track Status.*

The program allows you to exercise some basic TSIP commands and can also log a TSIP report in binary format for later translation.

iQ_Chat

iQ_Chat is a 16-bit DOS-based application that interfaces with the GPS receiver through a serial port. It allows you to exercise TSIP commands, configure the GPS receiver for NMEA or TAIP, and view NMEA or TAIP output. It also logs a TSIP report in binary format.

2. Hardware Setup

- 2.1 Using an RS-232 cable, connect a workstation to the GPS connector on the MultiModem.
- 2.2 Attach both antennas (included in your ship kit). The GPS antenna is a 50 ohm SMA antenna. The GSM/CDMA antenna is a standard SMA antenna.
- 2.3 Plug one end of the power cord into the device and the other end into a live power outlet. **PWR** LED lights up.

Warning: Do not connect your wireless modem directly to a vehicle's battery for your power source. Doing so may cause power spikes. If you wish to use the battery as a power source, add a filtering device to the DC input.

3. Verify the GPS Connection

The workstation should be running a utility, such as **iQ_Monitor**, to monitor GPS satellite signals. **iQ_Monitor** is included on the product CD with the MultiModem Developer's Kit.

Application Example 1

In this example, the GPS side of the MultiModem is monitoring GPS locations and the wireless modem side of the MultiModem is waiting for incoming data.

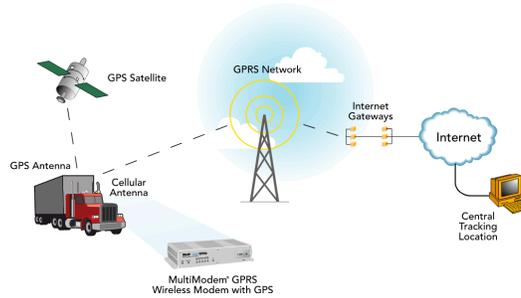
A portable workstation, such as a laptop or handheld PC, is connected to this wireless modem to both serial ports – the GSM/CDMA port and the GPS port.

1. Using an RS-232 cable, connect the GPS connector jack to portable PC's serial port.
2. Using an RS-232 cable, connect the GSM/CDMA jack to the PC's other serial port.
3. Attach both antennas (the GPS antenna and the GSM/CDMA antenna).

4. Set both the S1 and S2 switches **up** (the default). If you have not changed the switches previously, then they will be in the default position. Note that the switches are located behind a cover plate on the connector side of the modem. The cover plate can be removed when you need to change the switch settings.
5. Connect to a power source; for example, to a cigarette outlet on a vehicle.
6. Run your software application that reads GPS data from the GPS serial port. The wireless modem is available to the portable PC for transferring data.

Your central tracking station can then retrieve the data wirelessly from your CDMA, GPRS, or EDGE network provider connection.

Application Example 2



This example shows the MultiModem GPRS Wireless Modem with GPS mounted in a truck that can be tracked by a GPS satellite.

The configuration for Example 2 shows a MultiModem located in a vehicle and not connected to a portable PC.

The MultiModem in this example simply reads the GPS data as it is sent from GPS satellite, and then it broadcasts the data to your central tracking system by way of your CDMA, GPRS, or EDGE network provider connection.

Note that in this example, you cannot configure the GPS; you can only receive data from port 1 of the GPS.

1. Mount the MultiModem in a vehicle.
2. Attach both antennas (the GPS antenna and the GSM/CDMA antenna).
3. Verify that the S1 switch **up** (the default).
4. Set the S2 switch **down**. This allows data from the GPS port 1 to flow to the wireless modem side of the MultiModem. Then, when you call into this modem from a remote location, the GPS data is displayed on the remotely located workstation's screen. Note that the workstation can be a laptop or a handheld device.
5. Connect to a power source; for example, to a cigarette outlet on a vehicle.
6. Your central tracking station can then retrieve the data wirelessly from your CDMA, GPRS, or EDGE network provider connection.



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