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MultiModem® ZBA

**MT9234ZBA-USB**

**User Guide**



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# MultiModem ZBA

## MT9234ZBA-USB User Guide

### S000419A Revision A

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#### Record of Revisions

<i>Revision</i>	<i>Date</i>	<i>Description</i>
A	11/05/07	Initial release

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This device is covered by one or more of the following patents: 6,031,867; 6,012,113; 6,009,082; 5,905,794; 5,864,560; 5,815,567; 5,815,503; 5,812,534; 5,809,068; 5,790,532; 5,764,628; 5,764,627; 5,754,589; D394,250; 5,724,356; 5,673,268; 5,673,257; 5,644,594; 5,628,030; 5,619,508; 5,617,423; 5,600,649; 5,592,586; 5,577,041; 5,574,725; D374,222; 5,559,793; 5,546,448; 5,546,395; 5,535,204; 5,500,859; 5,471,470; 5,463,616; 5,453,986; 5,452,289; 5,450,425; D361,764; D355,658; D355,653; D353,598; D353,144; 5,355,365; 5,309,562; 5,301,274; 7,082,106; 7,082,141; 7,092,406 . Other patents pending.

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# Chapter 1 - Description and Specification

Congratulations on your purchase of the MultiModem ZBA-USB modem. Your MT9234ZBA-USB data/fax modem supports remote configuration and dial-up connections. It offers V.34/33.6K fax and Error Correction Mode, that reduces fax transmission time by more than half when compared to traditional fax modems. In addition, they are globally approved for use in many countries around the world. This means one model can ship virtually anywhere.

This User Guide will help you install, configure, test, and use your modem.

Check the Multi-Tech's Web site for current versions of our product documentation.

## Features include:

- V.92/56K download speeds and 48K upload speeds when connecting with V.92 servers
- V.44 compression improves data throughput rates
- Class 1.0 and Class 2.1 faxing at speeds to V.34/33.6K bps (Super G3)
- Error Correction Mode (ECM) provides fast and reliable fax transmissions
- Windows Plug-and-Play operation
- Linux compatible
- U.S. Caller ID reporting
- Remote configuration for centralized setup and control
- Globally approved models for use in many countries worldwide
- Small footprint and stackable design
- Self-resetting lightning protection
- Flash memory for easy updates
- USB cable included
- Ten-year warranty

## Universal Serial Bus (USB)

Universal Serial Bus (USB), defined by a consortium of industry leaders, permits connection of multiple low-speed and medium speed computer peripheral devices such as telephones, modems, printers, keyboards, mice, and scanners; all from a single personal computer port. The specification, based on an open architecture is quickly becoming a standard feature in new desktop and notebook computers.

## Package Contents

The MultiModemUSB package contains:

- An MT9234ZBA-USB data/fax modem
- A set of four self-adhesive plastic feet
- A printed *Quick Start Guide*
- One Product CD
- One USB cable
- One modular telephone cable

## AT Commands Info

The AT Commands for the MultiModem are published in a separate Reference Guide included on your product CD and posted on the Multi-Tech web site.

## Technical Specifications

Your MultiModemZBA-USB modem meets the following specifications:

<b>Trade Name</b>	MultiModem <sup>®</sup> ZBA
<b>Model Number</b>	MT9234ZBA-USB
<b>Server-to-Client Data Rates</b>	V.90 speeds when accessing a V.90 or V.92 server (actual speed depends on server capabilities and line conditions)
<b>Client-to-Server Data Rates</b>	Up to 50Kbps when accessing a V.92 server (actual speed depends on server capabilities and line conditions); otherwise, the same as client-to client data lines.
<b>Client-to-Client Data Rates</b>	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400, 1200, 0-300 bps
<b>Fax Data Rates</b>	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400, 1200, 0-300 bps
<b>Data Format</b>	Serial, binary, asynchronous
<b>Modem Compatibility</b>	ITU-T V.92, V.90, V.34 enhanced, V.34, V.34bis, V.32, V.32bis, V.22; Bell 212A and 103; ITU-T V.21, V.42, V.42bis, V.44
<b>Fax Compatibility</b>	ITU-T "Super" Group 3, Class 1.0, 2.0, 2.1, T.4, T.30, V.21, V.27ter, V.29, V.34, V.17; TIA/EIA 578 Class 1, 2, TR29.2
<b>Error Correction</b>	ITU-T V.42
<b>Data Compression</b>	ITU-T V.44 (4:1 throughput), V.42bis (4:1 throughput), MNP 5 (2:1 throughput)
<b>Flow Control</b>	XON/XOFF (software), RTS/CTS (hardware)
<b>Intelligent Features</b>	Plug and play; fully AT command compatible; autodial, redial, repeat dial; pulse or tone dial; dial pauses; auto answer; caller ID; EIA extended automode; adaptive line probing; automatic symbol and carrier frequency during start-up, retrain, and rate renegotiation; DTMF detection; call status display, auto-parity and data rate selections; keyboard-controlled modem options; non-volatile memory; on-screen displays for modem option parameters; command lines of up to 40 characters each; remote configuration
<b>Command Buffer</b>	40 characters
<b>Transmit Level</b>	-12dBm (Euro/NAM) – varies by country/region setting
<b>Lightning Protection</b>	FCC Part 68 A/B surge
<b>Frequency Stability</b>	±0.01%
<b>Receiver Sensitivity</b>	-43 dBm under worst-case conditions
<b>AGC Dynamic Range</b>	43 dB
<b>Connectors</b>	USB connector; two RJ-11 phone jacks
<b>Cables</b>	One RJ11 phone cable One USB cable <b>Note:</b> Any cables connected to the computer should be shielded to reduce interference.
<b>Diagnostics</b>	Power-on self test, local analog loop, local digital loop, remote digital loop.
<b>Environmental</b>	Temperature range -40°– 60°C (-40°–140°F); humidity range 20–90% (non-condensing)
<b>Dimensions</b>	10.9 cm wide x 14.5 cm long x 2.5 cm high (4.3" x 5.7" x 1.10")
<b>Weight</b>	227 g (8 oz)
<b>Limited Warranty</b>	10 year

## Chapter 2 – Installation

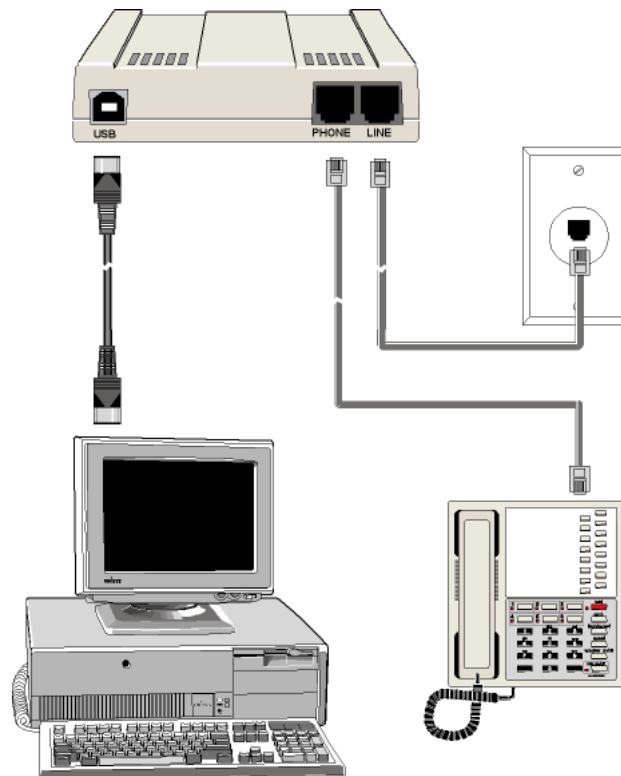
This chapter shows you step-by-step how to set up your Multi-Tech MT9234ZBA-USB modem.

### Safety Warning Telecom

- Use this product only with UL and cUL listed computers.
- To reduce the risk of fire, use only 26 AWG (.41mm) or larger telephone wiring.
- Never install telephone wiring during a lightning storm.
- Never install a telephone jack in wet locations unless the jack is specifically designed for wet locations.
- Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
- Use caution when installing or modifying telephone lines.
- Avoid using a telephone during an electrical storm. There is a risk of electrical shock from lightning.
- Do not use a telephone in the vicinity of a gas leak.
- This product must be disconnected from the telephone network interface when servicing.

### Step 1: Connect the Modem to Your PC

Placing the modem in a convenient location, connect it to your computer's USB port, to the telephone line, and, optionally, to your telephone.



### USB Connection

Plug one end of the USB cable into the USB connector on the modem, and the other end into a USB port connector on your computer.

## Line Connection

Plug one end of the phone cable into the modem's LINE jack and the other end into a phone line wall jack.

**Note:** The LINE jack is not interchangeable with the PHONE jack. Do not plug the phone into the LINE jack or the line cable into the PHONE jack.

**Note:** The Federal Communications Commission (FCC), and Industry Canada impose certain restrictions on equipment connected to public telephone systems. See [Appendix A](#) for more information.

## Phone Connection

For voice-only calls, you can optionally plug a telephone into the modem's PHONE jack.

## Step 2: Install the Modem Driver

The MT9234ZBA-USB drivers need to be installed in your computer's program directory. The procedure will be different depending on the operating system. This section provides installation procedures for Windows 2000 and above. The MT9234ZBA-USB driver installation is done in three parts, each directed by an installation wizard. The three parts are: (1) installation of the Multi-port serial adapter, (2) installation of the serial port, and (3) installation of the modem. This procedure is for Windows 2000 and XP.

## Modem Driver Installation Procedure

### Preliminaries

1. Power up your computer.
2. If you have not already done so, connect the modem's USB cable to a USB port on the computer and connect the phone line between the modem and a telephone wall jack.
3. Windows will detect that the new modem is present.

### Installation of the Multi-port serial adapter

4. The **Welcome to the Found New Hardware Wizard** screen appears. In response to the question, "Can Windows connect to Windows Update to search for software?" select "No, not this time" and click **Next**.
5. The next screen prompts you to insert the product CD into the computer. Insert the product CD, select "Install from a list or specific location (Advanced)," and click **Next**.
6. At the **Please Choose Your Search and Installation Options** screen, select "Search for the best driver in these locations," and browse on the product CD to "Windows \_2k\_XP/USB Serial Driver." Click **OK** and click **Next**.
7. A "has not passed Windows logo testing" screen appears. Click **Continue Anyway**.

**Note:** This Microsoft operating system searches for a digital signature when you install any new hardware. If a "has not passed Windows logo testing" screen (or Digital Signature Not Found screen) appears, simply click **Continue Anyway** (or YES) to continue installation. Although Multi-Tech submits all eligible products to Microsoft for certification, the turn-around time is subject to many factors. Not having a digital signature does not affect product performance in any way.

The wizard will install the files for the Multi-port serial adapter.

8. A **Completing the Found New Hardware Wizard** screen will appear for the Multi-port serial adapter. Click **Finish**.

### Installation of the Serial Port

9. The **Welcome to the Found New Hardware Wizard** screen appears for a second time. In response to the question, "Can Windows connect to Windows Update to search for software?" select "No, not this time" and click **Next**.
10. At the next screen, select "Install from a list or specific location (Advanced)," and click **Next**.
11. At the **Please Choose Your Search and Installation Options** screen, select "Search for the best driver in these locations," and browse on the product CD to "Windows \_2k\_XP/USB Serial Driver." Click **OK** and click **Next**.

12. A “**has not passed Windows logo testing**” screen appears. Click **Continue Anyway**. (See note on logo testing above.)

The wizard will install the file for the serial port.

13. A **Completing the Found New Hardware Wizard** screen will appear for the serial port. Click **Finish**.

#### ***Installation of the Modem***

14. The **Welcome to the Found New Hardware Wizard** screen appears for a third time. In response to the question,  
“Can Windows connect to Windows Update to search for software?”  
select “No, not this time” and click **Next**.

15. At the next screen, select “Install from a list or specific location (Advanced),” and click **Next**.

16. At the **Please Choose Your Search and Installation Options** screen, select “Search for the best driver in these locations,” and browse on the product CD to “Windows \_2k\_XP/Modem Driver.” Click **OK** and click **Next**.

17. A “**has not passed Windows logo testing**” screen appears. Click **Continue Anyway**. (See note on logo testing above.)

The wizard will install the file for the modem.

18. A **Completing the Found New Hardware Wizard** screen will appear for the modem. Click **Finish**.

The installation of drivers is now complete.

## **Step 3: Country Configuration with Global Wizard**

Different countries have different requirements for how modems must function. Therefore, before you use your modem, you must configure it to match the defaults of the country in which you are using it. You can use one of two configuration methods:

- Using the Global Wizard to Configure Your Modem
- Using AT Commands to Configure Your Modem

### **Using the Global Wizard to Configure Your Modem**

The Global Wizard configuration utility is recommended for computers running Windows 2000 or newer.

1. Insert the MultiModemUSB CD into the CD-ROM drive. The **Autorun** dialog box appears.
2. Click **Initial Setup and Country Selection**.
3. Choose either:
  - **Run Global Wizard from CD**. This will not load the wizard onto your hard drive, or
  - **Install Global Wizard on the HD**. This will install the wizard onto your hard drive for future use.
4. The **Global Wizard** dialog box appears. Click **Next**.
5. The Global Wizard searches for your modem and identifies it. Click **Next**.
6. Select the country in which the modem will be used, and then click **Next**.
7. Review your choice of country. If it is correct, click **Next** to configure the modem.
8. When Global Wizard announces that the parameters have been set, click **Finish** to exit.



## Using AT Commands to Configure Your Modem

Non-Windows users can configure the modem using AT commands. You must enter these commands in your communication program's terminal window.

1. Run your favorite communication program and open the program's terminal window.
2. To configure the modem for a specific country, type **AT%T19,0,nn**, where **nn** is the country code in hexadecimal format, and then press ENTER. The message **OK** displays.
3. To verify the change, type **ATI9**, and then press ENTER.

The country/region code displays:

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Example	Country/Region	AT command (hexadecimal)	Result code (decimal)
	Euro/NAM	AT%T19,0,34 (default)	52

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The complete list of country/region codes can be found on the Multi-Tech Web site at

<http://www.multitech.com/PRODUCTS/Categories/Modems/global/configuration.asp#chart>

Then click on global modems. The Global Modem Country Approvals page displays. On this page you can view approvals, configuration strings and responses by country and product.

# Chapter 3 - Operation

## Front Panel

The MT9234ZBA-USB has 6 LED indicators on the front panel that indicate status, configuration, and activity.



Figure 3-1. Front panel

- TR** **Transmit Data.** The TD LED flashes when the modem is transmitting data to another modem.
- RD** **Receive Data.** The RD LED flashes when the modem is receiving data from another modem.
- CD** **Carrier Detect.** The CD LED lights when the modem detects a valid carrier signal from another modem. It is on when the modem is communicating with the other modem and off when the link is broken.
- OH** **Off-Hook.** The OH LED lights when the modem is off-hook, which occurs when the modem is dialing, online, or answering a call. The LED flashes when the modem pulse-dials.
- TR** **Terminal Ready.** The TR LED lights when a communications program is using the modem. It means the modem is ready for an outgoing or incoming call. It goes off when the communications program disconnects. When it goes off, a connected modem will also disconnect.
- Power.** The PWR led lights when the system is applying power to the modem.

## Connecting to the Internet

Your Multi-Tech modem is your gateway to the Internet and the World Wide Web. To access the Internet and Web via your modem, you must establish a dial-up account with an Internet service provider (ISP). To locate an ISP near you, look in a local directory or computer publication. Your ISP should provide you with the following information:

- User name (also called user ID)
- Password
- Access number (the number you call to connect to the server)
- Host name and/or domain name
- Domain Name Server (DNS) server address

If, besides the Web, you use the Internet for e-mail and newsgroups, your ISP should also provide you with the following information:

- E-mail or POP mail address
- POP server address
- Mail or SMTP address
- News or NNT server address

## Internet Connection

Before you can connect to the Internet, you must set up a remote-node client program on your computer. Windows XP uses HyperTerminal to establish your connection to the ISP's server, which is the shared computer that manages calls from clients (your computer) to the Internet. Most, if not all, Windows browsers can automatically open this connection. For instructions on how to set up this connection, consult your ISP or your operating system's online help or printed documentation. Many ISPs include with their service a program that will install and configure this connection automatically for you.

# Chapter 4 - Remote Configuration

Remote configuration is a network management tool that allows you to configure modems anywhere in your network from one location. With password protected remote configuration, you can issue AT commands to a remote MT9234ZBA-USB modem for maintenance or troubleshooting as if you were on site.

## Basic Procedure

The following steps are valid regardless of whether the connection is established by the local or the remote Multi-Tech modem.

1. Establish a data connection with a remote MT9234ZBA-USB modem.
2. Send three remote configuration escape characters followed by **AT** and the setup password, and press ENTER. Example: **%%%ATMTSMODEM**. You have four tries to enter the correct password before being disconnected. If the password is correct, the remote modem responds with **OK**.
3. You can now send AT commands to configure the remote modem.
4. When you have finished configuring the remote modem, save the new configuration by typing **AT&W0**, and pressing **Enter**.
5. Type **ATO** and press **Enter** to exit remote configuration. You can then break the connection in the normal way.

**CAUTION:** If you hang up while you are in remote configuration mode, it may lock up the remote modem.

## Setup

Multi-Tech modems are shipped with a default setup password (MTSMODEM). Because anyone who has an owner's manual knows the default setup password, for security you should change the password and possibly also the remote configuration escape character.

### Changing the Setup Password

1. Open a data communications program such as Phone Tools or HyperTerminal.
2. To change the password, type **AT#S=xxxxxxx**, where xxxxxxxx stands for the password, and press ENTER. The password can include any keyboard character, and must be one to eight characters long. The modem responds with **OK**.
3. The new password is saved automatically. You can now either enter more AT commands or exit the data communications program. The next time you remotely configure the modem you must use the new setup password.

**Note:** You can only change the setup password locally; you cannot do it remotely. Also, passwords are case sensitive. The next time you enter the password, it must be in the same case as you set it up.

### Changing the Remote Escape Character

To increase security, you can change a remote modem's remote configuration escape character. The remote configuration escape character is stored in register **S9**. The factory default is 37, which is the ASCII code for the percent character (%). Setting **S9** to 0 (zero) disables remote configuration entirely—but if you do this remotely, you won't be able to change it back remotely!

1. Establish a remote configuration link with the remote modem as described in "Basic Procedure."
2. Type **ATS9=n**, where *n* is the ASCII code for the new remote configuration escape character, then press ENTER.
3. Save the new value by typing **AT&W** and pressing ENTER.
4. Type **ATO<CR>** to exit remote configuration.

# Chapter 5- Troubleshooting

Your modem was thoroughly tested at the factory before it was shipped. If you are unable to make a successful connection, or if you experience data loss or garbled characters during your connection, it is possible that the modem is defective. However, it is more likely that the source of your problem lies elsewhere. The following symptoms are typical of problems you might encounter:

- None of the LEDs light when the modem is on.
- The modem does not respond to commands.
- The modem dials but is unable to make a connection.
- The modem disconnects while online.
- The modem cannot connect when answering.
- Data is being lost.
- There are garbage characters on the monitor.
- The modem doesn't work with Caller ID.
- Fax and data software can't run at the same time.

## None of the Indicators Light

When you plug in the modem, the operating system detects and configures the modem, and the TR LED should come on.

If the TR LED does not come on, check to see that the driver from the product CD has been installed, refer to Chapter 2, step 2 – Install the Modem Driver.

## The Modem Does Not Respond to Commands

- Make sure you are issuing the modem commands from data communication software, either manually in terminal mode or automatically by configuring the software. (You cannot send commands to the modem from the DOS prompt.)
- Make sure you are in terminal mode in your data communication program, then type AT and press ENTER. If you get an OK response from your modem, your connections are good and the problem likely is in the connection setup in your communication software.
- Try resetting your modem by unplugging the USB cable from the modem, and then plugging it back in.
- Try rebooting the computer.
- The modem might have a problem beyond the scope of this user guide. If you have another Multi-Tech modem, try swapping modems. If the problem goes away, the first modem is possibly defective. Call Technical Support for assistance.

## The Modem Dials But Cannot Connect

There can be several reasons the ZBA fails to make a connection. Possibilities include:

- lack of a physical connection to the telephone line.
- a wrong dial tone.
- a busy signal.
- a wrong number.
- no modem at the other end.
- a faulty modem, computer, or software at the other end.
- incompatibility between modems.

You can narrow the list of possibilities by using extended result codes. Extended result codes are enabled by default. If they have been disabled, enter **ATV1X4** and press ENTER while in terminal mode, or include **V1X4** in the modem's initialization string. When you dial again, the modem will report the call's progress.

- If the modem reports *NO DIALTONE*, check that the modem's telephone line cable is connected to both the modem's LINE jack (not the PHONE jack) and the telephone wall jack. If the cable looks

secure, try replacing it. If that doesn't work, the problem might be in your building's telephone installation. To test the building installation, plug a telephone into your modem's telephone wall jack and listen for a dial tone. If you hear a dial tone, your modem might be installed behind a company phone system (PBX) with an internal dial tone that sounds different from the normal dial tone. In that case, the modem might not recognize the dial tone and might treat it as an error. Check your PBX manual to see if you can change the internal dial tone; if you can't, change your modem's initialization string to replace **X4** with **X3**, which will cause the modem to ignore dial tones (note, however, that **X3** is not allowed in some countries, such as France and Spain).

- If the modem reports **BUSY**, the other number might be busy, in which case you should try again later, or it might indicate that you have failed to add a **9**, prefix to the phone number if you must dial 9 for an outside line.
- If you must dial 9 to get an outside line, the easiest way to dial it automatically is to include it in the modem's dial prefix, e.g., **ATDT9,**. Note the comma, which inserts a pause before the number is dialed. By inserting **9**, into the dial prefix, you do not have to include it in each directory entry.
- To change the dial prefix in Windows 98 HyperTerminal, select **Call** from the **Call** menu, click **Dialing Properties**, and type **9** in the local and long distance boxes in **How I dial from this location**.
- If the modem reports **NO ANSWER**, the other system has failed to go off-hook, or you might have dialed a wrong number. Check the number.
- If the modem reports **NO CARRIER**, the phone was answered at the other end, but no connection was made. You might have dialed a wrong number, and a person answered instead of a computer, or you might have dialed the correct number, but the other computer or software was turned off or faulty. Check the number and try again, or try calling another system to make sure your modem is working. Also, try calling the number on your telephone. If you hear harsh sounds, then another modem is answering the call, and the modems might be having problems negotiating because of modem incompatibilities or line noise. Try connecting at a lower speed.

## The Modem Disconnects While Online

- If you have Call Waiting on the same phone line as your modem, it can interrupt your connection when someone tries to call you. If you have Call Waiting, disable it before each call. In most telephone areas in North America, you can disable Call Waiting by preceding the telephone number with **\*70** (check with your local telephone company).
- You can automatically disable Call Waiting by including the disabling code in the modem's dial prefix (e.g., **ATDT\*70,**—note the comma, which inserts a pause before the number is dialed). To change the dial prefix in Windows 98 HyperTerminal, select **Call** from the **Call** menu, click **Dialing Properties**, check **This location has Call Waiting**, and select the correct code for your phone service.
- If you have extension phones on the same line as your modem, you or someone else can interrupt the connection by picking up another phone. If this is a frequent problem, disconnect the extension phones before using the modem, or install another phone line especially for the modem.
- Check for loose connections between the modem and the computer and the telephone jack.
- You might have had a poor connection because of line conditions or the problem might have originated on the other end of the line. Try again.
- If you were online with an online service, it might have hung up on you because of lack of activity on your part or because you exceeded your time limit for the day. Try again.

## The Modem Cannot Connect When Answering

- Autoanswer might be disabled. Turn on autoanswer in your data communications program or send the command **ATS0=1** (**ATS0=2** if you have Caller ID service) to make sure your modem is in terminal mode.

## The Modem Doesn't Work with Caller ID

- Caller ID information is transmitted between the first and second rings, so if autoanswer is turned off (**S0=0**) or if the modem is set to answer after only one ring (**S0=1**), the modem will not receive Caller ID information. Check your initialization string, and if necessary change it to set the modem to answer after the second ring (**S0=2**).
- Make sure that you have Caller ID service from your telephone company.

## Fax and Data Software Can't Run at the Same Time

- Communications devices can be accessed by only one application at a time. In Windows 2000 and higher, you can have data and fax communication applications open at the same time, but they cannot use the same modem at the same time.

# Appendix A – Regulatory Compliance

## FCC Part 68 Telecom

1. This equipment complies with part 68 of the Federal Communications Commission Rules. On the outside surface of this equipment is a label that contains, among other information, the FCC registration number. This information must be provided to the telephone company.
2. The suitable USOC jack (Universal Service Order Code connecting arrangement) for this equipment is shown below. If applicable, the facility interface codes (FIC) and service order codes (SOC) are shown.
3. An FCC-compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack that is Part 68 compliant. See installation instructions for details.
4. The ringer equivalence number (REN) is used to determine the number of devices that may be connected to the telephone line. Excessive RENs on the telephone line may result in the device not ringing in response to an incoming call. In most, but not all, areas the sum of the RENs should not exceed 5.0. To be certain of the number of devices that may be connected to the line, as determined by the total RENs, contact the local telephone company.
5. If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.
6. The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications in order to maintain uninterrupted service.
7. If trouble is experienced with this equipment (the model of which is indicated below) please contact Multi-Tech Systems, Inc. at the address shown below for details of how to have repairs made. If the trouble is causing harm to the telephone network, the telephone company may request you remove the equipment from the network until the problem is resolved.
8. No repairs are to be made by you. Repairs are to be made only by Multi-Tech Systems or its licensees. Unauthorized repairs void registration and warranty.
9. This equipment should not be used on party lines or coin lines.
10. If so required, this equipment is hearing aid compatible.
11. This product is labeled with the following information:

Manufacturer:	MultiTech Systems, Inc.
Trade Name:	MultiModem <sup>®</sup> ZBA
Model Number:	MT9234ZBA-USB
FCC Registration Number:	AU7USA-24713-M5-E
Ren:	0.3B
Modular Jack (USOC):	RJ11
Service Center in USA:	MultiTech Systems, Inc. 2205 Woodale Drive Mounds View, MN 55112 (763) 785-3500 Fax (763) 785-9874



## FCC Part 15

This equipment has been tested and found to comply with the limits for a **Class B** digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference 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.
- Plug 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.

This device complies with Part 15 of the FCC rules. Operation of this device is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference that may cause undesired operation.

**WARNING:** Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

## Fax Branding Statement

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message unless such message clearly contains the following information:

- Date and time the message is sent
- Identification of the business or other entity, or other individual sending the message
- Telephone number of the sending machine or such business, other entity, or individual

This information is to appear in a margin at the top or bottom of each transmitted page or on the first page of the transmission. (Adding this information in the margin is referred to as *fax branding*.)

Since any number of fax software packages can be used with this product, the user must refer to the fax software manual for setup details. Typically the fax branding information must be entered via the configuration menu of the software.

## Canadian Limitations Notice

**Notice:** The ringer equivalence number (REN) assigned to each terminal device provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the ringer equivalence numbers of all the devices does not exceed 5.

**Notice:** The Industry Canada label identifies certificated equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Industry Canada label does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations. Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment or equipment malfunctions may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

**Caution:** Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

## Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe B respecte toutes les exigences du -Règlement Canadien sur le - matériel brouilleur.

## International Modem Restrictions

Some dialing and answering defaults and restrictions may vary for international modems. Changing settings may cause a modem to become non-compliant with -national telecom requirements in specific countries. Also note that some software packages may have features or lack restrictions that may cause the modem to become non-compliant.



## EMC, Safety, and R&TTE Directive

The CE mark is affixed to this product to confirm compliance with the following -European Community Directives:

- Council Directive 89/336/EEC of 3 May 1989 on the approximation of the laws of Member States relating to electromagnetic compatibility;  
and
- Council Directive 73/23/EEC of 19 February 1973 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits;  
and
- Council Directive 1999/5/EC of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

## South African Notice

This modem must be used in conjunction with an approved surge protection device.

## Appendix B – Warranty & Repair Policies

### Multi-Tech Warranty Statement

Multi-Tech Systems, Inc., (hereafter “MTS”) warrants that its products will be free from defects in material or workmanship for a period of two, five, or ten years (depending on model) from date of purchase, or if proof of purchase is not provided, two, five, or ten years (depending on model) from date of shipment.

MTS MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE HEREBY DISCLAIMED.

This warranty does not apply to any products which have been damaged by lightning storms, water, or power surges or which have been neglected, altered, abused, used for a purpose other than the one for which they were manufactured, repaired by Customer or any party without MTS’s written authorization, or used in any manner inconsistent with MTS’s instructions.

MTS’s entire obligation under this warranty shall be limited (at MTS’s option) to repair or replacement of any products which prove to be defective within the warranty period or, at MTS’s option, issuance of a refund of the purchase price. Defective products must be returned by Customer to MTS’s factory — transportation prepaid.

MTS WILL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES, AND UNDER NO CIRCUMSTANCES WILL ITS LIABILITY EXCEED THE PRICE FOR DEFECTIVE PRODUCTS.

### Repair Procedures for U.S. and Canadian Customers

In the event that service is required, products may be shipped, freight prepaid, to our Mounds View, Minnesota factory:

Multi-Tech Systems, Inc.  
2205 Woodale Drive  
Mounds View, MN 55112  
Attn: Repairs, Serial # \_\_\_\_\_

A Returned Materials Authorization (RMA) is not required. Return shipping charges (surface) will be paid by MTS to destinations in U.S. and Canada.

Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), and your telephone number. If the product is out of warranty, a payment in advance is required. Acceptable means of payment include credit card, wire transfer or a check in U.S. dollars drawn on a U.S. Bank.

For out of warranty repair charges, go to [COMPANY/Policies/warranty/](#)

Extended two-year overnight replacement service agreements are available for selected products. Please call MTS at (888) 288-5470, extension 5308 or visit our web site at [PARTNERS/Programs/overnight\\_replacement](#) for details on rates and coverages.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department at (800) 972-2439 or email [support@multitech.com](mailto:support@multitech.com). Please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at (800) 328-9717 or (763) 717-5631, or email [mtsrepair@multitech.com](mailto:mtsrepair@multitech.com).

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

### Repair Procedures for International Customers (Outside U.S.A. and Canada)

Your original point of purchase Reseller may offer the quickest and most economical repair option for your Multi-Tech product. You may also contact any Multi-Tech sales office for information about the nearest distributor or other repair service for your Multi-Tech product. The Multi-Tech sales office directory is available at <http://www.multitech.com/PARTNERS/Channels/offices/>

In the event that factory service is required, products may be shipped, freight prepaid to our Mounds View, Minnesota factory. Recommended international shipment methods are via Federal Express, UPS or DHL courier services, or by airmail parcel post; shipments made by any other method will be refused. Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), your telephone number, and if the product is out of warranty, a payment in advance is required. Acceptable means of payment include credit card, wire transfer or a check in U.S. dollars drawn on a U.S. bank. Repaired units shall be shipped freight collect, unless other arrangements are made in advance.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department nearest you or email [support@multitech.com](mailto:support@multitech.com). When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A., or email [mtsrepair@multitech.com](mailto:mtsrepair@multitech.com).

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

## Repair Procedures for International Distributors

International distributors should contact their MTS International sales representative for information about the repair of the Multi-Tech product(s).

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our International Technical Support department at +(763)717-5863. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A. or email [mtsrepair@multitech.com](mailto:mtsrepair@multitech.com).

Repairs for damages caused by lightning storms, water, power surges, incorrect installation, physical abuse, or user-caused damages are billed on a time-plus-materials basis.

## Replacement Parts

SupplyNet, Inc., can supply you with replacement power supplies, cables and connectors for selected Multi-Tech products. You can place an order with SupplyNet via mail, phone, fax or the Internet at the following addresses:

Mail:           SupplyNet, Inc.  
                  614 Corporate Way  
                  Valley Cottage, NY 10989  
Phone:        800 826-0279  
Fax:           914 267-2420  
Email:         [info@thesupplynet.com](mailto:info@thesupplynet.com)  
Internet:      <http://www.thesupplynet.com>

## Appendix C – Waste Electrical and Electronic Equipment

July, 2005

The WEEE directive places an obligation on EU-based manufacturers, distributors, retailers and importers to take-back electronics products at the end of their useful life. A sister Directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all Multi-Tech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

### Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or the seller from whom you purchased the product.



## Appendix D - C-ROHS HT/TS Substance Concentration

### 依照中国标准的有毒有害物质信息

根据中华人民共和国信息产业部 (MII) 制定的电子信息产品 (EIP)

标准 - 中华人民共和国《电子信息产品污染控制管理办法》(第 39 号), 也称作中国

RoHS, 下表列出了 Multi-Tech Systems Inc. 产品中可能含有的有毒物质 (TS) 或有害物质 (HS) 的名称及含量水平方面的信息。

成分名称	有害/有毒物质/元素					
	铅 (PB)	汞 (Hg)	镉 (CD)	六价铬 (CR6+)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板	O	O	O	O	O	O
电阻器	X	O	O	O	O	O
电容器	X	O	O	O	O	O
铁氧体磁环	O	O	O	O	O	O
继电器/光学部件	O	O	O	O	O	O
IC	O	O	O	O	O	O
二极管/晶体管	O	O	O	O	O	O
振荡器和晶振	X	O	O	O	O	O
调节器	O	O	O	O	O	O
电压传感器	O	O	O	O	O	O
变压器	O	O	O	O	O	O
扬声器	O	O	O	O	O	O
连接器	O	O	O	O	O	O
LED	O	O	O	O	O	O
螺丝、螺母以及其它五金件	X	O	O	O	O	O
交流-直流电源	O	O	O	O	O	O
软件/文档 CD	O	O	O	O	O	O
手册和纸页	O	O	O	O	O	O
底盘	O	O	O	O	O	O

**X** 表示所有使用类似材料的设备中有害/有毒物质的含量水平高于 SJ/Txxx-2006 限量要求。

**O** 表示不含该物质或者该物质的含量水平在上述限量要求之内。

# Appendix E - Linux Installations

## Introduction

The MT9234MU supports Linux 2.4 kernel versions (2.4.28 and above), 2.6 kernel versions 2.6.8 through 2.6.10, and, with a special patch, Linux kernel versions 2.6.11 through 2.6.20.4. There are three separate installation procedures for these ranges of kernel versions. When installation is complete, you must use AT commands to configure the modem for the country in which it is operating.

## Installation in Computers Using the Linux 2.4 Kernel

### 1. Introduction

This procedure applies to Linux 2.4 kernel versions 2.4.28 and above.

These tgz and source RPM packages (ti\_usb-1.2.tgz and ti\_usb-1.2-1.src.rpm) contain a device driver for the MT9234MU's TI USB 3410 processor in the Linux 2.4 kernels.

This package is designed for these hardware platforms: a standard PC with i486, Pentium, or compatible CPUs (32 bit x86).

This package has been tested on these Linux distributions:

- Red Hat 8.0
- Red Hat 9.0
- SUSE Linux Standard Server 8.0

Most likely this package will work on many other Linux distributions based on the 2.4 kernels, but this has not yet been tested. Note that different distributions can make custom changes to the Linux kernel, and there is a small chance that these changes might be incompatible with this package.

This package will not work in the Linux 2.6 kernels. Separate packages of the TI USB 3410/5052 driver are available for the Linux 2.6 kernels.

These packages are available from <http://www.brimson.com/downloads>

The tgz package will be named ti\_usb-X.Y.tgz, and the source RPM package will be named ti\_usb-X.Y-Z.src.rpm, where X.Y-Z is the version number. See [www.brimson.com/downloads/README](http://www.brimson.com/downloads/README) for a description of the packages available.

If you have questions or problems with this package please contact Texas Instruments technical support or Brimson technical support.

## 2. Installation Steps

### Install the Kernel Sources

To build the TI USB driver you must have the matching kernel sources for your kernel.

To verify that you have matching kernel sources, run "uname -r" to get the version of the running kernel. Then check for the directory /usr/src/linux-<version>, /lib/modules/<version>/source, /lib/modules/<version>/build, or /usr/src/linux-<stripped\_version>, where stripped\_version has the extra version information removed. In these directories look for the files include/linux/autoconf.h and .config.

If you do not find the correct kernel source directory, you must find and install the kernel sources from your distribution CDs or other media.

### Prepare the Kernel Sources

This step may or may not be necessary, depending on how your Linux distribution installs the kernel sources.

Log in as root and do the following:

Command	Explanation
1. cd /usr/src/linux-<version>	Change to the source directory.
2. make mrproper	Clean up any old files.
3. Use either of these commands:  make oldconfig  -OR-  make cloneconfig	Make a configuration file to match your running kernel.  <i>for Red Hat</i>    <i>for SUSE</i>  For other distributions these same commands might work, or you might need to find a config file in /boot or in a configs directory, copy it to .config, and run "make oldconfig".
4. make dep	Create the dependency and version files.

If you have built your own kernel, the kernel sources will already be installed and prepared. If you are using a kernel that came with a Linux distribution, it can sometimes be difficult to get the kernel sources correctly installed and prepared, since each Linux distribution handles kernel sources slightly differently.

For example, if you get errors about the wrong kernel version, you may have installed the wrong kernel sources, or you may need to edit the kernel version in the top level Makefile of the kernel sources. If you get compilation errors, perhaps you forgot to run "make oldconfig" and "make dep".

If you have difficulties, look carefully at the error messages when installing the TGZ or RPM packages--those messages should give you an indication of just what the error is.



## Build and Install the TI USB Driver from the Source RPM Package

Follow this step if your distribution supports RPM packages; otherwise, follow the next step on installing from a TGZ package.

You will need the TI USB source RPM package for this step. The Introduction section above describes where to find the latest TI USB source RPM.

Log in as root and do the following:

Command	Explanation
1.  <code>rpmbuild --rebuild ti_usb-X.Y-Z.src.rpm</code> -- OR -- <code>rpm --rebuild ti_usb-X.Y-Z.src.rpm</code>	This command builds the driver package for your kernel.  For Red Hat.  For SUSE.
2.  <code>cd /usr/src/redhat/RPMS/i386</code> -- OR -- <code>cd /usr/src/packages/RPMS/i386</code>	For Red Hat.  For SUSE.  Or use the appropriate path for your Linux distribution.
3. <code>rpm -Uvh ti_usb-X.Y-Z.i386.rpm</code>	This command installs the driver package.

If there are problems in this process, you may need to go back to install and prepare the kernel sources as described above. You may need to remove the RPM package with "`rpm -e ti_usb-X.Y-Z`" or remove RPM temporary files. Red Hat stores RPM temporary files in `/var/tmp` and `/usr/src/redhat/BUILD`; other distributions may store them in other places.

### Build and Install the TI USB Driver from the TGZ Package

You will need the TI USB tgz package for this step. The Introduction section above describes where to find the latest TI USB tgz package.

Log in as root and do the following:

Command	Explanation
1. tar xvfz ti_usb-X.Y.tgz	Un-package the files.
2. cd ti_usb-X.Y	
3. ./configure	Configure the package for your distribution and kernel.
4. make	Build the driver.
5. make install	Install the ti_usb driver.

If there are problems in this process, you may need to go back to install and prepare the kernel sources as described above.

### Load the TI USB Driver

The ti\_usb driver should be automatically loaded when you plug in the TI USB 3410 device, provided your device uses the default vendor and product ids. If it does not, see the section entitled "VENDOR and PRODUCT IDS" in the Release Notes file for Linux 2.4 kernel installations (on the product CD as file name ti\_usb\_release\_notes-1 2.txt).

The first TI USB 3410 device plugged in will appear as /dev/ttyTIUSB0, the next as /dev/ttyTIUSB1, and so on.

Note that these device names are different from the device names used by the Linux usbserial driver. See the section below entitled "DEVICE FILES" for more information.

If TI USB devices had been in use before installing the new TI USB driver, old versions of the drivers will still be loaded. These old versions must be unloaded before the newly installed driver will be used.

The simplest way to unload the old drivers and load the new is to reboot.

Alternatively, you can close all open TI USB serial ports, disconnect the TI USB serial devices, and then unload the old TI USB serial driver with the command

```
rmmod ti_usb
```

**Completion.** Then reconnect the TI USB serial devices and the new driver will be loaded.

## Device Files

Because the TI USB driver does not use usbserial (to avoid known problems with usbserial) it uses its own device file names, `/dev/ttyTIUSB0`, `/dev/ttyTIUSB1`, and so on.

The device files are created automatically when the `ti_usb` driver is loaded. This is done by the module post-install command in `/etc/modules.conf`, which runs the script `/etc/ti_usb/make_devices`.

You can change the device names that `ti_usb` uses. First you should remove the old device files by running

```
/etc/ti_usb/make_devices remove
```

Then edit `/etc/ti_usb/make_devices`. At the top of this file you will find the parameters `DEVICE_NAME` which determines the basename of the TI USB device files, `DEVICE_COUNT` which determines the number of device files created, `DEVICE_GROUP` which determines the group owner of the device files, and `DEVICE_PERMISSIONS` which determines the device file permissions.

For example, to create 8 TI USB device files named `/dev/ttyusb0` through `/dev/ttyusb7`, owned by the `uucp` group, and having permissions `0660`, change the parameters like this

```
DEVICE_NAME=/dev/ttyusb
DEVICE_COUNT=8
DEVICE_GROUP=uucp
DEVICE_PERMISSIONS=0660
```

After editing `make_devices`, run the script to create the new device files, like this

```
/etc/ti_usb/make_devices
```

If you use `devfs`, the `ti_usb` devices will be `/dev/usb/ti/0`, `/dev/usb/ti/1`, and so on in the order they are plugged in. The `ti_usb` driver has not been tested with `devfs`.

## ***Uninstalling the TI USB Driver (for 2.4 kernel versions)***

If you installed the TI USB RPM package, you can uninstall it by logging in as root and running the command

```
rpm -e ti_usb-X.Y-Z
```

If you installed the TI USB TGZ package, you can uninstall it by logging in as root and running the following commands:

Command	Explanation
cd ti_usb-X.Y	You will need to give a full or relative path to the unpacked source file directory.
make uninstall	

# Installation in Computers Using the Linux 2.6 Kernel

## 1. Introduction

This procedure applies to Linux 2.6 kernel versions 2.6.8 through 2.6.10.

These tgz and source RPM packages (ti\_usb\_2.6-1.2.tgz and ti\_usb\_2.6-1.2-1.src.rpm) contain a device driver for the MT9234MU's TI USB 3410 processor in the Linux 2.6 kernels.

These packages have been tested on the Fedora Core 2 Linux distribution.

Most likely these packages will work on many other Linux distributions based on the 2.6 kernels, but this has not yet been tested. Note that different distributions can make custom changes to the Linux kernel, and there is a small chance that these changes might be incompatible with this package.

The TI USB 3410/5052 driver has been tested in the kernel.org kernels 2.6.5 through a pre-release version of 2.6.10, and in the Fedora Core 2 kernels 2.6.5-1.358 and 2.6.9-1.6. There are limitations in kernels before 2.6.8; see the section on Known Limitations in the Release Notes file for kernel 2.6 (the file name is ti\_usb\_2\_6\_release\_notes-1\_2.txt and it is on the product CD).

These packages will not work in the Linux 2.4 kernels (however, installation in the 2.4 kernels is covered earlier in this chapter).

These packages are available from <http://www.brimson.com/downloads>

The tgz package will be named ti\_usb\_2.6-X.Y.tgz, and the source RPM package will be named ti\_usb\_2.6-X.Y-Z.src.rpm, where X.Y-Z is the version number. See [www.brimson.com/downloads/README](http://www.brimson.com/downloads/README) for a description of the packages available.

If you have questions or problems with this package, please contact Texas Instruments technical support or Brimson technical support.

## 2. Installation Steps

### Install the Kernel Sources

To build the TI USB driver you must have the matching kernel sources for your kernel.

In particular, you must have the file usb-serial.h for your kernel sources. Sometimes Linux distributions will include the kernel headers but not the complete kernel sources, and usb-serial.h will be missing. However, the complete kernel sources should still be available as a separate add-on package.

To verify that you have matching kernel sources, run "uname -r" to get the version of the running kernel. Then check for the directory /usr/src/linux-<version>, /lib/modules/<version>/source, /lib/modules/<version>/build, or /usr/src/linux-<stripped\_version>, where stripped\_version has the extra version information removed. In these directories look for the files include/linux/autoconf.h, .config, and drivers/usb/serial/usb-serial.h.

If you do not find the correct kernel source directory, you must find and install the kernel sources from your distribution CDs or other media.

## Prepare the Kernel Sources

This step may or may not be necessary, depending on how your Linux distribution installs the kernel sources.

Log in as root and do the following:

Command	Explanation
1. <code>cd /usr/src/linux-&lt;version&gt;</code>	Change to the source directory.
2. <code>make mrproper</code>	Clean up any old files.
3. <i>Use either of these commands:</i>  <code>make oldconfig</code>  -OR-  <code>make cloneconfig</code>	Make a configuration file to match your running kernel.  <i>for Red Hat</i>  <i>for SUSE</i>  For other distributions these same commands might work, or you might need to find a config file in /boot or in a configs directory, copy it to .config, and run "make oldconfig".
4. <code>make prepare</code>	To prepare the kernel sources for your machine.

If you have built your own kernel, the kernel sources will already be installed and prepared. If you are using a kernel that came with a Linux distribution, it can sometimes be difficult to get the kernel sources correctly installed and prepared, since each Linux distribution handles kernel sources slightly differently.

For example, if you get errors about the wrong kernel version, you may have installed the wrong kernel sources, or you may need to edit the kernel version in the top level Makefile of the kernel sources. If you get errors about a missing `usb-serial.h`, you may only have the kernel headers installed. If you have trouble getting the full kernel sources installed and prepared, you can copy the correct version of `usb-serial.h` to `drivers/usb/serial` in the kernel headers directory and then the other kernel sources are not needed.

If you have difficulties, look carefully at the error messages when installing the TGZ or RPM packages. Those messages should give you an indication of just what the error is.

## Build and Install the TI USB Driver from the Source RPM Package

Follow this step if your distribution supports RPM packages; otherwise, follow the next step on installing from a TGZ package.

You will need the TI USB 3410/5052 source RPM package for this step. The Introduction section above describes where to find the latest TI USB 3410/5052 source RPM.

Log in as root and do the following:

Command	Explanation
1.  <code>rpmbuild --rebuild ti_usb_2.6-X.Y-Z.src.rpm</code> -- OR -- <code>rpm --rebuild ti_usb_2.6-X.Y-Z.src.rpm</code>	This command builds the driver package for your kernel.  For Red Hat.  For SUSE.
2.  <code>cd /usr/src/redhat/RPMS/i386</code> -- OR -- <code>cd /usr/src/packages/RPMS/i386</code>	For Red Hat.  For SUSE.  Or use the appropriate path for your Linux distribution.
3. <code>rpm -Uvh ti_usb_2.6-X.Y-Z.i386.rpm</code>	This command installs the driver package.

If there are problems in this process, you may need to go back to install and prepare the kernel sources as described above. You may need to remove the RPM package with "`rpm -e ti_usb_2.6-X.Y-Z`" or remove RPM temporary files. Red Hat stores RPM temporary files in `/var/tmp` and `/usr/src/redhat/BUILD`; other distributions may store them in other places.

### Build and Install the TI USB Driver from the TGZ Package

Follow this step if your distribution does not support RPM packages; otherwise, follow the previous step on installing from an RPM package.

You will need the TI USB 3410/5052 tgz package for this step. The Introduction section above describes where to find the latest TI USB 3410/5052 tgz package.

Log in as root and do the following:

Command	Explanation
1. tar xvfz ti_usb_2.6-X.Y.tgz	Un-package the files.
2. cd ti_usb_2.6-X.Y	
3. ./configure	Configure the package for your distribution and kernel.
4. make install	Build and install the ti_usb_3410_5052 driver.

If there are problems in this process, you may need to go back to install and prepare the kernel sources as described above.

### Load the TI USB 3410/5052 Driver

The ti\_usb\_3410\_5052 driver should be automatically loaded when you plug in the TI USB 3410/5052 devices, provided your device uses the default vendor and product ids. If it does not, see the section of the Release Notes file "VENDOR and PRODUCT IDS" (on the product CD as file name ti\_usb\_2.6\_release\_notes-1.2.txt ).

The first TI USB 3410/5052 device plugged in will appear as /dev/ttyUSB0, then next as /dev/ttyUSB1, and so on. These device names are shared with other USB serial devices.

If TI USB devices had been in use before installing the new TI USB driver, old versions of the drivers will still be loaded. These old versions must be unloaded before the newly installed driver will be used.

The simplest way to unload the old drivers and load the new is to reboot.

Alternatively, you can close all open TI USB serial ports, disconnect the TI USB serial devices, and then unload the old TI USB serial driver with the command

```
rmmod ti_usb_3410_5052
```

**Completion.** Then reconnect the TI USB serial devices and the new driver will be loaded.



## ***Uninstalling the TI USB Driver (for 2.6 kernel versions)***

If you installed the TI USB RPM package, you can uninstall it by logging in as root and running the command

```
rpm -e ti_usb_2.6-X.Y-Z
```

If you installed the TI USB TGZ package, you can uninstall it by logging in as root and running the following commands:

Command	Explanation
cd ti_usb_2.6-X.Y	You will need to give a full or relative path to the unpacked source file directory.
make uninstall	

## Installation in Computers Using the Linux 2.6.20 Kernel

### 1. Introduction

This procedure applies to Linux 2.6 kernel versions 2.6.11 through 2.6.20 and higher.

This tgz package contains a patch for the Linux kernel version 2.6.20 and later to add support for MultiTech modems. The patch was generated from the 2.6.20.4 kernel source. Additional support files like hotplug scripts, udev rules and firmware images are also included.

The TI USB 3410/5052 driver should be included in the official Linux kernel in version 2.6.20 or later. The official Linux kernel does not yet have support for the Multitech modems, however; to add that support you need this package.

This package has been tested on these Linux distributions: (a) Fedora Core 6, and (b) CentOS 5.

Most likely this package will work on many other Linux distributions based on the 2.6 kernels, but this has not yet been tested. Note that different distributions can make custom changes to the Linux kernel, and there is a small chance that these changes might be incompatible with this package.

These packages are available from <http://www.brimson.com/downloads>

If you have questions or problems with this package, please contact Texas Instruments technical support or Brimson technical support.

### 2. Installation Steps

#### Patching and Rebuilding the Kernel

Apply the patch `ti_usb_multitech_2.6.20.4.patch`. This patch should apply to 2.6.20.4 and later kernels. Then rebuild and reinstall your kernel and/or kernel modules. Be sure the TI USB driver is configured on.

Detailed instructions on patching and building a kernel can be found elsewhere.

#### Installing the Hotplug Scripts

The `ti_usb_3410_5052` driver needs a hotplug script to work correctly. This hotplug script is used to change the device configuration.

Copy `ti_usb_3410_5052` to `/etc/hotplug/usb/ti_usb_3410_5052`. Be sure the script is owned by `root:root` and has permissions `r-xr-xr-x`.

If the device configuration is not being set properly, you might need a slightly different hotplug script, depending on your Linux distribution. If this does not work, remove `/etc/hotplug/usb/ti_usb_3410_5052` and instead copy `/etc/ti_usb/ti_usb_3410_5052.hotplug` into `/etc/hotplug.d/usb`.

Some distribution have deprecated hotplug scripts. If this is the case, you will most likely need a udev rule to perform this function.

#### Installing udev Rules

The `ti_usb_3410_5052` driver needs a udev rule to work correctly. This udev rule is used to change the device configuration.

Copy `25_ti_usb_3410_5052.rule` to `/etc/udev/rules.d`. Be sure the rule is owned by `root:root` and has permissions `r-xr-xr-x`.

If the device configuration is not being set properly, you might need a slightly different udev rule, depending on your Linux distribution.

**Note:** This is only needed if firmware is not built into the driver.

## Installing the Firmware Images

Copy `ti_mts_fw_cdma`, `ti_mts_fw_edge`, `ti_mts_fw_gsm`, `ti_mts_fw_mt9234mu` and `ti_mts_fw_mt9234zbausb` to `/usr/lib/hotplug/firmware/` or `/lib/firmware` depending on your distribution.

Be sure the files are owned by `root:root` and have permissions `r--r--r--`.

## Load the TI USB 3410/5052 Driver

The `ti_usb_3410_5052` driver should be automatically loaded when you plug in the TI USB 3410/5052 devices, provided your device uses the default vendor and product ids. If it does not, see the section below titled "VENDOR and PRODUCT IDS".

The first TI USB 3410/5052 device plugged in will appear as `/dev/ttyUSB0`, then next as `/dev/ttyUSB1`, and so on. These device names are shared with other USB serial devices.

If TI USB devices had been in use before installing the new TI USB driver, old versions of the drivers will still be loaded. These old versions must be unloaded before the newly installed driver will be used.

The simplest way to unload the old drivers and load the new is to reboot.

Alternatively, you can close all open TI USB serial ports, disconnect the TI USB serial devices, and then unload the old TI USB serial driver with the command

```
rmmod ti_usb_3410_5052
```

Then reconnect the TI USB serial devices and the new driver will be loaded.

## Uninstalling the TI USB Driver (for 2.6 kernel versions)

If you installed the TI USB RPM package, you can uninstall it by logging in as root and running the command

```
rpm -e ti_usb_2.6-X.Y-Z
```

If you installed the TI USB TGZ package, you can uninstall it by logging in as root and running the following commands:

Command	Explanation
<code>cd ti_usb_2.6-X.Y</code>	You will need to give a full or relative path to the unpacked source file directory.
<code>make uninstall</code>	

## Using AT Commands to Configure Country Code

If you are comfortable using AT commands, you can configure your modem using AT commands. You must enter these commands in your communication program's terminal window.

To configure the modem for a specific country, execute the following AT commands:

1. Type AT%T19,0,nn (where *nn* represents the country code). Press Enter.
2. The modem will respond "OK."
3. Type AT&F&W (this saves changes). Press Enter.
4. The modem will respond "OK."
5. Type AT!9 (this verifies that country code has been chosen). Press Enter.
6. The modem will display the country code in decimal format followed by an "OK."
7. Check to be sure the code for your country is displayed.  
If not, repeat procedure to correct.

Here are two examples of country, command, and result codes.

<b>Country</b>	<b>AT Command</b> (Hexidecimal)	<b>AT!9 Result Code</b> (Decimal)
Euro/NAM*	AT%T19,0,34 (default)	52
Japan	AT%T19,0,10	16

Because the list of country codes is continually being updated, we present the complete list on our Web site:

<http://www.multitech.com/GlobalModem/config>

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