
MultiModem[®] ZBA

MT9234ZBA-USB

User Guide

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Record of Revisions

Revision	Date	Description
D	09/29/09	Updated FCC statement and EMC, Added information on when the power LED comes on. Added Thailand approval.
E	09/01/2011	Removed references to product CD.
F	12/12/12	Updated RoHS and other regulatory statements.
G	12/16/13	Added UL translations.
H	03/13/14	Added Russian statement.

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Patents

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; 7082106; 7082141; 7092406 . Other patents pending.

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Contacting Multi-Tech Support

In order to better serve our customers, manage support requests and shorten resolution times, we have created the online web portal allowing you to submit questions regarding Multi-Tech products directly to our technical support team. Get answers to your most complex questions, ranging from implementation, troubleshooting, product configuration, firmware upgrades and much more.

To create an account and submit a Support Case on the Portal, visit support.multitech.com

Online Web Portal support.multitech.com

The Knowledge Base provides immediate answers to your questions and gives you access to support resolutions for all Multi-Tech products. Visit our support area on the website for other support services.

Knowledge Base and Support Services www.multitech.com/en_US/SUPPORT

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Warranty

To read the warranty statement for your product, please visit:

http://www.multitech.com/en_US/COMPANY/Policies/warranty/

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Chapter 1 – Product Overview and Specifications

Congratulations on your purchase of the MultiModem ZBA-USB modem. Your MultiModem product 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 manual helps you install, configure, test, and use your modem.

Check Multi-Tech's website for current versions of product documentation.

Features Overview

Your modem includes the following features:

- 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
- Two-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 MultiModem USB package contains:

- A MultiModem data/fax modem
- A set of four self-adhesive plastic feet
- One USB cable
- One modular telephone cable

AT Commands Info

The AT commands are published in a separate Reference Guide. Download this guide from the Multi-Tech website.

Technical Specifications

Your MultiModem ZBA-USB modem has the following specifications:

Trade Name	MultiModem® ZBA
Model Number	MT9234ZBA-USB
Client-to-Server Data Rates	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.
Client-to-Client Data Rates	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400, 1200, 0-300 bps
Fax Data Rates	33600, 31200, 28800, 26400, 24000, 21600, 19200, 16800, 14400, 12000, 9600, 7200, 4800, 2400, 1200, 0-300 bps
Data Format	Serial, binary, asynchronous
Modem Compatibility	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
Fax Compatibility	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
Error Correction	ITU-T V.42
Data Compression	ITU-T V.44 (4:1 throughput), V.42bis (4:1 throughput), MNP 5 (2:1 throughput)
Flow Control	XON/XOFF (software), RTS/CTS (hardware)
Intelligent Features	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
Command Buffer	40 characters
Transmit Level	-12dBm (Euro/NAM) – varies by country/region setting
Lightning Protection	FCC Part 68 A/B surge
Frequency Stability	±0.01%
Receiver Sensitivity	-43 dBm under worst-case conditions
AGC Dynamic Range	43 dB
Connectors	USB connector; two RJ-11 phone jacks
Cables	One RJ11 phone cable One USB cable
	Note: Any cables connected to the computer should be shielded to reduce interference.
Diagnostics	Power-on self test, local analog loop, local digital loop, remote digital loop.
Environmental	Temperature range -40°– 50°C (-32°–120°F); humidity range 20–90% (non-condensing)
Dimensions	10.9 cm wide x 14.5 cm long x 2.5 cm high (4.3” x 5.7” x 1.10”)
Weight	227 g (8 oz)
Limited Warranty	2 year

Chapter 2 – Installing the Modem

This chapter describes how to set up MultiModem ZBA-USB modems.

Telecom Safety Warning

Before servicing, disconnect this product from its power source and telephone network. Also:

- 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.
- Use this product with UL and cUL listed computers only.
- 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 may be a remote risk of electrical shock from lightning.
- Do not use a telephone in the vicinity of a gas leak.

CAUTION: To reduce the risk of fire, use only 26 AWG or larger UL Listed or CSA Certified telecommunication line cord.

Avertissements de sécurité télécom

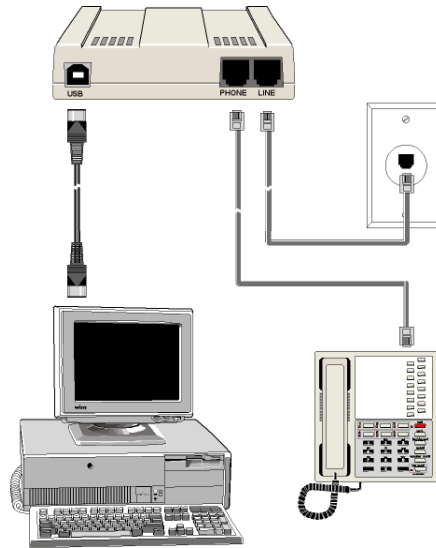
Avant de l'entretien, débrancher ce produit de son réseau d'alimentation et de téléphone. également:

- Ne jamais installer du câblage téléphonique pendant un orage électrique.
- Ne jamais installer de prises téléphoniques à des endroits mouillés à moins que la prise ne soit conçue pour de tels emplacements.
- Utilisez ce produit avec UL et cUL ordinateurs répertoriés seulement.
- Ne jamais toucher fils ou des bornes téléphoniques non isolés à moins que la ligne téléphonique n'ait été déconnectée au niveau de l'interface réseau.
- Faire preuve de prudence au moment d'installer ou de modifier des lignes téléphoniques.
- Éviter d'utiliser le téléphone pendant un orage électrique. Il peut y avoir un risque de choc électrique causé par la foudre.
- N'utilisez pas un téléphone à proximité d'une fuite de gaz.

ATTENTION: Pour réduire les risques d'incendie, utiliser uniquement des conducteurs de télécommunications 26 AWG au de section supérieure.

Connecting the Modem to the Computer

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



Connecting the USB Cable

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.

Connecting the Phone Line

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.

Connecting a Telephone

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

Installing the Modem Driver

Installation Overview

Compatibility: This MultiModem is compatible with Windows Operating Systems Vista/XP/2003/2008 and Linux.

Windows Drivers: The MultiModem product driver must be installed in your computer's program directory. You can download the Windows drivers from the Multi-Tech website. A complete set of drivers for each operating system is organized into Vista and XP with either 32-bit or 64-bit processor. Most users select either the 32-bit Vista or 32-bit XP drivers (Windows 2003 also use the XP drivers). Server users can select either 32-bit or 64-bit depending on their application. For server users to determine whether they have a 32-bit or 64-bit operating system, go to Start | All Programs | Accessories | System Tools | Computer and click on the System Properties button. Under System you see System Type: 64-bit Operating System.

Linux Drivers: You can also use the Multi-Tech website to download Linux Operating System drivers. Refer to the Readme file (also in the Linux directory) for the correct driver file and installation guide for your distribution/version of Linux.

Windows Driver Installation Overview

This section describes how two install wizards guide you through the software installation.

- The first wizard installs the TUSB3410 Serial Port.
- The second wizard installs the modem driver.

Installing the Modem Driver in Windows Vista

Before You Begin

1. Ensure you have downloaded the modem driver from the Multi-Tech website.
2. Power up your computer.
3. 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.
4. Windows detects that the new modem is present.

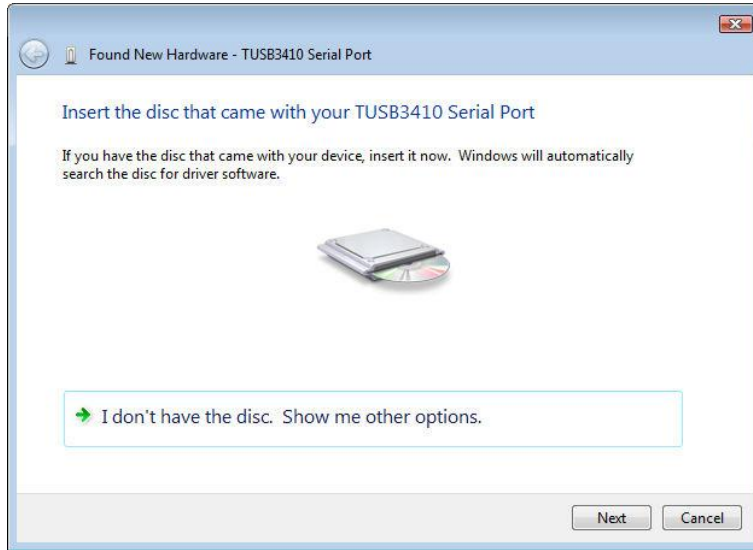
Installing the Driver for the TUSB3410 Serial Port

1. The Found New Hardware wizard panel appears, indicating that Windows needs to install driver software for your TUSB3410 Serial Port.

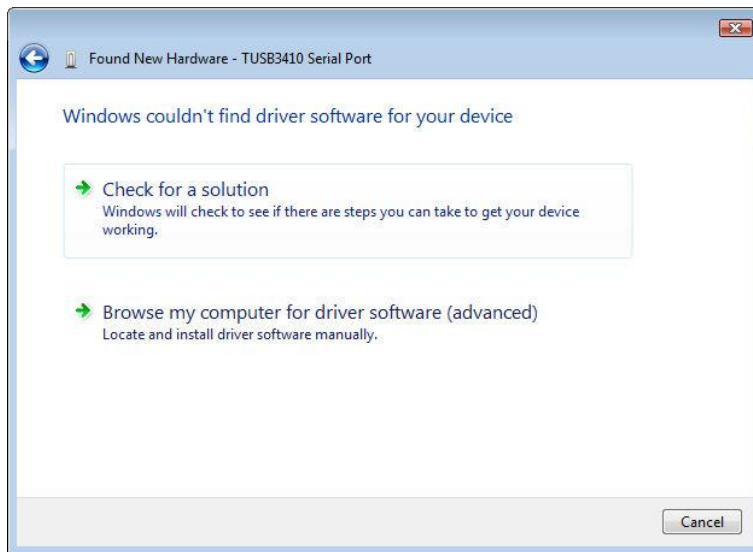


Click on **Locate and install driver software (recommended)**. Windows guides you through the process of installing driver software for your device.

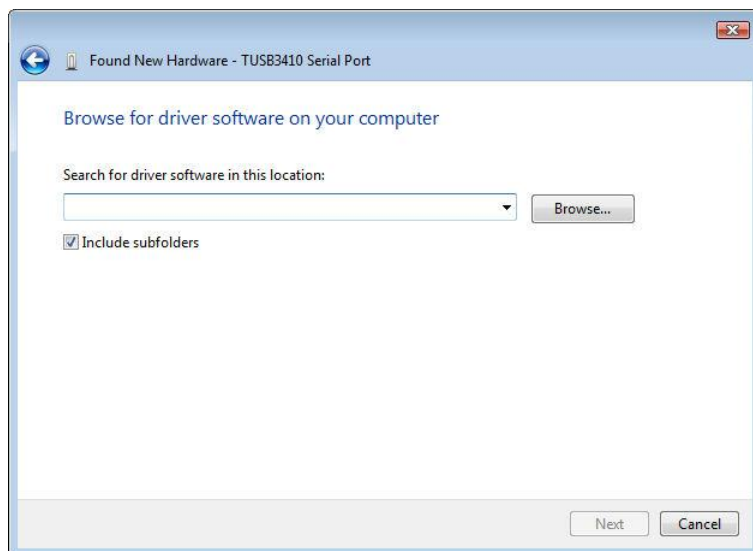
2. The next pane appears. Select **I don't have the disc. Show me other options**. Windows may prompt you to search online, but this is not necessary.



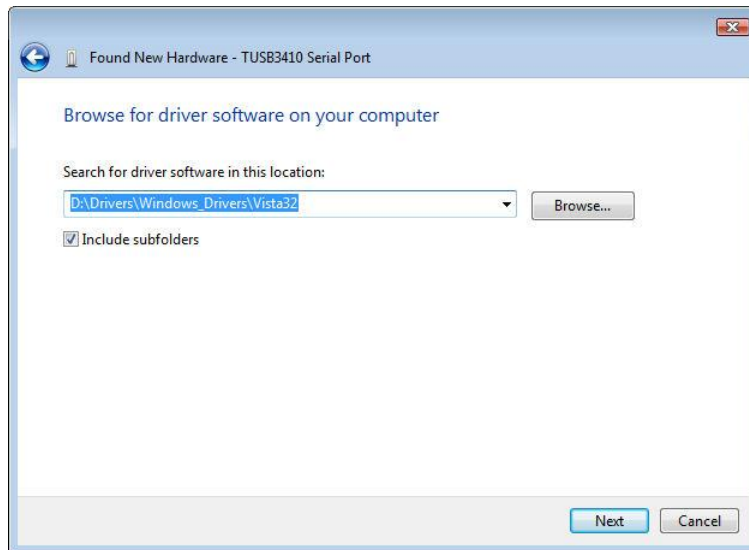
3. In the next pane, click **Browse my computer for driver software (advanced)**.



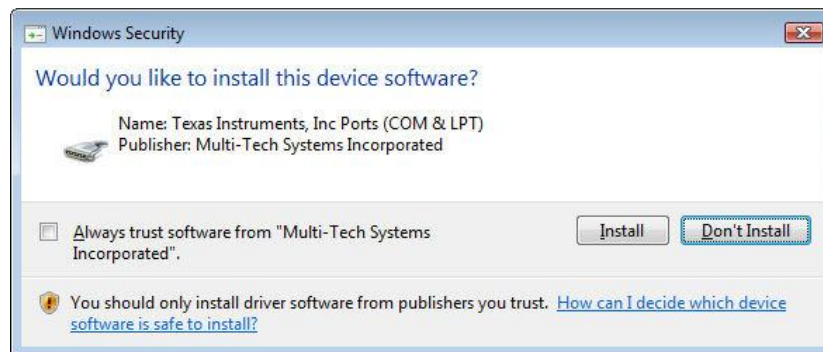
4. At the Browse for driver software on your computer wizard, click **Browse**.



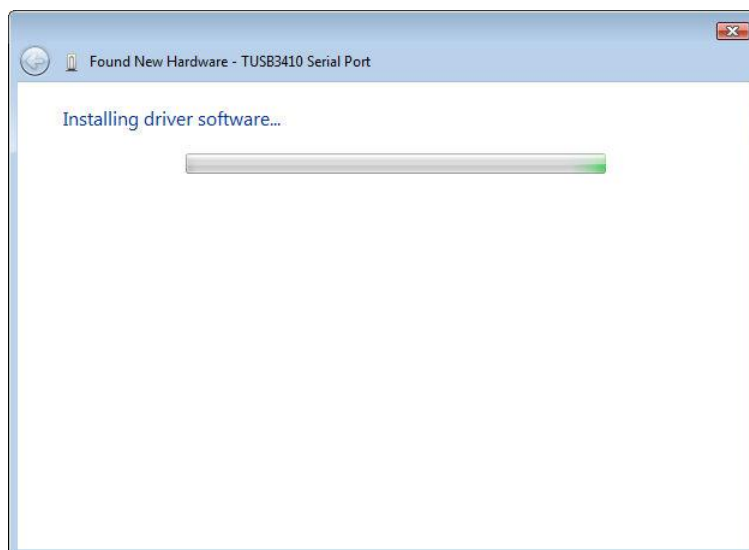
- In the dialog box that appears, navigate to the area where you stored the drivers you downloaded from the Multi-Tech website. Click **OK**. Then click **Next**.



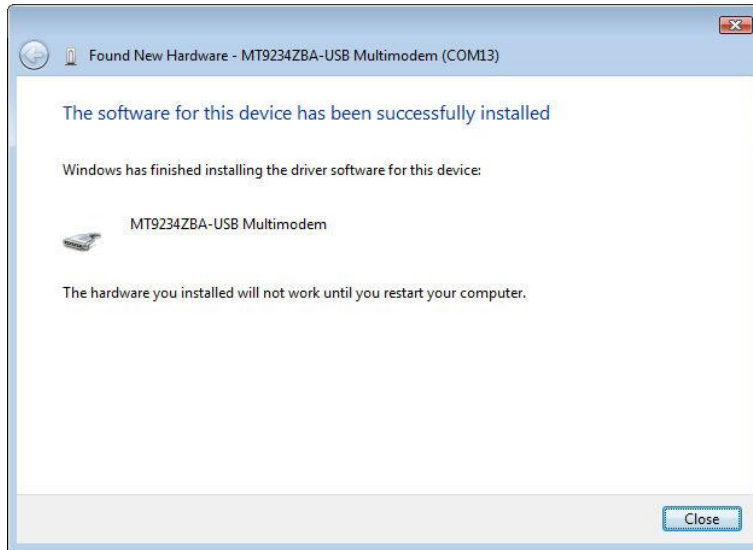
- The 'Would you like to install this device software?' pane appears. Click **Install**.



- The 'Installing driver software...' pane appears, showing the installation's progress.



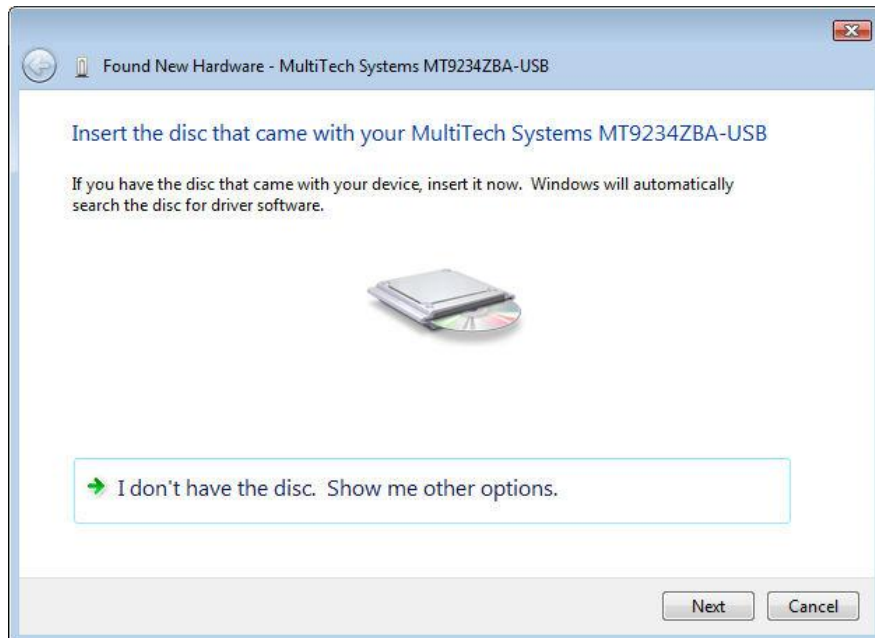
8. A wizard pane appears to tell you that the software is now successfully installed. Click **Close**.



Installing the Modem Driver

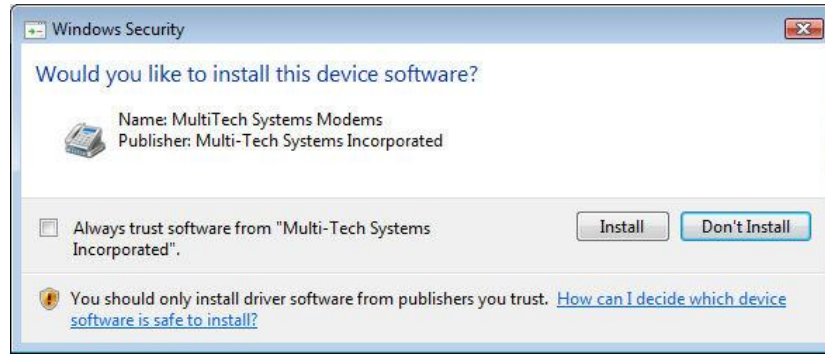
To install the modem driver:

1. The Found New Hardware wizard opens.

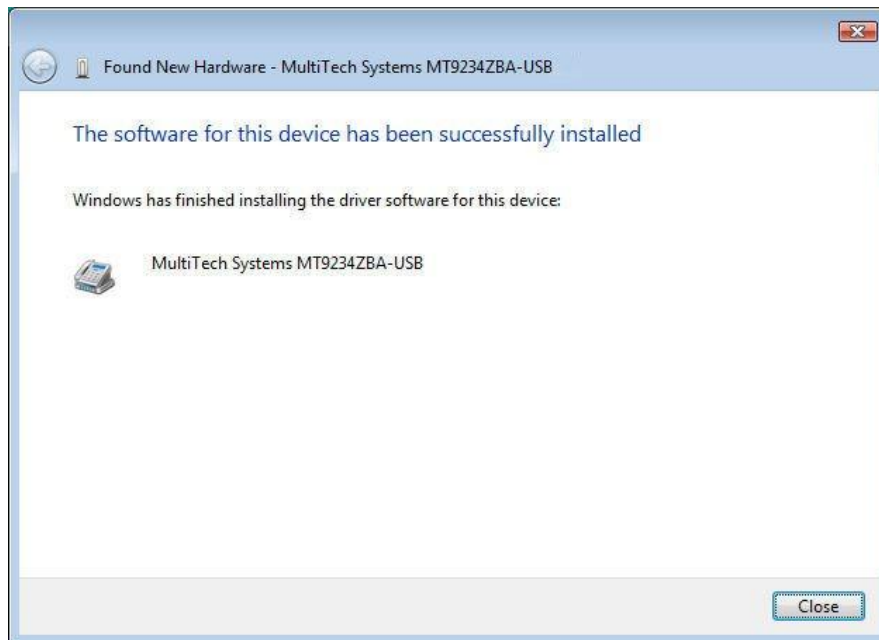


Select **I don't have the disc. Show me other options.** Click **Next**.

- In the next pane that appears, click **Install**.



- The software for this device has been successfully installed pane appears.



- Click **Close**. Driver installation is complete.

After installation is complete, test the operation of your new MultiModem product by registering it. To do so, go to the following website and follow the on-line instructions:

<http://www.multitech.com/register>

Installing the Modem Driver in Windows Server 2008, XP, 2003

This installation assumes a Windows Server 2008, XP, or 2003 operating system.

Installing the Serial Port

1. Connect the USB cable between the MultiModem and the PC.
2. The operating system starts a wizard that steps you through the installation. From this pane, select **Yes, this time only**. Click **Next**.



3. The Found New Hardware Wizard pane opens.



Select **Install from a list or specific location (Advanced)**. Click **Next**.

- The Please choose your search and installation options appears. Select the **Search for the best driver in these locations** radio button.

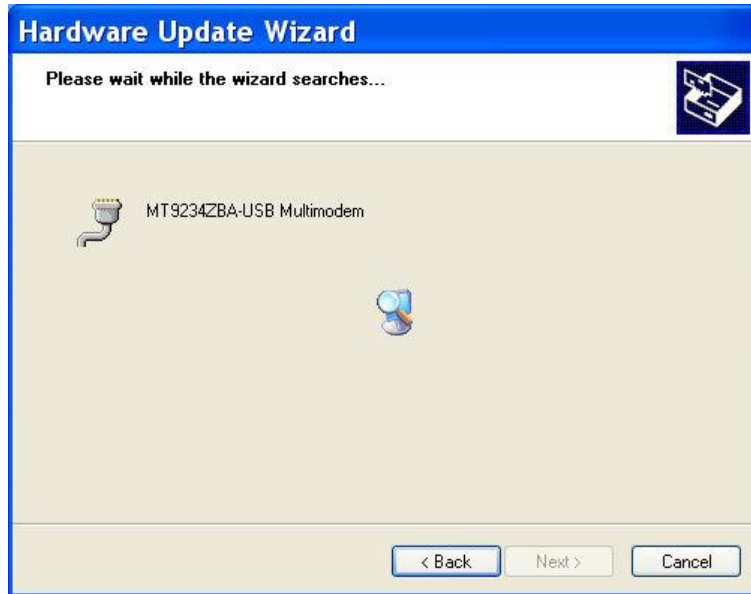


Click **Browse**.

- Browse to the area where you placed the drivers that you downloaded from the Multi-Tech website. Click **Next**.



- The pane, Please wait while the wizard searches for the MT9234ZBA-USB MultiModem, appears.



- The pane, Please select the best match for your hardware from the list below, can sometimes appear. If it does select, Select MT9234ZBA-USB MultiModem.



8. A Windows Logo Testing dialog box appears. Click **Continue Anyway**.



9. A progress pane appears, to indicate that the installation is taking place.



At the Completing the Found New Hardware Wizard pane, click **Finish**.



Installation of the Serial Port is complete.

Installing the Modem Driver

To install the modem driver:

1. The Welcome to the Found New Hardware Wizard pane – Can Windows connect to Windows update to search for software appears. Select **Yes, this time only**. Then click **Next**.



- In the next wizard pane, click **Install from a list or specific location (Advanced)**. Then click **Next**.



- The Please choose your search and installation options pane appears.



Select the radio button **Search for the best driver in these locations** and then select **Include this location in the search**:

4. Click **Browse** then navigate to the area where you placed the driver files that you downloaded from the Multi-Tech website. Click **OK**.
5. The Please wait while the wizard searches for the MT9234ZBA-USB pane appears.



6. In some cases, the following wizard pane can appear. If so, select the desired driver.



7. The final Windows Logo Testing pane may appear depending on operating system settings.



Click **Continue Anyway**.

8. The Please wait while the wizard installs the software pane appears.



9. The Completing the Found New Hardware Wizard pane appears. Click **Finish**.



With the modem .inf file successfully installed, the entire software installation procedure for the MultiModem product is complete.

After installation is complete, test the operation of your new MultiModem product by registering it. To do so, got to the following URL and follow the on-line instructions:

<http://www.multitech.com/register>

Configuring the Country Where Modem is Used

Different countries have different requirements for how modems must function. Therefore, before you use your modem, 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 helps you configure the modem for a specific country. It is recommended you run the Global Wizard configuration utility on computers running Windows Server 2008, Vista, XP, and 2003.

1. Download the Global Wizard from the Multi-Tech website.
2. To install the Global Wizard, double-click the file you downloaded.
3. In the dialog box that appears, click **Run**.
4. An Installation Wizard steps you through installation of the utility.
5. After you install the Global Wizard, start it by going to the Windows Start button, select **All Programs**, then **Global Wizard**.
6. The **Global Wizard** dialog box appears. Click **Next**.
7. The Global Wizard searches for your modem and identifies it. Click **Next**.
8. Select the country where the modem is used and then click **Next**.
9. Review your choice of country. If it is correct, click **Next** to configure the modem.
10. 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. For example:

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

You can find the complete list of country/region codes on the Multi-Tech website:

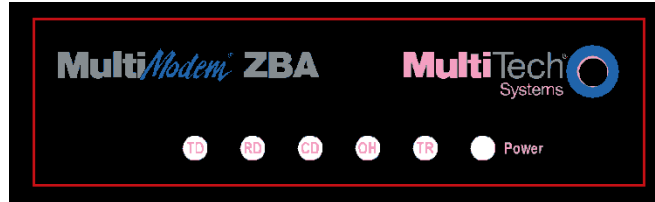
http://www.multitech.com/en_US/PRODUCTS/Categories/Device_Networking/global_modems/configuration.asp

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

Chapter 3 – Operating the Modem

Front Panel

The MultiModem product has 6 LED indicators on the front panel that indicate status, configuration, and activity.



Transmit Data. The TD LED flashes when the modem is transmitting data to another modem.



Receive Data. The RD LED flashes when the modem is receiving data from another modem.



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.



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.



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 also disconnects.

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

Setting up a Remote-Node Client Program

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 installs and configures this connection automatically for you.

Chapter 4 – Remotely Configuring Modems

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 MultiModem product for maintenance or troubleshooting as if you were on site.

Remote Configuration Overview

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 MultiModem product.
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, the remote modem might lock up.

Setting Up Modems for Remote Configuration

This section describes how to change the setup password and the remote configuration escape character.

Changing the Setup Password

Modems are shipped with a default setup password (MTSMODEM). As a precaution, change the default setup password for your Multi-Tech modems.

To change the 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.
3. The modem responds with **OK**. 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 change the password remotely. Also, passwords are case sensitive.

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 (%). For ASCII code characters, refer to Appendix E.

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 the section “Remote Configuration Overview.”
2. Type **ATS9=*n***
where *n* is the ASCII code for the new remote configuration escape character.
3. Press ENTER.
4. To save the new value type **AT&W** and press ENTER.
5. To exit remote configuration, type **ATO<CR>**.

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, ensure that the driver has been installed.

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.

Modem Dials But Cannot Connect

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

- Lack of a physical connection to the telephone line.
- Wrong dial tone
- Busy signal
- 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 reports 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 causes 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. Try again later, or it might indicate that you 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, for example, **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.

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.

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.

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 does 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 2003 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 Information

FCC Part 68 Telecom

1. This equipment complies with Part 68 of the 47 CFR rules and the requirements adopted by the ACTA. Located on this equipment is a label that contains, among other information, the registration number and Ringer Equivalence Number (REN) for this equipment or a product identifier in the format:

For current products: US:AAAEQ##Txxxx.

For legacy products: AU7USA-xxxxx-xx-x.

If requested, this number must be provided to the telephone company.

2. A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable 47 CFR Part 68 rules and requirements adopted by the ACTA. It's designed to be connected to a compatible modular jack that is also compliant.
3. The Ringer Equivalence Number (REN) is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ##Txxxx. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.
4. 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 isn't practical, the telephone company will notify the customer 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.
5. 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 to maintain uninterrupted service.
6. If trouble is experienced with this equipment, please contact Multi-Tech Systems, Inc. at the address shown below for details of how to have the repairs made. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.
7. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.
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. If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this equipment does not disable your alarm equipment.
If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.
10. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.
11. This equipment is hearing aid compatible.
12. Manufacturing Information on telecommunications device (modem):

Manufacturer:	MultiTech Systems, Inc.
Trade Name:	MultiModem® ZBA
Model Number:	MT9234ZBA-USB
FCC Registration Number:	AU7USA-24713-M5-E
Ren:	0.3B
Modular Jack (USOC):	RJ11
Service Center in USA:	Multi-Tech 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.
- 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: 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.

Canadian Limitations Notice

Notice: This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

Notice: The REN assigned to each terminal equipment 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 five.

Restrictions concernant le raccordement de matériel

Avis: Le présent matériel est conforme aux spécifications techniques d'Industrie Canada applicables au matériel terminal. Cette conformité est confirmée par le numéro d'enregistrement. Le sigle IC, placé devant le numéro d'enregistrement, signifie que l'enregistrement s'est effectué conformément à une déclaration de conformité et indique que les spécifications techniques d'Industrie Canada ont été respectées. Il n'implique pas qu'Industrie Canada a approuvé le matériel.

Avis: L'IES assigné à chaque dispositif terminal indique le nombre maximal de terminaux qui peuvent être raccordés à une interface téléphonique. La terminaison d'une interface peut consister en une combinaison quelconque de dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas 5.

EMC Requirements for 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.

This device complies with Industry Canada RSS Appliance radio exempt from licensing. The operation is permitted for the following two conditions:

1. the device may not cause harmful interference, and
2. the user of the device must accept any interference suffered, even if the interference is likely to jeopardize the operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

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 2004/108/EC of 15 December 2004 on the approximation of the laws of Member States relating to electromagnetic compatibility;
- and
- Council Directive 2006/95/EC of 12 December 2006 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.

Thailand Approval

Translation in Thai

“This telecom device and equipment is conform to technical standard no....”

or

“This telecom device and equipment is conform to requirement to NTC”

“เครื่องโทรคมนาคมและอุปกรณ์นี้ มีความสอดคล้องตามมาตรฐานทางเทคนิค เลขที่.....”

or

“เครื่องโทรคมนาคมและอุปกรณ์นี้ มีความสอดคล้องตามข้อกำหนดของ กทช.”

Russian Statement

MT9234ZBA-USB is Russia approved, Declaration of Conformity # Д-ТФ-0605 valid till 25.01.2015 (for MT9234ZBA-USB).

South African Notice

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

Waste Electrical and Electronic Equipment

WEEE Directive

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 where you purchased the product.

July, 2005



Restriction of the Use of Hazardous Substances (RoHS)



Multi-Tech Systems, Inc. Certificate of Compliance 2011/65/EU

Multi-Tech Systems confirms that its embedded products comply with the chemical concentration limitations set forth in the directive 2011/65/EU of the European Parliament (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment - RoHS)

These Multi-Tech products do not contain the following banned chemicals¹:

- Lead, [Pb] < 1000 PPM
- Mercury, [Hg] < 1000 PPM
- Hexavalent Chromium, [Cr+6] < 1000 PPM
- Cadmium, [Cd] < 100 PPM
- Polybrominated Biphenyl, [PBB] < 1000 PPM
- Polybrominated Diphenyl Ether, [PBDE] < 1000 PPM

Environmental considerations:

- Moisture Sensitivity Level (MSL) =1
- Maximum Soldering temperature = 260C (in SMT reflow oven)

¹Lead usage in some components is exempted by the following RoHS annex, therefore higher lead concentration would be found in some modules (>1000 PPM);

–Resistors containing lead in a glass or ceramic matrix compound.

Information on HS/TS Substances According to Chinese Standards

In accordance with China's Administrative Measures on the Control of Pollution Caused by Electronic Information Products (EIP) # 39, also known as China RoHS, the following information is provided regarding the names and concentration levels of Toxic Substances (TS) or Hazardous Substances (HS) which may be contained in Multi-Tech Systems Inc. products relative to the EIP standards set by China's Ministry of Information Industry (MII).

Name of the Component	Hazardous/Toxic Substance/Elements					
	Lead (PB)	Mercury (Hg)	Cadmium (CD)	Hexavalent Chromium (CR6+)	Polybrominated Biphenyl (PBB)	Polybrominated Diphenyl Ether (PBDE)
Printed Circuit Boards	O	O	O	O	O	O
Resistors	X	O	O	O	O	O
Capacitors	X	O	O	O	O	O
Ferrite Beads	O	O	O	O	O	O
Relays/Opticals	O	O	O	O	O	O
ICs	O	O	O	O	O	O
Diodes/ Transistors	O	O	O	O	O	O
Oscillators and Crystals	X	O	O	O	O	O
Regulator	O	O	O	O	O	O
Voltage Sensor	O	O	O	O	O	O
Transformer	O	O	O	O	O	O
Speaker	O	O	O	O	O	O
Connectors	O	O	O	O	O	O
LEDs	O	O	O	O	O	O
Screws, Nuts, and other Hardware	X	O	O	O	O	O
AC-DC Power Supplies	O	O	O	O	O	O
Software / Documentation CDs	O	O	O	O	O	O
Booklets and Paperwork	O	O	O	O	O	O
Chassis	O	O	O	O	O	O

- X** Represents that the concentration of such hazardous/toxic substance in all the units of homogeneous material of such component is higher than the SJ/Txxx-2006 Requirements for Concentration Limits.
- O** Represents that no such substances are used or that the concentration is within the aforementioned limits.

Information on HS/TS Substances According to Chinese Standards (in Chinese)

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 B – Installing with Linux

Your Multi-Tech modem 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.

Installing the Modem on Computers Running the Linux 2.4 Kernel

Installation Overview

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 your Multi-Tech modem'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 works 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 does 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 is named ti_usb-X.Y.tgz, and the source RPM package is named ti_usb-X.Y-Z.src.rpm, where X.Y-Z is the version number. See 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.

Installing 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:

1. Run "uname -r" to get the version of the running kernel.
2. 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.
3. 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.

Preparing 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 are 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.

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

Building and Installing the TI USB Driver from the TGZ Package

You 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 xvzf 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.

Loading 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.

The first TI USB 3410 device plugged in appears 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. For more information, see the following section "Device Files".

If TI USB devices had been in use before installing the new TI USB driver, old versions of the drivers are still be loaded. You must unload these old versions before the newly installed driver can be used.

To unload old drivers and load new driver:

1. Reboot
Or
2. Close all open TI USB serial ports.
3. Disconnect the TI USB serial devices.
4. Unload the old TI USB serial driver with the command

```
rmmod ti_usb
```
5. Reconnect the TI USB serial devices and the new driver is 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 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 are `/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	Give a full or relative path to the unpacked source file directory.
make uninstall	

Installing the Modem on Computers Using the Linux 2.6 Kernel

Installation Overview

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 MULTIMODEM PRODUCT '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 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.

These packages do 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 is named ti_usb_2.6-X.Y.tgz, and the source RPM package is named ti_usb_2.6-X.Y-Z.src.rpm, where X.Y-Z is the version number. See 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.

Installing 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 include the kernel headers but not the complete kernel sources, and usb-serial.h is 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.

Preparing 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-<version></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 built your own kernel, the kernel sources are 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 provide an indication of what the error is.

Building and Installing 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 need the TI USB 3410/5052 source RPM package for this step. The Introduction section describes where to find the latest TI USB 3410/5052 source RPM.

Log in as root and do the following:

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

Building and Installing 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 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 xvzf 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, you may need to go back to install and prepare the kernel sources as described above.

Loading 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".

The first TI USB 3410/5052 device plugged in appears 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 can still be loaded. You must unload these old versions before the newly installed driver is used.

To unload old drivers and load new driver:

1. Reboot
or
2. Close all open TI USB serial ports.
3. Disconnect the TI USB serial devices.
4. Unload the old TI USB serial driver with the command
`rmmod ti_usb_3410_5052`
5. Reconnect the TI USB serial devices and the new driver is 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 using these commands:

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

Installing the Modem on Computers Using the Linux 2.6.20 Kernel

Installation Overview

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 Multi-Tech 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 Multi-Tech 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 works 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.

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 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_MULTIMODEM PRODUCT` 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--`.

Loading 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".

The first TI USB 3410/5052 device plugged in appears 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 can still be loaded. You must unload these old versions before the newly installed driver is 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 is 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>	Provide a full or relative path to the unpacked source file directory.
<code>make uninstall</code>	

Appendix C – ASCII Conversion

ASCII Conversion Chart

CTRL	CODE	HEX	DEC	CODE	HEX	DEC	CODE	HEX	DEC	CODE	HEX	DEC
@	NUL	00	0	SP	20	32	@	40	64	`	60	96
A	SOH	01	1	!	21	33	A	41	65	a	61	97
B	STX	02	2	"	22	34	B	42	66	b	62	98
C	ETX	03	3	#	23	35	C	43	67	c	63	99
D	EOT	04	4	\$	24	36	D	44	68	d	64	100
E	ENQ	05	5	%	25	37	E	45	69	e	65	101
F	ACK	06	6	&	26	38	F	46	70	f	66	102
G	BEL	07	7	'	27	39	G	47	71	g	67	103
H	BS	08	8	(	28	40	H	48	72	h	68	104
I	HT	09	9	)	29	41	I	49	73	i	69	105
J	LF	0A	10	*	2A	42	J	4A	74	j	6A	106
K	VT	0B	11	+	2B	43	K	4B	75	k	6B	107
L	FF	0C	12	,	2C	44	L	4C	76	l	6C	108
M	CR	0D	13	-	2D	45	M	4D	77	m	6D	109
N	SO	0E	14	.	2E	46	N	4E	78	n	6E	110
O	SI	0F	15	/	2F	47	O	4F	79	o	6F	111
P	DLE	10	16	0	30	48	P	50	80	p	70	112
Q	DC1	11	17	1	31	49	Q	51	81	q	71	113
R	DC2	12	18	2	32	50	R	52	82	r	72	114
S	DC3	13	19	3	33	51	S	53	83	s	73	115
T	DC4	14	20	4	34	52	T	54	84	t	74	116
U	NAK	15	21	5	35	53	U	55	85	u	75	117
V	SYN	16	22	6	36	54	V	56	86	v	76	118
W	ETB	17	23	7	37	55	W	57	87	w	77	119
X	CAN	18	24	8	38	56	X	58	88	x	78	120
Y	EM	19	25	9	39	57	Y	59	89	y	79	121
Z	SUB	1A	26	:	3A	58	Z	5A	90	z	7A	122
[	ESC	1B	27	;	3B	59	[	5B	91	{	7B	123
\	FS	1C	28	<	3C	60	\	5C	92	|	7C	124
]	GS	1D	29	=	3D	61	]	5D	93	}	7D	125
^	RS	1E	30	>	3E	62	^	5E	94	~	7E	126
_	US	1F	31	?	3F	63	_	5F	95	DEL	7F	127

NUL Null, or all zeros

SOH Start of Header

STX Start of Text

ETX End of Text

EOT End of Transmission

ENQ Enquiry

ACK Acknowledge

BEL Bell or Alarm

BS Backspace

HT Horizontal Tab

LF Line Feed

VT Vertical Tab

FF Form Feed

CR Carriage Return

SO Shift Out

SI Shift In

DLE Data Link Escape

DC1 Device Control 1

DC2 Device Control 2

DC3 Device Control 3

DC4 Device Control 4

NAK Negative Acknowledge

SYN Sync.

ETB End Transmission Block

CAN Cancel

EM End of Medium

SUB Substitute

ESC Escape

FS File Separator

GS Group Separator

RS Record Separator

US Unit Separator

DEL Delete

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