MultiModem® ZDX

Model MT5656ZDX-Series

Voice/Data/Fax Modem

User Guide

MultiTech® Systems

MultiModem® ZDX User Guide

MT5656ZDX, MT5656ZDX-V
S000248, Revision M

Copyright

Revision	Date	Description
K	06/03/11	Remove all references to CDs.
L	09/17/12	Updated RoHS.
M	12/16/2013	Added UL translations.

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. Other patents pending.

Trademarks

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Contacting Multi-Tech

Knowledge Base

The Knowledge Base provides immediate access to support information and resolutions for all Multi-Tech products. Visit **http://www.multitech.com/kb.go.**

Support Portal

To create an account and submit a support case directly to our technical support team, visit: https://support.multitech.com

Support

Business Hours: M-F, 9am to 5pm CT

Country	By Email	By Phone
Europe, Middle East, Africa:	support@multitech.co.uk	+(44) 118 959 7774
U.S., Canada, all others:	support@multitech.com	(800) 972-2439 or (763) 717-5863

World Headquarters

Multi-Tech Systems, Inc.
2205 Woodale Drive
Mounds View, Minnesota 55112
Phone: 763-785-3500 or 800-328-9717
Fax: 763-785-9874

Warranty

To read the warranty statement for your product, please visit: **http://www.multitech.com/warranty.go.**

Contents

Chapter 1 – Product Overview

Overview

Multi-Tech MT5656ZDX and MT5656ZDX-V modems are compatible with the ITU-TV.92 protocol that provide quick connections, downstream transmissions at speeds up to 56K bps, and upstream transmissions at speeds up to 48K bps when connected to V.92-compatible Internet Service Providers. The V.92 protocol is able to send downstream from the Internet to your computer at these speeds because data on the telephone network typically is converted from digital to analog only once before it reaches your modem. Upstream transmissions and transmissions between client modems are limited to 33.6K bps, as are upstream transmissions that are converted more than once on the telephone lines.

Modem features include Plug and Play operation. In standard mode, the modem can store up to four command lines or telephone numbers of up to 40 characters each in nonvolatile memory. Other modem capabilities include modem-on-hold, AT&T calling card tone detection, pulse and tone dialing, adaptive answer, V.42bis and V.44 data compression, and self-resetting lightning protection.

Please note that some V.92 features are turned off in the factory default configuration, and may need to be turned on, depending on your needs.

Related Documents

Download related documents from www.multitech.com/man.go.

- AT Command Reference Guide (S000273)
- +V Voice Command Developer's Guide (S0000099)
- Fax Enhancements (S0000279)
- Fax Developer's Guide Classes 2 and 2.0/2.1 (S0000239)
- Fax Developer's Guide Classes 1 and 1.0 (S0000262)
- Fax Overview Developer's Reference (S0000265)

Package Contents

- One MultiModem ZDX (MT5656ZDX)
- One set of four self-adhesive rubber feet
- One power supply
- One RS-232 cable (a DB9F to DB25M serial cable)
- One RJ-11 telephone cable

You Need

- A computer with an available serial port
- A nearby AC power outlet
- A nearby phone jack
- Optional: If you want speakerphone functions along with the ability to record sound or .WAV files through the sound card at the same time, you need:
- One stereo PC microphone
- One stereo male to male patch cord
- One sound card
- Speakers

Technical Specifications

Feature	Description
Server-to-Client Data Rates	V.90 speeds when accessing a V.90 or V.92 server 1
Client-to-Server Data Rates	Up to 50Kbps when accessing a V.92 server1; 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	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.22bis, V.22; Bell 212A and 103; ITU-T V.21; V.42, V.42bis, V.44
Fax Compatibility	T.4, T30, V.21, V.27ter, V.29, V.34, V.17; TIA/EIA 578 Class 1 and Class 2, TR29.2
Video Compatibility	ITU-T V.80 for H.34 video conferencing
Voice Compatibility	AT+V/TAM command set
Voice Mode Sampling	Up to 44.100 KHz (down-sampled to 11.025 KHz)
Error Correction	ITU-T V.42 (LAP-M or MNP 4)
Data Compression	ITU-T V.44 (4:1 throughput), V.42bis (4:1 throughput), MNP 5 (2:1 throughput)
Speed Detection	Automatic speed detection and switching between available speeds
Speed Conversion	Serial port data rates adjustable to 300; 1200; 2400; 4800; 9600; 19,200; 38,400; 57,600; 115,200 bps
Operation Modes	Fax online modes, full duplex data over dial-up; voice
Flow Control	XON/XOFF (software), RTS/CTS (hardware)
Intelligent Features	Plug and play, full AT command compatible, autodial, redial, repeat dial, pulse or tone dial, dial pauses, auto answer, adaptive answer; EIA extended auto mode; caller ID, 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, US Caller ID reporting; quick-connect startup, TAPI compliant.
Command Buffer	40 Characters

Feature	Description
Transmission Level	-11 dBm (North America and Pan Euro) - varies by country setting
Frequency Stability	±0.01%
Receiver Sensitivity	-43 dBm under worst-case conditions
AGC Dynamic Range	43 dB
Connectors	Two RJ-11 phone jacks, DB25F RS-232C connector, power connector
Cables	One modular telephone cable
Diagnostics	Local analog loop, local digital loop, remote digital loop
Speaker	Speaker for call progress monitoring
Speaker and Microphone Jacks	MultiModemZDXV
Manual Controls	Power switch
Environmental	Temperature range 0°–50°C (32°–120°F); humidity range 20–90% (non-condensing)
Storage Temperature	-10° to +85°C (14°- 185° F)
Power Consumption	150 mA @ 9 VDC
Dimensions	10.8 cm wide x 14.8 cm long x 2.9 high (4.25” × 5.8” x 1.15”)
Weight	224 g (8 oz)
Operating Systems	Tested for use with Windows 2000+ and Linux (2.2.x kernel)
Warranty	2 years

[1]Though these modems are capable of 56K bps download performance, line impairments, public telephone infrastructure and other external technological factors currently prevent maximum 56K bps connections.

Chapter 2 - Installation

Analog Telecom Safety Warnings

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 analogique

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

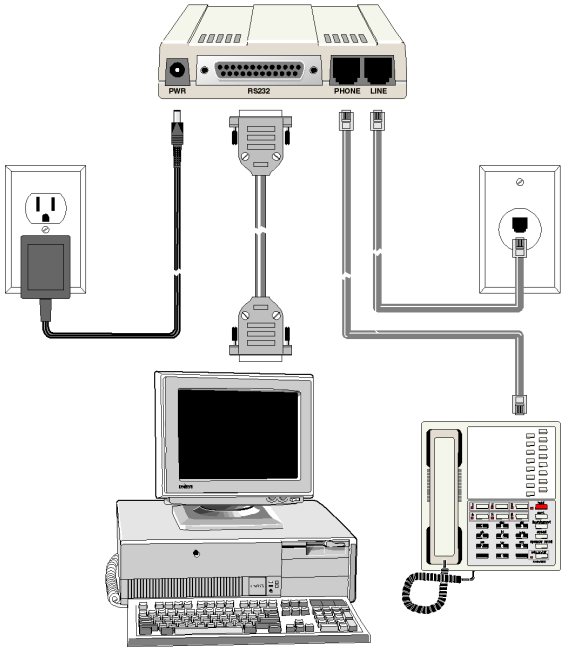
- Ne jamais installer du câblage téléphonique pendant un orage électrique.
- Ne jamais installer de prises téléphoniques à des endroits mouillés à moins que la prise ne soit conçue pour de tels emplacements.
- Utilisez ce produit avec UL et cUL ordinateurs répertoriés seulement.
- Ne jamais toucher fils 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 supérleure.

Installing on a Windows Computer

Connecting the Modem to Your System

Turn off your computer. Place the modem in a convenient location, then connect it to your computer's serial port, to the phone line, to AC power, and to your phone (phone is optional).



1. Connect the Modem to Your PC (RS-232 Connection).

   Plug one end of the RS-232 serial cable into the RS-232 connector on the modem, and plug the other end into a serial port connector on your computer.

2. Connect the Modem to the Telephone Line (Line Connection)

   Plug one end of the phone cable into the modem's LINE jack and the other end into a phone wall jack. The phone cable is included with your modem.

   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.

3. (Optional) Connect the Modem to the Phone.

   For voice-only calls, plug a phone into the modem's PHONE jack.

4. Connect the Power

   Make sure the power switch is set to OFF. The power switch is located on the side panel of the modem.

   Plug the power supply into a power outlet or power strip. Plug the other end into the PWR jack on the modem.

CAUTION: Use only the power supply cable supplied with the modem. Use of any other power supply voids the warranty and can damage the modem.

About Power Connection, Surge Protectors, and Lightning

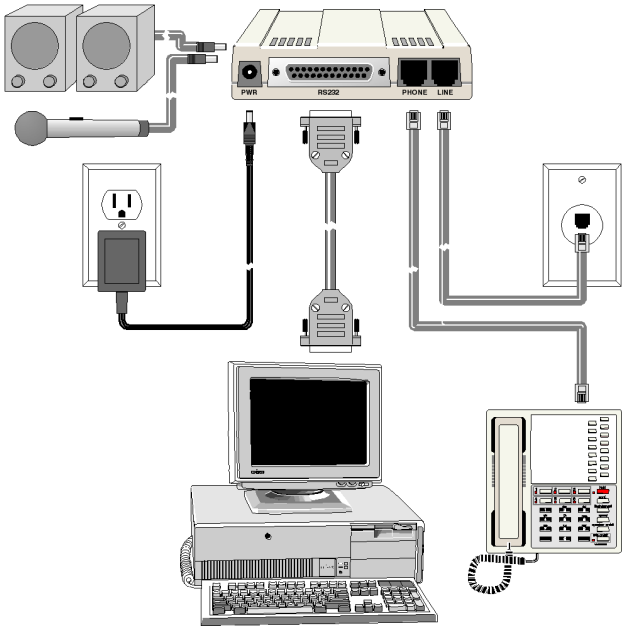
Power surges and other transient voltages on power lines, such as those caused by lightning strikes, can damage or destroy your modem. Therefore, we recommend that you plug the modem into a surge protector rather than directly into a wall outlet, preferably a surge protector that provides protection against electrical spikes on the phone line as well as on the power line. Note that not even a surge protector can guard against damage from a nearby lightning strike. During an electrical storm, it is safest to unplug your computer equipment from both the power outlet and the phone line.

Power-On Test

Test the modem by turning it on (an on-off switch is located on the side panel). When you apply power, the modem performs a diagnostic self-test. The **PWR** indicator lights; and if a terminal program is running, the TR indicator also lights. If this does not happen, check that the power switch is on, the power supply is solidly connected, and the AC outlet is live. If these measures do not work see the *Troubleshooting* chapter.

The Federal Communications Commission (FCC) and Industry Canada impose certain restrictions on equipment connected to public phone systems. For more information, see Appendix A.

Connecting Voice (Voice option only)



1. Connect the Microphone

   For voice mail or speakerphone applications, plug an unamplified microphone into the MIC jack on the side of the modem. The microphone should have a stereo 1/8-inch (3.5mm) mini plug. Do not use a monophonic microphone.

2. Connect the Speaker

   For speakerphone or voice mail applications, use a 1/8-inch (3.5mm) plug male-to-male stereo patch cord to connect the SPKR jack on the side of the modem to the LINE IN jack on your sound card. If your sound card does not have a LINE IN jack, use its MIC jack. The stereo male-to-male patch cord can be purchased at a local PC retail store.

   If you do not have a sound card, you can plug an amplified speaker directly into the SPKR jack.

Installing the Modem Driver on Windows

To install on Windows 2000 or newer:

1. Download the modem driver from http://www.multitech.com/support.go.
2. Make sure your modem is connected properly, and then turn on your computer. Windows should detect your new modem and open the **Welcome to the Found New Hardware** wizard.

Note: If Windows cannot find a modem, your modem may be turned off, or it may be plugged into the wrong connector on your computer. See *Troubleshooting*.

3. From the Browse function in the Install Wizard, point to the Temporary folder you created on your local PC to store the driver that you downloaded from the Multi-Tech website. Windows installs and configures the modem.
4. Click **Finish** to exit.

Connecting to the Internet

To access the Internet and Web via your modem, you must establish a dial-up account with an Internet service provider (ISP). 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 you use the Internet for email and newsgroups, your ISP should also provide you with the following information:

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

Dial-Up Networking

Before you can connect to the Internet, you must set up a remote-node client program on your computer. The Windows version is called Dial-Up Networking. Dial-Up Networking establishes 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 start Dial-up Networking automatically when you open them.

For instructions on how to set up Dial-Up Networking, consult your ISP or your operating system's online help or printed documentation. Many ISPs include with their service a program that will instruct and configure Dial-Up Networking automatically for you.

Installing on a Linux Computer

These instructions describe how to install a modem on a computer using RedHat Linux 6.2 operating system. Other versions of RedHat and other Linux operating systems should be similar. With Linux, you do not need drivers for most standard external modems and most internal ISA bus modems. Programs in Linux commonly call upon the port, rather than the modem.

Standard Linux Serial Port Definitions

Port	Linux Port
Com 1	ttyS0
Com 2	ttyS1
Com 3	ttyS2
Com 4	ttyS3

Connecting the Modem and Verifying Operation

1. Connect the external modem to an available serial port.
2. Use the Terminal Program Minicom to verify operation. At the command prompt, type **minicom –s** and press **ENTER**.
3. Select **Serial port setup** and press **ENTER**.
4. From **Serial port setup,** use the A key to access **Serial Device,** and then press ENTER.
5. Press **ESC**. You are now in the Minicom terminal.
6. Type **AT** and press **ENTER**. The screen should display **OK** to verify the operation. Alternately, dial a phone number to verify line operation

To leave Minicom, press CTRL + A, and then press Z. 7. On the help menu, press X to exit.

Using the Modem Connect to the Internet

Linux allows different graphic user interfaces (GUI). The following steps use the Gnome Desktop GUI. It is assumed that the ISP being called assigns the DNS and IP addresses.

1. Select the **Gnome Footprint** from the taskbar.
2. Select **Internet** from the menu.
3. Select **Dialup Configuration Tool.**
4. Select **Add,** and then click **Next.**
5. Enter the connection name and phone number, and then click **Next.**
6. Enter your user name and password, and then click **Next.**
7. Select **Normal ISP** if your ISP is not listed, and then click **Next.**
8. Click **Finish.**

Calling the ISP

1. Select the **Gnome Footprint** from the taskbar.
2. Select **Internet** from the menu.
3. Select **RH PPP Dialer**.

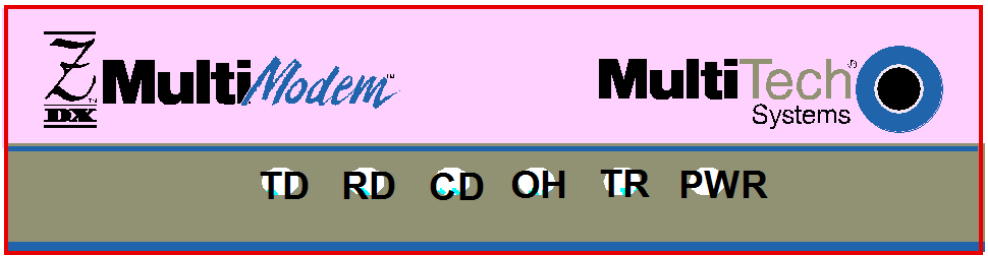
4. Select the connection name used when you connected to the Internet.
5. Click **OK.**

To use the system to answer calls, Linux requires other programs to be installed, such as Mgetty and Mgetty+Sendfax, depending on requirements. Each vendor of Linux usually has adequate information on installing these programs. Consult your Linux documentation for additional information.

Chapter 3 - Operation

Your Multi-Tech modem operates under the control of a communications program. For information on how to use the modem with your communications program, please refer to the documentation provided with the data communications program.

An experienced modem user can configure the program's software to change the way the software interacts with a modem and configure the modem to change the way it operates.



Front Panel

About the LED Indicators

The modem has ten LED indicators on the front panel that indicate status and activity:

TD Transmit Data

Flashes when the modem is transmitting data to another modem.

RD Receive Data

Flashes when the modem is receiving data from another modem.

CD Carrier Detect

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

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

Lights when a communication program is using the modem. It means the modem is ready for an outgoing or incoming call. It goes off when the communication program disconnects the serial port. When it goes off, a connected modem will disconnect.

Note: When you turn on the modem, the **PWR** indicator lights; and if a terminal program is running, the **TR** indicator also lights.

Configuring Your Software

You may use either the communication program included with your modem or a third-party program. Communication programs designed for Windows normally do not need to be manually configured, since they obtain configuration information from Windows. Though each communication program is different, the following procedure should work with most of them.

1. Turn on your computer and run your communications program.
2. Find the dialog box or menu that lets you select your modem. (In Windows Terminal select **Settings** | **Modem Commands;** in HyperTerminal select **File** | **Properties** | **Phone Number;** and in the communications program select **Configure** | **General Configuration** | **Communication** | **Change Modem.**
3. Choose your modem from the program's modem list. If it isn't listed, choose a generic modem and modify the settings as necessary.
4. Change the modem initialization string, if necessary. The factory default configuration works well for most purposes. To load the factory default configuration, use **AT&F.** To load a custom configuration that was saved using the ***&W*** command, use **ATZ.** Note that the ***Z*** command must be in a command string by itself. For a Macintosh, the initialization string should include the ***&D0*** command. If you do not want the modem to always answer the phone, add **S0=0** to the string. To use Caller ID with the modem, add **S0=2** to the string (Caller ID information is sent between the first and second rings, so the phone must ring at least twice before the modem picks up the line). Depending on the software, you might have to end the string with a carriage return character (**^M).**

   Note: To change the modem's default configuration, type new commands in the communication program's terminal window, adding the &W command to store them in the modem's nonvolatile memory. For instance, to create a default configuration for a Macintosh computer that turns off auto answer, type AT&F&D0S0=0&W. The new configuration loads automatically whenever the modem is turned on or receives the ATZ command.
5. Select the port the modem is connected to (normally COM1 or COM2).
6. Select your serial port speed. This can be labeled "maximum speed," "DTE bps," or "baud rate." Ideally, if you use data compression, you should set your serial port baud rate to four times the modem's maximum transmission speed or faster; however, few files can be compressed enough to require speeds that high, and not all serial ports can handle speeds that high.
7. If the communication program has an autobaud selection, make sure it is disabled. Autobaud applies only to older modems, and can cause problems if enabled.
8. If the program allows you to edit the no-connect messages (*NO CARRIER, BUSY, NO ANSWER, NO DIAL TONE),* make sure there is no space between *DIAL* and *TONE* in *NO DIAL TONE.*
9. Refer to the program manual or online help for other configuration choices. In most cases you can accept the default values.

Configuring Your Modem

Your modem normally is configured through Windows or through the communication program you are using. The default settings work best for most purposes. However, you also can configure your modem by sending **AT** commands to the modem. See the AT Command Reference Guide for a list of **AT** (data) commands and how to use them.

Chapter 4 - 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, check the list of troubleshooting procedures before calling Multi-Tech.

If you experience problems, please check the following before calling Technical Support.

Indicators Don't Light Up

When you turn on the modem, the PWR indicator and the terminal turn on. If the LEDs remain off, the modem is probably not receiving power.

1. Make sure the modem's power switch is on, especially if you normally turn the modem on by turning on a power strip.
2. If the modem is plugged into a power strip, make sure the power strip is plugged in and its power switch is on.
3. Make sure the transformer module is firmly connected to the modem and to the wall outlet or power strip.
4. If the power strip is on and the modem switch is on, try moving the transformer module to another outlet on the power strip.
5. Test that the outlet is live by plugging another device, such as a lamp, into it.
6. The modem or the DC power transformer may be defective. If you have another Multi-Tech modem, try swapping modems. If the problem goes away, the first modem or the DC power transformer may be defective.
7. Call Technical Support for assistance.

CAUTION: Do not under any circumstances replace the transformer module with one designed for another product. Doing so can damage the modem and void your warranty.

Modem Does Not Respond to Commands

1. Verify the modem is plugged in and turned on.
2. Verify you are issuing the modem commands from the data communications program, either manually in terminal mode or automatically by configuring the software. (You cannot send commands to the modem from the DOS prompt.)
3. Verify you are in terminal mode in your data communications 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 communications program.
4. If you don't get an *OK,* the problem may still be in the communications program. Verify you have done whatever is necessary in your software to make a port connection. Not all communication programs connect to the COM port automatically. Some connect when the software loads and remain connected until the program terminates. Others can disconnect without exiting the program. The modem's TR indicator lights to show that the software has taken control of the modem through the COM port.
5. Your communications program settings may not match the physical port the modem is connected to. The serial cable might be plugged into the wrong connector—check your computer documentation to make sure.

Or you might have selected a COM port in your software other than the one the modem is physically connected to—compare the settings in your software to the physical connection.

6. If the modem is on, the cable is plugged into the correct port, the communications program is configured correctly, and you still don't get an *OK,* the fault might be in the serial cable. Verify it is firmly connected at both ends.
7. Is this the first time you have used the cable? If so, it may not be wired correctly. Check the cable description on the packaging to Verify the cable is the right one for your computer.
8. Peripheral expansion cards, such as sound and game cards, might include a serial port preconfigured as COM1 or COM2. The extra serial port, or the card itself, may use the same COM port, memory address, or interrupt request (IRQ) as your communication port. Be sure to disable any unused ports.
9. **Windows 9x and 2000:** Right-click on My Computer, select **Properties** from the menu, click on the **Device Manager** tab, double-click on **Ports,** then double-click on the communication port your modem is connected to. In the port's **Properties** sheet, click on the **Resources** tab to see the port's input/output range and interrupt request. If another device is using the same address range or IRQ, it appears in the **Conflicting Device List.** Uncheck **Use automatic settings** to change the port's settings so they do not conflict with the other device, or select the port the conflicting device is on and change it instead. If you need to open your computer to change switches or jumpers on the conflicting device; refer to the device's documentation.

The serial port might be defective. If you have another serial port, install the modem on it, change the COM port setting in your software, and try again.

The modem may be defective. If you have another Multi-Tech modem, try swapping modems. If the problem goes away, the first modem may be 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.
- A missing dial tone.
- A busy signal.
- A wrong number.
- No modem at the other end.
- A faulty modem, computer, or software at the other end.
- Modem incompatibility.

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

- If the modem reports *NO DIAL TONE,* check that the modem's phone line cable is connected to both the modem's LINE jack (not the PHONE jack) and the phone wall jack. If the cable looks secure, try replacing it. If that doesn't work, the problem might be in your building's phone installation. To test the building installation, plug a phone into your modem's phone wall jack and listen for a dial tone. If you hear a dial tone, your modem might be installed behind a corporate 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.
- 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 Verify 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 phone areas in North America, you can disable Call Waiting by preceding the phone number with ***70** (check with your local phone 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 Terminal, select **Settings** | **Modem Commands.** To change it in HyperTerminal, select **Connect** 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, the phone jack, and AC power.
- 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, 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 your modem in terminal mode.

Garbage Characters on the Monitor

- Your computer and the remote computer might be set to different word lengths, stop bits, or parities. If you have connected at 8-N-1, try changing to 7-E-1, or vice-versa, using your communications program.
- You might be experiencing line noise. Enable error correction, if it is disabled, or hang up and call again; you might get a better connection the second time.
- Try entering the **&V1** command to display information about the last connection, making a screen print of the connection statistics, and checking for parameters that might be unacceptable.

Modem Doesn't Work with Caller ID

- Caller ID information is transmitted between the first and second rings, 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.

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:	Multi-Tech Systems, Inc.
Trade Name:	MultiModem
Model Number:	MT5656ZDX
Registration No:	US:AN7M501B56ZDX
Ringer Equivalence:	0.3B
Modular Jack (USOC):	RJ11C or RJ11W (single line)
Service Center in USA:	Multi-Tech Systems, Inc. 2205 Woodale Drive Mounds View, MN 55112 USA (763) 785-3500 (763) 785-9874 Fax

47 CFR Part 15 Regulation Class B Devices

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.

Industry Canada Class B Devices

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 Reglement 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.

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, Safety, and R&TTE Directive Compliance

CE

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.

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.

Waste Electrical and Electronic Equipment Statement

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 chemicals[1]:

- 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)

[1]Lead 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 – Upgrading the Modem

Your modem is controlled by semi-permanent software, called *firmware,* which is stored in flash memory. Firmware is nonvolatile; that is, it remains stored in memory when the modem is turned off. However, it can be changed by either the manufacturer or the user.

Since the firmware in your modem is stored in flash memory, you can upgrade it yourself in a few minutes by using the following procedures.

Upgrade Overview

The upgrade procedure consists of the following steps, which are described in greater detail in the following sections.

Step 1: Identify the Modem Firmware

You must know the model number and firmware version of your Multi-Tech modem to know whether or not you should update it.

1. Run your favorite terminal program. If you are using Windows 95, 98, 2000 or Windows NT, you can use HyperTerminal. If you are using Windows 3.1, you can use Windows Terminal.
2. In the program's terminal window, type **AT&F.** Even if you cannot see the **AT&F** command on your screen, be sure to type it completely, and then press ENTER. If the modem does not respond with *OK,* repeat the **AT&F** command.
3. Now type **ATI3** and record your results. The firmware version should appear first in the response, which should look **similar** to the following:

   V2.300G-V90_2M_DLS

Step 2: Identify the Current Firmware Version

Identify the current version of the firmware at the Multi-Tech Web site. If your modem already has the current firmware, there is no need to update it.

1. Using your favorite Web browser, go to http://www.multitech.com/en_US/SUPPORT/Updates/drivers/
2. Scroll down the table to your modem model number.
3. Look at the firmware version number for your modem.
4. If the firmware version number matches the firmware version number found in "Step 1: Identify the Modem Firmware," your modem has the current firmware version, and does not need to be updated.
5. If the firmware version number is greater than the firmware version number found in "Step 1: Identify the Modem Firmware," your modem has an older firmware version.
   Continue with "Step 3: Download the Upgrade File."

   Warning: The first digit of the new firmware must match the first digit of the old firmware, or the modem may not work properly; e.g., if your current firmware version is 4.16, replace it only with 4.xx firmware, not 6.xx firmware.

Step 3: Download the Upgrade File

1. If you are not already at the MultiModemZDX firmware page of the Multi-Tech Web site, follow the procedure in "Step 2: Identify the Current Firmware."
2. Download the upgrade file for your modem by clicking its name, and save the file in a temporary folder on your hard disk.
3. In the same section of the Web page, download the Flash Wizard utility for your operating system by clicking it, and save it in the same folder.

Step 4: Extract the Upgrade Files

1. Install the Flash Wizard utility by double-clicking the file name in Windows Explorer.
2. Extract the upgrade files by double-clicking the file name. The extracted files include a .HEX file, which contains the upgrade data, and a Readme file.
3. Copy the upgrade .S37 file into the Flash Wizard folder.

Step 5: Upgrade the Modem's Firmware

Before you begin the following procedure, read the README.TXT file extracted from the upgrade archive file. Note the file name for the boot code (e.g., 2MBPFL1 1 .S37) and the file name for the new firmware (e.g., BkQg300G.hex).

Warning: Never install an older version of firmware over a newer version. Doing so will destroy the Flash PROM! If the Flash PROM is destroyed, the modem must be sent in for repair.

1. Run Flash Wizard by double-clicking its icon or file name, or by selecting it from the Start menu. The **Identifying Devices** dialog box is displayed as Flash Wizard locates and identifies the devices connected to your system.

Note: If the message *ERROR: No valid devices detected* is displayed, verify that the device is powered on and that all cables are correctly and securely attached.

2. Click the modem to be upgraded, and then click **Next** to proceed.
3. Select the port to be upgraded from the **Port** list, select the appropriate .HEX file from the **Hex File** list, and then click **Next** to continue.

Note: Do not use FLASHLDR.HEX. This file is used internally by Flash Wizard.

The **Progress** dialog box appears, showing a status bar that indicates the progress of the upgrade.

Caution: Any disruption of the program during this stage of the upgrade can cause your modem to become inoperable. Wait for the **Next** button to become active before proceeding.

When the flash upgrade is complete, the message *Programming Complete* appears.

4. Click **Next**. The **Results** dialog box appears.
5. Click **Finish** to exit.

Step 6: Restore Your Parameters

Your modem has been updated. You can now open your terminal program to reprogram your modem parameters or to confirm the update by typing **ATI3** in the terminal window and pressing **Enter**.

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