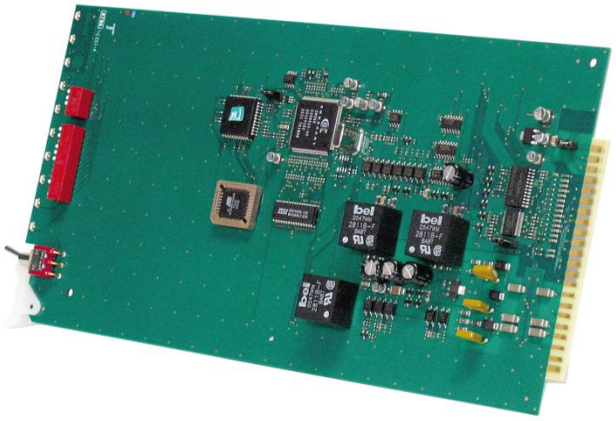
Data/Fax Rack Mounted Modem Card MT5600BR-V92



Configuration Guide

MultiTech® Systems

Data/Fax Rack Mounted Modem Card
MT5600BR-V.92
S000392F Revision F

Copyright

Revision History

Revision	Date	Description
B	04/19/07	Updated Technical Support information
C	06/01/09	Updated switch settings for firmware release 7.02o and Technical Support information
D	01/12/12	Removed CD references. Added Multi-Tech Installation Resources site information. Removed rack installation instructions and added reference to CC1600 documentation for rack installation.
E	04/26/12	Updated regulatory information.
F	12/16/13	Added UL translations.

Trademarks

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; 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; 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; 5,355,365; 5,309,562; 5,301,274. Other patents pending.

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.

Installation Resources
To download manuals, firmware, and software, visit http://www.multitech.com/setup/product.go.

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

Technical 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 – Description and Specifications

Overview

The MT5600BR-V92 modem card was designed for the CC1600 Series card cage. It uses ITU-T V.92 protocol to provide quick connections, capable of 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.

Product Documentation

This document is a configuration guide for the MT5600BR-V92. To download these documents, go to http://www.multitech.com/setup/product.go and select your model from the Product drop down list.

- CC1600 Series Card Cage User Guide (S000325) - Provides rack installation instructions.
- MultiModem II AT Command Reference Guide (S000373)
- Fax Service Class 1 and 1.0 Developer's Guide (S000262)
- Fax Service Class 2, 2.0, and 2.1 Developer's Guide (S000239)

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

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.

Technical Specifications

Your MT5600BR-V92 data/fax modem meets the specifications listed below:

Category	Description
Server-to-Client Data Rates	V.90 speeds when accessing a V.90 or V.92 server (actual speed depends on server capabilities and line conditions)[1]
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	14400, 12000, 9600, 7200, 4800, 2400, 1200, 0-300 bps
Data Format	Serial, binary, asynchronous, synchronous
Fax Compatibility	T.4, T30, V.21, V.27terV.29, V.34, V.17; TIA/EIA 578 Class 1, 1.0, 2TR29.2
Video Compatibility	ITU-T V.80 for H.34 video conferencing
Error Correction	ITU-T V.42 (LAP-M or MNP 4)
Data Compression	ITU-T V.44 (6:1 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
Mode of Operation	Full duplex data over dial-up line, 2-wire and 4-wire lease line; automatic or manual dialing, automatic or manual answer
Flow Control	XON/XOFF (software), RTS/CTS (hardware)
Command Buffer	60 Characters
Transmission Level	-11 dBm (dial-up), -15dBm (lease line); dBm level selectable with DIP-Switch #3 in lease line setting
Frequency Stability	±0.01%
Receiver Sensitivity	-43 dBm under worst-case conditions
AGC Dynamic Range	43 dB
Interface	EIA RS232C/ITU-TSS V.24
Diagnostics	Power-on Self Test and Local analog loop
Environmental	Temperature range 0°–50°C (32°–120°F); humidity range 20–90% (non-condensing)
Storage Temperature	-10° to +85°C (14°- 185° F)
Dimensions	10½ wide x 5½ long
Weight	8 oz

[1] Although this modem is capable of 56K bps download performance, line impairments, phone infrastructure, and other external factors may prevent maximum 56K bps connections.

Note: Transmissions between the MT5600BR-V92 and other modems are limited to 33.6K bps, as are upstream transmissions to non-V.92-compatible ISPs and downstream transmissions that are converted more than once on the telephone network.

Chapter 2 – Hardware Settings

Setting DIP Switches

The MT5600-V92 modem card contains sixteen DIP switches. How a switch operates depends on whether the modem is in synchronous or asynchronous mode (DIP switch #12).

Factory defaults are set to use the MT5600BR-V92 to dial up a remote installation where the call is answered automatically. Your communications software may require different settings. For the correct DIP switch settings, check your software's documentation.

Before you install modem cards in the card cage, verify that the DIP switch settings are correct for your application (dial-up or lease line).

DIP Switches 1-12

*Factory default setting

Switch	Function	Position	Effect
1	DTR Forced/DTR from Interface*	Up*	DTR forced ON at all times
		Down	DTR dependent on interface
2	Flow Control &E4* (Async/Dial-Up/Leased Line)	Up*	Hardware flow control
		Down	Software flow control
	SDLC*/BSC (Sync)	Up*	SDLC mode
		Down	BSC mode
3	Result Codes Enabled* (Async Dial-up)	Up	Q1 Disable Responses
		Down*	Q0 Enable Responses
	DbM Transmit -15dB/-11dB* (Async/Sync/Leased Line)	Up	Lease Line
		Down*	Transmits at -11dB
4	Read switches in ASYNC*	Up*	Follows DIP-Switch 6 settings
	Ignores switches in ASYNC	Down	Uses stored parameters. Bypasses DIP-Switch 6 settings
	Read switches in SYNC* (Sync Dial-Up/Leased Line)	Up*	AS/400 Mode OFF
		Down	AS/400 Mode ON
5	Auto-Answer Enabled* (Async/Sync/Dial-Up)	Up*	Enable Auto Answer
		Down	Disable Auto Answer
	Answer/Originate* (Async/Sync/Leased Line)	Up*	Answer Mode
		Down	Originate Mode
6	Max-Throughput Enabled*	Up*	Compression with error correction
	Max - Throughput Disabled	Down	No compression or error correction
	Slave Clock Disabled* (Sync/Dial-Up/Leased)	Up*	Slave Clocking OFF
		Down	Slave Clocking ON
7	RTS/Normal/Forced* (Sync/Async/Dial/Leased)	Up	RTS dependent on interface
		Down*	RTS forced ON
8	Command Mode Enabled* (Sync/Async/Dial/Leased)	Up	Disable Command Mode
		Down	Enabled Command Mode
9	No affect		

Switch	Function	Position	Effect
10	Dial-Up*/Leased-Line	Up*	Dial-Up Operation
		Down	Lease Line Operation
11	No affect in async		
	External Clocking (Sync)	Up	External Clock
	Internal Clocking*(Sync)	Down *	Internal Clock
12	Sync Mode	Up	Synchronous Operation
	Async Mode*	Down *	Asynchronous Operation

DIP Switches 13-16

*Factory default setting

Switch	Position	Effect
13/14	Up/Up*	D Read from stored parameters for speed (Default V.92)
	Down/UP	V.34 Operation
	Up/Down	V.32b Operation
	Down/Down	V.22b Operation
15	Up*	CD/DSR from Interface
	Down	CD/DSR Forced On
16	Up	2-Wire Operation
	Down	4-Wire Operation

OOS (Busy Out) Toggle Switch

The front panel has a two-position out of service (OOS) switch. Use this switch to take the modem off-hook, which creates a busy condition for the modem.

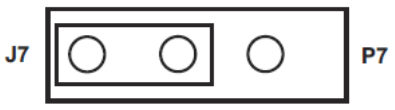
- Move the OOS toggle switch to BUSY to take the modem out of service. The OOS and OH LEDs light and incoming calls get a busy signal.

If you suspect a modem is not working, use BUSY to have an optional device, such as a hunt group, roll the call to the next available modem while you check the busy modem.

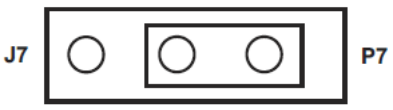
Out of Service Test Jumper

When the MT5600BR-V92 is out of service, it is busy to incoming calls. In the Test (default) setting, the modem drives pin 25 high when the modem is in Test mode. The OOS (optional) setting forces pin 25 high and puts the modem in a busy condition.

Note: Jumper (shorting) plugs do not shipped with the MT5600BR-V92, but Multi-Tech Technical Support will provide jumper plugs on request.



Test Setting (Factory Default)



OOS Setting (Optional)

LED Indicators

The MT5600BR-V92 has ten LED diagnostic indicators.

LED	Description
RCV	Blinks while receiving data. The RCV LED state matches that of the RCV circuit on Pin 3 of the RS232C/V.24 interface.
XMT	Blinks while transmitting data. The XMT LED state matches that of the XMT circuit on Pin 2 of the RS232C/V.24 interface.
CO	Lights when a valid carrier tone has been detected.
56	Lights when the modem connects using V.92 protocol. Actual connection speed depends on ISP server capabilities and line conditions.
33.6	Lights when the modem connects at 33,600 bps.[1]
14.4	Lights when the modem connects at 14,400 bps. [1]
OH	Lights when the phone line is off-hook. This occurs when the modem is dialing, on line, answering a call, or when the OOS toggle is set to BUSY. This LED flashes when the modem is pulse dialing in the Command Mode.
DTR	When the DTR LED is lit, the modem is permitted to answer an incoming call. When the DTR LED is off, if the modem is dependent on DTR, it disconnects. The state of this DTR LED matches that of the DTR circuit on Pin 20 of the RS232C/V.24 interface.
RI	Lights during the ringing interval when incoming call is received.
OOS	When the OOC LED is on, the modem is in an out of service (OOS) state. When the modem is out of service, it is busy to incoming calls.

[1] If both the 33.6 and 14.4 LEDs are lit, the modem is operating in the 16,800 to 33,600bps mode.

Chapter 3 – Software Configuration

Configuring Communications Software

Configure your communications software to work with your modem, your computer, and the remote system it calls. Most communications programs provide a default initialization string and default settings for other parameters.

To configure you communications software to work with the MT5600BR-V92 modem:

- Set the modem initialization string.
  This is a command sequence that the software uses to configure the modem when loading communications software or beginning a session.
  - Always begin the initialization string with **AT**.
  - Follow the AT with the modem reset command, **&F**, to ensure that you are starting with a known state.
  - Additional commands depend on the modem's capabilities and what you want it to do.
  - Newer communications programs provide initialization strings when you select your model from a list. If the MT5600BR-V92 is not listed, select MultiModemII.

  Note: Modem capabilities and command implementations vary from modem to modem. If you use an initialization string intended for another modem, particularly one from another manufacturer, you might not have access to some modem features.

PC Initialization Strings

We recommend the following initialization string for a MT5600BR-V92 connected to a PC-compatible computer:

AT &F X4 S0=0 ^M

This string:

- Resets the MT5600BR-V92 to the factory default settings
- Selects extended result codes with NO DIAL TONE and BUSY, and turns off auto-answer.

Notes: If you send commands through communications software, you must end every string with **^M**. This is the ASCII code for the Return key on most keyboards, the default code for carriage return in the MT5600BR-V92, and most communications programs.

If you send commands to the modem in terminal mode, you must press **Return** (<CR>) to end every string.

In the MT5600BR-V92, the carriage return character is defined in S-register S3. If you change it, also change the carriage return character code used in your communications software.

Changing Default Parameters

The default values for the other parameters in modem configuration menus rarely need changing. They typically include the dialing prefix (ATDT for touch-tone service and ATDP for rotary service), the dialing suffix (^M), the hang-up string (+++) Response then (ATH0^M), and response messages (RING, NO CARRIER, BUSY, etc.). Communications software with a host mode might include an auto-answer string (AT S0=1^M).

Macintosh Initialization Strings

- To use RTS/CTS hardware flow control with a Macintosh computer, you must use serial cable wired for hardware control.
- Macintosh 128 and 512 models cannot use RTS/CTS flow control at all. For these models, use the following string to turn off the default RTS/CTS hardware flow control, turn on XON/XOFF flow control, and ignore DTR: **AT &F X4 &k4 &D0 ^M**
- For hardware flow control, use the following initialization string **AT &F X4 &K3 &D0 ^M**
- Add **S0=0** to both strings to disable auto-answer if the MT5600BR-V92 is on a voice line.

To store the initialization string in nonvolatile memory:

1. With your communications software open and connected to the modem's COM port, type the initialization string in the terminal window, substituting a carriage return for **^M**.
2. Enter AT &W0 <CR>.

When the initialization string is stored, you can use the following string to initialize your modem:
AT Z ^M

Configuring the Modem for Your Country or Region

Different countries have different requirements for how modems must function. Before using your modem, configure it for country/region in which you are using it. You can use either the Global Wizard or AT Commands to configure the modem for your country.

Using the Global Wizard

If using your modem with a Windows operating system, use the Global Wizard software to set the country. This is available through the Multi-Tech Installation Resources site.

Installing the Global Wizard

1. Go to http://www.multitech.com/setup/product.go and select your model from the Product drop down list.
2. Click Software.
3. Click **Global Wizard** link.
4. Click **Run** twice. The Global Wizard installer launches.
5. Click **Next.**
6. Click **Yes.**
7. Click Next.
8. Click **Finish**. This completes the Global Wizard installation.

Selecting the Country through the Global Wizard

1. **Click Start | All Programs |Global Wizard** and select Global Wizard. The Global Wizard opens.
2. Click **Next**. The Global Wizard searches for your modems and identifies them.
3. Click **Next.** Select a modem to configure.
4. Click **Next**.
5. Select the country in which the modem will be used and click **Next.**
6. Review your choice of country. If it is correct, click **Next** to configure the modem.
7. When Global Wizard announces that the parameters have been set, click **Finish** to exit.

Using AT Commands to set Country or Region

Non-Windows users can configure the modem using AT commands. You must enter these commands in your communication program's terminal window. To configure the country/region code, the initialization string must contain the AT command for your specific country or region.

1. Run a communications program, such as HyperTerminal.
2. Type **AT%T19,0,nn**, where **nn** is the country/region code in hexadecimal notation.
3. Click **Enter**. The message **OK** displays.
4. To verify that the correct country/region has been configured, type: **ATI9** and click **Enter**.

   The country/region code displays, for example:

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

A list of country/region codes can be found on the Multi-Tech Web site at http://www.multitech.com/global/approvals.go.

Appendix A - Regulatory Compliance

47 CFR 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. If so required, this equipment is hearing-aid compatible.
12. Manufacturing information:

Manufacturer:	Multi-Tech Systems, Inc.
Trade Name	MultiModem® II
Model Number:	MT5600BR-V92
FCC Registration No:	AU7USA32234--M5-E
Ringer Equivalence No:	0.4B
Modular Jack (USOC):	RJ11C
Service Center in USA:	Multi-Tech Systems, Inc. 2205 Woodale Drive Mounds View, MN 55112 U.S.A.

47 CFR Part 15 Regulation

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.

Fax Branding Statement

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

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

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

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

Canadian Limitations Notice

Notice: 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.

Industry Canada

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

Cet appareil numérique de la classe A respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

New Zealand Telecom Warning Notice

1. The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services.

   This equipment is not capable under all operating conditions of correct operating conditions of correct operation at the higher speed which it is designated. 33.6 kbps and 56 kbps connections are likely to be restricted to lower bit rates when connected to some PSTN implementations. Telecom will accept no responsibility should difficulties arise in such circumstances.

2. Immediately disconnect this equipment should it become physically damaged, and arrange for its disposal or repair.

3. This modem shall not be used in any manner which could constitute a nuisance to other Telecom customers.

4. This device is equipped with pulse dialing, while the Telecom standard is DTMF tone dialing. There is no guarantee that Telecom lines will always continue to support pulse dialing.

   Use of pulse dialing, when this equipment is connected to the same line as other equipment, may give rise to 'bell tinkle' or noise and may also cause a false answer condition. Should such problems occur, the user should NOT contact the Telecom Faults Service.

   The preferred method of dialing is to use DTMF tones, as this is faster than pulse (decadic) dialing and is readily available on almost all New Zealand telephone exchanges.

5. Warning Notice: No '111' or other calls can be made from this device during a mains power failure.

6. This equipment may not provide for the effective hand-over of a call to another device connected to the same line.

7. Some parameters required for compliance with Telecom's Telepermit requirements are dependent on the equipment (PC) associated with this device. The associated equipment shall be set to operate within the following limits for compliance with Telecom's Specifications:

   For repeat calls to the same number:

   - There shall be no more than 10 call attempts to the same number within any 30 minute period for any single manual call initiation, and
   - The equipment shall go on-hook for a period of not less than 30 seconds between the end of one attempt and the beginning of the next attempt.

   For automatic calls to different numbers:

   - The equipment shall be set to ensure that automatic calls to different numbers are spaced such that there is no less than 5 seconds between the end of one call attempt and the beginning of another.

8. For correct operation, total of the RN's of all devices connected to a single line at any time should not exceed 5.

South African Statement

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

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 regulatory 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.

Other

The above country-specific examples do not cover all countries with specific regulations; they are included to show you how each country may differ. If you have trouble determining your own country's requirements, check with Multi-Tech's Technical Support for assistance.

Appendix B – Upgrading Firmware

Your modem is controlled by semi-permanent firmware, which is stored in flash memory. Multi-Tech's firmware remains stored in memory when the modem is turned off and can be upgraded as new features are added.

Checking the Modem Firmware Version

Check the current firmware version to determine if an update is needed:

1. Run a terminal program, such as HyperTerminal.
2. In the 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**, press Enter and record your results. The firmware version should appear first in the response, for example:
4. ACF3_V1.702a_V90_P21_FSH
5. The number after the V is the current version number.

Checking the Current Firmware Version

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

1. Go to http://www.multitech.com/setup/product.go and select your model from the Product drop down list.
2. Click **Firmware**. The firmware zip file name contains the version number. For example, hhgg702o.zip, indicates version 702o.
3. Compare the version number on the modem to the version on the site. If the versions match, there is no need to update.

   Make sure you compare any letters following the version number. If there was a minor release, the letter may change instead of the number.

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.

Downloading and Installing the Flash Wizard

1. If you are not on the MT5600BR-V92 page, go to http://www.multitech.com/setup/product.go and select the model from the Product drop down list.
2. Click Software.
3. Click the Flash Wizard utility link and click **Open**.
4. Click **Next** to start through the Flash Wizard installation. Note the folder where the Flash Wizard will be installed; you'll need to extract the upgrade file to the same location.
5. Click **Next** and then click **Finish**.

Extracting the Upgrade Files

1. Click **Firmware** and then click the firmware upgrade link.
2. Click **Open** and then click **Extract**.
3. Select the folder where you installed the Flash Wizard and click **Extract.** The default folder is C:\Program Files\Multi-Tech Systems\Flash Wizard.

Clearing Your Stored Parameters

Before you flash your modem, record the parameters that are currently stored in it, so you can reprogram it after flashing. After you have recorded them, send the **AT&F** command to reset the modem to clear the stored -parameters.

1. Run your favorite terminal program, such as HyperTerminal.
2. In the program's terminal window, type **AT&V** and press **Enter** to list your modem's current parameters.
3. Record your parameters by saving the screens and sending them to your printer.
4. Type **AT&F** and press **Enter** to clear your stored parameters and reset your modem to factory default.
5. Close the terminal program.

Upgrading the Modem's Firmware

Warning: Never install an older version of firmware over a newer version. This destroys the flash PROM! If the flash PROM is destroyed, the modem must be sent in for repair.

1. Click **Start | Programs | Flash Wizard** to launch the Flash Wizard. 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 modem is turned on and that all cables are correctly and securely attached.

2. Select the modem to be upgraded, and then click **Next**.
3. Select the port to be upgraded and the appropriate .HEX file, and then click **Next**.

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

Caution: If the upgrade is disrupted at this state, your modem may become inoperable. Wait for **Next** to become active before proceeding.

Programming Complete appears and Next becomes active when the flash upgrade is complete.

4. Click **Next** to continue.
5. Click **Finish** to exit the Flash Wizard.

Restoring Your Parameters

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

Appendix C – ASCII Conversion Table

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

NUkL	Null, or all zeros	VT	Vertical Tab	SYN	Sync
SOH	Start of Header	FF	Form Feed	ETB	End Transmission Block
STX	Start of Text	CR	Carriage Return	CAN	Cancel
ETX	End of Text	SO	Shift Out	EM	End of Medium
EOT	End of Transmission	SI	Shift In	SUB	Substitute
ENQ	Enquiry	DLE	Data Link Escape	ESC	Escape
ACK	Acknowledge	DC1	Device Control 1	S	File Separator
BEL	Bell or Alarm	DC2	Device Control 2	GS	Group Separator
BS	Backspace	DC3	Device Control 3	RS	Record Separator
HT	Horizontal Tab	DC4	Device Control 4	US	Unit Separator
LF	Line Feed	NAK	Negative Acknowledge	DEL	Delete

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