

## MultiModem<sup>®</sup> ISI

ISI9234HPCIE Server Card User Guide

## MultiModem® ISI Server Card User Guide

Model: ISI9234HPCIE

Part Number: S000581, Version 1.1.3

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

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# Product Overview

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## Product Overview

The MultiModem ISI server cards and modems provide four built-in V.92/56K modems on an industry-standard PCI Express x1 architecture for analog dial-up or dedicated fax servers. It also offers V.34/33.6K Super G3 fax and Error Correction Mode to reduce fax transmission time.

### ISI Server Cards

The ISI9234HPCIE is a server modem expansion card that uses the PCI Express x1 architecture with four V.92 data/Super G3 fax modems. It allows you to add modems to communication servers and async host that have 32-bit PCI bus architecture.

The ISI9234HPCIE has one RJ-45 connector that fans out to four RJ-11 connectors, one for each modem. The half size card supports a high-speed interface up to 230 Kbps.

### ISI Modems

ISI modems are compatible with the ITU-T V.92 protocol. They operate with downstream transmission speeds up to 56 Kbps and upstream speeds up to 48 Kbps when connected to a V.92-compatible Internet service. The V.92 protocol sends data downstream at these speeds because data on the phone network is converted from digital to analog only once before it reaches your modem.

Transmissions upstream and between client modems are limited to 33.6 Kbps. Downstream transmissions that are converted more than once are also limited to 33.6 Kbps.

When calling an ISI modem with another V.92 modem over an analog phone line, the maximum speed is 33.6 Kbps. V.90 and V.92 connections are not possible when an analog line calls another analog line. When an ISI modem connects an analog line to a digital line, the higher V.90/V.92 speeds are not available. If dialing a digital line that supports V.90/V.92, the ISI modems can achieve the higher V.90/V.92 speeds.

**Note:** Line impairments, public phone infrastructure, and other external technological factors may prevent connections from reaching the maximum 56 Kbps speed.

### AT Commands

Use AT Commands to configure your ISI modems. In standard mode, store up to three command lines or phone numbers of up to 40 characters each in nonvolatile memory. Modems can be set to support pulse and tone dialing and can detect AT&T calling card tone. You can also configure for call progress detection, DTR dialing, remote configuration, callback security, and limited TAM functions.

## Documentation

Download documentation from [www.multitech.com/setup/product.go](http://www.multitech.com/setup/product.go).

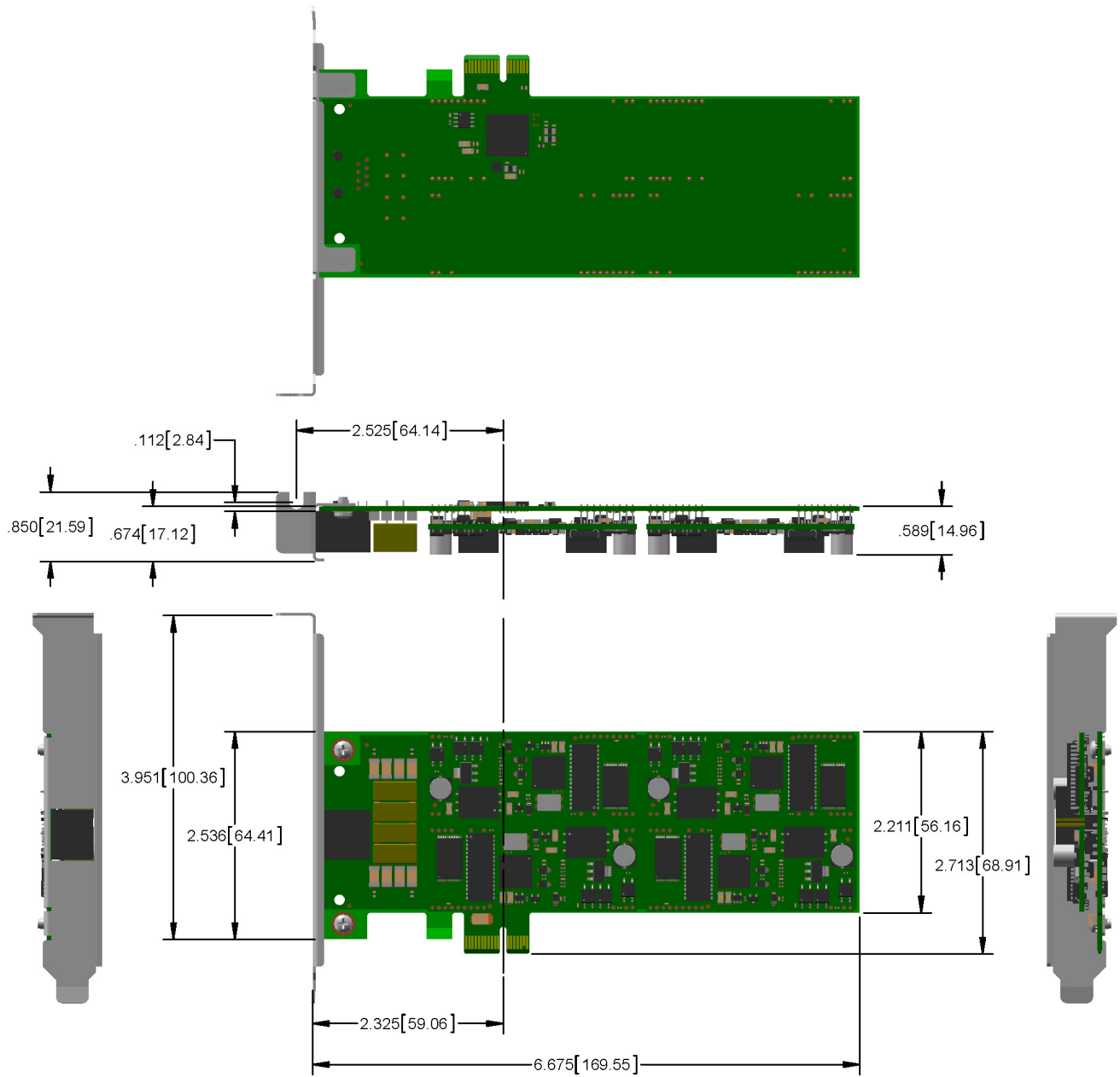
|  |   |
|--|---|
| MultiModem ISI ISI9234HPCIE User Guide                       | This document. Provides specifications, safety and regulatory information, installation, and configuration information (part number S000581). |
| MultiModem and SocketModem MT9234 AT Command Reference Guide | Provides AT commands for configuring your device (part number S000434).   |
| Fax Overview Developer Guide                                 | Describes fax protocols, formats, compression, and transmission (part number S0000265).   |
| Fax Enhancements   | Describes V.34 Fax/Real-Time Fax Compression Conversion V.92 modems (part number S0000279).   |
| Fax Developer's Guide (Classes 1 and 1.0)                    | Provides information and commands for using Fax Service Class 1 and Class 1.0 (part number S0000262).   |
| Fax Developer's Guide (Classes 2 and 2.0/2.1)                | Provides information and commands for using Fax Service Class 2 and Class 2.0/2.1 (part number S0000239).                                     |

## Specifications

| Category                             | Description                                      |
|--------------------------------------|--|
| <b>General</b>                       |  |
| Bus Type                             | PCI Express form factor 1x, PCIe 1.0 compatible. |
| Interrupt Request                    | One IRQ per card (can be shared)                 |
| <b>Speed</b>                         |  |
| Baud Rates                           | 300 bps to 230 Kbps per port                     |
| <b>Physical Description</b>          |  |
| Weight                               | 0.45 lbs. (200 g)                                |
| Dimensions                           | See the topic, Dimensions.                       |
| <b>Connectors and Cables</b>         |  |
| Connectors                           | One RJ-45 jack                                   |
| Cables                               | One RJ-45 4-port fan-out cable                   |
| <b>Environment</b>                   |  |
| Operating Temperature                | 23° to 140° F (-5° to 60° C) <sup>1</sup>        |
| <b>Power Requirements</b>            |  |
| Input Voltage                        | 3.3V from PCIe interface                         |
| <b>Certifications and Compliance</b> |  |
| EMC Compliance                       | FCC Part 15 Class B                              |
|                                      | EN55022 Class B                                  |
|                                      | EN55024  |
| Safety Compliance                    | UL/cUL 60950-1 2nd Ed                            |
|                                      | IEC60950-1 2nd Ed am.1                           |
| Telecom Compliance                   | 47CFR Part 68, CS03, TBR21                       |

# Dimensions

## Dimensions with Standard Bracket

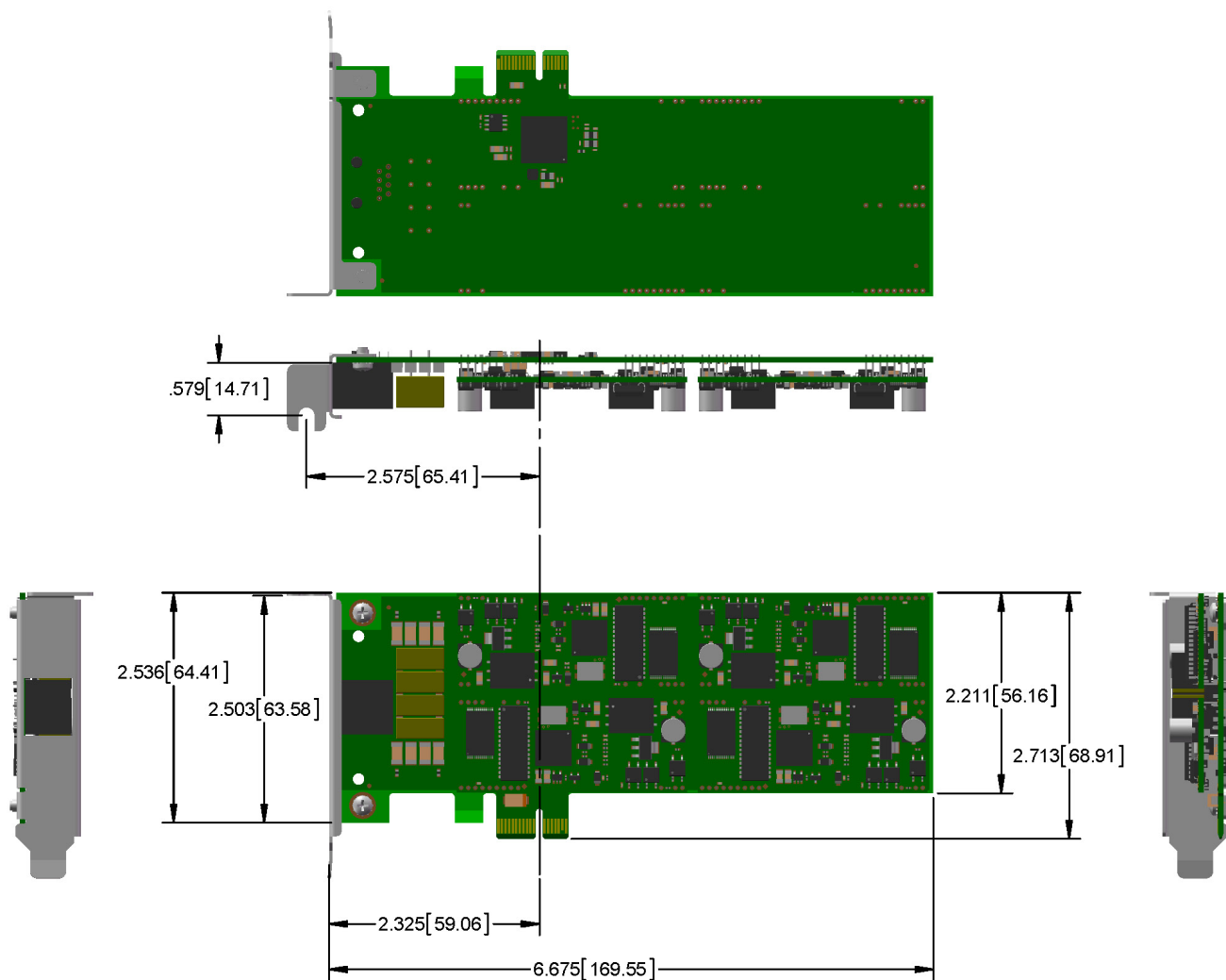


DIMENSIONS IN In [mm]

ISI9234HPCIE/4



## Dimensions with Low Profile Bracket



DIMENSIONS IN In [mm]

ISI9234HPCIE/4 LP

## Power Measurements

|                  | Sleep | Typical | Maximum | Peak  | Total Inrush Charge measured in Millicoulombs (mC) | Total Inrush Charge Duration during Powerup |
|------------------|-------|---------|---------|-------|--|---|
| <b>3.3 volts</b> |       |         |         |       |  |   |
| Current (AMPS)   | 0.402 | 0.541   | 0.550   | 0.592 | 16.00  | 26mS  |
| Watts            | 1.320 | 1.760   | 1.790   |       |  |   |

# Safety Notices

---

## 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.

## Avertissement 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 supérieure.

# Installing Hardware

## Changing Mounting Brackets

To use the low profile bracket, remove the standard bracket and replace it with the low profile bracket.



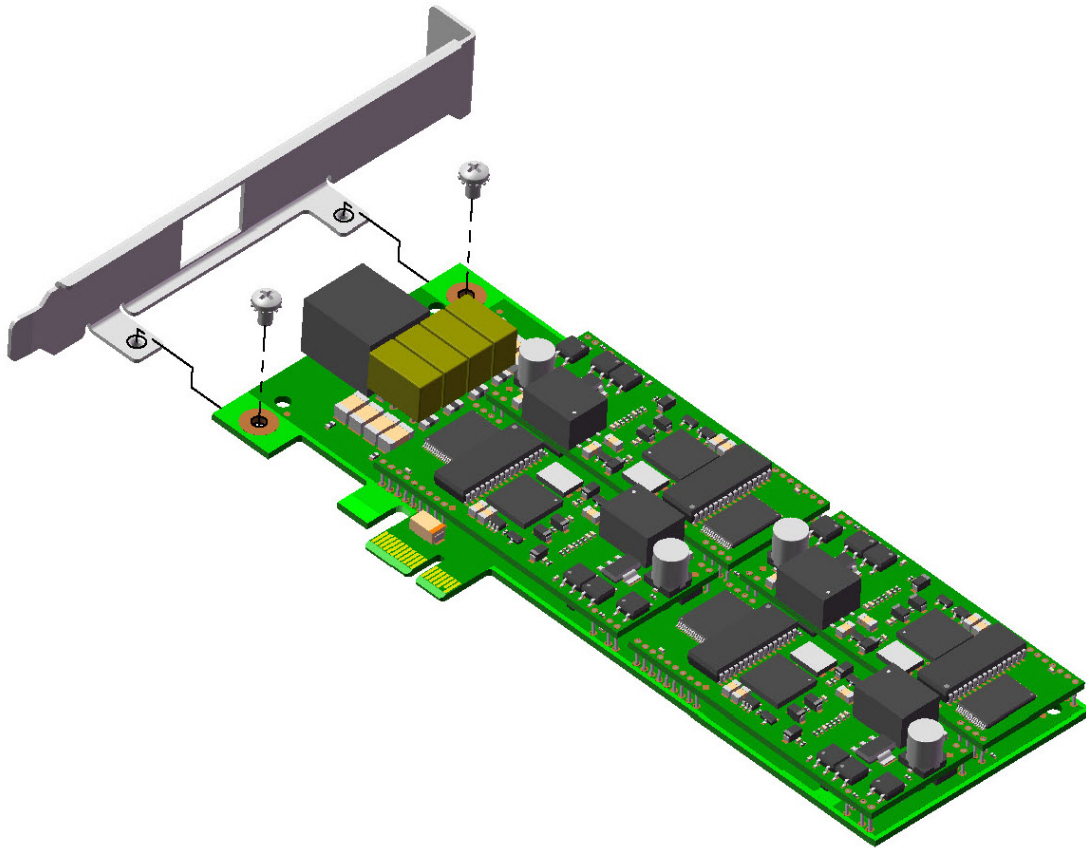
**Warning:** Before handling the device, discharge any static in your body by touching a piece of grounded metal such as the computer chassis. Electrostatic discharge (ESD) is the release of stored static electricity that can damage electrical circuitry or components. Static electricity is often stored in your body and discharged when you come in contact with an object of a different potential.



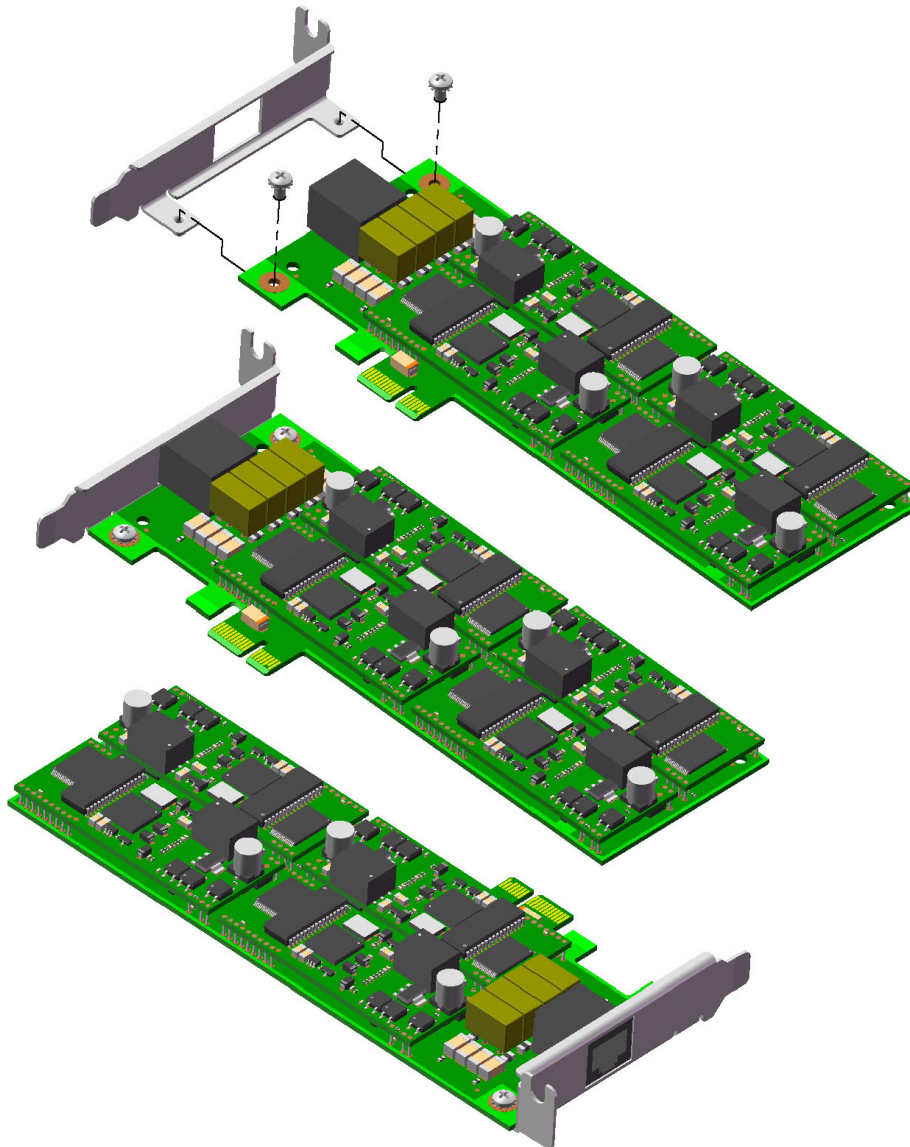
**Attention:** Perform the procedure described in this section only at an ESD workstation using an antistatic wrist strap. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal ground screw (lug).

1. Carefully remove the ISI Card from its antistatic bag. Handle it only by the mounting bracket and edges. Do not touch the gold-plated connectors along the bottom edge.

2. Remove the two screws holding the standard bracket to the device.



3. Mount the low profile bracket using the screws you removed in Step 1.



## Installing Hardware

**Note:** Install the hardware, before installing drivers.



**Warning:** Before handling the device, discharge any static in your body by touching a piece of grounded metal such as the computer chassis. Electrostatic discharge (ESD) is the release of stored static electricity that can damage electrical circuitry or components. Static electricity is often stored in your body and discharged when you come in contact with an object of a different potential.



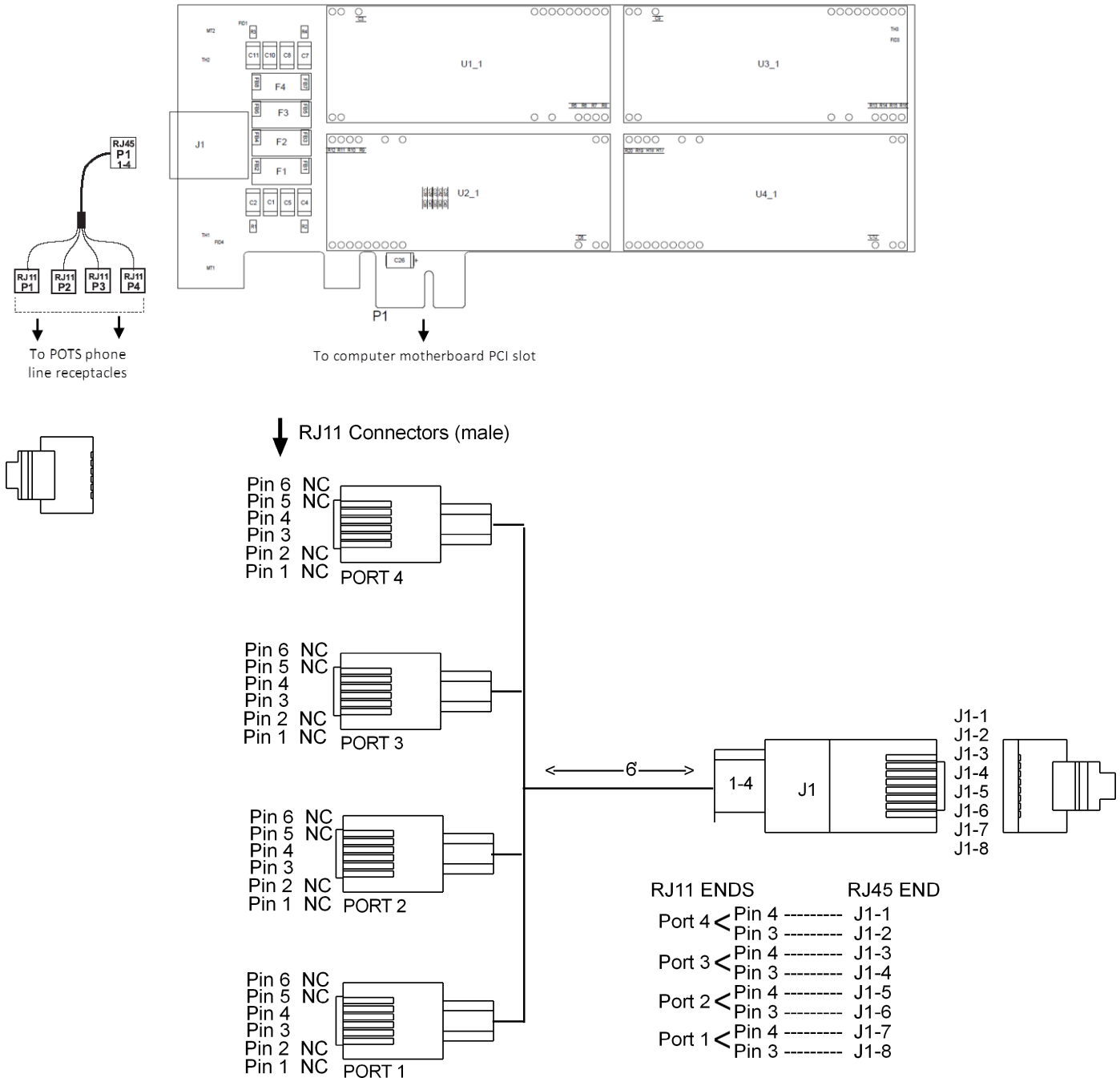
**Attention:** Perform the procedure described in this section only at an ESD workstation using an antistatic wrist strap. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal ground screw (lug).

To install the ISI card in your PCI-bus computer:

1. Turn off your computer, remove the power cord, and disconnect any peripheral devices.
2. Remove the computer's cover as instructed in your computer's manual.
3. Remove the slot cover for the unused PCI slot where you will install the ISI Card. Refer to your computer's manual for instructions on removing the slot cover.
4. If you did not swap the mounting bracket, carefully remove the ISI Card from its antistatic bag. Handle it only by the mounting bracket and edges. Do not touch the gold-plated connectors along the bottom edge.
5. Install the ISI Card into the selected expansion slot in the same manner as any other add-on card. Refer to your computer's manual for instructions on adding cards.
6. Fasten the retaining bracket to the computer chassis and replace cover on the computer.
7. Cable the card. The fan-out cable extends connections for four modems from the RJ-45 plug to four RJ-11 plugs.
  - a. Attach each RJ-11 plug to a phone line receptacle.
  - b. Attach the RJ-45 connector into the appropriate RJ45 receptacle on the ISI Server card.

## Cable Diagrams

The ISI9234HPCIE uses a single fan-out cable to connect the four modems to four phone lines. The cable has an RJ-45 connector on one end and four RJ-11 connectors on the other end. Use the RJ-11 connectors to connect to phone lines.



# Installing on Windows

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The ISI9234HPCIE supports both 32-bit and 64-bit versions of the following Windows operating systems:

- Windows Server 2003, 2008, and 2012
- Windows 7, 8, Vista, and XP

For Linux support, refer to Installing on Linux.

## Downloading Windows Drivers

**Note:** Drivers for all supported Windows operating systems are included in the same zip file.

To select the correct driver, you need to know if you have a 32-bit or 64-bit operating system. If you do not know, check System information in the Windows Control Panel.

1. Go to [www.multitech.com/setup/product.go](http://www.multitech.com/setup/product.go) and select your model from the Product drop down list.
2. Click **Drivers** and download the Windows driver.
3. Open the zip file and extract the files for your operating system to a folder in your Program directory.

## Using the Windows Installer

**Note:** You need administrator rights to install the driver on your computer.

After you have installed the device in the PCIe slot on the computer's mother board, install the driver you extracted:

1. Boot to the Windows operating system. If the Found New Hardware window appears, click **Cancel** to close it.
2. Go to Driver's folder and double-click **installdrv.cmd** to start the install.
3. Check **Always trust software from "Multi-Tech Systems"** and click **Install** to install the drivers.

## Troubleshooting a Windows Installation

This topic describes troubleshooting for known installation issues.

**Note:** We recommend troubleshooting in Administrator mode.

### Installations Did Not Install Four COM Ports or Modems

If the installation process did not install four COM ports or in the Device Manager, four modems:

1. In the Device Manager, run **Scan for Hardware Changes**.
2. Reboot the computer.

### In the Device Manager, COM Port Numbers Do Not Match Hardware COM Ports

In Device Manager, Multi-Tech Communications Port (COMx), may show 5, 9, 14 and 15. When selecting the COM Port properties it shows COM5, 6, 7 and 8.

**Note:** This issue appeared when installing on Windows 7 64bit, Windows 2008 64 bit or when installing with the "installdrv.cmd".



To get the Communications port numbers to match COM ports:

1. In the Device Manager, go to **Modems**.
2. Right-click **MultiTech Systems MT9234SMI #4** and select **Uninstall**.
3. On the Confirm Device Uninstall tab, check **Delete the driver software for this device.** ,if provided, and select **OK**.
4. Repeat the uninstall for the remaining three modems.
5. In Device Manager go to **Ports**.
6. Right-click **MultiTech Communications Port (COMx)** and select **Uninstall**.
7. On the Confirm Device Uninstall tab, check **Delete the driver software for this device.** ,if provided, and select **OK**
8. Repeat the uninstall for the remaining three COM ports.
9. Reboot the computer or **Scan for Hardware changes** so Windows can re-detect the COM ports and modems.
10. Confirm that the MultiTech Communications Port (COMx) numbers matches the COM ports.

### **The installdrvs.cmd File Does Not work on XP or 2003**

Only Windows Vista, 2008, 2012, 7 and 8 are supported.

# Installing on Linux

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## Installing on Linux Kernel 3.5 and Higher

**Note:** The steps below were tested with Ubuntu 12.04 with Linux kernel 3.5.0 and may or may not work for other 3.x.x versions.

After installing the ISI9234HPCIE in a PCIe slot:

1. Power up the computer and boot to Linux.
2. Go to [www.multitech.com/setup/product.go](http://www.multitech.com/setup/product.go) and select your model from the Product drop down list.
3. Download the Linux driver, **xr17v35x-lnx3.x.x-pak.zip**, into a specified directory, such as `/exar`.
4. Start a terminal session and run command `# cd /exar`.
5. Run command `# unzip xr17v35x-lnx3.x.x-pak.zip`.
6. Find **Makefile** in the `/exar`, then execute command `# make` to compile the driver file, `xr17v35x.ko`.
7. Run command `# insmod xr17v35x.ko` to activate the module driver.

**Note:** This module registers Exar ports as `"/dev/ttyXR0"`, `"/dev/ttyXR1"`, etc.

8. Go to `/lib/modules/(kernel version)/kernel/drivers` and run command `mkdir exar`
9. Copy the **xr17v35x.ko** file into the `exar` folder `/lib/modules/(kernel version)/kernel/drivers/exar`.
10. Edit the `/etc/modules` file and add **xr17v35x**.
11. Run the command `depmod`.
12. Reboot Linux.

Linux device drivers and device should now be installed and activated.

To verify that the modules loaded, send the command `lsmod`

## Installing Drivers on Linux Kernel 2.6.x

**Note:** The steps below were tested with Ubuntu and Linux kernel 2.6.32 and may or may not work for other 2.x.x versions.

After installing the ISI9234HPCIE in a PCIe slot:

1. Power up the computer and boot to Linux.
2. Go to [www.multitech.com/setup/product.go](http://www.multitech.com/setup/product.go) and select your model from the Product drop down list.
3. Download the Linux driver, **xr17v35x-lnx3.x.x-pak.zip**, into a specified directory, such as `/exar`.
4. Start a terminal session and run command `# cd /exar`.
5. Run command `# unzip xr17v35x-lnx2.6.32-pak.zip`.
6. Find **Makefile** in the `/exar`, then execute command `# make` to compile the driver file, `xr17v35x.ko`.
7. Run command `# insmod xr17v35x.ko` to activate the module driver.

**Note:** This module registers Exar ports as `"/dev/ttyXR0"`, `"/dev/ttyXR1"`, etc.

8. Go to `/lib/modules/(kernel version)/kernel/drivers` and run command `mkdir exar`
9. Copy the **xr17v35x.ko** file into the `exar` folder `/lib/modules/(kernel version)/kernel/drivers/exar`.
10. Edit the `/etc/modules` file and add **xr17v35x**.

11. Run the command **depmod**.

12. Reboot Linux.

Linux device drivers and device should now be installed and activated.

To verify that the modules loaded, send the command **lsmod**

# Configuring Modems for Your Country

---

Different countries have different regulations for modem operation. Before using your modems, you must configure them for the country in which you are using them. For Windows computers, use the Global Wizard to set the country. For Linux computers, use AT Commands to set the country.

## Installing the Global Wizard

The Global Wizard utility works with the 32-bit and 64-bit versions of following Windows operating systems:

- Windows Server 2003, 2008, and 2012
  - Windows 7, 8, Vista, and XP
1. Go to [www.multitech.com/setup/product.go](http://www.multitech.com/setup/product.go) and select your model from the Product drop down list.
  2. Click **Software**.
  3. Click the **Global Wizard** link and run the Global Wizard installer.
  4. Follow the on screen prompts and click **Finish** when installation is complete.

## Using the Global Wizard

To set your country:

1. Run the **Global Wizard**, click **Start > All Programs > Global Wizard > Global Wizard**.
2. Click **Next**. The Global Wizard searches for your modems and identifies them.
3. Click **Next** and select a modem to configure.
4. Click **Next** and select the country in which the modem will be used.
5. Click **Next** and verify your choice of country. If it is correct, click **Next** to configure the modem.
6. Click **Finish** to exit.
7. If your device has multiple modems, repeat Steps 3 through 6 for each modem.

## Using AT Commands to Set Country

If not using Windows, use AT commands to configure the modem. A complete list of country and region codes is available on the Multi-Tech site at [www.multitech.com/global/configuration.go](http://www.multitech.com/global/configuration.go).

1. Run a communication program and open a terminal window.
2. Type **AT%T19,0,nn**, where **nn** is the country/region code in hexadecimal format, press **ENTER**. OK appears.
3. Type **ATI9** and press **ENTER** to verify the change.

The country code displays in decimal format, as in this example:

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

# Regulatory Information

## 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. This equipment is hearing aid compatible.
12. Manufacturing Information on telecommunications device (modem):

Manufacturer:

Multi-Tech Systems

|                        |  |
|------------------------|--|
| Trade Name:            | SocketModem  |
| Model Number:          | MT9234SMI  |
| Registration Number:   | US:AU7MM01BMT9234SMI   |
| Ringer Equivalence:    | 0.1B   |
| Modular Jack (USOC):   | RJ11C or RJ11W (single line)   |
| Service Center in USA: | Multi-Tech Systems, Inc.<br>2205 Woodale Drive<br>Mounds View, MN 55112 USA<br>(763)785-3500<br>(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.

## EMC, Safety, and R&TTE Directive Compliance



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.

# Environmental Information

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## 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





## REACH Statement

### Registration of Substances

After careful review of the legislation and specifically the definition of an “article” as defined in EC Regulation 1907/2006, Title II, Chapter 1, Article 7.1(a)(b), it is our current view Multi-Tech Systems, Inc. products would be considered as “articles”. In light of the definition in § 7.1(b) which requires registration of an article only if it contains a regulated substance that “is intended to be released under normal or reasonably foreseeable conditions of use,” Our analysis is that Multi-Tech Systems, Inc. products constitute nonregisterable articles for their intended and anticipated use.

### Substances of Very High Concern (SVHC)

Per the candidate list of Substances of Very High Concern (SVHC) published October 28, 2008 we have reviewed these substances and certify the Multi-Tech Systems, Inc. products are compliant per the EU “REACH” requirements of less than 0.1% (w/w) for each substance. If new SVHC candidates are published by the European Chemicals Agency, and relevant substances have been confirmed, that exceeds greater than 0.1% (w/w), Multi-Tech Systems, Inc. will provide updated compliance status.

Multi-Tech Systems, Inc. also declares it has been duly diligent in ensuring that the products supplied are compliant through a formalized process which includes collection and validation of materials declarations and selective materials analysis where appropriate. This data is controlled as part of a formal quality system and will be made available upon request.

## 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<sup>1</sup>:

- 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)

<sup>1</sup>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).

### Hazardous/Toxic Substance/Elements

| Name of the Component            | 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。

### 有害/有毒物质/元素

| 成分名称         | 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            |
| ICs          | 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            |
| LEDs         | 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。