Intelligent Serial Interface

Model Number ISI4608
Quick Start Guide

MultiTech Systems

Quick Start Guide
P/N 82081106, Revision B
Model #ISI4608

Record of Revision

Revision	Description
A (8/30/00)	Quick Start Guide initial release. All pages at Revision A.
B (6/15/01)	Added/revised installation info about Windows 2000, Windows Me, Linux, SCO, and Netware, as well info on safety & MTS Patents.

TRADEMARKS

Trademarks of Multi-Tech Systems, Inc. are as follows:
Multi-Tech, MultiExpress, and the Multi-Tech logo: Multi-Tech Systems, Inc.
UNIX: X/Open Co. Ltd.
MS-DOS and Windows 95, 98, NT, 2000: Microsoft Corporation
SCO: The Santa Cruz Operation, Inc.
Pentium: Intel Corporation
PC-DOS: International Business Machines Corporation
Novell, NetWare, NetWare Connect and UNIXWare: Novell Corporation
Xenix:Xerox Corporation

Contact Info	Patent Info
Multi-Tech Systems, Inc. 2205 Woodale Dr. Mounds View, Minnesota 55112, U.S.A. (763) 785-3500 (800) 328-9717 U.S. Fax: (763) 785-9874 Tech Support: (800) 972-2439 Internet: www.multitech.com	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

Contents

Intelligent Serial Interface

Chapter 1 - Introduction and Description

MultiTech Systems

Introduction to the **Intelligent**Serial**Interface**

The new **Intelligent**Serial**Interface** card, model ISI4608, is a hardware solution for adding fast serial ports to communication servers and async hosts that have 16-bit ISA-bus architecture. Fast serial ports are essential to communication servers, which pool modems and other communication devices for users on a LAN, and to asynchronous hosts that provide user access through serial ports.

The ISI4608 ships with a NetWare® Loadable Module (aioisix.nlm) for NetWare Connect communication servers, and drivers for each of the following multiuser operating systems: Windows® 2000/98/95/NT/Me, SCO® Open Server 5.0® and Linux.

The **Intelligent**Serial**Interface** card(s) can be combined to support asynchronous serial devices (local or dial-up). The ports can be used to connect basic terminals with or without multiple pages of memory to multiplexer channels and asynchronous modems. When multiple page terminals are used in an Open Server 5.0 environment, a utility called *"Multi_View"* allows you to have multiple sessions. Each ISI4608 port can support as many screens as there are physical pages of memory on the terminal. If you have SCO Open Server 5.0 System V/386 Version 4.0 or later, there is an extended feature supplement (*EFS*) "rolled into" the operating system which now officially supports data rates up to 33,600 bps; also included is a text-driven configuration facility so the system administrator can create the appropriate modem dialer without having to purchase a "C-Language" programming environment or knowing how to write a dialer program in "C". In a Windows 95/98/Me environment, a built-in "autodetect" utility enables the detection of Multi-Tech modems and sets the proper initialization strings. When the ISI4608 is used in Windows 2000, the ISI Management Software can be used to control modem ports and monitor data traffic on the server.

This manual contains product specification, installation instructions, and technical support information which will assist you in the installation process. Basic PC skills are assumed. Therefore, we have not included step-by-step instructions for such basic operations as logging in and file editing, etc.

Product Description

The ISI4608 is a multiport serial port expansion card which adds data buffering on each port for enhanced serial port performance. The ISI4608 features an on-board microprocessor to coordinate the communications activity of your local and remote terminals. Using an ISI4608 to provide additional serial connections enables your system's processor to perform more efficiently. This is because the ISI4608 handles all of the byte-by-byte interrupts generated by asynchronous terminals and stores the data in buffers. The processor works together with 256K bytes of RAM to allocate resources dynamically to the most active port. The ISI then generates one interrupt for an entire block of information and transfers the block to the system's microprocessor.

The ISI4608 has one 78-pin (DB78S) connector which interfaces with an eight-port fan-out, or "*octopus*", cable (supplied with the card), providing eight additional serial ports. It is a "3/4 size" add-on card which supports a high-speed interface up to 115.2K bps. The ISI4608 features one bank of 8 DIP-Switches for I/O address selection and one jumper block for IRQ selection.

ISI4608 Applications

The most common application for the ISI4608 is where a powerful microcomputer is being used as a server or host, but lacks enough connectivity to accommodate the desired number of users. For this application, the ISI4608 is the ideal solution. The ISI4608 provides eight additional serial ports with every card installed, with potentially four additional cards installed per system -- for a total of thirty-two serial ports per system.

Technical Specifications

Computer Requirements

- 386, 486, or Pentium®- based PC or compatible with ISA Bus Architecture
- Microsoft Windows 2000/NT/98/95/Me, SCO Open Server (version 5.0), Novell Netware, Linux (kernel 2.0, 2.2, or 2.4)
- At least one CD-ROM drive (a floppy drive may be used if drivers are downloaded from MultiTech web site)
- 800 blocks of hard disk space for UNIX; 150 Kbytes for Windows 2000; 100 Kbytes for Windows NT; 150 Kbytes for Windows 95/ 98/Me; 50 Kbytes for Novell

Physical/Electrical/Environmental

- Dimensions: 9.17" x 4.2" x .06"
23.3 cm x 10.67 cm x .15 cm
- Baud Rates: 300 bps to 460 Kbps per port
- Bus Type: ISA
- Connectors: DB78S
- Cabling: Eight port fan-out cable. DB78M (male) interface to card, eight DB25 (male) connectors for serial devices
- Serial Interface: Eight RS232C or RS232D ports
- Temperature: 32° to 120°F (0° to 50°C)
- Power: 1.5 amps @ +5v DC
- Base I/O: Address: One 16-byte address space per card. Valid options range from 100h to 3F0h (DIP-switch setting; see Appendix A of User Guide)
- Interrupt Request (IRQ) One IRQ per card. Valid options include 2, 3, 4, 5, 7, 10, 11, 12, & 15 (Jumper setting)
- Warranty: Two years

Manufactured in Mounds View, MN, U.S.A.

Intelligent Serial Interface

Chapter 2 - Hardware Installation

MultiTech Systems

Safety Warnings Telecom

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. This product is to be used with *UL* and *CUL* listed computers.
4. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
5. Use caution when installing or modifying telephone lines.
6. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning.
7. Do not use the telephone to report a gas leak in the vicinity of the leak.
8. To reduce the risk of fire, use only No. 26 AWG or larger Telecommunication line Cord.

ISI4608 Installation

This chapter provides you with the procedures to install the Multi-Tech ISI4608 card(s) in your ISA or EISA bus personal computer (or compatible with 16 bit ISA slot).

Hardware installation involves:

1) Opening your PC.
2) Setting card configuration (determining I/O address DIP-Switch setting and IRQ jumper setting).
3) Installing the card into the PC.

Determining Current System Settings

When you install a device in your computer, the processor must have a means of routing information to and from the device and the device must have a means of gaining the processor's attention. These are called Input/Output (*I/O*) addresses and Interrupt Requests *(IRQs*), respectively. The ISI4608 card requires 16 I/O addresses and one IRQ value which are not used by any other device in your system.

When selecting a unique base I/O address, be sure that the next address is also unused. To determine your ISI's current settings, see Appendix A of User Guide.

If you are certain that these settings are not already in use, continue with the hardware configuration and installation. You can install up to four ISI4608 cards into your system. Each card is shipped with its IRQ set at level 10 and a base I/O address of 210 hex. Check your system's device settings to see if these values can be used. If the defaults are already in use, select a unique IRQ and I/O address combination for each card you install, and record those values for use in the hardware and software installation sections that follow.

Table 2-1
Recommended Base I/O Address and IRQ Values

ISI4608 Card		Base I/O Address	IRQ
Initial	8 -port board	210h	10
First	8-port upgrade	220h	11
Second	8-port upgrade	230h	12
Third	8-port upgrade	240h	15

Note: If you choose IRQ 3 or 4, you may have to disable a COM device from your BIOS setup. Also, most 386 or higher compatible computers will not be able to assign IRQ2 to the ISI card because IRQ2 is reserved for slave interrupt control.

Hardware Installation Procedure

Perform the procedures in Table 2-2 to install the ISI4608 card(s) in your PC-ISA bus computer. The installation procedures include setting the I/O address switch block and the IRQ jumper. This section may be skipped if the **defaults: I/O Address 210 Hex and IRQ 10** are the values you have selected. However, if you are installing multiple cards, step 4a of Table 2-2 describes how to configure your card(s).

Table 2-2
ISI4608 Installation Procedure

Step	Procedure
1	Make sure your computer and any peripheral equipment connected to it are turned off. Failure to do so may damage both your ISI card(s) and your PC. The ISI4608 may be installed in a PC-AT, 386, 486, or Pentium equivalent ISA-bus computer.
2	Remove the cover of your computer as instructed in your computer's documentation.
3	Locate the unused slot(s) which you will be using for your ISI4608 card(s), and remove the slot cover(s) per the instructions in your computer's documentation.
4	Check the settings of the I/O address switch and the IRQ jumper to ensure that they are set properly for your installation.

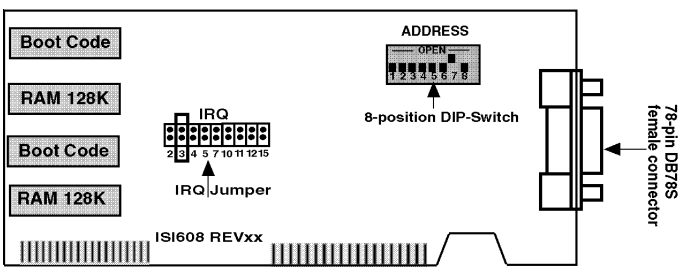

Figure 2-1. ISI4608 Board Components

Table 2-2 (cont'd)

Step	Procedure
4a	The default setting for the ISI4608's base I/O address is 210 hex. The default value for the IRQ jumper is IRQ 10. Choose the IRQ value by covering the appropriate pins with the shorting plug (supplied). Look at the diagram shown above, if needed. If your system requires a different setting or if you are installing multiple cards, see Appendix A of the User Guide for a table of valid address settings. **Note:** If you are installing the ISI4608 as a second card in a **Multi**Com**RN***Gateway* (remote node gateway) the suggested I/O address is 220 hex/IRQ11. Record any changes you make to these settings and keep them handy for the software installation section in Chapter 3.
5	Install the ISI4608 card(s) into the selected expansion slot(s) in the same manner as any other add-on card, as instructed in your computer's documentation.
6	Fasten the retaining bracket to the computer chassis and replace the cover.
7	Attach the octopus cable to the DB78S female connector on the ISI4608 card at the back of your computer. The RS232 ports provided by the octopus cable are for connection to modems, multiplexers or other devices. If the other device is a local terminal port, then a crossover cable is required (not included) between the octopus cable and the terminal port. See Appendix C of the User Guide for schematic of a crossover cable. **Note:** Any cables connected to the computer must be shielded to reduce interference.

Table 2-2 (cont'd)

Step	Procedure

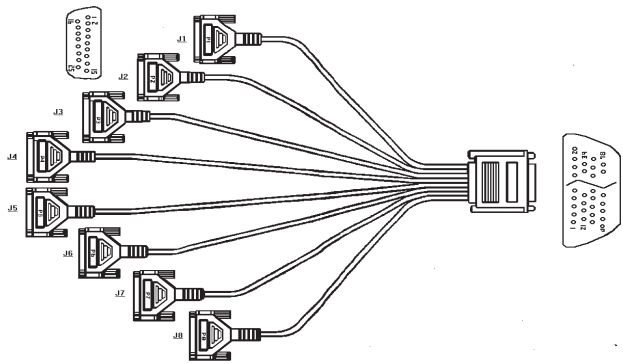

Figure 2-2. Octopus Cable

8 Turn power on to the computer and refer to the manual that was provided with the software you will be using with the ISI4608 in order to perform software installation procedures.

Note: If the ISI4608 card is being used as an expansion card (Remote Node--model #RNI08) for the **Multi**Com**RN***Gateway*, then you must reconfigure the gateway software, using the RASCON.EXE program. You will need to add the card's settings to the Board Information entry and assign access rights to each user under the User Information entry. See Chapter Three of the **Multi**Com**RN***Gateway* Owner's manual for server configuration.

Intelligent Serial Interface

Chapter 3 - Driver Installation

MultiTech Systems

Introduction

This chapter describes software/driver installation for the ISI cards when used in Windows 2000, Windows NT4, Windows NT3.51, Windows 95/98/Me, Novell, Linux, and SCO Open Server 5. We also describe installation of MultiTech's Management Software for use with ISI cards under Windows 2000.

The process of installing a device driver consists of a modification to your system. For this reason, only the "*super user*" (system administrator) is allowed to perform the installation. If you cannot login as the **root**, you must find the person in your organization who has this authorization (i.e., password). To begin the driver installation, login as **root**. Then go to the section of this chapter that deals with the operating system you are using.

Installing ISI4608 Software for Windows 2000

1. Turn off the PC.
2. The ISI4608 card must already be installed in an ISA expansion slot in the PC. If it is not, follow the PC manufacturer's instructions concerning installation of expansion cards. Observe standard precautions regarding electro-static discharge (ESD) when handling the ISI4608 board (the board should be kept in its shipping bag until used). During installation, handle the ISI4608 circuit card by its edges and keep one hand in contact with the PC chassis. Set the Base I/O Address and the Interrupt Request (IRQ) values per the table below:

Recommended Base I/O Address and IRQ Values

ISI4608	Base I/O Address	IRQ
Initial 8 port board	210h	10
First 8 port upgrade	220h	11
Second 8 port upgrade	230h	12
Third 8 port upgrade	240h	15

The I/O Address DIP Switch and the IRQ Jumper Block are at the top middle of the ISI4608 circuit board and on the component side.

3. Turn on the PC and start Windows 2000.
4. Insert the ISI driver CD-ROM into the CD-ROM drive in the computer (in cases where the driver files have been downloaded from the MultiTech web site and copied onto diskette, insert the diskette into the floppy drive now).
5. Go to **Start | Settings | Control Panel | Add/Remove Hardware**.

   Click **Next**.
6. At the **Choose a Hardware Task** screen, select "Add/Troubleshoot a device."

   Click **Next**.
7. At the **Choose a Hardware Device** screen, select "Add a new device."

   Click **Next**.
8. At the **Find New Hardware** screen, select "No, I want to select the hardware from a list."

   Click **Next**.
9. At the **Hardware Type** screen, select "Multi-port serial adapters."

   Click **Next**.
10. At the **Select a Device Driver** screen, click on **Have Disk**.
11. At the **Install from Disk** screen, enter the pathof the driver files (i.e., the file directory location, in most cases on CD-ROM).

    Click **OK**.
12. In the **Models** list, highlight "Multi-Tech ISI4608-ISA 8 Port Serial Card."

    A comment screen appears indicating that the Base I/O Address and IRQ must be specified for the ISI4608 card.

    Click **OK**.
13. The **Add New Hardware Wizard Properties** screen appears.

    A. In the **Resource Settings** field, select "Input/Output Range" and click on Change Setting. The **Edit Input/Output Range** screen appears.

Select the value that matches the Base I/O Address value that you have already set on the ISI4608 board in Step 2. Click **OK**.

B. In the **Resource Settings** field, select "Interrupt Request" and click on **Change Setting**. The **Edit Interrupt Request** screen appears.

Select the value that matches the IRQ value that you have already set on the ISI4608 board in Step 2. Click **OK**. At the **Resources** tab, click **OK** again.

14. At the **Start Hardware Installation** screen, click **Next**.

15. A completion screen appears.

Click **Finish**.

16. You will be prompted to restart your computer. Click **Yes**.

ISI4608 for Windows 2000: Installing ISI Management Software (server OSs only)

If you are using a Windows 2000 Server operating system ("Server" or "Advanced Server"), you must decide whether you want to use the MultiTech ISI Management Software in conjunction with your ISI4608 board. The ISI Management Software is shipped with the ISI card.

1. Turn on your computer and start Windows 2000.

2. Insert the CD-ROM containing the ISI Management Software into your CD-ROM drive. (If ISI Management Software has been downloaded from the MultiTech web site, it will typically be on a diskette. In that case, insert diskette into floppy drive).

3. Go to **Start** | **Run**. In the **Run** window, enter the file path of the ISI Management software. Typically, this would be `E:\SERVCARD\UTILITY\MGMT\SETUP.EXE`.

Click **OK**.

4. The **ISI Management** setup screen appears. At the **Welcome** screen, click **Next**.

5. A progress screen appears while files are copied. If the **Error Creating WWW Server** message appears, it may indicate that there was an attempt to install the ISI Management Software on a client

version of Windows 2000. (The ISI Management Software can be installed only in the *Windows 2000 Server* and *Windows 2000 Advanced Server* operating systems.)

6. A completion screen appears.

Select "Yes, I want to restart my computer now" and click **Finish**.

After the computer has restarted, the installation of the driver and of the ISI Management Software will be complete.

Remove ISI4608 Driver (Windows 2000)

1. Go to **Start** | **Settings** | **Control Panel**.
2. Click on **Add/Remove Hardware**. Click **Next**.
3. Click on “Uninstall/Unplug a device” and click **Next**.
4. In the subsequent screen, click on “Uninstall a device” and click **Next**.
5. At the **Add/Remove Hardware Wizard** screen, highlight the ISI driver file for the specific server card that you intend to remove. Click **Next**.
6. When you are asked to confirm removal, click on the **Yes** radio button and click **Next**.
7. Click **Finish**. You can remove the driver for only one ISI4608 card at a time.

ISI4608 Software Installation Procedure for Windows NT 3.51/4.0

1. Turn off the PC.

2. The ISI4608 card must be installed in an ISA-type expansion slot in the PC. If not, follow the PC manufacturer's instructions concerning installation of expansion cards. Observe standard precautions regarding electro-static discharge (ESD) when handling the ISI4608 board (the board should be kept in its shipping bag until used). During installation, handle the ISI4608 circuit card by its edges and keep one hand in contact with the PC chassis.

Recommended Base I/O Address and IRQ Values

ISI4608	Base I/O Address	IRQ
Initial 8 port board	210h	10
First 8 port upgrade	220h	11
Second 8 port upgrade	230h	12
Third 8 port upgrade	240h	15

The I/O Address DIP Switch and the IRQ Jumper Block are at the top middle of the ISI4608 circuit board and on the component side.

3. Turn on the PC and start Windows NT4.0.

4. Insert the driver CD-ROM into the CD-ROM drive. (If drivers were obtained from MultiTech web site and stored on diskette, place diskette into floppy drive now.)

5. Click **Start | Settings | Control Panel | Network | Adapters**. Then click **Add**.

6. The **Select Network Adapter** dialog box appears. Click **Have Disk**.

7. The **Insert Disk** dialog box appears. Type or browse for the path (file directory location) of the Windows NT driver (for example, E:\SERVCARD\DRIVERS\WINNT\SETUP.EXE). Click **OK**.

8. The **Select OEM Option** dialog box appears. Click **OK**.

A transient dialog box will appear indicating the progress of the setup program.

9. The **ISI Cards** dialog box appears. Click **Add**.

10. Then the **ISI Card Settings** dialog box appears. Enter the correct port count: allocate 8 ports for each ISI4608 card. Select the first port number for ISI modems, which is usually COM3.

Click "ISA" in the **Bus Type** field. Enter the Base I/O Address and IRQ as in Step 2 above.

11. The **ISI Cards** dialog box appears again and shows the port resource allocation just made. To add more cards, click **Add** and repeat Step 9.

After the last ISI card has been added, click **Close**.

12. The file is copied and "Multi-Tech 4, 8, 16-port ISI Card" appears in the **Network Adapters** box. Click **Close**.

13. When prompted about restarting your computer, click **Yes**.

The ISI4608 card software is now installed in Windows NT.

Removing ISI4608 Card and Driver in Windows NT 3.51/4.0

1. Go to **Start | Settings | Control Panel | Network**. Click on the **Adapters** tab.

2. Select "MultiTech 4, 8, 16-port ISI card," and then click **Remove**.

To complete the un-install procedure, restart your computer.

ISI4608 Software Installation Procedure for Windows 95/98/ME

1. Turn off the PC.

2. The ISI4608 card must be installed in an ISA-type expansion slot in the PC. If not, install the ISI4608 card in an available ISA expansion slot following the PC manufacturer's instructions concerning installation of expansion cards. Observe standard precautions regarding electro-static discharge (ESD) when handling the ISI4608 board (the board should be kept in its shipping bag until used). During installation, handle the ISI4608 circuit card by its edges and keep one hand in contact with the PC chassis.

Set the Base I/O Address and the Interrupt Request (IRQ) values per the table below:

Recommended Base I/O Address and IRQ Values

ISI4608	Base I/O Address	IRQ
Initial 8 port board	210h	10
First 8 port upgrade	220h	11
Second 8 port upgrade	230h	12
Third 8 port upgrade	240h	15

The I/O Address DIP Switch and the IRQ Jumper Block are at the top middle of the ISI4608 circuit board and on the component side.

3. Turn on the PC and start Windows 95/98/ME.

4. Insert MultiTech ISI driver CD-ROM into the CD-ROM drive. (If drivers were downloaded from the MultiTech web site and placed on diskette, insert diskette into floppy drive now.)

5. (Follow either 5A or 5B, but not both.)

A. From Windows Explorer, open the **95-98-ME** directory on the CD-ROM or floppy drive that contains the ISI driver file (for example, E:\SERVCARD\DRIVERS\95-98-ME\). Highlight the file **setup.exe**.

B. From the **Start** menu, go to **Run**. Browse to the path of the **95-98-ME** directory.

6. Launch the setup program. (From Windows Explorer, double-click on **setup.exe**; from the **Run** menu, click **OK**.)
7. The installation wizard will begin running. At the **Welcome** screen, click **Next**.
8. Under **Select Type of Card**, check the **Install ISA Card** box. Click **Next**.
9. Specify the number of ports on the card as **8**.
10. A message screen appears.

    Click **OK**.
11. A completion screen appears.

    Click **OK**.
12. The **System Properties | Device Manager** screen appears. Highlight **MultiTech ISI Card**. Click **Properties**.
13. The **MultiTech ISI Card Properties** screen appears.
    Click on the **Resources** tab.
14. Click on **Set Configuration Manually**.
15. Set the "Input/Output Range" to match the Base I/O Setting that you specified on the hardware DIP switch in Step 2 above. Set the "Interrupt Request" to match the IRQ setting you specified on the hardware jumper block in Step 2 above. To alter these parameters, click on the **Change Setting** button.

    16. When editing of IRQs and Base I/O Address settings is complete, click **OK**. Then click **OK** at the **Resources** screen.

    The **System Settings Change** screen appears.
17. When prompted about re-starting your computer, click **Yes**.
18. When the computer is restarted, the software installation will be complete.

Removing the ISI4608 Driver (Windows 95/ 98/Me)

1. Click **Settings**, **Control Panel**, and then double-click **Add/Remove Programs**.
2. From the list box, select **MultiTech ISI Driver Device**.
3. Click **Add/Remove** and follow screen instructions.

NetWare Driver Installation

Multi-Tech Systems provides AIO drivers for the ISI4608 cards, so they can function with Novell compatible asynchronous applications (e.g., NetWare Connect). The AIO driver is simply an NLM (NetWare Loadable Module) that runs on the file server. Drivers must be loaded on the file server where the board is installed. Drivers can be loaded from the file server's console prompt or incorporated for autoloading in the AUTOEXEC.NCF file.

The file AIOMTS.MDC contains Novell (version 3.12 and higher) initialization strings for ISI products not previously listed for use with BorderManager and NetWare Connect. The file AIOMTS.MDC is included on the ISI Product Family CD. To benefit from the AIOMTS.MDC file, you must copy it from the CD to the appropriate directory on your computer.

To use AIOMTS.MDC under BorderManager, RAS, NIAS in 4.2 or 5.x:

Copy AIOMTS.MDC to your System directory.

To use AIOMTS.MDC under Novell NetWare 3.x, 4.1, 4.11 with Netware Connect 2.028 or higher:

Copy AIOMTS.MDC to your System and System/AIO directories.

To install the Multi-Tech AIO driver, copy the file *AIOISIX.NLM* to the system directory of the file server from a workstation on the network. To copy, you can use the following command:

COPY E:\SERVCARD\DRIVERS\NOVELL\AIOSIX.NLM F:\SYSTEM

If you have downloaded the ISI driver from the MultiTech web site onto a diskette, use this command:

COPY A:\NOVELL\AIOISIX.NLM F:\SYSTEM

To load the driver, go to the system or PC console (where the ISI card is installed) and enter the following at the prompt:

LOAD AIOISIX [port=W] [interrupt=X] [name=Y] [note=Z]

The I/O Address DIP Switch and the IRQ Jumper Block are at the top middle of the ISI4608 circuit board and on the component side.

To install the ISI card scripts, copy **aiomdms.mdc** to **f:\system\aio\directory**. Click **Yes** to overwrite the existing aiomdms.mdc file.

Configuring Ports for NetWare Connect

When the driver is installed, it will allocate 8 consecutive COM ports for the ISI4608 card.

To set up NetWare Connect ports, enter **LOAD NWCCON** at the NetWare console prompt. LOAD NWCCON opens the NetWare Connect Configuration Utility. Select the appropriate menu options (modem type, speed, flow control, etc.).

Removing the Driver (Novell)

In Novell, remove file AIOISIX.NLM from the system directory and make the appropriate changes to the *Autoexec.ncf* file.

Error Messages

1. **Error: An ISI4608 does not seem to appear at address X**

   This means that the driver could not find the ISI4608 residing at the address X. Make sure that there is no other device in your system at the same I/O address. Make sure that the ISI4608 is seated properly in the system slot.

2. **Error: ISI4608 rejected the load header**

Error: ISI4608 got out of sync

Error: ISI4608 verify failed at address X

Error: Expected X received Y

Error: Verify got out of sync

All the above errors represent problems with the file server not being able to communicate with the ISI4608. Make sure that you do not have any other device residing in the system at the same I/O address you have chosen for the ISI4608. Power down the server, make sure that the ISI4608 is seated properly in the system slot. Power up the file server and try to load the AIO driver again. If the problem persists, contact the Multi-Tech Technical Support team.

SCO Open Server 5 Driver Installation

The ISI driver for SCO Open Server 5 is shipped on CD-ROM (FAT file system) and can also be downloaded from the Multi-Tech web site. In both cases, the driver files are compressed ("tarred"). Users installing from the CD-ROM should begin at "To install from CD-ROM" directly below. Users installing from a floppy disk should skip down to "To install driver from floppy disk" later in this section. The filename of the SCO5 driver in its tarred form is **sco50x.tar**.

This present installation section is task-oriented with minimal explanation of procedural steps. The section *Multi-Tech Installation Script,* which immediately follows this section, presents additional details to aid in installation.

To install from CD-ROM:

```
# mount -r /dev/cd0 /mnt

# cd /mnt

# cd servcard/drivers/sco50x

#cp sco50x.tar /

# cd <ENTER>
```

To format a floppy disk for SCO5:

1. At the Unix prompt, run the **scosh** program.
2. Select **Manager**.
3. Select **Archive**.
4. Select **Format**.
5. Make sure that Device is pointed to the floppy drive.
6. Select **Continue**.

To untar the driver file and copy files onto floppy disk:

1. Make a temporary directory for the ISI driver files..

   # mkdir /isi

2. Copy the tarred isi driver file into the temporary directory.

   # cp sco50x.tar /isi

3. Untar this file and put its contents into the temporary directory.

   # cd /isi

   # tar xvf sco50x.tar

4. Copy the untarred (inflated or non-compressed) files to a floppy disk

   # cd /isi/unifiedinstimg301

   #scosh

   - Select **Manager**.

   - Select **Archive**.

   - Select **Create**.

   - Press space bar to highlight tmp/ and usr/ directories.

   - Press <ENTER> to copy.

   - Make sure Device is pointed to the floppy disk.

   - Make sure that the “Type” is cpio.

   - Select **Continue**.

5. To verify that the files have been copied onto the floppy disk, use these commands:

scosh

- Select **Manager**.

- Select **Archive**.

- Select **List**.

- Make sure Device is pointed to the floppy disk.

- Select **Continue**.

To install driver from floppy disk

(Users starting with the untarred SCO5 driver on a floppy disk can begin the installation here).

1. Run the **custom** utility.

2. Select **Software**.

3. Select **Install New**.

4 Highlight driver file from local host and select **Continue**.

5. Select as the Media Device “Floppy Disk Drive.”

6. Select .

7. Highlight “Multi-Tech ISA/PCI ...” and select **Install**.

8. Enter **Y** (yes) to continue installing the ISI driver.

9. As many as four ISI4608 cards can be installed in the server. Type 1, 2, 3, or 4, based on the number of ISI4608 cards you are installing in your system. Type the base I/O address and the IRQ value for each card. Be sure that the I/O address and the IRQ value match the values set in the DIP switch and jumper block on the ISI4608 card. (The I/O Address DIP Switch and the IRQ Jumper Block are at the top middle of the ISI4608 circuit board and on the component side.)

For further details see *MultiTech Installation Script* step 1.

10. For the number of pseudo-devices to be created, type **8**.
For further details see *MultiTech Installation Script* step 2.

11. Type **Y** (yes) to accept the prefix for tty ports. For further details see *MultiTech Installation Script* step 3.

12. Type **Y** (yes) to confirm the selection. For further details see *MultiTech Installation Script* step 4.

13. After the driver is installed, press <Enter> to continue. For further details see *MultiTech Installation Script* step 4 (last paragraph) and step 5.

14. Exit the **custom** utility. For further details see *MultiTech Installation Script* step 6.

15. Remove the floppy disk and reboot your computer. For further details see *MultiTech Installation Script* step 7.

MultiTech Installation Script

The Multi-Tech Installation Script for SCO Open Server 5 systems requests information about how many boards you want to install, designations for communication ports and printer ports, and how many pseudo devices you want to create for Multi_View utility. Based on this information, the appropriate driver files will be installed and linked with your system's kernel.

1. This text appears on the screen:

   ```
   You can install up to 4 ISA/PCI cards in a
   system. The PCI cards will be autodetected on
   bootup. Enter the number of ISA cards you
   want to install and configure on your system
   (0-4).
   ```

   Select **0** if your computer has a PCI bus. This tells the SCO operating system to autodetect the ISI cards.

   For ISA-bus cards like the ISI4608, type 1, 2, 3, or 4, depending on how many cards you want to install in the computer.

2. The following text appears on the screen:

   ```
   Multi_View is a utility which will allow you
   to have multiple sessions on terminals that
   have multiple pages of physical memory.  In
   order for this utility to work with
   MultiTech's serial cards, pseudo devices have
   ```

```
to be created in your /dev directory.  These
devices are system-wide resources.

Enter the number of pseudo-devices to be
created for the use of Multi_View utility
(1 - 256).
```

The Multi_View utility initializes the multiple-page capability of terminals with multiple pages of memory. The number specified here is the total number of devices (between 1 and 256) available to all Multi-Tech terminals and it's the number of pseudo devices available to the Multi_View utility.

Specify **8** pseudo devices for each ISI4608 card installed.

For example, if the computer contains three ISI4608 cards, you would enter **24**.

You must initialize each of the eight ports separately using the **enable** command (for example, `enable ttyl1a`).

3. This text appears on the screen and relates to the "/dev" directory.

```
This script also creates the devices in your
system to communicate with the ports of
ISICOM.  The default prefix for the tty ports
is ttyl.  The default prefix for the printer
is prnl.  Is this acceptable? (y/n/q).
```

For most users, it's best to select **y**, which entails accepting the default values. Then proceed to step 4.

Details for use of non-default port/printer values. The /dev directory holds device-information files used by the kernel to access the hardware. When you add an ISI card, you must give the ISI ports unique names so they do not conflict with existing ports or with other devices known to your system. If a device name has already been assigned to an existing device and the operator assigns that name to a new device, then the existing device will be *deleted* when the ISI port using its name is created.

a. To use a non-default base name, type **N** and then enter a basename having less than five characters. The base name you

select will be used for all ports on each card you install. ISI port designations will have this form:
[*basename prefix*][*board number*][*port letter*].

basename: Length is one to four characters.
board number: Values will be 1, 2, 3, or 4, depending on how many ISI cards are installed in your computer.
port letter: For ISI4608, use letters A through H for modems. (For terminal control devices, use lower-case letters as port identifiers.)

Device basename selected: _____

b. After you select a device basename, you are prompted for a printer base name. This prefix identifies each port that supports a terminal with a printer attached to its auxiliary port (for transparent printing). Specify a unique printer base name (printer parameters are outlined in the Multi_Setup Utility section in this manual).

Printer base name selected: _____

When you have specified the device base name and the printer base name, press **Enter** to continue.

4. The confirmation screen lists the values you have selected. The following text appears on the screen (default values are shown):

```
You have chosen the following setup
The tty prefix is ttyl.
The printer prefix is prnl.
Number of Multi_View pseudo devices
[user-specified number].
```

If these values are correct, type **Y** and the installation process will continue. If there is an error in any of the values displayed, type **N** and the first screen displays. Then re-enter the information for each card.

When you accept the confirmation list (by typing **Y**), a series of messages displays while the driver is being installed and the kernel

rebuilt. After the terminals have been added to the Terminal Control database, and when the display says "**Press <Enter> to continue**:", then press **ENTER**. When **Installation complete** displays, press **ENTER** again.

5. Select **Host** and press **ENTER** . Remove the diskette from the drive.
6. Select **Exit** and press **ENTER** .
7. To reboot the system (required), enter the following commands:

   Type **shutdown -g0-y** and press **ENTER**

   OR

   Type **init 6** and press **ENTER** .

   Driver installation for the ISI card now is complete.

Activating Ports in SCO Open Server 5

SCO Open Server 5 provides a device database that monitors the activity of serial ports through which users can log onto the host. If your ISI ports are used by terminals (e.g., to allow users to log onto your host), you must create an entry in the system's device database that furnishes specific information for the terminals that will be used on each ISI port. The database is referenced each time a user attempts to log in. If there is no database entry for a particular terminal, access to the host is denied.

1. Turn on your system and verify that the firmware for each ISI4608 loads successfully. If the firmware for a given ISI4608 card does not load, none of its ports will be accessible. (If this happens, see *Multi-Tech's Administrative Utility* section in this manual.)
2. Type the complete name of the first device you want to create in **usr/lib/uucp/Devices**. Substitute the specific base name, board number, and port letter for the generic parameters in the expression **ttylbx**. Use a lower-case **x** value for local DTE (terminal) support and an upper case **X** value for modem control for each port you want to enable. Example: **ttyl2A** denotes the second ISI card (2) and the first port on that card (A). The port status can be altered later, but one setting must be selected at this time. The ACU line would read as follows:

ACU ttylbX - 9600 ***dialer name***. Replace **b, X** and **dialer-name** with appropriate values.

3. Repeat this process for each port on each board you have installed. **Record the setting you select for each port.**
4. Using device names created in the previous section, type the following command for each port you want to activate: **enable ttylbx**
5. Repeat this command for each port you want to activate, using the lower case letter for local terminal use or upper case for modem control.

Note: *Only one of the options (e.g., modem control or local terminal access) should be enabled for any port at one time. For example, you cannot enable* `ttyl1a` *and then enable* `ttyl1A`*. To change the status of a port, disable the current status (*`disable ttyl1a`*) and then enable it for the desired status (*`enable ttyl1A`*).*

Removing the Driver (SCO Open Server 5)

To remove the Multi-Tech Serial Card Driver, enter the configuration utility (e.g., custom for SCO Open Server 5) and follow instructions to remove the entire driver and rebuild the kernel without the ISI driver. If it is necessary to reinstall the driver due to I/O address or IRQ overlap, remove the driver first.

Note: Remove the driver before permanently removing the ISI card from the computer.

Linux Driver for Multi-Tech ISI Server Cards

LINUX: Pre-Installation Issues

When unpacking the Linux driver, there are two choices, one driver for the 2.0.x kernel (at this writing, it is filename L300_20X.TAR), and one driver that works for both the 2.2.x kernel and the 2.4.x kernel (at this writing, it is filename L305_22X_24X.TAR). Be absolutely positive about which kernel you have! Note that updated driver files may be issued from time to time.

The 'make' utility, GNU C compiler, and the kernel sources need to be installed on your system. If any of these are missing, the compilation will fail. Most later Linux OSs install these elements automatically .

LINUX: Copying the driver from the media

The Linux drivers (for 2.0 and 2.2/2.4 kernels) are shipped in compressed (‘tarred’) form on a CD-ROM formatted with the FAT file system. In some cases, users may download Linux ISI drivers from the MultiTech web site onto diskette (in ext2 format). We present instructions for both situations below.

LINUX: Copying and untarring the driver from CD-ROM

1. Mount the CD-ROM using this command:

   mount /mnt/cdrom

2. Change directory

   cd /mnt/cdrom

3. List the files on the CD-ROM and locate the directory for the kernel in use (2.0 or 2.2/2.4), using this command

   ls

4. Untar the appropriate Linux driver using this command:

> tar vxf *{filename}*/tmp

At this writing, the filename will be either L300_20X.TAR or L305_22X_24X.TAR.

LINUX: Copying and untarring the driver from a floppy

The ISI driver *.tar* file can be copied from a DOS formatted floppy using the 'mcopy' command if the 'mtools' have been installed. Issue 'mcopy a:isilinux.tar <destination folder>' to copy the isilinux.tar (or current driver name) file to the destination folder. As an alternative, the floppy can be manually mounted and the file copied to the required destination folder.

NOTE: To read from a DOS formatted floppy, a kernel with support for the FAT file system (either statically linked in the kernel or as modules) is required.

Steps for copying the driver from a floppy:

1. Linux floppy disks are in ext2 format.
2. Insert Linux driver in drive A: and mount floppy drive.

   > mount -t ext2 /dev/fd0 /mnt/floppy

3. Copy files from floppy to a temporary directory on hard drive.

   > mkdir /isi

   > cd /isi

   > cp /mnt/floppy/kernel_2.2.x/* /isi

After you have copied the installation tar file to a folder, use the command 'tar xvf isilinux.tar' to untar (unzip or de-compress) the installation files in that folder.

LINUX: Driver installation and loading

Execute the 'Install' script to build the driver and to copy the driver and firmware files to the required folder.

> cd /isi

> ./Install

For ISI4608, which are equipped with the ISA-type bus, the installation script requires the user to type in the I/O address and the

IRQ to be used. The installation creates the script file 'ISICOMStart' in the destination folder. 'ISICOMStart' automates the loading process for the driver and firmware.

To view busy I/O address space on your system, enter
cat/proc/ioports

To view busy IRQs, enter:
cat /proc/interrupts

You must load the driver before you can load the firmware. You can load the driver manually using the 'insmod' utility. For ISI4608 cards which are equipped with the ISA-type bus, the I/O base address and the IRQ required by the card also need to be passed as parameters to insmod (this does not apply to ISI cards with the PCI bus). The I/O Address DIP Switch and the IRQ Jumper Block are at the top middle of the ISI4608 circuit board and on the component side.

insmod isicom io=card1, ... card4 irq=card1, ... card4

The PCI cards and their configurations will be auto-detected by the driver.

You can manually load the firmware into all of the installed ISI cards simultaneously by executing the 'frmld' utility in the installation folder. The firmware to all the installed cards can be manually loaded by executing the 'firmld' utility in the installation folder. This utility requires the firmware files (.bin) to be located in the /usr/local/ISICOM/ folder.

LINUX: Setting the baud rate

The 'stty' utility can be used to set the baud rate of a particular port. For example, to set the baud rate of the first port on the first card (ttyM1a) to 38400 bps, execute 'stty 38400 < /dev/ttyM1a'.

The current baud rate can be viewed by executing 'stty < /dev/ttyM1a'.

LINUX: Verifying the ports

Terminal utilities like 'minicom' can be used to verify the ports, 'talk' to the modem, and dial out.

To configure 'minicom' for a particular port, run it with the '-s' option. In the 'serial port setup' menu option, set the serial device to the required ISI port device (for example, '/dev/ttyM1a' for the first port on the first card). Save the configuration for a particular port using the 'save setup as' menu option as, for example, '1a' for the port /dev/ttyM1a. To connect to the port /dev/ttyM1a using minicom the next time, 'minicom 1a' needs to be executed.

LINUX: TTY Devices Created by the Drivers:

Device files corresponding to ports on the ISI card are created in the **/dev** folder. Use **ttyMxy** for normal ports and **cumxy** for corresponding callout ports. Normal ports (**ttyM**) are configured for dial-in connections. Callout ports (**cum**) are used for dial-out connections.

In these expressions (**ttyMxy** and **cumxy**), the letter **x** is the card number (1-4), and **y** is the port designator (a, b, c, ...).

The ISI Linux driver creates the following TTY devices in /dev directory:

- /dev/ttyM1a TO /dev/ttyM1p for the first ISI card
- /dev/ttyM2a TO /dev/ttyM2p for the second ISI card
- /dev/ttyM3a TO /dev/ttyM3p for the third ISI card
- /dev/ttyM4a TO /dev/ttyM4p for the fourth ISI card

For 8-port cards, like the ISI4608, it uses the following:

- /dev/ttyM1a TO /dev/ttyM1h for the first ISI card
- /dev/ttyM2a TO /dev/ttyM2h for the second ISI card
- /dev/ttyM3a TO /dev/ttyM3h for the third ISI card
- /dev/ttyM4a TO /dev/ttyM4h for the fourth ISI card

Devices mapped for ISI4608 cards):

For the ISI4608 card (8 ports):

- /dev/ttyM1a to /dev/ttyM1h *should be mapped for modem ports.*

LINUX -- Dial-in configuration:

To configure a particular port for dial-in, utilities like 'mgetty' need to be installed on the system. If, for example, the port /dev/ttyM2c needs to be configured for a remote-access dial-in connection, an entry of the form 'M2c:12345:respawn:/sbin/mgetty ttyM2c' needs to be added in the /etc/inittab file. After you have made the change, execute 'init q' so that the 'init' process re-reads the inittab file and spawns the mgetty process to wait for an incoming connection. Users can then dial in, use their user names and passwords to log in, and access their accounts on the machine.

To disable dial-in access on a particular port, change the entry in the /etc/inittab file to 'M2c:12345:off:/sbin/mgetty ttyM2c'or just comment-out that entry by prefixing a '#' to the entry on the line.

LINUX -- PPP setup:

The 'PPP-HOWTO' (a document that is available as a part of the 'HOWTO' documentation on most of the distributions under /usr/doc/HOWTO) explains in detail the procedure for configuring a Linux machine as a PPP server. This information is also available at

http://www.interweft.com.au/other/ppp-howto/ppp-howto.html.

The documentation in the PPP-HOWTO is directly applicable to ISI ports.

Note: *A base I/O address of 0, e.g., ISIBaseX=oxo, or omission of these parameters for any card X, disables that particular card.*

Miscellaneous:

Device files corresponding to ports on the ISI4608 cards are created in the **/dev** folder. Use **ttyMxy** for normal ports and **cumxy** for corresponding callout ports. The letter **x** is the card number (1–4), and **y** is the port number, (a–h) for 8-port cards.

Normal ports (**ttyM**) are configured for dial-in connections. Callout ports (**cum**) are used for dial-out connections.

To view busy I/O address space on your system, enter:

cat /proc/ioports

To view busy IRQs, enter:

cat /proc/interrupts

To load the driver manually, use **insmod**.

Example: To load two ISI cards configured with base I/O addresses 0x210 and 0x200 and IRQs 5 and 10, enter the following in the destination folder:

insmod isicom
ISIBase1=0x210
Irq1=5
ISIBase2=0x200
Irq2=10

To remove the driver manually, enter **rmmod isicom**. This removes the driver only if no ISI ports are in use.

Removing the ISI Driver (Linux)

1. Type cd /usr/local. Press Enter.
2. Type rm -r ISICOM. Press Enter.
3. This will remove driver for all ISIHx cards in that Linux server.
4. Remove the isictl file by typing “rm isictl” in the /dev directory.
5. Remove all devices that start with ttyM1x, ttyM2x, ttyM3x and ttyM4x in the /dev directory.

   “rm ttyM1*” “rm ttyM2*”

   “rm ttyM3*” “rm ttyM4*”

Intelligent Serial Interface

Chap 4: Warranty, Service & Tech Support

MultiTech Systems

Warranty, Service & Tech Support

Limited Warranty

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

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

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

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

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

Addendum for North American Products

In the event that service is required, products may be shipped, freight prepaid, to our Mounds View, Minnesota, factory (Multi-Tech Systems, Inc., 2205 Woodale Drive, Mounds View, MN 55112, Attn: Repairs, Serial #_____). A Returned Materials Authorization (RMA) is not required. Return shipping charges (surface) will be paid by MTS. Please include, inside the shipping box, a description of the problem, a return shipping address (must have street address, not P.O. Box), a telephone number, and if the product is out of warranty, a check or purchase order for repair charges.

Extended two-year overnight replacement agreements are available for selected products. Please refer to our Overnight Replacement

Agreement for details on rates and coverages.

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department at 1-800-972-2439. Please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at (800) 328-9717 or (763) 717-5631.

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

Addendum for International Products

Distributors should contact Amex, Inc., for information about the repairs for your Multi-Tech product.

Amex, Inc.
2724 Summer Street NE
Minneapolis, MN 55413 U.S.A.
Tel: +(612) 331-3251
Fax: +(612) 331-3180

Please direct your questions regarding technical matters, product configuration, verification that the product is defective, etc., to our Technical Support department nearest you. When calling the U.S., please direct your questions regarding repair expediting, receiving, shipping, billing, etc., to our Repair Accounting department at +(763) 717-5631 in the U.S.A., or a nearby Multi-Tech office which is listed on the “Multi-Tech Corporate Offices” sheet in this International Distributor Resource Kit.

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

Out of Warranty Repair Cost Charts

See the Multi-Tech web site for current repair rates.

Upgrades and Product Support via Internet

You can access updated versions of firmware, drivers, flash utility programs and other software-related support for ISI4608 server cards

via the MultiTech web site and/or the MultiTech FTP site.

www.multitech.com. Go to **Support** page. Drivers, software, and firmware are available here. Follow links for manuals, replacements, our warranty, and access to our FTP site.

ftp://ftp.multitech.com. **ISI Cards** have their own directory.

Technical Support

Multi-Tech has an excellent technical support staff available to help you get the most out of your Multi-Tech product. If you have any questions about the operation of this product, call Technical Support at (800) 972-2439. Model and serial numbers are located on the Multi-Tech label on the component side of the ISI4608. To display the firmware version, type ATI1 in terminal mode. Software versions are printed on the diskette labels. Before calling Technical Support, note the status of your equipment, including screen messages, diagnostic test results, problems with a specific application, etc.

Send the ISI4608 to this address:

MULTI-TECH SYSTEMS, INC.
2205 WOODALE DRIVE
MOUNDS VIEW, MINNESOTA 55112
ATTN: SERVICE OR REPAIRS

Recording ISI4608 Information

Please fill in the following information on your Multi-Tech product. This will help tech support in answering your questions.

Serial No.: _____
Firmware Version: _____
Driver Version: _____
Operating System: _____
COM Port #: _____

Please note the status of your ISI4608 before calling tech support (e.g., screen messages, diagnostic test results, problems with a specific application, etc.).

Software User License Agreement

The ISI drivers and firmware are licensed by Multi-Tech Systems, Inc. to the original end-user purchaser of the product, hereafter referred to

as *Licensee*. The License includes the distribution diskette or CD-ROM, other accompanying programs, and the documentation.

The ISI drivers and firmware, hereafter referred to as *Software, consists* of the computer program files included on the original distribution diskette.

Licensee agrees that by purchase and/or use of the Software, he hereby accepts and agrees to the terms of this License Agreement.

In consideration of mutual covenants contained herein, and other good and valuable considerations, the receipt and sufficiency of which is acknowledged, Multi-Tech Systems, Inc. does hereby grant to the Licensee a non-transferrable and nonexclusive license to use the Software and accompanying documentation on the following conditions and terms:

The software is furnished to the Licensee for execution and use on a single computer system only and may be copied (with the inclusion of the Multi-Tech Systems, Inc. copyright notice) only for use on that computer system.

The Licensee hereby agrees not to provide or otherwise make available any portion of this software in any form to any third party without the prior express written approval of Multi-Tech Systems, Inc.

Licensee is hereby informed that this Software contains confidential, proprietary, and valuable trade secrets developed by or licensed to Multi-Tech Systems, Inc. and agrees that sole ownership shall remain with Multi-Tech Systems, Inc.

The Software is copyrighted. Except as provided herein, the Software and documentation supplied under this agreement may not be copied, reproduced, published, licensed, sublicensed, distributed, transferred, or made available in any form, in whole or in part, to others, without expressed written permission of Multi-Tech Systems, Inc. Copies of the Software may be made to replace worn or deteriorated copies for archive or backup procedures.

Licensee agrees to implement sufficient security measures to protect Multi-Tech Systems', Inc. proprietary interests and not to allow the use, copying or transfer by any means, other than in accordance with

this agreement.

Licensee agrees that any breach of this agreement will be damaging to Multi-Tech Systems, Inc.

Licensee agrees that all warranties, implied or otherwise, with regard to this Software, including all warranties of merchantability and fitness for any particular purpose are expressly waived, and no liability shall extend to any damages, including consequential damages, whether known to Multi-Tech Systems, Inc. It is hereby expressly agreed that Licensee's remedy is limited to replacement or refund of the license fee, at the option of Multi-Tech Systems, Inc. for defective distribution media. There is no warranty for misused materials.

Neither this Software nor the accompanying documentation may be modified or translated without the written permission of Multi-Tech Systems, Inc.

This agreement shall be governed by the laws of the State of Minnesota. The terms and conditions of this agreement shall prevail regardless of the terms of any other submitted by the Licensee. This agreement supersedes any proposal or prior agreement. Licensee further agrees that this License Agreement is the complete and exclusive Statement of Agreement, and supersedes oral, written, or any other communications between Multi-Tech Systems, Inc. and Licensee relating to the subject matter of this agreement is not assignable without written permission of an authorized agent of Multi-Tech Systems, Inc.

On-Line Warranty Registration

If you want to register your ISI card on-line, you can do so at the following address:

http://www.multitech.com/register

About the Internet

Multi-Tech's Internet presence includes a Web site and an FTP site:

http://www.multitech.com

ftp://ftp.multitech.com

Intelligent Serial Interface

Index

MultiTech Systems

Index

82081106