PXI

NI 8352/8353 User Manual

NATIONAL INSTRUMENTS

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Compliance

Compliance with FCC/Canada Radio Frequency Interference Regulations

Determining FCC Class

The Federal Communications Commission (FCC) has rules to protect wireless communications from interference. The FCC places digital electronics into two classes. These classes are known as Class A (for use in industrial-commercial locations only) or Class B (for use in residential or commercial locations). All National Instruments (NI) products are FCC Class A products.

Depending on where it is operated, this Class A product could be subject to restrictions in the FCC rules. (In Canada, the Department of Communications (DOC), of Industry Canada, regulates wireless interference in much the same way.) Digital electronics emit weak signals during normal operation that can affect radio, television, or other wireless products.

All Class A products display a simple warning statement of one paragraph in length regarding interference and undesired operation. The FCC rules have restrictions regarding the locations where FCC Class A products can be operated.

Consult the FCC Web site at www.fcc.gov for more information.

FCC/DOC Warnings

This equipment generates and uses radio frequency energy and, if not installed and used in strict accordance with the instructions in this manual and the CE marking Declaration of Conformity*, may cause interference to radio and television reception. Classification requirements are the same for the Federal Communications Commission (FCC) and the Canadian Department of Communications (DOC).

Changes or modifications not expressly approved by NI could void the user's authority to operate the equipment under the FCC Rules.

Class A

Federal Communications Commission

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at their own expense.

Canadian Department of Communications

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

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

Compliance with EU Directives

Users in the European Union (EU) should refer to the Declaration of Conformity (DoC) for information* pertaining to the CE marking. Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit ni.com/certification, search by model number or product line, and click the appropriate link in the Certification column.

* The CE marking Declaration of Conformity contains important supplementary information and instructions for the user or installer.

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About This Manual

The *NI 8352/8353 User Manual* contains information about installing, configuring, using, and maintaining the NI 8352/8353.

Conventions

The following conventions appear in this manual:

»	The » symbol leads you through nested menu items and dialog box options to a final action. The sequence **File»Page Setup»Options** directs you to pull down the **File** menu, select the **Page Setup** item, and select **Options** from the last dialog box.
	This icon denotes a note, which alerts you to important information.
	This icon denotes a caution, which advises you of precautions to take to avoid injury, data loss, or a system crash. When this symbol is marked on a product, refer to the *Read Me First: Safety and Radio-Frequency Interference* for information about precautions to take.
bold	Bold text denotes items that you must select or click in the software, such as menu items and dialog box options. Bold text also denotes parameter names.
italic	Italic text denotes variables, emphasis, a cross-reference, or an introduction to a key concept. Italic text also denotes text that is a placeholder for a word or value that you must supply.
monospace	Text in this font denotes text or characters that you should enter from the keyboard, sections of code, programming examples, and syntax examples. This font is also used for the proper names of disk drives, paths, directories, programs, subprograms, subroutines, device names, functions, operations, variables, filenames, and extensions.
monospace bold	Bold text in this font denotes the messages and responses that the computer automatically prints to the screen. This font also emphasizes lines of code that are different from the other examples.

Related Documentation

The following documents contain information that you may find helpful as you read this manual:

- *CompactPCI Specification PICMG 2.0 R 3.0*

- *PXI Hardware Specification, Revision 2.1*

- *PXI Software Specification, Revision 2.1*

- ANSI/IEEE Standard 1014-1987, *IEEE Standard for a Versatile Backplane Bus: VMEbus*

- ANSI/VITA 1-1994, *VME64*

- *NI-VISA User Manual*

- *NI-VISA Programmer Reference Manual*

- *Read Me First: Safety and Radio-Frequency Interference*, National Instruments

1

Getting Started

This chapter describes the key features of the NI 8352/8353 and lists the kit contents and optional equipment you can order from National Instruments.

Unpacking

Carefully inspect the shipping container and the NI 8352/8353 for damage. Check for visible damage to the metal work. Check to make sure all hardware and switches are undamaged. If damage appears to have been caused during shipment, file a claim with the carrier. Retain the packing material for possible inspection and/or reshipment.

What You Need to Get Started

The NI 8352/8353 kit contains the following items:

❑ NI 8352/8353 rack mount controller

❑ *NI 8352/8353 User Manual*

❑ Windows recovery CD/DVD

❑ NI driver CD

❑ Rack mount kit

❑ AC power cable (refer to Table 1-1 for a list of AC power cables)

Table 1-1. AC Power Cables

Power Cable	Reference Standards
Standard 120 V (USA)	ANSI C73.11/NEMA 5-15-P/IEC83
Switzerland 220 V	SEV
Australia 240 V	AS C112
Universal Euro 230 V	CEE (7), II, IV, VII IEC83
North America 240 V	ANSI C73.20/NEMA 5-15-P/IEC83
United Kingdom 230 V	BS 1363/IEC83
Japan 100 V	ANSI C73.11/NEMA 5-15-P/IEC83

If you are missing any of the above items, or if you have the incorrect AC power cable, contact National Instruments.

Key Features

The NI 8352/8353 combines the performance of a PC with a National Instruments remote controller for PXI in a rack-mountable compact 1U form factor.

Mainboard Features

CPU

- Intel Core2 Duo 2.4 GHz/Core2 Quad 2.4 GHz CPU with 800 MHz FSB and 4/8 MB L2 cache

Chipset

- Intel 3000 chipset
- Intel ICH7R chipset
- Intel PXH-V

Memory

- 1 GB memory standard (2×512 MB ECC (32 M $\times 64$ bit), unbuffered, DDR-II)
- Maximum memory supported: 8 GB 533/667 DDR-II SDRAM in 4 DIMM sockets (240 pin)

Slots

- PCI Express x8 slot
- PCI-X 64-bit 133 MHz

Video

- ATI ES 1000 with 16 MB SDRAM

HDD

- 2×250 GB (or greater) SATA hard drive RAID0
- 4×3.5 in. expansion bay SATA

DVD-ROM

- Slim DVD-ROM drive

Onboard LAN

- $2 \times$ Intel 82573V/L Gigabit Ethernet controller

Onboard I/O

- PS/2 keyboard port
- PS/2 mouse port
- Serial port
- VGA port
- Two USB 2.0 ports (rear)
- Two USB 2.0 ports (front)
- Two RJ-45 ports

Power Management Features

- RTC alarm and wake up
- Wake up on LAN (WOL)
- Wake up on serial ring
- Wake up on keyboard/mouse from sleep (S1)
- Wake up on USB from sleep (S1)

- Wake up on PCI
- Supports ACPI S1/S4/S5 functions

Front Panel LEDs

- Power
- LAN activity
- HDD activity
- Thermal trip LED

System Management

- SMB (I^2C)
- Temperature, voltage, and fan monitors
- Chassis intrusion

NI 8352/8353 Description

Figure 1-1 shows the key features of the NI 8352/8353 front panel. For detailed information about the NI 8352/8353 rear panel, refer to Chapter 3, *I/O Information*.
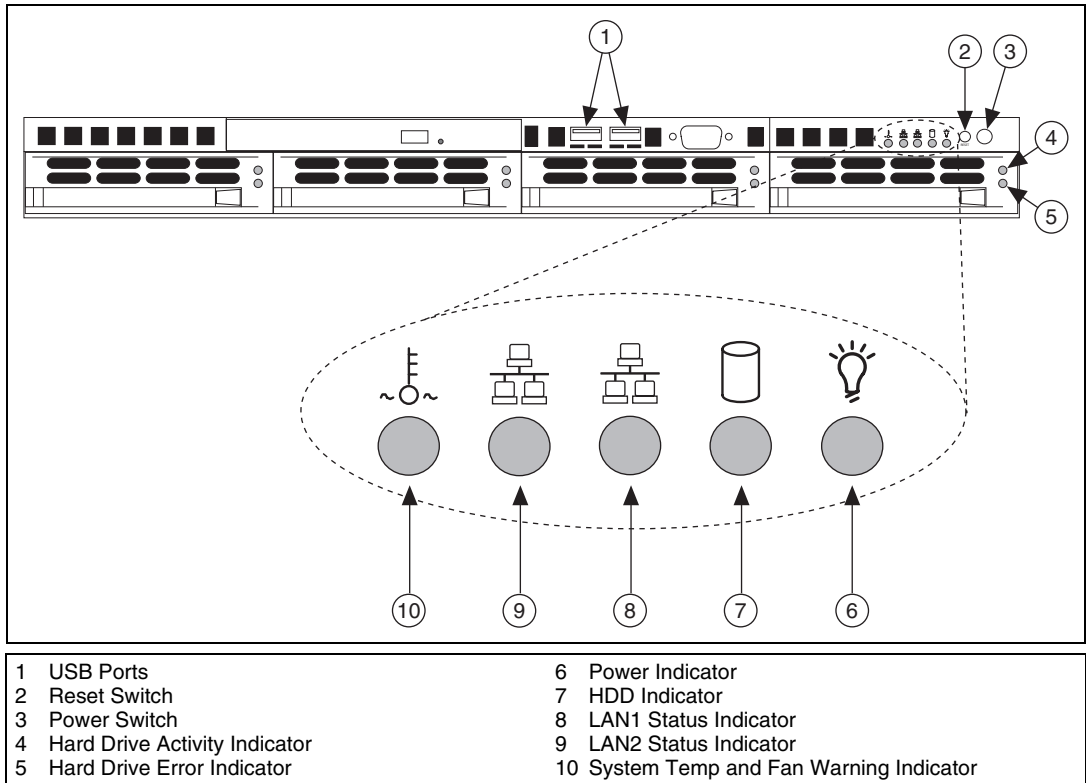

1	USB Ports	6	Power Indicator
2	Reset Switch	7	HDD Indicator
3	Power Switch	8	LAN1 Status Indicator
4	Hard Drive Activity Indicator	9	LAN2 Status Indicator
5	Hard Drive Error Indicator	10	System Temp and Fan Warning Indicator

Figure 1-1. Front View of the NI 8352/8353

The front panel includes the following LEDs:

- **Power indicator**—glows when the NI 8352/8353 is powered on.

- **LAN status indicators**—flash when there is activity on LAN1 or LAN2.

- **Overheat/FanFail LED**

  – Off—Normal

  – On—Overheat

  – Flashing—Fan

Optional Equipment

Memory Upgrades

You can upgrade the NI 8352/8353 memory to a maximum of 8 GB.

Note   A 32-bit operating system such as Windows XP Pro addresses a maximum of 4 GB.

The NI 8352/8353 supports dual-channel DDR-II SDRAM unbuffered memory in four 240-pin DIMM sockets. The NI 8352/8353 supports ECC memory.

Note   National Instruments has tested and verified that the DDR-II DIMMs we sell work with the NI 8352/8353. We recommend you purchase your DDR-II DIMM modules from National Instruments. Other off-the-shelf DDR-II DIMM modules are not guaranteed to work properly.

Rack Mount Kit

A rack mount kit is included for mounting the NI 8352/8353 chassis into a 19 in. instrument cabinet.

USB Floppy Disk Drive

A USB floppy drive is available from National Instruments, part number 778492-02.

NI 8352/8353 Overview

The NI 8352/8353 is a 1U PC-server-based controller for MXI-Express-based control of PXI chassis. The controller provides leading-edge processing power with Intel Pentium Core2 Duo and Core2 Quad processors, high disk bandwidth with hardware RAID support, high I/O bandwidth with a PCI Express x8 slot or an option for a PCI-X slot, and up to 8 GB of memory. The server fits in a 26 in. rack.

National Instruments Software

National Instruments has developed several software kits you can use with the NI 8352/8353.

National Instruments hardware and software work together to help you make the most of your PXI Express system. The LabVIEW, Measurement Studio, and LabWindows™/CVI™ application development environments combine with leading hardware drivers such as NI-DAQmx to provide exceptional control of NI hardware. Instrument drivers are available at `ni.com/idnet` to simplify communication with instruments over a variety of buses.

LabVIEW is a powerful and easy-to-use graphical programming environment you can use to acquire data from thousands of different instruments including USB, IEEE 488.2, VXI, serial, PLCs, and plug-in boards. LabVIEW helps you convert acquired data into meaningful results using powerful data analysis routines. Add-on tools provide additional specialized functionality. For more information, visit `ni.com/labview` and `ni.com/toolkits`.

If you prefer to use Microsoft's Visual Basic, Visual C++, and Visual Studio .NET for the core of your application, Measurement Studio adds tools for measurement and automation to each language. For more information, visit `ni.com/mstudio`.

LabWindows/CVI is an interactive ANSI C programming environment designed for building virtual instrument applications. LabWindows/CVI includes a drag-and-drop editor for building user interfaces, a complete ANSI C environment for building your test program logic, and a collection of automated code generation tools, as well as utilities for building automated test systems, monitoring applications, or laboratory experiments. For more information, visit `ni.com/lwcvi`.

NI-DAQmx provides an extensive library of functions you can call from your application development environment or interactive environment, such as NI Signal Express. These functions provide an intuitive API for National Instruments multifunction DAQ products. Features include analog input (A/D conversion), buffered data acquisition (high-speed A/D conversion), analog output (D/A conversion), waveform generation, digital I/O, counter/timer operations, SCXI signal conditioning, RTSI or PXI synchronization, self-calibration, messaging, and acquiring data to extended memory. For more information, visit `ni.com/daq`.

National Instruments modular instruments use specialized drivers suited to each product's specialization. Express VIs provide customized, interactive programming of instruments in a single interface, and soft front panels provide an interface for testing the functionality of each instrument with no programming required. NI switches, DMMs, high-speed DIO, high-speed digitizers, and sources each have customized drivers for high-end modular instrumentation systems. RF applications leverage two drivers, NI-RFSG and NI-RFSA, and dynamic signal acquisition is available through NI-DAQmx. For more information, visit `ni.com/modularinstruments`.

You can expand the timing and triggering functionality of your PXI system with PXI timing and synchronization products. These products provide precision clock sources, custom routing of triggers for multichassis synchronization, clock sharing, and more, and are programmed with NI-Sync. For more information, visit `ni.com/pxi`.

NI-VISA is the National Instruments implementation of the VISA specification. VISA is a uniform API for communicating and controlling USB, Serial, GPIB, PXI, VXI, and various other types of instruments. This API aids in the creation of portable applications and instrument drivers. For information about writing your own PXI instrument driver with NI-VISA, refer to the *NI-VISA Help* and the `readme.txt` file in the NI-VISA directory. For more information, visit `ni.com/visa`.

With LabVIEW for Linux and support for more than 200 devices on Linux with the NI-DAQmx driver, you can now create virtual instruments based on the Linux OS. The NI-VISA driver for Linux has improved instrument control in Linux, and NI modular instruments are partially supported. For more information, visit `ni.com/linux`.

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Installation and BIOS Setup

This chapter describes how to install, configure, and use the NI 8352/8353.

Before connecting the NI 8352/8353 to a power source, read this chapter and the *Read Me First: Safety and Radio-Frequency Interference* document included with your NI 8352/8353.

Safety Information

⚠ **Caution**   Before undertaking any troubleshooting, maintenance, or exploratory procedure, carefully read the following caution notices.

This equipment contains voltage hazardous to human life and safety, and is capable of inflicting personal injury.

- **Chassis Grounding**—The NI 8352/8353 requires a connection from the premise wire safety ground to the NI 8352/8353 chassis ground. The earth safety ground *must* be connected during use of this equipment to minimize shock hazards. Refer to the *Connecting Safety Ground* section for instructions on connecting safety ground.

- **Live Circuits**—Operating personnel and service personnel must *not* remove protective covers when operating or servicing the NI 8352/8353. Adjustments and service to internal components must be undertaken by qualified service technicians. During service of this product, the mains connector to the premise wiring must be disconnected. Dangerous voltages may be present under certain conditions; use extreme caution.

- **Explosive Atmosphere**—Do *not* operate the chassis in conditions where flammable gases are present. Under such conditions, this equipment is unsafe and may ignite the gases or gas fumes.

- **Parts Replacement**—Service this equipment only with parts that are exact replacements, both electrically and mechanically. Contact National Instruments for replacement part information. Installation of parts with those that are not direct replacements may cause harm to personnel operating the chassis. Furthermore, damage or fire may occur if replacement parts are unsuitable.

- **Modification**—Do *not* modify any part of the NI 8352/8353 from its original condition. Unsuitable modifications may result in safety hazards.

Chassis Cooling Considerations

The NI 8352/8353 is designed to operate on a bench or in an instrument rack. Determine how you want to use the NI 8352/8353 and follow the appropriate installation instructions.

Providing Adequate Clearance

Apertures in the front, top, rear, and along both sides of the chassis facilitate power supply and motherboard cooling. Air enters through the front and top inlets of the chassis and exits through the fans on the rear of the chassis. Place the NI 8352/8353 on a bench top or in an instrument rack so that the fans (air outlets) and the air inlet apertures along the top and front of the chassis have adequate ventilation. Keep other equipment a minimum of 76.2 mm (3 in.) away from the air outlets on the rear of the chassis.

Installation

Follow these steps to connect devices to the NI 8352/8353:

1. Connect a keyboard and mouse to the appropriate connectors on the NI 8352/8353 rear panel.

2. Connect the VGA monitor video cable to the VGA connector on the rear panel.

3. (Optional) To boot into LabVIEW RT, connect the network cable to LAN jack 1 on the rear panel. (Refer to Figure 3-1, *NI 8352/8353 Rear Panel Layout*, for the location of LAN jack 1.)

4. Connect the USB, serial, and parallel devices as necessary to the NI 8352/8353 front and rear panel ports.

⚠ **Caution**   To minimize shock hazard, make sure the electrical power outlet you use to power the NI 8352/8353 has an appropriate earth safety ground. Refer to the *Connecting Safety Ground* section for more information.

5. Connect the AC power cable to the AC inlet on the rear panel and to an AC power outlet. For more information, refer to *Connecting to Power Source* section.

6. Connect the MXI-Express port on the rear of the NI 8352/8353 to the PXI chassis and power on the chassis.

7. Power on the NI 8352/8353.

8. Verify that the NI 8352/8353 boots. If it does not boot, refer to the *What if the NI 8352/8353 does not boot?* section of Chapter 5, *Troubleshooting*.

Connecting Safety Ground

The NI 8352/8353 is designed with a three-position NEMA 5-15 style plug for the U.S. that connects the ground line to the chassis ground. To minimize shock hazard, make sure the electrical power outlet you use to power the chassis has an appropriate earth safety ground.

Connecting to Power Source

Attach input power through the rear AC inlet using the appropriate AC power cable supplied.

⚠ **Caution**   To completely remove power, you *must* disconnect the AC power cable.

The power switch allows you to power on the chassis or place it in standby mode. Push the power switch to the On position (if not already on). Observe that all fans become operational and the power indicator is lit.

BIOS Setup

This section describes all main BIOS setup options.

Use the up/down arrow keys to move among the different settings in each menu. Use the left/right arrow keys to change the options for each setting.

Press <Esc> to exit the CMOS setup menu. The next section describes in detail how to navigate through the menus.

To access submenus, highlight a menu item and press <Enter>.

Main BIOS Setup Menu

Main Setup Features

System Time

To set the system date and time, enter the correct information in the appropriate fields. Press <Enter> to save the data.

System Date

Using the arrow keys, highlight the month, day, and year fields, and enter the correct data. Press <Enter> to save the data.

BIOS Date

This field displays the date when this BIOS version was built.

Legacy Diskette A

Use this setting to set the type of floppy disk drive installed as diskette A. The options are **Disabled**, **360 KB 5.25 in.**, **1.2 MB 5.25 in.**, **720 KB 3.5 in.**, **1.44/1.25 MB 3.5 in.** (default), and **2.88 MB 3.5 in.**

Parallel ATA

Use this setting to enable or disable the function of Parallel ATA. The options are **Disabled**, **Channel 0** (default), **Channel 1**, and **Both**.

Serial ATA

Use this setting to enable or disable the function of Serial ATA. The options are **Disabled** and **Enabled** (default).

Native Mode Operation

Select the native mode for ATA. The options are **Parallel ATA**, **Serial ATA**, **Both**, and **Auto** (default).

SATA Controller Mode

Select **Compatible** to allow the BIOS to detect the SATA and PATA drives automatically and place them in Legacy Mode. Select **Enhanced** to allow the BIOS to detect the SATA and PATA drives automatically and place them in the Native IDE Mode.

Note   The Enhanced mode requires Windows 2000 or later.

When the SATA Controller Mode is set to Enhanced, the following items display.

Serial ATA (SATA) RAID

Select **Enabled** to enable Serial ATA RAID functions. (For Windows, use the RAID driver if this feature is set to Enabled. When this item is set to Enabled, the **ICH RAID Code Base** item is available for you to select activation of either Intel or Adaptec Host RAID firmware. If this item is set to Disabled, the **SATA AHCI Enable** item is available.) The options are **Enabled** and **Disabled** (default).

SATA AHCI

Select **Enabled** to enable the Serial ATA Advanced Host Interface function. (Be careful when using this function. This feature is for advanced programmers only.) The options are **Enabled** and **Disabled** (default).

ICH RAID Code Base

Select **Intel** to enable the Intel SATA RAID firmware. Select **Adaptec** to use Adaptec's HostRAID firmware. The options are **Intel** (default) and **Adaptec**.

IDE Primary Master/Slave, IDE Secondary Master/Slave, SATA Port3, and SATA Port4

Use these settings to set the parameters of IDE Primary Master/Slave, IDE Secondary Master/Slave, and SATA Port3/SATA Port4 slots. Press <Enter> to access the following submenu items. Set the correct configurations accordingly.

Type

Use this option to select the IDE hard drive type. The **Auto** (default) option allows the BIOS to automatically configure the parameters of the HDD installed at the connection. Enter a number between 1 to 39 to select a predetermined HDD type. Select **User** to enter the parameters of the HDD installed. Select **CDROM** if a CDROM drive is installed. Select **ATAPI** if a removable disk drive is installed.

CHS Format

In this format, the BIOS displays the following items:

TYPE: This item displays the IDE or SATA device type.

Cylinders: This item indicates the status of cylinders.

Headers: This item indicates the number of headers.

Sectors: This item displays the number of sectors.

Maximum Capacity: This item displays the maximum system storage capacity.

LBA Format

In this format, the BIOS displays the following items:

Total Sectors: This item displays the number of total sectors available in the LBA format.

Maximum Capacity: This item displays the maximum capacity in the LBA format.

Multi-Sector Transfers

Use this item to specify the number of sectors per block to be used in multisector transfer. The options are **Disabled** (default), **4 Sectors**, **8 Sectors**, and **16 Sectors**.

LBA Mode Control

This item determines whether the Phoenix BIOS accesses the IDE Primary Master Device via the LBA mode. The options are **Enabled** and **Disabled** (default).

32 Bit I/O

Use this option to enable or disable the 32-bit data transfer function. The options are **Enabled** and **Disabled** (default).

Transfer Mode

Use this option to set the transfer mode. The options are **Standard** (default), **Fast PIO1**, **Fast PIO2**, **Fast PIO3**, **Fast PIO4**, **FPIO3/DMA1**, and **FPIO4/DMA2**.

Ultra DMA Mode

Use this option to select Ultra DMA Mode. The options are **Disabled** (default), **Mode 0**, **Mode 1**, **Mode 2**, **Mode 3**, **Mode 4**, and **Mode 5**.

System Memory

This display shows the amount of system memory.

Extended Memory

This display shows the amount of extended memory.

Advanced Setup

Choose **Advanced** from the Phoenix BIOS Setup Utility main menu with the arrow keys. To access submenus, highlight a menu item and press <Enter>.

Boot Features

Access this submenu to change the following settings.

QuickBoot Mode

If enabled, this feature speeds up the Power On Self Test (POST) routine by skipping certain tests after the computer is turned on. The settings are **Enabled** (default) and **Disabled**. If disabled, the POST routine runs at normal speed.

Quiet Boot

Use this setting to enable or disable the graphic logo screen during bootup. The settings are **Enabled** (default) and **Disabled**.

ACPI Mode

Use this setting to employ Advanced Configuration and Power Interface (ACPI) power management on your system. The options are **Yes** (default) and **No**.

Power Button Behavior

If set to **Instant-Off**, the system powers off immediately when you press the power button. If set to **4-sec override**, the system powers off when you press the power button for 4 seconds or longer. The options are **Instant-Off** (default) and **4-sec override**.

Resume on Modem Ring

Select **On** to "wake up" your system when your modem receives an incoming call. The options are **On** (default) and **Off**.

Power Loss Control

Use this setting to choose how the system reacts when power returns after an unexpected power loss. The options are **Stay Off**, **Power On**, and **Last State** (default).

Watchdog

If enabled, this option automatically resets the system if the system is not active for more than 5 minutes. The options are **Enabled** and **Disabled** (default).

Summary Screen

Use this setting to enable or disable the summary screen that displays the system configuration during bootup. The options are **Enabled** (default) and **Disabled**.

Memory Cache

Cache System BIOS Area

Use this setting to designate a reserve area in the system memory as a system BIOS buffer. This allows the BIOS to write (cache) data into this reserved memory area. Select **Write Protect** (default) to enable this function and reserve this area for BIOS ROM access only. Select **Uncached** to disable this function and make this area available for other devices.

Cache Video BIOS Area

Use this setting to designate a reserve area in the system memory as a video BIOS buffer. This allows the BIOS to write (cache) data into this reserved memory area. Select **Write Protect** (default) to enable the function and reserve this area for video BIOS ROM access only. Select **Uncached** to disable this function and make this area available for other devices.

Cache Base 0–512K

If enabled, this feature allows the data stored in the 0–512K memory area to be cached (written) into a buffer, a storage area in static DROM (SDROM), or written into L1, L2 cache inside the CPU to increase CPU operation speed. Select **Uncached** to disable this function. Select **Write Through** to allow data to be cached into the buffer and written into the system memory at the same time. Select **Write Protect** to prevent data from being written into the base memory area of Block 0–512K. Select **Write Back** to allow the CPU to write back data directly from the buffer without writing data to the system memory for fast CPU data processing and operation. The options are **Uncached**, **Write Through**, **Write Protect**, and **Write Back** (default).

Cache Base 512K–640K

If enabled, this feature allows the data stored in the 512K–640K memory area to be cached (written) into a buffer, a storage area in the static DROM (SDROM), or written into L1, L2, L3 cache inside the CPU to increase CPU operation speed. Select **Uncached** to disable this function. Select **Write Through** to allow data to be cached into the buffer and written into the system memory at the same time. Select **Write Protect** to prevent data from being written into the base memory area of Block 512–640K. Select **Write Back** to allow the CPU to write back data directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are **Uncached**, **Write Through**, **Write Protect**, and **Write Back** (default).

Cache Extended Memory

If enabled, this feature allows the data stored in the extended memory area to be cached (written) into a buffer, a storage area in static DROM (SDROM), or written into L1, L2, L3 cache inside the CPU to increase CPU operation speed. Select **Uncached** to disable this function. Select **Write Through** to allow data to be cached into the buffer and written into the system memory at the same time. Select **Write Protect** to prevent data from being written into the system memory area above 1 MB. Select **Write Back** to allow the CPU to write back data directly from the buffer without writing data to the System Memory for fast CPU data processing and operation. The options are **Uncached**, **Write Through**, **Write Protect**, and **Write Back** (default).

Discrete MTRR Allocation

If enabled, Memory Type Range Registers (MTRRs) are configured as distinct, separate units and cannot be overlapped. If enabled, you can achieve better graphic effects when using a Linux graphic driver that requires the write-combining configuration with 4 GB or more memory. The options are **Enabled** and **Disabled** (default).

PCI Configuration

Access this submenu to make changes to the following PCI device settings.

Onboard GLAN1/Onboard GLAN2 (Gigabit-LAN) OPROM Configure

Enable this option to boot from GLAN. The options are **Disabled** and **Enabled** (default).

Reset Configuration Data

If set to **Yes**, this setting clears the Extended System Configuration Data (ESCD) area. The options are **Yes** and **No** (default).

Frequency for PCI-X

Use this option to change the bus frequency for the devices installed in the slot indicated. The options are **Auto** (default), **PCI 33 MHz**, **PCI 66 MHz**, **PCI-X 66 MHz**, **PCI-X 100 MHz**, and **PCI-X 133 MHz**.

Slot1 PCI 32, Slot6 PCI-X 133 MHz, and Slot6 PCI-Exp. x8

Access these submenus to change the following settings.

Option ROM Scan

When enabled, this setting initializes the device expansion ROM. The options are **Enabled** (default) and **Disabled**.

Enable Master

Use this setting to enable the selected device as the PCI bus master. The options are **Enabled** (default) and **Disabled**.

Latency Timer

Use this setting to set the clock rate for Bus Master. A high-priority, high-throughout device may benefit from a greater clock rate. The options are **Default**, **0020h**, **0040h**, **0060h**, **0080h**, **00A0h**, **00C0h**, and **00E0h**. For Unix, Novell, and other operating systems, select the **other** option. If a drive fails after installing new software, you may want to change this setting and try again. A different OS requires a different Bus Master clock rate.

Large Disk Access Mode

This setting determines how large hard drives are accessed. The options are **DOS** (default) or **Other** (for Unix, Novell NetWare, and other operating systems).

Advanced Chipset Control

Access this submenu to change the following settings.

⚠️ **Caution**   Be careful when changing the advanced settings. Incorrect values may cause system malfunction. Also, a very high DRAM frequency or incorrect DRAM timing may cause system instability. When this occurs, revert to the default setting.

Clock Spectrum Feature

If enabled, the BIOS monitors the level of electromagnetic interference caused by the components and attempts to decrease the interference whenever needed. The options are **Enabled** and **Disabled** (default).

ECC Conditions

This setting specifies the ECC error conditions treated as ECC Error Events by the system. The options are **None**, **Single Bit**, **Multiple Bit** (default), and **Both**.

📝 **Note**   This item is available only when memory supports it.

ECC Error Handler

Use this setting to select the type of interrupt activated as a result of an ECC error. The options are **None**, **NMI (Non-Maskable Interrupt)**, **SMI (System Management Interrupt)** (default), and **SCI (System Control Interrupt)**.

📝 **Note**   This item is available only when memory supports it.

Route Port 80h Cycles to

Use this feature to select the bus where debug information is sent. The options are **Disabled**, **PCI** (default), and LPC.

USB Function

Select **Enabled** to enable the function of specified USB devices. The settings are **Enabled** (default) and **Disabled**.

Legacy USB Support

Use this setting to enable support for legacy USB devices. The settings are **Enabled** (default) and **Disabled**.

Advanced Processor Options

Access this submenu to change the following settings.

CPU Speed

This display indicates the installed processor speed.

Frequency Ratio[1]

Use this feature to set the CPU internal frequency multiplier. The options are **Default**, **x12**, **x13**, **x14**, **x15**, **x16**, **x17**, and **x18**.

Hyperthreading[1]

Set to **Enabled** to use hyperthreading for increased CPU performance. The options are **Disabled** and **Enabled** (default).

Machine Checking[1]

Set to **Enabled** to activate machine checking, which allows the CPU to detect and report hardware (machine) errors via a set of model-specific registers (MSRs). The options are **Disabled** (default) and **Enabled**.

L3 Cache[1]

Set to **Enabled** to enable the L3 cache function, which optimizes system and CPU performance. The options are **Disabled** and **Enabled** (default).

---

[1] Available when the CPU supports this feature.

Thermal Management 2[1]

Set to **Enabled** to use thermal management 2 (TM2), which lowers CPU voltage and frequency when the CPU temperature reaches a predefined overheat threshold. Set to **Disabled** to use thermal management 1 (TM1), which regulates CPU clocking via CPU internal clock modulation when the CPU temperature reaches the overheat threshold. The options are **Disabled** and **Enabled** (default).

Adjacent Cache Line Prefetch[1]

The CPU fetches the cache line for 64 bytes if this option is set to **Disabled**. The CPU fetches both cache lines for 128 bytes as comprised if set to **Enabled**. The options are **Disabled** and **Enabled** (default).

C1 Enhanced Mode[1]

Set to **Enabled** to enable Enhanced Halt State, which lowers CPU voltage/frequency to prevent overheating. The options are **Enabled** and **Disabled** (default).

Note Refer to the Intel Web site for detailed information.

Intel Virtualization Technology[1]

Set to **Enabled** to use virtualization technology, which allows one platform to run multiple operating systems and applications in independent partitions, creating multiple "virtual" systems on one physical computer. The options are **Enabled** and **Disabled** (default).

Note When changing this setting, you must power off and restart the system for the change to take effect. Refer to the Intel Web site for detailed information.

No Execute Mode Memory Protection[2]

Set to **Enabled** to enable Execute Disable Bit, which allows the processor to classify areas in memory where an application code can execute and where it cannot. This prevents a worm or virus from creating a flood of codes to overwhelm the processor or damage the system during an attack. The options are **Disabled** and **Enabled** (default).

---

[1] Available only when the CPU supports this feature.

[2] Available only when the OS and CPU support this feature. For more information about hardware/software support for this function, refer to the Intel and Microsoft Web sites.

Processor Power Management[1]

Use this feature to choose the processor power management mode. The options are **Disabled** (default) and **C States Only**. If set to **Disabled**, C states and GV1/GV3 are disabled. If set to **C States Only**, the processor power is controlled through CPU power states in the APCI setting.

I/O Device Configuration

Access this submenu to change the following settings.

KBC Clock Input

Use this setting to select KBC clock frequency. The options are **6 MHz**, **8 MHz**, **12 MHz** (default), and **16 MHz**.

Serial Port A

Use this setting to assign control of serial port A. The options are **Enabled** (user defined, default), **Disabled**, and **Auto** (BIOS or OS controlled).

Base I/O Address

Use this setting to select the base I/O address for serial port A. The options are **3F8** (default), **2F8**, **3E8**, and **2E8**.

Interrupt

Use this setting to select the interrupt request (IRQ) for serial port A. The options are **IRQ3** and **IRQ4** (default).

Serial Port B

Use this setting to assign control of serial port B. The options are **Enabled** (user defined, default), **Disabled**, **Auto** (BIOS controlled) and **OS Controlled**.

Mode

Use this setting to set the type of device connected to serial port B. The options are **Normal** (default) and **IR** (for an infrared device).

Base I/O Address

Use this setting to select the base I/O address for serial port B. The options are **3F8**, **2F8** (default), **3E8**, and **2E8**.

---

[1] Available only when the CPU supports this feature.

Interrupt

Use this setting to select the interrupt request (IRQ) for serial port B. The options are **IRQ3** (default) and **IRQ4**.

Parallel Port

Use this setting to assign parallel port control. The options are **Enabled** (user defined, default), **Disabled**, and **Auto** (BIOS or OS controlled).

Base I/O Address

Use this setting to select the parallel port base I/O address. The options are **378** (default), **278**, and **3BC**.

Interrupt

Use this setting to select the parallel port interrupt request (IRQ). The options are **IRQ5** and **IRQ7** (default).

Mode

Use this setting to specify the parallel port mode. The options are **Output only**, **Bi-Directional**, **EPP**, and **ECP** (default).

DMA Channel

Use this setting to specify the parallel port DMA channel. The options are **DMA1** and **DMA3** (default).

Floppy Disk Controller

Use this setting to assign control of the floppy disk controller. The options are **Enabled** (user defined, default), **Disabled**, and **Auto** (BIOS and OS controlled).

Base I/O Address

Use this setting to select the floppy port base I/O address. The options are **Primary** (default) and **Secondary**.

DMI Event Logging

Access this submenu to change the following settings.

Event Log Validity

This display informs you of the event log validity. It is not a setting.

Event Log Capacity

This display informs you of the event log capacity. It is not a setting.

View DMI Event Log

Highlight this item and press <Enter> to view the event log contents.

Event Logging

Use this setting to enable or disable event logging. The options are **Enable** (default) and **Disable**.

ECC Event Logging

Use this setting to enable or disable ECC event logging. The options are **Enable** (default) and **Disable**.

Mark DMI Events as Read

Highlight this item and press <Enter> to mark the DMI events as read.

Clear All DMI Event Logs

Select **Yes** and press <Enter> to clear all DMI event logs. The options are **Yes** and **No** (default).

Console Redirection

Access this submenu to change the following settings.

COM Port Address

Use this setting to redirect the console to Onboard COM A or Onboard COM B. The options are **Enable** and **Disable** (default).

BAUD Rate

Use this setting to select the BAUD rate for console redirection. The options are **300**, **1200**, **2400**, **9600**, **19.2K** (default), **38.4K**, **57.6K**, and **115.2K**.

Console Type

Use this setting to select the console type for console redirection. The options are **VT100**, **VT100 8bit**, **PC-ANSI 7bit**, **PC ANSI** (default), **VT100+**, and **VT-UTF8**.

Flow Control

Use this setting to select the fl ow control for console redirection. The options are **None**, **XON/XOFF**, and **CTS/RTS** (default).

Console Connection

Use this setting to select the console connection. The options are **Direct** (default) or **Via Modem**.

Continue CR after POST

Use this setting to choose whether to continue with console redirection after the POST routine. The options are **On** and **Off** (default).

Hardware Monitor Logic

CPU Temperature Threshold

Use this option to set a CPU temperature threshold that activates the alarm system when the CPU temperature reaches this threshold. The options are **70 °C**, **75 °C**, **80 °C** (default), and **85 °C**.

Highlight this option and press <Enter> to see monitor data for the following items.

CPU Temperature

This item displays the CPU temperature.

System Temperature

This item displays the system temperature.

Fan1–Fan6 Speeds

If Auto Fan Control is enabled, the BIOS automatically displays the status of the fans indicated in this item.

Fan Speed Control Modes

Use this feature to decide how the system controls the onboard fan speed. The CPU temperature and fan speed are correlative. When the CPU on-die temperature increases, the fan speed also increases, and vice versa. If the option is set to 3-pin fan, voltage controls the fan speed. If the option is set to 4-pin, Pulse Width Modulation (PWM) controls the fan speed. Select **3-pin** if your chassis came with 3-pin fan headers. Select **4-pin** if your chassis came with 4-pin fan headers. Select **Workstation** if your system is

used as a workstation. Select **Server** if your system is used as a server. Select **Disable** to disable the fan speed control function and allow the onboard fans to run constantly at full speed (12 V). Select **4-pin Quiet** (or **Super Quiet**) to lower the fan speed and noise. The options are **Disable** (default), **3-pin (Server)**, **3-pin (Workstation)**, **4-pin (Server)**, and **4-pin (Workstation)**,

Voltage Monitoring

The following items are monitored and displayed:

- Vcore: 1.25 V
- 1.5 V
- –12 V
- Vdimm
- +3.3 V
- +12 V
- 5 Vsb
- 5 VDD
- P_VTT
- Vbat

IPMI

Access this submenu to change the following settings. (This option is available only when an IPMI card is installed in the system.)

IPMI Specification Version

This item displays the current IPMI version.

Firmware Version

This item displays the current firmware version.

System Event Logging

Select **Enabled** to enable IPMI event logging. When this function is set to **Disabled**, the system continues to log events received via system interface. The options are **Enabled** (default) and **Disabled**.

Clear System Event Logging

Select **Enabled** to force the BIOS to clear the system event logs during the next cold boot. The options are **Enabled** and **Disabled** (default).

Existing Event Log Number

This item displays the existing event log number.

Event Log Control

System Firmware Progress

Select **Enabled** to log POST progress. The options are **Enabled** and **Disabled** (default).

BIOS POST Errors

Select **Enabled** to log POST errors. The options are **Enabled** and **Disabled** (default).

BIOS POST Watchdog

Select **Enabled** to enable POST Watchdog. The options are **Enabled** and **Disabled** (default).

OS Boot Watchdog

Select **Enabled** to enable OS Boot Watchdog. The options are **Enabled** and **Disabled** (default).

Timer for Loading OS (Minutes)

Use this setting to set the time value (in minutes) for OS Boot Watchdog by entering a desired number. The default setting is **10** (minutes). (Ignore this option when OS Boot Watchdog is set to **Disabled**.)

Time Out Option

Use this setting to determine what action to take in an event of a system boot failure. The options are **No Action** (default), **Reset**, **Power Off**, and **Power Cycles**.

System Event Log/System Event Log (List Mode)

These options display the System Event (SEL) Log and System Event (SEL) Log in List Mode. The options are **SEL (System Event Log) Entry Number**, **SEL Record ID**, **SEL Record Type**, **Time Stamp**, **Generator ID**, **SEL Message Revision**, **Sensor Type**, **Sensor Number**, **SEL Event Type**, **Event Description**, and **SEL Event Data**.

Realtime Sensor Data

This feature displays information from motherboard sensors, such as temperatures, fan speeds, and voltages of various components.

Security

Use the arrow keys to choose **Security** from the Phoenix BIOS Setup Utility main menu. To display security setting options, highlight the setting using the arrow keys and press <Enter>. This section describes all security BIOS settings.

Supervisor Password Is:

This item indicates if a supervisor password has been entered for the system. **Clear** means such a password has not been used, and **Set** means a supervisor password has been entered.

User Password Is:

This item indicates whether a user password has been entered for the system. **Clear** means such a password has not been used, and **Set** means a user password has been entered.

Set Supervisor Password

To set a supervisor password, highlight **Set Supervisor Password** and press <Enter>. When prompted, enter the supervisor password in the dialogue box, which allows access to the BIOS.

Set User Password

To set a user password, highlight **Set User Password** and press <Enter>. When prompted, enter the user password in the dialogue box, which allows access to the system at bootup.

Fixed Disk Boot Sector

This setting may offer protection against viruses when set to **Write Protect**, which protects the boot sector on the hard drive from having a virus written to it. The options are **Write Protect** and **Normal** (default).

Password on Boot

Use this setting to decide whether a password is required during bootup. The options are **Enabled** (password required, default) and **Disabled** (password not required).

Boot

Use the arrow keys to choose **Boot** from the Phoenix BIOS Setup Utility main menu. For details on how to change the order and specs of boot devices, refer to the **Item Specific Help** window. This section describes all boot BIOS settings.

Boot Priority Order/Excluded from Boot Orders

The items in the boot list section are bootable devices listed in the sequence of boot order as specified. The items included in the candidate list are currently not bootable. Press <+> or <–> to move the device up or down. Press <F> or <R> to specify the type of an USB device, either fixed or removable. You can select one item from the boot list and press <X> to remove it from the list of bootable devices (to make its resource available for other bootable devices). Conversely, you can select an item from the candidate list and press <X> to remove it from the candidate list and place it in the boot list to make it bootable. For details on how to change the priority of boot order of devices, refer to the **Item Specific Help** window.

Exit

Use the arrow keys to choose **Exit** from the Phoenix BIOS Setup Utility main menu. This section describes all Exit BIOS settings.

Exit Saving Changes

Highlight this item and press <Enter> to save any changes you made and exit the BIOS Setup utility.

Exit Discarding Changes

Highlight this item and press <Enter> to exit the BIOS Setup utility without saving any changes you may have made.

Load Setup Defaults

Highlight this item and press <Enter> to load the default settings for all items in the BIOS Setup. These are the safest settings to use.

Discard Changes

Highlight this item and press <Enter> to discard (cancel) any changes you made. You will remain in the setup utility.

Save Changes

Highlight this item and press <Enter> to save any changes you made. You will remain in the setup utility.

Rack Mounting

Note   To rack mount the NI 8352/8353, the chassis must be at least 26 in. deep.

The rack mounting hardware includes:

•   One pair of inner slides to be installed on the chassis.

•   One pair of outer slides to be installed in the rack.

•   Two pairs of short brackets for the front of the outer slides.

Note   One pair of short brackets includes screw threads, and the other pair does not. Use the pair that fits into your rack.

•   One pair of long brackets for the rear of the outer slides.

Installing Inner Slides

Follow these steps to install the inner slides:

1. Locate the right inner slide (the slide used on the right side of the chassis when facing the chassis front panel).

2. Align the four square holes on the right inner slide against the hooks on the right side of the chassis, as shown in Figure 2-1.

3. Securely attach the slide to the chassis with two M4 flathead screws. Repeat steps 1–3 to install the left inner slide to the left side of the chassis.

1	Hooks on Chassis	2	Square Holes on Right Inner Slide	3	Holes for M4 Screws
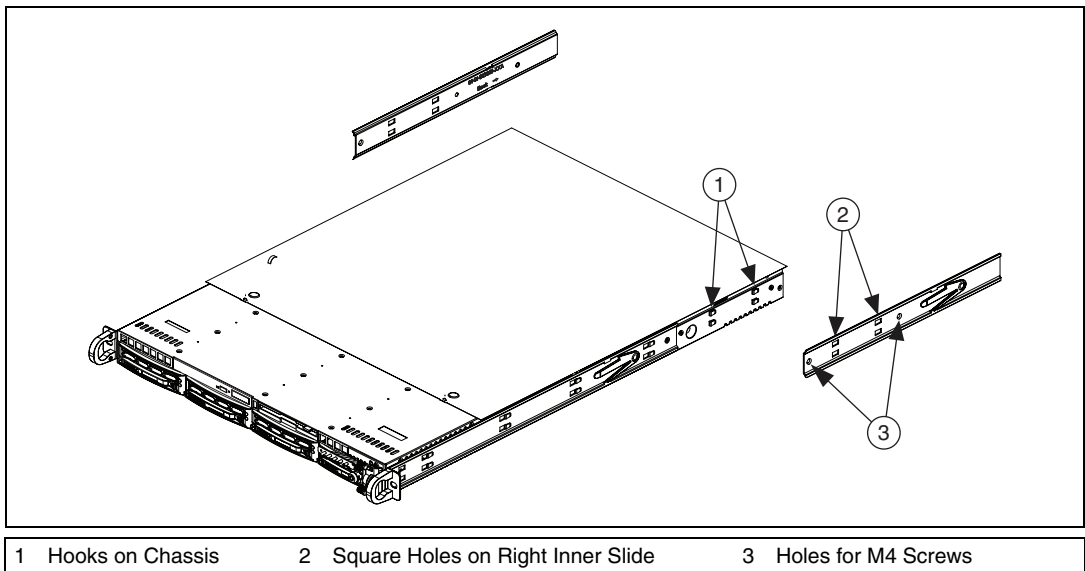
Figure 2-1. Installing Inner Slides

Installing Outer Slides

Follow these steps to install the outer slides:

1. Measure the distance from the front rail of the rack to the rear rail of the rack.

2. Attach a short bracket to the rear of the right outer slide and a long bracket to the front of the right outer slide, as shown in Figure 2-2.

3. Adjust the short and long brackets to the proper distance so that the chassis fits snugly into the rack.

4. Repeat steps 1–3 for the left outer slide.

| 1 | Long Bracket | 2 | Short Bracket |
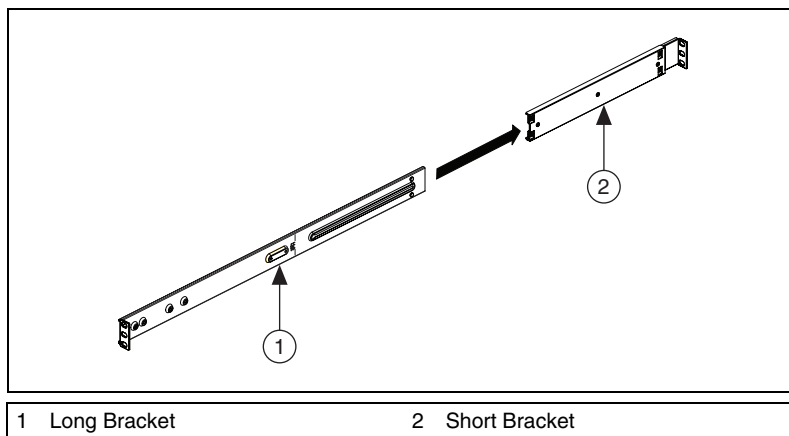
Figure 2-2. Installing Outer Slides

Installing the Slide Assemblies in the Rack

Use the M5 screws and washers to secure the slide assemblies to the rack, as shown in Figure 2-3.

| 1 | M5 Screws and Washers | 2 | Slide Assemblies |
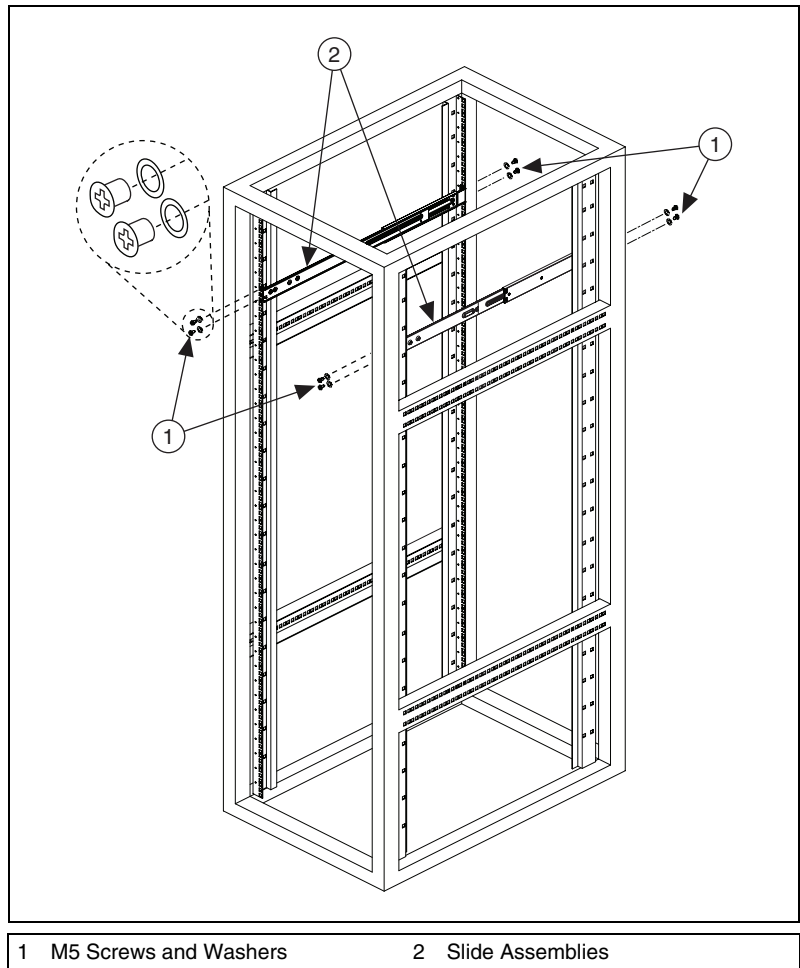
Figure 2-3. Installing Slide Assemblies into Rack

Installing the Chassis into the Rack

Follow these steps to install the chassis in the rack:

1.   Push the inner slides, attached to the chassis, into the grooves of the outer slide assemblies installed in the rack, as shown in Figure 2-4.

1 Inner Slides	2 Grooves of Outer Slide Assemblies
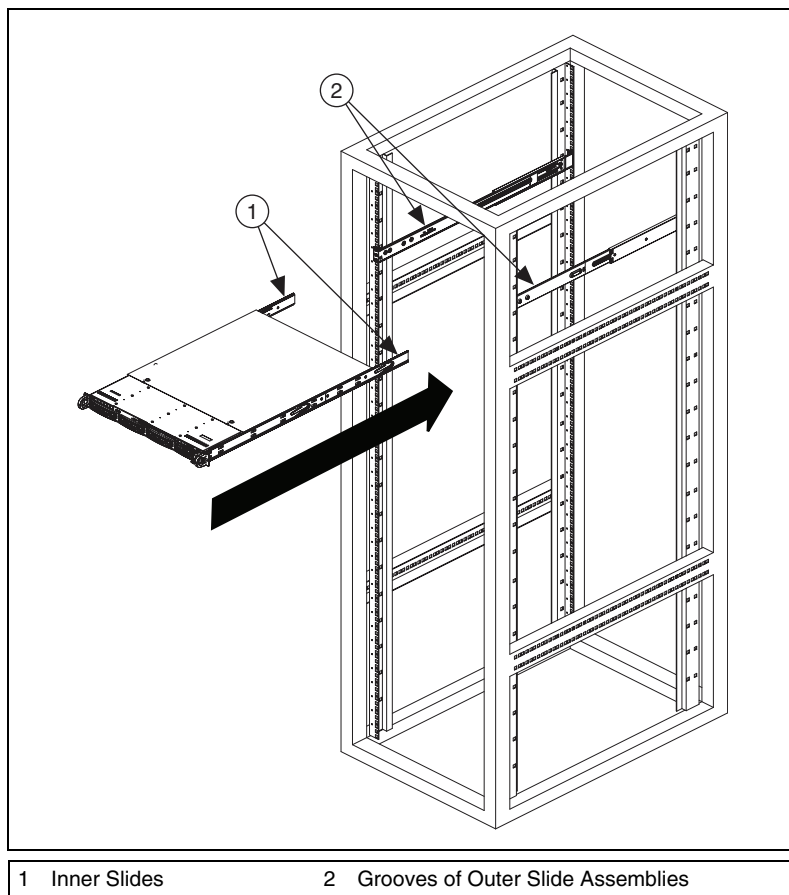
Figure 2-4. Installing Inner Slides into Outer Slides

2. Push the chassis all the way to the back of the outer slide assemblies, as shown in Figure 2-5. (The plastic bezel is not included in the kit.)
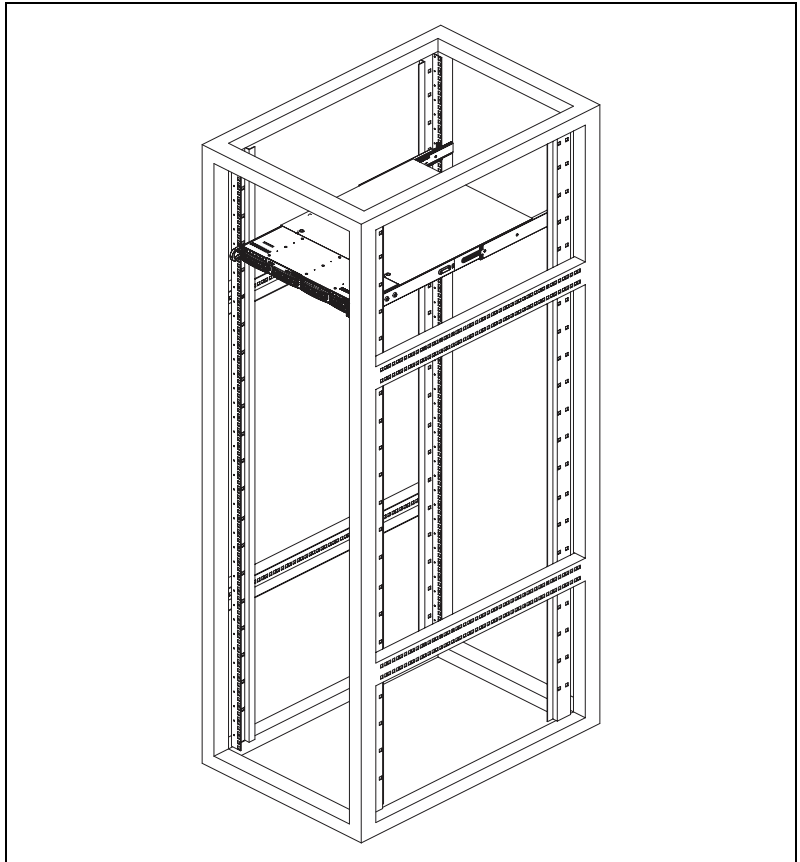
Figure 2-5. Installing Chassis Into Rack

Hard Drive Recovery

The NI 8352/8353 includes two methods of restoring the original factory condition of your hard drive. Hard drive-based recovery stores a factory backup on a separate part of your hard drive, allowing you to restore your controller without additional media. The NI 8352/8353 also ships with an OS Recovery CD that allows you to reinstall your operating system onto your hard drive via an external CD-ROM. For more information about these tools, refer to KnowledgeBase 2ZKC02OK at `ni.com/support`.

✎ **Note**   Recovering the OS erases the contents of your hard disk. Back up any files you want to keep.

Installing an OS

The NI 8352/8353 includes a preinstalled OS. In some cases, you may want to reinstall the OS or install a different OS from the integrated CD-ROM drive. To install from the CD-ROM drive, you must change the boot device; refer to the *Boot Priority Order/Excluded from Boot Orders* section for more information.

Cleaning

⚠ **Caution**   *Always* disconnect the AC power cable before cleaning or servicing the chassis.

Exterior Cleaning

⚠ **Cautions**   Avoid getting moisture inside the chassis during exterior cleaning, especially through the top vents.

Do *not* wash the front- or rear-panel connectors or switches. Cover these components while cleaning the chassis.

Do *not* use harsh chemical cleaning agents; they may damage the chassis. Avoid chemicals that contain benzene, toluene, xylene, acetone, or similar solvents.

Clean the exterior surfaces of the chassis with a dry lint-free cloth or a soft-bristle brush. Do *not* use abrasive compounds on any part of the chassis.

3

I/O Information

This chapter describes the NI 8352/8353 I/O connectors.

Rear Panel Connectors

Table 3-1 lists various peripherals and their corresponding NI 8352/8353 external connectors, bus interfaces, and functions.

Table 3-1. NI 8352/8353 Peripherals Overview

Peripheral	External Connector	Description
Keyboard	PS/2 (5-pin Din)	PS/2-style keyboard
Mouse	PS/2 (5-pin Din)	PS/2-style mouse
USB	USB 4-pin Series A stacked receptacle	USB 2.0 capable
USB	USB 4-pin Series A stacked receptacle	USB 2.0 capable
Serial	COM1 (9-pin DSUB)	16550 RS-232 serial port
Video	VGA (15-pin DSUB)	Intel Extreme Graphics controller
Ethernet	LAN (RJ45)	10/100/1000 Ethernet connection
Ethernet	LAN (RJ45)	10/100/1000 Ethernet connection

Figure 3-1 shows the rear panel layout of the NI 8352/8353.

1	PS/2 Mouse Connector	3	USB Ports	5	VGA Port	7	LAN 2
2	PS/2 Keyboard Connector	4	Serial Port	6	LAN 1		
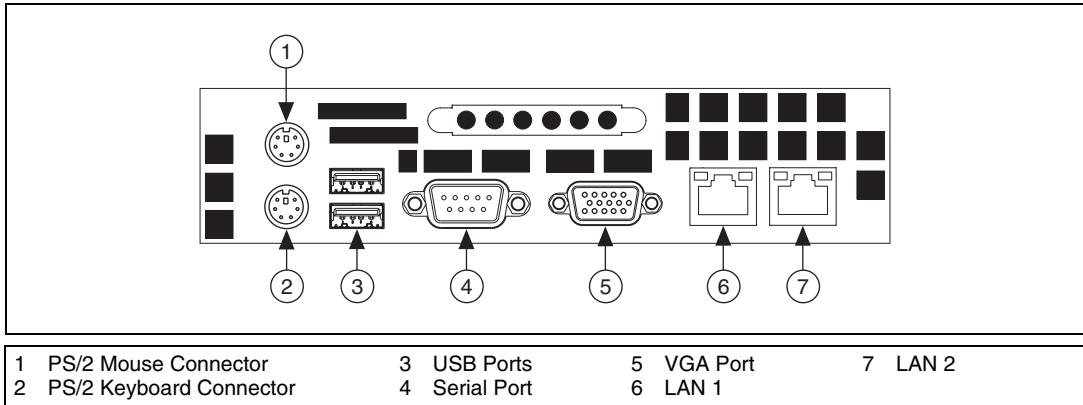
Figure 3-1. NI 8352/8353 Rear Panel Layout

PS/2

Figure 3-2 shows the location and pinouts for the PS/2 keyboard and mouse connectors on the NI 8352/8353. Table 3-2 lists and describes the PS/2 connector signals.
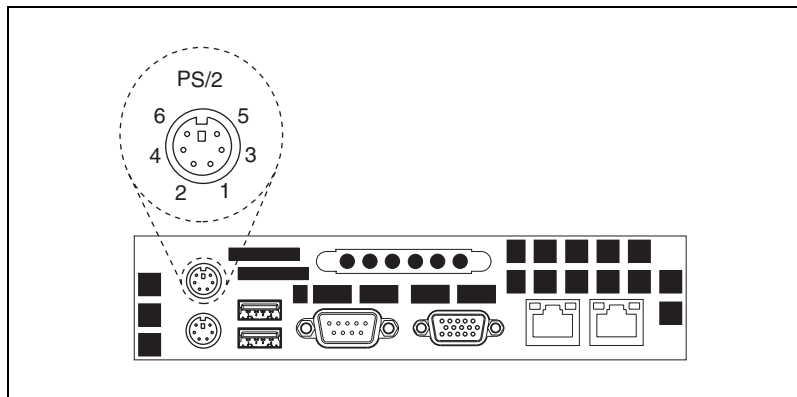
Figure 3-2. PS/2 Connector Location and Pinout

Table 3-2. PS/2 Connector Signals

Pin	Signal Name	Signal Description
1	DATA	Data Keyboard
2	NC	Data Mouse

Table 3-2. PS/2 Connector Signals (Continued)

Pin	Signal Name	Signal Description
3	GND	Ground
4	VCC	VCC
5	CLK	Clock Keyboard
6	NC	Clock Mouse

Universal Serial Bus

Figure 3-3 shows the location and pinouts for the Universal Serial Bus (USB) connectors on the NI 8352/8353. Table 3-3 lists and describes the USB connector signals.

AMP manufactures a USB mating connector, part number 787633.
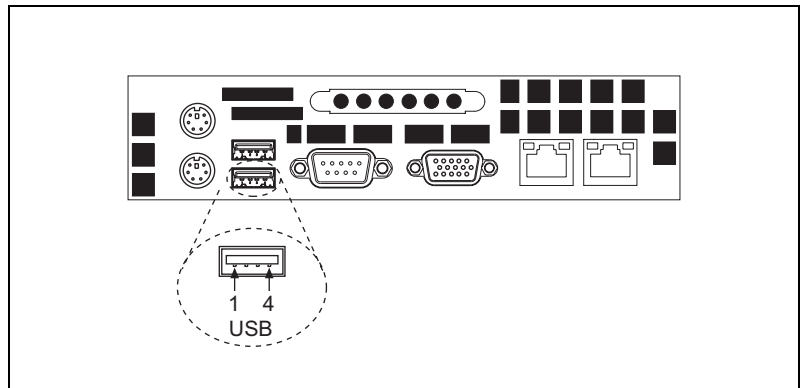
Figure 3-3. USB Connector Location and Pinout

Table 3-3. USB Connector Signals

Pin	Signal Name	Signal Description
1	VCC	Cable Power (+5 V)
2	–Data	USB Data–
3	+Data	USB Data+
4	GND	Ground

Serial

Figure 3-4 shows the location and pinouts for the serial connector on the NI 8352/8353. Table 3-4 lists and describes the serial connector signal.

AMP manufactures a serial port mating connector, part number 745491-5.
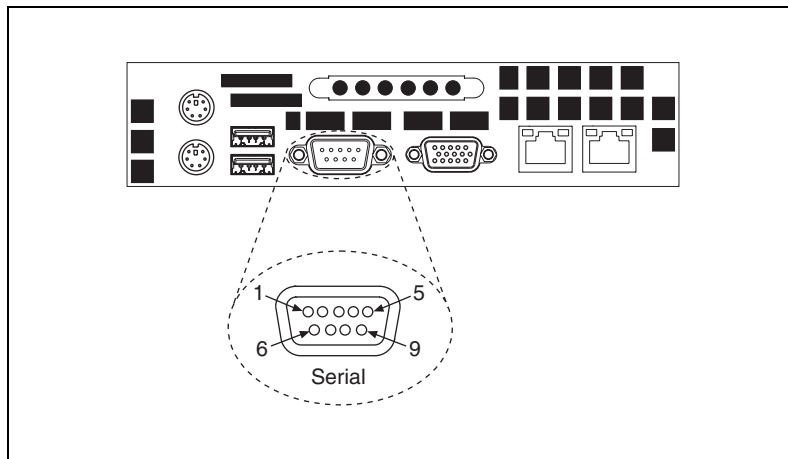
Figure 3-4. Serial Connector Location and Pinout

Table 3-4. Serial Connector Signals

Pin	Signal Name	Signal Description
1	DCD*	Data Carrier Detect
2	SIN*	Receive Data
3	SOUT*	Transmit Data
4	DTR*	Data Terminal Ready
5	GND	Ground
6	DSR*	Data Set Ready
7	RTS*	Ready to Send
8	CTS*	Clear to Send
9	RI*	Ring Indicator

VGA

Figure 3-5 shows the location and pinouts for the VGA connector on the NI 8352/8353. Table 3-5 lists and describes the VGA connector signals.

AMP manufactures a mating connector with part numbers 748364-1 (housing) and 748333-2 (pin contact).
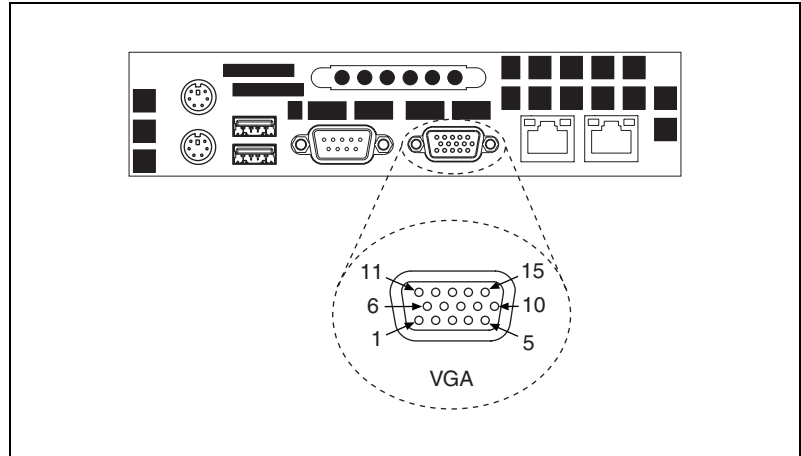
Figure 3-5. VGA Connector Location and Pinout

Table 3-5. VGA Connector Signals

Pin	Signal Name	Signal Description
1	R	Red
2	G	Green
3	B	Blue
4	NC	Not Connected
5	GND	Ground
6	GND	Ground
7	GND	Ground
8	GND	Ground
9	+5V	5 V
10	GND	Ground
11	NC	Not Connected
12	SD	Serial Data
13	HSync	Horizontal Sync
14	VSync	Vertical Sync
15	SC	Serial Clock

Ethernet

Figure 3-6 shows the location and pinouts for the Ethernet connectors on the NI 8352/8353. Table 3-6 lists and describes the Ethernet connector signals.

AMP manufactures a mating connector, part number 554739-1.
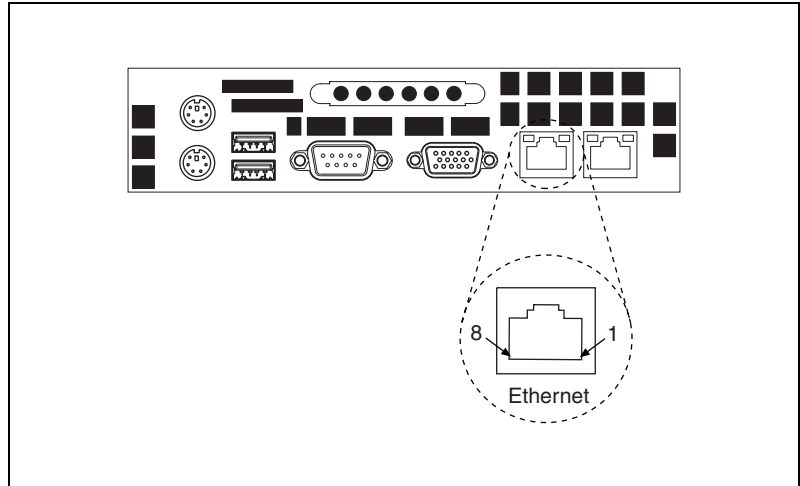
Figure 3-6. Ethernet Connector Location and Pinout

Table 3-6. Ethernet Connector Signals

Pin	Signal Name	Signal Description
1	D0P	Differential Pair 0+
2	D0N	Differential Pair 0–
3	D1P	Differential Pair 1+
4	D2P	Differential Pair 2+
5	D2N	Differential Pair 2–
6	D1N	Differential Pair 1–
7	D3P	Differential Pair 3+
8	D3N	Differential Pair 3–

MXI-Express Connectors

Refer to your MXI-Express hardware user manual for connector information.

4

Common Configuration Questions

This chapter answers common configuration questions you may have when using the NI 8352/8353.

General Questions

What do the LEDs on the NI 8352/8353 front panel mean?

The power indicator lights when the main power is turned on. The LAN status LEDs flash to when there is activity on LAN1 and LAN2. The hard drive LED lights when there is hard drive activity on the NI 8352/8353. For more information, refer to Figure 1-1, *Front View of the NI 8352/8353*.

How do I check the configuration of the memory, hard drive, time/date, and so on?

You can view these parameters in the BIOS setup. To enter the BIOS setup, reboot the NI 8352/8353 and press <Delete> during the memory tests. Refer to the *BIOS Setup* section of Chapter 2, *Installation and BIOS Setup*, for more information.

Can I use the internal SATA drive and an external hard drive at the same time?

Yes.

Boot Options

What devices can I boot from?

The NI 8352/8353 can boot from the following devices:

• The internal SATA hard drive

• The internal CD-ROM drive

• A network PXE server on the same subnet

- An external USB mass storage device such as a USB hard drive or
  CD-ROM

Note   You should enable Legacy USB support to boot from USB devices. Refer to the
BIOS Setup section of Chapter 2, *Installation and BIOS Setup*, for more information.

- An external USB floppy drive

Note   There are some limitations when booting from a USB device. Windows XP
can be installed from a USB CD-ROM, but earlier versions of Windows cannot. The
NI 8352/8353 BIOS configures the USB devices so that they will work in a DOS
environment.

How do I configure the controller to boot from these devices?

Press <Delete>, enter the BIOS, and select **Boot**. You can set the boot order
using <+> and <–>. Set the order by device type and set the order for the
devices listed within the device type. Refer to *BIOS Setup* in Chapter 2,
Installation and BIOS Setup, for more information.

Chassis Configuration

How do I set up the NI 8352/8353 to work with my PXI chassis?

Configuration of the PXI system is handled through Measurement &
Automation Explorer (MAX), included with the software pre-installed
on your NI 8352/8353. MAX creates the `pxisys.ini` file, which defines
the layout and parameters of your PXI system.

The configuration steps for single or multiple-chassis systems are the same.
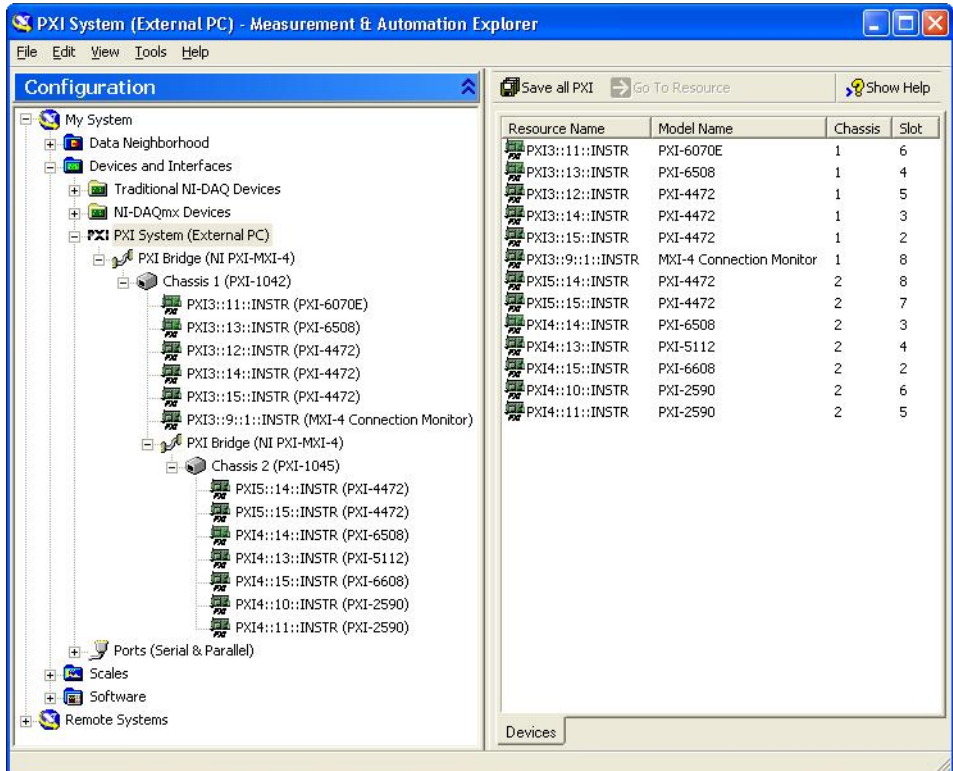
Figure 4-1. Multichassis Configuration in MAX

Basic PXI System Configuration

1. Launch MAX.

2. In the **Configuration** tree, click the **Devices and Interfaces** branch to expand it.

3. If the PXI system controller has not yet been configured, it is labeled **PXI System (Unidentified)**. Right-click this entry to display the pop-up menu, then select the appropriate controller model from the **Identify As** submenu.

4. Click the **PXI System** controller. The chassis (or multiple chassis in a multichassis configuration) is listed below it. Identify each chassis by right-clicking its entry, then selecting the appropriate chassis model through the **Identify As** submenu. Further expanding the **PXI System** branch shows all devices in the system that can be recognized by NI-VISA. When your controller and all your chassis are identified, the required pxisys.ini file is complete.

The PXI specification allows many combinations of PXI chassis and system modules. To assist system integrators, the manufacturers of PXI chassis and system modules must document the capabilities of their products. The minimum documentation requirements are contained in .ini files, which consist of ASCII text. System integrators, configuration utilities, and device drivers can use these .ini files.

The capability documentation for the chassis is contained in a chassis.ini file provided by the chassis manufacturer. The information in this file is combined with information about the system controller to create a single system initialization file called pxisys.ini (PXI System Initialization). The NI 8352/8353 uses MAX to generate the pxisys.ini file from the chassis.ini file.

Device drivers and other utility software read the pxisys.ini file to obtain system information. For detailed information about initialization files, refer to the PXI specification at www.pxisa.org.

Upgrade Information

How do I upgrade system memory?

Refer to *Upgrading Memory* in Appendix B, *Hardware Configuration*.

How do I flash a new BIOS?

You can download the new BIOS from ftp.ni.com/support/pxi/. For more information, refer to KnowledgeBase 3H3COSD8 at ni.com.

Where do I get the latest software drivers?

The latest National Instruments software is available from ni.com/ downloads/. For peripheral drivers, refer to KnowledgeBase 3H3COSD8 at ni.com.

My NI 8352/8353 does not have an internal floppy drive. Is there a way to use an external drive?

Yes. The NI 8352/8353 controller supports and can boot from USB floppy drives. A USB floppy drive will not work with Windows NT4, but will work with Windows 2000 or Windows XP. Refer to the *Boot Options* section for more information.

A USB floppy drive is available from National Instruments, part number 778492-02.

5

Troubleshooting

This chapter answers common troubleshooting questions you may have when using the NI 8352/8353.

What if the NI 8352/8353 does not boot?

Several problems can cause a controller not to boot. Here are some things to look for and possible solutions.

Things to Notice:

- Which LEDs come on? The power indicator LED should stay lit. The hard disk drive LEDs should blink during boot as the disk is accessed.

- What appears on the display? Does it hang at some particular point (BIOS, Operating System, and so on)? If nothing appears on the screen, try a different monitor. Does your monitor work with a different PC? If it hangs, note the last screen output that you saw for reference when consulting National Instruments technical support.

- What has changed about the system? Did you recently move the system? Was there electrical storm activity? Did you recently add a new module, memory chip, or piece of software?

- Has the system overheated? If the Overheat/FanFail LED is lit, this indicates overheating. Unplug the AC power cord from the server and allow it to cool down before powering it on again.

Things to Try:

- Make sure the NI 8352/8353 is plugged in to a working power source.

- Remove any nonessential cables or devices.

- Make sure the CPU and memory modules are properly seated in their slots.

- Clear the CMOS. (Refer to the *Clear CMOS Jumper: JBT1* section of Appendix B, *Hardware Configuration*.)

- Recover the hard drive on the NI 8352/8353. (Refer to the *Hard Drive Recovery* section of Chapter 2, *Installation and BIOS Setup*.)

My NI 8352/8353 boots fine until I get to Windows, at which point I cannot read the screen. This may include garbled output, white screen, black screen, or an out of synch message from the monitor.

This problem usually results from having the video card output set past the limits of the monitor. You will need to boot Windows in Safe Mode. To do this, reboot the NI 8352/8353. As Windows begins to boot, hold down <F8>. You should now be able to reset the video driver to lower settings. Try setting the resolution to 640 × 480 and the refresh rate to 60 Hz. Once you reboot, you can raise these values again, using the test option in Windows. These settings are accessible through the **Advanced** tab of the **Display** item in the **Control Panel**. Alternately, you can try a different monitor, preferably a newer and larger one.

My system boots fine as long as a particular module is not in my chassis.

The most common cause of this is a damaged module. Try the module in a different chassis or with a different controller. Also, remove any external cables or terminal blocks connected to the system. If the module does not work in these cases, it is likely damaged. Contact the module manufacturer for further troubleshooting.

Refer to the KnowledgeBase or product manuals section at `ni.com` for more information specific to the chassis and module with which you are having difficulties.

How do I set Windows to prompt me before shutting down when I press the power button?

Select **Start»Control Panel»Power Options** to open the **Power Options Properties** window. Select the **Advanced** tab. In the **Power buttons** section, select **Ask me what to do** from the pull-down menu. When this is selected, Windows prompts you to cancel, shut down, or restart when you press the power button.

A

Specifications

This appendix lists the NI 8352/8353 electrical, mechanical, and environmental specifications.

Electrical

AC Input

Input voltage range................................. 100–240 VAC

Operating voltage range[1]........................ 90–264 VAC

Input frequency .... 50/60 Hz

Operating frequency range[1] .... 47–63 Hz

Input current rating................................ 5 A max

Power disconnect .... The AC power cable provides main power disconnect. Depressing the front panel power switch enables or inhibits the internal power supply.

Mainboard

Socket.. LGA 775

Chipset .... Intel 3000 chipset, supports 533/800/1066 MHz FSB, 8 GB dual-channel DDR-II memory

Memory Slots.. Four 240-pin DIMM slots, two per channel

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[1] Operating range is guaranteed by design.

PCI/PCI Express ....One PCI Express x8 slot or
one PCI 32-bit slot
(both risers included)

SATA..Four SATA ports compliant with
the Serial-ATA 2.0 specification.
Maximum data rate of 300 MB/s.

IDE...One primary IDE connector and
one CompactFlash card IDE
connector. (If the CompactFlash
card connector is populated, the
primary connector is available for
one device only; otherwise, the
primary connector can connect
multiple devices.)

USB ports ....Four USB 2.0 ports

Keyboard ....PS/2 keyboard port

Mouse ....PS/2 mouse port

Video ....VGA port, onboard ATI ES 1000
with 16 MB SDRAM

Serial..One RS-232 serial port

LAN ....Two RJ45 LAN jacks

Onboard LAN controller ....Intel 82573V/L Gigabit Ethernet
controller

CPU

CPU ....Intel Core2 Duo/Core 2 Quad

Clock speed...2.40 GHz

Front side bus speed ....1066 MHz

L2 cache..4/8 MB

Package...LGA 775

Hard Disk Drive

Capacity .... 250 GB in one, two, or four-drive configurations for maximum capacity of 1 TB

Interface .... Serial-ATA

Memory

Standard memory .... 2×512 MB (32 M $\times 64$ bit), DDR-II SDRAM, ECC 667 MHz, unbuffered, 240-pin DIMMs

2 GB memory upgrade .... Standard memory plus 2×1 GB (128 M $\times 64$ bit), DDR-II SDRAM, ECC 533 MHz, unbuffered, 240-pin DIMMs

4 GB memory upgrade .... 4×1 GB (128 M $\times 64$ bit), DDR-II SDRAM, ECC 667 MHz, unbuffered, 240-pin DIMMs,

Mechanical

Overall dimensions (standard chassis)

Height... 43 mm (1.70 in.)
Width .... 437 mm (17.2 in.)
Depth... 503 mm (19.8 in.)

Weight.. 8.6 kg (19.0 lbs)

Environmental

Operating temperature for NI 8352........ 5 to 40 °C

Operating temperature for NI 8353........ 5 to 35 °C

Storage temperature .... −10 to 60 °C

Relative humidity

Operating .... 10 to 90% noncondensing
Nonoperational (storage) .... 5 to 95% nonconducting

Operating location................................. Indoor use

Altitude ....2,000 m

Installation Category..............................II

Pollution Degree 2

Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

*   IEC 60950-1, EN-60950-1
*   UL 60950-1, CSA 60950-1

Note   For UL, Demko, and other safety certifications, refer to the product label or visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

This product is designed to meet the requirements of the following standards of EMC for electrical equipment for measurement, control, and laboratory use:

*   EN 55024, CISPR 24 EMC requirements
*   EN 55022, CISPR 22 Emissions; Class A
*   CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A

Note   For EMC compliance, operate this device with shielded cabling.

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

*   2006/95/EC; Low-Voltage Directive (safety)
*   2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Note   Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain the DoC for this product, visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

Environmental Management

National Instruments is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial not only to the environment but also to NI customers.

For additional environmental information, refer to the *NI and the Environment* Web page at `ni.com/environment`. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers   At the end of their life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit `ni.com/environment/weee.htm`.

电子信息产品污染控制管理办法 （中国 RoHS）

中国客户   National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。
关于 National Instruments 中国 RoHS 合规性信息，请登录 `ni.com/environment/rohs_china`。
(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

B

Hardware Configuration

This appendix describes how to configure and upgrade the NI 8352/8353 hardware.

⚠ **Caution** **Hazardous Voltage Area**

No user (operator) serviceable parts are inside the NI 8352/8353.

The hardware configuration and upgrade procedures described in this appendix must be performed only by a qualified service technician.

Disconnect the power cord before servicing.

Figure B-1 shows the key features of the NI 8352/8353 mainboard.

1 Intel 3000 North Bridge	16 PCI-X 133 MHz/Slot6	33 JWOR
2 24-Pin ATX PWR/	17 Fan2	34 LE1
JPW1	18 Fan3	35 Battery
3 Fan6/CPU Fan	19 JWD	36 USB5/6 J46
4 PXH-V	20 JPF	37 JBT1
5 Pentium Core2 Duo	21 WOL	38 USB3/4 J45
CPU LGA 775	22 BIOS	39 J4 IDE (Compact Flash
6 Fan1	23 SATA3	Card Only)
7 8-Pin PWR/JPW2	24 SATA2	40 ICH7R South Bridge
8 JPR1	25 SATA1	41 J9
9 PW3	26 SATA0/JS1	42 J27/Floppy
10 DIMM 1A/DIMM 1	27 Fan4	43 COM2
11 DIMM 1B/DIMM 2	28 IDE1/J3	44 PCI 32-Bit 33 MHz/Slot1
12 DIMM 2A/DIMM 3	29 JP3	45 J30/Printer
13 DIMM 2B/DIMM 4	30 Buzzer	46 JPG1
14 JLED	31 JWF1	47 S I/O
15 FP CTRL/JF1	32 JL1	48 LE 4

49 LE 3
50 VGA CTRL
51 LAN CTRL
52 JPL2
53 JPL1
54 IPMI
55 JI^{2}C2
56 JI^{2}C1
57 LAN CTRL
58 Fan5
59 GLAN2
60 GLAN1
61 SXB-E1 PCI-Ex8/J42
62 VGA/J6
63 COM1/J31
64 USB 1/2/J15
65 PS/2 KB/Mouse/J28

Figure B-1. NI 8352/8353 Mainboard Layout

Jumper Settings

Figure B-2 shows the jumper locations on the NI 8352/8353.

1	JI²C1	4	JPL2	7	JP3
2	JI²C2	5	JPG1	8	JPF
3	JPL1	6	JBT1	9	JWD
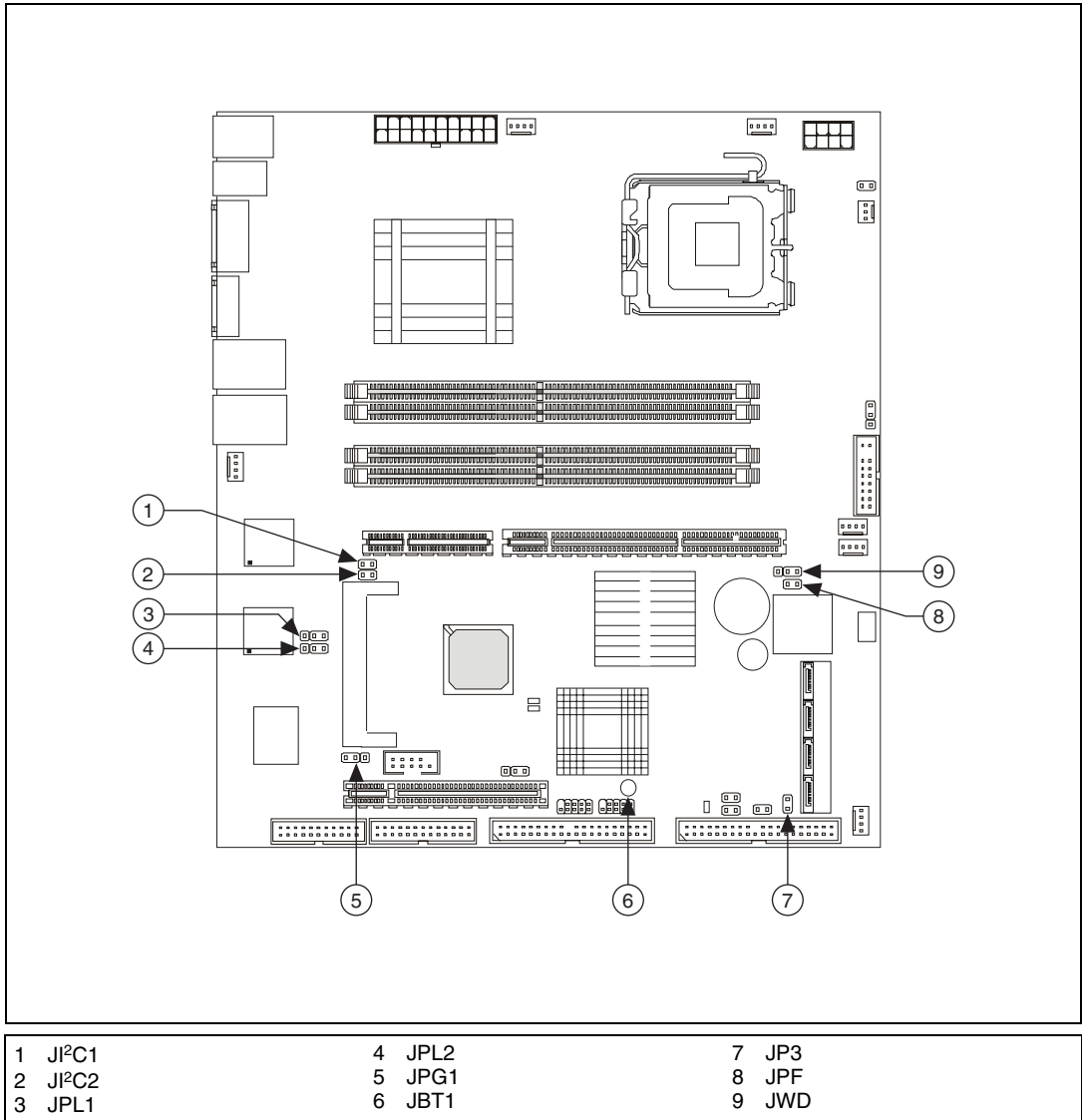
Figure B-2. NI 8352/8353 Jumper Locations

Enable/Disable SMBus to PCI/PCI Express Slots Jumper: JI²C1/JI²C2

Use jumpers JI²C1/JI²C2 to connect PCI/PCI Express slots to the system management bus. The default setting is open to disable the connection.
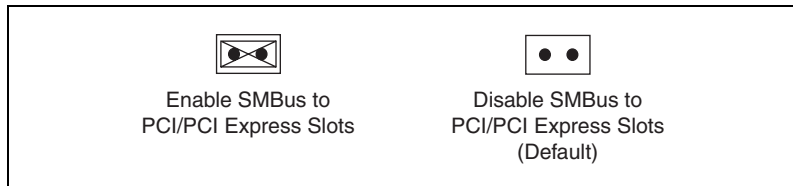
Figure B-3. Enable/Disable SMBus to PCI/PCI Express Slots Jumper: JI²C1/JI²C2

Enable/Disable GLAN1/GLAN2 Jumper: JPL1/JPL2

Use JPL1 to enable or disable the GLAN1 port and JPL2 to enable or disable the GLAN2 port on the motherboard. The default setting is enabled.
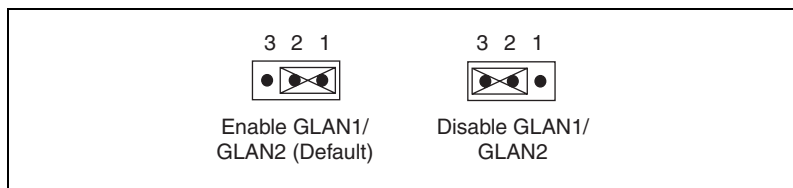
Figure B-4. Enable/Disable GLAN1/GLAN2 Jumper: JPL1/JPL2

Enable/Disable VGA Connector Jumper: JPG1

Use JPG1 to enable or disable the VGA connector on the motherboard. The default setting is enabled.
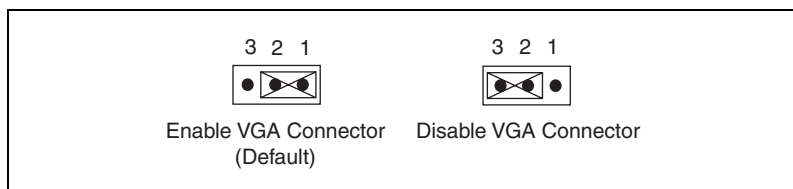
Figure B-5. Enable/Disable VGA Connector Jumper: JPG1

Clear CMOS Jumper: JBT1

⚠️ **Caution**   Always remove the AC power cord from the system before clearing CMOS.

⚠️ **Caution**   For an ATX power supply, you must completely shut down the system, remove the AC power cord, and then short JBT1 to clear CMOS. Do not use the PW_ON connector to clear CMOS.

Use JBT1 to clear CMOS. Instead of pins, this "jumper" consists of contact pads to prevent accidental CMOS clearing. To clear CMOS, use a metal object such as a small screwdriver to touch both pads at the same time to short the connection.
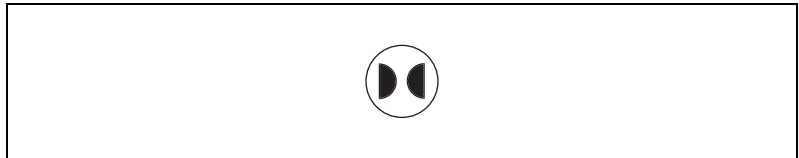
Figure B-6. Clear CMOS Jumper: JBT1

CompactFlash Master/Slave Select Jumper: JP3

Use JP3 to select CompactFlash master (primary) or slave (secondary) mode. Close this jumper to enable a CompactFlash card (master/primary mode). For the CompactFlash card to work properly, you must connect the CompactFlash card power cable to JWF1 and close this jumper to enable it. The default setting is disabled.
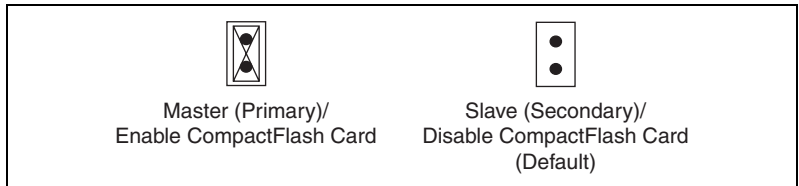
Figure B-7. CompactFlash Master/Slave Select Jumper: JP3

Enable/Disable Power Force On Jumper: JPF

Use JPF to enable or disable the Power Force On function. If enabled, the power always stays on automatically. If disabled, you must press the power button to power on the system. The default setting is disabled.
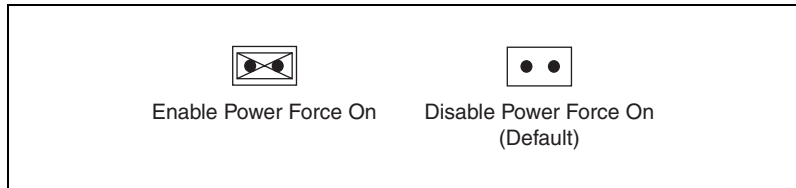
Figure B-8. Enable/Disable Power Force On Jumper: JPF

Enable/Disable Watchdog Jumper: JWD

JWD controls the watchdog, a system monitor that takes action when a software application hangs. Closing pins 1–2 allows the watchdog to reset the system if a program hangs. Closing pins 2–3 generates a nonmaskable interrupt for the program that hangs.

Note This function requires software support.

Note The watchdog must also be enabled in the BIOS.
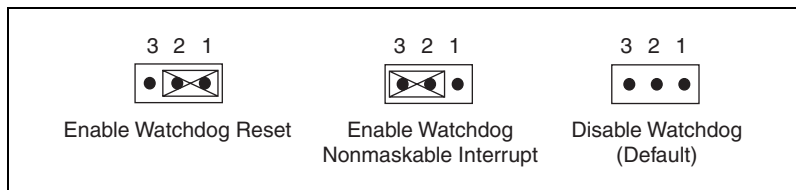
Figure B-9. Enable/Disable Power Force On Jumper: JPF

Other Connectors

Figure B-10 shows the locations of other connectors on the NI 8352/8353.

1	Fan6	4	Fan2	7	JL1	10	COM2
2	Fan1	5	Fan3	8	USB5/6 J46	11	SXB-E1 PCI-Ex8 J42
3	FP CTRL JF1	6	Fan4	9	USB3/4 J45	12	Fan5
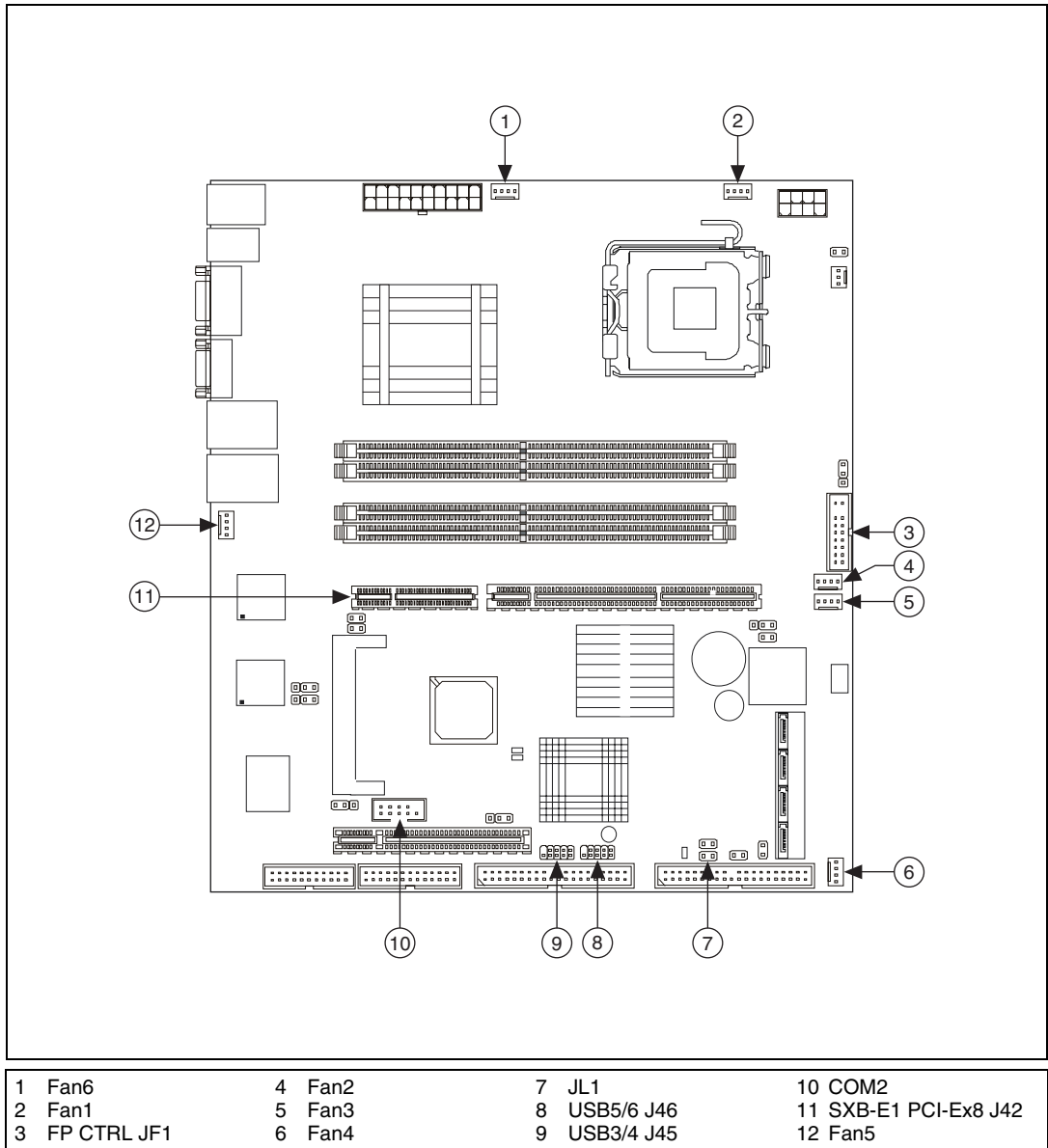
Figure B-10. NI 8352/8353 Other Connector Locations

Chassis Intrusion Switch Connector: JL1

JL1 is the chassis intrusion header. Attach the appropriate cable to be informed of a chassis intrusion.
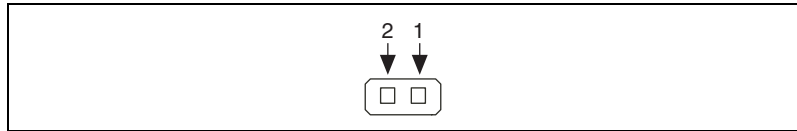
Figure B-11. Chassis Intrusion Switch Connector (JL1)

Table B-1. Chassis Intrusion Switch Connector Signals

Pin	Signal Name
1	CINTRU
2	GND

Front Panel Connector: JF1

JF1 contains header pins for various buttons and indicators on the control panel at the front of the chassis. These connectors are designed specifically for use with this chassis.
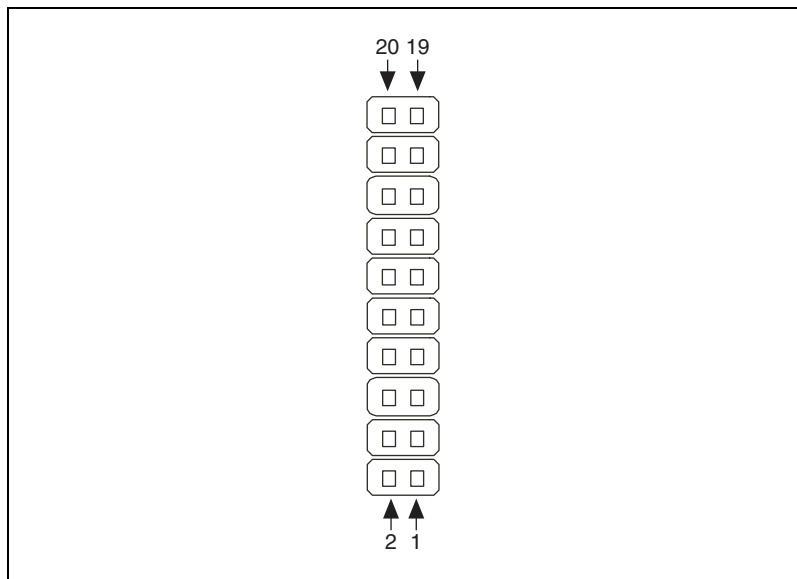
Figure B-12. Front Panel Connector (JF1)

Table B-2. Front Panel Connector Signals

Pin	Signal Name	Signal Description
1	PWR	Power button signal
2	GND	Power button +3 V standby
3	Reset	Reset button reset
4	GND	Reset button ground
5	—	—
6	—	—
7	Vcc	Overheat/fan fail LED Vcc
8	GND	Overheat/fan fail LED ground
9	Vcc	NIC2 LED Vcc
10	GND	NIC2 LED ground
11	Vcc	NIC1 LED Vcc
12	GND	NIC1 LED ground
13	Vcc	HDD LED +5 V
14	GND	HD active
15	Vcc	Power LED +5 V
16	GND	Power LED ground
17	—	—
18	—	—
19	NMI	Nonmaskable interrupt button control
20	GND	Nonmaskable interrupt button ground

Front USB Connectors: USB 3/4 and USB 5/6

Two Universal Serial Bus ports (USB 1/2) are on the I/O back panel. In addition, four USB ports (USB 3/4 and USB 5/6) are at J45 and J46 on the motherboard. You can use these ports to provide front chassis USB access (cables not included).
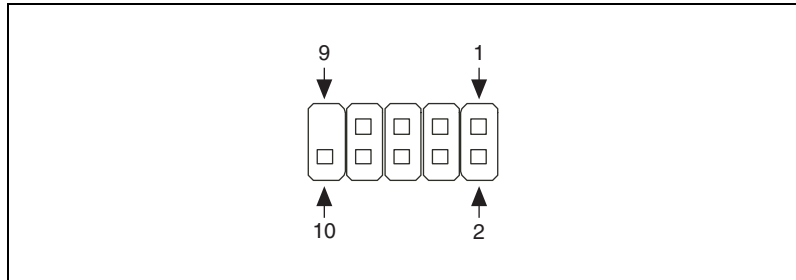
Figure B-13. Front USB Connectors (USB 3/4 and USB 5/6)

Table B-3. Front USB Connector Signals

Pin	Signal Name	Pin	Signal Name
1	VCC	6	USB1+
2	VCC	7	GND
3	USB0–	8	GND
4	USB1–	9	Key
5	USB0+	10	NC

Power Saving Switch Connector: JGS1

Attach a power saving switch to this connector. Press the switch once to have the system enter the Sleep/Suspend state. Press any key to wake up the system.
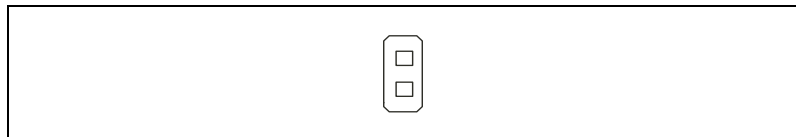
Figure B-14. Power Saving Switch Connector (JGS1)

Fan Power Connectors: Fan1 to Fan6

The NI 8352/8353 has six fan connectors (Fan1 to Fan6). Fan6 is designated as the CPU fan.

✎ **Note**   All fans are 4-pin fans. However, pins 1–3 of the fan headers are backward compatible with traditional 3-pin fans.

The onboard fan speeds are controlled by the Fan Speed Mode (Thermal Management) in the BIOS Hardware Monitoring section. When using Thermal Management settings, use all 3-pin fans or all 4-pin fans on the motherboard. Do not use 3-pin fans and 4-pin fans on the same board. The default setting is disabled, which allows the onboard fans to run at full speed.
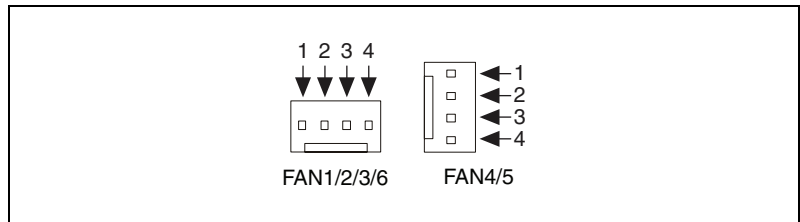
Figure B-15. Fan Power Connectors (Fan1 to Fan6)

Table B-4. Fan Power Connector Signals

Pin	Signal Name
1	GND
2	+12 V
3	Tachometer
4	PWM_Control

Serial Port Header: COM2

The motherboard includes two serial headers, COM1 (J31) and COM2. COM1 is a port located next to VGA port.
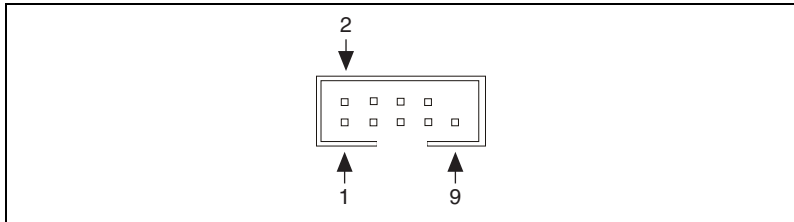
Figure B-16. Serial Port Header (COM2)

Table B-5. Serial Port Header Connector Signals

Pin	Signal Name	Signal Description
1	CD	Data carry detect
2	RD	Serial in or receive data
3	TD	Serial out of transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send
8	CTS	Clear to send
9	RI	Ring indicate

PCI Express Slot

The mainboard provides one PCI Express x8 slot. This PCIE_1 slot accepts x8 cards and runs at x8 speeds, with an extra PCIE_3 slot for riser cards. The slot is PCI Express Specification v1.0a compliant. (You cannot directly plug in a PCI Express board. The riser card is required to provide power to the board.)
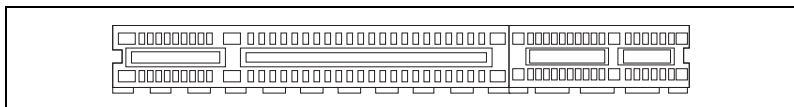
Figure B-17. PCI Express Slot

Upgrading Memory

The mainboard includes four 240-pin ECC DDR-II SDRAM slots with maximum memory size of 8 GB. Install at least one memory module in the slots.

Figure B-18 shows the DIMM location on the main board. DIMM1 is on the top; DIMM4 is on the bottom.
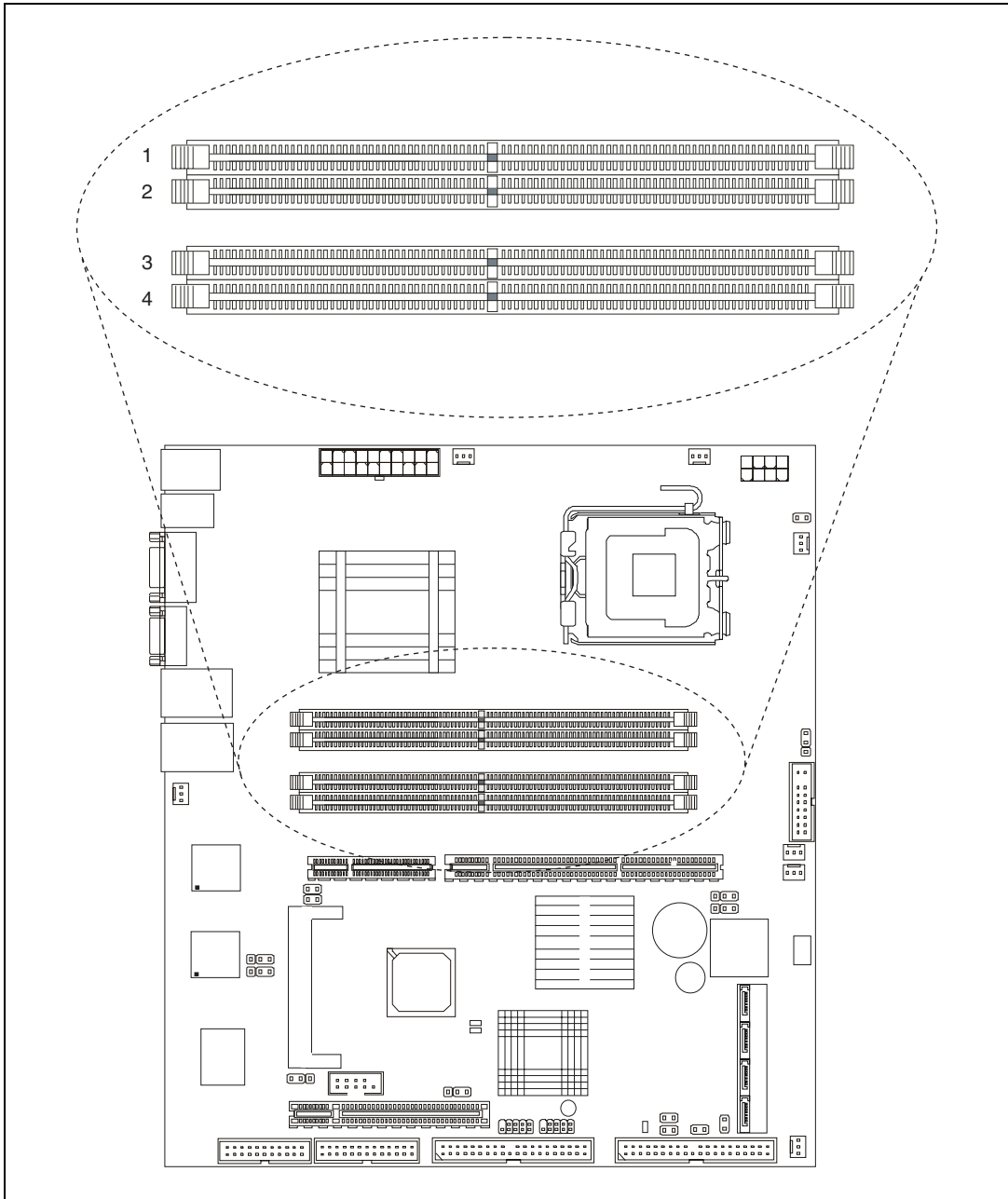
Figure B-18. DIMM Location

Dual-Channel Memory Configuration

For optimum memory performance, you can use dual-channel memory configurations. In these configurations, identical memory is installed in channels A and B. Figures B-19, B-20, and B-21 show allowed configurations for dual-channel memory mode.

Note   Due to chipset limitations, only the following operating systems support 8 GB memory:

- 32-bit: Windows 2000 Advanced Server, Windows Server 2003 Enterprise Edition
- 64-bit: Windows Server 2003 Standard x64 Edition, Windows XP Professional x64 Edition, Windows Server 2003 Enterprise x64 Edition

You can install a maximum of 2 GB DIMMs on each slot. However, only DDR2 667 MHz 2 GB density modules are available for this configuration.

Some older versions of DDR2-667 may not match the Intel on-die temperature requirement and are automatically downgraded to run at 533 MHz. If this occurs, contact your memory vendor to check the ODT value.

Due to memory allocation to system devices, memory available for operational use is reduced when you use 4 GB of RAM. Refer to Table B-6 for details.

Table B-6. Possible System Memory Allocation and Availability

System Device	Size	Physical Memory Available (4 GB Total System Memory)
Firmware hub flash memory (system BIOS)	1 MB	3.99
Local APIC	4 KB	3.99
Area reserved for the chipset	2 MB	3.99
I/O APIC (4 KB)	4 KB	3.99
PCI enumeration area 1	256 MB	3.76
PCI Express (256 MB)	256 MB	3.51
PCI enumeration area 2 (if needed) (aligned on 256 MB boundary)	512 MB	3.01

Table B-6. Possible System Memory Allocation and Availability (Continued)

System Device	Size	Physical Memory Available (4 GB Total System Memory)
VGA memory	16 MB	2.85
TSEG	1 MB	2.84
Memory available to OS and other applications	—	2.84

Table B-7 shows all possible memory module combinations.

Table B-7. Memory Module Combinations

DIMM1 (Channel A)	DIMM2 (Channel B)	DIMM3 (Channel A)	DIMM4 (Channel B)	Total Memory
256 MB–2 GB	256 MB–2 GB	—	—	512 MB–4 GB
—	—	256 MB–2 GB	256 MB–2 GB	512 MB–4 GB
512 MB–1 GB	512 MB–1 GB	—	—	1–2 GB
512 MB–1 GB	512 MB–1 GB	512 MB–1 GB	512 MB–1 GB	2–4 GB

Installing memory with different speeds is allowed, but the faster memory downshifts to the speed of the slower memory.

Figure B-19 shows two identical DIMMs in DIMM 1 and DIMM 2. You can also install identical DIMMs in DIMM 3 and DIMM 4.

| 1 | Two Identical DIMMs |
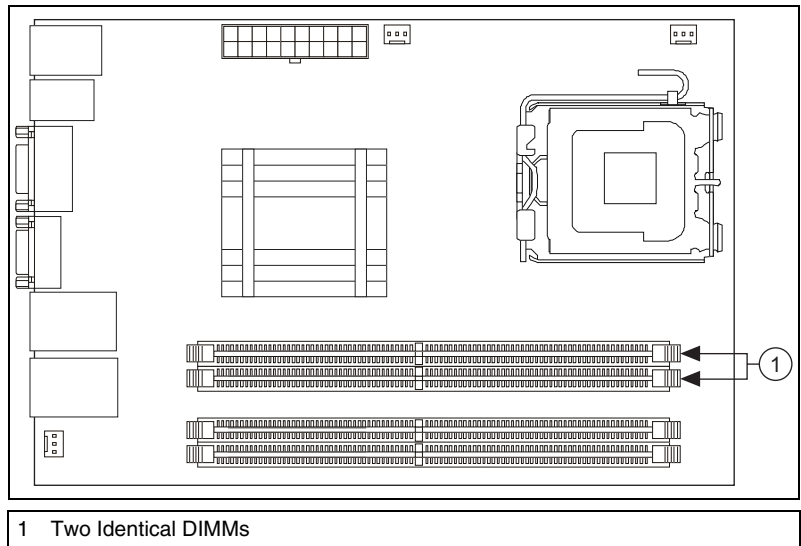
Figure B-19. Two Identical DIMMs in DIMM 1 and DIMM 2

Figure B-20 shows two different pairs of identical DIMMS—two identical DIMMs in DIMM 1 an DIMM 2 and two identical DIMMs in DIMM 3 and DIMM 4.

| 1 | First Pair of Identical DIMMs | 2 | Second Pair of Identical DIMMs |
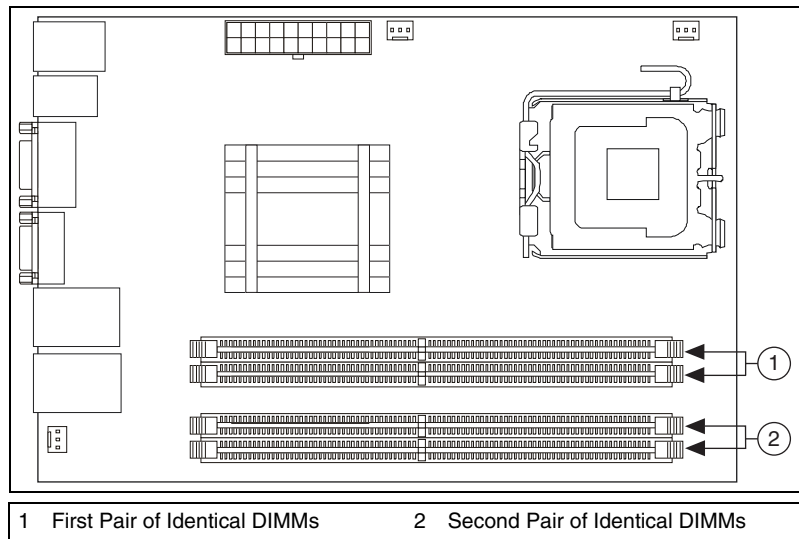
Figure B-20. Two Different Pairs of Identical DIMMs

Figure B-21 shows four identical DIMMs installed in DIMM 1 through DIMM 4.

| 1 | Four Identical DIMMs |
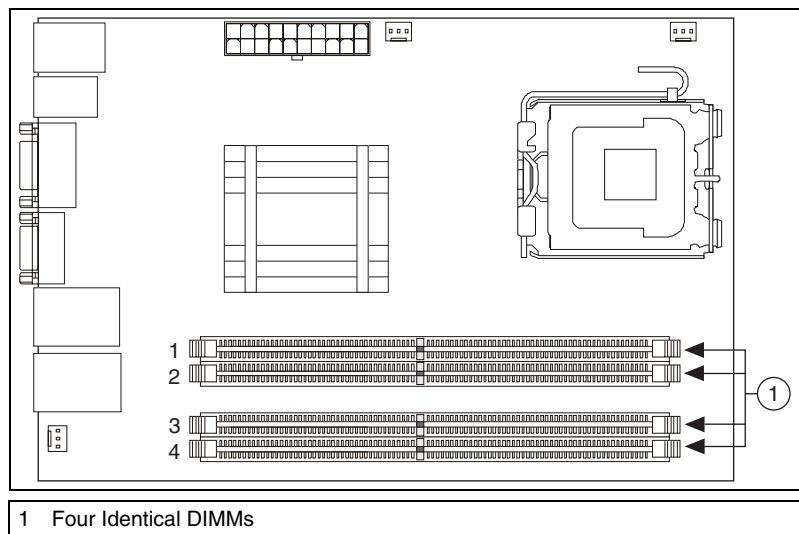
Figure B-21. Four Identical DIMMs

Installing DDR Modules

Follow these steps to install DDR modules:

1. Press the cover release buttons on the top of the NI 8352/8353.

2. Push the cover backward to remove it.

3. Align the notch in the center of the DDR DIMM module with the key on the DIMM slot. Insert the module vertically into the slot and push it in until the pins are fully inserted, as shown below.

1 Notch	2 Key

4. When the module is fully inserted, the plastic clip at each side of the slot automatically closes, as shown below.

5. Replace the NI 8352/8353 cover by sliding the cover forward. Make sure the safety lock fits firmly.

Removing DDR Modules

Follow these steps to remove DDR modules:

1. Open the plastic clips on both sides of the module.

2. Remove the module from the slot.

Upgrading and Replacing Hard Disk Drives

Figure B-22 shows the NI 8352/8353 IDE and SATA connector locations.

1 SATA3	2 SATA2	3 SATA1	4 SATA0	5 IDE1
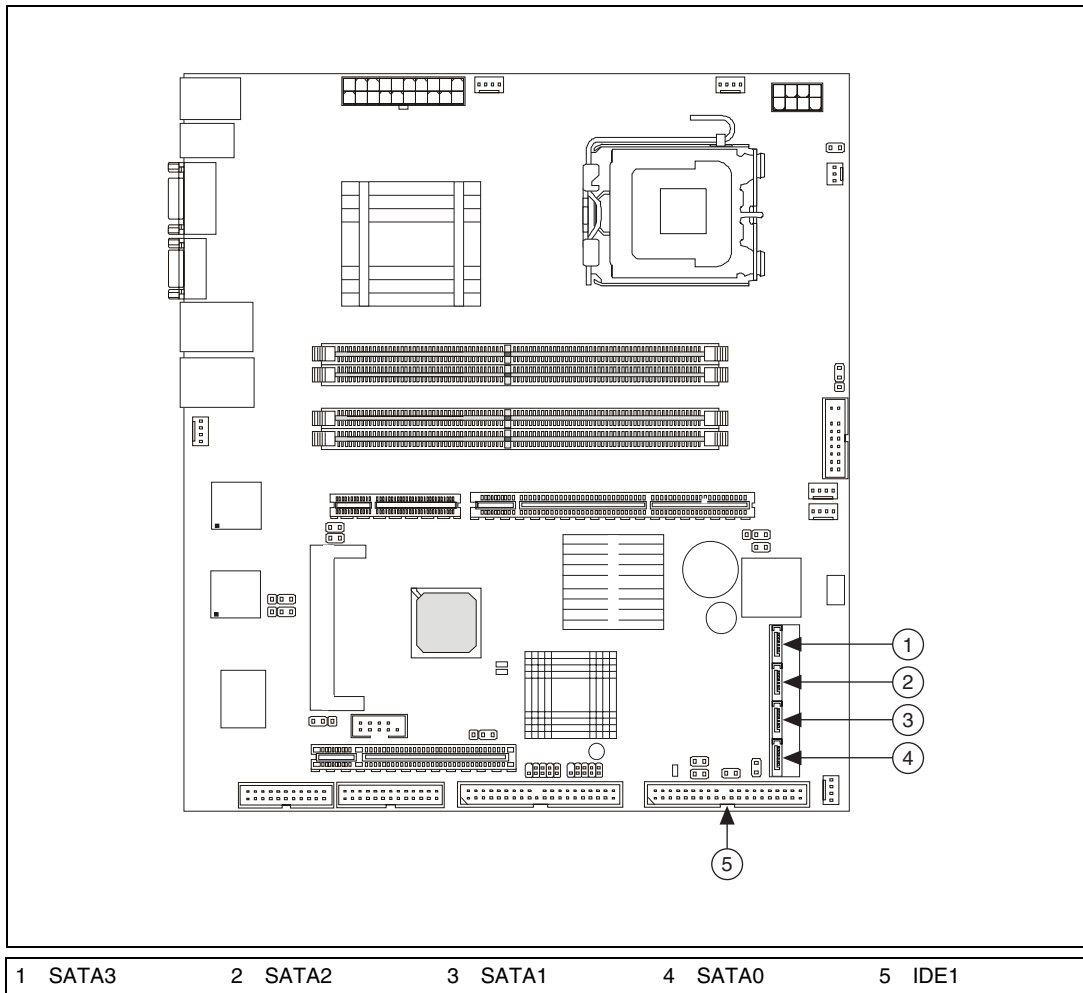
Figure B-22. NI 8352/8353 IDE and SATA Connectors

DVD-ROM Connector: IDE1

The mainboard has a 32-bit Enhanced PCI IDE and Ultra DMA 66/100 controller that provides PIO mode 0~4, Bus Master, and Ultra DMA 66/100 functions. You can connect a DVD-ROM or other IDE devices.

Figure B-23 shows the IDE1 connector.
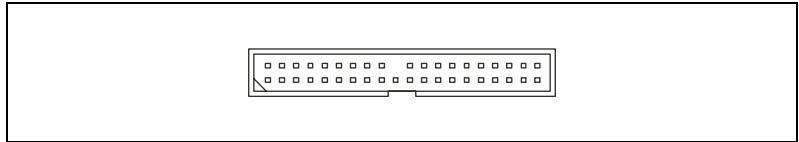
Figure B-23. IDE1 Connector

SATA Connectors: SATA0–SATA3

The ICH7R south bridge supports four Serial ATA connectors (SATA0–SATA3).

SATA connectors are high-speed Serial ATA interface ports. Each supports Serial ATA data rates of 300 MB/s. All connectors are fully compliant with Serial ATA 2.0 specifications. Each Serial ATA connector can connect to one hard disk.

Figure B-24 shows the SATA0–SATA3 connector.
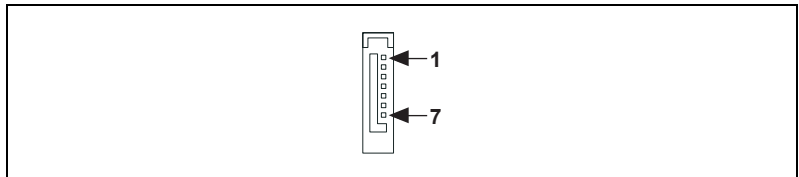
Figure B-24. SATA0–SATA3 Connector

Hard Disk Installation

⚠ **Caution**   Before removing or installing a hard disk drive, be sure the NI 8352/8353 is powered off and not connected to AC power.

Follow these steps to install a hard disk drive:

1. Press the release tab to release the SCA drive tray from its locking position.

2. Pull the SCA drive tray out from the chassis, as shown in Figure B-25.
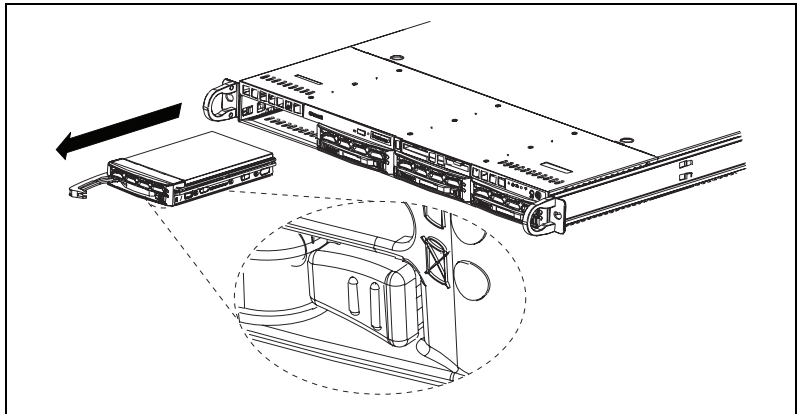
Figure B-25. Removing SCA Drive Tray

3. Remove the two screws that attach to the sides of the dummy tray. Remove the tray, as shown in Figure B-26.
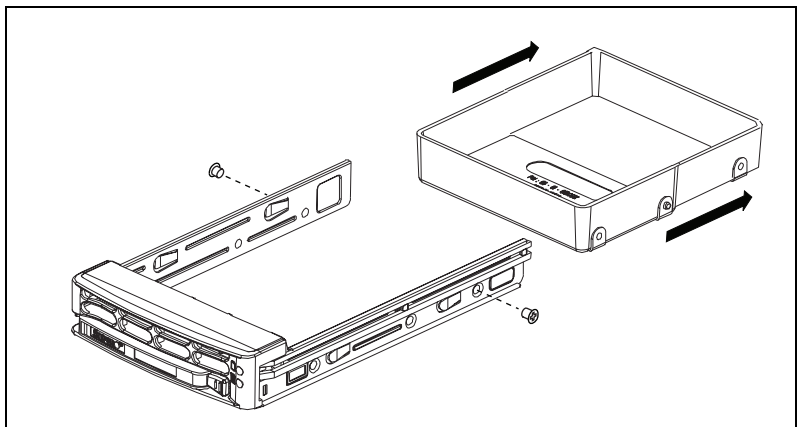
Figure B-26. Removing Dummy Tray

4. Slide a hard disk drive into the SCA drive tray. Secure the drive to the tray with three screws on each side of the tray, as shown in Figure B-27.
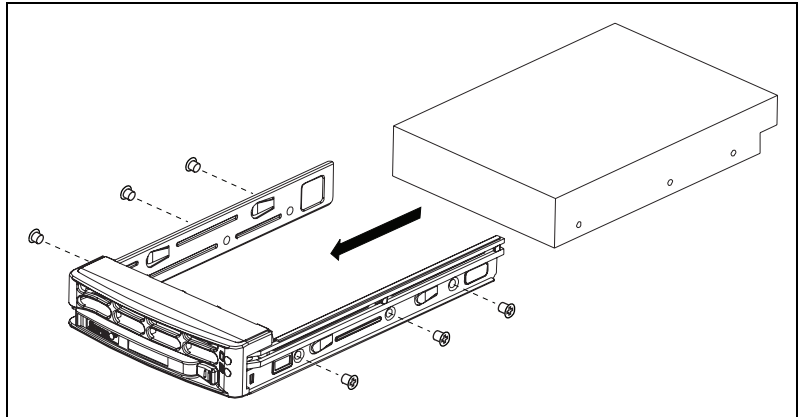
Figure B-27. Sliding Hard Disk Drive into SCA Drive Tray

5. Once the hard disk drive is securely installed in the SCA tray, you can reinstall the SCA drive tray in the chassis.

Installing a PCI Express Expansion Card

Follow these steps to install a PCI Express expansion card:

1. Locate the riser card bracket on the NI 8352/8353 chassis.

2. Lift the bracket from the chassis.

3. Unscrew the cover plates on the bracket and set them aside for later use.

4. Insert the PCI Express expansion card into the PCI Express slot on the riser card bracket.

5. Screw the expansion card firmly to the riser card bracket.

6. Align the riser card bracket with the PCI Express slot on the chassis. Carefully push down the bracket with even force on both sides until it is firmly seated in the slot.

C

Intel SATA RAID Utility for Intel ICH7R

This appendix describes the Intel SATA RAID utility for Intel ICH7R.

Intel RAID Configuration Utility

The Intel RAID Configuration utility is an embedded BIOS utility for creating, managing, and deleting arrays from the controller BIOS and initializing drives.

To run the Intel RAID Configuration utility, press <Ctrl-I> when the following message appears during system startup:

Press <CTRL-I> to enter Configuration Utility...

The main menu appears. To select an option from this or any menu, browse with the arrow keys to highlight an option and press <Enter>. In some cases, selecting an option displays another menu. To return to the previous menu at any time, press <Esc>.

Creating a RAID0 Volume

Follow these steps to create a RAID0 volume:

1. Select **Create RAID Volume** from the main menu and press <Enter>. The Create Volume Menu screen appears.

2. Specify a name for the RAID 0 set and press <Tab> or <Enter> to go to the next field.

3. When **RAID Level** is highlighted, press the up and down arrow keys to select **RAID0(Stripe)** and press <Enter>.

4. When **Disks** is highlighted, press <Enter> to select the HDD to configure as RAID. The Select Disks screen appears.

5. Use the up and down arrow keys to highlight a drive and press the space bar to select it. A triangle appears, confirming the drive selection.

6. Use the up and down arrow keys to select the RAID0 array stripe size (4–128 KB). Press <Enter>.

Note For a server, use a lower stripe size. For a multimedia system, use a higher stripe size. The default size is 128 KB.

7. Press <Enter> when **Create Volume** is highlighted. A warning message displays.

8. When asked `Are you sure you want to create this volume (Y/N)`, press <Y> to create the RAID volume or <N> to return to the **Create Volume** menu.

Creating a RAID1 Volume

Follow these steps to create a RAID1 volume:

1. Select **Create RAID Volume** from the main menu and press <Enter>. The Create Volume Menu screen appears.

2. Specify a name for the RAID1 set and press <Tab> or <Enter> to go to the next field.

3. When **RAID Level** is highlighted, press the up and down arrow keys to select **RAID1(Mirror)** and press <Enter>.

4. When **Capacity** is highlighted, enter your RAID volume capacity and press <Enter>. The default setting is the maximum capacity allowed.

5. Press <Enter> when **Create Volume** is highlighted. A warning message displays.

6. When asked `Are you sure you want to create this volume (Y/N)`, press <Y> to create the RAID volume or <N> to return to the **Create Volume** menu.

Creating a RAID10 (RAID1+ RAID0)

Follow these steps to create a RAID10 volume:

1. Select **Create RAID Volume** from the main menu and press <Enter>. The Create Volume Menu screen appears:

2. Specify a name for the RAID10 set and press <Enter>.

3. When **RAID Level** is highlighted, use the up and down arrow keys to select **RAID10(RAID0+1)** and press <Enter>.

4. When **Stripe Size** is highlighted, use the up and down arrow keys to select the RAID10 stripe size (4–128 KB). Press <Enter>.

Note   For a server, use a lower stripe size. For a multimedia system, use a higher stripe size. The default setting is 64 KB.

5.   When **Capacity** is highlighted, enter your RAID volume capacity and press <Enter>. The default setting is the maximum capacity allowed.

6.   Press <Enter> when **Create Volume** is highlighted. A warning message displays.

7.   When asked `Are you sure you want to create this volume (Y/N)`, press <Y> to create the RAID volume or <N> to return to the **Create Volume** menu.

Creating a RAID5 Set (Parity)

Follow these steps to create a RAID5 set:

1.   Select **Create RAID Volume** from the main menu and press <Enter>. The Create Volume Menu Screen appears.

2.   Specify a name for the RAID5 set and press <Enter>.

3.   When **Raid Level** is highlighted, use the up and down arrow keys to select **RAID5(Parity)** and press <Enter>.

4.   When **Disk** is highlighted, press <Enter> to select the HDD to configure as RAID. The Select Disk screen appears.

5.   Use the up and down arrow keys to highlight a drive and press the space bar to select it. A triangle appears, confirming the drive selection.

6.   Use the up and down arrow keys to select the RAID5 array stripe size (4–128 KB). Press <Enter>.

Note   For a server, use a lower stripe size. For a multimedia system, use a higher stripe size. The default size is 128 KB.

7.   Enter your desired RAID volume capacity and press <Enter> when the capacity item is highlighted. The default setting is the maximum capacity allowed.

8.   Press <Enter> when **Create Volume** is highlighted. A warning message displays.

9.   When asked `Are you sure you want to create this volume (Y/N)`, press <Y> to create the RAID volume or <N> to return to the **Create Volume** menu.

Deleting a RAID Volume

⚠ **Caution** Be sure to back up your data before deleting a RAID set. You will lose all data on the disk drives when deleting a RAID set.

Follow these steps to delete a RAID volume:

1. From the main menu, select **Delete RAID Volume** and press <Enter>.

2. Use the up and down arrow keys to select the RAID set to delete and press <Delete>. A warning message displays.

3. When asked `Are you sure you want to delete this volume (Y/N)`, press <Y> to delete the RAID volume or <N> to return to the **Delete Volume** menu.

Resetting to Non-RAID and Resetting a RAID HDD

⚠ **Caution** Be careful when you reset a RAID volume HDD to non-RAID or reset a RAID HDD. Resetting reformats the HDD and deletes all internal RAID structure on the drive.

Follow these steps to reset to non-RAID or reset a RAID HDD:

1. From the main menu, select **Reset Disks to Non-RAID** and press <Enter>. The Reset RAID Data screen appears.

2. Use the up and down arrow keys to highlight the RAID set drive to reset and press the space bar to select the drive.

3. Press <Enter> to reset the RAID set drive. A warning message appears.

4. Press <Y> to reset the drive or <N> to return to the main menu.

Exiting the Intel Matrix Storage Manager Utility

Follow these steps to exit the Intel Matrix Storage Manager utility:

1. From the main menu, select **Exit** and press <Enter>. A warning message appears.

2. Press <Y> to reset the drive or <N> to return to the main menu.

D

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Glossary

Symbol	Prefix	Value
p	pico	10^{-12}
n	nano	10^{-9}
μ	micro	10^{-6}
m	milli	10^{-3}
k	kilo	10^{3}
M	mega	10^{6}
G	giga	10^{9}
T	tera	10^{12}

Symbols

•	Degrees
Ω	Ohms
%	Percent

A

A	Amperes
A/D	Analog-to-digital. Most often used as *A/D converter*.
AC	Alternating Current
ACPI	Advanced Configuration and Power Management Interface
ANSI	American National Standards Institute
API	Application Programming Interface—A standardized set of subroutines or functions along with the parameters that a program can call.

APIC	Advanced Programmable Interrupt Controller
ASCII	American Standard Code for Information Exchange
ASIC	Application-Specific Integrated Circuit
ATA	The specification formulated in the 1980s that defines the IDE drive interface.

B

B	Bytes
BIOS	Basic Input/Output System—BIOS functions are the fundamental level of any PC or compatible computer. BIOS functions embody the basic operations needed for successful use of the computer's hardware resources.

C

C	Celsius
CAS	Column Address Strobe
CMOS	Complementary Metal Oxide Semiconductor—A process used in making chips.
COM	Communications port
CPU	Central Processing Unit
CSA	Carrier Serving Area

D

D/A	Digital-to-analog—Most often used as an abbreviation for a D/A converter (also known as DAC).
DC	Direct Current
DDR	Double Data Rate
DIMM	Dual In-line Memory Module

DMA	Direct Memory Access—A method by which data is transferred between devices and internal memory without intervention of the central processing unit.
DMI	Desktop Management Interface
DRAM	Dynamic RAM (Random Access Memory)—Storage that the computer must refresh at frequent intervals.

E

ECC	Error-Correcting Code
EDO RAM	Extended Data Output RAM--A type of random access memory (RAM) chip that improves the time to read from memory on faster microprocessors such as the Intel Pentium.
EEPROM	Electronically Erasable Programmable Read Only Memory
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EPP	Enhanced Parallel Port

F

FCC	Federal Communications Commission

G

GB	Gigabytes of memory
GPIB	General Purpose Interface Bus (IEEE 488)

H

HDD	Hard Disk Drive
Hz	Hertz; cycles per second

I

I/O	Input/output—The techniques, media, and devices used to achieve communication between machines and users.
IDE	Integrated Drive Electronics—Hard disk and built-in controller.
IEEE	Institute of Electrical and Electronics Engineers
IRQ*	Interrupt signal
ISA	Industry Standard Architecture—The original PC bus architecture, specifically the 16-bit AT bus.

K

KB	Kilobytes of memory

L

LAN	Local Area Network—Communications network that serves users within a confined geographical area. It is made up of servers, workstations, a network operating system, and a communications link.
LCD	Liquid Crystal Display—A display technology using polarizing filters and liquid crystal cells.
LED	Light-emitting diode

M

MAX	Measurement & Automation Explorer
MB	Megabytes of memory
MPS	Multiprocessor Specification
MTBF	Mean Time Between Failure
MTTR	Mean Time to Repair
MXI	Multisystem eXtension Interface

N

NI-DAQ	The National Instruments software for data acquisition instruments.
NI-VISA	The National Instruments implementation of the VISA standard—An interface-independent software that provides a unified programming interface for VXI, GPIB, and serial instruments.

P

PCI	Peripheral Component Interconnect. The PCI bus is a high-performance 32-bit or 64-bit bus with multiplexed address and data lines.
PEF	Platform Event Filter
PIO	Programmed Input/Output
POSC	Power On Self Configuration
POST	Power On Self Test
PXI	PCI eXtensions for Instrumentation—An open implementation of CompactPCI that adds electrical features that meet the high-performance requirements of instrumentation applications by providing triggering, local buses, and system clock capabilities. PXI also offers two-way interoperability with CompactPCI products.

R

RAM	Random Access Memory—The computer's primary workspace.
RAS	Row Address Strobe
RMS	Root Mean Squared
RTC	Real Time Clock—An electronic circuit that maintains the time of day and also can provide timing signals for timesharing operations.

S

SATA	Serial-ATA. *See also* ATA.
SCSI	Small Computer System Inteface
SDRAM	A form of dynamic RAM memory that is about 20% faster than EDO RAM. SDRAM interleaves two or more internal memory arrays so that while one array is being accessed, the next one is being prepared for access. SDRAM-II is a faster version of SDRAM technology.
SO-DIMM	Small Outline Dual In-line Memory Module
SPD	Serial Presence Detect EEPROM
SRAM	Static RAM—A memory chip that requires power to hold its content. It does not require refresh circuitry as a dynamic RAM chip, but it does take up more space and uses more power.

U

UDMA	Ultra Direct Memory Access. *See also* DMA.
USB	Universal Serial Bus

V

V	Volts
VGA	Video Graphics Array—The minimum video display standard for all PCs.
VISA	Virtual Instrument Software Architecture—A single interface library for controlling GPIB, VXI, RS232, and other types of instruments. VISA has been standardized by the VXI *Plug&Play* Systems Alliance.
VME	Versa Module Eurocard
VXI	VME eXtensions for Instrumentation

W

W	Watts
WDT	Watchdog Timer

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