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PXI

NI 8351 User Manual

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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 8351 User Manual* contains information about installing, configuring, using, and maintaining the NI 8351.

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 8351 and lists the kit contents and optional equipment you can order from National Instruments.

Unpacking

Carefully inspect the shipping container and the NI 8351 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 8351 kit contains the following items:

- ❑ NI 8351 rack mount controller
- ❑ MXI-Express kit
- ❑ *NI 8351 User Manual*
- ❑ Windows recovery CD
- ❑ NI driver CD
- ❑ MXI-Express software 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 8351 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 Pentium D 3.0 GHz CPU with 800 MHz FSB and 1 MB L2 cache

Chipset

- Intel E7230 chipset
- Intel ICH7R chipset

Memory

- 512 MB memory standard (2 × 256 MB ECC (32 M × 64 bit), unbuffered, DDR-II)
- Maximum memory supported: 8 GB 533/667 DDR-II SDRAM in 4 DIMM sockets (240 pin)

Slots

- PCI Express x4 slot

Video

- ATI Radeon 7000 with 16 MB SDRAM

HDD

- 160 GB (or greater) SATA hard drive
- 3.5 in. expansion bay SATA or ATA 66/100

CD-ROM

- Slim CD-ROM drive

Onboard LAN

- Intel 82573V/L Gigabit Ethernet controller

Onboard I/O

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

Remote Controller

- MXI-Express interface

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

Devices

- 6 × 2 line LCD display panel
- Up, Enter, and Next buttons

Front Panel LEDs

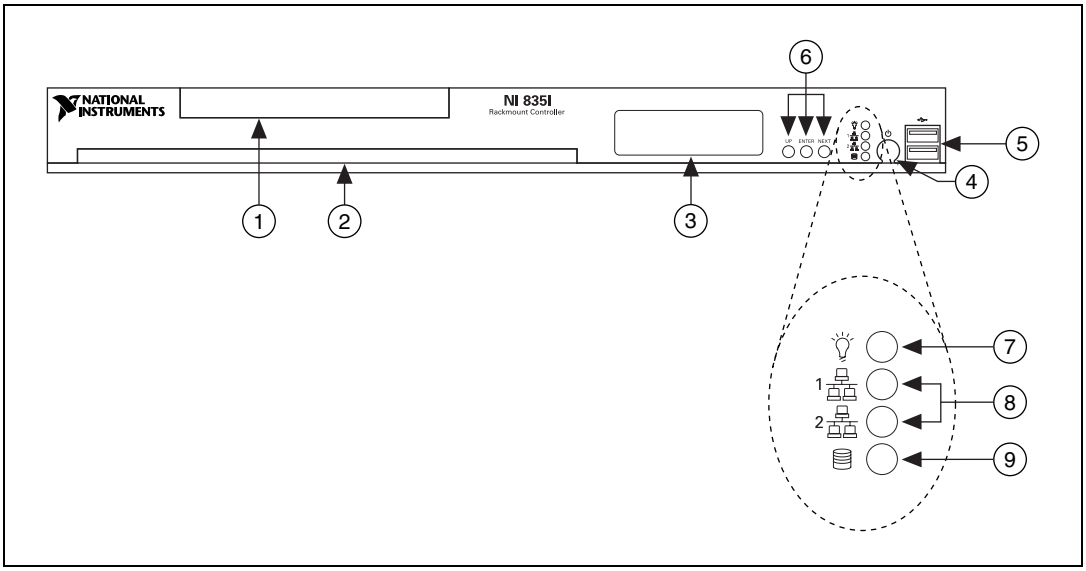
- Power
- LAN activity
- HDD activity

System Management

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

NI 8351 Description

Figure 1-1 shows the key features of the NI 8351 front panel. For detailed information about the NI 8351 rear panel, refer to Chapter 3, *I/O Information*.



1	CD-ROM	4	Power Button (On/Standby)	7	Power Indicator
2	Air Inlet	5	USB Ports	8	LAN Status Indicator
3	LCD Front Panel	6	LCD Control Buttons	9	Hard Disk in Use Indicator

Figure 1-1. Front View of the NI 8351

The front panel includes the following LEDs:

- **Power indicator**—glows when the NI 8351 is powered on.
- **LAN status indicators**—flash when there is activity on LAN1 or LAN2.
- **Hard disk in use indicator**—flashes when the system is accessing data on the hard disk.

The front panel also includes the following LCD control buttons:

- **Up**—Use this button to return to the previous selection.
- **Enter**—Use this button to execute the command.
- **Next**—Use this button to go to the next selection.

Optional Equipment

Memory Upgrades

You can upgrade the NI 8351 memory to a maximum of 8 GB.

The NI 8351 supports dual-channel DDR-II SDRAM unbuffered memory in four 240-pin DIMM sockets. The NI 8351 supports ECC memory.

Note National Instruments has tested and verified that the DDR-II DIMMs we sell work with the NI 8351. 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 8351 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 8351 Overview

The NI 8351 is a 1U high rack-mountable PC with a remote controller for a PXI system. It is designed for PC control of a PXI test and measurement system using a minimum of rack space. A cable and PXI controller are included for connection to a PXI chassis.

The NI 8351 has an Intel Pentium D processor for high performance. This allows multithreaded software to better use the CPU. This often increases the throughput of multithreaded applications, but single-threaded applications may run more slowly.

National Instruments Software

National Instruments has developed several software kits you can use with the NI 8351.

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`.

2

Installation and BIOS Setup

This chapter describes how to install, configure, and use the NI 8351.

Before connecting the NI 8351 to a power source, read this chapter and the *Read Me First: Safety and Radio-Frequency Interference* document included with your NI 8351.

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 8351 requires a connection from the premise wire safety ground to the NI 8351 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 8351. 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**—Only service this equipment 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 8351 from its original condition. Unsuitable modifications may result in safety hazards.

Chassis Cooling Considerations

The NI 8351 is designed to operate on a bench or in an instrument rack. Determine how you want to use the NI 8351 and follow the appropriate installation instructions.

Providing Adequate Clearance

Apertures in the front, rear, and along both sides of the chassis facilitate power supply and motherboard cooling. Air enters through the front and side inlets of the chassis and exits through the fans on the rear of the chassis. Place the NI 8351 on a bench top or in an instrument rack so that the fans (air outlets) and the air inlet apertures along both sides and the 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 8351:

1. Connect a keyboard and mouse to the appropriate connectors on the NI 8351 rear panel.
2. Connect the VGA monitor video cable to the VGA connector on the rear panel.
3. Connect the network cable to LAN jack 1 on the rear panel.
4. Connect the USB, serial, and parallel devices as necessary to the NI 8351 front and rear panel ports.

Caution To minimize shock hazard, make sure the electrical power outlet you use to power the NI 8351 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 8351 to the PXI chassis and power on the chassis.

7. Power on the NI 8351.
8. Verify that the NI 8351 boots. If it does not boot, refer to the *What if the NI 8351 does not boot?* section of Chapter 5, *Troubleshooting*.

Connecting Safety Ground

The NI 8351 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 includes information about the BIOS setup program for configuring the system for optimum use. You may need to run the setup program when:

- During the system boot, an error message requests you to run setup.
- You want to change the default settings for customized features.

Entering Setup

Power on the computer, and the system starts the POST (Power On Self Test) process. When the following message appears, press <F2> to enter setup.

```
Press F2 to enter SETUP
```

If the message disappears before you respond, and you still want to enter setup, restart the system by turning it off and on. You may also restart the system by pressing <Ctrl-Alt-Delete>.

Getting Help

After entering the setup menu, the first menu you see is the **Main** menu.

Main Menu

The **Main** menu lists the setup functions you can change. Use the arrow keys (↑↓) to select an option. The highlighted setup function online description appears at the bottom of the screen.

Submenu

If a triangle appears to the left of an option, you can launch a submenu from this option. A submenu contains additional options for an option parameter. Use the arrow keys (↑↓) to highlight the option and press <Enter> to access the submenu. Then use the control keys to enter values and move from option to option within a submenu. To return to the main menu, press <Esc>.

General Help <F1>

The BIOS setup program includes a general help screen. To access this screen from any menu, press <F1>. The help screen lists the appropriate keys to use and the possible selections for the highlighted option. Press <Esc> to exit the help screen.

Menu Bar

When you enter the PhoenixBIOS setup utility, the **Main** menu appears. On the **Main** menu screen are basic BIOS settings, including system time and date and the setup categories the BIOS supplies. Use the arrow keys (↑↓) to move among the items and menus and change the settings.

Main

Use this menu for basic system configuration, such as time, date, etc.

Advanced

Use this menu to set up special enhanced features on your system chipset.

Security

Use this menu to set supervisor and user passwords.

Power

Use this menu to specify power management settings.

Boot

Use this menu to specify the boot device priority.

Exit

Use this menu to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.

Main

The items in the **Main** menu are for basic system information and configuration.

Use the arrow keys (↑↓) or <Tab> to highlight the desired item or field. Use <+> or <–> to switch to the preferred value.

System Time

The time format is <HH> <MM> <SS>.

System Date

The date format is <YYYY> <MM> <DD>.

IDE Primary Master/Slave, SATA Port 1/2/3/4

Press <Page Up>/<+> or <Page Down>/<–> to select **[Manual]**, **[None]**, or **[Auto]** type. Your drive specifications must match the drive table. The hard disk will not work properly if you enter improper information for this category. If your hard disk drive type is not matched or listed, use **[Manual]** to define your own drive type manually.

If you select **[Manual]**, you must enter information in the following items. Enter the information directly from the keyboard. This information should be in the hard disk or system documentation.

[Type]	Select how to define the HDD parameters.

[Multisector Transfers]	Any selection except **Disabled** determines the number of sectors transferred per block.
[LBA Mode Control]	Enabling LBA causes Logical Block Addressing to be used in place of cylinders, heads, and sectors.
[32-Bit I/O]	Enables 32-bit communication between the CPU and IDE card.
[Transfer Mode]	Selects the method for transferring the data between the hard disk and system memory.
[Ultra DMA Mode]	Indicates the type of Ultra DMA.

Boot Features

Use this submenu to configure system boot features.

Floppy Check

Use this setting to cause the BIOS to search for floppy disk drives at boot time. When enabled, the BIOS activates the floppy disk drives during the boot process. The drive activity light turns on, and the head moves back and forth once. Options: **[Disabled]**, **[Enabled]**.

Summary Screen

Select **[Enabled]** to display the system summary screen during boot. Options: **[Enabled]**, **[Disabled]**.

Boot-Time Diagnostic Screen

Select **[Enabled]** to view the system diagnostic screen during boot. Options: **[Enabled]**, **[Disabled]**.

QuickBoot Mode

Set this item to **[Enabled]** to allow the system to boot within 5 seconds by skipping some check items. Options: **[Enabled]**, **[Disabled]**.

Installed Memory/Available to OS/Used by Devices

These read-only items show the system memory status.

Advanced

The **Advanced** menu includes several submenus with more settings. To enter a submenu, highlight it and press <Enter>.

Advanced Chipset Control

Use this submenu to configure chipset features for optimal system performance.

ECC Condition

Use this setting to specify whether ECC Error Condition is detected.

ECC Error Handler

When an ECC error occurs, an interrupt is generated. Use this setting to select the type of interrupt to report:

[NMI] Nonmaskable Interrupt

[SMI] System Management Interrupt

[SCI] System Control Interrupt

Interleave Mode

Use this setting to determine whether the BIOS autodetects or disables the interleave mode.

Parallel ATA

Use this setting to enable/disable the onboard PATA controller.

Serial ATA

Use this setting to enable or disable the onchip Serial-ATA controller.

SATA Controller Mode Option

Use this setting to specify the SATA controller mode. (Pre-Win2K operating systems do not work in Enhanced mode.)

[Compatible] SATA and PATA drives are autodetected and placed in **Legacy** mode.

[Enhanced] (non-AHCI) SATA and PATA drives are autodetected and placed in **Native IDE** mode.

SATA RAID Enable

Use this setting to enable or disable the RAID function for each SATA hard disk drive. Options: **[Enabled]**, **[Disabled]**.

SATA AHCI Enable

Use this setting to disable/enable Enhanced AHCI mode. The WinXP-SP1+IAA driver supports AHCI mode.

Advanced Processor Options

Press <Enter> to view the onboard CPU settings.

Hyperthreading

The processor uses hyperthreading technology to increase transaction rates and reduce end-user response times. The technology treats the two cores inside the processor as two logical processors that can execute instructions simultaneously. Therefore, system performance is highly improved. If you disable the function, the processor uses only one core to execute the instructions. Options: **[Enabled]**, **[Disabled]**.

Note Disable this item if your operating system does not support hyperthreading, or unreliability and instability may occur.

Single Logical Proc. Mode

Use this setting to control the CPU core. When set to **[Disabled],** the CPU works as multicore processor. When set to **[Enabled]**, only a single thread and core are enabled.

Set Max Ext CPUID = 3

Use this setting to set the Max CPUID extended function value to 3.

Processor Power Management

Use this setting to set power management options for the processor.

[Disabled]	C States and GV1/GV3 are disabled.
[GV1/GV3 Only]	C States are disabled.
[C States Only]	GV1/GV3 are disabled.
[Enabled]	C States and GV1/GV3 are enabled.

Hardware Monitor

Press <Enter> to enter this submenu.

Auto Fan Speed Control

Use this setting to enable/disable the Smart Fan feature. Smart Fan adjusts the CPU fan speed automatically depending on the CPU current temperature, avoiding system damage caused by overheating.

V(VCC5), V(Vcore), V(VCC3), V(V_1P5), V(12V), V(3Vsb), CPU/SYS Temperature, SYS Fan1/SYS Fan2 Speed

These items display the current status of all of monitored hardware devices/components, such as CPU voltage, temperature, and fan speed.

ASF Configuration

Use this submenu to specify the ASF configuration.

Minimum WatchDog Timeout

Use this setting to specify the minimum time period for the BIOS to stop the Watchdog Timer after a reset has occurred.

BIOS Boot Timeout

Use this setting to specify the time period for the BIOS to boot before the system is reset.

OS Boot Timeout

Use this setting to specify the time period for the OS to boot before the system is reset.

Power-On Wait Time

Use this setting to specify the maximum amount of time for the Alert Sending Device (ASD) to establish connection with its transport media.

Console Redirection

Press <Page Up>/<+> or <Page Down>/<–> to configure Console Redirection. The following submenus appear.

Com Port Address

Use this setting to enable/disable the motherboard com port. Options: **[Disabled]**, **[Onboard COM A]**, **[Onboard COM B]**.

Baud Rate

Use this setting to select the delay before key repeat. Options: **[300]**, **[1200]**, **[2400]**, **[9600]**, **[19.2K]**, **[38.4K]**, **[57.6K]**, **[115.2K]**.

Console Type

Use this setting to enable a specified console type. Options: **[VT100]**, **[VT100, 8bit]**, **[PC-ANSI, 7bit]**, **[PC ANSI]**, **[VT100+]**, **[VT-UTF8]**.

Flow Control

Use this setting to enable flow control. Options: **[None]**, **[XON/XOFF]**, **[CTS/RTS]**.

Console Connection

Use this setting to indicate whether the console is connected directly to the system or connected via a modem. Options: **[Direct]**, **[Via modem]**.

Continue C. R. after POST

Select **[On]** to enable Console Redirection after the OS loads. Options: **[On]**, **[Off]**.

I/O Device Configuration

Use this submenu to configure I/O Devices for optimal system performance.

Integrated Device Control

Use this submenu to configure a specified integrated device.

Legacy USB Support

If your operating system does not support USB 1.1/2.0 or have a USB 1.1/2.0 driver installed (for example, DOS and SCO Unix), set this item to **[Enabled]** to use any USB 1.1/2.0 device. Options: **[Disabled]**, **[Enabled]**.

Serial Port A/B

Use these settings to specify the onboard Serial Port A/B base I/O port addresses. Select **[Auto]** to allow the BIOS to determine the correct base I/O port address automatically. Options: **[3F8/IRQ4]**, **[2F8/IRQ3]**, **[3E8/IRQ4]**, **[2E8/IRQ3]**, and **[Disabled]**.

Parallel Port

Set this item to **[Enabled]** to configure the parallel port base I/O address and IRQ manually. Options: **[Enabled]**, **[Disabled]**.

Mode

Select an operating mode for the onboard parallel (printer) port.

[Output Only]	Standard parallel port
[EPP]	Enhanced parallel port
[ECP]	Extended capability port
[Bidirectional]	SPP duplex mode

To operate the onboard parallel port as Standard parallel port only, select **[Output Only]**. To operate the onboard parallel port in the EPP mode simultaneously, select **[EPP]**. By selecting **[ECP]**, the onboard parallel port operates in ECP mode only. Selecting **[Bidirectional]** allows the onboard parallel port to support SPP duplex mode.

Base I/O Address

Use this setting to specify the base I/O port addresses of the onboard parallel port. Options: **[378]**, **[278]**, **[3BC]**. (This setting is not available when the parallel port is set to **[EPP]** mode.)

Interrupt

Use this setting to specify the parallel port interrupt. Options: **[IRQ 5]**, **[IRQ 7]**.

Floppy Disk Controller

Use this setting to enable or disable the onboard floppy controller. Select **[Enabled]** when you have installed a floppy disk drive. Options: **[Enabled]**, **[Disabled]**.

Base I/O Address

Use this setting to specify the onboard floppy base I/O port address.

DMI Event Logging

Press <Page Up>/<+> or <Page Down>/<–> to view DMI event logging.

View DMI Event Log

Press <Enter> to view the DMI event log contents.

Event Logging

Use this setting to disable/enable the BIOS to log Desktop Management Interface (DMI) events. Options: **[Disabled]**, **[Enabled]**.

ECC Event Logging

Use this setting to disable/enable the BIOS to log Error Checking and Correcting (ECC) events. Options: **[Disabled]**, **[Enabled]**.

Mark DMI Events as Read

Press <Enter> and a screen appears, asking you to confirm whether to clear all DMI event logs immediately. Press <Y> and <Enter>, and the BIOS clears all DMI event logs right away.

Clear All DMI Event Logs

When you set this setting to **[Yes]**, the DMI event log is cleared at the next POST stage. Then, the BIOS automatically sets this option to **[No]**. Options: **[Yes]**, **[No]**.

Security

Use this menu to set security passwords to control system access at boot time and when entering the BIOS setup program.

Supervisor Password Is/User Password Is

This read-only item shows the preset supervisor/user password.

Set Supervisor Password

Use this setting to control access to the BIOS Setup utility.

Set User Password

Use this setting to control access to the system at boot.

Virus Check Reminder/System Backup Reminder

Use this setting to display a reminder message at boot (daily, every Monday, or first of every month).

Password on Boot

Selecting **[Enabled]** requires a password on boot and prior setting of the supervisor password. If the supervisor password is set and this option is disabled, the BIOS assumes the user is booting. Options: **[Enabled]**, **[Disabled]**.

Power

Use this menu to specify your power management settings. The options available depend on the hardware installed in your system.

Resume on Modem Ring

Select **[On]** to wake up the system when an incoming call on the modem is detected. Options: **[On]**, **[Off]**.

Resume on Time

Select **[On]** to wake up the system at a predetermined time. Options: **[On]**, **[Off]**.

Resume Time

The time format is <HH> <MM> <SS>.

Resume Date

The date format is <MM> <DD> <YYYY>.

Resume on LAN

Select **[Enabled]** to wake up the system when incoming signals are detected on the specified LAN devices. Options: **[Enabled]**, **[Disabled]**.

After Power Failure

Use this setting to specify whether your system reboots after a power failure or interrupt occurs. Available settings are:

[Stay Off] Returns the system to an off state.

[Power On] Returns the system to a full on state.

[Last State] Restores the system to the previous status before the power failure or interrupt occurred.

Boot

Use this menu to set the operating system boot device priority.

Boot Priority Order

Use this setting to set the boot priority of the specified devices. Press <Enter> to enter the submenu and:

- Use the arrow keys (↑↓) to select the desired device.
- Press <Page Up>/<+> or <Page Down>/<–> to move the device up or down in the priority list.
- Use <X> to exclude/include the device to boot.
- Use <R> or <F> to specify the USB ZIP to be the removable device (<R>) or hard drive (<F>).

Excluded from Boot Order

Use this setting to exclude the specified devices from the boot order list.

Exit

Use this menu to exit the BIOS setup. Note that <Esc> does not exit this menu. You must select an item from the menu or menu bar to exit.

Exit Saving Changes

Select this option to save the changes and quit.

Exit Discarding Changes

Select this option to abandon the changes and quit.

Load Setup Defaults

Use this option to restore all BIOS settings to the optimal defaults. The setup defaults are the manufacturer default values for optimized mainboard performance.

Discard Changes

Use this option to restore all BIOS settings to previous values.

Save Changes

Use this option to save the changes without exiting the **Setup** menu.

Drivers and Software

Files and Directories Installed on Your Hard Drive

Your hard drive includes a directory called `images` in its root that contains software and soft copies of manuals for the peripherals. The directory structure under the `images` directory is logically organized into several levels.

In the `images` directory, you will find a `manuals` directory, an `os` directory, and directories for each computer peripheral.

The `manuals` directory contains quick reference guides, technical reference manuals, and National Instruments software manuals, all in Adobe Acrobat format. To access any manual, change your directory to `c:\images\ni8351\manuals` and list the contents of that directory. You will see several files, one corresponding to each peripheral.

The `os` directory contains a subdirectory corresponding to the operating system installed on your computer.

The rest of the directories correspond to each peripheral in your system. Within these directories are the peripheral drivers. These files and directories are copied exactly from the manufacturer distribution disks, so the naming conventions vary from peripheral to peripheral.

LCD Function Menu

Three buttons control the LCD function panel:

- **Up**—Go to the previous selection.
- **Enter**—Execute the command.
- **Next**—Go to the next selection.

You can use the LCD front panel control buttons to access information under the **LCD Info**, **H/W Monitor**, and **System Conf** menus. The menu structures are shown in Figures 2-1 and 2-2.

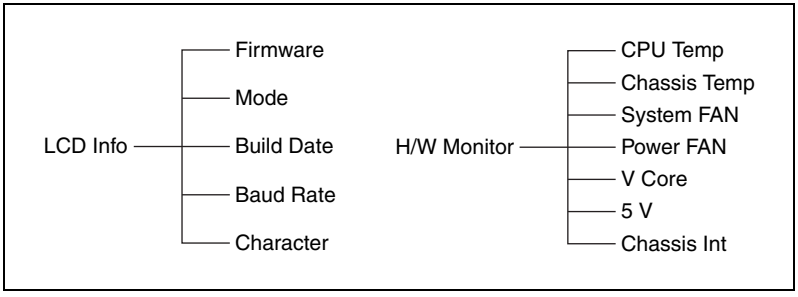


Figure 2-1. LCD Info and H/W Monitor Control Panel Menu Structure

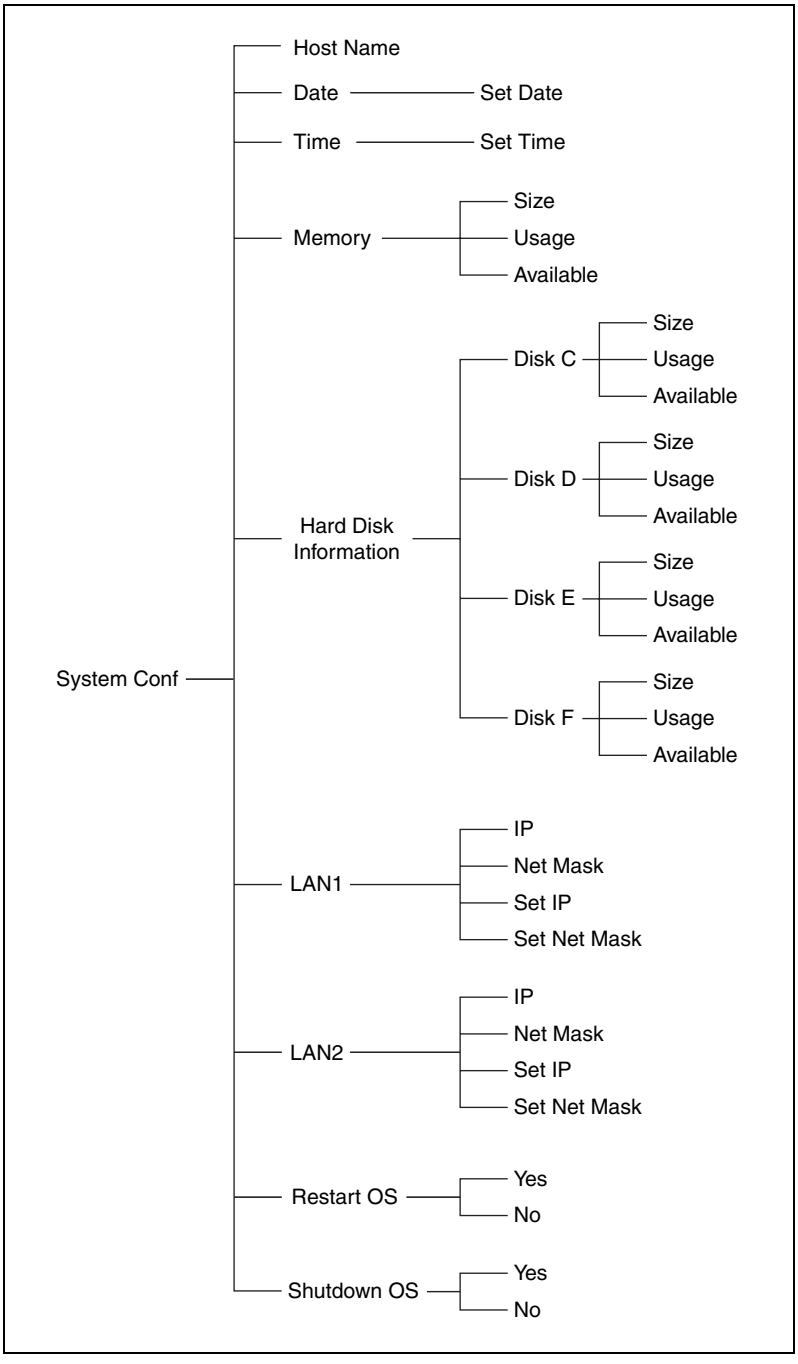


Figure 2-2. System Conf Control Panel Menu Structure

Table 2-1 describes the debug functions that appear in the LCD before the NI 8351 boots to OS.

Table 2-1. Debug Functions Before Boot to OS

Function	Description
LCD Panel v1.1 Initialize OK	Show product information and version.
BIOS POST: C1 Msg: Mem Sizing	If the system has memory problems, it stops at C1.
BIOS POST: C3 Msg: BIOS chsum	If the system has BIOS problems, it stops at C3.
BIOS POST: 18 Msg: CPU Init.	If the system has CPU problems, it stops at 18.
BIOS POST: 2B Msg: VGA Init.	If the system has VGA problems, it stops at 2B.
BIOS POST: 2D Msg: Sign-on Msg.	Shows information about logo processor brand name.
BIOS POST: 52 Msg: Ext. Mem Test	If the system has memory problems, it stops at 52.
BIOS POST: 75 Msg: IDE Init.	If the system has IDE problems, it stops at 75.
BIOS POST: 8B Msg: PCI ROM Init.	If the system has PCI problems, it stops at 8B.
BIOS POST: 94 Msg: disp summary	
<Boot to OS>	If the system is problem free, it boots to OS.

Table 2-2 describes the LCD Info functions that appear in the LCD.

Table 2-2. LCD Info Functions

Function	Description
Firmware 1/5 V1.1	Show LCD firmware version
Mode 2/5 Communication	Show LCD working mode
Build Date 3/5 2002/03/25	Show LCD firmware build date
Baud Rate 4/5 9600	Show LCD communication speed with COM port For PC and LCD link
Character 5/5 16X2	Show LCD characters

Table 2-3 describes the H/W Monitor functions that appear in the LCD.

Table 2-3. H/W Monitor Functions

Function	Description
CPU 1/15 42C	Show CPU temperature information
Chassis 2/15 28C	Show chassis temperature information
System FAN 3/15 0 RPM	Show system fan speed information
Power FAN 4/15 4219 RPM	Show power fan speed information
V core 6/15 1.46 V	Show V core voltage information
+5 V 9/15 5.07 V	Show +5 V voltage information
Chassis int 15/15 OFF	Show chassis intrusion detect information

Table 2-4 describes the System Conf functions that appear in the LCD.

Table 2-4. System Conf Functions

Function	Description
Host name 1/9	Show system host name
Date 2002.8.21 2/9	Set Date 1/1 Show the date and allow to set the date
Time 13:24:50 3/9	Set Time 1.1 Show the time and allow to set the time
Memory 4/9	Size 1/3 Show memory size 511MB
	Usage 2/3 Unable to show used memory size 153MB
	Available 3/3 Unable to show available memory size 358MB
Hard Disk Information 5/9	Can detect four hard disks on the system
Disk C 3698 MB 1/4	Size 1/3 Show partition size 3698 MB
	Usage 2/3 Unable to show the used size 1485 MB
	Available 3/3 Unable to show the available size 2213 MB
Disk D 15393 MB 2/4	Size 1/3 Show partition size 15393 MB
	Usage 2/3 Unable to show the used size 494 MB
	Available 3/3 Unable to show the available size 14899 MB

Table 2-4. System Conf Functions (Continued)

Function	Description
Disk E 3/4 0 MB	Size 1/3 Show partition size 0 MB
	Usage 2/3 Unable to show the used size 0 MB
	Available 3/3 Unable to show the available size 0 MB
Disk F 4/4 0 MB	Size 1/3 Show partition size 0 MB
	Usage 2/3 Unable to show the used size 0 MB
	Available 3/3 Unable to show the available size 0 MB
LAN1 6/9 100.100.100.101	IP 1/4 Show the system IP information 100.100.100.101
	Netmask 2/4 Show the system Net Mask information 255.255.255.0
	Set IP Allow users to set the system IP 000.000.000.000
	Setmask Allow users to set the system Net Mask 000.000.000.000
LAN2 7/9 100.100.100.101	IP 1/4 Show the system IP information 100.100.100.101
	Netmask 2/4 Show the system Net Mask information 255.255.255.0
	Set IP Allow users to set the system IP 000.000.000.000
	Setmask Allow users to set the system Net Mask 000.000.000.000

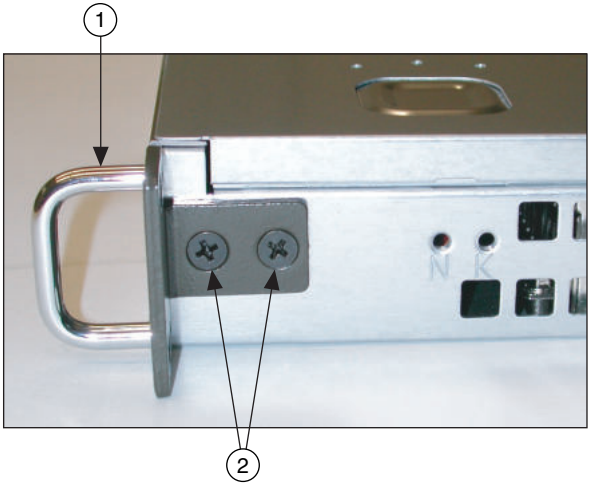
Table 2-4. System Conf Functions (Continued)

Function	Description
Restart 8/9 Restart OS	Yes/No Restart your Windows OS
Shutdown 9/9 Shutdown OS	Yes/No Shut down your Windows OS

Rack Mounting

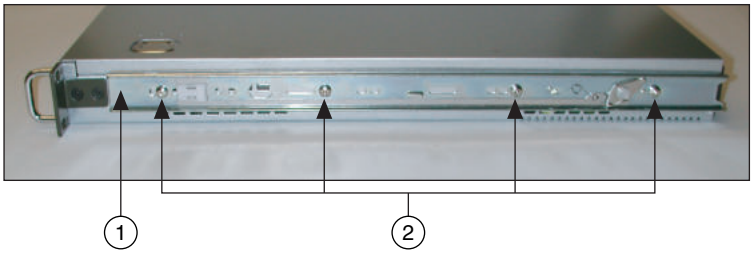
Follow these steps to rack mount the NI 8351:

1. Attach the rack mount handles to the NI 8351 front panel using the black M4x6 screws.



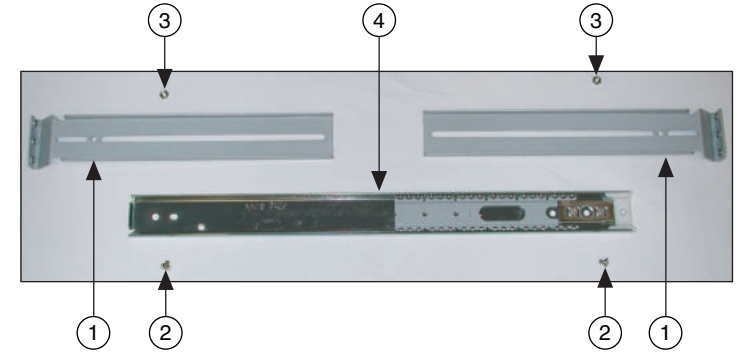
1 Rack Mount Handle 2 M4x6 Screws

2. Attach the side rails to the sides of the NI 8351 using four M4x6 screws on each side.



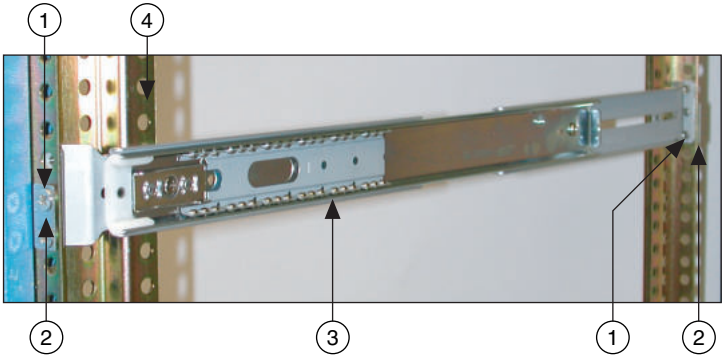
1	Side Rail	2	M4x6 Screws

3. Attach the mounting brackets to the rack rails using M4x6 screws and M4 nuts. The rear bracket position is adjustable; attach the rear bracket so that it aligns with the rear rail on the rack.



1	Mounting Bracket	3	M4 Nut
2	M4x6 Screw	4	Rack Rail

4. Attach the rack rails to the rack using the M5x8 screws and the two-hole rack mounting plates.



1	M5x8 Screw	3	Rack Rail
2	Two-Hole Mounting Plate	4	Rack

5. Align the rails on the NI 8351 with the rack rails. Slide the NI 8351 halfway into the rack.



6. Press the locking tabs on both sides of the NI 8351 and slide the NI 8351 fully into the rack.



1 Locking Tab

Note The locking tabs lock the NI 8351 halfway into the rack, so that it cannot slide out. When removing the NI 8351, pull the locking tabs forward to unlock them.

7. Secure the NI 8351 to the rack with the mounting screws.

Hard Drive Recovery

The NI 8351 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 8351 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 8351 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* 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

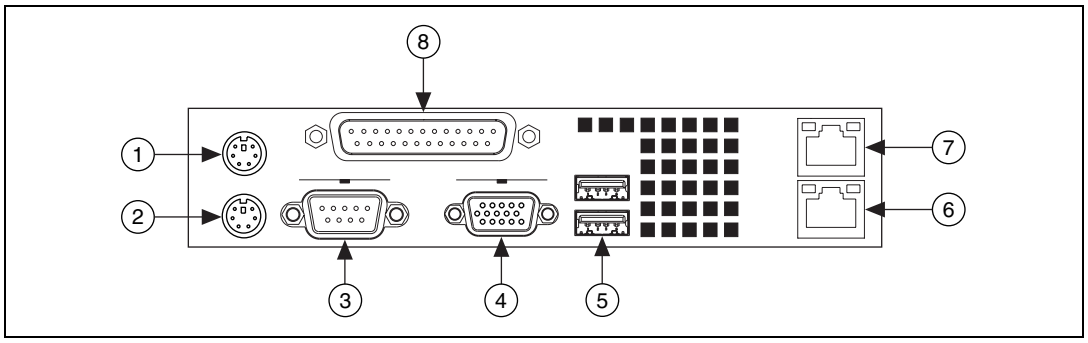
Rear Panel Connectors

Table 3-1 lists various peripherals and their corresponding NI 8351 external connectors, bus interfaces, and functions.

Table 3-1. NI 8351 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
Parallel	Parallel Port (36-pin champ)	IEEE 1284
Serial	COM1 (9-pin DSUB)	16550 RS-232 serial port
Video	VGA (15-pin DSUB)	Intel Extreme Graphics controller
Ethernet	LAN (RJ45)	10/100 Ethernet connection
Ethernet	LAN (RJ45)	10/100 Ethernet connection

Figure 3-1 shows the rear panel layout of the NI 8351.



1	PS/2 Mouse Connector	3	Serial Port	5	USB Ports	7	LAN 1
2	PS/2 Keyboard Connector	4	VGA Port	6	LAN 2	8	Parallel Port

Figure 3-1. NI 8351 Rear Panel Layout

PS/2

Figure 3-2 shows the location and pinouts for the PS/2 keyboard and mouse connectors on the NI 8351. Table 3-2 lists and describes the PS/2 connector signals.

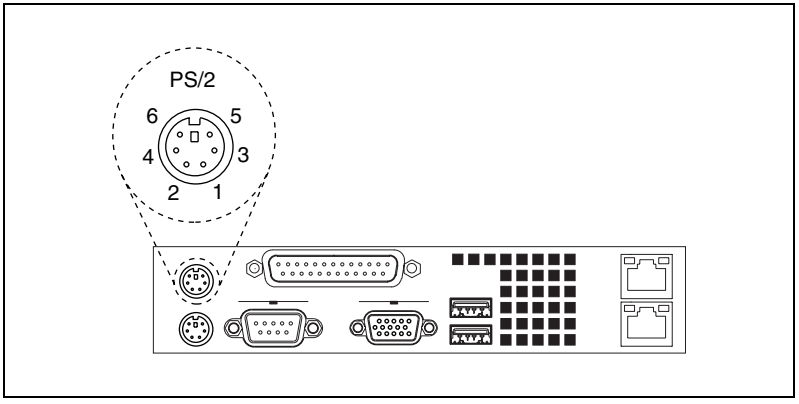


Figure 3-2. PS/2 Connector Location and Pinout

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 8351. Table 3-3 lists and describes the USB connector signals.

AMP manufactures a USB mating connector, part number 787633.

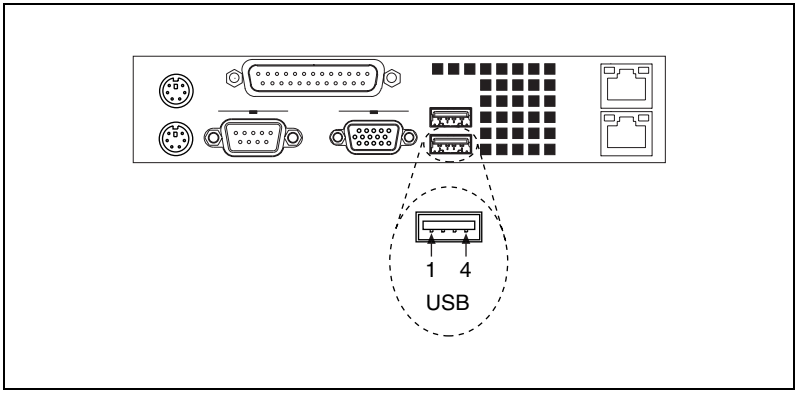


Figure 3-3. USB Connector Location and Pinout

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

Parallel Port

Figure 3-4 shows the location and pinouts for the IEEE 1284 (parallel) connector on the NI 8351. Table 3-4 lists and describes the IEEE 1284 connector signals.

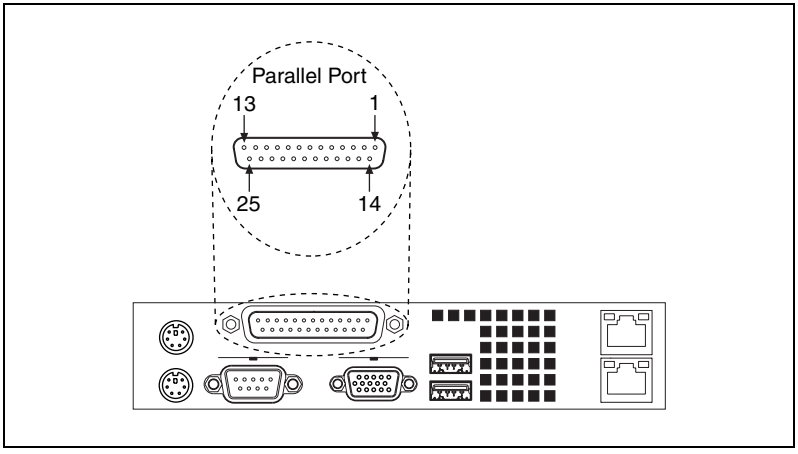


Figure 3-4. Parallel Port Connector Location and Pinout

Table 3-4. Parallel Port Connector Signals

Pin	Default Configuration (LPT)	
	Signal Name	**Signal Description**
1	BUSY	Device Busy
2	SLCT	Select
3	ACK*	Acknowledge
4	FAULT*(ERROR*)	Fault
5	PAPEREND	Paper End
6	PD0	Data Bit 0
7	PD1	Data Bit 1
8	PD 2	Data Bit 2
9	PD3	Data Bit 3
10	PD4	Data Bit 4
11	PD5	Data Bit 5

Table 3-4. Parallel Port Connector Signals (Continued)

Pin	Default Configuration (LPT)	
	Signal Name	**Signal Description**
12	PD6	Data Bit 6
13	PD7	Data Bit 7
14	INIT*	Initialize Printer
15	STROBE*	Strobe
16	SLCTIN*	Select Input
17	AUTOFD*	Auto Line Feed
18	+5V	+5 V
19–35	GND	Ground
36	NC	Not Connected

Serial

Figure 3-5 shows the location and pinouts for the serial connector on the NI 8351. Table 3-5 lists and describes the serial connector signal.

AMP manufactures a serial port mating connector, part number 745491-5.

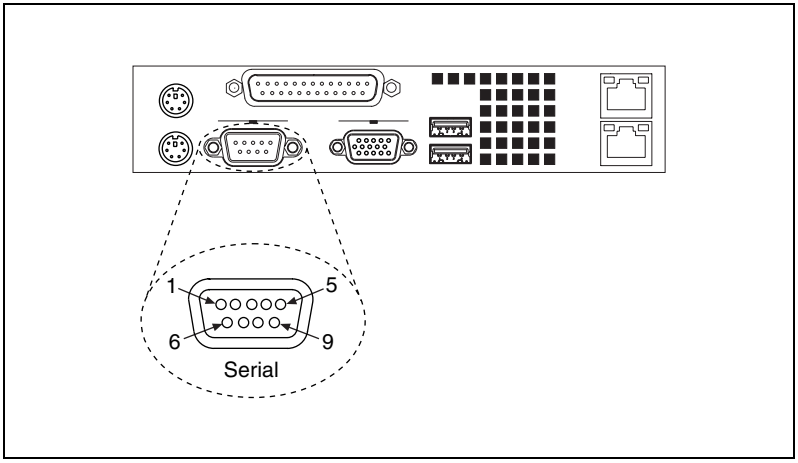


Figure 3-5. Serial Connector Location and Pinout

Table 3-5. 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 3-6 shows the location and pinouts for the VGA connector on the NI 8351. Table 3-6 lists and describes the VGA connector signals.

AMP manufactures a mating connector with part numbers 748364-1 (housing) and 748333-2 (pin contact).

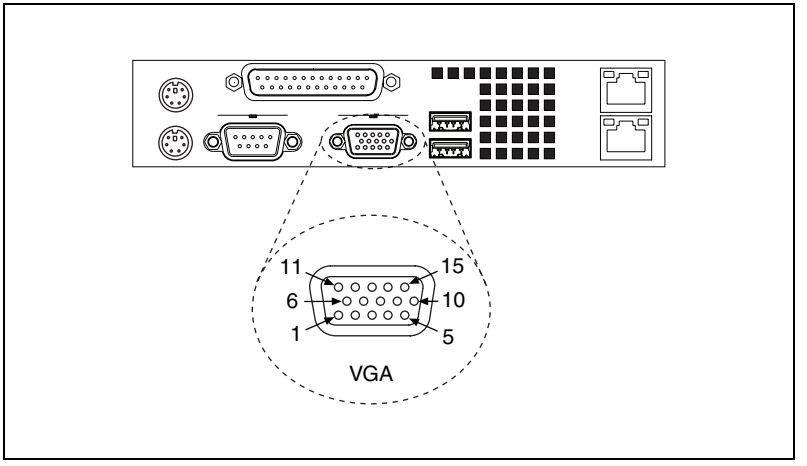


Figure 3-6. VGA Connector Location and Pinout

Table 3-6. 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 3-7 shows the location and pinouts for the Ethernet connectors on the NI 8351. Table 3-7 lists and describes the Ethernet connector signals.

AMP manufactures a mating connector, part number 554739-1.

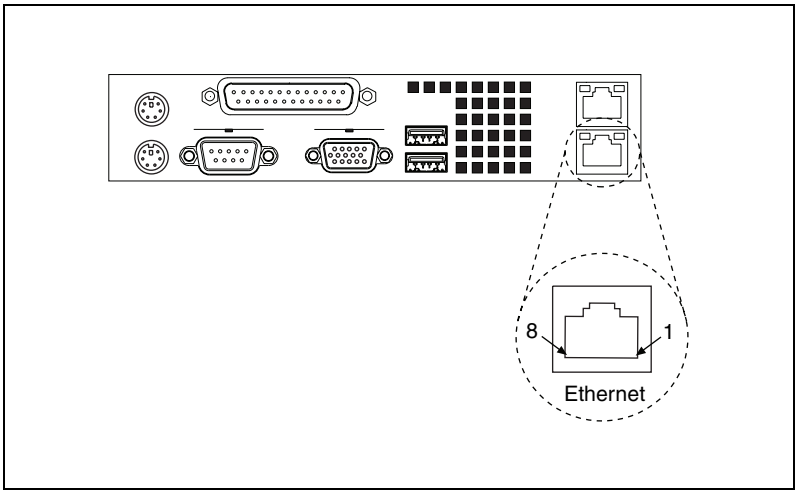


Figure 3-7. Ethernet Connector Location and Pinout

Table 3-7. 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 8351.

General Questions

What do the LEDs on the NI 8351 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 8351. For more information, refer to Figure 1-1, *Front View of the NI 8351*.

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 8351 and press <F2> 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 8351 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 8351 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 <F2>, 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 8351 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 8351. 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.

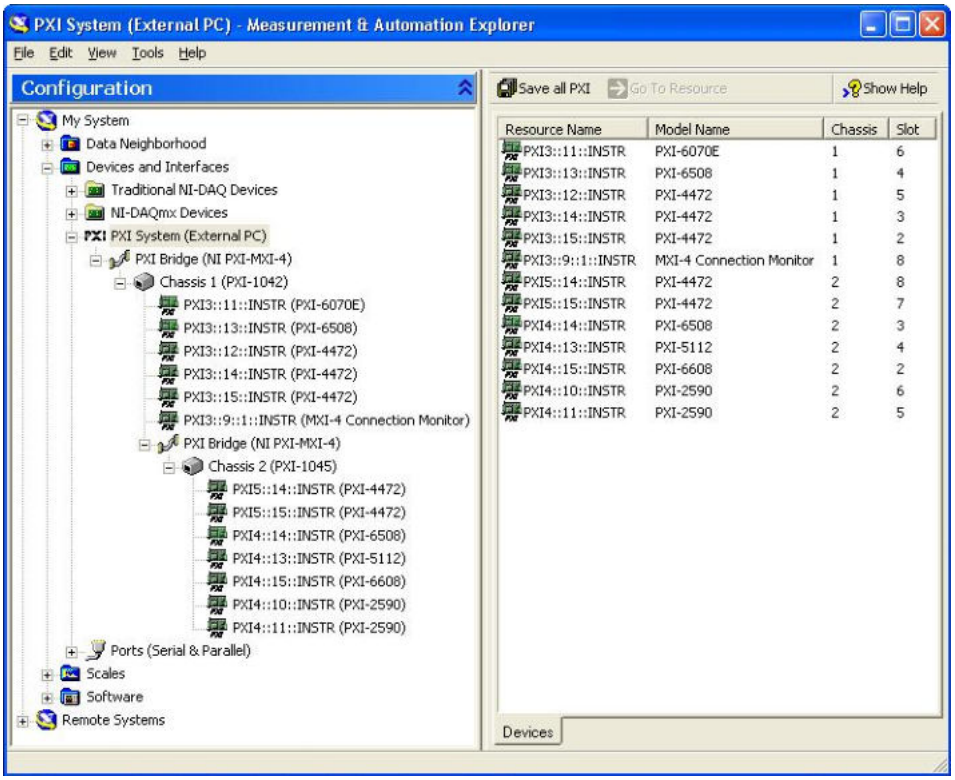


Figure 4-1. Multichassis Configuration in MAX

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 8351 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 8351 does not have an internal floppy drive. Is there a way to use an external drive?

Yes. The NI 8351 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 8351.

What if the NI 8351 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 LED 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?

Things to Try:

- Make sure the NI 8351 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: JBAT1* section of Appendix B, *Hardware Configuration*.)
- Recover the hard drive on the NI 8351. (Refer to the *Hard Drive Recovery* section of Chapter 2, *Installation and BIOS Setup*.)

My NI 8351 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 8351. 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 8351 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..... 6–3 A

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 E7230 chipset, supports 533/800/1066 MHz FSB, 4 GB dual-channel DDR-II memory

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

PCI ..... One PCI Express x4 slot

[1] Operating range is guaranteed by design.

SATA	Four SATA ports compliant with the Serial-ATA 2.0 specification. Maximum data rate of 300 MB/s
IDE	One primary and one secondary IDE connector. Ultra DMA 66/100 support
USB ports	Four USB 2.0 ports
Keyboard	PS/2 keyboard port
Mouse	PS/2 mouse port
Video	VGA port, onboard ATI Radeon 7000 with 16 MB SDRAM
Serial	One RS-232 serial port
Parallel	One parallel port
LAN	Two RJ45 LAN jacks
Onboard LAN controller	Intel 82573V/L Gigabit Ethernet controller

CPU

CPU	Intel Pentium D
Clock speed	3.0 GHz
Front side bus speed	800 MHz
L2 cache	1 MB/core
Package	LGA 775

Hard Disk Drive

Capacity	160 GB or larger
Interface	Serial-ATA

Memory

Standard memory ..... 2 × 256 MB (32 M × 64 bit), DDR-II SDRAM, ECC 533 MHz, unbuffered, 240-pin DIMMs

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

4 GB memory upgrade ..... 4 × 1 GB (128 M × 64 bit), DDR-II SDRAM, ECC 533 MHz, unbuffered, 240-pin DIMMs,

Mechanical

Overall dimensions (standard chassis)

- Height ..... 43.2 mm (1.70 in.)
- Width ..... 435.1 mm (17.13 in.)
- Depth ..... 434.4 mm (17.10 in.)

Weight ..... 8.6 kg (19.0 lbs)

Environmental

Operating temperature ..... 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 information technology equipment:

- IEC 60950-1, EN 60950-1
- UL 60950-1
- CAN/CSA-C22.2 No. 60950-1

Note For UL 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

Emissions.....EN 55011 Class A at 10 m.
FCC Part 15A above 1 GHz

Immunity .....EN 61326:1997 + A2:2001, Table 1

CE, C-Tick, and FCC Part 15 (Class A) Compliant

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:

Low-Voltage Directive (safety).....73/23/EEC

Electromagnetic Compatibility
Directive (EMC) 89/336/EEC

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.

B

Hardware Configuration

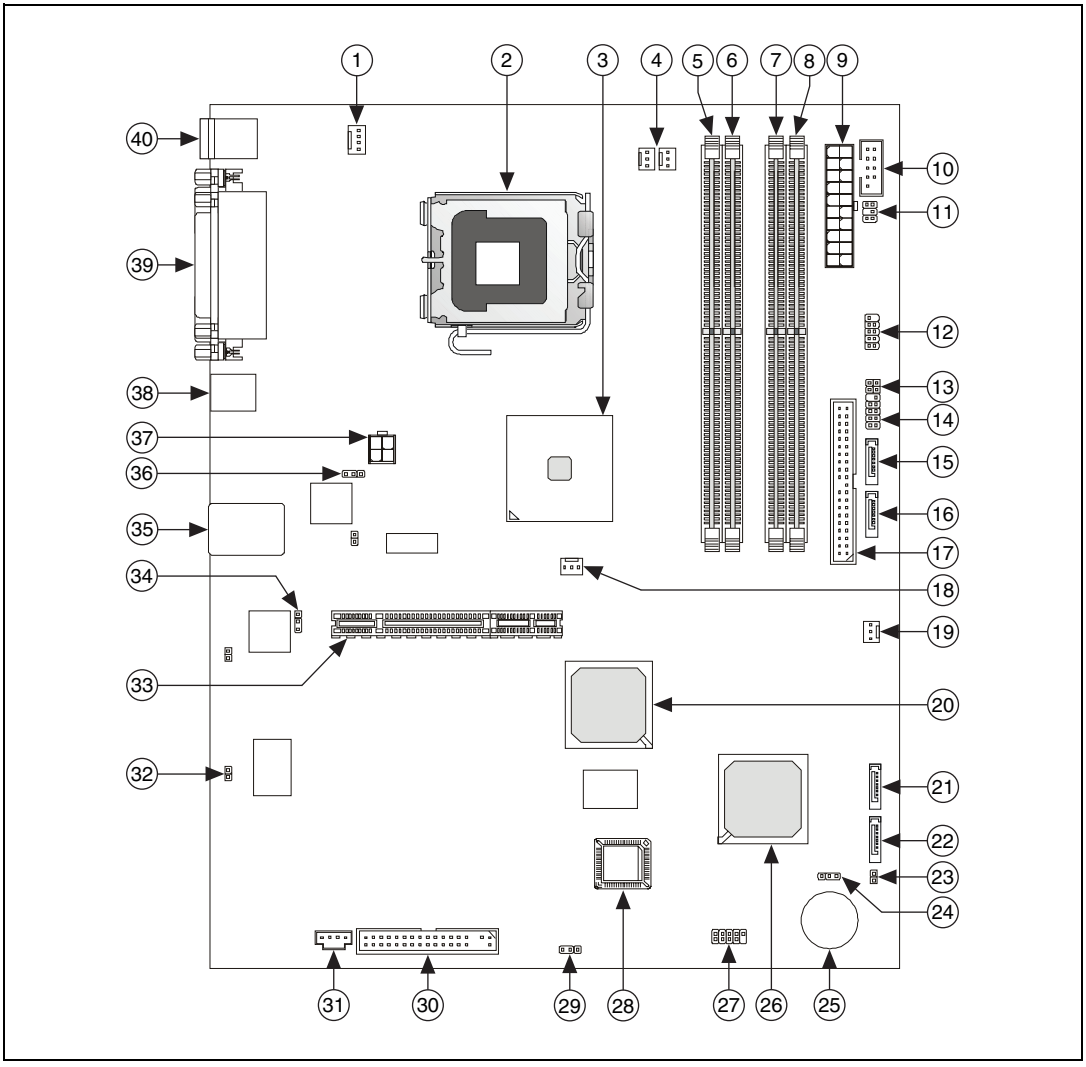
Caution Hazardous Voltage Area

No user (operator) serviceable parts are inside the NI 8351.

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 8351 mainboard.

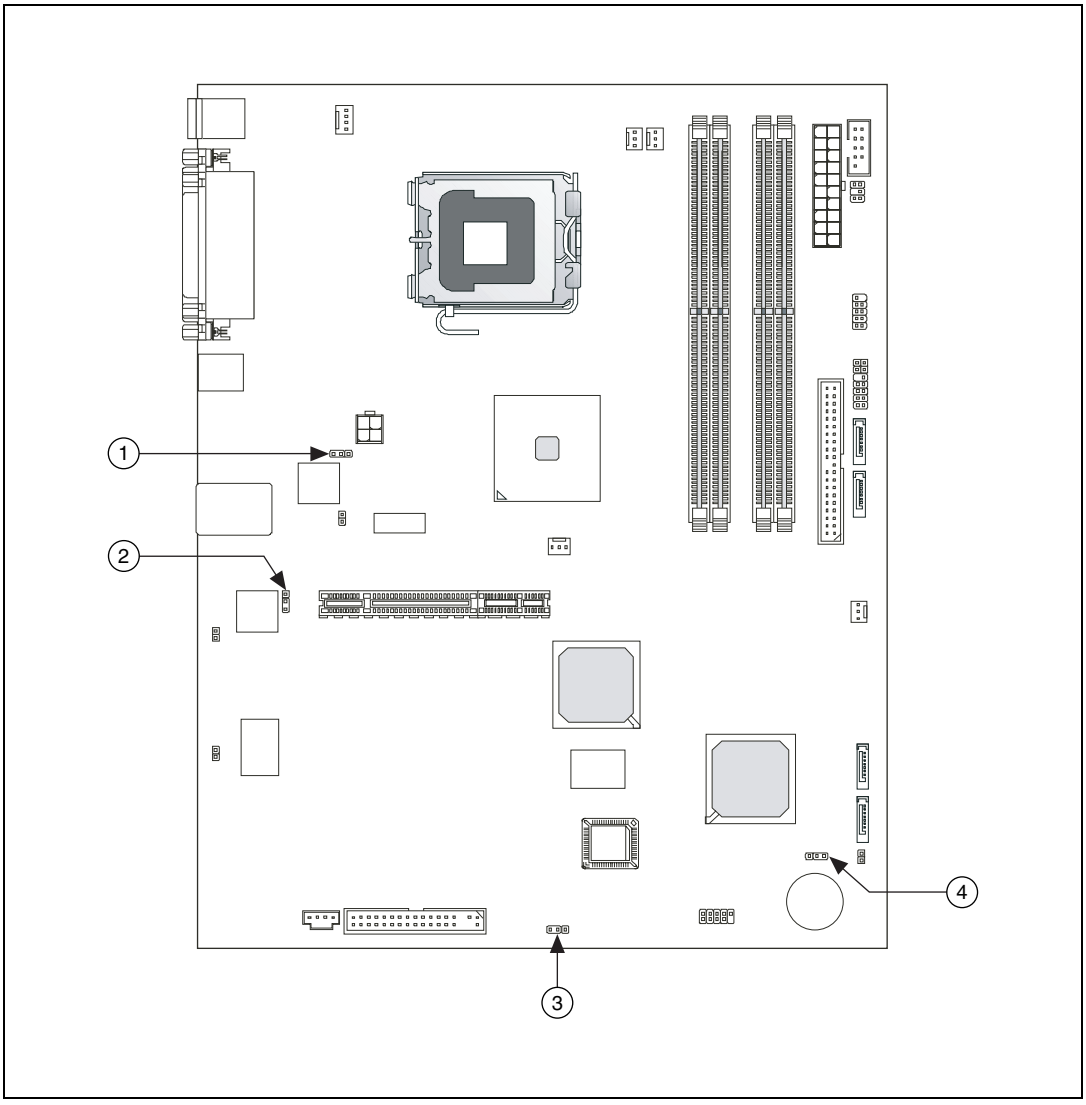


1 CPU_FAN1	12 JUSB2	23 JCI1	34 J8
2 CPU Socket	13 JACT1/2	24 JBAT1	35 RJ45 LAN Jacks
3 Intel 7230	14 JFP1	25 Battery	36 J5
4 SYSFAN2/1	15 SATA4	26 Intel ICH7R	37 JPW1
5 DIMM 1	16 SATA3	27 JUSB1	38 USB Ports
6 DIMM 2	17 IDE1	28 BIOS	39 Top—LP1; Bottom—COM A, VGA Port
7 DIMM 3	18 SYSFAN4	29 J2	
8 DIMM 4	19 SYSFAN3	30 FDD1	40 PS/2 Connectors (Top—Mouse; Bottom—Keyboard)
9 ATX1	20 ATI Radeon 7000	31 JCD1	
10 COM2	21 SATA2	32 JGS1	
11 JLCD1	22 SATA1	33 PCIX1	

Figure B-1. NI 8351 Mainboard Layout

Jumper Settings

Figure B-1 shows the jumper locations on the NI 8351.



1 J5	2 J8	3 J2	4 JBAT1

Figure B-1. NI 8351 Jumper Locations

Enable/Disable LAN1 Jumper: J5

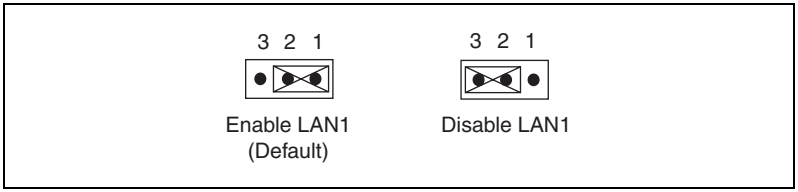


Figure B-2. Enable/Disable LAN1 Jumper: J5

Enable/Disable LAN2 Jumper: J8

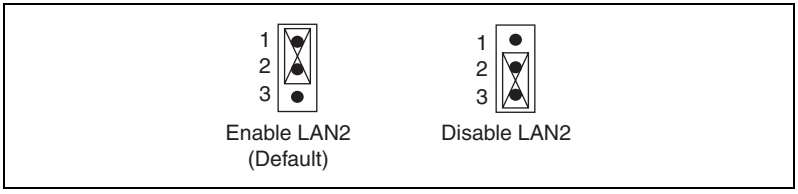


Figure B-3. Enable/Disable LAN2 Jumper: J8

BIOS Write Protect Jumper: J2

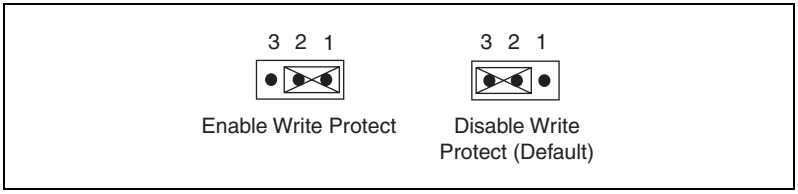


Figure B-4. BIOS Write Protect Jumper: J2

Clear CMOS Jumper: JBAT1

The CMOS RAM has a power supply from an external battery to preserve the system configuration data. With this power supply, the system can automatically boot the OS every time it is turned on. Use the JBAT1 (Clear CMOS) jumper to clear the system configuration by shorting pins 2–3.

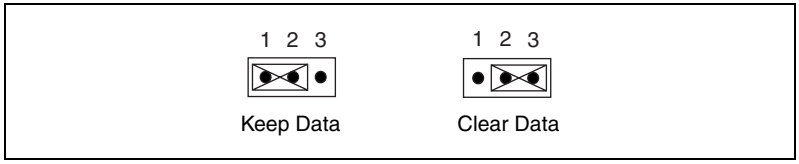
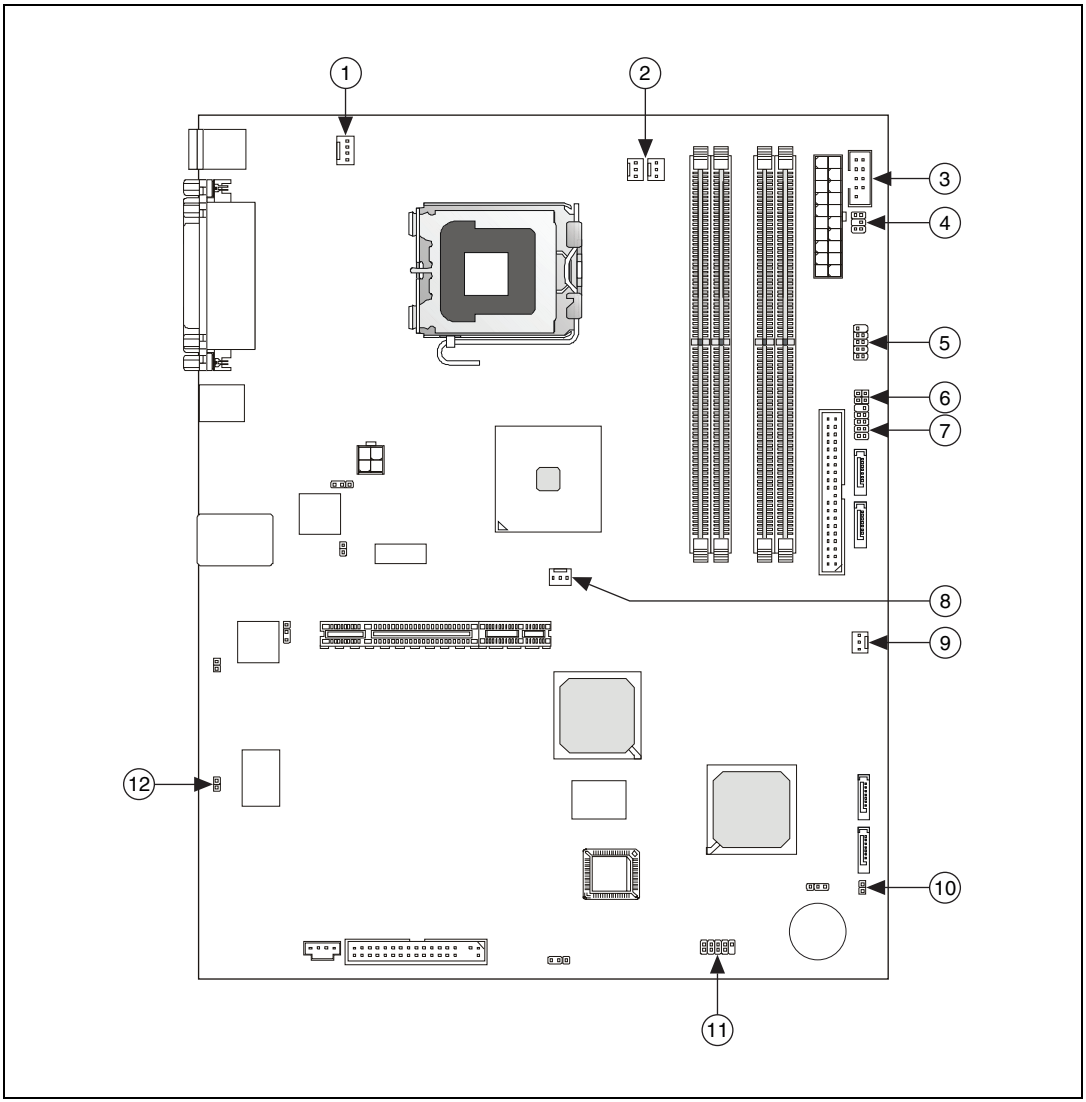


Figure B-5. Clear CMOS Jumper: JBAT1

Caution To avoid damaging the mainboard, clear the CMOS only when the system is powered off. Also, be sure to return reconnect pins 1–2 after clearing the CMOS.

Other Connectors

Figure B-6 shows the locations of other connectors on the NI 8351.



1	CPU_FAN1	4	JLCD1	7	JFP1	10	JCI1
2	SYSFAN2/1	5	JUSB2	8	SYSFAN4	11	JUSB1
3	COM2	6	JACT1/JACT2	9	SYSFAN3	12	JGS1

Figure B-6. NI 8351 Other Connector Locations

Chassis Intrusion Switch Connector: JCI1

This connector is connected to a 2-pin chassis switch. If the NI 8351 is opened, the switch shorts. The system records this status and shows a warning message on the startup screen during boot. To clear the warning, you must enter the BIOS utility and clear the record. Refer to *BIOS Setup* in Chapter 2, *Installation and BIOS Setup*, for information about the Case Open Warning feature.

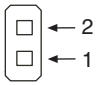


Figure B-7. Chassis Intrusion Switch Connector (JCI1)

Table B-1. Chassis Intrusion Switch Connector Signals

Pin	Signal Name
1	CINTRU
2	GND

LCD Panel Connector: JLCD1

This connector is for connection to an LCD panel, which shows information about current status or mode of the connected system.

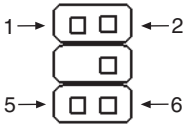


Figure B-8. LCD Panel Connector (JLCD1)

Table B-2. LCD Panel Connector Signals

Pin	Signal Name
1	SOUT
2	SIN
3	NC
4	GND1

Table B-2. LCD Panel Connector Signals (Continued)

Pin	Signal Name
5	GND0
6	VCC

LAN LED Connectors: JACT1 and JACT2

The LAN LED connectors connect to LAN LEDs, which show LAN activity. JACT1 is for the LAN1 jack, and JACT2 is for the LAN2 jack. The LAN1 and LAN2 jacks are on the rear panel.

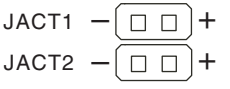
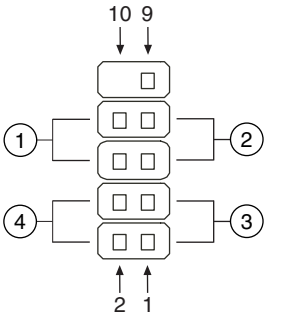


Figure B-9. LAN LED Connectors (JACT1 and JACT2)

Front Panel Connector: JFP1

The mainboard includes one front panel connector for electrical connection to the front panel switches and LEDs. JFP1 is compliant with *Intel Front Panel I/O Connectivity Design Guide*.



1	Power Switch	3	HDD LED
2	Reset Switch	4	Power LED

Figure B-10. Front Panel Connector (JFP1)

Table B-3. Front Panel Connector Signals

Pin	Signal Name	Signal Description
1	HD_LED_P	Hard disk LED pull-up
2	FP PWR/SLP	MSG LED pull-up
3	HD_LED_N	Hard disk active LED
4	FP PWR/SLP	MSG LED pull-up
5	RST_SW_N	Reset switch low reference pull-down to GND
6	PWR_SW_P	Power switch high reference pull-up
7	RST_SW_P	Reset switch high reference pull-up
8	PWR_SW_N	Power switch low reference pull-down to GND
9	RSVD_DNU	Reserved—do not use

Front USB Connector: JUSB1 and JUSB2

The mainboard includes two USB 2.0 pin headers, JUSB1 and JUSB2, that are compliant with *Intel I/O Connectivity Design Guide*. USB 2.0 technology increases data transfer rate up to a maximum throughput of 480 Mbit/s, which is 40 times faster than USB 1.1, and is ideal for connecting high-speed USB interface peripherals such as USB HDD, digital cameras, MP3 players, printers, modems, and so on.

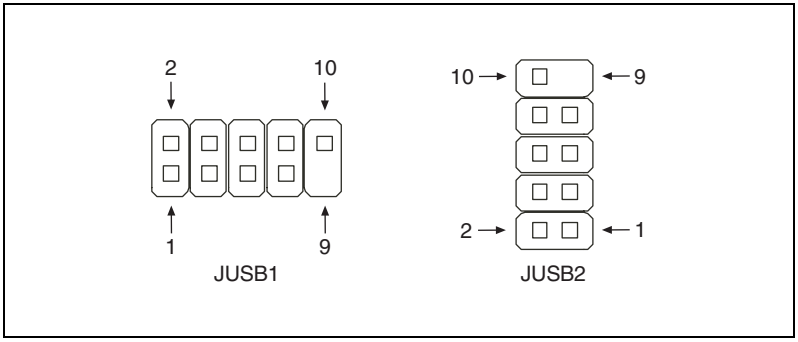


Figure B-11. Front USB Connector (JUSB1 and JUSB2)

Table B-4. 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.

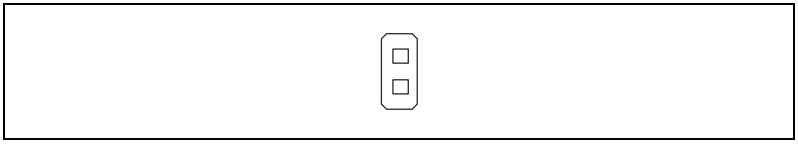


Figure B-12. Power Saving Switch Connector (JGS1)

Fan Power Connectors: CPU_FAN1, SYSFAN1/2/3/4

The fan power connectors support system cooling fans with +12 V. When connecting wires to the connectors, always remember that the red wire is positive and should be connected to the +12 V pin; the black wire is Ground and should be connected to GND. If the mainboard has a system hardware monitor chipset onboard, you must use a specially designed fan with a speed sensor to take advantage of the CPU fan control.

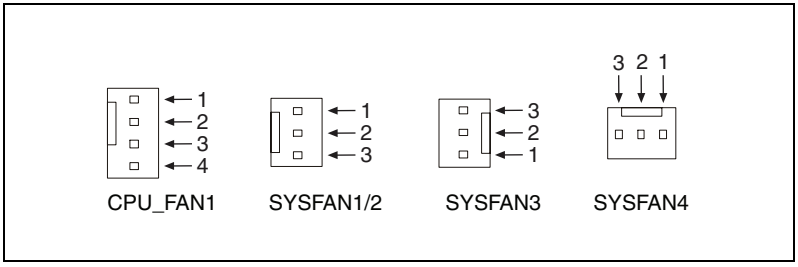


Figure B-13. Fan Power Connectors (CPU_FAN1 and SYSFAN1/2/3/4)

Table B-5. Fan Power Connector Signals

Pin	Signal Name
1	GND
2	+12 V
3	SENSOR
4	Control

Note CPU_FAN1 supports smart fan control. You can set up the smart fan control functions in the BIOS setup utility.

Serial Port Header: COM2

The mainboard includes one 9-pin header as a serial port. The port is a 16550A high-speed communication port that sends and receives 16-byte FIFOs. You can attach a serial mouse or other device directly to the header.

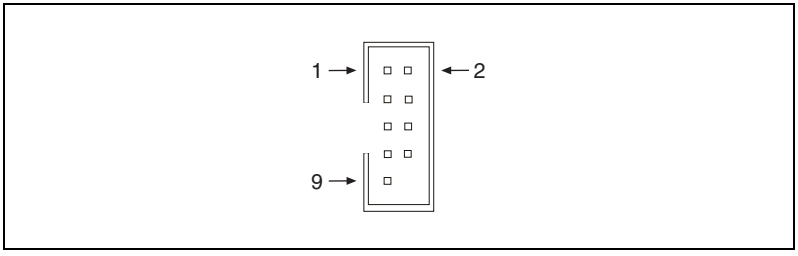


Figure B-14. Serial Port Header (COM2)

Table B-6. Serial Port Header Connector Signals

Pin	Signal Name	Signal Description
1	DCD	Data carry detect
2	SIN	Serial in or receive data
3	SOUT	Serial out of transmit data
4	DTR	Data terminal ready
5	GND	Ground
6	DSR	Data set ready
7	RTS	Request to send

Table B-6. Serial Port Header Connector Signals (Continued)

Pin	Signal Name	Signal Description
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.

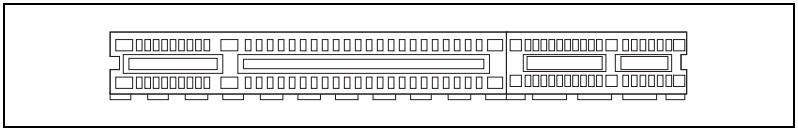


Figure B-15. PCI Express Slot

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-16 shows the DIMM location on the main board. DIMM1 is on the left; DIMM4 is on the right.

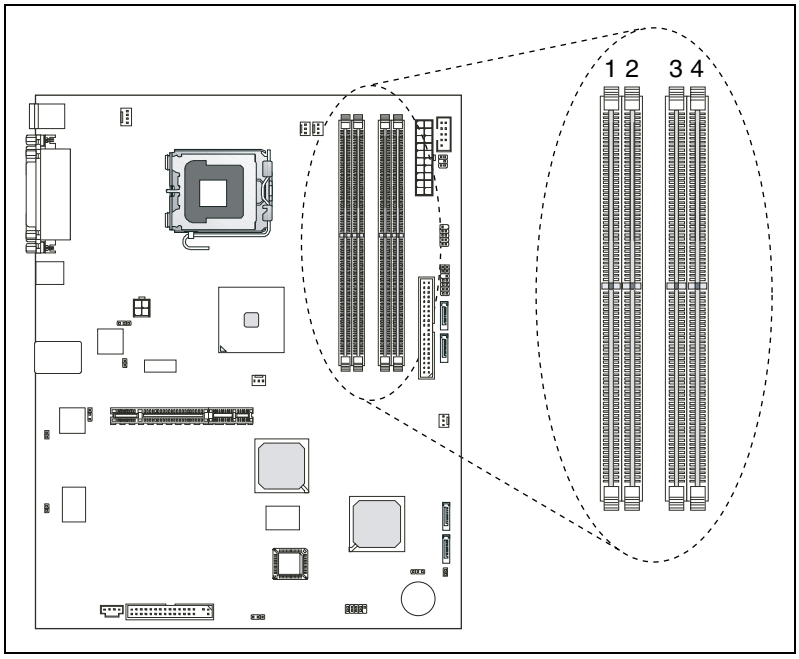


Figure B-16. DIMM Location

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-17, B-18, and B-19 show allowed configurations for dual-channel memory mode.

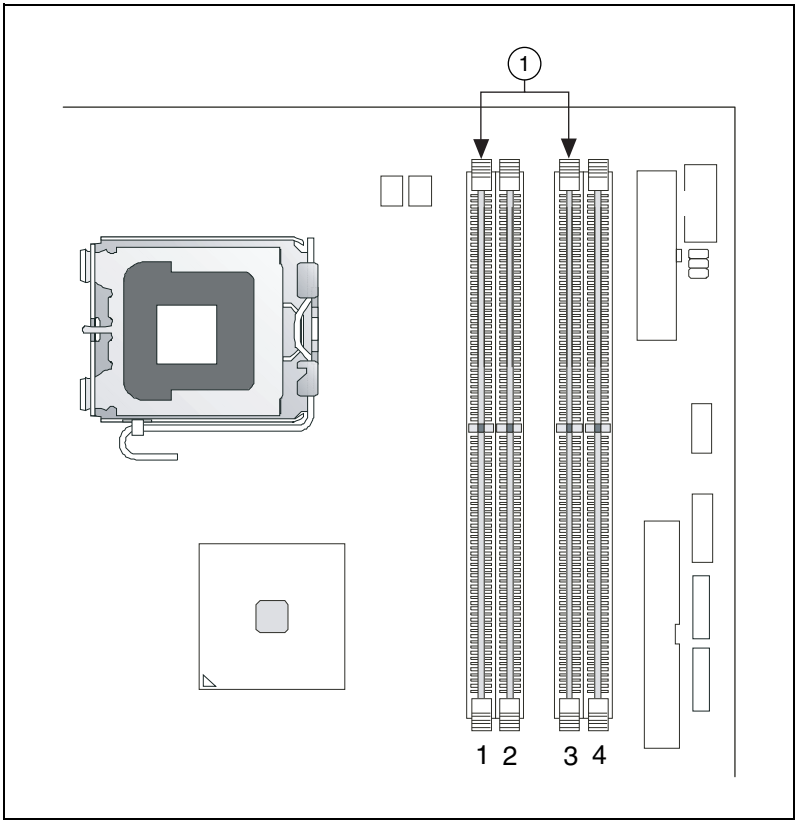
Table B-7 shows all possible memory module combinations.

Table B-7. Memory Module Combinations

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

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

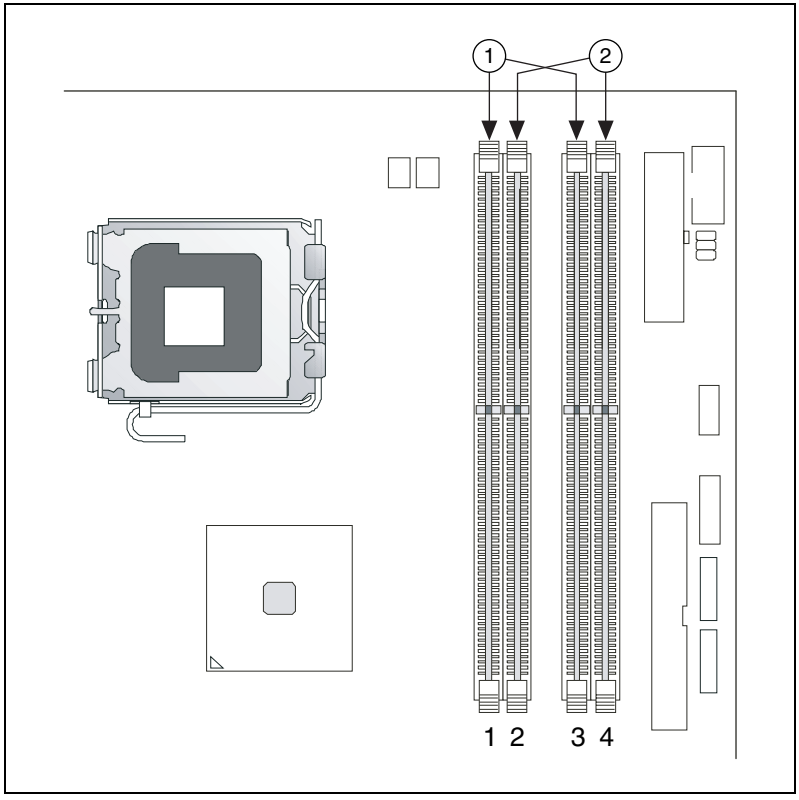
Figure B-17 shows two identical DIMMs in DIMM 1 and DIMM 3. You can also install identical DIMMs in DIMM 2 and DIMM 4.



1	Two Identical DIMMs

Figure B-17. Two Identical DIMMs in DIMM 1 and DIMM 3

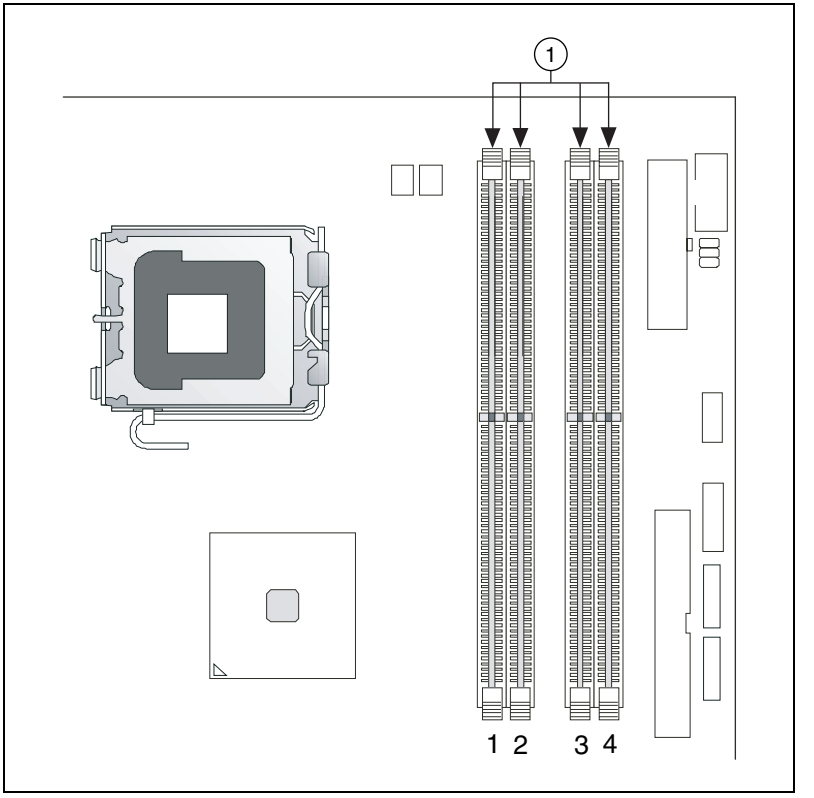
Figure B-18 shows two different pairs of identical DIMMS—two identical DIMMs in DIMM 1 an DIMM 3 and two identical DIMMs in DIMM 2 and DIMM 4.



1	First Pair of Identical DIMMs	2	Second Pair of Identical DIMMs

Figure B-18. Two Different Pairs of Identical DIMMs

Figure B-19 shows four identical DIMMs installed in DIMM 1 through DIMM 4.



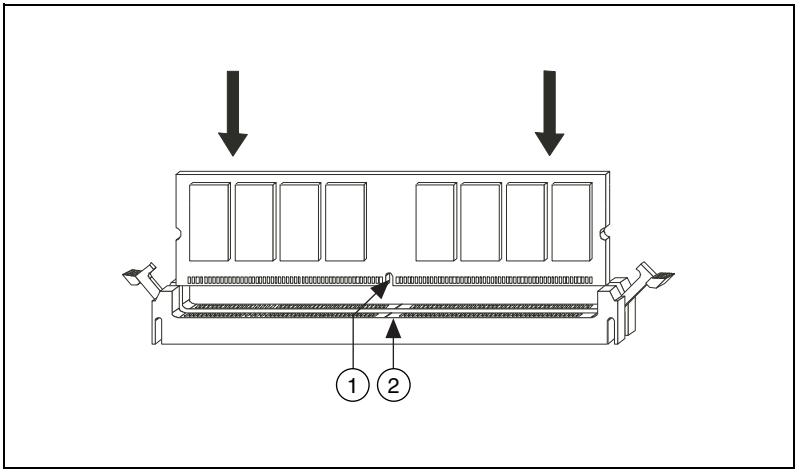
1	Four Identical DIMMs

Figure B-19. Four Identical DIMMs

Installing DDR Modules

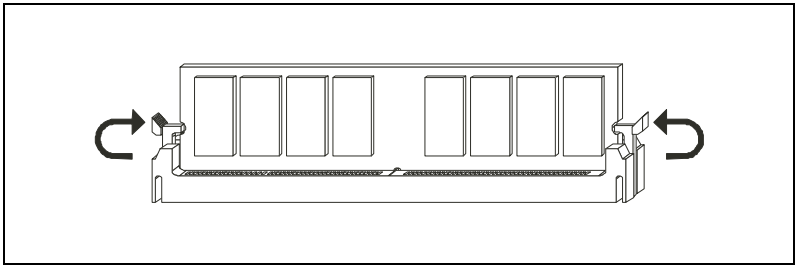
Follow these steps to install DDR modules:

1. Press the cover release buttons on the top of the NI 8351.
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 8351 cover by sliding the cover forward. Make sure the safety lock fits firmly.

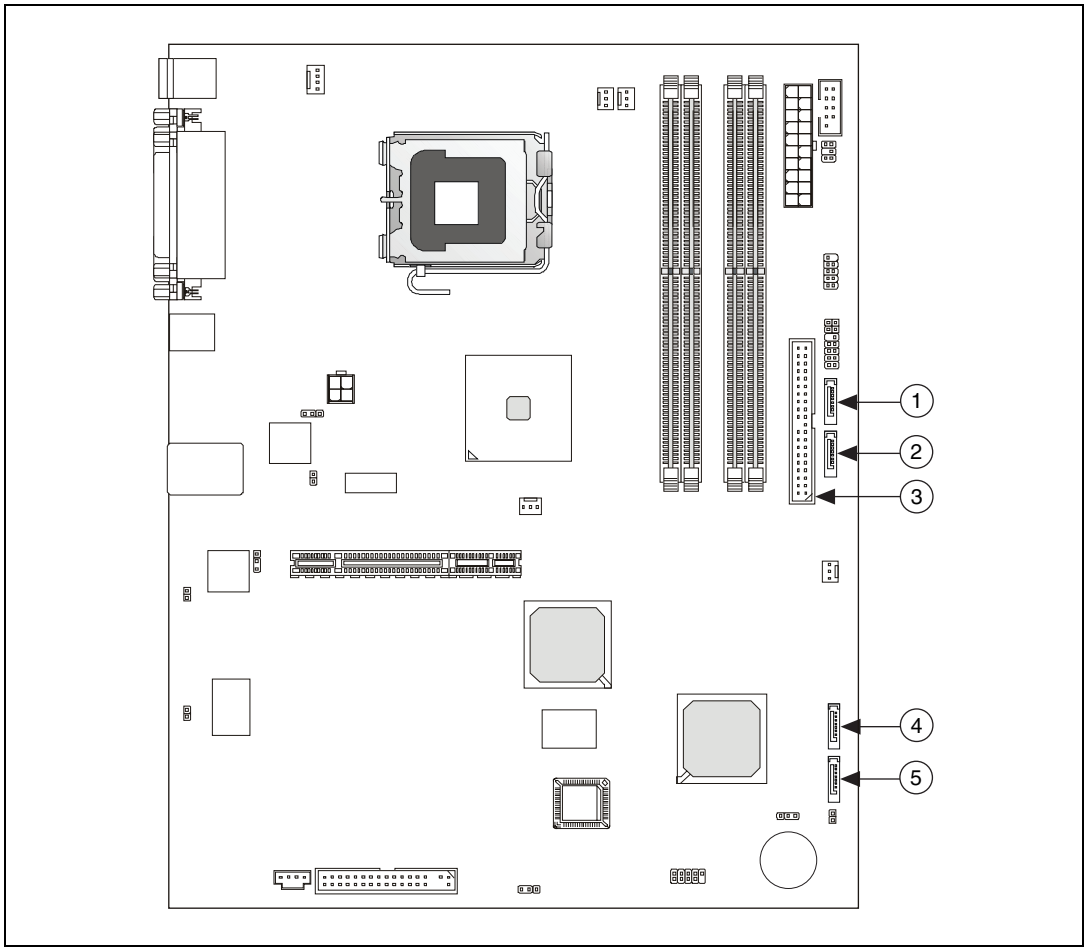
Removing DDR Modules

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-20 shows the NI 8351 IDE and SATA connector locations.



1	SATA4	2	SATA3	3	IDE1	4	SATA2	5	SATA1

Figure B-20. NI 8351 IDE and SATA Connectors

Hard Disk 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 up to two hard disk drives, a CD-ROM, and other devices.

Figure B-21 shows the IDE1 connector.

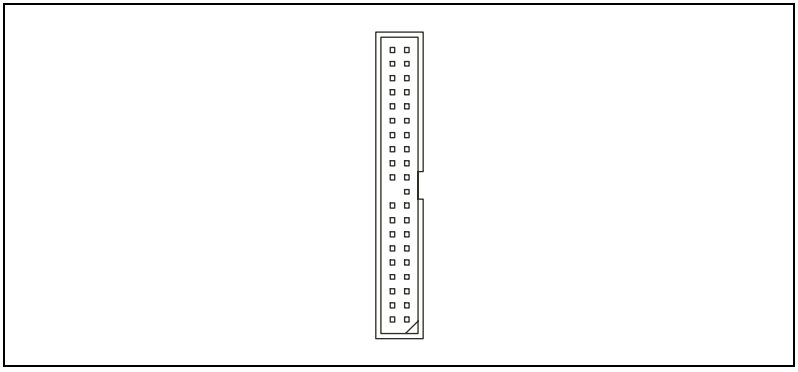


Figure B-21. IDE1 Connector

SATA Connectors: SATA1–SATA4

The ICH7R south bridge supports four Serial ATA connectors (SATA1–SATA4).

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-22 shows the SATA1–SATA4 connector.

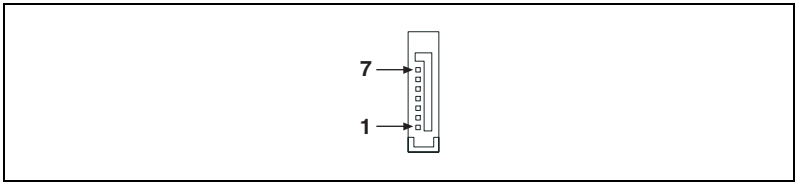


Figure B-22. SATA1–SATA4 Connector

Hard Disk Removal

Caution Before removing or installing a hard disk drive, be sure the NI 8351 is powered off and not connected to AC power.

Follow these steps to install a hard disk drive:

1. Press the cover release buttons on the top of the NI 8351.
2. Push the cover backward to remove it.

3. Unscrew the thumb screws securing the hard disk drive cover plate, slide the cover plate forward, and remove it.
4. Push the hard disk drive bracket backward to release the hard disk drive.
5. Disconnect the hard disk drive power cord and ATA 100 (or SATA) cable.
6. Remove the hard disk drive.

Hard Disk Installation

Caution Before removing or installing a hard disk drive, be sure the NI 8351 is powered off and not connected to AC power.

Follow these steps to install a hard disk drive:

1. Press the cover release buttons on the top of the NI 8351.
2. Push the cover backward to remove it.
3. Unscrew the hard disk drive cover plate and slide it forward.
4. Turn over the hard disk drive cover plate and remove the hard disk drive brackets.
5. Place the first hard disk drive into the chassis. Be sure the hard disk drive screw holes align with the chassis disk drive mounting tabs.
6. Connect the hard disk drive power cord and ATA 100 (or SATA) cable.
7. Push the hard disk drive bracket forward to secure the hard disk drive.
8. To install a second hard disk drive, repeat steps 5 through 7.
9. Replace the hard disk drive bracket.
10. Replace the hard disk drive cover plate and tighten the screws to hold it in place.
11. Replace the NI 8351 cover by sliding the cover forward. Make sure the safety lock fits firmly.

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 8351 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

Adaptec SATA RAID Utility for Intel ICH7R

The southbridge ICH7R provides a hybrid solution that combines two independent SATA ports for support of up to two Serial ATA (Serial ATA RAID) drives. It uses Adaptec Embedded Serial ATA RAID software to support RAID levels 0 and 1 for easy storage subsystem management.

Serial ATA (SATA) is the latest generation of the ATA interface. SATA hard drives deliver blistering transfer speeds of up to 150 Mbytes/s with CRC error checking. Serial ATA uses long, thin cables, making it easier to connect your drive and improving the airflow inside your PC. It also features data handling optimizations including tagged command queuing, elevator seek, and packet chain command.

Note The information and volumes in your system may differ from those in this appendix.

Introduction

Overview

Adaptec Embedded Serial ATA RAID with HostRAID adds RAID functionality to the Serial ATA I/O controller by supporting RAID levels 0 and 1. HostRAID adds entry-level RAID support to the Serial ATA I/O controller. With HostRAID, you can add reliable performance and full data protection.

Storage Requirements

Device drivers and storage management software require approximately 20 MB of disk space.

Features

Adaptec Embedded Serial ATA RAID Software RAID supports:

- RAID levels 0, 1, and simple volume using Adaptec HostRAID technology.
- Operating system-independent configuration and RAID creation using Adaptec RAID Configuration (ARC).
- Easy array configuration and status using Adaptec Storage Manager.
- Event logging and broadcasting, including messaging for alphanumeric pagers.

Storage Management Software Overview

Adaptec Embedded Serial ATA RAID includes the following software tools to manage your storage subsystem:

- **Adaptec Storage Manager—Browser Edition**—Browser-based storage management software that provides all creation, management, and data logging functions needed to manage arrays.
- **Adaptec RAID Configuration (ARC) Utility**—Part of the controller's built-in BIOS code. For details, refer to *Adaptec RAID Configuration Utility*.
- **Array Configuration Utility (ACU)**—A DOS/BIOS application used to create, configure, and manage arrays. For details, refer to *Adaptec RAID Configuration Utility*.

Installing Adaptec Storage Manager—Browser Edition

This section explains how to install Adaptec Storage Manager—Browser Edition to enable remote and local management of arrays.

Supported Browsers

To run Adaptec Storage Manager, your computer must have a Web browser supporting JavaScript and cookies. The following browsers are supported:

- Internet Explorer (IE) 5.0 or later
- Netscape Navigator 7 or later

When using Adaptec Storage Manager, you must log on to your system with administrator privileges.

Typical, Custom, and Compact Installations

You can select from these setup options:

- **Typical (default)**—Supports local and remote management; however, Adaptec SNMP is not included.
- **Custom**—For expert users. Primarily used on Web servers or to ensure SNMP and Notifier are available for a managed system. You can select from these components:
  - **Managed System Components**—If you choose this selection only, the installation is the same as a compact installation.
  - **Adaptec Web Server**—Installs components allowing managed systems to communicate with Web browsers.
  - **Adaptec Storage Manager Notifier**—Installs messaging, including email and broadcaster capabilities.
  - **Adaptec SNMP**—Installs components used by SNMP-based applications. Requires Microsoft SNMP agents. Not included in a typical installation.
- **Compact**—Installs only the components required on a remotely managed system. Refer to *Managed System Components*.

Note When you perform a typical or compact installation, components needed for communication and remote management are installed automatically.

Installing Adaptec Storage Manager

Note When installing on a FAT 32 file system, the folder being installed is automatically hidden.

Complete the following steps to install Adaptec Storage Manager:

1. Verify that a supported browser is installed. Refer to *Supported Browsers* for details.
2. Insert the application CD and wait for the Autorun executable to start the installation. If the executable does not run, browse the CD and click **Autorun**.
3. Click **Adaptec Utilities**.
4. Click **Install Adaptec Storage Manager**.
5. Click **Next** in the Install Shield window.

6. Read the license agreement. If you agree to its terms, click **Yes**. If not, click **No** and terminate the installation. The Select a Setup Type window appears. It includes three types of installations: typical, compact, and custom. Refer to *Typical, Custom, and Compact Installations* for details.
7. Choose a setup type and click **Next**.
8. When you see the Destination Folder, click **Next**.
9. When you see the setup information, click **Next**. A progress bar in the Setup Status window indicates progress. Before the progress bar shows the installation is completed, another window pops up, indicating that a security certificate has been generated.
10. Click **OK**. The Root Certificate Store window appears.
11. Click **Yes**. The security certificate generated during installation is added to the Certificate Store. If you click **No** at this point, you need to install the certificate the first time you run Adaptec Storage Manager.
12. When prompted to restart your computer, accept the default (Yes) and click **Finish**.
13. The system restarts to complete the installation.
14. Remove the application CD before the system restarts; otherwise, the installation starts again.

Configuring Internet Browsers

If you are managing a local storage array, and your computer uses a proxy server, you must configure your browser to enable Adaptec Storage Manager to bypass the proxy server. Also, if you are managing remote systems, you must configure Adaptec Storage Manager to bypass the proxy server when communicating with these systems.

This section describes the following procedures:

- *Configuring Internet Explorer for Local Management*
- *Configuring Internet Explorer for Remote Management*
- *Configuring Netscape Navigator for Local Management*
- *Configuring Netscape Navigator for Remote Management*

Configuring Internet Explorer for Local Management

When using the high security setting, you must enable the following settings manually:

- JavaScript
- Cookies (not stored)

In Internet Explorer 5 and 5.5, you *do not* need to enable the following custom level security settings for the local intranet:

- Active scripting
- Allow per session cookies (not stored)

Select **Tools»Internet Options** to access these settings.

Note Internet Explorer 6.0 has no security setting for cookies. There is no setting for blocking intranet cookies.

If you are using a proxy server to access the Internet, you must bypass the proxy server to access the Adaptec Storage Manager Web server. Follow these steps to verify whether you are using a proxy server:

1. In the Internet Options window, click the **Connections** tab.
2. Click **LAN Settings**.
   - If the **Use a proxy server** box is not checked, exit by clicking **OK**. You are not using a proxy server, so ignore this setting.
   - If the **Use a proxy server** box is checked, be sure the **Bypass proxy server for local addresses** box is also checked. Then, click the **Advanced** button. In the Exceptions window, enter `localhost` as an entry.

You are now ready to proceed to *Using Adaptec Storage Manager—Browser Edition*.

Configuring Internet Explorer for Remote Management

Follow these steps if you know the IP address of the system you want to manage remotely:

1. Choose **Tools»Internet Options»Connections»LAN Settings**.
2. Select **Use a proxy server for your LAN»Advanced**.
3. In the **Exceptions** section, enter the managed system IP address.

Configuring Netscape Navigator for Local Management

Follow these steps to configure Netscape Navigator:

1. Log in to your computer with administrator access.
2. Select **Edit»Preferences**.
3. In the Preferences window, click the right arrow on the **Privacy and Security** line. Ensure that one of the **Enable cookies** options is selected.
4. Select the **Advanced** line. Ensure that **Enable Javascript for Navigator** is checked.
5. Exit Navigator, then restart it. This enables any settings you have modified.
6. You are now ready to proceed to *Using Adaptec Storage Manager—Browser Edition*.

Configuring Netscape Navigator for Remote Management

Follow these steps if you know the IP address of the system you want to manage remotely:

1. Choose **Edit»Preferences»Advanced»Proxies»Manual proxy configuration»No Proxy For**.
2. Enter the managed system IP address.

Using Adaptec Storage Manager—Browser Edition

Overview

This section describes how to use Adaptec Storage Manager to manage arrays. After you log in, you can use online help to create, configure, and manage arrays.



Note Your controller may not support all features described. In most cases, if your controller does not support a feature, the feature does not appear in the interface.

With Adaptec Storage Manager, you can:

- Locally manage a system containing a supported Adaptec RAID controller with Windows and a supported browser.
- Remotely manage any system containing a supported Adaptec RAID controller with Managed System Components (refer to *Typical,*

Custom, and Compact Installations). You can manage a system remotely from a system that does not contain a RAID controller.

You can also remotely manage these same systems by either of these methods:

- Installing Adaptec Storage Manager on the remote system.
- Directing the remote system browser to the system you want to manage.

Architectural Overview

A locally managed system requires these components:

- A supported Web browser.
- The Adaptec Web service, which supplies content displayed on the Web browser.
- An Adaptec-supplied storage agent.

A remotely managed system requires these components:

- A supported Web browser on the remote system.
- A storage agent installed on the system with the RAID controller.
- TCP/IP connections on the remote and managed systems.

You can install the Web service on the same remote system as the browser, the system with the RAID controller installed, or a third system.

Communication security is ensured because Secure-HTTP (S-HTTP) or SSL protocols encrypt all transmitted data. Connection over an Ethernet network, a corporate WAN, or VPN is supported.

Logging In

Follow these steps to log in:

1. Click **Start»Programs»Adaptec Storage Manager»Adaptec Storage Manager—Browser Edition** to start Adaptec Storage Manager.
2. Enter the host name or IP address of the system you want to manage and the username and password you would use to log in to that system.
3. Click **Login**.

Note When running Adaptec Storage Manager for the first time:

- You must install a security certificate if you chose not to during the installation process. Refer to *Installing a Security Certificate* for details.
- You are asked to register your software. Refer to *Registering Your Software* for details.

Follow these steps to log in from any system with a Web browser:

1. Launch the Web browser.
2. Enter the IP address for the system you want to access (for example, `https://10.6.3.14:3513/adaptec`) in the address bar and press <Enter>. When connection to the remote system is established, the System Login screen appears.

Note If you are using a proxy server to access the Internet, you must bypass the proxy server to access the Adaptec Storage Manager Web server. Refer to *Configuring Internet Browsers* for details.

3. Enter the host name or IP address of the system you want to manage. Also, enter the administrative username and password you would normally use to log into that system.
4. Click **Login**.

Installing a Security Certificate

If you chose not to install a security certificate when you installed Adaptec Storage Manager, you must install the certificate when you run the application for the first time.

Follow these steps to create the certificate:

1. When the Security Alert window appears, click **View Certificate**.
2. In the Certificate window, click **Install Certificate**.
3. In the Certificate Import Wizard window, click **Next**. The Certificate Import Wizard window contents change.
4. Accept the default, **Automatically select the certificate store**, and click **Next**.
5. On the root Certificate Store window, click **Yes**. Another Certificate Import wizard window appears.
6. Click **OK**. The Certificate window from Step 2 reappears.

7. Click **OK**. You are returned to the Security Alert window from Step 1.
8. Click **Yes** to finish creating and storing the certificate.

Registering Your Software

After installing and creating a security certificate, you are asked to register the product. If your computer has an Internet connection, click **Register Now**. If you must delay registration, click **Register Later**. If you choose **Register Later**, you are prompted to register the application the next time you run it.

The Basics

The action buttons in the Adaptec Storage Manager are:

- **Logout**—Ends your session and returns you to the login window.
- **Rescan**—Rescans the system configuration. Typically, a rescan occurs automatically when required (for example, after an array is created).

  However, the system configuration can change without notifying Adaptec Storage Manager. For example, drives inserted or removed from a nonintelligent enclosure or an enclosure powered on after you logged into Adaptec Storage Manager are not displayed unless you manually rescan.

The remaining buttons open additional windows with more detailed information. Use these buttons to perform actions or change settings on a specific aspect of your storage subsystem:

- **Events**
- **Options**
- **Help**
- **Properties**
- **Tasks**

Immediately following the header frame is a controller information line. This line includes the model number of the first Adaptec RAID controller found in the system and the amount of cache memory (if any) installed on a controller.

Beneath the controller information are Physical Devices and Logical Devices views, which show connected devices and existing arrays on a controller. Controller information and device views are repeated for each additional Adaptec RAID controller in the system.

Select the controller by clicking anywhere on the controller information. When the controller is selected, the **Events**, **Properties**, and **Tasks** buttons change from blue to amber. This indicates that clicking these buttons displays additional windows with information and options specific to a controller.

Pop-Up Tool Tips

If you position the cursor over a device or button, a pop-up tool tip appears. The tips contain helpful information about button functions and devices.

Physical Devices

The Physical Devices view displays information about the drives and enclosures attached to the Adaptec RAID controller. The devices are organized by the channel or port they are connected to and shown in numerical order.

The display for each channel includes information on maximum speed capability, the number of the channel on the controller, and the number of devices found (excluding the SCSI controller).

Selecting a channel or device turns the **Events**, **Properties**, and **Tasks** buttons amber. This indicates that clicking these buttons displays additional windows with information and options specific to that device or channel.

At the top of the Physical Devices view, grouped to the right of **View**, are three view selection buttons. These buttons select the physical devices connected to this controller.

Changing How Drives are Displayed

By default, the Physical Devices view displays a condensed view of the controller configuration and hides detailed drive information. You can access more information either by positioning the cursor over the device or clicking the arrowhead to the left of a row of devices.

The selected display mode button appears in a lighter shade of blue than the other two buttons. The default display is the Text Description view, but in the condensed view shown when Adaptec Storage Manager is loaded, the display is the same in all three modes.

If you change the display mode by selecting the other view buttons, a yellow arrow flashes to the left of any devices where the condensed display omits information.

An icon is always the first entry on each device line. The hard disk drive icon represents a hard disk drive. If a + symbol appears with the hard disk drive icon, the drive is a hot spare. Different icons represent other devices.

View

When the default display mode is expanded, it shows the following information about each device:

- Drive capacity
- Drive manufacturer and model number
- SCSI drive ID or Serial ATA port number

When expanded, the **Full Size Capacity View** button and **Relative Size Capacity View** button represent each drive as a bar. A drive that is not part of any array is shaded blue surrounded by a dotted line.

The **Full Size Capacity View** button displays a full-length bar for each drive, regardless of capacity.

The **Relative Size Capacity View** button displays a proportional bar for each drive. The largest capacity drive is shown full length. The other drives are shown proportional to the drive capacity, relative to the largest drive.

Any part of a drive in an array is shown as a gray segment within the bar. Selecting any gray segment highlights it in amber and, in the Logical Devices view, highlights the array of which this segment is a member.

In either the Full Size Capacity view or Relative Size Capacity view, a small portion at each end of the drive may be shown in dark gray.

The segment at the end of the drive may vary in size from drive to drive because, in addition to the RAID signature, the controller may also limit the usable capacity of each drive. This is because drives of the same apparent capacity from different manufacturers, or even different models from the same manufacturer, actually vary slightly in true capacity. Although this is not an issue in normal operation, it can be when assigning hot spares or replacing a failed drive. If the controller uses the maximum capacity of a drive and a hot spare or replacement drive is a few megabytes smaller, it cannot replace the failed drive. By rounding drive capacities down to the nearest 2 MB, this possibility is effectively eliminated.

Logical Devices

As described earlier, when Adaptec Storage Manager loads, the Logical Devices view is expanded, and you can see the arrays on a controller.

At the top of this view are the **Create**, **Modify**, and **Delete** buttons. Each button opens a wizard for the corresponding function.

Use the **Modify** button to:

- Change an array from one RAID level to another
- Expand an array
- Change a RAID 0 stripe size

For detailed instructions for these buttons, refer to the online help.

The Logical Devices view main area displays the arrays on a controller. The area defaults to a condensed view of top-level arrays.



Note Use the **Options** button to display second-level arrays if your controller supports them.

This condensed view shows the RAID level of each device and whether it is protected by a hot spare.

If a global hot spare exists, arrays show as protected if the hot spare is large enough to protect them.

In the expanded view, the array icons are arranged vertically. Alongside them are the array capacity, name, and type.

Selecting an array by clicking on it highlights the following in amber:

- All drives or segments that form the array in the Physical Devices view.
- The **Events**, **Properties**, and **Tasks** buttons in the header frame. Selecting any button displays a new window with additional information and options specific to that array.



Note In Windows Server 2003, to see animated icons for Adaptec Storage Manager logical devices, go to **Internet Explorer Properties»Advanced»Multimedia** and select **Play animations in Web Pages**.

Adaptec RAID Configuration Utility

The Adaptec RAID Configuration (ARC) utility is an embedded BIOS utility that includes:

- The **Array Configuration Utility (ACU)**—Use this utility to create, configure, and manage arrays.
- **Disk Utilities**—Use these utilities to format and verify disks.

To run ARC, press <Ctrl-A> when the following message appears during system startup:

```
Press <Ctrl-A> for Adaptec RAID Configuration Utility
```

The ARC menu appears, presenting the Array Configuration Utility (ACU) and disk utilities options.

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

Using the Array Configuration Utility

Use the Array Configuration Utility (ACU) to create, manage, and delete arrays from the controller BIOS and initialize drives.

Managing Arrays

Use the **Manage Arrays** option to view array properties and members and delete arrays. The following sections describe these operations.

Viewing Array Properties

Follow these steps to view the properties of an existing array:

1. At the BIOS prompt, press <Ctrl-A>.
2. From the ARC menu, select **Array Configuration Utility (ACU)**.
3. From the ACU menu, select **Manage Arrays**.
4. In the List of Arrays dialog box, select the array to view and press <Enter>. The Array Properties dialog box appears, showing detailed information about the array. The physical disks associated with the array are displayed here.
5. Press <Esc> to return to the previous menu.

Deleting Arrays

Caution Back up the data in an array before deleting it. Otherwise, all array data is lost. You cannot restore arrays.

Follow these steps to delete an existing array:

1. Power on your computer and press <Ctrl-A> when prompted to access the ARC utility.
2. From the ARC menu, select **Array Configuration Utility (ACU)**.
3. From the ACU menu, select Manage Arrays.
4. Select the array to delete and press **Delete**.
5. In the Array Properties dialog box, select **Delete** and press <Enter>. The following prompt displays:

   Warning!! Deleting the array will render array unusable. Do you want to delete the array? (Yes/No):

   In RAID 1, the following prompt also displays:

   Deleting the partition will result in data loss! Do you also want to delete the partition? (Yes/No):
6. Click **Yes** to delete the array or partition or **No** to return to the previous menu.
7. Press <Esc> to return to the previous menu.

Creating Arrays

Before creating arrays, be sure the disks for the array are connected and installed in your system. Note that disks with no usable space and unitialized disks are shown in gray, and you cannot use them. Refer to *Initializing Disk Drives*.

Follow these steps to create an array:

1. Power on your computer and press <Ctrl-A> when prompted to access the ARC utility.
2. From the ARC menu, select **Array Configuration Utility (ACU)**.
3. From the ACU menu, select **Create Array**.
4. Select the disks for the new array and press <Insert>. To deselect any disk, highlight the disk and press <Delete>.
5. Press <Enter> when both disks for the new array are selected. The **Array Properties** menu displays.

Assigning Array Properties

Note After you create the array and assign its properties, you cannot change the array properties using the ACU. Instead, use Adaptec Storage Manager.

Follow these steps to assign properties to the new array:

1. In the **Array Properties** menu, select an array type and press <Enter>. Notice that only the available array types, RAID 0 and RAID 1, are displayed. Each type requires two drives.
2. Enter an optional label for the array and press <Enter>.
3. Select the desired stripe size for RAID 0. Available stripe sizes are 16, 32, and 64 KB (default).

Note Adaptec recommends that you do not change the default.

4. Use **Create RAID via** to select creation methods for RAID 0 and RAID 1. The following table includes examples of when each is appropriate.

RAID Level	Create Via	Appropriate Use
RAID 0	No Init	Creating a RAID 0 on new drives.
RAID 0	Migrate[1]	Creating a RAID 0 from one new drive and one drive with data you want to preserve.
RAID 1	Build[1]	Anytime you want to create a RAID 1, especially with data on one drive that you want to preserve.
RAID 1	Clear	Creating a RAID 1 on new drives, or when you want to ensure that the array contains no data after creation.

RAID Level	Create Via	Appropriate Use
RAID 1	Quick Init	Fastest way to create a RAID 1. Appropriate when using new drives.
[1] If you select Migrate for RAID 0 or Build for RAID 1, you are asked to select the source drive. The source drive contents are preserved. However, the data on the new drive is lost.		

Notes:

- Before adding a new drive to an array, back up any data contained on the new drive. Otherwise, you will lose all data.
- If you stop the Build or Clear process on a RAID 1 from the ACU, you can restart it only from Adaptec Storage Manager. (Refer to Chapter 2, *Installation and BIOS Setup*, for details.)
- A RAID 1 created using the Quick Init option may return some data miscompares if you later run a consistency check. This is normal and is not a cause for concern.
- The ACU allows you to use drives of different sizes in a RAID 1. However, during a build operation you can select only the smaller drive as the source or first drive.
- When migrating from single volume to RAID 0, you can migrate from a larger drive to a smaller drive. However the destination drive must be at least half the capacity of the source drive.
- You should not migrate or build an array on Windows dynamic disks (volumes), as this results in data loss.

5. When you are finished, click **Done**.

Caution Do not interrupt the creation of a RAID 0 using the migrate option. If you do, you cannot restart or recover the source drive data.

Initializing Disk Drives

If an installed disk does not appear in the disk selection list for creating a new array or appears grayed out, you may need to initialize it before you can use it as part of an array. You must initialize drives attached to the controller before using them in an array.

Caution Initializing a disk overwrites the disk partition table and makes disk data inaccessible. If the drive is used in an array, you may not be able to use the array again. Do not initialize a disk that is part of a boot array. To determine which disks are associated with a particular array, refer to *Viewing Array Properties*.

To initialize drives:

1. Power on your computer and press <Ctrl-A> when prompted to access the ARC utility.
2. From the ARC menu, select **Array Configuration Utility (ACU)**.
3. Select **Initialize Drives**.
4. Use the up and down arrow keys to highlight the disk to initialize and press <Insert>.
5. Repeat step 4 so that both drives to be initialized are selected.
6. Press <Enter>.
7. Read the warning message and be sure you have selected the correct disk drives to initialize. Press <Y> to continue.

Using the Disk Utilities

Use the Disk Utilities to format or verify your Serial ATA hard disk media.

Follow these steps to access the disk utilities:

1. Power on your computer and press <Ctrl-A> when prompted to access the ARC utility.
2. From the ARC menu, select **Disk Utilities**.
3. Select the desired disk and press <Enter>. You are offered the following options:

Caution Formatting destroys all data on the drive. Be sure to back up your data before performing this operation.

- **Format Disk**—Simulates a low-level format of the hard drive by writing zeros to the entire disk. Serial ATA drives are low-level formatted at the factory and do not need to be low-level formatted again.
- **Verify Disk Media**—Scans the disk drive media for defects.

D

Technical Support and Professional Services

Visit the following sections of the National Instruments Web site at ni.com for technical support and professional services:

- **Support**—Online technical support resources at ni.com/support include the following:
  - **Self-Help Resources**—For answers and solutions, visit the award-winning National Instruments Web site for software drivers and updates, a searchable KnowledgeBase, product manuals, step-by-step troubleshooting wizards, thousands of example programs, tutorials, application notes, instrument drivers, and so on.
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- **System Integration**—If you have time constraints, limited in-house technical resources, or other project challenges, National Instruments Alliance Partner members can help. To learn more, call your local NI office or visit ni.com/alliance.

If you searched ni.com and could not find the answers you need, contact your local office or NI corporate headquarters. Phone numbers for our worldwide offices are listed at the front of this manual. You also can visit the Worldwide Offices section of ni.com/niglobal to access the branch office Web sites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

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
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
VME	Versa Module Eurocard
VXI	VME eXtensions for Instrumentation

W

W	Watts
WDT	Watchdog Timer

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