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NI RMC-8354

User Manual

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Electromagnetic Compatibility Information

This hardware has been tested and found to comply with the applicable regulatory requirements and limits for electromagnetic compatibility (EMC) as indicated in the hardware's Declaration of Conformity (DoC)[1]. These requirements and limits are designed to provide reasonable protection against harmful interference when the hardware is operated in the intended electromagnetic environment. In special cases, for example when either highly sensitive or noisy hardware is being used in close proximity, additional mitigation measures may have to be employed to minimize the potential for electromagnetic interference.

While this hardware is compliant with the applicable regulatory EMC requirements, there is no guarantee that interference will not occur in a particular installation. To minimize the potential for the hardware to cause interference to radio and television reception or to experience unacceptable performance degradation, install and use this hardware in strict accordance with the instructions in the hardware documentation and the DoC[1].

If this hardware does cause interference with licensed radio communications services or other nearby electronics, which can be determined by turning the hardware off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient the antenna of the receiver (the device suffering interference).
- Relocate the transmitter (the device generating interference) with respect to the receiver.
- Plug the transmitter into a different outlet so that the transmitter and the receiver are on different branch circuits.

Some hardware may require the use of a metal, shielded enclosure (windowless version) to meet the EMC requirements for special EMC environments such as, for marine use or in heavy industrial areas. Refer to the hardware's user documentation and the DoC[1] for product installation requirements.

When the hardware is connected to a test object or to test leads, the system may become more sensitive to disturbances or may cause interference in the local electromagnetic environment.

Operation of this hardware in a residential area is likely to cause harmful interference. Users are required to correct the interference at their own expense or cease operation of the hardware.

Changes or modifications not expressly approved by National Instruments could void the user's right to operate the hardware under the local regulatory rules.

[1] The Declaration of Conformity (DoC) contains important EMC compliance information and instructions for the user or installer. 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.

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About This Manual

The *User Manual* contains information about installing, configuring, using, and maintaining the NI RMC-8354.

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 Electromagnetic Compatibility*, National Instruments

1 Getting Started

This chapter describes the key features of the NI RMC-8354 and lists the kit contents and optional equipment you can order from National Instruments.

Unpacking

Carefully inspect the shipping container and the NI RMC-8354 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 RMC-8354 kit contains the following items:

- ☐ NI RMC-8354 rack mount controller
- ☐ *NI RMC-8354 User Manual*
- ☐ Windows recovery CD/DVD
- ☐ Rack mount kit
- ☐ Front bezel
- ☐ 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 6-15-P/IEC83
United Kingdom 230 V	BS 1363/IEC83
Japan 100 V	ANSI C73.11/NEMA 5-15-P/IEC83

The unit comes with the standard 120 V (USA) cable. If you have the incorrect AC power cable, contact National Instruments.

NI RMC-8354 Overview

The NI RMC-8354 is a 1U PC-server-based controller for remote control of PXI chassis. The controller provides leading-edge processing power with Intel Core i7 Quad Core processors, high disk bandwidth with hardware RAID support, high I/O bandwidth with a PCI Express 2.0 x16 slot, and up to 16 GB of memory.

Key Features

The NI RMC-8354 offers the performance of a high-end PC in a compact 1U rack-mountable form factor for controlling a PXI or PXI Express system using a National Instruments remote controller.

Mainboard Features

CPU

- Intel Core i7-860 Quad Core 2.8 GHz, 8 MB Cache, LGA1156

Chipset

- Intel 3420 chipset

Memory

- 1/2 GB DDR3 memory standard (1/2 × 1 GB)
- Maximum memory supported: 16 GB DDR3-1333 in 4 DIMM sockets

Slots

- One PCI Express 2.0 x16 slot

Video

- Matrox G200eW 16 MB DDR2 (max resolution 1280 × 1024)

HDD

- 1 × 500 GB or 4 × 500 GB SATA (3 Gbps) hard drive JBOD/RAID5

DVD-ROM

- Slim DVD-ROM drive

Onboard LAN

- 2 × Intel 82574L Gigabit Ethernet controller

Onboard I/O

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

Power Management Features

- ACPI/ACPM power management
- Main switch override mechanism
- Wake-On-LAN (WOL) header
- Wake up on keyboard/mouse from Soft-Off
- Power-on mode from AC power recovery
- Internal/external modem ring-on

Front Panel LEDs

- Power indicator
- LAN status indicators
- HDD indicator
- System temp (overheat) and fan (fail) warning indicator

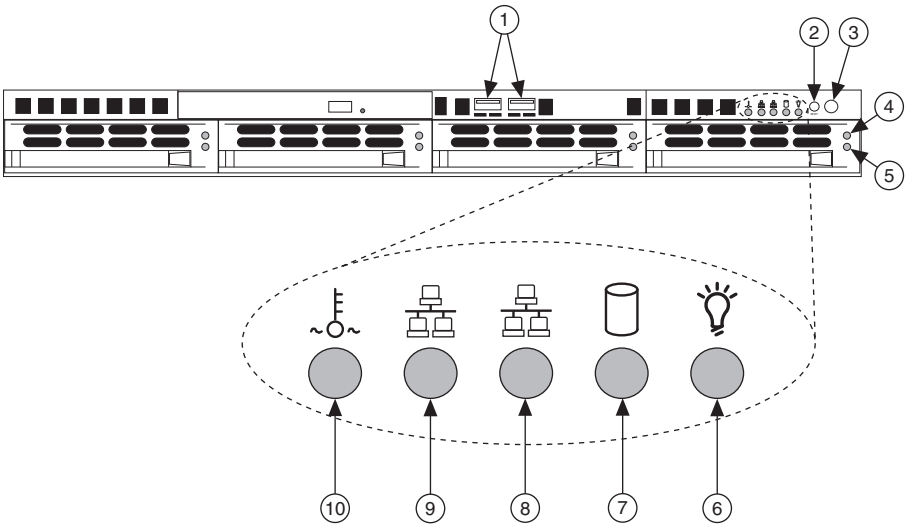
System Management

- Monitoring for CPU and chassis environment
- CPU thermal trip support
- +5 V standby alert LED
- Fan speed control

NI RMC-8354 Description

Figure 1-1 shows the key features of the NI RMC-8354 front panel. For detailed information about the NI RMC-8354 rear panel, refer to Chapter 3, *I/O Information*.

Figure 1-1. Front View of the NI RMC-8354



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

The front panel includes the following LEDs:

- **Power indicator**—glows when the NI RMC-8354 is powered on.
- **LAN status indicators**—flash when there is activity on LAN1 or LAN2.
- **Overheat/FanFail LED**
  - Off—Normal
  - On—Overheat
  - Flashing—Fan failure warning

Optional Equipment

Memory Upgrades

You can upgrade the NI RMC-8354 memory to a maximum of 16 GB.

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

The NI RMC-8354 supports dual-channel DDR-3 SDRAM unbuffered memory in four 240-pin DIMM sockets. The NI RMC-8354 is compatible with ECC memory.

Note Supported DIMM sizes are 1 GB, 2 GB, and 4 GB.

Note National Instruments has tested and verified that the DDR-3 DIMMs we sell work with the NI RMC-8354. We recommend you purchase your DDR-3 DIMM modules from National Instruments. Other off-the-shelf DDR-3 DIMM modules are not guaranteed to work properly.

USB Floppy Disk Drive

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

National Instruments Software

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.

2

Installation and BIOS Setup

This chapter describes how to install, configure, and use the NI RMC-8354.

Before connecting the NI RMC-8354 to a power source, read this chapter and the *Read Me First: Safety and Electromagnetic Compatibility* document included with your NI RMC-8354.

Safety Information

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

Caution Overloading the circuits may damage supply wiring. Do not exceed the ratings on the equipment nameplate when connecting equipment to the supply circuit.

Caution Risk of explosion if battery is replaced by an incorrect type. dispose of used batteries according to instructions.

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

- **Chassis Grounding**—The NI RMC-8354 requires a connection from the premise wire safety ground to the NI RMC-8354 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 RMC-8354. Adjustments and service to internal components must be undertaken by qualified service technicians. During service of this product, the mains connector to the premise wiring must be disconnected. Dangerous voltages may be present under certain conditions; use extreme caution.
- **Explosive Atmosphere**—Do *not* operate the chassis in conditions where flammable gases are present. Under such conditions, this equipment is unsafe and may ignite the gases or gas fumes.
- **Parts Replacement**—Service this equipment only with parts that are exact replacements, both electrically and mechanically. Contact National Instruments for replacement part information. Installation of parts with those that are not direct replacements may cause harm to personnel operating the chassis. Furthermore, damage or fire may occur if replacement parts are unsuitable.
- **Modification**—Do *not* modify any part of the NI RMC-8354 from its original condition. Unsuitable modifications may result in safety hazards.

Chassis Cooling Considerations

The NI RMC-8354 is designed to operate in an instrument rack. Follow the appropriate installation instructions.

Caution If installed in a closed or multiunit rack assembly, the rack environment operating ambient temperature may be greater than room ambient temperature. Therefore, install the equipment in an environment compatible with the maximum ambient operating temperature (Tma) specified in Appendix A, *Specifications*.

Providing Adequate Clearance

Apertures in the front, top, rear, and along both sides of the chassis facilitate power supply and motherboard cooling. Air enters through the front and top inlets of the chassis and exits through the fans on the rear of the chassis. Place the NI RMC-8354 in an instrument rack so that the fans (air outlets) and the air inlet apertures along the top and front of the chassis have adequate ventilation. Keep other equipment a minimum of 76.2 mm (3 in.) away from the air outlets on the rear of the chassis.

Installation

Follow these steps to connect devices to the NI RMC-8354:

Caution Because of the risk of high energy (>240VA), the unit must be installed only in a Restricted Access Location.

1. Connect a keyboard and mouse to the appropriate connectors on the NI RMC-8354 rear panel.
2. Connect the VGA monitor video cable to the VGA connector on the rear panel.
3. (Optional) To boot into LabVIEW RT, connect the network cable to LAN jack 1 on the rear panel. (Refer to Figure 3-1, *NI RMC-8354 Rear Panel Layout*, for the location of LAN jack 1.)
4. Connect the USB, serial, and parallel devices as necessary to the NI RMC-8354 front and rear panel ports.

Caution To minimize shock hazard, make sure the electrical power outlet you use to power the NI RMC-8354 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 the *Connecting to Power Source* section.
6. Power on the NI RMC-8354.
7. Verify that the NI RMC-8354 boots. If it does not boot, refer to the *What if the NI RMC-8354 does not boot?* section of Chapter 5, *Troubleshooting*.

Connecting Safety Ground

The NI RMC-8354 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 Overloading the circuits may damage supply wiring. Do not exceed the ratings on the equipment nameplate when connecting equipment to the supply circuit.

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

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

BIOS Setup

This section describes all main BIOS setup options.

To enter the BIOS menu, press <Del>. Use the up and down arrow keys to move among the different settings in each menu. Use the left and right arrow keys to change the options for each setting.

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

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

Note To reset the BIOS to the default settings, load the optimal defaults by pressing <F9> in the BIOS Setup Utility. Optimal default settings default to the following:

- Disable the floppy controller
- Disable serial port 2 (COM2)
- Enable RAID (Intel)
- Set the fan speed control modes to balanced
- Enable Intel C-STATE tech
- Disable Remote Access configuration

Main BIOS Setup Menu

The main BIOS setup menu includes the following items:

- Device name: Supermicro X8SIE/X8SIE-F/X8SIE-LN4/X8SI6-F
- Version
- Build date
- Processor

  The AMI BIOS automatically displays the following processor status items:
  - Type of processor
  - Speed
  - Physical count
  - Logical count
- System memory

  The system memory displays the following memory sizes available in the system:
  - Populated size
  - Available size

Advanced Setup Configurations

Use the arrow keys to select **Boot Setup** and press <Enter> to access the submenu items.

Boot Feature

This menu includes the following options.

Quick Boot

If enabled, this option skips certain tests during POST to reduce the time needed for system boot. The options are **Enabled** and **Disabled**.

Quiet Boot

Use this option to modify the bootup screen options between POST messages or the OEM logo. Select **Disabled** to display the POST messages. Select **Enabled** to display the OEM logo instead of the normal POST messages. The options are **Enabled** and **Disabled**.

AddOn ROM Display Mode

This option sets the option ROM display mode. The options are **Force BIOS** and **Keep Current**.

Bootup Num-Lock

This option selects the numlock key power-on state. The options are **Off** and **On**.

PS/2 Mouse Support

This option enables support for the PS/2 mouse. The options are **Disabled**, **Enabled**, and **Auto**.

Wait For “F1” If Error

This option forces the system to wait until <F1> is pressed if an error occurs. The options are **Disabled** and **Enabled**.

Hit “Del” Message Display

This option displays **`Press DEL to run Setup`** during POST. The options are **Enabled** and **Disabled**.

Watch Dog Function

If enabled, the watch dog timer allows the system to reboot when it is inactive for more than 5 minutes. The options are **Enabled** and **Disabled**.

Power Button Mode

Use this option to decide whether the power button turns off the system instantly or waits 4 seconds when pressed. The options are **Instant Off** and **4 Seconds Override**.

Restore on AC Power Loss

Use this option to set the power state after a power outage. Select **Power-Off** for the system power to remain off after a power loss. Select **Power-On** for the system power to be turned on after a power loss. Select **Last State** to allow the system to resume its last state before a power loss. The options are **Power-On**, **Power-Off**, and **Last State**.

Interrupt 19 Capture

Interrupt 19 is the software interrupt that handles the boot disk function. When you set this item to **Enabled**, the host adaptors ROM BIOS “captures” interrupt 19 at boot and allows the drives attached to these host adaptors to function as bootable disks. If you set this item to **Disabled**, the host adaptors ROM BIOS does not capture interrupt 19, and the drives attached to these adaptors do not function as bootable devices. The options are **Enabled** and **Disabled**.

Processor and Clock Options

Caution Be careful when changing the advanced settings. An incorrect value, very high DRAM frequency, or incorrect DRAM timing may cause the system to become unstable. If this occurs, revert to the default setting.

CPU Ratio

Use this option to use the CPU clock multiplier to multiply CPU speed to enhance performance. Select **Manual** to set the multiplier setting manually. Select **Auto** for the BIOS to select the CPU multiplier setting for your system automatically. The options are **Default** and **Manual**.

Clock Spread Spectrum

Select **Enable** to use the clock spectrum feature, which allows the BIOS to monitor and reduce the electromagnetic interference level that the components cause. Select **Disabled** to enhance system stability. The options are **Disabled** and **Enabled**.

Hardware Prefetcher (Available Subject to CPU Support)

If set to **Enabled**, the hardware prefetcher prefetches streams of data and instructions from the main memory to the L2 cache in the forward or backward manner to improve CPU performance. The options are **Disabled** and **Enabled**.

Adjacent Cache Line Prefetch (Available Subject to CPU Support)

The CPU fetches the cache line for 64 bytes if you set this option to **Disabled**. If you set this option to Enabled, the CPU fetches both cache lines for 128 bytes as comprised.

MPS and ACPI MADT Ordering

Use this option to choose the ordering method for the Multiple ACPI Description Table (MADT). Select **Modern Ordering** for Windows XP or later. Select **Legacy Ordering** for Microsoft Windows 2000 or earlier. The options are **Modern Ordering** and **Legacy Ordering**.

Intel Virtualization Technology (Available Subject to CPU Support)

Select **Enabled** to use the virtualization technology feature to allow one platform to run multiple OSs and applications in independent partitions, creating multiple "virtual" systems in one physical computer. The options are **Enabled** and **Disabled**.



Note If you change to this setting, you must power off and restart the system for the change to take effect. Refer to `www.intel.com/technology/virtualization` for detailed information.

Execute Disable Bit Capability (Available Subject to OS and CPU Support)

Set to **Enabled** to enable the Execute Disable Bit, which allows the processor to designate areas in the system memory where application code can execute and where it cannot, thus preventing a worm or virus from flooding illegal codes to overwhelm the processor or damage the system during an attack. The default is **Enabled**. (Refer to the Intel and Microsoft Web sites for more information.)

Simultaneous Multithreading (Available Subject to CPU Support)

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

Active Processor Cores

Set to **Enabled** to use a processor's second core and beyond. (Refer to the Intel Web site for more information.) The options are **All**, **1**, **2**, **3**, and **4**.

Intel EIST Technology

With Enhanced Intel SpeedStep Technology (EIST), the system can adjust processor voltage and core frequency automatically to reduce power consumption and heat dissipation. Refer to the Intel Web site for detailed information. The options are **Disabled** and **Enabled**.

Intel Turbo Boost Technology (Available If Intel EIST is Enabled)

With this option, processor cores can run faster than the marked frequency in specific conditions. The options are **Disabled** and **Enabled**.

C1E Support

Select **Enabled** to use the Enhanced Halt State feature. C1E significantly reduces CPU power consumption by reducing the CPU clock cycle and voltage during a Halt State. The options are **Disabled** and **Enabled**.

Intel C-State Tech

If enabled, the system automatically sets the C-state to either C2, C3, or C4 state. The options are **Default** and **Enabled**.

C-State Package Limit Setting

If set to **Auto**, the AMI BIOS automatically sets the C-state package register limit. The options are **Auto**, **C1**, **C3**, **C6**, and **C7**.

C1 Auto Demotion

When enabled, the CPU conditionally demotes C3, C6, or C7 requests to C1 based on un-core auto-demote information. The options are **Disabled** and **Enabled**.

C3 Auto Demotion

When enabled, the CPU conditionally demotes C6 or C7 requests to C3 based on un-core auto-demote information. The options are **Disabled** and **Enabled**.

Advanced Chipset Control

The **Advanced Chipset Control** submenu includes the following items.

Memory Remap Feature

Enable this option to remap overlapped PCI memory above the total physical memory. The settings are **Enabled** and **Disabled**.

Intel VT-d

Select **Enabled** to enable Intel virtualization technology support for direct I/O VT-d by reporting the I/O device assignments to VMM through the DMAR ACPI tables. This feature offers fully protected I/O resource sharing across Intel platforms for greater reliability, security, and availability in networking and data sharing. The settings are **Enabled** and **Disabled**.

Active State Power Management

Select **Enabled** to start Active State Power Management for signal transactions between L0 and L1 links on the PCI Express bus. This maximizes power saving and transaction speed. The options are **Enabled** and **Disabled**.

Route Port 80h Cycles to

Use this option to send debug information to a specific bus. The options are **Disabled**, **PCI**, and **LPC**.

USB Functions

Use this option to decide the number of onboard USB ports to enable. The options are **Disabled** and **Enabled**.

Legacy USB Support (Available if USB Functions is Enabled)

Select **Enabled** to use legacy USB devices. If you set this item to **Auto**, legacy USB support is enabled automatically if a legacy USB device is installed on the motherboard, and vise versa. The settings are **Disabled**, **Enabled**, and **Auto**.

SATA/Floppy Configuration

When you select this submenu, the AMI BIOS automatically detects IDE device presence and displays the following items.

Floppy A

Use this option to select the type of floppy drive connected to the system. The options are **Disabled**, **360 KB 5 1/4”**, **1.2 MB 5 1/4”**, **720 KB 3 1/2”**, **1.44 MB 3 1/2”**, and **2.88 MB 3 1/2”**.

SATA#1 Configuration

Selecting **Compatible** sets SATA#1 to legacy compatibility mode, while selecting **Enhanced** sets SATA#1 to native SATA mode. The options are **Disabled**, **Compatible**, and **Enhanced**.

Configure SATA as

Use this item to select the SATA#1 drive type. The options are **IDE**, **RAID**, and **AHCI**.

PCH RAID CodeBase

Select **Intel** to enable the Intel SATA HostRAID Utility. Select **Adaptec** to use the Adaptec HostRAID Utility. The options are **Intel** and **Adaptec**.

SATA#2 Configuration (Available If IDE Is Enabled Under Configure SATA#1 as)

Select **Enhanced** to set SATA#2 to native SATA mode. The options are **Disabled** and **Enhanced**.

IDE Detect Timeout (sec)

Use this option to set the timeout value for the BIOS to detect the ATA and ATAPI devices installed in the system. The options are **0** (seconds), **5**, **10**, **15**, **20**, **25**, **30**, and **35**.

SATA 0 ~ 5r

Use these settings to set the parameters of the disc storage devices attached to the SATA ports. Press <Enter> to activate the submenu screen for detailed item options. Set the correct configurations accordingly. The submenu items are listed below.

Type

Select the device type connected to the system. The options are **Not Installed**, **Auto**, **CD/DVD**, and **ARMD**.

LBA/Large Mode

Logical Block Addressing (LBA) is a method of addressing data on a disk drive. In the LBA mode, the maximum drive capacity is 137 GB. For drive capacities over 137 GB, your system must be equipped with a 48-bit LBA mode addressing. If not, install an ATA/133 IDE controller card that supports 48-bit LBA mode. The options are **Disabled** and **Auto**.

Block (Multi-Sector Transfer)

Block Mode boosts the IDE drive performance by increasing the amount of data transferred. You can transfer only 512 bytes of data per interrupt if you do not use Block Mode. Block Mode allows transfers of up to 64 KB per interrupt. If you select **Disabled**, data can transfer to and from the device one sector at a time. If you select **Auto**, data can transfer to and from the device multiple sectors at a time if the device supports this transfer method. The options are **Auto** and **Disabled**.

PIO Mode

The IDE Programmable I/O (PIO) mode programs timing cycles between the IDE drive and programmable IDE controller. As the PIO mode increases, the cycle time decreases. The options are **Auto**, **0**, **1**, **2**, **3**, and **4**.

If you select **Auto**, the AMI BIOS detects the PIO mode automatically. Use this value if you cannot determine IDE disk drive support.

If you select **0**, the AMI BIOS uses PIO mode 0. The data transfer rate is 3.3 Mbytes/s.

If you select **1**, the AMI BIOS uses PIO mode 1. The data transfer rate is 5.2 Mbytes/s.

If you select **2**, the AMI BIOS uses PIO mode 2. The data transfer rate is 8.3 Mbytes/s.

If you select **3**, the AMI BIOS uses PIO mode 3. The data transfer rate is 11.1 Mbytes/s.

If you select **4**, the AMI BIOS uses PIO mode 4. The data transfer bandwidth is 32 bits. Select **Enabled** to enable 32-bit data transfer.

DMA Mode

If you select **Auto**, the BIOS detects IDE DMA mode automatically when you cannot determine IDE disk drive support.

If you select **SWDMA0**, the BIOS uses single word DMA mode 0. The data transfer rate is 2.1 Mbytes/s.

If you select **SWDMA1**, the BIOS uses single word DMA mode 1. The data transfer rate is 4.2 Mbytes/s.

If you select **SWDMA2**, the BIOS uses single word DMA mode 2. The data transfer rate is 8.3 Mbytes/s.

If you select **MWDMA0**, the BIOS uses multiword DMA mode 0. The data transfer rate is 4.2 Mbytes/s.

If you select **MWDMA1**, the BIOS uses multiword DMA mode 1. The data transfer rate is 13.3 Mbytes/s.

If you select **MWDMA2**, the BIOS uses multiword DMA mode 2. The data transfer rate is 16.6 Mbytes/s.

If you select **UDMA0**, the BIOS uses ultra DMA mode 0. The data transfer rate is 16.6 Mbytes/s. It has the same transfer rate as PIO mode 4 and multiword DMA mode 2.

If you select **UDMA1**, the BIOS uses ultra DMA mode 1. The data transfer rate is 25 Mbytes/s.

If you select **UDMA2**, the BIOS uses ultra DMA mode 2. The data transfer rate is 33.3 Mbytes/s.

If you select **UDMA3**, the BIOS uses ultra DMA mode 3. The data transfer rate is 66.6 Mbytes/s.

If you select **UDMA4**, the BIOS uses ultra DMA mode 4. The data transfer rate is 100 Mbytes/s.

The options are **Auto**, **SWDMA*n***, **MWDMA*n***, and **UDMA*n***.

SMART for Hard Disk Drives

Self-Monitoring Analysis and Reporting Technology (SMART) helps predict impending drive failures. If you select **Auto**, the AMI BIOS detects hard disk drive support automatically. Select **Disabled** to prevent the AMI BIOS from using the SMART. Select **Enabled** to allow the AMI BIOS to use the SMART. to support the hard drive disk. The options are **Disabled**, **Enabled**, and **Auto**.

32-Bit Data Transfer

Select **Enable** to enable the function of 32-bit IDE data transfer. The options are **Enabled** and **Disabled**.

PCI/PnP Configuration

Use this menu to set the PCI/PnP configurations for the following items.

Clear NVRAM

This option clears the NVRAM during system boot. The options are **No** and **Yes**.

Plug & Play OS

If you select **Yes**, the OS configures Plug & Play devices. (This is not required for system boot if your system has an OS that supports Plug & Play.) If you select **No**, the AMI BIOS configures all devices in the system.

PCI Latency Timer

This option sets the latency timer of each PCI device installed on a PCI bus. Select **64** to set the PCI latency to 64 PCI clock cycles. The options are **32**, **64**, **96**, **128**, **160**, **192**, **224**, and **248**.

PCI IDE Bus Master

When enabled, the BIOS uses PCI bus mastering for reading/writing to IDE drives. The options are **Disabled** and **Default**.

PCIE I/O Performance

This feature selects the setting for the IOH PCI Express maximum payload size. The options are **128B** and **256B**.

ROM Scan Ordering

This option determines what kind of option ROM activates over another. The options are **Onboard First** and **Add-On First**.

PCI Slot 1, PCIe Slot 2 & 6 OPROM

Use this option to enable or disable PCI slot option ROMs. The options are **Disabled** and **Enabled**.

Load Onboard LAN1 Option ROM

This option enables or disables the onboard LAN option ROMs. The options are **Disabled** and **Enabled**.

Load Onboard LAN2 Option ROM

This option enables or disables the onboard LAN option ROMs. The options are **Disabled** and **Enabled**.

Boot Graphics Adapter Priority

Use this option to select the graphics controller used as the primary boot device. The options are **Other**, **Onboard VGA**, and **Slot 6**. Select **Slot 6** if a graphics controller is installed in the CPU-controlled slot 6 slot.

Super IO Device Configuration

This menu includes the following options.

Serial Port1 Address/Serial Port2 Address

This option specifies the Serial Port 1 and Serial Port 2 base I/O port address and Interrupt Request address. Select **Disabled** to prevent the serial port from accessing any system resources. When you set this option to **Disabled**, the serial port physically becomes unavailable. If you select **3F8/IRQ4**, the serial port uses 3F8 as its I/O port address and IRQ 4 for the interrupt address. The options for Serial Port1 are **Disabled**, **3F8/IRQ4**, and **2E8/IRQ3**. The options for Serial Port2 are **Disabled**, **2F8/IRQ3**, and **2E8/IRQ3**.

Onboard Floppy Controller

Select **Enabled** to enable the onboard floppy controller. The options are **Enabled** and **Disabled**.

Remote Access Configuration

This menu includes the following items.

Remote Access

Use this option to enable the Remote Access feature. The options are **Disabled** and **Enabled**.

If you set Remote Access to **Enabled**, the following items display.

Serial Port Number

Use this option to select the serial port for console redirection. The options are **COM 1**, **COM 2**, and **COM 3**.



Note Serial Over LAN (SOL) is enabled on COM 3 on the X8SIE-F and X8SI6-F.

Serial Port Mode

Use this option to set the serial port mode for Console Redirection. The options are **115200 8, n, 1**; **57600 8, n, 1**; **38400 8, n, 1**; **19200 8, n, 1**; and **9600 8, n, 1**.

Flow Control

Use this option to set the flow control for Console Redirection. The options are **None**, **Hardware**, and **Software**.

Redirection After BIOS POST

Select **Disabled** to turn off Console Redirection after Power-On Self-Test (POST). Select **Always** to keep Console Redirection active all the time after POST. (Some OSs may not support this setting.) Select **Boot Loader** to keep Console Redirection active during POST and Boot Loader. The options are **Disabled**, **Boot Loader**, and **Always**.

Terminal Type

Use this option to select the target terminal type for Console Redirection. The options are **ANSI**, **VT100**, and **VT-UTF8**.

VT-UTF8 Combo Key Support
This option is a terminal keyboard definition for sending commands from a remote console. Available options are **Enabled** and **Disabled**.

Sredir Memory Display Delay
This feature defines the length of time in seconds to display memory information. The options are **No Delay**, **Delay 1 Sec**, **Delay 2 Sec**, and **Delay 4 Sec**.

Hardware Health Configuration

Use this menu to monitor system hardware health and review the status of each item when displayed.

CPU Overheat Alarm

Use this option to select the CPU Overheat Alarm setting, which determines when the CPU overheat alarm is activated to warn of possible CPU overheat.

Caution Any temperature that exceeds the CPU threshold temperature that the CPU manufacturer predefines may result in CPU overheat or system instability. When the CPU temperature reaches this predefined threshold, the CPU and system cooling fans run at full speed.

The options are:

- **Early Alarm**—Select this setting to trigger the CPU overheat alarm (including the LED and buzzer) as soon as the CPU temperature reaches the CPU overheat threshold that the CPU manufacturer predefines.
- **Default Alarm**—Select this setting to trigger the CPU overheat alarm (including the LED and buzzer) when the CPU temperature reaches about 5 °C above the threshold temperature that the CPU manufacturer predefines, to give the CPU and system fans additional time needed for CPU and system cooling. In both the alarms above, take immediate action as described below.

System Temperature

This option displays the absolute system temperature (for example, 34 °C).

CPU Temperature

The CPU Temperature option displays the CPU temperature status as the BIOS detects it:

- **Low**—This level is considered the normal operating state. The CPU temperature is well below the CPU temperature tolerance. The motherboard fans and CPU run normally as configured in the BIOS (Fan Speed Control).

  User Intervention: No action required.
- **Medium**—The processor is running warmer. This is a precautionary level and generally means there may be factors contributing to this condition, but the CPU still is within its normal operating state and below the CPU temperature tolerance. The motherboard fans

and CPU run normally as configured in the BIOS. The fans may adjust to a faster speed depending on the Fan Speed Control settings.

User Intervention: No action is required. However, consider checking the CPU fans and chassis ventilation for blockage.

- **High**—The processor is running hot. This is a caution level, because the CPU temperature tolerance has been reached (or has been exceeded) and may activate an overheat alarm:
  - **Default Alarm**—The Overheat LED and system buzzer activate if the High condition continues for some time after it is reached. The CPU fan runs at full speed to bring down the CPU temperature. If the CPU temperature still increases even with the CPU fan running at full speed, the system buzzer activates and the Overheat LED turns on.
  - **Early Alarm**—The Overheat LED and system buzzer are activated exactly when the High level is reached. The CPU fan runs at full speed to bring down the CPU temperature.



Caution In both the alarms above, take immediate action as described below.

Refer to the *CPU Overheat Alarm* section to modify the above alarm settings.

User Intervention: If the system buzzer and Overheat LED has activated, take action immediately by checking the system fans, chassis ventilation, and room temperature to correct any problems.



Note The system may shut down if it continues for a long period to prevent damage to the CPU.



Note In its newer processors, Intel has upgraded the CPU thermal technology that reports absolute temperatures (Celsius/Fahrenheit) to a more advanced feature. The basic concept is that each CPU has unique embedded temperature information that the motherboard can read. This temperature threshold or temperature tolerance is assigned at the factory and is the baseline by which the motherboard takes action during different CPU temperature conditions (for example, increasing CPU fan speed, triggering the overheat alarm, etc.). Because CPUs can have different temperature tolerances, the installed CPU now can send its temperature tolerance to the motherboard, resulting in better CPU thermal management.

The information provided above is for your reference only. For more information about thermal management, refer to the Intel Web site at `www.Intel.com`.

Fan Speed Control Modes

Use this option to decide how the system controls the speeds of the onboard fans. The CPU temperature and fan speed are correlative. When the CPU on-die temperature increases, the fan speed also increases for effective system cooling.

Select **Full Speed** to allow the onboard fans to run at full speed (100 percent Pulse Width Modulation Duty Cycle) for maximum cooling. The **Full Speed** setting is recommended for special system configuration or debugging.

Select **Performance** for the onboard fans to run at 70 percent of the Initial PWM Cycle for better system cooling. The **Performance** setting is recommended for high-power-consuming and high-density systems.

Select **Balanced** for the onboard fans to run at 50 percent of the Initial PWM Cycle to balance the needs between system cooling and power saving. The **Balanced** setting is recommended for regular systems with normal hardware configurations.

Select **Energy Saving** for the onboard fans to run at 30 percent of the Initial PWM Cycle for best power efficiency and maximum quietness.

The options are **Full Speed (@100% of PWM Cycle)**, **Performance (@70% of PWM Cycle)**, **Balanced (@50% of PWM Cycle)**, and **Energy Saving (@30% of PWM Cycle)**.

Fan1 ~ Fan 6 Reading

This option displays the fan speed readings from fan interfaces Fan1 through Fan5. The options are **Vcore**, **AVCC**, **3.3Vcc**, **12V**, **V_DIMM**, **5V**, **–12V**, **3.3Vsb**, and **Vbat**.

ACPI Configuration

Use this menu to configure Advanced Configuration and Power Interface (ACPI) power management settings for your system.

High-Performance Event Timer

Select **Enabled** to activate the High-Performance Event Timer (HPET) that produces periodic interrupts at a much higher frequency than a real-time clock (RTC) does in synchronizing multimedia streams. This provides smooth playback and reduces the dependency on other timestamp calculation devices such as an *x*86 RDTSC Instruction embedded in the CPU. The High-Performance Event Timer replaces the 8254 Programmable Interval Timer. The options are **Enabled** and **Disabled**.

ACPI Aware O/S

This option enables ACPI support (if the OS supports it) to control ACPI through the OS. Otherwise, disable this feature. The options are **Yes** (enabled) and **No** (disabled).

ACPI APIC Support

Select **Enabled** to include the ACPI APIC Table Pointer in the Root System Description Table (RSDT) pointer list. The options are **Enabled** and **Disabled**.

APIC ACPI SCI IRQ

When you set this item to **Enabled**, the system supports APIC ACPI SCI IRQ. The options are **Enabled** and **Disabled**.

Headless Mode

Use this feature to enable the system to function without a keyboard, monitor, or mouse attached. The options are **Enabled** and **Disabled**.

ACPI Version Features

The options are **ACPI v1.0**, **ACPI v2.0**, and **ACPI v3.0**. Refer to the ACPI Web site at `www.acpi.info/` for further explanation.

Event Log Configuration

This menu includes the following items.

View Event Log

Use this option to view the System Event Log.

Mark All Events as Read

This option marks all events as read. The options are **OK** and **Cancel**.

Clear Event Log

This option clears the event log memory of all messages. The options are **OK** and **Cancel**.

PCIE Error Log

Use this option to enable logging of errors encountered in the system PCI Express bus. The options are **Yes** and **No**.

Security Settings

The AMI BIOS provides a supervisor and user password. If you use both passwords, you must set the supervisor password first.

Supervisor Password

This option indicates whether you have set a supervisor password for the system. **Clear** means you have not set a supervisor password, and **Set** means you have set one.

User Password

This item indicates whether you have set a user password for the system. **Clear** means you have not set a user password, and **Set** means you have set one.

Change Supervisor Password

Select this feature and press <Enter> to access the submenu, then type in a new supervisor password.

User Access Level

This option is available when you set a supervisor password. Available options are:

- **Full Access**—You have full read and write access to the setup utility.
- **View Only**—You can access to the setup utility, but cannot change the fields.
- **Limited**—You can change only limited fields such as **Date** and **Time**.
- **No Access**—You do not have access to the setup utility.

Change User Password

Select this feature and press <Enter> to access the submenu, then type in a new user password.

Clear User Password

This option is available only if you set a user password.

Password Check

Available options are **Setup** and **Always**.

Boot Sector Virus Protection

When enabled, the AMI BOIS displays a warning when any program (or virus) issues a disk format command or attempts to write to the hard disk drive boot sector. The options are **Enabled** and **Disabled**.

Boot Settings

Use the following options in this menu to configure boot settings.

Boot Device Priority

Use this option to specify the boot device priority sequence. The settings are **1st boot device**, **2nd boot device**, **3rd boot device**, **4th boot device**, **5th boot device**, and **Disabled**.

- **1st boot device**: First floppy drive
- **2nd boot device**: [USB: XXXXXXXXX]
- **3rd boot device**: [SATA: XXXXXXXXX]
- **4th boot device**: [Network: XXXXXXXXX]
- **5th boot device**: [Network: XXXXXXXXX]

Hard Disk Drives

Use this option to specify the hard drive priority sequence.

- **1st drive**: [SATA: XXXXXXXXXX]
- **2nd drive**: [SATA: XXXXXXXXXX]

Removable Drives

Use this option to specify the removable drive boot sequence. The settings are **1st boot device**, **2nd boot device**, and **Disabled**.

- 1st drive
- **2nd drive**: [USB: XXXXXXXXX]

Retry Boot Devices

Select this option to retry booting from the configured boot devices if the systems fail to boot initially. The options are **Disabled** and **Enabled**.

Exit Options

Select the **Exit** tab from the AMI BIOS Setup Utility screen to enter the Exit BIOS Setup screen.

Save Changes and Exit

When you have completed the system configuration changes, select this option to leave the BIOS Setup Utility and reboot the computer so the new system configuration parameters can take effect. Select **Save Changes and Exit** from the **Exit** menu and press <Enter>.

Discard Changes and Exit

Select this option to quit the BIOS Setup Utility without making any permanent changes to the system configuration and reboot the computer. Select **Discard Changes and Exit** from the **Exit** menu and press <Enter>.

Discard Changes

Select this option and press <Enter> to discard all changes and return to the AMI BIOS Setup Utility.

Load Optimal Defaults

To set this option, select **Load Optimal Defaults** from the **Exit** menu and press <Enter>. Then select **OK** to allow the AMI BIOS to load optimal defaults to the BIOS settings automatically. The optimal settings are for maximum system performance, but may not work best for all computer applications.

Load Fail-Safe Defaults

To set this option, select **Load Fail-Safe Defaults** from the **Exit** menu and press <Enter>. The fail-safe settings are for maximum system stability, but not for maximum performance.

POST Error Beep Codes

This section lists Power On Self Test (POST) error beep codes for the AMI BIOS. POST error beep codes are in two categories: recoverable and terminal. This section lists beep codes for recoverable POST errors.

Recoverable POST Error Beep Codes

When a recoverable error occurs during POST, the BIOS displays a POST code that describes the problem. The BIOS also may issue one of the following beep codes:

- **One long and eight short beeps**: Video configuration error.
- **One repetitive long beep**: No memory detected.
- **One continuous beep with the front panel Overheat LED on**: System overheat.

Rack Mounting

Note The rack mount kit provided with the NI RMC-8354 is intended to work with racks that are 26 to 33 in. deep. For information about installing the NI RMC-8354 into a rack that is less than 26 in. deep, refer to KnowledgeBase 4GCEKKMT at `ni.com/support`.

The rack mounting hardware includes:

- One pair of inner slides to be installed on the chassis.
- One pair of outer slides to be installed in the rack.
- Three pairs of short brackets for the outer slides.
- Bag of assorted fasteners.
- One pair of long brackets for the rear of the outer slides.

Caution When mounting the equipment in the rack, do not create a hazardous condition due to uneven mechanical loading.

Note One pair of short brackets includes screw threads, and the other two pairs have slots. If the short brackets are required for your specific rack mounting configuration, use the pair(s) that fits into your rack best.

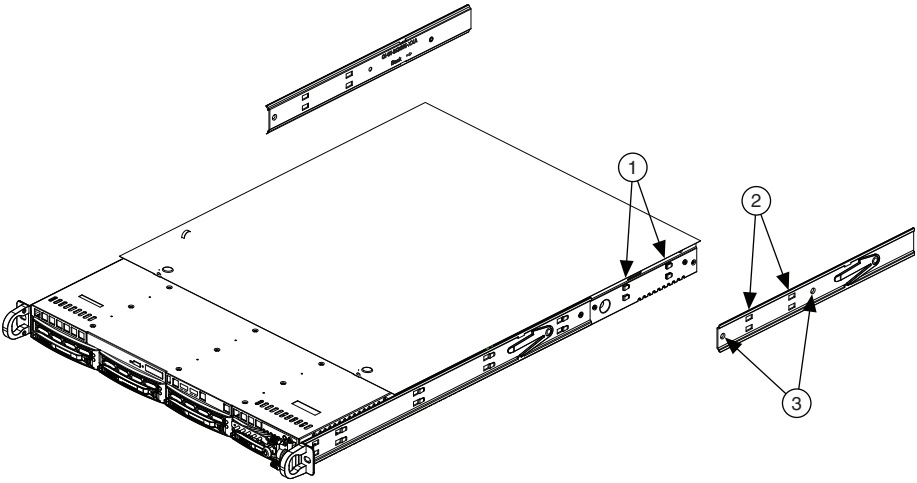
Note Rack mounting hardware provided in the accessory kit, but not specifically described in the following instructions, is for other possible rack mounting configurations not mentioned in this manual. Consult any relevant literature provided with the intended rack for specific mounting information before attempting to install the NI RMC-8354.

Installing the Inner Slides

Follow these steps to install the inner slides to the NI RMC-8354:

1. Locate the right inner slide (the slide used on the right side of the chassis when facing the chassis front panel).
2. Align the four square holes on the right inner slide against the hooks on the right side of the chassis, as shown in Figure 2-1.
3. Securely attach the slide to the chassis with two M4 flathead screws.
4. Repeat steps 1–3 to install the left inner slide to the left side of the chassis.

Figure 2-1. Installing Inner Slides



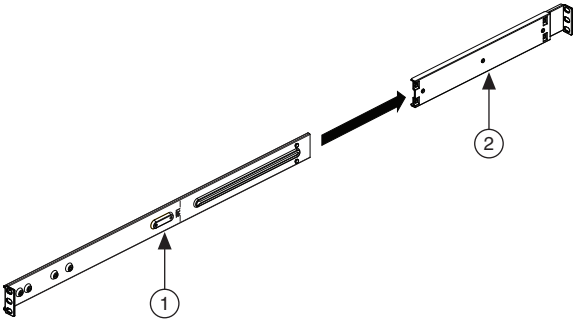
1 Hooks on Chassis 2 Square Holes on Right Inner Slide 3 Holes for M4 Screws

Assembling the Outer Slide Assemblies

Follow these steps to assemble the outer slide assemblies:

1. Measure the distance from the front rail of the rack to the rear rail of the rack.
2. Attach a long bracket to the rear of the right outer slide, as shown in Figure 2-2.
3. Adjust the outer slide assembly to the proper distance so that the chassis fits snugly into the rack.
4. Repeat steps 1 to 3 for the left outer slide.

Figure 2-2. Assembling Outer Slide Assemblies

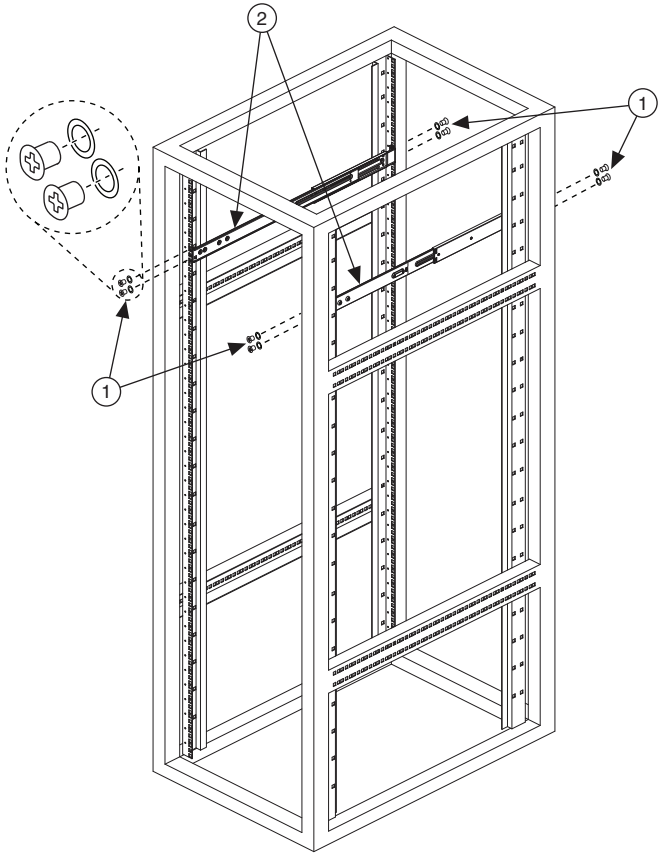


1	Outer Slide	2	Long Bracket

Installing the Outer Slide Assemblies in the Rack

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

Figure 2-3. Installing Slide Assemblies into Rack



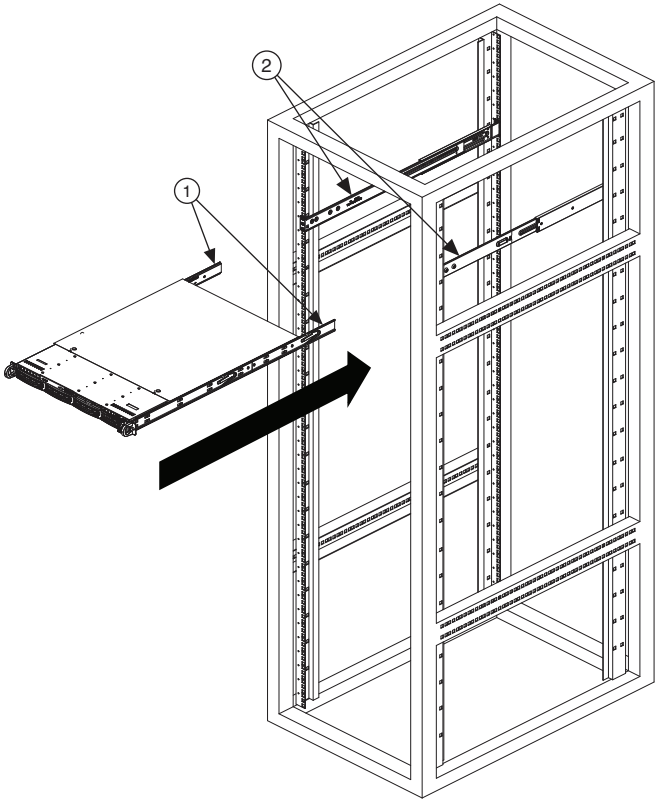
1	M5 Screws and Washers	2	Slide Assemblies

Installing the Chassis into the Rack

Follow these steps to install the chassis in the rack:

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

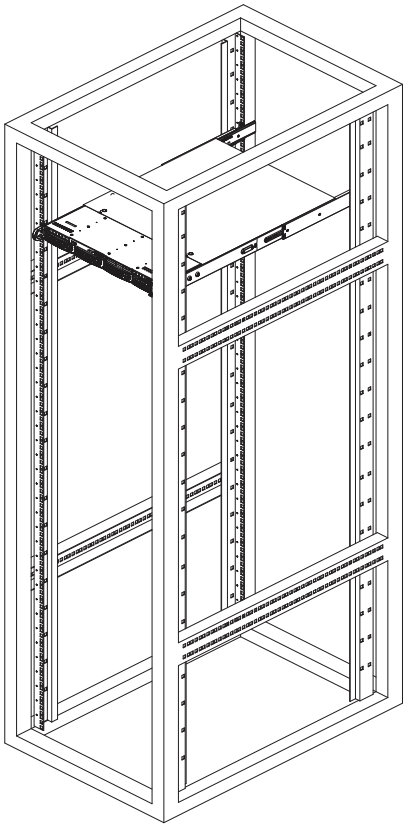
Figure 2-4. Installing Inner Slides into Outer Slides



1	Inner Slides	2	Grooves of Outer Slide Assemblies

2. Push the chassis all the way to the back of the outer slide assemblies, as shown in Figure 2-5.

Figure 2-5. Installing Chassis Into Rack



OS Reinstallation and Recovery

Caution Recovering the OS using the hard drive-based recovery or the OS recovery CD/DVD erases the contents of your hard disk. Before recovering the OS, back up any files you want to keep.

The NI RMC-8354 includes a preinstalled OS from the factory. The NI RMC-8354 also includes two methods of restoring/reinstalling the OS to your system.

- Hard drive-based recovery stores a factory backup on a separate portion of your hard drive, allowing you to restore your server without additional media.

Note The hard drive recovery hot key is <F4>. To access the hard drive-based recovery tool, press and hold <F4> when video first appears during the boot process.

- The NI RMC-8354 also ships with an OS recovery CD/DVD you can use to reinstall your operating system onto your hard drive.

  If you need to reinstall your operating system, you can use the included OS recovery CD/DVD. Boot the NI RMC-8354 using the OS recovery CD/DVD to recover the OS.

Note You also may need to update or reinstall software after using the OS reinstallation CD/DVD to recover your OS. The OS reinstallation CD/DVD may contain drivers that are older or newer than the factory-installed version of the OS and may not contain the latest RAID drivers. To ensure you have the latest drivers, go to `www.intel.com` and install the Intel Rapid Storage Technology (Intel RST) RAID software package.

Note After you reinstall or recover your OS, you may find shortcuts on the desktop that require you to install specific drivers or software (for example, video drivers). Due to driver and software packaging, it was not possible to preinstall this software during the OS installation.

Cleaning

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

Exterior Cleaning

Caution Avoid getting moisture inside the chassis during exterior cleaning, especially through the top vents.

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

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

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

3

I/O Information

This chapter describes the NI RMC-8354 I/O connectors.

Rear Panel Connectors

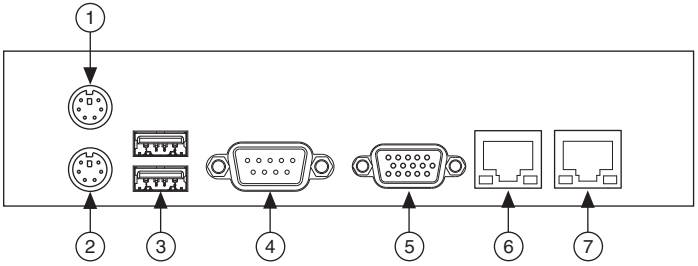
Table 3-1 lists various peripherals and their corresponding NI RMC-8354 external connectors, bus interfaces, and functions.

Table 3-1. NI RMC-8354 Peripherals Overview

Peripheral	External Connector	Description
Keyboard	PS/2 (5-pin Din)	PS/2-style keyboard
Mouse	PS/2 (5-pin Din)	PS/2-style mouse
USB	USB 4-pin Series A stacked receptacle	USB 2.0 capable
USB	USB 4-pin Series A stacked receptacle	USB 2.0 capable
Serial	COM1 (9-pin DSUB)	16550 RS-232 serial port
Video	VGA (15-pin DSUB)	Matrox G200eW graphics controller
Ethernet	LAN (RJ45)	10/100/1000 Ethernet connection
Ethernet	LAN (RJ45)	10/100/1000 Ethernet connection

Figure 3-1 shows the rear panel layout of the NI RMC-8354.

Figure 3-1. NI RMC-8354 Rear Panel Layout



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

PS/2

Figure 3-2 shows the location and pinouts for the PS/2 keyboard and mouse connectors on the NI RMC-8354. Table 3-2 lists and describes the PS/2 connector signals.

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

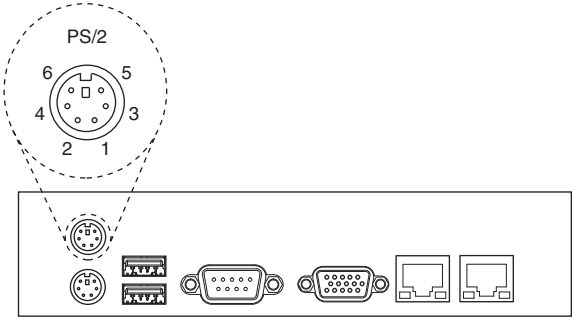


Table 3-2. PS/2 Connector Signals

Pin	Signal Name	Signal Description
1	DATA	Data Keyboard
2	NC	Data Mouse
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 RMC-8354. Table 3-3 lists and describes the USB connector signals.

AMP manufactures a USB mating connector, part number 787633.

Figure 3-3. USB Connector Location and Pinout

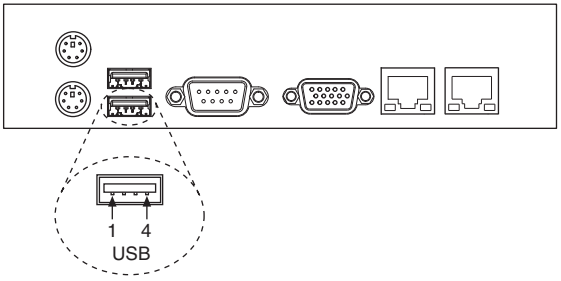


Table 3-3. USB Connector Signals

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

Serial

Figure 3-4 shows the location and pinouts for the serial connector on the NI RMC-8354. Table 3-4 lists and describes the serial connector signal.

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

Figure 3-4. Serial Connector Location and Pinout

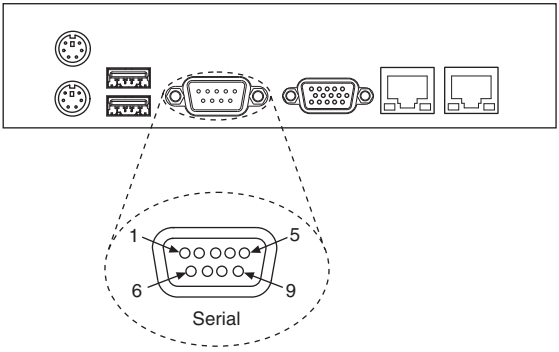


Table 3-4. Serial Connector Signals

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

VGA

Figure 3-5 shows the location and pinouts for the VGA connector on the NI RMC-8354. Table 3-5 lists and describes the VGA connector signals.

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

Figure 3-5. VGA Connector Location and Pinout

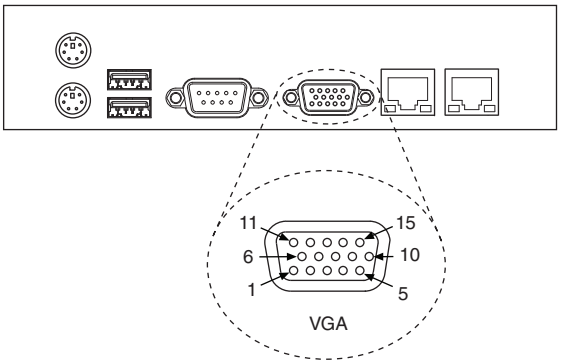


Table 3-5. VGA Connector Signals

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

Ethernet

Figure 3-6 shows the location and pinouts for the Ethernet connectors on the NI RMC-8354. Table 3-6 lists and describes the Ethernet connector signals.

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

Figure 3-6. Ethernet Connector Location and Pinout

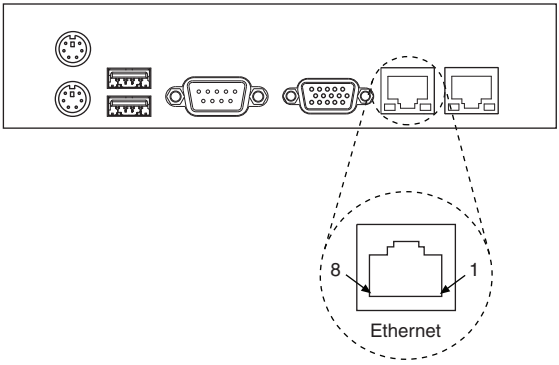


Table 3-6. Ethernet Connector Signals

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

MXI-Express Connectors

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



Note The NI RMC-8354 BIOS supports only 188 PCI buses by default. For large multichassis systems requiring more than 188 PCI buses, use the NI MXI-Express BIOS compatibility software to work around this limitation on Windows. At this time, there is no workaround available for systems running LabVIEW RT. To access NI MXI-Express BIOS Compatibility Software, search for *MXI-Express BIOS Compatibility Software* at `ni.com/drivers`.

4

Common Configuration Questions

This chapter answers common configuration questions you may have when using the NI RMC-8354.

General Questions

What do the LEDs on the NI RMC-8354 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 RMC-8354. For more information, refer to Figure 1-1, *Front View of the NI RMC-8354*.

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 RMC-8354 and press <Delete> during the memory tests. Refer to the *BIOS Setup* section of Chapter 2, *Installation and BIOS Setup*, for more information.

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

Yes.

How much noise do the fans generate?

The fans have the following noise specifications:

Sound pressure level (at operator position)

- Minimum ..... 53.9 dBA
- Maximum..... 64.9 dBA

Sound power

- Minimum ..... 61.6 dBA
- Maximum..... 72.0 dBA

What RAID modes are supported?

The NI RMC-8354 officially supports only RAID 5. Other RAID configurations such as RAID-0 and RAID-1 are known to function, but are not fully validated.

Does the NI RMC-8354 support a PCI card?

No, the NI RMC-8354 can support only PCI Express cards while using a riser card (provided).

What is the shortcut key to get to the boot menu while the BIOS is going through POST?

The shortcut key is <F11>.

Boot Options

What devices can I boot from?

The NI RMC-8354 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 RMC-8354 BIOS configures the USB devices so that they will work in a DOS environment.

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

Press <Delete>, enter the BIOS, and select **Boot**. 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 RMC-8354 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 RMC-8354. 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. In MAX, select **Help»Help Topics»PXI** to configure your chassis.

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 RMC-8354 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 the *Upgrading Memory* section in Appendix B, *Hardware Configuration*.

How do I flash a new BIOS?

To see if the latest BIOS is available, go to `ni.com/downloads/`.

Where do I get the latest software drivers?

The latest National Instruments software is available from `ni.com/downloads/`.

My NI RMC-8354 does not have an internal floppy drive. Is there a way to use an external drive?

Yes. The NI RMC-8354 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 RMC-8354.

What if the NI RMC-8354 does not boot?

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

Things to Notice:

- Which LEDs come on? The power indicator LED should stay lit. The hard disk drive LEDs should blink during boot as the disk is accessed.
- What appears on the display? Does it hang at some particular point (BIOS, Operating System, and so on)? If nothing appears on the screen, try a different monitor. Does your monitor work with a different PC? If it hangs, note the last screen output that you saw for reference when consulting National Instruments technical support.
- What has changed about the system? Did you recently move the system? Was there electrical storm activity? Did you recently add a new module, memory chip, or piece of software?
- Has the system overheated? If the Overheat/FanFail LED is lit, this indicates overheating. Unplug the AC power cord from the server and allow it to cool down before powering it on again.
- Has any memory been installed in the unsupported slots? (Refer to the *Memory Upgrades* section in Chapter 1, *Getting Started*, for more information.)

Things to Try:

- Make sure the NI RMC-8354 is plugged in to a working power source.
- Remove any nonessential cables or devices.
- Make sure the CPU and memory modules are properly seated in their slots.
- Clear the CMOS. (Refer to the *Clear CMOS Jumper: JBT1* section of Appendix B, *Hardware Configuration*.)
- Recover the hard drive on the NI RMC-8354. (Refer to the *OS Reinstallation and Recovery* section of Chapter 2, *Installation and BIOS Setup*.)
- Remove memory from unsupported slots.

My NI RMC-8354 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 RMC-8354. 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 RMC-8354 electrical, mechanical, and environmental specifications.

Electrical

AC Input

Input voltage range ..... 100 to 240 VAC

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

Input frequency ..... 50/60 Hz

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

Input current rating ..... 5 A max

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

Power Requirements

Measured, peak inrush (power ON) ..... 197 W

Measured, idle ..... 92 W

Measured, active (100% CPU) ..... 203 W

Mainboard

Socket ..... LGA 1156

Chipset ..... Intel 3420 chipset

Memory Slots ..... Four 240-pin DIMM slots, three per channel, 1066/1333 16 GB max memory

PCI Express ..... One PCI Express 2.0 x16 slot

SATA ..... Six SATA ports compliant with the Serial-ATA 2.0 specification.

USB ports ..... Four USB 2.0 ports

Keyboard ..... PS/2 keyboard port

Mouse ..... PS/2 mouse port

[1] Operating range is guaranteed by design.

Video	VGA port, onboard Matrox G200eW 16 MB DDR2 (max resolution 1280 × 1024)
Serial	One RS-232 serial port
LAN	Two RJ45 LAN jacks
Onboard LAN controller	Intel 82574L Gigabit Ethernet controller

CPU

CPU	Intel i7 860 Quad Core
Clock speed	2.86 GHz
Max turbo frequency (single core)	3.46 GHz
Intel Smart Cache	8 MB
Package	LGA 1156

Hard Disk Drive

Capacity	500 GB in one, two, or four-drive configurations for maximum capacity of 2 TB (maximum usable capacity shown by Windows in RAID 5 is 1.36 TB)
Interface	Serial-ATA

Memory

Standard memory	1/2 × 1 GB (128 M × 72 bit), DDR-III SDRAM, ECC 1333 MHz
4 GB memory upgrade	2 × 2 GB (128 M × 72 bit), DDR-III SDRAM, ECC 1333 MHz
8 GB memory upgrade (64-bit OS)	4 × 2 GB (128 M × 72 bit), DDR-III SDRAM, ECC 1333 MHz
16 GB memory upgrade (64-bit OS)	4 × 4 GB (512 M × 72 bit), DDR-III SDRAM, ECC 1333 MHz

Mechanical

Overall dimensions (standard chassis)	
Height	1U
Width	437 mm (17.2 in.)
Depth	503 mm (19.8 in.)
Weight (with four 500 GB drives)	10.75 kg (23.7 lbs)

Environmental

Caution If installed in a closed or multiunit rack assembly, the rack environment operating ambient temperature may be greater than room ambient temperature. Therefore, install the equipment in an environment compatible with the maximum ambient temperature (Tma) the manufacturer specifies.

Operating temperature ..... 5 to 35 °C
(Tested in accordance with IEC 60068-2-1.)

Storage temperature ..... -40 to 70 °C
(Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2.)

Relative humidity (tested in accordance with IEC 60068-2-56)

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

Operating location ..... Indoor use

Altitude ..... 2,000 m

Installation Category..... II

Pollution Degree 2

Acoustic Emissions[1]

Sound pressure level (at operator position)

- Minimum ..... 53.9 dBA
- Maximum..... 64.9 dBA

Sound power

- Minimum ..... 61.6 dBA
- Maximum..... 72.0 dBA

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, CSA 60950-1

Caution Overloading the circuits may damage supply wiring. Do not exceed the ratings on the equipment nameplate when connecting equipment to the supply circuit.

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

[1] Typical data. Tested in accordance with ISO 7779; meets MIL-PRF-28800F requirements.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326 (IEC 61326): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note For the standards applied to assess the EMC of this product, refer to the *Online Product Certification* section.

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

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

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

Online Product Certification

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

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

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

Waste Electrical and Electronic Equipment (WEEE)



EU Customers At the end of the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste and Electronic Equipment, visit `ni.com/environment/weee`.

Battery Replacement and Disposal



Caution Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to instructions.



Battery Directive This device contains a long-life coin cell battery. If you need to replace it, use the Return Material Authorization (RMA) process or contact an authorized National Instruments service representative. For more information about compliance with the EU Battery Directive 2006/66/EC about Batteries and Accumulators and Waste Batteries and Accumulators, visit `ni.com/environment/batterydirective`.

电子信息产品污染控制管理办法 （中国 RoHS）



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

B

Hardware Configuration

This appendix describes how to configure and upgrade the NI RMC-8354 hardware.



Caution Hazardous Voltage Area

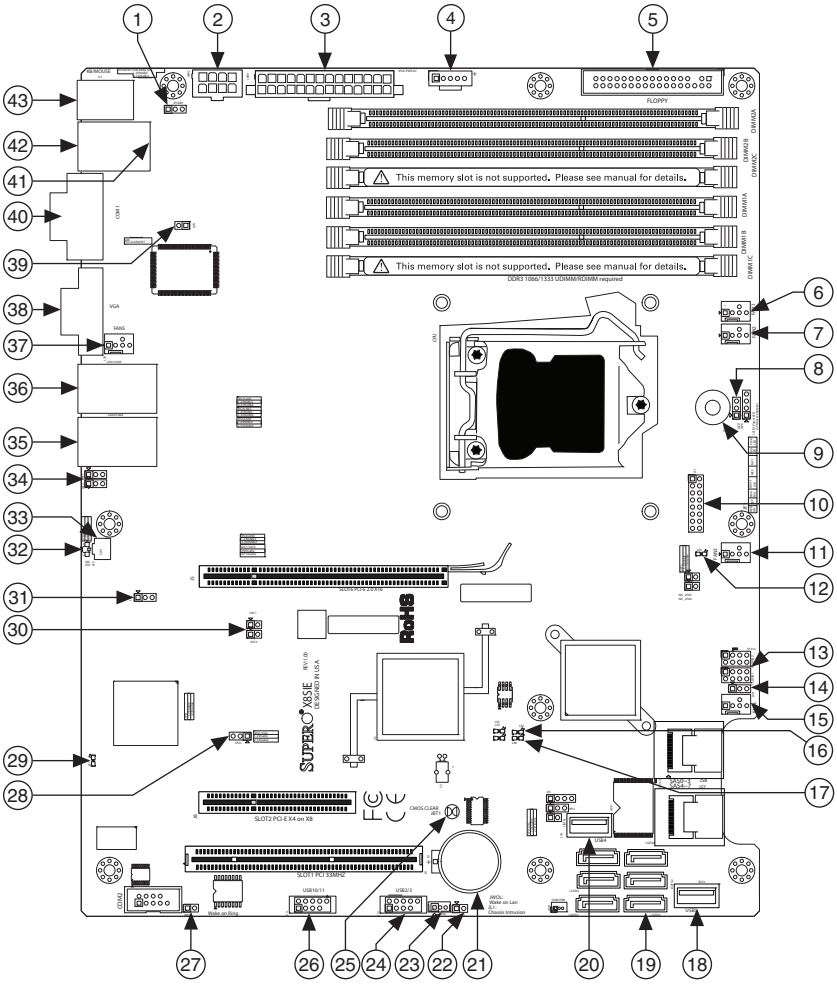
No user (operator) serviceable parts are inside the NI RMC-8354.

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 RMC-8354 mainboard.

Figure B-1. NI RMC-8354 Mainboard Layout

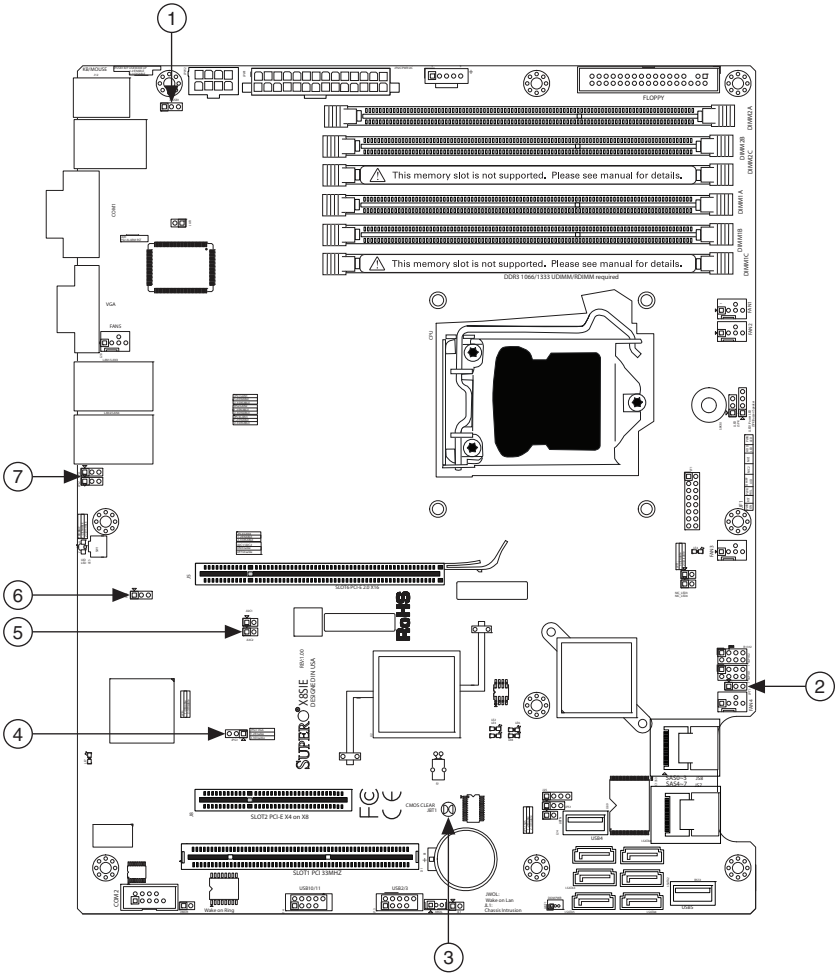


1	JPUSB1	12	LE4	23	JWOL	34	JPL1/2
2	JPW2	13	T-SGPIO0/1	24	USB2/3	35	LAN2
3	JPW1	14	JPT1	25	JBT1	36	LAN1
4	JPI²C	15	Fan4	26	USB10/11	37	Fan5
5	Floppy	16	LE6	27	JWOR	38	VGA
6	Fan1	17	LE8	28	JPG1	39	JAR
7	Fan2	18	USB5	29	LE7	40	COM1
8	JLED	19	I-SATA0–5	30	JI²C1/JI²C2	41	IPMI
9	SPKR1	20	USB4	31	JPB	42	USB0/1
10	JF1	21	B1	32	UID LED	43	KB/Mouse
11	Fan3	22	JL1	33	SW1		

Jumper Settings

Figure B-2 shows the jumper locations on the NI RMC-8354.

Figure B-2. NI RMC-8354 Jumper Locations



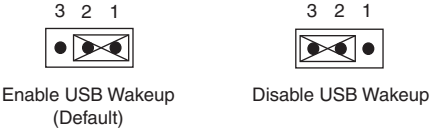
1	JPUSB1	3	JBT1	5	JI²C1/JI²C2	7	JPL1/2
2	JPT1	4	JPG1	6	JPB		

Enable/Disable USB Wakeup Jumper: JPUSB1

Use the JPUSB1 jumper to wake up your system by pressing a key on a USB keyboard or clicking the USB mouse. Use the JPUSB1 jumper together with the USB wakeup feature in the BIOS. Enable this jumper and the USB feature in the BIOS to wake up your system via USB devices.

Note When the USB function is enabled in the BIOS, and the USB wakeup jumper is disabled, remove the USB devices from the USB ports whose USB jumper is disabled before the system goes into the standby mode.

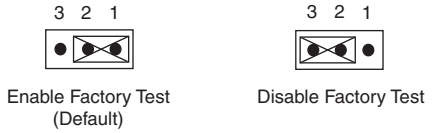
Figure B-3. Enable/Disable USB Wakeup Jumper: JPUSB1



Enable/Disable Factory Test Jumper: JPT1

Use the JPT1 jumper to enable or disable the factory test. The default setting is enabled.

Figure B-4. Enable/Disable Factory Test Jumper: JPT1



Clear CMOS Jumper: JBT1

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

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

Use JBT1 to clear CMOS. Instead of pins, this “jumper” consists of contact pads to prevent accidental CMOS clearing. To clear CMOS, use a metal object such as a small screwdriver to touch both pads at the same time to short the connection.

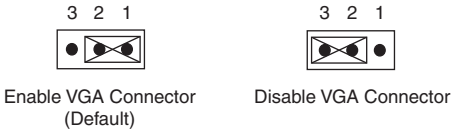
Figure B-5. Clear CMOS Jumper: JBT1



Enable/Disable VGA Connector Jumper: JPG1

Use JPG1 to enable or disable the VGA connector on the motherboard. The default setting is enabled.

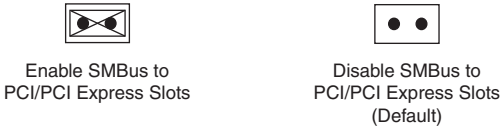
Figure B-6. Enable/Disable VGA Connector Jumper: JPG1



Enable/Disable SMBus to PCI/PCI Express Slots Jumper: JI^{2}C1/JI^{2}C2

Use jumpers JI^{2}C1/JI^{2}C2 to connect PCI/PCI Express slots to the system management bus. The default setting is open to disable the connection.

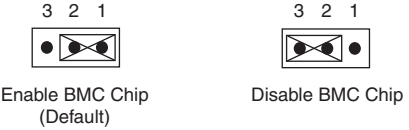
Figure B-7. Enable/Disable SMBus to PCI/PCI Express Slots Jumper: JI^{2}C1/JI^{2}C2



Enable/Disable BMC Jumper: JPB

Use the JPB jumper to enable or disable the Baseboard Management Control (BMC) chip and onboard IPMI connection. Use this jumper together with the IPMI settings in the BIOS. The default setting is enabled.

Figure B-8. Enable/Disable BMC Jumper: JPB



Enable/Disable GLAN1/GLAN2 Jumper: JPL1/JPL2

Use JPL1 to enable or disable the GLAN1 port and JPL2 to enable or disable the GLAN2 port on the motherboard. The default setting is enabled.

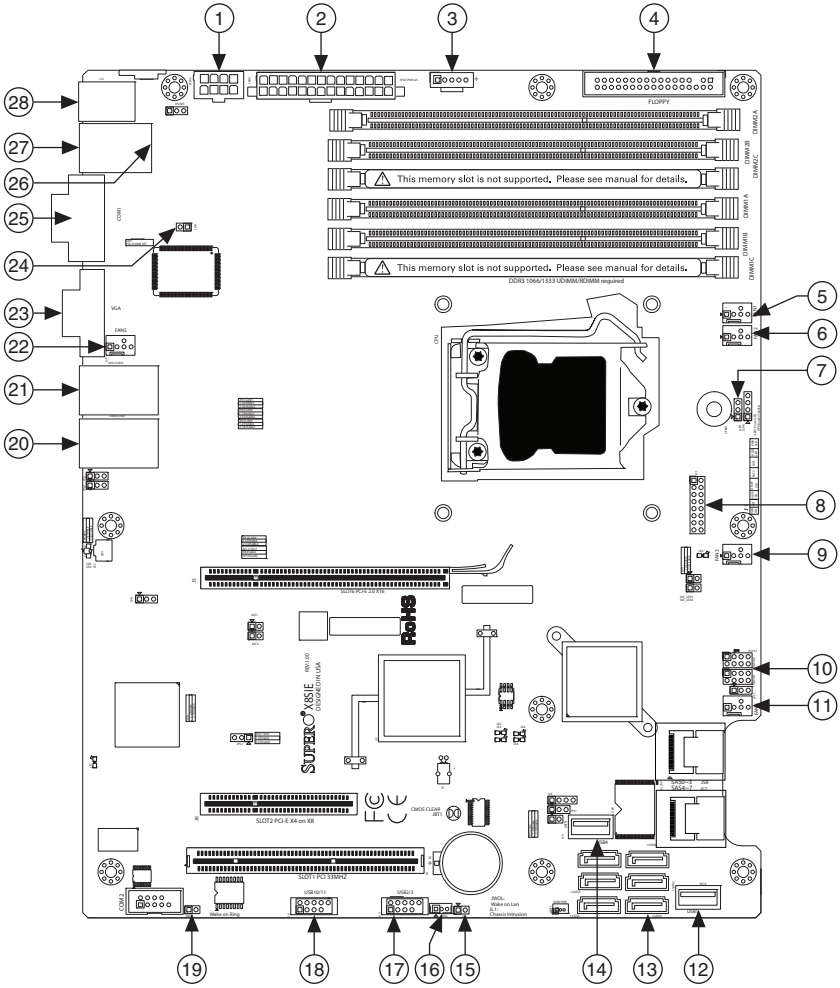
Figure B-9. Enable/Disable GLAN1/GLAN2 Jumper: JPL1/JPL2



Other Connectors

Figure B-10 shows the locations of other connectors on the NI RMC-8354.

Figure B-10. NI RMC-8354 Other Connector Locations



1	JPW2	8	JF1	15	JL1	22	Fan5
2	JPW1	9	Fan3	16	JWOL	23	VGA
3	JPI2C	10	T-SGPIO0/1	17	USB2/3	24	JAR
4	Floppy	11	Fan4	18	USB10/11	25	COM1
5	Fan1	12	USB5	19	JWOR	26	IPMI
6	Fan2	13	I-SATA0–5	20	LAN2	27	USB0/1
7	JLED	14	USB4	21	LAN1	28	KB/Mouse

Power Supply I²C Connector: JPI²C

JPI²C is the power supply I²C connector. This connector monitors the power supply, fan, and system temperature statuses.

Figure B-11. Power Supply I²C Connector (JPI²C)

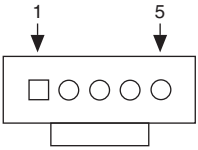


Table B-1. Power Supply I²C Connector Signal Descriptions

Pin	Signal Description
1	Clock
2	Data
3	PWR Fail
4	GND
5	3.3 V

Floppy Connector

The floppy connector is next to the DIMM memory banks on the motherboard.

Notice the following when connecting the floppy cable:

- The floppy cable has seven twisted wires.
- A red mark on a wire typically designates the pin 1 location.
- A single floppy ribbon cable has 34 wires and two connectors for two floppy drives. The connector with twisted wires always connects to drive A, and the connector without twisted wires always connects to drive B.

Figure B-12. Floppy Connector

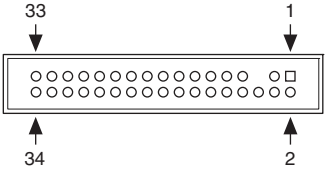


Table B-2. Floppy Connector Signal Descriptions

Pin	Signal Description	Pin	Signal Description
1	GND	2	FDHDIN
3	GND	4	Reserved
5	Key	6	FDEDIN
7	GND	8	Index
9	GND	10	Motor enable
11	GND	12	Drive select B
13	GND	14	Drive select B
15	GND	16	Motor enable
17	GND	18	DIR
19	GND	20	STEP
21	GND	22	Write data
23	GND	24	Write gate
25	GND	26	Track 00
27	GND	28	Write protect
29	GND	30	Read data
31	GND	32	Side 1 select
33	GND	34	Diskette

Fan Power Connectors: Fan1 to Fan5

The NI RMC-8354 has five fan headers (Fan1 to Fan5). These fans are 4-pin fan headers. However, pins 1 to 3 of the fan headers are backward compatible with the traditional 3-pin fans. A fan speed control setting in the BIOS allows the BIOS to set fan speeds automatically based on the system temperature. The default setting is disabled, which allows the onboard fans to run at full speed.

Note Use all 3-pin fans or all 4-pin fans on a motherboard. Do not use 3-pin fans and 4-pin fans on the same board.

Figure B-13. Fan Power Connectors (Fan1 to Fan6)

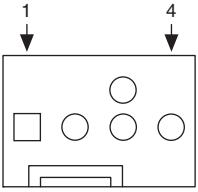


Table B-3. Fan Power Connector Signals

Pin	Signal Description
1	GND
2	2.5 A/+16 V (red)
3	Tachometer
4	PWM_Control

Onboard Power LED Header: JLED

JLED is the onboard power LED header. The power LED header is connected to front control panel at JF1 to indicate the system power status.

Figure B-14. Onboard Power LED Header (JLED)

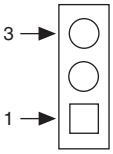


Table B-4. Onboard Power LED Header Signal Descriptions

Pin	Signal Description
1	VCC
2	No Connection
3	Connection to PWR LED on JF1

Front Panel Connector: JF1

JF1 contains header pins for various buttons and indicators on the control panel at the front of the chassis. These connectors are designed specifically for use with this chassis.

Figure B-15. Front Panel Connector (JF1)

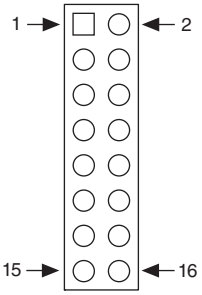


Table B-5. Front Panel Connector Signals

Pin	Signal Name	Signal Description
1	PWR	Power button signal
2	GND	Power button +3 V standby
3	Reset	Reset button reset

Table B-5. Front Panel Connector Signals (Continued)

Pin	Signal Name	Signal Description
4	GND	Reset button ground
5	LED_Anode+	Power fail LED Vcc
6	Power Fail LED	Power fail LED ground
7	UID LED	Vcc/blue UID LED
8	OH/Fan Fail LED	OH/fan fail LED
9	LED_Anode+	NIC2 LED Vcc
10	NIC2 LED	NIC2 LED ground
11	LED_Anode+	NIC1 LED Vcc
12	NIC1 LED	NIC1 LED ground
13	LED_Anode+	HDD LED +5 V
14	HDD LED	HD active
15	LED_Anode+	Power LED +5 V
16	Power LED	Power LED ground

T-SGPIO0/1 Headers

Use the two Serial-Link General Purpose Input/Output (T-SGPIO) headers to communicate with the enclosure management chip in the system.

Figure B-16. T-SGPIO0/1 Header

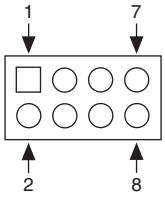


Table B-6. T-SGPIO0/1 Header Signal Descriptions

Pin	Signal Description	Pin	Signal Description
1	NC	2	NC
3	GND	4	DATA Out

Table B-6. T-SGPIO0/1 Header Signal Descriptions (Continued)

Pin	Signal Description	Pin	Signal Description
5	Load	6	GND
7	Clock	8	NC

Chassis Intrusion Switch Connector: JL1

JL1 is the chassis intrusion header. Attach the appropriate cable to be informed of a chassis intrusion.

Figure B-17. Chassis Intrusion Switch Connector (JL1)



Table B-7. Chassis Intrusion Switch Connector Signals

Pin	Signal Name
1	CINTRU
2	GND

Wake-On-LAN Header: JWOL

JWOL is the Wake-On-LAN header on the motherboard. You must also have a LAN card with a Wake-On-LAN connector and cable to use this feature.

Figure B-18. Wake-On-LAN Header (JWOL)

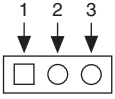


Table B-8. Wake-On-LAN Signals

Pin	Signal Description
1	+5 V Standby
2	Ground
3	Wakeup

Front USB Connectors: USB2/3 and USB10/11

Two Universal Serial Bus ports (USB0/1) are on the I/O back panel. In addition, four USB ports (USB2/3 and USB10/11) are at J13 and J14 on the motherboard. You can use these ports to provide front chassis USB access (cables not included).

Figure B-19. Front USB Connectors (USB 2/3 and USB 10/11)

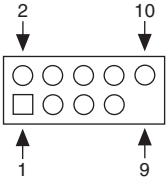


Table B-9. Front USB Connector Signals

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

Wake-On-Ring Header: JWOR

JWOR is the Wake-On-Ring header. Wake-On-Ring allows your computer to wake up when receiving an incoming call to the modem when in the suspend state. You must have a Wake-On-Ring card and cable to use this feature.

Figure B-20. Wake-On-Ring Header (JWOR)



Table B-10. Wake-On-Ring Header Signals

Pin	Signal Description
1	GND
2	Wakeup

Alarm Reset Header: JAR

If three power supplies are installed and Alarm Reset (JAR) is connected, the system notifies you when any of the three power modules fail. Connect JAR to a microswitch to turn off the alarm that is activated when a power module fails.

Figure B-21. Alarm Reset (JAR)



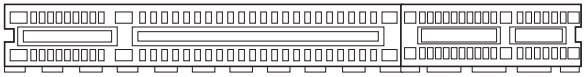
Table B-11. Alarm Reset Signals

Pin	Signal Description
1	Ground
2	+5V

PCI Express Slot

This slot is PCI Express Specification v2.0 compliant.

Figure B-22. PCI Express Slot



Upgrading Memory

The mainboard includes six 240-pin ECC DDR-III SDRAM slots with maximum memory size of 16 GB.

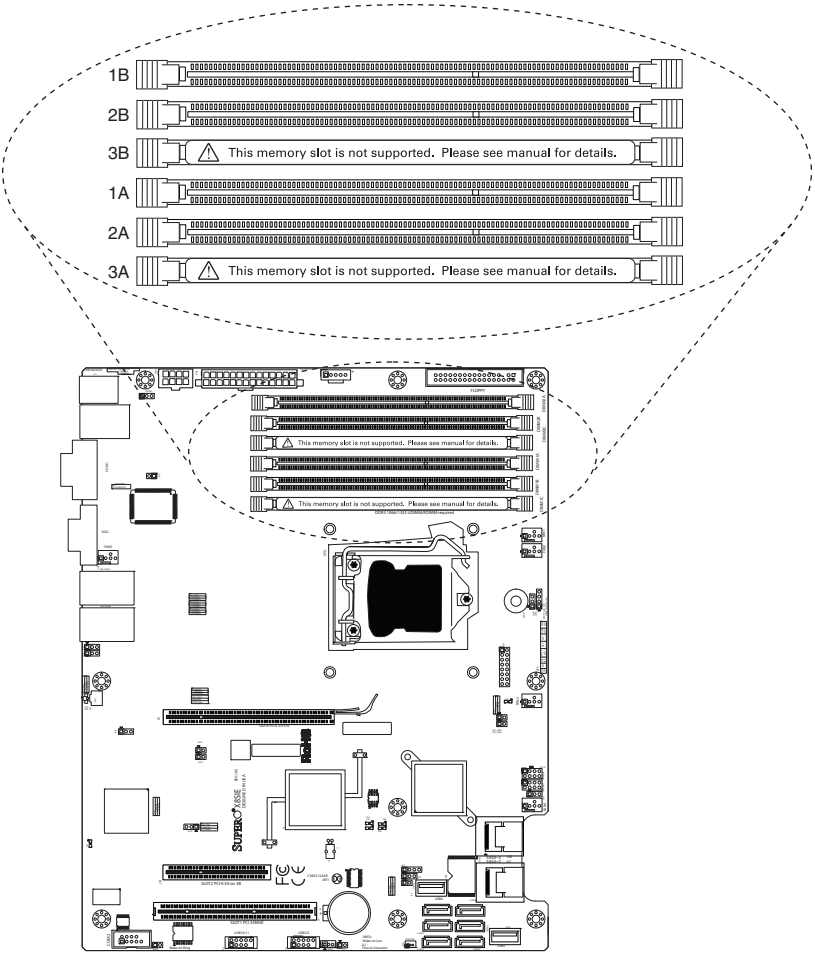
Figure B-23 shows the DIMM location on the main board. Slot 1, channel B is on the top; slot 3, channel A is on the bottom.

Note Slots 3A and 3B shown in Figure B-23 are not officially supported, because the processor (Intel i7 860) in this product supports only two channels of memory.

Memory upgrades are available from National Instruments under the following orderable part numbers:

- **781653-01**—1 × 2 GB DDR3 RAM for NI RMC-8354 (1 × 2 GB DIMM)
- **781654-01**—1 × 4 GB DDR3 RAM for NI RMC-8354 (1 × 4 GB DIMM)

Figure B-23. DIMM Location



Memory Support

The NI RMC-8354 supports up to 16 GB of DDR3 ECC UDIMM (1333 MHz in 4 DIMM slots). Populating these DIMM modules with a pair of memory modules of the same type and size results in interleaved memory, which improves memory performance. Refer to the following table for DIMM module support guidelines.

Table B-12. DDR3 ECC/Unbuffered (UDIMM) Memory Support

ECC UDIMM	1 GB (x4 DRAM)	2 GB (x4 DRAM)
Single rank	Up to 4 GB (4 × 1 GB DIMM modules)	Up to 8 GB (4 × 2 GB DIMM modules)
Dual rank	Up to 8 GB (4 × 2 GB DIMM modules)	Up to 16 GB (4 × 4 GB DIMM modules)
Quad rank	Not supported	Not supported

Note For ECC UDIMMs, populate only slots 1A, 2A, 1B, and 2B. Refer to Figure B-23 for slot and channel locations.

Memory Population Guidelines

Refer to the following table when populating the NI RMC-8354.

Table B-13. DDR3 ECC UDIMM Memory

DIMM Slots per Channel	DIMMs Populated per Channel	DIMM Type	POR Speeds	Ranks per DIMM (Any Combination)
2	1	Unbuffered DDR3 ECC	1066 and 1333	Single rank, dual rank
2	2	Unbuffered DDR3 ECC	1066 and 1333	Single rank, dual rank

Note For ECC UDIMMs, populate only slot 1 and/or slot 2 per channel. Refer to Figure B-23 for slot and channel locations.

Note Due to memory allocation to system devices, the amount of memory that remains for operational use is reduced when you use 4 GB of RAM. The reduction in memory availability is disproportional.

For Microsoft Windows users, Microsoft implemented a design change in Windows XP with Service Pack 2 (SP2) and Windows Vista. This change is specific to the Physical Address Extension (PAE) mode behavior, which improves driver

compatibility. For more information, refer to the Microsoft knowledgebase article at `http://support.microsoft.com/kb/888137`.

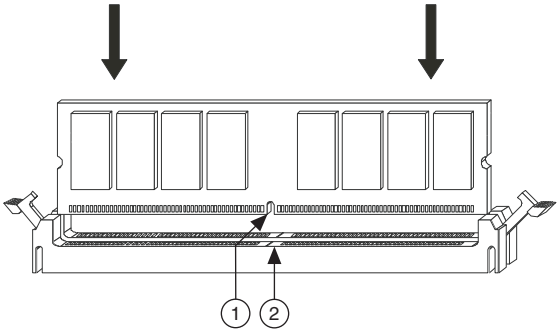
Table B-14. Possible System Memory Allocation and Availability

System Device	Size	Physical Memory Available (4 GB Total System Memory)
Firmware hub flash memory (system BIOS)	1 MB	3.99
Local APIC	4 KB	3.99
Area reserved for the chipset	2 MB	3.99
I/O APIC (4 KB)	4 KB	3.99
PCI enumeration area 1	256 MB	3.76
PCI Express (256 MB)	256 MB	3.51
PCI enumeration area 2 (if needed) (aligned on 256 MB boundary)	512 MB	3.01
VGA memory	16 MB	2.85
TSEG	1 MB	2.84
Memory available to OS and other applications	—	2.84

Installing DDR Modules

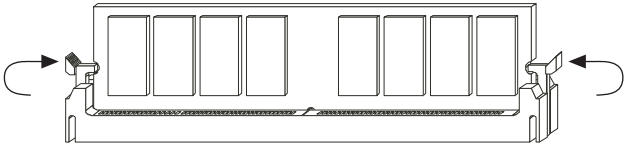
Follow these steps to install DDR modules:

1. Press the cover release buttons on the top of the NI RMC-8354.
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 RMC-8354 cover by sliding the cover forward. Make sure the safety lock fits firmly.

Removing DDR Modules

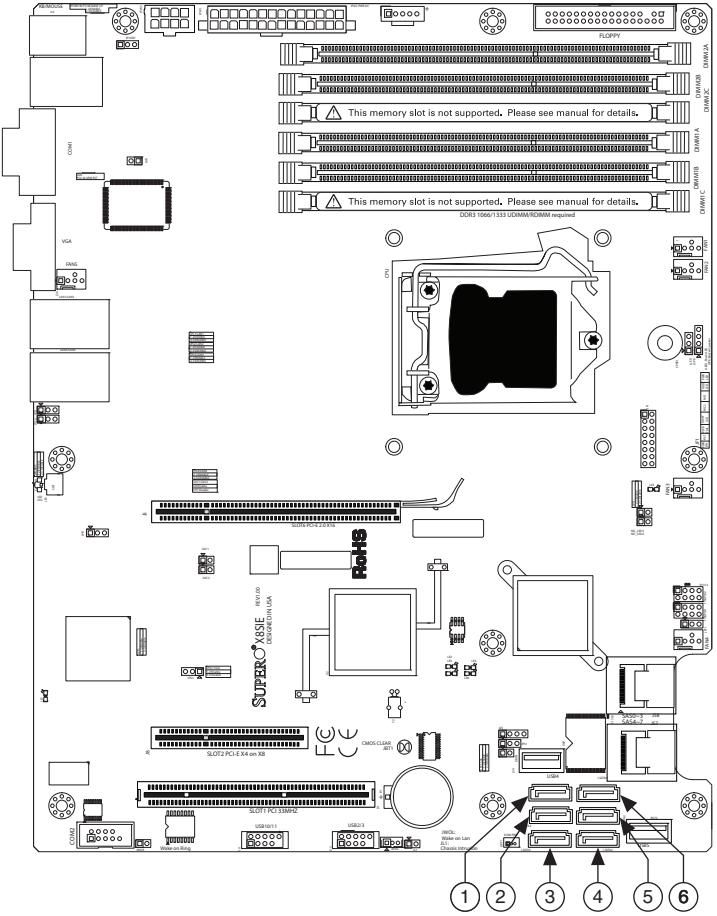
Follow these steps to remove DDR modules:

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-24 shows the NI RMC-8354 SATA connector locations.

Figure B-24. NI RMC-8354 SATA Connectors



1	SATA1	2	SATA3	3	SATA5	4	SATA4	5	SATA2	6	SATA0

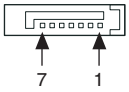
I-SATA Connectors: I-SATA0–I-SATA5

The ICH10R south bridge supports six Serial ATA connectors (I-SATA0–I-SATA5).

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-25 shows the I-SATA0–I-SATA5 connector.

Figure B-25. I-SATA0–I-SATA5 Connector



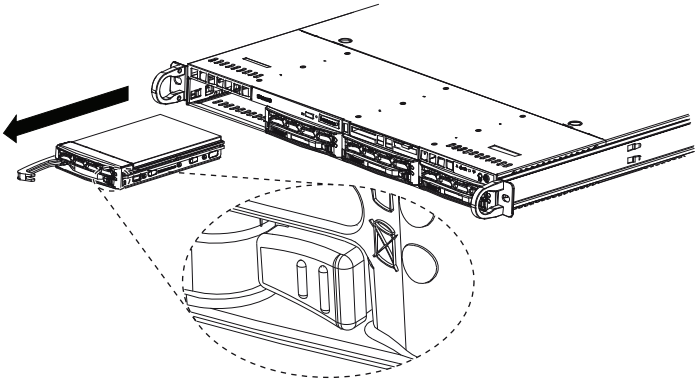
Hard Disk Installation

Caution Before removing or installing a hard disk drive, be sure the NI RMC-8354 is powered off and not connected to AC power.

Follow these steps to install a hard disk drive:

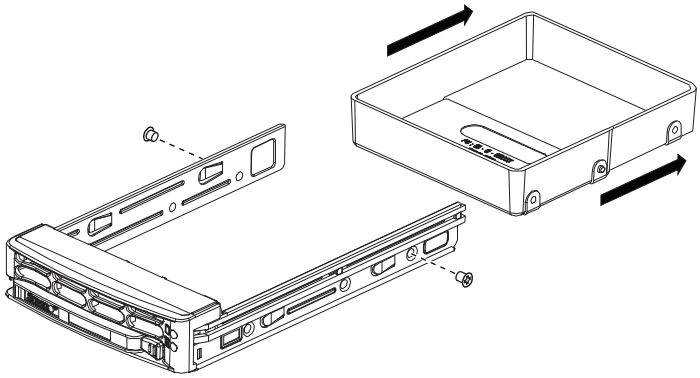
1. Press the release tab to release the SCA drive tray from its locking position.
2. Pull the SCA drive tray out from the chassis, as shown in Figure B-26.

Figure B-26. Removing SCA Drive Tray



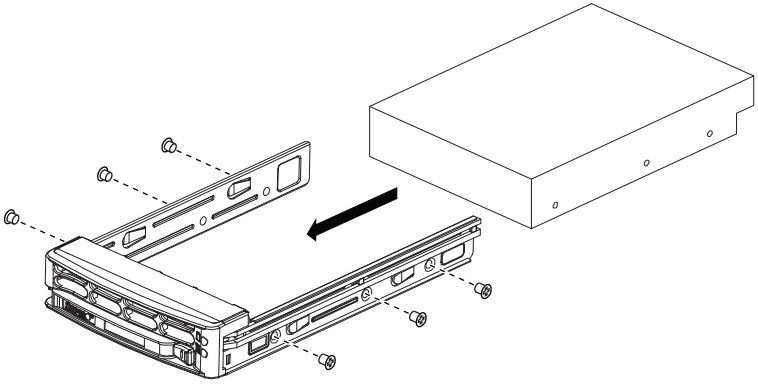
3. Remove the two screws that attach to the sides of the dummy tray. Remove the tray, as shown in Figure B-27.

Figure B-27. Removing Dummy Tray



4. Slide a hard disk drive into the SCA drive tray. Secure the drive to the tray with three screws on each side of the tray, as shown in Figure B-28.

Figure B-28. Sliding Hard Disk Drive into SCA Drive Tray



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

Installing a PCI Express Expansion Card

Follow these steps to install a PCI Express expansion card:

1. Locate the riser card bracket already installed in the NI RMC-8354 chassis.
2. Unscrew and lift the bracket from the chassis. (Depending on the PCI Express card size, removing the bracket may not be necessary to install a PCI Express expansion card.)
3. Remove the PCI slot filler bracket from the chassis.
4. Insert the PCI Express expansion card into the PCI Express slot on the riser card bracket.
5. Align the riser card bracket with the PCI Express slot on the chassis. (This may require "wiggling" the bracket to fit the bottom edge into the slot on the chassis.) If the bracket was removed from the chassis, carefully push down the bracket with even force on both sides until it is firmly seated in the slot.
6. Secure the PCI Express card bracket by closing the locking tab mechanism on the chassis.

C

Intel SATA RAID Utility for Intel ICH10R

This appendix describes the Intel SATA RAID utility for Intel ICH10R.

Intel RAID Configuration Utility

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

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

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

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

Note The shipping default RAID mode is RAID 5.

Intel HostRAID Configurations

The following types of Intel HostRAID configurations are supported:

- **RAID0 (Data Striping)**—RAID0 writes data in parallel, interleaved (“striped”) sections between two hard drives. RAID0 doubles the data transfer rate (over a single hard drive) to enhance system performance. To use RAID0, two or more hard drive disks are required.
- **RAID1 (Data Mirroring)**—Use RAID1 to copy identical data from one disk drive to another. By doing so, a “mirror” of source data is created to enhance data security. To use RAID1, two or more hard drive disks are required, and the second drive must be the same size or larger than the first drive.
- **RAID10 (Striping and Mirroring)**—RAID0 and RAID1 modes are combined (without parity information) to maximize system performance and data security. To use RAID10, four or more hard drive disks are required.
- **RAID5**—Both data and parity information are striped and mirrored across three or more hard drives. To use RAID 5, three or more hard drive disks are required.

Configuring the AMI BIOS for SATA RAID Settings

Note Press <Del> during system bootup to enter the BIOS Setup Utility.

Follow these steps to configure the AMI BIOS for SATA RAID settings:

1. Use the arrow keys to select the **Advanced** menu from the menu bar and press <Enter> to enter the **Advanced** menu.
2. In the **Advanced** menu, scroll down to **IDE/SATA Configuration** and press <Enter> to enter the **IDE/SATA Configuration** submenu.
3. Once in the **IDE/SATA Configuration** submenu, scroll down to **Configure SATA#1 as** and press <Enter>. The Options window displays.
4. From the Options window, select **RAID** and press <Enter>.
5. Press <Esc> to return to the previous menu. Use the arrow keys to select **Exit** from the menu bar at the top and press <Enter> to enter the **Exit** submenu.
6. From the **Exit** submenu, select **Save Changes and Exit** and press <Enter> to save the changes and exit the BIOS. The system reboots.
7. After the system exits from the BIOS Setup Utility, the system automatically reboots. When the system is rebooting, press <Ctrl> and <I> simultaneously to enter the Intel HostRAID utility.

Creating a RAID0 Volume

Follow these steps to create a RAID0 volume:

1. Select **Create RAID Volume** from the main menu and press <Enter>.
2. Specify a name for the RAID0 set and press <Tab> or <Enter> to go to the next field. (To select the previous menu, press <Esc>.)
3. When **RAID Level** is highlighted, use the up and down arrow keys to select **RAID0 (Stripe)** and press <Enter>.
4. When **Disks** is highlighted, press <Enter> to select the HDD to configure for RAID.
5. Use the up and down arrow keys to highlight a drive and press the space bar to select it. A triangle appears to confirm the drive selection.
6. When **Stripe Size** is highlighted, use the up and down arrow keys to select the stripe size for your RAID0 and press <Enter>.

Note Stripe size is 4–128 KB for RAID0. For a server, use a lower stripe size; for a multimedia system, use a higher stripe size. The default stripe size is 128 KB.

7. Press <Enter> when the **Create Volume** item is highlighted. A warning message displays, indicating that all data on the selected disks will be lost.
8. At the **`Are you sure you want to create this volume (Y/N)`** prompt, press <Y> to create the RAID volume or <N> to return to the **Create Volume** menu.

Creating a RAID1 Volume

Follow these steps to create a RAID1 volume:

1. Select **Create RAID Volume** from the main menu and press <Enter>.
2. Specify a name for the RAID1 set and press <Tab> or <Enter> to go to the next field. (To select the previous menu, press <Esc>.)
3. When **RAID Level** is highlighted, use the up and down arrow keys to select **RAID1 (Mirror)** and press <Enter>.
4. When **Disks** is highlighted, press <Enter> to select the HDD to configure for RAID.
5. Use the up and down arrow keys to highlight a drive and press the space bar to select it. A triangle appears to confirm the drive selection.
6. When **Capacity** is highlighted, press <Enter> to specify the disk capacity to configure for RAID1.
7. Press <Enter> when **Create Volume** is highlighted. A warning message displays, indicating that all data on the selected disks will be lost.
8. At the **`Are you sure you want to create this volume (Y/N)`** prompt, press <Y> to create the RAID volume or <N> to return to the **Create Volume** menu.

Creating a RAID10 (RAID1+ RAID0) Volume

Follow these steps to create a RAID10 (RAID1 + RAID0) volume:

1. Select **Create RAID Volume** from the main menu and press <Enter>. The Create Volume Menu screen appears.
2. Specify a name for the RAID10 set and press <Enter>.
3. When **RAID Level** is highlighted, use the up and down arrow keys to select **RAID10 (RAID1 + RAID0)** and press <Enter>.
4. When **Disk** is highlighted, press <Enter> to select the HDD to configure as RAID.
5. On the pop-up screen, use the up and down arrow keys to highlight a drive and press the space bar to select it. A triangle appears to confirm the drive selection.
6. When **Stripe Size** is highlighted, use the up and down arrow keys to select the stripe size of 4-128 KB for your RAID10 and press <Enter>. The default setting is 64 KB.



Note For a server, use a lower stripe size; for a multimedia system, use a higher stripe size.

7. When **RAID Capacity** is highlighted, enter your RAID volume capacity and press <Enter>. The default setting is the maximum capacity allowed.
8. Press <Enter> when the **Create Volume** item is highlighted. A warning message displays, indicating that all data on the selected disks will be lost.
9. At the **`Are you sure you want to create this volume (Y/N)`** prompt, press <Y> to create the RAID volume or <N> to return to the **Create Volume** menu.

Creating a RAID5 Set (Parity)

Follow these steps to create a RAID5 set:

1. Select **Create RAID Volume** from the main menu and press <Enter>. The **Create Volume** menu screen appears.
2. Specify a name for the RAID5 set and press <Enter>.
3. When **RAID Level** is highlighted, use the up and down arrow keys to select **RAID5 (Parity)** and press <Enter>.
4. When **Disk** is highlighted, press <Enter> to select the HDD to configure as RAID.
5. On the pop-up screen, use the up and down arrow keys to highlight a drive and press the space bar to select it. A triangle appears to confirm the selection.
6. Use the up and down arrow keys to select the stripe size of 4-128 KB for RAID5 and press <Enter>.



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

7. Enter your desired RAID capacity and press <Enter> when the capacity item is highlighted. The default setting is the maximum capacity allowed.
8. Press <Enter> when **Create Volume** is highlighted. A warning message displays, indicating that all data on the selected disks will be lost.
9. At the **`Are you sure you want to create this volume (Y/N)`** prompt, press <Y> to create the RAID volume or <N> to return to the **Create Volume** menu.

Recovery

Use this feature to create the recovery volume by copying data from a designated master drive to a designated recovery drive.



Note A recovery drive is a backup drive to store data copied from the original (master) drive. A master drive is the original drive containing the source files to be copied to the recovery drive.

Follow these steps to create a recovery drive:

1. Select **Create RAID Volume** from the main menu and press <Enter>. The Create Volume Menu screen appears.
2. Specify a name for the recovery disk drive and press <Enter>.
3. When **RAID Level** is highlighted, use the up and down arrow keys to select **Recovery** and press <Enter>.
4. When **Select Disks** is highlighted, press <Enter> to select the HDD to create the recovery volume.

5. On the **Select Disks** screen, use the up and down arrow keys to select a drive to use as your master drive and press <Tab> to configure it as your master drive. Use the arrow keys to select your recovery drive and press the space bar to configure it. Press <Enter> to complete the disk selection.
6. When **RAID Capacity** is highlighted, enter your RAID volume capacity and press <Enter>. The default setting is the maximum capacity allowed.
7. When **Sync** is highlighted, use the up and down arrow keys to select the **Continuous** or **On Request** update policy. If you select **Continuous**, data on the master drive is copied to the recovery drive automatically as long as both drives are connected to the system. If you select **On Request**, data on the master drive is copied to the recovery drive when you request it.
8. Press <Enter> when the **Create Volume** item is highlighted. A warning message displays, indicating that all data on the selected disks will be lost.
9. At the **`Are you sure you want to create this volume (Y/N)`** prompt, press <Y> to create the RAID volume or <N> to return to the **Create Volume** menu without making changes.

Deleting a RAID Volume



Caution Be sure to back up your data before deleting a RAID set. You will lose all data on the drives when deleting a RAID set. You also will lose the recovery image.

Follow these steps to delete a RAID volume:

1. From the main menu, select **Delete RAID Volume** and press <Enter>.
2. Use the up and down arrow keys to select the RAID set to delete and press <Del>. A warning message displays.
3. At the **`Are you sure you want to delete this volume (Y/N)`** prompt, press <Y> to delete the RAID volume or <N> to return to the **Delete Volume** menu.

Resetting to Non-RAID



Caution Be careful when you reset a RAID volume HDD to a non-RAID HDD. Resetting a RAID HDD or RAID volume reformats the disk drive and deletes the internal RAID structure and contents.

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

1. From the main menu, select **Reset Disks to Non-RAID** and press <Enter>.
2. Use the up and down arrow keys to highlight the RAID set drive to reset and press the space bar to select it.
3. Press <Enter> to reset the RAID set drive. A warning message displays.
4. Press <Y> to reset the drive or <N> to return to the main menu.

Recovery Volume Options

Caution A recovery drive is a backup drive to store data copied from the original (master) drive. A master drive is the original drive containing the source files to be copied to the recovery drive.

Follow these steps to select a recovery volume option:

1. From the main menu, select **Recovery Volume Options**.
2. When **Recovery Volume Options** is highlighted, press <Enter>.
3. To boot from a recovery disk only, select **Enable Only Recovery Disk** and press <Enter>.

Caution If a recovery disk is available, its RAID volume recovery support is enabled, and the master disk is disabled.

4. To boot from the master disk that contains the original data sources only, select **Enable Only Master Disk** and press <Enter>.

Caution If a master disk is available, its RAID volume recovery support is enabled, and the recovery disk is disabled. Any change in steps 3 or 4 stops automatic synchronization between the master and recovery drives.

5. Press <Esc> to return to the main menu.

Exiting the Intel Matrix Storage Manager Utility

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

1. From the main menu, select **Exit** and press <Enter>.
2. A warning message appears. At the prompt, press <Y> to delete the drive or <N> to return to the main menu.

D

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Glossary

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

Symbols

°	Degrees
W	Ohms
%	Percent

A

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

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

B

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

C

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

D

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

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

E

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

F

FCC	Federal Communications Commission.

G

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

H

HDD	Hard Disk Drive.
Hz	Hertz; cycles per second.

I

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

K

KB	Kilobytes of memory.

L

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

M

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

N

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

P

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

R

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

S

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

U

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

V

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

W

W	Watts.
WDT	Watchdog Timer.

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