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INSTALLATION GUIDE
NI RMC-8354

This guide includes installation information for the NI RMC-8354. For more information about configuring, using, and maintaining the NI RMC-8354, refer to the *NI RMC-8354 User Manual*. You can download the user manual in PDF format at `ni.com/manuals`.

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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

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 for a list of AC power cables)

Table 1. AC Power Cables

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

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

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

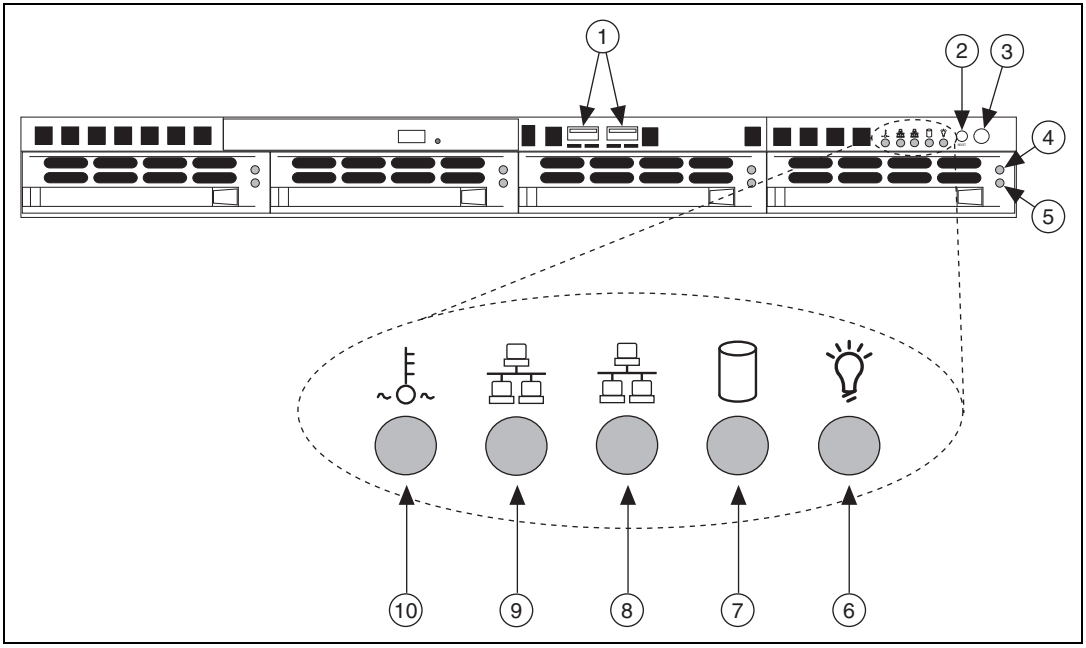
- Power indicator
- LAN status indicators
- HDD indicator
- System temp (overheat) and fan (fail) warning indicator

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 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*, in the *NI RMC-8354 User Manual*.



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

Figure 1. Front View of the NI RMC-8354

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.

Rack Mount Kit

A rack mount kit is included for mounting the NI RMC-8354 chassis into a 26 in. instrument cabinet.

Note If your cabinet is less than 26 in. deep, refer to KnowledgeBase 4GCEKKMT at `ni.com/support` for rack mount modification.

USB Floppy Disk Drive

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

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.

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.

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 on a bench or in an instrument rack. Determine how you want to use the NI RMC-8354 and 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*, in the *NI RMC-8354 User Manual*.

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 on a bench top or in an instrument rack so that the fans (air outlets) and the air inlet apertures along the top and front of the chassis have adequate ventilation. Keep other equipment a minimum of 76.2 mm (3 in.) away from the air outlets on the rear of the chassis.

Installation

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

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*, in the *NI RMC-8354 User Manual* 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*, in the *NI RMC-8354 User Manual*.

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.

Rack Mounting

Note The rack mount kit provided with the NI RMC-8354 is intended to work with racks that are 26–33 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.

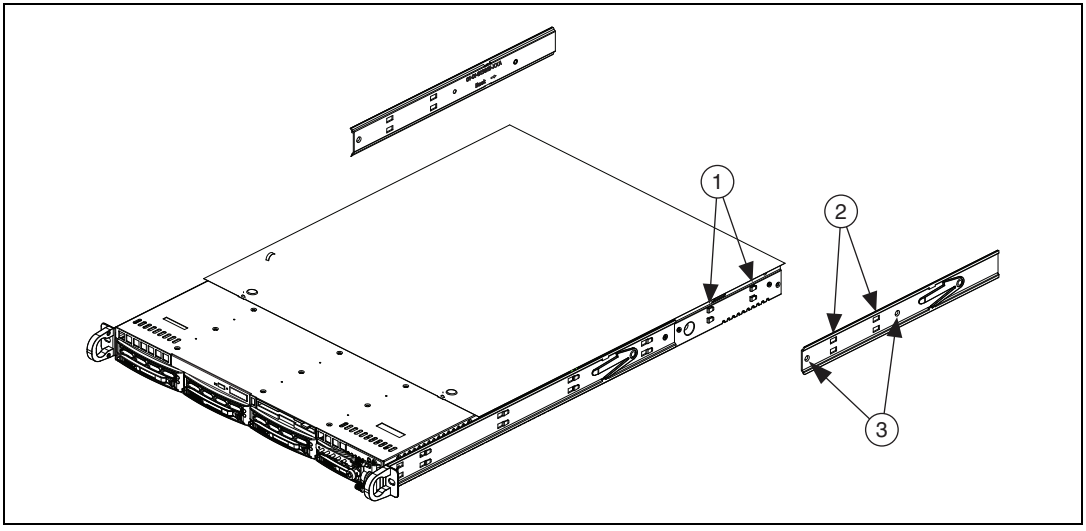
Note One pair of short brackets includes screw threads, and the other two pairs have slots. If the short brackets are required for your specific rack mounting configuration, use the pair(s) that fits into your rack best.

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 RMC-8354.

Installing the Inner Slides

Follow these steps to install the inner slides to the 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.
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.



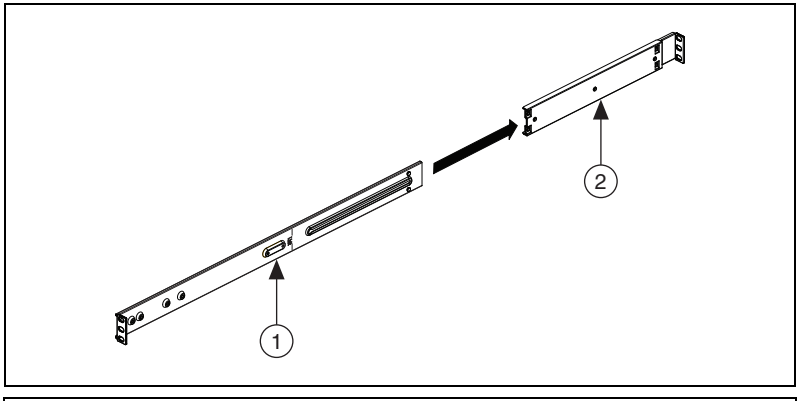
1 Hooks on Chassis	2 Square Holes on Right Inner Slide	3 Holes for M4 Screws

Figure 2. Installing Inner Slides

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 3.
3. Adjust the outer slide assembly to the proper distance so that the chassis fits snugly into the rack.
4. Repeat steps 1–3 for the left outer slide.

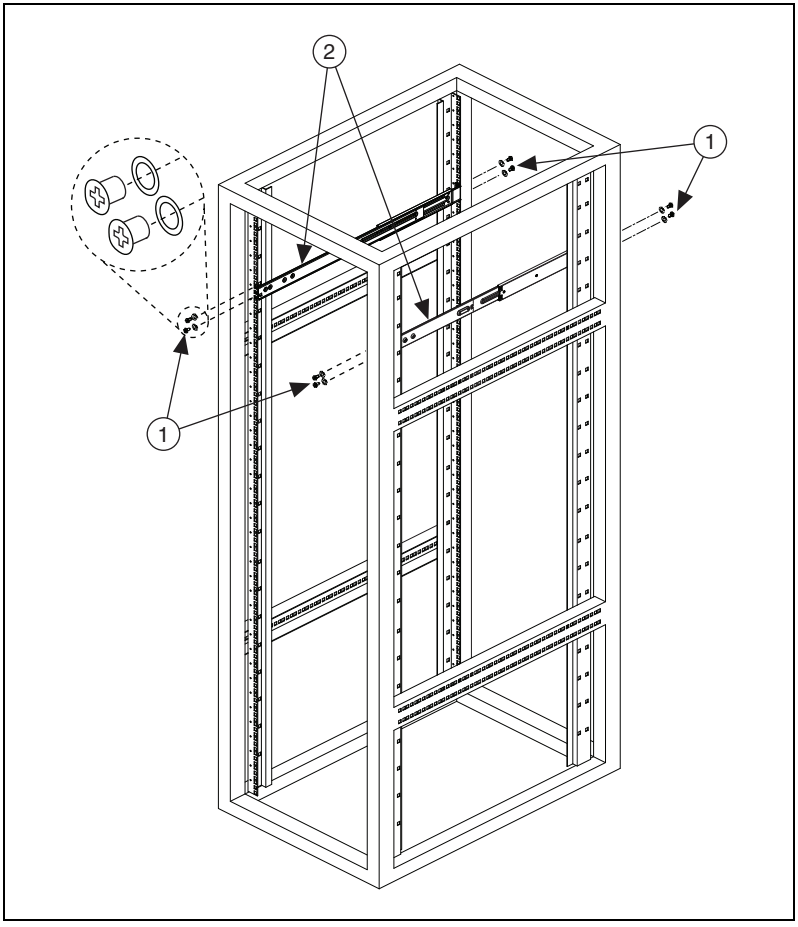


1	Outer Slide	2	Long Bracket

Figure 3. Assembling Outer Slide Assemblies

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 4.



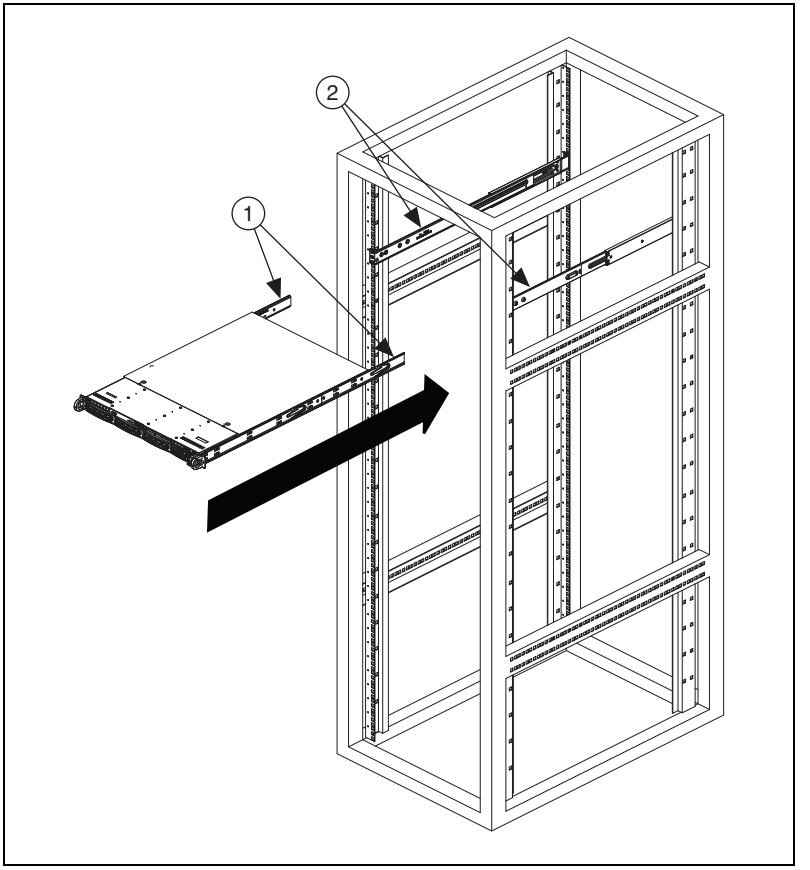
1	M5 Screws and Washers	2	Slide Assemblies

Figure 4. Installing Slide Assemblies into Rack

Installing the Chassis into the Rack

Follow these steps to install the chassis in the rack:

1. Push the inner slides, attached to the chassis, into the grooves of the outer slide assemblies installed in the rack, as shown in Figure 5.



1	Inner Slides	2	Grooves of Outer Slide Assemblies

Figure 5. Installing Inner Slides into Outer Slides

2. Push the chassis all the way to the back of the outer slide assemblies, as shown in Figure 6.

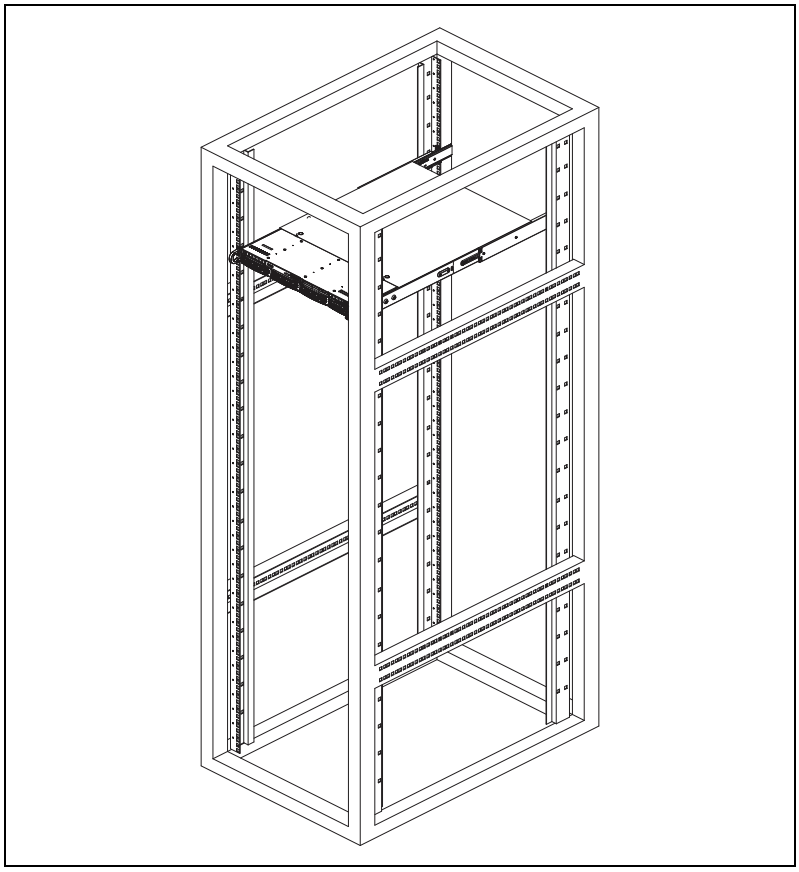


Figure 6. Installing Chassis Into Rack

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

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

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

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

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

Specifications

This section lists the NI RMC-8354 electrical, mechanical, and environmental specifications.

Electrical

AC Input

Input voltage range..... 100–240 VAC

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

Input frequency ..... 50/60 Hz

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

Input current rating..... 5 A max

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

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

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

[1] Operating range is guaranteed by design.

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
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

Installation Category..... II

Pollution Degree 2

Altitude..... 2,000 m

Operating location..... Indoor use only

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

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

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)

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

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

Waste Electrical and Electronic Equipment (WEEE)



EU Customers At the end of 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



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`.)

Where to Go for Support

The National Instruments Web site is your complete resource for technical support. At `ni.com/support` you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

National Instruments corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. National Instruments also has offices located around the world to help address your support needs. For telephone support in the United States, create your service request at `ni.com/support` and follow the calling instructions or dial 512 795 8248. For telephone support outside the United States, contact your local branch office:

Australia 1800 300 800, Austria 43 662 457990-0,
Belgium 32 (0) 2 757 0020, Brazil 55 11 3262 3599,
Canada 800 433 3488, China 86 21 5050 9800,
Czech Republic 420 224 235 774, Denmark 45 45 76 26 00,
Finland 358 (0) 9 725 72511, France 01 57 66 24 24,
Germany 49 89 7413130, India 91 80 41190000, Israel 972 3 6393737,
Italy 39 02 41309277, Japan 0120-527196, Korea 82 02 3451 3400,
Lebanon 961 (0) 1 33 28 28, Malaysia 1800 887710,
Mexico 01 800 010 0793, Netherlands 31 (0) 348 433 466,
New Zealand 0800 553 322, Norway 47 (0) 66 90 76 60,
Poland 48 22 328 90 10, Portugal 351 210 311 210,
Russia 7 495 783 6851, Singapore 1800 226 5886,
Slovenia 386 3 425 42 00, South Africa 27 0 11 805 8197,
Spain 34 91 640 0085, Sweden 46 (0) 8 587 895 00,
Switzerland 41 56 2005151, Taiwan 886 02 2377 2222,
Thailand 662 278 6777, Turkey 90 212 279 3031,
United Kingdom 44 (0) 1635 523545

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