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INSTALLATION GUIDE

RMC-8356

This guide includes installation information for the RMC-8356. For more information about configuring, using, and maintaining the RMC-8356, refer to the *RMC-8356 User Manual*. You can download the user manual in PDF format at `ni.com/manuals`.

Contents

NATIONAL INSTRUMENTS

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*

Unpacking

Carefully inspect the shipping container and the RMC-8356 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 RMC-8356 kit contains the following items:

☐ RMC-8356 rack mount controller

☐ *RMC-8356 User Manual*

☐ Windows recovery USB (optional)

☐ Rack mount kit

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

☐ DisplayPort to VGA adapter

Note Onboard VGA is disabled by default. Use the included DisplayPort to VGA adapter to use a VGA monitor.

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 RMC-8356 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 Xeon E3-1275-V5 3.6 GHz, 80 W

Chipset

- Intel C236 chipset

Memory

- 16 GB UDIMM Non-ECC DDR4 memory standard (1 ×16 GB)
- Maximum memory supported: 64 GB Unregistered Non-ECC DDR4-2133 MHz in 4 DIMM sockets.

Slots

- 1 x PCI Express 3.0 x16 slot

Video

- Aspeed AST2400 BMC (max resolution 1280 × 1024)

Note Disabled by default.

- Intel HD P530 Graphics, 2 × Display Port, 1 × DVI

HDD

- 1 x 1 TB SATA3 hard drive JBOD

Onboard LAN

- 1 x Intel PHY i219LM Gigabit Ethernet controller
- 1 x Intel I210-AT

Onboard I/O

- 1 x Front Serial port
- 1 x VGA port

Note Disabled by default.

- 2 x Display Port
- 1 x DVI
- 2 x USB 2.0 ports (rear)
- 2 x USB 3.0 ports (rear)
- 2 x USB 3.0 ports (front)
- 2 x RJ-45 ports

Power Supply

- 350 W AC power supply w/ PFC

Fan

- Internal 4 x 4 cm Fans

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

Front Panel LEDs

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

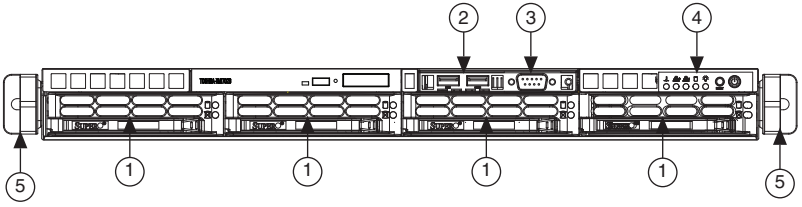
System Management

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

RMC-8356 Description

Figure 1 shows the key features of the RMC-8356 front panel. For detailed information about the RMC-8356 rear panel, refer to Chapter 3, *I/O Information*, in the *RMC-8356 User Manual*.

Figure 1. Front View of the RMC-8356



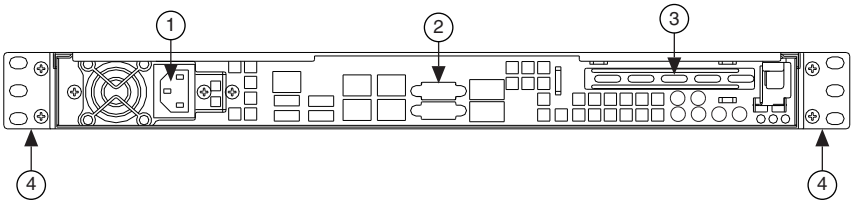
1	SATA HDD	4	Control Panel
2	USB Ports	5	Rack Ear Brackets
3	COM Port		

The front of the chassis includes the following features:

- **SATA HDD**—Hot-swap 3.5” SATA hard disk drive.
- **USB Ports**—Two front-access USB 3.0 ports.

- **COM Port**—Front-access COM (Serial) port.
- **Control Panel**—Front control panel with LEDs and buttons.
- **Rack Ear Brackets**—Attaches server chassis to the rack.

Figure 2. Rear View of the RMC-8356

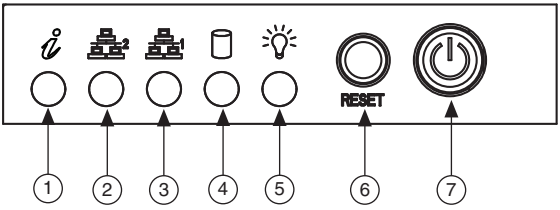


1	Power Supply	3	Expansion Card Slot
2	I/O Back Panel	4	Rack Ear Brackets

The rear of the chassis includes the following features:

- **Power Supply**—350 W Platinum Level Power Supply.
- **I/O Back Panel**—Rear I/O ports.
- **Expansion Card Slot**—Slot for one expansion card (requires pre-installed riser card).
- **Rack Ear Brackets**—Attaches server chassis to the rack.

Figure 3. Control Panel Features



1	Overheat/Fan Fail LED	5	Power LED
2	NIC2 LED	6	Reset Button
3	NIC1 LED	7	Power Button
4	HDD LED		

The control panel includes the following LEDs:

- **Overheat/Fan Fail LED**—Flash indicates a fan failure. Solid indicates overheat condition.
- **NIC2 LED**—Flash when there is activity on LAN port 2.
- **NIC1 LED**—Flash when there is activity on LAN port 1.
- **HDD LED**—Flash when there is hard drive activity.
- **Power LED**—Solid when system is operating.

- **Reset Button**—Reboots the system.
- **Power Button**—Removes the main power but maintains standby power. To perform many maintenance tasks, you must also unplug system before servicing.

Upgrade/Optional Equipment

Memory Upgrades

National Instruments has tested and verified that the DDR-4 UDIMMs we offer work with the RMC-8356. We recommend you purchase your DDR-4 UDIMM modules from National Instruments. Other off-the-shelf DDR-4 UDIMM modules are not guaranteed to work properly.

Upgrade Options

Table 2 lists upgrade options available for the RMC-8356.

Table 2. RMC-8356 Upgrade Options

Orderable P/N	Description
785651-01	Spare 1 TB HDD
785652-01	Spare 16 GB DDR4 memory module

RMC-8356 Overview

The RMC-8356 is a 1U PC-based controller for remote control of PXI chassis. The controller provides leading-edge processing power with Intel Xeon E3-1275-V5 processors, high disk bandwidth with RAID support, high I/O bandwidth with a PCI Express 3.0 x16, dedicated Intel Graphics w/ DP, and up to 64 GB of UDIMM Non-ECC memory.

Safety Information

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

Caution To prevent damage, you must employ industry-standard ESD prevention measures during installation, maintenance, and operation.

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 There is a danger of explosion if the onboard battery is installed upside down (which reverses its polarities). This battery must be replaced only with the same or an equivalent type recommended by the manufacturer (CR2032).

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

- **Chassis Grounding**—The RMC-8356 requires a connection from the premise wire safety ground to the RMC-8356 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.
- **Mechanical Loading**—To avoid a hazardous load condition, be sure the mechanical load is even when rack mounting the equipment.
- **Live Circuits**—Operating personnel and service personnel must *not* remove protective covers when operating or servicing the RMC-8356. 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 RMC-8356 from its original condition. Unsuitable modifications may result in safety hazards.

Chassis Cooling Considerations

The RMC-8356 is designed to operate on a bench or in an instrument rack. Determine how you want to use the RMC-8356 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 *RMC-8356 User Manual*.

Providing Adequate Clearance

Apertures in the front and rear of the chassis facilitate power supply and motherboard cooling. Air enters through the front of the chassis and exits through the fans on the rear of the chassis. Place the RMC-8356 on a bench top or in an instrument rack so that the fans (air outlets) and the air inlet apertures in the front and rear 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 RMC-8356:

1. Connect a keyboard and mouse to the appropriate connectors on the RMC-8356 rear panel.
2. Connect the DisplayPort or DVI monitor video cable to the corresponding DisplayPort or DVI connector on the rear panel.
3. Connect the USB and serial devices as necessary to the RMC-8356 front and rear panel ports.

Caution To minimize shock hazard, make sure the electrical power outlet you use to power the RMC-8356 has an appropriate earth safety ground. Refer to the *Connecting Safety Ground* section for more information.

4. 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.
5. Power on the RMC-8356.
6. Verify that the RMC-8356 boots. If it does not boot, refer to the *What if the RMC-8356 does not boot?* section of Chapter 5, *Troubleshooting*, in the *RMC-8356 User Manual*.

Connecting Safety Ground

The RMC-8356 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

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

Installing the Rails

There are a variety of rack units on the market, which may require a slightly different assembly procedure.

The following is a basic guideline for installing the system into a rack with the rack mounting hardware provided. You should also refer to the installation instructions that came with the specific rack you are using.

Identifying the Rails

The rack rails and the related hardware should have been included with the system. Refer to Figure 4 to identify the rail sections.

Note The two rails are left/right specific.

Installing the Chassis Rails

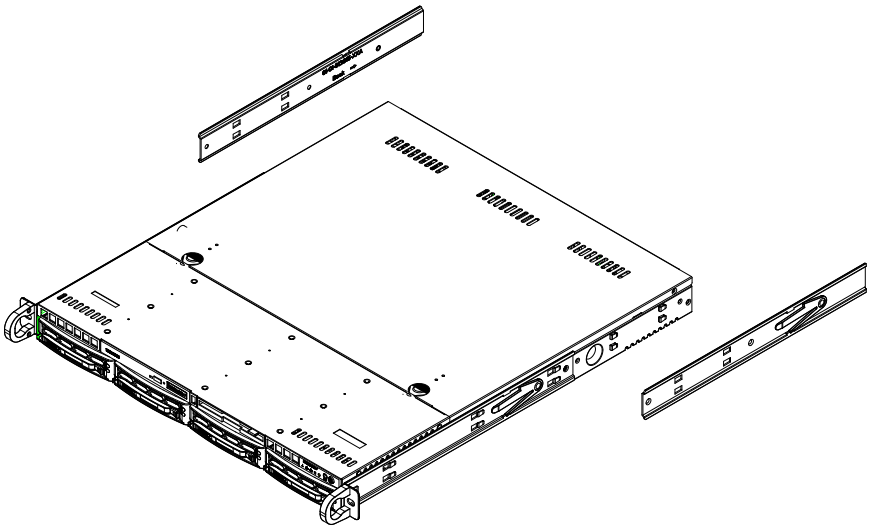
Begin the rack mounting procedure by installing the inner rails to the server chassis.

1. Position the front and rear chassis rail sections along the side of the server making sure the screw holes line up. Note that these two rails are left/right specific.
2. Screw the front chassis rail (the long piece) securely to the side of the chassis. There should be two screws for each side. Repeat this procedure for the other rail on the opposite side of the chassis.
3. Attach the two rear chassis rails to the chassis in the same manner, again keeping in mind that the rails are left/right specific. You will also need to attach the rail brackets when installing into a Telco rack.

Caution Slide rail mounted equipment is not to be used as a shelf or a work space.

Caution Do not pick up the server with the front handles. They are designed to pull the system from a rack only.

Figure 4. Installing the Rear Inner Rails



Installing the Rack Rails

Determine where you want to place the server in the rack. Note that servers should always be installed at the bottom of a rack first for stability reasons.

1. Position the chassis rail guides at the desired location in the rack, keeping the sliding rail guide facing the inside of the rack.
2. Screw the assembly securely to the rack using the brackets provided.
3. Attach the other assembly to the other side of the rack, making sure that both are at the exact same height and with the rail guides facing inward.

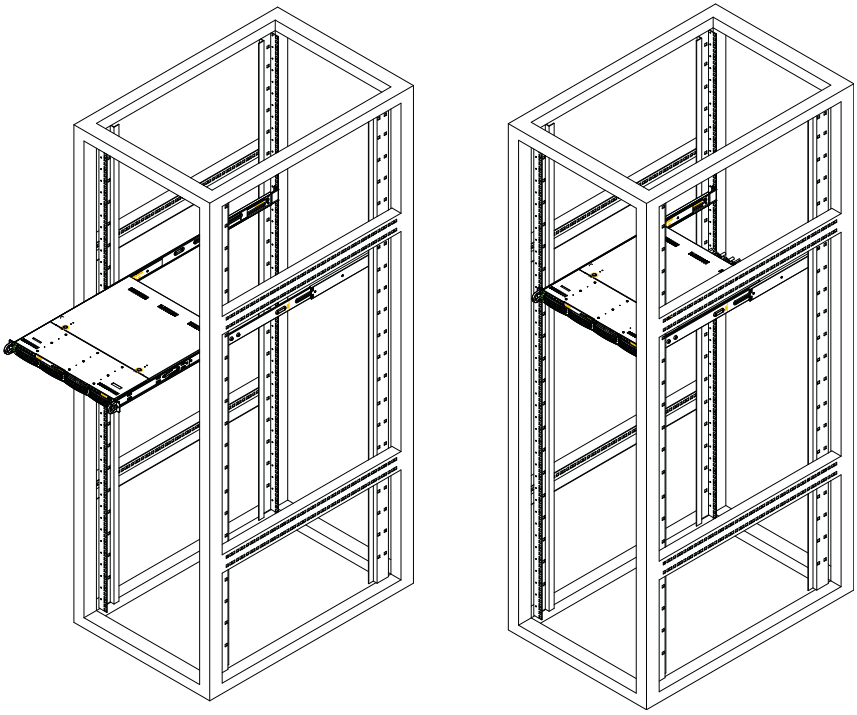
Note Both front chassis rails and the rack rails have a locking tab, which serves two functions. First, it locks the server into place when installed and pushed fully into the rack (its normal operating position. In addition, these tabs lock the server in place when fully extended from the rack. This prevents the server from coming completely out of the rack when pulled out for servicing.

Installing the Server into a Rack

You should now have rails attached to both the chassis and the rack. The next step is to install the server into the rack.

1. Line up the rear of the chassis rails with the front of the rack rails.
2. Slide the chassis rails into the rack rails, keeping the pressure even on both sides (you may have to press the locking tabs when inserting).
3. When the server has been pushed completely into the rack, you should hear the locking tabs click.

Figure 5. Installing the Server into a Rack



Note Figures are for illustrative purposes only. Always install servers at the bottom of a rack first.

Caution Stability hazard. The rack stabilizing mechanism must be in place, or the rack must be bolted to the floor before you slide the unit out for servicing. Failure to stabilize the rack can cause the rack to tip over.

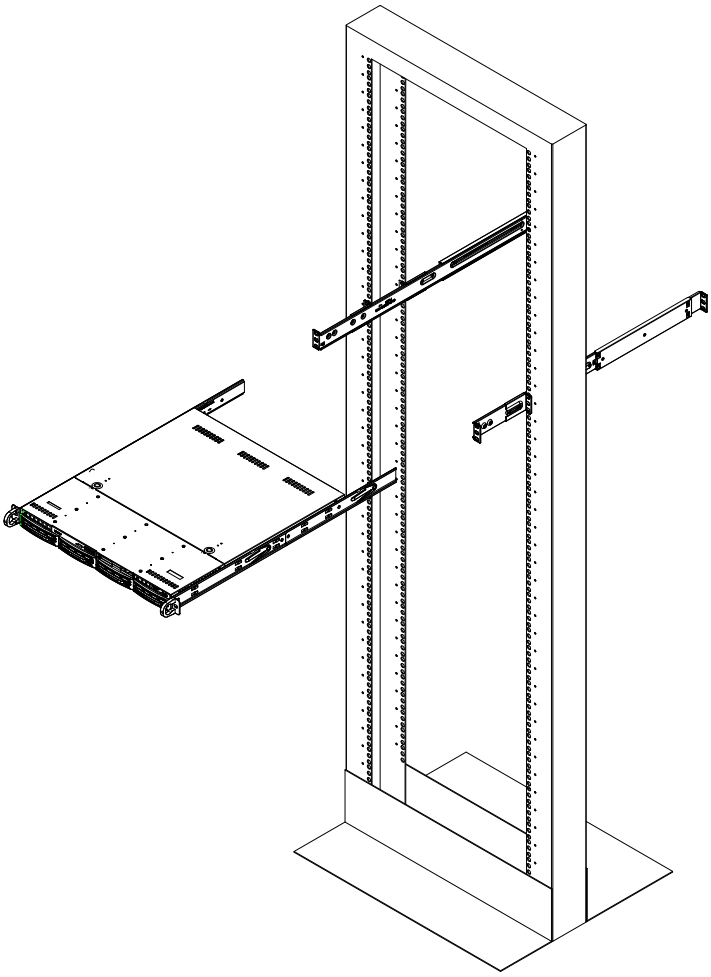
Installing the Server into a Telco Rack

To install the RMC-8356 into a Telco (open) type rack, use two L-shaped brackets on either side of the chassis (four total).

1. First, determine how far the server will extend out from the front of the rack. The chassis should be positioned so that the weight is balanced between front and back.
2. Attach the two front brackets to each side of the chassis, then the two rear brackets positioned with just enough space to accommodate the width of the rack.

3. Finish by sliding the chassis into the rack and tightening the brackets to the rack.

Figure 6. Installing the Server into a Telco Rack



Note Figure 6 is for illustrative purposes only. Always install servers at the bottom of a rack first.

OS Reinstallation and Recovery

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

The RMC-8356 includes a preinstalled OS from the factory. The RMC-8356 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.

Note Hard drive recovery is *not* available if the OS is installed on a RAID array.

- The RMC-8356 may also ship with an OS recovery USB 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 USB. Boot the RMC-8356 using the OS recovery USB to recover the OS.

Note You also may need to update or reinstall software after using the OS reinstallation USB to recover your OS. The OS reinstallation USB 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.

Specifications

This section lists the RMC-8356 electrical, mechanical, and environmental specifications.

Electrical

AC Input

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

Operating voltage range..... 90 VAC to 264 VAC

Input frequency..... 50 Hz/60 Hz

Operating frequency range ..... 47 Hz to 63 Hz

Input current rating ..... 4.2 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 Using the RMC-8356 in a manner not described in this document may impair the protection the RMC-8356 provides.

Mainboard

Socket ..... LGA 1151

Chipset..... Intel C236 chipset

Memory slots ..... 4 x Dual Channel DDR4 UDIMM, unbuffered ECC/Non-ECC

PCI Express ..... 1 x PCI Express 3.0 x16 slot

SATA..... 4 x 3.5 in. Hot-Swappable SATA3 Bays

USB ports	2 x USB 2.0 ports (Rear) 4 x USB 3.0 (2 Rear, 2 Front)
Video	2 x Display Port 1 x DVI-I 1 x VGA
Serial	RS-232 serial port
LAN	2 x Gigabit Ethernet RJ45, 1 x Dedicated IPMI RJ45
Onboard LAN controller	Intel i219LM + i210AT Dual-Port Gigabit Ethernet controller

CPU

CPU	Xeon E3-1275-V5
Clock speed	3.6 GHz
Max turbo frequency	4 GHz
Intel Smart Cache	8 MB
Package	LGA 1151

Hard Disk Drive

Capacity	1 TB 3.5 in. with 3 additional 3.5 in. drive bays for expansion
Interface	Serial-ATA 3

Memory

Standard memory	1 x 16 GB DDR4 SDRAM, UDIMM ECC 2133 MHz
Max configurable upgrade	64 GB (4 x 16 GB) DDR4 SDRAM, UDIMM ECC 2133 MHz

Mechanical

Overall dimensions (standard chassis)	
Height	1U
Width	437 mm (17.2 in.)
Depth	508 mm (20.0 in.)
Weight	8 kg (17.6 lbs)

Environmental

Caution If installed in a closed or multi-unit 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 ..... 10 to 35 °C
(Tested in accordance with IEC 60068-2-1.)

Storage temperature ..... -40 to 60 °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 ..... 8 to 90% noncondensing
- Nonoperational (storage) ..... 5 to 95% noncondensing

Operating location ..... Indoor use only

Maximum altitude..... 2,000 m

Installation Category..... II

Pollution Degree 2

Acoustic Emissions

Sound pressure level (at front bystander position)

Minimum ..... 53.1 dBA

Maximum..... 61.4 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.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for digital devices and information technology equipment:

- EN 55032 (CISPR 32): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AZ/NZS CISPR 32: Class A Emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-003: Class A emissions

Note In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia and New Zealand (per CISPR 32) Class A equipment is intended for use only in non-residential locations.

Note For EMC declarations and certifications, and additional information, refer to the *Online Product Certification* section.

CE Compliance CE

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

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/13/EU; 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 2012/19/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`.)

Worldeated wide Support and Services

The NI website 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.

Visit `ni.com/services` for NI Factory Installation Services, repairs, extended warranty, and other services.

Visit `ni.com/register` to register your NI product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting `ni.com/certification`. If your product supports calibration, you can obtain the calibration certificate for your product at `ni.com/calibration`.

NI corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. NI also has offices located around the world. For telephone support in the United States, create your service request at `ni.com/support` or dial 1 866 ASK MYNI (275 6964). For telephone support outside the United States, visit the Worldwide Offices section of `ni.com/niglobal` to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

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