HDD-8261 Safety, Environmental, and Regulatory Information





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Overview

Note Before you begin, install and configure your chassis and controller.

This document explains how to install and configure the HDD-8261. For more information about configuring, using, and maintaining the HDD-8261, refer to <u>ni.com</u>.

Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any changes or modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.

Unpacking



Caution To prevent electrostatic discharge (ESD) from damaging the device, ground yourself using a grounding strap or by holding a grounded object, such as your computer chassis.

- 1. Carefully inspect the shipping container and the HDD-8261 for damage.
- 2. Check for visible damage to the metal work.



Note Do not install a device if it appears damaged in any way.

- 3. 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.
- 4. Unpack any other items and documentation from the kit.

What You Need to Get Started

The HDD-8261 kit contains the following items:

- HDD-8261 module
- HDD-8261 documentation



Note The device kit does not include driver media. Go to <u>ni.com/info</u> and enter the Info Code RAIDDrivers for instructions on where to download the drivers for your device.

Key Features

The HDD-8261, using software RAID or JBOD mode, provides a compact storage solution in a 3U PXI Express platform.

| SATA Chipset | Marvel 88SE9485 |
|--------------|--|
| HDD | 4 × 1 TB (or greater) SATA (platter) hard drives, or 6 × 400 GB (or greater) SATA solid state hard drives |

| Front Panel LEDs | Power |
|------------------|----------------------------------|
| | Failure LED |
| | HDD activity |
| | |

Table 1. HDD-8261 Mainboard Features

HDD-8261 Overview

The HDD-8261 PXI Express/cPCI Express Storage Module supports a software-based striped/simple/spanned RAID array. The HDD-8261 is a three-slot wide hard drive storage device that holds up to four or six 2.5 in. solid-state or mechanical laptop hard drives. The module has a GEN2 x8 PXI Express high-bandwidth connector to the chassis backplane.

Note The only supported version of Microsoft Windows is Windows 7 (64-bit). Using the HDD-8261 in any other version of Windows results in reduced performance and is not recommended.

Optimizing Streaming Performance

Note For more information about optimizing streaming performance, visit <u>ni.com/info</u> and enter the info codes provided in the following table:

| Description | Info Code |
|---------------------------------------|-----------|
| Optimizing Performance on the NI 8261 | ex23vi |
| Optimizing Streaming Performance | exme7j |
| Understanding RAID | ex88ay |

The HDD-8261 2U in-chassis storage module expands NI high-speed streaming solutions by offering high in-chassis data streaming rates and storage capacities, using software RAID combined with either HDDs for capacity or SSDs for bandwidth. For maximum streaming bandwidth, use the HDD-8261 in the PXIe-1085 chassis with the PXIe-8880 controller.

The HDD-8261 offers up to 2 GB/s read and write speed for the SSD drive option and up to 250 MB/s read and write speed for 80% of the striped array (RAID 0) capacity across all four drives in the HDD drive option.

SSD/HDD Performance

The system configuration used for this benchmarking included a PXIe-8880 embedded controller running Windows 7 64-bit OS, with 24 GB system RAM, in PXIe-1085 chassis. For best throughput, configure a striped volume across all the drives of the HDD-8261 using disk management.

Figure 1. SDD Write Performance



Figure 2. SSD Read Performance





Figure 3. HDD Write Performance

Figure 4. HDD Read Performance



Note The HDD-8261 HDD version performs best in a PXIe-1085 chassis with fans set to Auto. With fans operating on High, performance degrades due to increased vibrations.

Hardware Installation

Caution To protect both yourself and the chassis from electrical hazards, leave the chassis off until you finish installing the HDD-8261.

Note For important information about using the HDD-8261 with chassis fans on high, go to <u>ni.com/info</u> and enter Info Code HDD8261Setup.

- 1. Power off your PXI Express or CompactPCI Express chassis, but leave it plugged in while installing the HDD-8261. The power cord grounds the chassis and protects it from electrical damage while you install the module.
- 2. Locate an available PXI Express or CompactPCI Express slot in the chassis. Do not install the HDD-8261 in the controller slot (slot 1 in a PXI Express chassis).



Note The HDD-8261 requires three open slots.

- 3. Remove or open any doors or covers blocking access to the slot in which you intend to install the HDD-8261.
- 4. Touch the metal part of the case to discharge any static electricity that might be on your clothes or body.
- 5. Make sure the injector/ejector handle is in its downward position. Be sure to remove all connector packaging and protective caps from retaining screws on the module. Align the HDD-8261 with the card guides on the top and bottom of the selected slot.

Caution Do not raise the injector/ejector handle as you insert the HDD-8261. It will not insert properly unless the handle is in its downward position so that it does not interfere with the injector/ejector rail on the chassis.

- 6. Hold the handle as you slowly slide the module into the chassis until the handle catches on the injector/ejector rail.
- 7. Raise the injector/ejector handle until the module firmly seats into the backplane receptacle connectors. The front panel of the HDD-8261 should be even with the front panel of the chassis.
- 8. Tighten the bracket-retaining screws on the top and bottom of the front panel to secure the HDD-8261 to the chassis.
- 9. Replace or close any doors or covers to the chassis.

Software/Driver Installation

The HDD-8261 does not include interface software to control the module. After you install the drivers, you must use the Disk Management Utility in Windows to manage the software RAID.

- 1. Download the driver from <u>ni.com/download/ni-8261-1.0/5756/en/</u> and unzip it.
- 2. Open Windows Device Manager (Start > Control Panel > Device Manager).
- 3. Right-click RAID Controller under Other devices in the hardware list.
- 4. Select Update Driver Software.
- 5. Select Browse my computer for driver software and choose the NI8261_x64_driver folder unzipped in step 1.
- 6. Leave Include Subfolders checked and click Next.
- 7. Complete the automatic installation. When the installation is complete, refer to the following section to set up the RAID array.

RAID Creation

To configure the software RAID on the HDD-8261, complete the following steps. The module uses the Marvell SATA controller, which does not have a built-in hardware RAID. Instead, you must build the RAID volume using the OS software.

Note The HDD-8261 drivers must be installed for Windows to see the drives.



Note Back up your data before you configure the software RAID.

- 1. Right-click My Computer and click Manage.
- 2. Click Disk Management in the left window. You should see four/six disk drives of the same size in basic mode. If the disks do not have a status of Unallocated, right-click any disk and select Delete Partition.

3. Right-click any disk and select New Striped Volume, then click Next.

| 🌆 Computer Management | | | - • • |
|---------------------------------------|-----------------------|---|---------------------|
| File Action View Help | | | |
| ⇒ ⇒ ≥ | 5 | | |
| 🌆 Computer Management (Local 🛛 Volu | ume Layout | Type File System Status | Actions |
| System Tools On Task Scheduler | Simple (C:) Simple | Basic Healthy (Primary Partition) Basic NTES Healthy (System Boot Page File Active Crash Dumn Prints | Disk Management 🔹 🔺 |
| ▶ 🛃 Event Viewer | (0) 0000 | III I I I I I I I I I I I I I I I I I | More Actions 🔹 🕨 |
| b 👸 Shared Folders | | | |
| b & Local Users and Groups Bas | Disk U | | |
| Device Manager | 53 GB | 66.88 GB NTFS 7.65 GB | |
| 🖌 🔄 Storage | line | Healthy (System, Boot, Page File, A Healthy (Primary Partition) | |
| 📄 Disk Management | | | |
| Services and Applications | Disk 1 | | |
| Bas 447 | NC 7.01 GB | 447.01 GB | |
| On | line | Unallocated | |
| | | | |
| | Disk 2 | | |
| Bas | sic COLOR | 117 01 CD | |
| 0n | line | 447.01 GB Unallocated | |
| | | | |
| | Diele 2 | | |
| Bas | sic S | | |
| 447 | V.01 GB | 447.01 GB | |
| | | Unanocateu | |
| | | , | |
| | Disk 4 | | |
| · · · · · · · · · · · · · · · · · · · | unallocated | Primary partition 🔳 Extended partition 📕 Free space | |
| | | | |

4. Click Add until all available disks are moved to the Selected window and click Next.

| New Striped Volume | — | | | | | | | |
|--|---|--|--|--|--|--|--|--|
| Select Disks You can select the disks and set the disk size for this volume. | | | | | | | | |
| Select the disks you want to use, and then click Add. | | | | | | | | |
| Available: Available: Add > Add > Add > Add > Remove All Total volume size in megabytes (MB): Maximum available space in MB: Select the amount of space in MB: | Selected: Disk 1 457733 MB Disk 2 457733 MB Disk 3 457733 MB Disk 4 457733 MB Disk 5 457733 MB Disk 6 457733 MB 2746398 457733 457733 | | | | | | | |
| < <u>B</u> ack | . <u>N</u> ext > Cancel | | | | | | | |

5. Assign a drive letter and click Next.

| New Striped Volume | x |
|--|---|
| Assign Drive Letter or Path For easier access, you can assign a drive letter or drive path to your volume. | |
| Assign the following drive letter Mount in the following empty NTFS folder: Browse Do not assign a drive letter or drive path | |
| < <u>B</u> ack <u>N</u> ext > Cance | |

6. Configure the Format Volume page as shown in the following figure and click Next.

| New Striped Volume | X | | | | | | |
|---|--------------------------------------|--|--|--|--|--|--|
| Format Volume To store data on this volume, you mu | st format it first. | | | | | | |
| Choose whether you want to format this volume, and if so, what settings you want to use. | | | | | | | |
| Do not format this volume | | | | | | | |
| Egrmat this volume with the following the second | owing settings | | | | | | |
| <u>F</u> ile system: | NTFS - | | | | | | |
| Allocation unit size: | Default 👻 | | | | | | |
| ⊻olume label: | New Volume | | | | | | |
| Perform a quick format | | | | | | | |
| Enable file and folder co | mpression | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | < <u>B</u> ack <u>N</u> ext > Cancel | | | | | | |

7. Click Finish to close the New Striped Volume Wizard.

| New Striped Volume | |
|--------------------|---|
| | Completing the New Striped Volume Wizard |
| | You have successfully completed the Wizard. |
| | You selected the following settings: Volume type: Striped Disks selected: Disk 1, Disk 2, Disk 3, Disk 4, Disk 5, D Volume size: 2746398 MB Drive letter or path: D: File system: NTFS Allocation unit size: Default Volume label: New Volume To close this wizard, click Finish. |
| | < <u>B</u> ack Finish Cancel |

8. If the disks were configured in basic mode, click Yes in the Disk Management dialog box to convert them to dynamic mode.

Note You must convert all disks that you want to include in the RAID array to dynamic mode.



Moving the HDD-8261 to a Different System

Complete the following steps to move your HDD-8261 to a different system or chassis with a different controller.

Note The following steps apply only if the HDD-8261 you are moving to a different system is in software RAID mode.



Caution To avoid data loss, do not move, swap, or replace the hard drives.

1. When the system boots, go into Disk Management. You will see four to six dynamic disks with yellow caution icons. Right-click any disk with a caution icon and select Import Foreign Disks.

| 🖳 Computer Management | | | | | | | | | | | | |
|-----------------------|--------------------------------|--|-----------------------------------|--------------|-------------|-----------------------------|----------|--|-------------|-----------------|----------|--|
| | 📕 File Action View Window Help | | | | | | | | | | | |
| ¢ | | | | | | | | | | | | |
| | Computer Management (Local) | Volume | Layout | Туре | File System | Status | Capacity | Free Space | % Free | Fault Tolerance | Overhead | |
| 9- | 🛃 System Tools | CRONIS SVC | Partition | Basic | FAT32 | Healthy (Unknown Partition) | 2.92 GB | 1 MB | 0% | No | 0% | |
| | Event Viewer | WINDOWS (C:) | Partition | Basic | NTFS | Healthy (System) | 52.96 GB | 40.89 GB | 77 % | No | 0% | |
| | Shared Folders | | | | | | | | | | | |
| | Performance Logs and Alerts | | | | | | | | | | | |
| | Device Manager | | | | | | | | | | | |
| ē- | Storage | | | | | | | | | | | |
| | 🗄 🙀 Removable Storage | | | | | | | | | | | |
| | Disk Defragmenter | | | | | | | | | | | |
| 4 | Disk Management | | | | | | | | | | | |
| ±1 | Services and Applications | 🗇 Disk 0 | | | | | | | | | | |
| | | Basic | WINDO | WINDOWS (C:) | | | | | ACRONIS SVC | | | |
| | | Online | 52.96 GB NTFS Healthy (System) | | | | | 2.93 GB FAT32 Healthy (Unknown Partition) | | | | |
| | | | 1 | (- / | • | | | | | , | | |
| | | Contraction Contra | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | Foreign | Name I a | | | | | | | | | |
| | | Dick 2 | Treport | Eoreige | Dieke | | | | | | | |
| | | Dynamic | Import | roroigin | UISIGHT. | | | | | | | |
| | | Fauring | Conver | t to Basi | ic Disk | | | | | | | |
| | | Poreign | | | | | | | | | | |
| | | Cisk 3 | Remove | e Disk | | | | | | | | |
| | | Dynamic | Propert | ies | | | | | | | | |
| | | Foreign | Help | | | | | | | | | |
| | | | | _ | | | | | | | | |
| | | Dynamic | | | | | | | | | | |

2. Be sure the Foreign disk group (4 of 4 disks) or Foreign disk group (6 of 6 disks) checkbox is enabled and click OK.

| 县 Computer Management | | | | | | | | | | |
|---|--|----------------------------------|--|--|---|---------------------------------|-------------------------------------|---------------------------|-----------------------------|----------------------|
| 💻 File Action View Window H | lelp | | | | | | | | | |
| ← → 🖻 🖬 😫 🗗 📽 | 1 | | | | | | | | | |
| Computer Management (Local) System Tools Go Event Newer Solar Conducts Solar Conducts Solar Conducts Performance Logs and Alerts Device Manager Solar Conducts Sol | Volume ACRONIS SVC WINDOWS (C:) | Layout Partition Partition | Type Basic Basic | File System FAT32 NTFS | Status Healthy (Unknown Partition) Healthy (System) | Capacity 2.92 GB 52.96 GB | Free Space 1 MB 40.89 GB | % Free 0 % 77 % | Fault Tolerance No No | Overhead 0% 0% |
| E Services and Applications | Contractions of the second sec | WINDO 52.96 G Healthy | B NTFS (System port F Before u |)) f <mark>oreign Dis</mark> sing these disl | ks | nfiguration. | ACRONIS 2.93 GB FJ Healthy (L | SYC AT32 Jnknown Pa | artition) | |
| | Disk 2 Dynamic Foreign Dynamic Foreign Foreign Disk 4 Dynamic | | Disk grou ▼ Forei | ips: gn disk group | (4 of 4 disks) | | | Disks OK Cancel | | |

3. You may see the following dialog box if a RAID volume was present on the HDD-8261 before you moved it to the new system. Click OK to allow the new system to reinitialize the RAID volume.

| Fore | ign Disk Volumes | | ? 🛛 |
|------|---|---|---------------|
| | The following list shows the disks. Click OK to add thes | e type, condition, and size of volumes on æ disks. | these foreign |
| | Туре | Condition | Size |
| | Striped volume | ОК | 953890 |
| | | ОК | Cancel |

4. Your RAID drive is now ready for use on the new system.

Where to Go Next

The following documents contain information that you may find helpful as you use the HDD-8261:

- **CompactPCI Specification PICMG 2.0 R 3.0**, available at www.picmg.org
- **PXI Hardware Specification, Revision 2.1**, available at www.pxisa.org
- PXI Software Specification, Revision 2.1, available at www.pxisa.org
- ANSI/IEEE Standard 1014-1987, IEEE Standard for a Versatile Backplane
 Bus: VMEbus, available at standards.ieee.org
- ANSI/VITA 1-1994, VME64, available at www.vita.com/specifications
- **Read Me First: Safety and Electromagnetic Compatibility**, available at <u>ni.com/manuals</u>

Specifications

This section lists the HDD-8261 electrical, mechanical, and environmental specifications.

Mainboard

| | SATA chipset | Marvel 88SE9485 | |
|--|--------------|-----------------|--|
|--|--------------|-----------------|--|

Hard Disk Drive

| Total storage capacity | |
|-----------------------------|---------------------|
| Rotating media (4 × HDD) | 4 TB (or greater) |
| Solid state media (6 × SSD) | 2.8 TB (or greater) |
| Interface | Serial-ATA 3.0 |
| | |

Physical

| Board dimensions | Three-slot 3U PXI Express module, 6 × 13 × 21.6 cm (2.4 × 5.1 × 8.5 in.) |
|------------------|--|
| | |

| Slot requirements | One PXI Express module slot plus two module expansion slots |
|-------------------|---|
| Compatibility | CompactPCI Express spec component |
| Weight | |
| 1 TB × 4 HDDs | 750 g |
| 400 GB × 6 SSDs | 740 g |

Environmental

| Maximum altitude | 2,000 m (800 mbar) |
|------------------|--------------------|
| Pollution degree | 2 |

Indoor use only.

Operating Environment

| Ambient temperature range ^[1] | |
|--|--|
| Rotating media (HDD) 5 to 50 °C (te | ested in accordance with IEC-60068-2-1 and IEC-60068-2-2; |
| meets MIL-F | PRF-28800F Class 3 high-temperature limit) |
| Solid state media (SSD) 0 to 50 °C (te | ested in accordance with IEC-60068-2-1 and IEC-60068-2-2; |
| meets MIL-F | PRF-28800F Class 3 limits) |
| Relative humidity range | 10 to 90% noncondensing (tested in accordance with IEC-60068-2-56) |

Storage Environment

| Ambient temperature range | | |
|--|--|--|
| Rotating media (HDD) -40 to 65 °C (teste meets MIL-PRF-28 | ed in accordance with IEC-60068-2-1 and IEC-60068-2-2; 8800F Class 3 low-temperature limit) | |
| Solid state media (SSD) -40 to 71 °C (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2; meets MIL-PRF-28800F Class 3 limits) | | |
| Relative humidity range | 5 to 95% noncondensing (tested in accordance with IEC-60068-2-56) | |

Shock and Vibration (SSD Only)

| Operational shock | 30 g peak, half-sine, 11 ms pulse (tested in accordance with IEC-60068-2-27; test profile developed in accordance with MIL-PRF-28800F) |
|------------------------|--|
| Random Vibratic | n |
| Operating 5 t | o 500 Hz, 0.3 g _{rms} (with solid state hard drive) |
| Nonoperating 5 t | o 500 Hz, 2.4 g _{rms} (tested in accordance with IEC-60068-2-64; nonoperating test |
| pro | ofile exceeds the requirements of MIL-PRF-28800F, Class 3) |

Note Specifications are subject to change without notice.

Electromagnetic Compatibility

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

• EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity

- EN 55011 (CISPR 11): Group 1, Class A emissions
- EN 55022 (CISPR 22): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AS/NZS CISPR 11: Group 1, Class A emissions
- AS/NZS CISPR 22: Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: 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 11) Class A equipment is intended for use only in heavy-industrial locations.



Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations and certifications, and additional information, refer to the <u>Online Product Certification</u> section.

CE Compliance $C \in$

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

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 <u>ni.com/certification</u>, 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 <u>ni.com/environment</u>. 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 This symbol indicates that waste products should be disposed of separately from municipal household waste according to WEEE Directive 2002/96/EC of the European Parliament and the Council on waste electrical and electronic equipment (WEEE). All products at the end of their life cycle must be sent to a WEEE collection and recycling center. Proper WEEE disposal reduces environmental impact and the risk to human health due to potentially hazardous substances used in such equipment. Your cooperation in proper WEEE disposal will contribute to the effective usage of natural resources. For information about the available collection and recycling scheme in a particular country, go to <u>ni.com/environment/weee</u>.

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.)

Worldwide Support and Services

The NI website is your complete resource for technical support. At <u>ni.com/support</u>, you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

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

Visit <u>ni.com/register</u> 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 <u>ni.com/</u> <u>certification</u>. If your product supports calibration, you can obtain the calibration certificate for your product at <u>ni.com/calibration</u>.

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 <u>ni.com/support</u> or dial 1 866 ASK MYNI (275 6964). For telephone support outside the United States, visit the **Worldwide Offices** section of <u>ni.com/niglobal</u> to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

¹ For chassis that are not available in the online catalog at ni.com, contact National Instruments for supported operating temperatures.