

Detailed Specifications

For user manuals and dimensional drawings, visit the product page resources tab on ni.com.

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2.3 GHz Eight-Core Embedded Controller for PXI Express

NI PXIe-8880



- Intel Xeon E5-2618L v3 processor (2.3 GHz (base), 3.4 GHz (single-core, Turbo Boost mode))
- Up to 24 GB/s system bandwidth
- 8 GB (1 x 8 GB DIMM) triple-channel 1866 MHz DDR4 standard, 24 GB (3 x 8 GB DIMM) maximum
- 240 GB (or greater) 1.8 in. SSD standard
- 2 x USB 3.0, 4 x USB 2.0, 2 x Gigabit Ethernet LAN, DisplayPort, GPIB and SMB trigger
- Software - already installed OS and drivers and hard-drive-based recovery image
- Complete PXI system configuration at ni.com/pxiadvisor

Overview

The NI PXIe-8880 is a high-performance Intel Xeon processor-based embedded controller for PXI Express systems. With the 2.3 GHz base frequency (3.4 GHz single-core, Turbo Boost mode), eight-core processor, and triple-channel 1866 MHz DDR4 memory, this controller is ideal for processor-intensive, modular instrumentation, and DAQ applications.

[Back to Top](#)

Application and Technology

OS Information

Windows 7 Professional (64-bit)

NI PXIe-8880 Features

CPU	Intel Xeon E5-2618L v3 (2.3 GHz (base), 3.4 GHz (single-core, Turbo Boost mode))
L3 cache	20 MB
System bandwidth	Up to 24 GB/s
PXI Express 4-link configuration	Four x4 links
PXI Express 2-link configuration	One x8 and one x16 link
Triple-channel DDR4 RAM, standard	8 GB (1 x 8 GB) ECC RAM
Triple-channel DDR4 RAM, maximum	24 GB (3 x 8 GB) ECC RAM
Hard drive (standard option), minimum	240 GB 1.8 in. SSD
10/100/1000BASE-TX (Gigabit) Ethernet ports	2
USB 3.0 ports	2
USB 2.0 ports	4
DisplayPort v1.2 (daisy chain capable)	1
GPIB (IEEE 488) controller	1
Watchdog/trigger SMB	1
Installed OS	Windows 7 Professional (64-bit)

Table 1. NI PXIe-8880 Features

Eight-Core Processor

The NI PXIe-8880 includes the eight-core Intel Xeon E5-2618L v3 processor. Eight-core processors contain eight cores, or computing engines, in one physical package. To increase the number of threads that you can process, the NI PXIe-8880 incorporates Intel Hyper-Threading technology that takes each of the eight physical cores and splits them into two virtual cores each, for a total of 16 virtual cores.

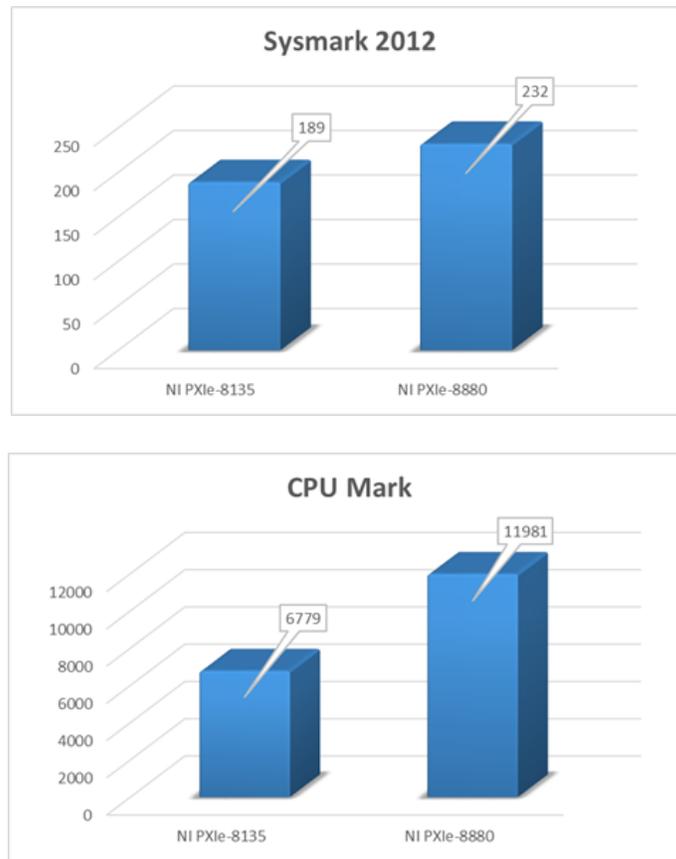


Figure 1. The NI PXIe-8880 provides up to 2X better performance than the NI PXIe-8135 embedded controller when multithreading.

High Bandwidth

This controller features the Intel Xeon E5 line of processors and takes advantage of advancements in PCI Express technology. By pairing the NI PXIe-8880 with a PXI Express high-bandwidth chassis, such as the NI PXIe-1085, you can simultaneously stream a larger set of I/O channels to the controller's system RAM, allowing for the creation of larger and more complex data record and playback applications. For example, by using an NI PXIe-1085 PXI Express chassis and an NI PXIe-8880 embedded controller, you can achieve a total of 24 GB/s of system bandwidth.

Building Hybrid Test Systems

The NI PXIe-8880 has two Ethernet ports, which enable the development of a hybrid test system. With the ability to use the second Ethernet port, you can combine multiple buses into your test systems. By taking advantage of hybrid test systems that combine components from multiple platforms, you can integrate new buses into existing test systems to help balance design considerations, take advantage of various technologies, and extend the life of your systems.

Hardware

With state-of-the-art packaging, the NI PXIe-8880 integrates the Xeon processor and all standard and extended PC I/O ports into a single unit. Because many of the I/O ports on the controller are integrated, all active slots in the chassis remain available for measurement and control modules. This rugged controller design minimizes integration issues and eliminates the need for complex cabling to daughterboards. The NI PXIe-8880 block diagram is shown in Figure 2.

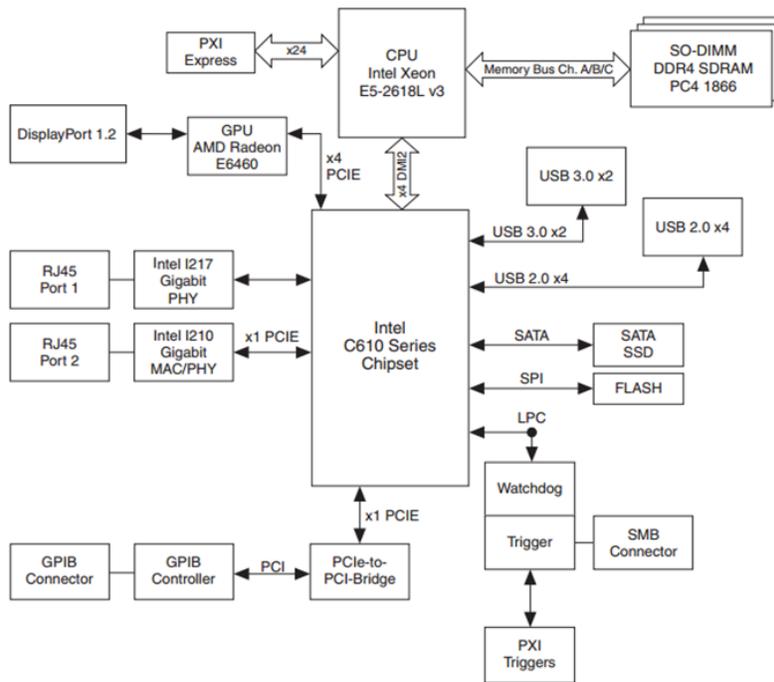


Figure 2. NI PXIe-8880 Block Diagram

Peripheral I/O

This module includes high-performance peripheral I/O such as two 10/100/1000BASE-TX (Gigabit) Ethernet ports, two USB 3.0 ports, and four USB 2.0 ports for connection to a keyboard, mouse, CD-ROM/DVD-ROM drive for software installation, or other standard PC peripherals such as speakers, printers, or memory sticks. Additionally, the NI PXIe-8880 controller includes an integrated GPIB (IEEE 488) controller, which provides control of external instrumentation, saving additional cost and a slot.

Video

The NI PXIe-8880 includes an integrated ATI Radeon E6460 graphics processing unit, which delivers intense, realistic 3D graphics with sharp images, fast rendering, smooth motion, and high detail, without the need for an additional video card or peripheral. This unique architecture provides balanced memory usage between graphics and the system for optimal performance.

Dual Monitor Support

The NI PXIe-8880 has one DisplayPort 1.2 connector, which supports simultaneous output. With this built-in capability, you can connect two monitors to your PXI system at the same time with independent displays. This negates the need for a separate PXI or CompactPCI video module to connect two monitors to your PXI system.

ECC Memory

The NI PXIe-8880 features error-correcting code (ECC) memory, which protects applications from data corruption by detecting and correcting the loss of data. The controller incorporates triple-channel 1866 MHz DDR4 RAM, which makes it ideal for data-intensive applications requiring significant analysis. The controller comes standard with 8 GB of system memory with upgrade options up to 24 GB.

USB Peripherals

NI offers a USB-to-dual-PS/2 keyboard/mouse adapter cable to connect a legacy PS/2 keyboard and mouse to a single USB port on your embedded controller. Additionally, NI offers an external USB CD-ROM/DVD-ROM for use with your embedded controller. Connect these drives to your embedded controller for easy software installation and upgrades. Both are completely powered through the USB ports, so no external power connections are required. Additional USB peripherals, such as USB speakers to add audio or USB memory sticks to add easily removable memory, are widely available from PC peripheral manufacturers.

In-ROM Memory and Hard-Drive Diagnostics

To improve the serviceability of the NI PXIe-8880, in-ROM diagnostics for the hard drive and memory can be quickly accessed without requiring external third-party tools. By running these diagnostics, the results of analysis can determine if you need to replace the hard drive or memory. The design of the controller allows for quick field replacement of critical components such as the hard drive and the memory without affecting the warranty. To ease the process of buying spare components, you can purchase hard drive and memory upgrades with the NI PXIe-8880. The combination of this and the in-ROM diagnostics significantly improves NI PXIe-8880 serviceability.

Hard-Drive-Based Recovery Image

The NI PXIe-8880 is shipped with a factory image of the software installation stored on a separate partition of the hard drive. In the case of software corruption, you can invoke a recovery tool during the controller's boot-up process that can use this backup image to restore the controller to its shipping software configuration. You also can use this recovery tool to create custom images that you can store on external mass storage devices such as a USB memory stick, USB hard drives, and USB CD/DVD drives. With this ability, you can create custom backup images that you can use to either recover an NI PXIe-8880 controller or replicate the installation on other NI PXIe-8880 controllers. For more information on this tool, refer to the [KnowledgeBase](#).

Software

The NI PXIe-8880 comes with the following minimum set of software already installed:

- Windows 7 Professional 64-bit OS (contact NI or visit ni.com/pxiadvisor for localized versions)
- Hard-drive-based recovery image
- NI-VISA and NI-488.2 drivers
- Drivers for all built-in I/O ports

With an NI system assurance program (base or standard) added to your PXI system order, your embedded controller is shipped already configured with all software and drivers applicable for your system. For example, assume you order a PXI system that includes LabVIEW and TestStand software, as well as DAQ modules, a digitizer, an arbitrary waveform generator, and a digital multimeter (DMM). With an NI system assurance program, NI not only assembles and tests your system but also fully configures the embedded controller with the appropriate NI-DAQmx, NI-SCOPE, NI-FGEN, and NI-DMM drivers as well as LabVIEW and TestStand.

Additionally, your embedded controller is configured with a customized hard-drive-based recovery image, so you can restore your controller to the as-shipped configuration at any time. This combination of software configuration and recovery tools provides both a productive and reliable development experience with your PXI system out of the box. To configure a complete PXI system with an NI system assurance program, contact NI or visit ni.com/pxiadvisor.

[Back to Top](#)

Support and Services

System Assurance Programs

NI system assurance programs are designed to make it even easier for you to own an NI system. These programs include configuration and deployment services for your NI PXI, CompactRIO, or Compact FieldPoint system. The NI Basic System Assurance Program provides a simple integration test and ensures that your system is delivered completely assembled in one box. When you configure your system with the NI Standard System Assurance Program, you can select from available NI system driver sets and application development environments to create customized, reorderable software configurations. Your system arrives fully assembled and tested in one box with your software preinstalled. When you order your system with the standard program, you also receive system-specific documentation including a bill of materials, an integration test report, a recommended maintenance plan, and frequently asked question documents. Finally, the standard program reduces the total cost of owning an NI system by providing three years of warranty coverage and calibration service. Use the online product advisors at ni.com/advisor to find a system assurance program to meet your needs.

Calibration

NI measurement hardware is calibrated to ensure measurement accuracy and verify that the device meets its published specifications. To ensure the ongoing accuracy of your measurement hardware, NI offers basic or detailed recalibration service that provides ongoing ISO 9001 audit compliance and confidence in your measurements. To learn more about NI calibration services or to locate a qualified service center near you, contact your local sales office or visit ni.com/calibration.

Technical Support

Get answers to your technical questions using the following National Instruments resources.

- **Support** - Visit ni.com/support to access the NI KnowledgeBase, example programs, and tutorials or to contact our applications engineers who are located in NI sales offices around the world and speak the local language.
- **Discussion Forums** - Visit forums.ni.com for a diverse set of discussion boards on topics you care about.
- **Online Community** - Visit community.ni.com to find, contribute, or collaborate on customer-contributed technical content with users like you.

Repair

While you may never need your hardware repaired, NI understands that unexpected events may lead to necessary repairs. NI offers repair services performed by highly trained technicians who quickly return your device with the guarantee that it will perform to factory specifications. For more information, visit ni.com/repair.

Training and Certifications

The NI training and certification program delivers the fastest, most certain route to increased proficiency and productivity using NI software and hardware. Training builds the skills to more efficiently develop robust, maintainable applications, while certification validates your knowledge and ability.

- **Classroom training in cities worldwide** - the most comprehensive hands-on training taught by engineers.
- **On-site training at your facility** - an excellent option to train multiple employees at the same time.
- **Online instructor-led training** - lower-cost, remote training if classroom or on-site courses are not possible.
- **Course kits** - lowest-cost, self-paced training that you can use as reference guides.
- **Training memberships** and training credits - to buy now and schedule training later.

Visit ni.com/training for more information.

Extended Warranty

NI offers options for extending the standard product warranty to meet the life-cycle requirements of your project. In addition, because NI understands that your requirements may change, the extended warranty is flexible in length and easily renewed. For more information, visit ni.com/warranty.

OEM

NI offers design-in consulting and product integration assistance if you need NI products for OEM applications. For information about special pricing and services for OEM customers, visit ni.com/oem.

Alliance

Our Professional Services Team is comprised of NI applications engineers, NI Consulting Services, and a worldwide National Instruments Alliance Partner program of more than 700 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit ni.com/alliance.

[Back to Top](#)

Detailed Specifications

This appendix lists the electrical, mechanical, and environmental specifications of the NI PXIe-8880 embedded controller.

Features

CPU	Intel® Xeon® E5-2618L v3
CPU Frequency	2.3 GHz (base), 3.4 GHz (single-core Turbo mode)
Intel Smart Cache	20 MB
Triple-Channel DDR4 RAM, PC4 1866	8 GB Standard 24 GB Maximum
Solid-State Drive	240 GB or larger Serial ATA
Ethernet	10/100/1000 BaseTX, 2 ports
PXI Express 4 Link Configuration	x4, x4, x4, x4
PXI Express 2 Link Configuration	x8, x16
GPIO (IEEE 488 Controller)	Yes
Hi-Speed USB (2.0) Ports	Yes (4)
Hi-Speed USB (3.0) Ports	Yes (2)
PS/2 Keyboard/Mouse Connector	No
PXI Express Trigger Bus	Yes
Input/Output	
Installed Operating System	Windows 7 Professional (64-Bit)

Electrical

Voltage (V)	Current (Amps)	
	Typical	Maximum
+3.3 V	2.24 A	2.96 A
+5 V	2.44 A	3.11 A
+12 V	6.5 A	8.7 A
+5 V _{AUX}	0.19 A	0.23 A

Physical

Board dimensions	Four-wide 3U PXI Express module
Slot requirements	One system slot plus three controller expansion slots
Compatibility	Fully compatible with <i>PXI Express Specification 1.0</i>
Weight	1.50 kg (3.4 lb) typical

Environmental

Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient temperature) with chassis fans on High .
Pollution Degree	2

Indoor use only.



Caution Clean the NI PXIe-8880 with a soft nonmetallic brush. Make sure that the device is completely dry and free from contaminants before returning it to service.

NI PXIe-8880

Ambient temperature range	
Standard	0 to 50 °C ^{1,2} (Tested in accordance with IEC 60068-2-1 and IEC 60068-2-2. Meets MIL-PRF-28800F Class 3 temperature limits, except as noted.)
	<p>¹ Processor should not throttle CPU frequency under reasonable, worst case processor work loads at high operating temperatures. If you experience CPU frequency.</p> <p>² 0 to 45 °C when used with the NI PXIe-1071, NI PXIe-1078 (with kit part number 158034A-01), or NI PXIe-1086 chassis.</p>

Relative humidity range	10% to 90%, noncondensing (Tested in accordance with IEC 60068-2-56.)
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 **Caution** The operating temperature must not be exceeded, even when used in a chassis with a higher temperature range.

Storage Environment

NI PXIe-8880

Ambient temperature range	
Standard	-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

Operating Shock	30 g peak, half-sine, 11 ms pulse in the Y and Z axes. 20 g peak, half-sine, 11 ms pulse in the X axis. (Tested in accordance with IEC 60068-2-27. Meets MIL-PRF-28800F Class 2 limits in Y and Z axes.)
Random Vibration	
Operating	5 to 500 Hz, 0.3 g _{rms}
Nonoperating	5 to 500 Hz, 2.4 g _{rms} (Tested in accordance with IEC 60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

 **Note** Specifications are subject to change without notice.

Safety

This product is designed to meet the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

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

 **Caution** Using the NI PXIe-8880 in a manner not described in this document may impair the protection the NI PXIe-8880 provides.

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 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 *Online Product Certification* section.

CE Compliance

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

To obtain product certifications and the Declaration of Conformity (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



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.

[Back to Top](#)

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