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Find the *National Instruments PXIe-8100 / PXIe-8100 RT* at our website: *Click HERE*

Technical Sales

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Requirements and Compatibility | Ordering Information | Detailed Specifications
For user manuals and dimensional drawings, visit the product page resources tab on ni.com.

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Low-Cost Real-Time Embedded Controller for PXI Express

NI PXIe-8100 RT



- Intel Atom D410 1.66 GHz single-core processor
- 512 MB (1 x 512 MB DIMM) single-channel 667 MHz DDR2 standard, 1 GB (1 x 1 GB DIMM) maximum
- Execution target for NI LabVIEW 2010 SP1 Real-Time or later applications
- 51 kHz single PID loop rate, maximum
- Reliable and deterministic operation
- One 10/100/1000BASE-TX Ethernet port, two USB 2.0 ports, and one RS232 serial port
- Complete PXI system configuration at ni.com/pxiadvisor

Overview

National Instruments RT Series PXI embedded controllers deliver a flexible, rugged platform for your deterministic, real-time measurement and control applications. The NI PXIe-8100 RT controller, which features the latest Intel single-core processor, 512 MB standard RAM, 667 MHz DDR2 memory, and 1 GB/s total system bandwidth, offers a low-cost solution for real-time test and control applications. You develop your LabVIEW application with the LabVIEW Real-Time Module on Windows OS and download the program to your PXI real-time controller via Ethernet.

LabVIEW Real-Time applications running on PXI systems achieve millisecond loop rates with only 3 to 4 µs of system jitter. These real-time measurement and control systems capitalize on Intel processors combined with the advanced timing, triggering, and I/O synchronization benefits of PXI. Furthermore, NI measurement services software extends the timing capabilities of PXI to deliver tight integration with LabVIEW Real-Time applications through operations such as hardware-timed software loops.

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Requirements and Compatibility

OS Information

- Real-Time OS

Software Compatibility

- LabVIEW Real-Time Module
- LabWindows/CVI Real-Time Module

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Application and Technology

NI PXIe-8100 RT Features

CPU	Intel Atom D410 1.66 GHz
PXI Express 4-link configuration	Four x1 links
Single-channel 667 MHz DDR2 RAM, standard	512 MB (1 x 512 MB)
Single-channel 667 MHz DDR2 RAM, maximum	1 GB (1 x 1 GB)
Soldered hard drive	512 MB NANDrive SSD Storage
10/100/1000BASE-TX (Gigabit) Ethernet ports	1

Hi-Speed USB ports	2
Serial port (RS232)	

Table 1. NI PXIe-8100 RT Features

Connect to Any I/O

The modularity of PXI and open development environment of LabVIEW make it easy to integrate a variety of I/O within your application. You can create a custom real-time embedded solution using an NI PXIe-8100 RT with any number and combination of PXI/CompactPCI plug-in modules. With built-in LabVIEW libraries, you can create applications with data acquisition, dynamic signal acquisition, motion control, image acquisition, reconfigurable I/O, and instrumentation. In addition, you can communicate with peripheral devices through CAN, GPIB, Ethernet, or serial protocols and use NI-VISA to integrate third-party PXI/CompactPCI modules into your application.

Create Reliable Stand-Alone Systems

To ensure reliable operation, embedded LabVIEW Real-Time applications continue to run even if the host PC is interrupted or rebooted. Because the NI PXIe-8100 RT embedded controller runs in a separate chassis with a dedicated power supply, the operator can shut down the host computer entirely without disrupting the real-time program.

For stand-alone operation, you can embed code in the system so that it starts automatically when the system boots, requiring no human interaction. Use the LabVIEW Professional Development System and LabVIEW Real-Time Module to compile your LabVIEW application into an executable and download it to your NI PXIe-8100 RT controller.

Real-Time Performance Benchmarks

Table 2 contains the PID loop rate benchmark numbers for the NI PXIe-8100 RT.

				Loop Rate (kHz)	
Benchmark	**Processing**	**Channels**	**DAQ I/O Mode**	**NI PXIe-8101 RT**	**NI PXIe-8100 RT**
Analog I/O	PID	1	Polling	119	51
Analog I/O	PID	1	Interrupt	73	31
Analog I/O	PID	4	Polling	89	42
Analog I/O	PID	4	Interrupt	63	26
Analog I/O	PID	16	Polling	32	18
Analog I/O	PID	16	Interrupt	29	15

Table 2. Maximum loop rates for LabVIEW Real-Time PXI systems are shown. All benchmarks use the LabVIEW 2010 Real-Time Module with NI-DAQmx 9.2.3. Benchmarks were revised to adhere to the architecture recommended by NI for symmetric multiprocessing enabled systems. Benchmarks that do not test network performance run on a headless target without a direct Ethernet connection for maximum performance. Benchmarks that do test network performance use interrupt-mode Ethernet via a direct connection between the host PC and real-time target with a crossover cable. Visit ni.com or contact National Instruments for additional benchmarks.

Memory

The NI PXIe-8100 RT uses single-channel 667 MHz DDR2 SDRAM. It has one SO-DIMM socket for the DDR2 SDRAM. 512 MB (1 x 512 MB DIMM) of RAM is standard with upgrade options to 1 GB.

Memory Options	**Configuration**	**Part Number**	
		Included in Kit	Additional P/N Required
Standard - 512 MB	1 x 512 MB DIMM	1 x 512 MB DIMM	N/A
1 GB	1 x 1 GB DIMM	1 x 512 MB DIMM	Add 1 x 781864-1024

Table 3. Memory Upgrade Options

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Ordering Information

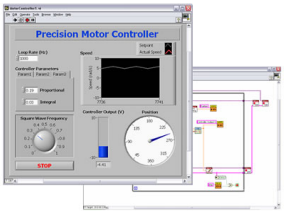
For a complete list of accessories, visit the product page on ni.com.

Products	Part Number	Recommended Accessories	Part Number
NI PXIe-8100 RT			
NI PXIe-8100 Real-Time Embedded SW	781669-33	No accessories required.	
Other Accessories			
USB-to-dual-PS/2 keyboard/mouse adapter cable	778713-02	No accessories required.	
USB English keyboard and optical mouse	779660-01	No accessories required.	
Memory Replacement and Upgrades			
1 GB DDR2 RAM for PXIe-8100 Controller	781864-1024	No accessories required.	
512 MB DDR2 RAM for PXIe-8100 Controller	781864-512	No accessories required.	

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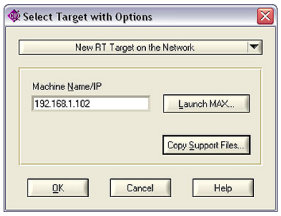
Software Recommendations

NI LabVIEW Real-Time Module



- Design deterministic real-time applications with LabVIEW graphical programming
- Download to dedicated NI or third-party hardware for reliable execution and a wide selection of I/O
- Take advantage of built-in PID control, signal processing, and analysis functions
- Automatically take advantage of multicore CPUs or set processor affinity manually
- Includes real-time OS, development and debugging support, and board support
- Purchase individually or as part of a LabVIEW suite

NI LabWindows™/CVI Real-Time Module



- Develop real-time applications in the LabWindows/CVI integrated development environment
- Deploy to dedicated real-time hardware for reliable, deterministic performance
- Use built-in PID control functions or create your own control algorithms
- Remotely debug real-time applications
- Use commercial off-the-shelf I/O, including data acquisition, modular instruments, and CAN

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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.

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.

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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.

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Detailed Specifications

This appendix lists the electrical, mechanical, and environmental specifications of the NI PXIe-8100 embedded controller.

Features

NI PXIe-8100	
CPU	Intel Atom Processor D410
COU Frequency	1.66 GHz
On-die L2 cache	512 KB
Single-Channel DDR2 RAM, PC2 5300	512 MB Standard; 1 GB Maximum
Hard Drive	Onboard 512 MB Parallel ATA solid-state drive [1]
Ethernet	10/100/1000 BaseTX
PXI Express 4 Link Configuration	x1, x1, x1, x1
PXI Express 2 Link Configuration	x1, x1
GPIB (IEEE 488 Controller)	No
Serial Ports (RS-232)	Yes (1)
Parallel Port	No
Hi-Speed USB (2.0) Ports	Yes (2)
ExpressCard/34 Slot	
PS/2 Keyboard/Mouse Connector	No
PXI Trigger Bus Input/Output	Yes
Installed Operating System	None

Electrical

Voltage (V)	Current (Amps)	
	Typical	Maximum
+3.3 V	1.2 A	2.1 A
+5 V	0.5 A	1.7 A
+12 V	0.5 A	0.8 A
–12 V	0.00 A	0.00 A
+5 V Aux	.42 A	.63 A

Physical

Board dimensions	2-slot 3U PXI Express module
Slot requirements	One system slot plus three controller expansion slots
Compatibility	Fully compatible with *PXI Express Specification* 1.0
Weight	0.30 kg (0.66 lb) typical

Environment

Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient temperature)
Pollution Degree	2

Indoor use only.

Caution Clean the NI PXIe-8100 with a soft nonmetallic brush. Make sure that the device is completely dry and free from contaminants before returning it to service.

Operating Environment

NI PXIe-8100	
Ambient temperature range	
Standard	5 to 50 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2. Meets MIL-PRF-28800F Class 3 high temperature limit.)
Relative humidity range	10% to 90%, noncondensing (Tested in accordance with IEC-60068-2-56.)

Caution The operating temperature must not be exceeded, even when used in a chassis with a higher temperature range.

Storage Environment

NI PXIe-8100	
Ambient temperature range	
Standard	–40 to 65 °C (Tested in accordance with IEC-60068-2-1 and IEC-60068-2-2. Meets MIL-PRF-28800F Class 3 low temperature limit.)
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 (Tested in accordance with IEC-60068-2-27. Meets MIL-PRF-28800F Class 2 limits.)
Random Vibration	
Operating	5 to 500 Hz, 0.3 g_{rms} (with solid-state hard drive)
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 Standards

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.

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 cables.

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

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

Online Product Certification

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

Environmental Management

National Instruments is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial not only to the environment but also 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 Electrical and Electronic Equipment, visit ni.com/environment/weee.htm.

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.

[1] Controllers configured for LabVIEW RT provide a 512 MB (minimum) PATA solid-state drive.

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