2.53 GHz Intel Core 2 Duo Real-Time Embedded Controllers for PXI

NI PXI-8108 RT *NEW!*

- Intel Core 2 Duo T9400 processor (2.53 GHz dual core)
- 1 GB (1 x 1 GB MB DIMM) RAM (standard)
- Execution target for NI LabVIEW Real-Time or LabWindows™/CVI Real-Time applications
- Reliable and deterministic operation
- Ethernet control of PXI
- Watchdog timer
- 134 kHz single PID loop rate, maximum

Development System Requirements (Windows)

- LabVIEW 8.6 or later
- LabVIEW Real-Time Module 8.6 or later

  Or
- LabWindows/CVI
- LabWindows/CVI Real-Time Module

Deployment Software (included)

- LabVIEW Real-Time embedded software

PXI System Configuration

- 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 PXI-8108 RT controller with its 2.53 GHz dual-core processor offers a high-performance platform, ideal for real-time test and control applications. You develop your LabVIEW application with the LabVIEW Real-Time Module on Windows and download the program to your PXI-8108 RT controller via Ethernet. The embedded code executes on a real-time OS. Thus, you use the powerful and flexible development tools of LabVIEW to build reliable, real-time solutions.

LabVIEW Real-Time applications running on PXI systems achieve microsecond loop rates with only 3 to 4 ns of system jitter. These real-time measurement and control systems capitalize on Intel processors coupled 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.

Run Parallel Tasks on Separate Processor Cores

The LabVIEW Real-Time Module takes advantage of the available dual cores on the Intel processor to increase performance and determinism for large real-time test and control applications. You can either explicitly assign certain tasks to run on specific cores of the processor or let the real-time OS manage this assignment for you.

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. Create a custom real-time embedded solution using a PXI-8108 RT embedded controller with any number and combination of PXI/CompactPCI plug-in modules.

Built-in LabVIEW libraries help you create applications with data acquisition, dynamic signal acquisition, motion control, image acquisition, reconfigurable I/O, and instrumentation. Communicate with peripheral devices through CAN, GPIB, Ethernet, or serial protocols. Use NI-VISA to integrate third-party PXI/CompactPCI modules in your application.

In addition, the PXI-8108 RT controller includes an external SMB connection for use as a trigger input, output, or watchdog timer. Use the external SMB to pass trigger and timing signals into and out of the PXI trigger bus in your system.

CPU	Intel Core 2 Duo T9400 Processor (2.53 GHz Dual Core)
800 MHz DDR2 RAM, standard	1 GB (1 x 1 GB)
800 MHz DDR2 RAM, maximum	2 GB (2 x 1 GB)
Storage, hard drive (minimum)	80 GB SATA
Storage, solid state	Optional[1]
Extended temperature and 24/7 operation option	✔
10/100/1000BASE-TX (Gigabit) Ethernet	✔
Serial port (RS232)	✔
Parallel port	✔
Hi-Speed USB ports	4
GPIB (IEEE 488) controller	✔
ExpressCard/34 slot	✔
Watchdog/trigger SMB	✔

[1]Optional 32 GB solid-state drive can replace the hard drive.

Table 1. PXI-8108 RT Features

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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 PXI-8108 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 PXI-8108 RT controller.

Dual-Boot Option

You can configure NI PXI embedded controllers to boot into Windows or the real-time OS. NI Measurement & Automation Explorer (MAX) includes features for installing and configuring PXI embedded controllers as LabVIEW Real-Time targets. The controllers use a hardware switch or BIOS setting to boot into the desired OS.

The result is a PXI embedded controller that can run embedded LabVIEW Real-Time or Windows applications. When the controller is in real-time mode, you need another Windows computer to develop and debug the LabVIEW Real-Time code for the PXI controller. To enable a Windows PXI embedded controller to dual-boot with the real-time OS, you must purchase the LabVIEW Real-Time embedded deployment software for the controller.

Extended Temperature and 24/7 Operation Option

The PXI-8108 RT embedded controller is available in two versions to address different environmental and usage conditions. The primary difference is that the version for extended temperature and 24/7 operation uses a different hard drive, designed for both reliability in low and high temperature extremes and 24/7 operation. The standard version of the controllers has an operating temperature of 5 to 50 °C and a storage temperature of -40 to 65 °C. The extended temperature and 24/7 operation version has an operating temperature of 0 to 55 °C and a storage temperature of -40 to 71 °C.

You can also use the extended temperature and 24/7 operation version for applications that require continuous operation for up to 24 hours/day, seven days/week because the hard drive is rated for 24/7 operation. The hard drive in the standard version of the controllers is designed to be powered on for eight hours/day, five days/week. Additionally, 24/7 operation applications may subject the hard drive to a high duty cycle (the percentage of the maximum sustained throughput of the hard drive). The hard drive in the standard version of the controllers is designed for a 20 percent duty cycle. The hard drives that are used in the extended temperature and 24/7 operation version and the standard version have a capacity of 80 GB (minimum) with a SATA interface.

				Loop Rate	
Benchmark	**Processing**	**Channels**	**DAQ I/O Mode**	**PXI-8108**	**PXI-8106**
Analog Input/Output	PID	1	Polling	136 kHz	86 kHz
Analog Input/Output	PID	1	Interrupt	43 kHz	35 kHz
Analog Input/Output	PID	4	Polling	78 kHz	51 kHz
Analog Input/Output	PID	4	Interrupt	42 kHz	33 kHz
Analog Input/Output	PID	16	Polling	31 kHz	26 kHz
Analog Input/Output	PID	16	Interrupt	25 kHz	16 kHz

Table 2. Maximum loop rates for LabVIEW Real-Time PXI systems are shown. All benchmarks use the LabVIEW Real-Time Module 8.6 with NI-DAQmx 8.8. 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.*

Ordering Information

To order a complete PXI system based on a LabVIEW Real-Time embedded controller, visit **ni.com/pxiadvisor**.

Step 1. Controller Model – select one of the following.

NI PXI-8108 RT

Base 780446-33

Extended temperature and 24/7 operation 780447-33

Step 2. Memory upgrades – select the amount of upgrade memory.

Standard:

1 GB (1 x GB MB DIMM)

Recommended upgraded memory configurations:

2 GB (1 x 2 GB DIMM must be purchased)

2 GB DDR2 RAM.....780446-2048

Step 3. Select Storage Options

250 GB standard temperature HDD 779175-06

32 GB solid-state HDD 779175-08

Step 4. Select Accessories

Micro-GPIB to GPIB cable (0.2 m) 183285-02

Micro-GPIB to GPIB cable (1 m) 183285-01

Micro-GPIB to GPIB cable (2 m) 183285-02

IEEE 1284 parallel port cable adapter (6 in.) 777169-01

NI PXI-8252 IEEE 1394 interface module.....778925-01

BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to **ni.com/pxi**.

Specifications

Specifications subject to change without notice.

Features

Processor	Intel Core 2 Duo 2.53 GHz T9400
Chipset	Mobile Intel GM45 Express Chipset
Front-side bus	1066 MHz
System memory (RAM)	1 GB DDR2 RAM PC2 6400 (standard) 2 GB DDR2 RAM PC2 6400 (maximum)
Ethernet	10/100/1000BASE-TX, RJ45 connector
Hard drive	
Base	80 GB minimum, internal 2.5 in., 9.5 mm Serial ATA 1.0 interface
Extended temperature and 24/7 operation option	80 GB minimum, internal 2.5 in., 9.5 mm Serial ATA 1.0 interface
Video	Integrated Graphics (Mobile Intel GM45 Express Chipset)
Serial	1 (RS232)
Parallel	IEEE 1284 Type C miniature connector (adapter cable not included)
GPIB	PCI-GPIB/TNT, micro D25 connector IEEE 488 and HS488 transfers
Hi-Speed USB	4
ExpressCard/34	1 (34 mm slot)

Power Requirements

Voltage (V)	Current (A)	
	Typical	Maximum
+3.3	2	3
+5	6	8
+12	0.1	0.3
-12	0.00	0.00

Physical

Board dimensions	4-slot 3U PXI module 8.1 by 13 by 21.6 cm (3.2 by 5.1 by 8.5 in.)
Slot requirements	One system slot plus three controller expansion slots
Compatibility	Fully compatible with PXI Specification
Weight	0.914 kg (2.02 lb) typical

Environment

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

Indoor use only.

Operating Environment

Ambient temperature range[1]

Base	5 to 50 °C[2] (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2)
Extended temperature range	0 to 55 °C (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2)
Relative humidity range	10 to 90% noncondensing (tested in accordance with IEC-60068-2-56)

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

[2]5 to 40 °C for the PXI-1000B DC.

Storage Environment

Ambient temperature range

Base	-40 to 65 °C (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2)
Extended temperature range	-40 to 70 °C (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2)
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; test profile developed in accordance with MIL-PRF-28800F)

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)

Safety Compliance

- IEC 61010-1, EN 61010-1
- UL 61010-01, CSA 61010-1

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

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)

Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain 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.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers: At the end of their life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit **ni.com/environment/weee.htm**.

NI Services and Support

NI has the services and support to meet your needs around the globe and through the application life cycle – from planning and development through deployment and ongoing maintenance. We offer services and service levels to meet customer requirements in research, design, validation, and manufacturing. Visit **ni.com/services**.

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We also offer service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Visit **ni.com/ssp**.

Hardware Services

NI Factory Installation Services

NI Factory Installation Services (FIS) is the fastest and easiest way to use your PXI or PXI/SCXI combination systems right out of the box. Trained NI technicians install the software and hardware and configure the system to your specifications. NI extends the standard warranty by one year on hardware components (controllers, chassis, modules) purchased with FIS. To use FIS, simply configure your system online with **ni.com/pxiadvisor**.

Calibration Services

NI recognizes the need to maintain properly calibrated devices for high-accuracy measurements. We provide manual calibration procedures, services to recalibrate your products, and automated calibration software specifically designed for use by metrology laboratories. Visit **ni.com/calibration**.

Repair and Extended Warranty

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