1.86 GHz Intel Celeron M Real-Time Embedded Controllers for PXI

NI PXI-8104 RT *NEW!*

- Intel Celeron M 440 processor (1.86 GHz single core)
- 512 MB (1 x 512 MB DIMM) dual-channel 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

Development System Requirements (Windows)

- LabVIEW
- LabVIEW Real-Time Module

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. With its 1.86 GHz processor and dual-channel 533 MHz DDR2 memory, the NI PXI-8104 RT offers an ideal balance of performance and value for real-time test and control applications. You develop your LabVIEW application with the NI LabVIEW Real-Time Module on Windows and download the program to your PXI-8104 RT controller via Ethernet. The embedded code executes on a real-time OS; thus, you can 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 the latest 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.

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-8104 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-8104 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 Celeron M 440 Processor (1.86 GHz Single Core)
Dual-channel 667 MHz DDR2 RAM, standard	512 MB (1 x 512 MB)
Dual-channel 667 MHz DDR2 RAM, maximum	2 GB (2 x 1 GB)
Storage, hard drive (minimum)	60 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
Watchdog/trigger SMB	✔

[1] Optional 512 or 128 MB solid-state drive can replace the hard drive.

Table 1. PXI-8104 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-8104 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-8104 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.

				Loop Rates (kHz)	
Benchmark	**Processing**	**Channels**	**DAQ I/O Mode**	**PXI-8104 RT**	**PXI-8106 RT**
Analog input and output	PID	1	Polling	90.1	104.1
Analog input and output	PID	1	Interrupt	42.6	47.1
Analog input and output	PID	16	Polling	25.2	27.3
Analog input and output	PID	16	Interrupt	17.3	19.6

Table 2. Maximum loop rates for LabVIEW Real-Time PXI systems are shown. All benchmarks use the LabVIEW 8.5 Real-Time Module with NI-DAQmx 8.7. PXI-8106 RT controller was used in single-core mode for making an accurate comparison with PXI-8104 RT. These benchmarks do not test network performance and run on a headless target without a direct Ethernet connection for maximum performance. 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**.

Controller

NI PXI-8104 RT 779916-33

Memory Upgrades

Standard

512 MB (1 x 512 MB DIMM)

Recommended upgraded memory configurations:

1 GB (1 x 512 MB DIMM must be purchased)

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

512 MB DDR2 RAM 779302-512

1 GB DDR2 RAM.....779302-1024

Solid-State Storage Options

128 MB solid-state HDD 779175-128

512 MB solid-state HDD 779175-512

Accessories

Parallel port adapter cable (6 in.).....777169-01

NI MKD-1117 (rack-mount 1U LCD monitor, keyboard, mouse drawer) 779872-01

NI PXI-8232, combo gigabit Ethernet and GPIB, NI-488.2....778658-01

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 subject to change without notice.

Features

Processor ..... Intel 1.86 GHz Celeron M 440
Chipset ..... Mobile Intel 945GME Express chipset
Front-side bus ..... 533 MHz
System memory (RAM) ..... 512 MB dual-channel DDR2 RAM PC2 5300 (standard)
2 GB dual-channel DDR2 RAM PC2 5300 (maximum)
Ethernet ..... 10/100/1000BASE-TX, RJ45 connector
Hard drive ..... 60 GB minimum, internal 2.5 in., 9.5 mm Serial ATA 1.0 interface
Video ..... Intel Extreme Graphics controller
Serial 1 (RS232)
Parallel ..... IEEE 1284 Type C miniature connector (adapter cable not included)
Hi-Speed USB 4

	Current	
Voltage (V)	Typical	Maximum
+3.3	2.5 A	3.25 A
+5	3.5 A	5.5 A
+12	5 mA	5 mA
-12	0.0 A	0.0 A

Power Requirements

Physical

Board dimensions ..... 4-wide 3U PXI Express module
Slot requirements ..... 1 system slot plus 3 controller expansion slots
Compatibility ..... Fully compatible with PXI specification
Weight ..... 0.94 kg (2.1 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 ..... 5 to 50 °C in an NI PXI-1042 chassis (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)

Storage Environment

Ambient temperature range ..... -40 to 65 °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 and Compliance

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 visit **ni.com/certification**, search by model number or product line, and click the appropriate link in the Certification column.

Electromagnetic Compatibility

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

- EN 61326 EMC requirements; Minimum Immunity
- EN 55011 Emissions; Group 1, Class A
- CE, C-Tick, ICES, and FCC Part 15 Emissions; Class A

Note: For EMC compliance, operate this device according to product documentation.

CE Compliance

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

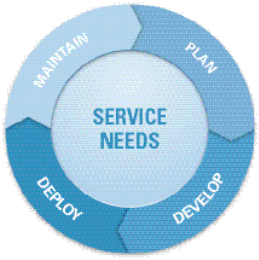
- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Note: 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



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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

NI provides complete repair services for our products. Express repair and advance replacement services are also available. We offer extended warranties to help you meet project life-cycle requirements. Visit **ni.com/services**.

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