2.16 GHz Intel Core 2 Duo Real-Time Embedded Controller for PXI

NI PXI-8106 RT *NEW!*

- Dual-core Intel Core 2 Duo processor
- Reliable and deterministic operation
- Ethernet control of PXI
- Execution target for LabVIEW Real-Time and LabWindows™/CVI Real-Time applications
- Ethernet control of PXI
- Multicore enabled (LabVIEW Real-Time 8.5 or later)
- 94 KHz single PID loop rate, maximum

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

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-8106 RT controller offers a high-performance platform, ideal for real-time test and control applications. You develop your LabVIEW application with the National Instruments LabVIEW Real-Time Module on Windows and download the program to your PXI-8106 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.

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-8106 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-8106 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.

Create Reliable Stand-Alone Systems

To ensure reliable operation, embedded LabVIEW applications continue to run even if the host PC is interrupted or rebooted. Because the PXI-8106 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-8106 RT controller.

Model	PXI-8106 RT
Processor	2.16 GHz Intel Core 2 Duo Processor T7400
Dual-channel 667 MHz DDR2 RAM, standard	512 MB
Dual-channel 667 MHz DDR2 RAM, maximum	2 GB
Storage, hard drive (minimum)	60 GB[1]
Storage, solid-state	Optional[2]
GPIB controller	✓
Gigabit Ethernet port	✓
Serial port (RS232)	✓
USB ports	4
Built-in microsecond hardware timing	✓
Watchdog/trigger SMB	✓

[1]40 GB minimum for extended temperature and 24/7 operation version. [2]Optional 512 MB or 128 MB solid-state drive can replace the hard drive.

Table 1. PXI-8106 RT Features

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Run Parallel Tasks on Separate Processor Cores

With the LabVIEW Real-Time Module (Version 8.5 or later), you can take 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 operating system manage this assignment for you. For older versions of the LabVIEW Real-Time Module (Version 8.2.1 or earlier), the processor is used in single-core mode.

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	
Benchmark	**Processing**	**Channels**	**DAQ I/O Mode**	**PXI-8106**	**PXI-8196**
Analog input and output	PID	1	Interrupt	36 kHz	30 kHz
Analog input and output	PID	1	Polling	94 kHz	79 kHz
Analog input and output	PID	16	Interrupt	16 kHz	14 kHz
Analog input and output	PID	16	Polling	31 kHz	27 kHz

Table 2. Maximum Loop Rates for LabVIEW Real-Time PXI Systems (All benchmarks use LabVIEW 8.2 Real-Time Module and NI-DAQmx 8.3 when applicable. All benchmarks adhere to the NI recommended architecture for LabVIEW Real-Time applications. 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 host PC and real-time target with a crossover cable. The processor is used in single-core mode for all benchmarks.) Visit **ni.com** *or contact National Instruments for additional benchmarks.*

Extended Temperature and 24/7 Operation Option

The PXI-8106 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 drive in the extended temperature and 24/7 operation version has a capacity of 40 GB (minimum) versus the 60 GB (minimum) hard drive used in the standard version of the controllers. See specifications for further details.

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-8106 RT

Base 779886-33

Extended Temperature and 24/7 Operation.....779887-33

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

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

Step 3. Select Solid-State Storage Options

128 MB solid-state HDD 779175-128

512 MB solid-state HDD 779175-512

Step 4. Select Accessories

Micro-GPIB to GPIB cable (0.2 m) 183285-0R2

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

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

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 Processor T7400 (2.16 GHz)
Chipset	Mobile Intel 945GM Express chipset
Ethernet	10/100/1000BASE-TX, RJ45 connector
Video	Intel GMA 950 graphics media accelerator, DVI-I connector
Serial	1 (RS232)
GPIB	PCI-GPIB/TNT, micro D25 connector IEEE 488 and HS488 transfers (adapter cable not included)
USB ports	4
RAM	2 SO-DIMM sockets, DDR2 SDRAM, PC2 5400, dual channel 512 MB (1 x 512 DIMM) standard, 2 GB (2 x 1 GB DIMMs) maximum
Hard drive	
Base	60 GB minimum, internal 2.5 in., 9.5 mm Serial ATA 1.0 interface
Extended temperature and 24/7 operation option	40 GB minimum, internal 2.5 in., 9.5 mm Fast Ultra ATA100 interface
V (I/O) keying	Chassis V (I/O) = +5 VDC (blue key)

Power Requirements

	Current (A)	
Voltage (V)	Typical	Maximum
+3.3	3.60	3.75
+5	7.50	8.50
+12	0.005	0.005
-12	0	0

Physical

Board dimensions	4-slot 3U PXI module
Slot requirements	1 system slot plus 3 controller expansion slots
Compatibility	Fully compatible with PXI Specification 2.0
Weight	0.94 kg (2.1 lb), typical

Environment

Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient temperature)
Pollution degree	2
For indoor use only.	

Operating Environment

Ambient temperature[1]	
NI PXI-8106 RT	
Base	5 to 50 °C[2] (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2)
Extended temperature	0 to 55 °C (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2)
Relative humidity	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**, please contact National Instruments for supported operating temperatures.
[2]5 to 40 °C for the PXI-8106 RT in the PXI-1000B DC.

Storage Environment

Ambient temperature
- NI PXI-8106 RT
  - Base ..... -40 to 65 °C (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)
  - Extended temperature ..... -40 to 71 °C (tested in accordance with IEC-60068-2-1 and IEC-60068-2-2.)

Relative humidity ..... 5 to 95% noncondensing (tested in accordance with IEC-60068-2-56)

Shock and Vibration

Operational shock

NI PXI-8106 RT ..... 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)

Note: Specifications subject to change without notice.

Safety Compliance

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

Electromagnetic Compatibility

Refer to the Declaration of Conformity (DoC) for regulatory compliance information.
To obtain the DoC for this product, click Declaration of Conformity at **ni.com/hardref.nsf**.

NI Services and Support

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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**.

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