2.0 GHz Pentium M 760 and 1.5 GHz Celeron M 370 Embedded Controllers for PXI

NI PXI-8195, NI PXI-8196

- 2.0 GHz Pentium M 760 (PXI-8196)
- 1.5 GHz Celeron M 370 (PXI-8195)
- 512 MB dual-channel DDR2 RAM standard, 2 GB maximum (PXI-8196)
- 256 MB dual-channel DDR2 RAM standard, 2 GB maximum (PXI-8195)
- Internal PXI trigger bus routing
- Watchdog timer
- Integrated peripheral I/O
  - 10/100/1000 BaseTX Ethernet
  - 4 USB 2.0 ports
  - ExpressCard/34 slot (PXI-8196)
  - GPIB (IEEE 488.2) interface (PXI-8196)
  - RS232 serial port
  - IEEE 1284 ECP/EPP parallel port
  - Integrated hard drive

Software

- OS and drivers already installed
- Hard-drive based recovery image

PXI System Configuration

- Complete PXI system configuration at ni.com/pxiadvisor

NEW

Overview

The National Instruments PXI-8196 and PXI-8195 are high-performance Pentium M 760 and Celeron M 370 based embedded controllers, respectively, for use in PXI and CompactPCI systems. The new Pentium M architecture provides the highest mobile performance at clock rates lower than Mobile Pentium 4 processors. The performance of the NI PXI-8196 is equivalent to that of a 3.0 GHz Pentium 4 system. They are ideal for applications requiring intensive analysis or PXI system development. A PXI-8196 or PXI-8195 embedded controller in a PXI chassis offers a compact, high-performance PC platform for modular instrumentation and data acquisition applications.

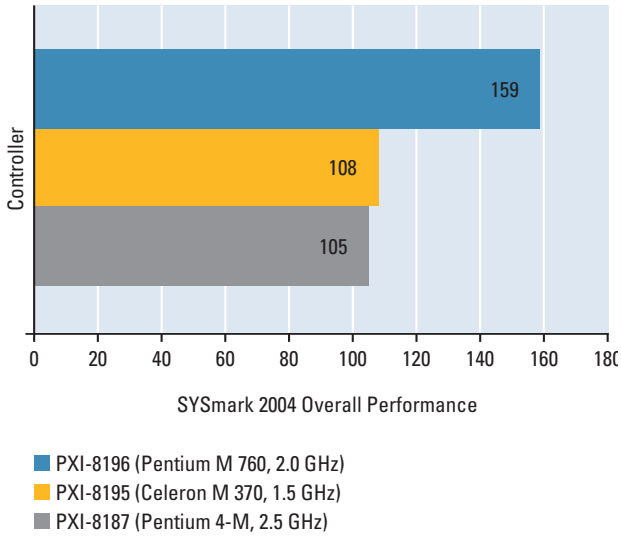

Figure 1. Embedded Controller Benchmarks

Hardware

With state-of-the-art packaging, the PXI-8196 and PXI-8195 embedded controllers integrate a Pentium M or Celeron M processor and all standard and extended PC peripherals into a single unit. By integrating many peripherals on the controller, all active slots in the PXI chassis remain available for measurement modules. This rugged one-piece controller design minimizes integration issues and eliminates the need for complex cabling to peripheral daughterboards. The PXI-8196 and PXI-8195 also use the Mobile Intel 915GM Express chipset to deliver maximum performance, flexibility, and stability. Moreover, the 915GM Express chipset includes the new PCI Express bus, which provides the ExpressCard interface and full-rate Gigabit Ethernet. A block diagram of the PXI-8196 is shown in Figure 3.

	PXI-8196	PXI-8195
CPU	2.0 GHz Pentium M 760	1.5 GHz Celeron M 370
Front-Side Bus	533 MHz	533 MHz
L2 Cache	2048 KB	1024 KB
Dual-Channel DDR2 RAM, Standard	512 MB	256 MB
Dual-Channel DDR2 RAM, Maximum	2 GB	2 GB
Hard Drive, Minimum	40 GB[1]	40 GB
10/100/1000 BaseTX Ethernet	✓	✓
GPIB (IEEE 488.2) Interface	✓	–
Serial Port	✓	✓
Parallel Port	✓	✓
USB 2.0 Ports	4	4
ExpressCard/34 Slot	✓	–
PS/2 Keyboard/Mouse Connector	–[2]	–[2]
Watchdog/Trigger SMB	✓	✓
Operating System	Windows XP[3]	Windows XP[3]

[1]30 GB hard drive for extended temperature option
[2]For a legacy PS/2 keyboard and mouse, add the USB to Dual PS/2 Adapter
[3]Contact National Instruments or visit ni.com/pxiadvisor for information on other operating systems

Table 1. PXI-8196 and PXI-8195 Features

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Peripheral I/O

The PXI-8196 and PXI-8195 include high-performance peripheral I/O such as 10/100/1000 BaseTX (Gigabit) Ethernet and four USB 2.0 ports for connection to a keyboard, a mouse, a CD drive for easy software installation, or other standard PC peripherals such as USB speakers, printers, or memory sticks. Use the IEEE 1284 ECP/EPP parallel port to connect to a wide variety of devices, including tape backup drives, printers, and scanners. An RS232 port is available for connecting to serial devices. Additionally, the PXI-8196 includes an integrated GPIB (IEEE 488.2) interface, which provides connectivity to external instrumentation, saving additional cost and a slot.

ExpressCard

The PXI-8196 includes an ExpressCard/34 slot. ExpressCard uses the PCI Express and USB 2.0 high-speed serial interfaces to provide up to 2.5 Gb/s throughput in each direction. Use the ExpressCard/34 slot to add a second Gigabit Ethernet port to your system or additional peripheral I/O such as 802.11 wireless LAN, IEEE 1394 (FireWire), Bluetooth, and various memory adapters.

Figure 2. This PXI-8196 controls an 18-slot PXI modular instrumentation system.

Trigger Input/Output and Watchdog

The PXI-8196 and PXI-8195 include 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 PXI system.

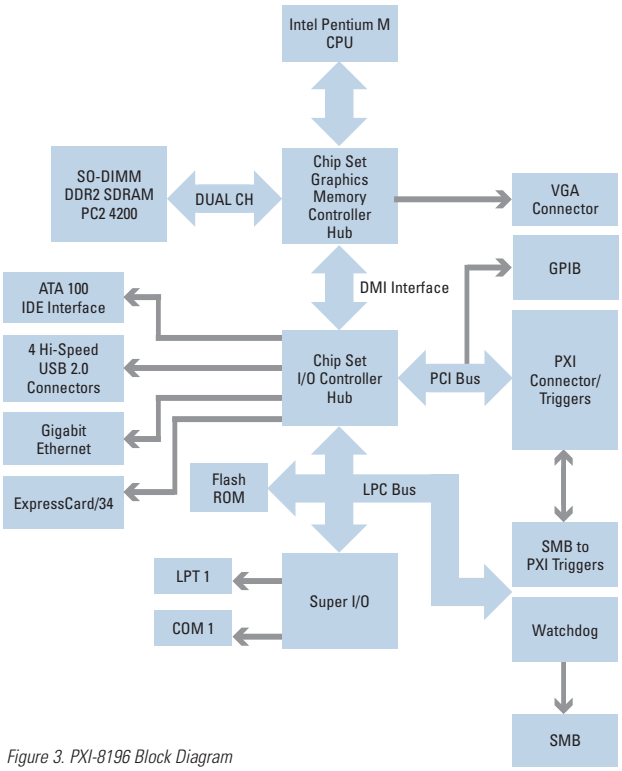

Figure 3. PXI-8196 Block Diagram

Video

The PXI-8196 and PXI-8195 feature the integrated Intel Graphics Media Accelerator 900, which provides a 2X increase in graphics performance over previous NI PXI embedded controllers. It 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.

Extended Temperature Option

The PXI-8196 is available in two versions to address different environmental conditions. The basic version has an operating temperature of 5 to 50 °C and a storage temperature of -40 to 65 °C. The extended-temperature version has an operating temperature of 0 to 55 °C and storage temperature of -40 to 85 °C. The primary difference is that the extended-temperature option uses a hard drive designed for reliability in the low and high temperature extremes. This extended-temperature hard drive has a capacity of 30 GB (minimum), versus 40 GB (minimum) on the standard controller. Please see the specifications for further details.

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Memory

The PXI-8196 and PXI-8195 use dual-channel DDR2 SDRAM. This feature makes the controllers ideal for data-intensive applications requiring significant analysis. The PXI-8196 and PXI-8195 each have two SO-DIMM sockets for the DDR2 SDRAM. 512 MB of RAM is standard with the PXI-8196, with upgrade options to either 1 or 2 GB. 256 MB of RAM is standard with the PXI-8195, with upgrade options to 512 MB, 1 GB, or 2 GB.

Software

The PXI-8196 and PXI-8195 come with the following minimum set of software already installed:

- Microsoft Windows XP Professional OS (contact National Instruments or visit **ni.com/pxiadvisor** for localized versions of Windows XP and for other available operating systems)
- Hard-drive based recovery image
- NI-VISA and NI-488.2 drivers
- Drivers for all built-in peripherals (Table 1)

With NI Factory Installation Services (FIS) added to a PXI system order, your embedded controller will be shipped already configured with all software and drivers applicable for your PXI system. For example, assume you order a PXI system that includes LabVIEW and TestStand software, as well as data acquisition modules, a digitizer, an arbitrary waveform generator, and a DMM. With FIS, your PXI system will not only be assembled and shipped, but also the embedded controller will be fully configured with the appropriate NI-DAQmx, NI-SCOPE, NI-FGEN, and NI-DMM drivers, as well as LabVIEW and TestStand. Additionally, your embedded controller will be configured with a hard-drive based recovery image, so you can restore your controller to the as-shipped configuration at any time in the future. 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 FIS, contact National Instruments or visit **ni.com/pxiadvisor**.

USB Peripherals

National Instruments offers a USB-to-dual-PS/2 keyboard/mouse adapter to connect a legacy PS/2 keyboard and mouse to a single USB port on your embedded controller. Additionally, NI offers external USB CD-ROM and USB floppy drives for use with your embedded controller. Using the USB interfaces, connect these drives to your embedded controller for easy software installation and upgrades. Both are completely powered through the USB port, 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.

Additional Peripheral Ports

National Instruments offers numerous plug-in modules to add additional peripherals and ports to your PXI system. With the wide variety of PXI peripheral devices available, you can choose modules that add communication with serial, IEEE 1394 (FireWire), and SCSI. Modules are also available for controlling other PXI or VXI/VME systems. Visit **ni.com/pxiadvisor** to configure a system with additional peripheral modules.

Ordering Information

For online configuration of a complete PXI system, including Factory Installation Services, visit **ni.com/pxiadvisor**.

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

NI PXI-8195 ..... 779910-xx
NI PXI-8196
Base 779911-xx
Extended Temperature 779912-xx

Step 2. Replace "xx" with the following to select Installed Operating System.

01 Windows XP (English)
00 Localized OS[1]
[1]Contact National Instruments or visit **ni.com/pxiadvisor** for the latest available operating systems.

Step 3. Memory Upgrades – select the amount of upgrade memory.

To take advantage of the increased bandwidth of dual-channel memory, the RAM DIMMs must be configured in matched pairs. For this reason, National Instruments recommends using matched pairs when upgrading memory.

PXI-8195
Standard
256 MB (1 x 256 MB DIMM)
Recommended upgraded memory configurations:
512 MB (2 x 256 MB DIMMs; 1 must be purchased)
1 GB (2 x 512 MB DIMMs must be purchased)
2 GB (2 x 1 GB DIMMs must be purchased)

PXI-8196
Standard
512 MB (2 x 256 MB DIMMs)
Recommended upgraded memory configurations:
1 GB (2 x 512 MB DIMMs must be purchased)
2 GB (2 x 1 GB DIMMs must be purchased)

256 MB DDR2 RAM DIMM 779301-256
512 MB DDR2 RAM DIMM 779301-512
1 GB DDR2 RAM DIMM 779301-1024

Step 4. Accessories[2]

USB to Dual PS/2 Keyboard/Mouse Adapter 778713-02
External USB CD-ROM 778492-01
External USB Floppy Drive 778492-02
Parallel Port Adapter Cable (6 in.) 777169-01
Micro-GPIB to GPIB Adapter Cable (0.2 m) 183285-0R2
Micro-GPIB to GPIB Cable (1 m) 183285-01
Micro-GPIB to GPIB Cable (2 m) 183285-02
[2]For additional peripheral modules, including serial, FireWire, and SCSI modules, please visit **ni.com/pxiadvisor**.

BUY NOW!

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

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Specifications

Specifications subject to change without notice

Features

Processor
- PXI-8195 ..... 1.5 GHz Celeron M 370
- PXI-8196 ..... 2.0 GHz Pentium M 760

Ethernet ..... 10/100/1000 BaseTX, RJ-45 connector
Video ..... Intel Graphics Media Accelerator 900
Serial 1 (RS232)
Parallel Port ..... IEEE 1284
Type C connector (miniature)
(adapter cable not included)
GPIB ..... PCI-GPIB/TNT, micro D25 connector
IEEE 488 and HS488 transfers
(adapter cable not included)
USB ..... 4 (USB 2.0)
RAM ..... 2 SO-DIMM sockets, DDR2 SDRAM, PC2 4200
- PXI-8195 ..... 256 MB standard, 2 GB maximum
- PXI-8196 ..... 512 MB standard, 2 GB maximum

Hard Drive
- PXI-8195 ..... 40 GB minimum, internal 2.5 in., 9.5 mm
Fast Ultra ATA100 interface
- PXI-8196
  - Base ..... 40 GB minimum, internal 2.5 in., 9.5 mm
Fast Ultra ATA100 interface
  - Extended Temp. Option ..... 30 GB minimum, internal 2.5 in., 9.5 mm
Fast Ultra ATA100 interface

V(I/O) Keying

The PXI-8195 and PXI-8196 require chassis V (I/O) = +5 VDC (blue key).

Power Requirements

PXI-8195

	Current (A)	
Voltage	**Typical**	**Maximum**
+3.3	2.8	3.2
+5	4.8	6.5
+12	0	0
-12	0	0

PXI-8196

	Current (A)	
Voltage	**Typical**	**Maximum**
+3.3	2.8	3.2
+5	5	7
+12	0	0
-12	0	0

Physical

Board Dimensions ..... 4-slot 3U PXI module
Slot Requirements ..... One system slot plus three controller expansion slots
MTBF
- PXI-8195 ..... TBD
- PXI-8196 ..... 124,400 hours

Weight ..... 0.7 kg (1.7 lb) typical

Operating Environment

Ambient temperature[1]
PXI-8195 ..... 5 to 50 °C (IEC-60068-2-1 and IEC 60068-2-2)[2]
PXI-8196
- Base ..... 5 to 50 °C (IEC-60068-2-1 and IEC 60068-2-2)[2]
- Extended Temp. Option ..... 0 to 55 °C (IEC-60068-2-1 and IEC 60068-2-2)[3]

Relative humidity ..... 10 to 90% noncondensing
(tested in accordance with IEC-60068-2-56)
Altitude ..... 2000 m (at 25 °C ambient temperature)

[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-1000B DC. National Instruments does not recommend using the PXI-1010 chassis with the PXI-8195 or the base verion of the PXI-8196.

[3] 0 to 35 °C for the PXI-1010.

Storage Environment

Ambient temperature
- PXI-8195 ..... -40 to 65 °C (IEC-60068-2-1 and IEC-60068-2-2)
- PXI-8196
  - Base ..... -40 to 65 °C (IEC-60068-2-1 and IEC-60068-2-2)
  - Extended Temp. Option ..... -40 to 85 °C (IEC-60068-2-1 and IEC-60068-2-2)

Relative humidity ..... 5 to 95% noncondensing (IEC-60068-2-56)

Shock and Vibration

Operational 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

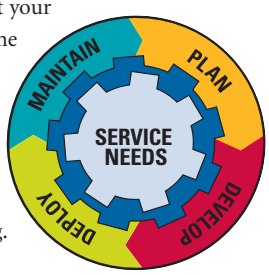
EN 61010-1, IEC 61010-1, UL 61010-01, CAN/CSA-C22.2 No. 61010-1

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

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.



Training and Certification

NI training is the fastest, most certain route to productivity with our products. NI training can shorten your learning curve, save development time, and reduce maintenance costs over the application life cycle. We schedule instructor-led courses in cities worldwide, or we can hold a course at your facility. We also offer a professional certification program that identifies individuals who have high levels of skill and knowledge on using NI products. Visit ni.com/training.

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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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