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Pentium III Embedded Controllers for PXI and CompactPCI

NI 8171 Series

- 1.26 GHz Intel Pentium III processor, maximum
- Full 132 Mbytes/s PCI bandwidth
- Internal PXI trigger bus routing
- High-performance peripherals
  - 100BaseTX fast Ethernet interface
  - GPIB (IEEE 488.2) Interface, optional
  - 15 GB Fast Ultra ATA100 hard drive, minimum
  - 1.44 MB floppy drive, optional
  - 2 serial ports, maximum
  - 2 USB ports
  - IEEE 1284 ECP/EPP parallel port
  - AGP Super VGA
- 512 MB SDRAM, with upgrades
- 512 KB advanced transfer cache, maximum
- Compliance with PXI and CompactPCI specifications
- Internal connections for PXI-1020 and PXI-1025 chassis, optional

NEW



Overview

The NI 8171 Series embedded controllers are high-performance Pentium III based controllers for use in any PXI or CompactPCI system. Using a NI 8171 Series embedded controller with a PXI chassis, you get a compact, high-performance PC platform for modular instrumentation, useful in a wide range of applications. With its rugged, industrial packaging, PXI is ideally suited for deployment in harsh environments.

The NI 8171 Series covers a wide spectrum of applications from low-cost embedded systems to high-performance automated systems. The NI 8174 provides a low-cost PXI system controller alternative, while the NI 8176 delivers cutting-edge performance with a 1.26 GHz Pentium III processor, 512 KB of on-die advanced transfer cache, and integrated GPIB. All of the NI 8171 Series embedded controllers offer performance instrumentation features such as a trigger input/output for system timing synchronization and integrated hard drives equipped with Fast Ultra ATA100 interfaces for high-speed streaming to disk applications (See Table 1).

INFO CODES

For more information or to order products online, visit *ni.com/info* and enter:

ni8176
ni8175
ni8174

BUY ONLINE!

	NI 8176	NI 8175	NI 8174
CPU	1.26 GHz Intel Pentium III	866 MHz Intel Pentium III	566 MHz Intel Celeron
On-Die Cache	512 KB	256 KB	128 KB
Synchronous DRAM	128 MB, Standard[1] 512 MB, Maximum	128 MB, Standard[1] 512 MB, Maximum	64 MB, Standard[2] 512 MB, Maximum
Hard Drive	15 GB, minimum	15 GB, minimum	15 GB, minimum
100BaseTX Ethernet	✓	✓	✓
GPIB (IEEE 488.2 Interface)	✓	-	-
Super VGA with Dynamic Memory Video Technology	✓	✓	✓
Serial Ports	2	2	1
Parallel Port	✓	✓	✓
USB Ports	2	2	2
PS/2 Keyboard/Mouse Connector	✓	✓	✓
3.5 in 1.44 MB Floppy Drive	✓	✓	-
PXI Trigger Bus Input/Output	✓	✓	✓
Operating System	Windows 2000	Windows 2000	Windows 2000
PXI-1020 or PXI-1025 Ready	✓	✓	-

[1]Up to 512 MB of PC133 SDRAM operating at 133 MHz with upgrade
[2]Up to 512 MB of PC133 SDRAM operating at 100 MHz with upgrades

Table 1. NI 8171 Series Embedded Controller Selection Guide

Hardware

With state-of-the-art packaging, the NI 8171 Series embedded controllers integrate Pentium III or Celeron processors and all standard and extended PC peripherals and components into a single modular unit, preserving all active PXI slots for measurement modules. With this unique packaging, the hard drive, floppy drive, and GPIB mount directly to the module, so you can remove the whole unit intact. This modular design minimizes integration issues and eliminates the need for complex cabling between modules. The NI 8171 Series also uses Intel's 815E chipset to deliver the maximum performance, flexibility, and stability of the Intel Pentium III and Celeron processors. A block diagram for the NI 8171 Series embedded controllers is included as Figure 1.

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Pentium III Embedded Controllers for PXI and CompactPCI

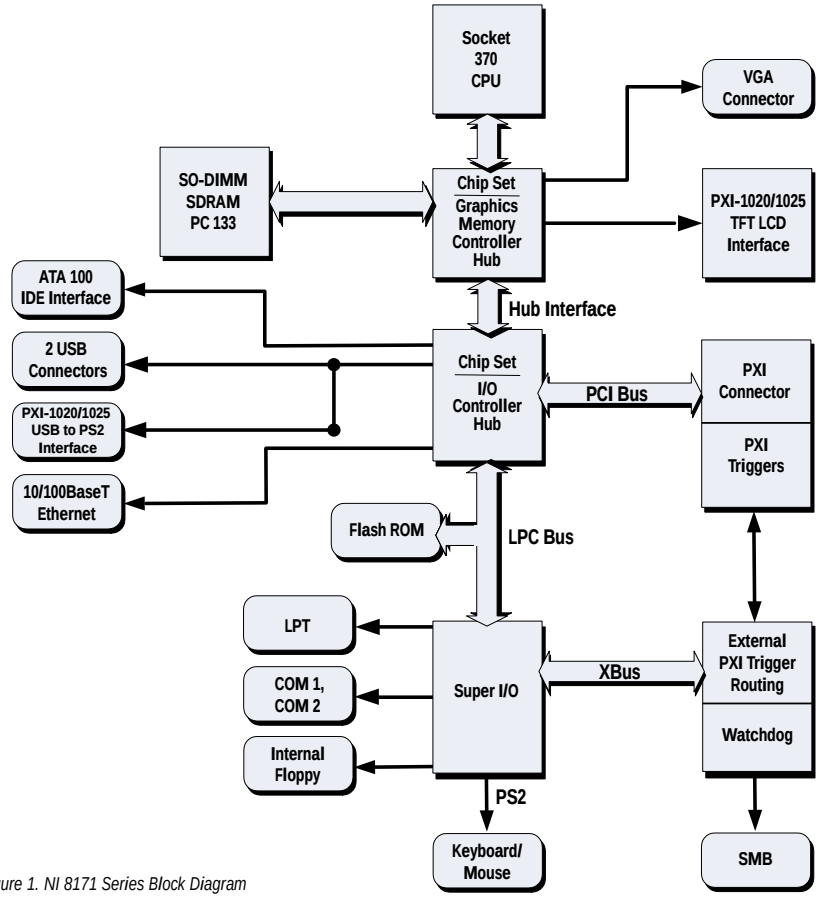


Figure 1. NI 8171 Series Block Diagram

Standard and Extended I/O

The NI 8171 Series embedded controllers come with an extensive set of standard and extended I/O for connecting to common peripheral devices. All models offer 10/100BaseTX Ethernet with the standard RJ-45 connection. Direct connections to standard PC-compatible keyboards and mice are made through a PS/2 connector with breakout adapter or through USB ports. You can also use the USB ports for connecting to external CD-ROMs (see Figure 3), speakers, and printers. Video connections are made through a standard 15-pin D-Sub connector. Use the IEEE 1284 ECP/EPP parallel port to connect to a wide variety of high-performance devices, including tape backup drives, printers, and scanners. An RS-232 port is available for connecting to serial devices.



Figure 2. The NI 8176 integrates a 1.26 GHz Intel Pentium III processor and GPIB (IEEE 488) interface.

The NI 8175 and NI 8176 have additional extended I/O, such as an additional RS-232 port and internal interface for controlling the PXI-1020 and PXI-1025 chassis. (See pages 34 and 36, respectively) The NI 8176 has a GPIB interface, which saves additional cost and a slot in the PXI system (see Figure 2). The GPIB interface supports standard IEEE 488 with transfer rates of 1.5 Mbytes/s and the high-speed HS488 GPIB protocol with transfer rates up to 7.7 Mbytes/s.

PXI Trigger Input/Output

The NI 8171 Series embedded controllers include an external SMB connection for use as a trigger input or output. Use the external SMB to pass trigger and timing signals into and out of the PXI Trigger Bus in your PXI system.

Video

The NI 8171 Series embedded controllers use Intel's Dynamic Memory Video Technology (DMVT). Using DMVT, you can achieve optimum graphics and memory performance through Direct AGP and highly efficient memory. This Super VGA delivers up to 11 MB of SDRAM when used with polygon intensive applications. The NI 8171 Series offers resolutions of 1280 x 1024 at 24-bit color and 1600 x 1200 at 256 colors.

Memory

The NI 8175 and NI 8176 come with 128 MB of SDRAM, and the NI 8174 comes with 64 MB of SDRAM. You can upgrade each of the NI 8171 Series embedded controllers to a maximum of 512 MB of SDRAM. Add factory installation services to your order, and NI installs memory for you.

Software

The NI 8171 Series embedded controllers come with an installed OS, chosen from Windows 2000 in English, Japanese, or other languages. NI-DAQ and NI-VISA are also installed. In addition, any National Instruments application software, such as LabVIEW, TestStand, and Measurement Studio, can come installed on your NI 8171 Series embedded controller along with any associated driver software if you include NI Factory Installation Services as part of your order.

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Pentium III Embedded Controllers for PXI and CompactPCI

USB CD-ROM Accessory

National Instruments offers an external USB CD-ROM for use with your NI 8171 Series embedded controllers (see Figure 3). Using the USB interface, connect this CD-ROM to your embedded controller for easy software installation and upgrades. The CD-ROM is completely powered through the USB port, so no external power connections are required.

Additional Peripheral Ports

National Instruments offers numerous plug-in modules to add additional peripherals and ports to your PXI system. Use the NI 8221 to augment your system with a PC Card (PCMCIA or Card Bus) interface or the PXI-GPIB to add an IEEE 488 interface. For additional serial ports, choose from the PXI-8420 Series modules.



Figure 3. USB CD-ROM

Ordering Information

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

NI 8176 1.26 GHz Pentium III with
Windows 2000 (English)……778468-01
Other operating systems*……778468-00

NI 8175 866 MHz Pentium III with
Windows 2000 (English)……778467-01
Other operating systems*……778467-00

NI 8174 566 MHz Celeron with
Windows 2000 (English)……778466-01
Other operating systems*……778466-00

*Contact National Instruments or visit *ni.com/pxiadvisor* for the latest processors and operating systems, including Windows 2000 in Japanese, and other languages.

Step 2. NI Factory Installation Services – select one of the following (required for Step 4).

PXI Systems.....960596-01
PXI/SCXI Combo Systems.....960596-04

Step 3. Memory Upgrades – the NI 8176 and NI 8175 embedded controllers come with 128 MB of memory installed, and the NI 8174 embedded controller comes with 64 MB of memory installed. If you want to upgrade your memory, select the amount of memory.

256 MB SDRAM 778469-256
512 MB SDRAM 778469-512

Step 4. Installed Application Software – select any NI application software you would like to have installed:

LabVIEW Full Development System for Windows (English**).....776670-03
Measurement Studio Full Development System for Windows 778800-03
TestStand Full Development System for Windows 777777-03

**LabVIEW is also available in German, French, and Japanese. Contact National Instruments for more information.

Step 5. Accessories – add the following accessories or for additional peripheral modules, refer to the Bus Interfaces section of the print catalog starting on page 48.

External USB CD-ROM – add on for easy software installation and upgrades
USB CD-ROM 778492-01

Parallel port converter cable – add to convert from Type C 36-position miniconnector to DB-25 25-position standard connector (15.2 cm).
IEEE 1284 parallel port adapter cable 182873-06

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Pentium III Embedded Controllers for PXI and CompactPCI

Specifications*

Complies with PXI Specification and CompactPCI, PICMG 2.0 Specification. Handles bus-mastering in all PXI/CompactPCI slots.

Handles all peripherals and user interfaces for PXI-1020 and PXI-1025. (NI 8176 and NI 8175 only)

Physical

Number of slots required
NI 8176, NI 8175 ..... 1 system slot, 3 controller expansion slots (to the left of system slot)
NI 8174 ..... 1 system slot, 2 controller expansion slots (to the left of system slot)

Dimensions
NI 8176, NI 8175 ..... 8.1 x 13 x 21.6 cm (3.2 x 5.1 x 8.5 in.), 3U
NI 8174 ..... 6.1 x 13 x 21.6 cm (2.4 x 5.1 x 8.5 in.), 3U

Weight
NI 8176 ..... 1.2 kg (2.7 lb.)
NI 8175 ..... 1.1 kg (2.4 1b.)
NI 8174 ..... 0.6 kg (1.4 lb.)

Peripherals

Ethernet ..... 10/100BaseTX, RJ-45 connector
Super VGA ..... 11 MB DRAM, maximum (Dynamic Video Memory Technology. Handles resolution of 1280 by 1024 at 24-bit color and 1600 by 1200 at 256 colors)
TFTLCD ..... Internal connection
Serial port
NI 8176, NI 8175 ..... 2 RS-232
NI 8174 ..... 1 RS-232
Parallel port ..... IEEE 1284, Type C connector
GPIB port ..... PCI-GPIB/TNT, full-size GPIB connector, Supports standard IEEE488 and HS488 protocols (NI 8176 only)
USB ..... 2 USB ports
Keyboard/mouse ..... 1 PS/2 connector, 2 port PS/2 adapter cable included
DRAM ..... 512 MB maximum, 7.5 ns SDRAM, 1 SO-DIMM socket
Floppy drive ..... Internal 3.5 in., 1.44 MB (NI 8176, NI 8175 only)
Hard drive ..... Internal 2.5-inch 9.5 mm, Fast Ultra ATA100 interface, 15 GB minimum

Power Requirements

VDC	NI 8176		NI 8175		NI 8174	
	Typical ADC	Maximum ADC	Typical ADC	Maximum ADC	Typical ADC	Maximum ADC
+3.3	3.0	4.0	3.2	4.7	3.0	4.3
+5	3.8	6.0	3.5	6.0	2.0	3.5
+12	0.01	0.05	0.01	0.05	0.01	0.05
-12	0	0	0	0	0	0

Total Power

Total Power	Typical (W)	Maximum (W)
NI 8176	30	44
NI 8175	28	36
NI 8174	20	32

Mean Time Between Failures (MTBF)

NI 8176 ..... 169,000 hours
NI 8175 ..... 180,000 hours
NI 8174 ..... 226,000 hours
(Predictions performed in accordance with Belcore methods.)

Operating Environment

Ambient temperature range ..... 0 to 50 °C (Meets IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity range ..... 20 to 80%, noncondensing (Meets IEC-60068-2-56.)

Storage Environment

Ambient temperature range ..... -20 to 60 °C (Meets IEC-60068-2-1 and IEC-60068-2-2.)
Relative humidity range ..... 5 to 95%, noncondensing (Meets IEC-60068-2-56.)

Shock and Vibration

Functional Shock ..... 30 g peak, half-sine, 11 ms pulse (Meets IEC 60068-2-27. Test profile developed in accordance with MIL-T-28800E Class 3.)

Random Vibration
Operating ..... 5 to 500 Hz, 0.3 g_{rms}
Non-operating ..... 5 to 500 Hz, 2.4 g_{rms}
(Meets IEC 60068-2-64. Nonoperating test profile developed in accordance with MIL-T-28800E and MIL-STD-810E Method 514.)

Safety Compliance

EN 61010-1, IEC 61010-1

***Specifications subject to change without notice.**

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