2.53 GHz Dual-Core Embedded Controller for PXI Express

NI PXIe-8108 *NEW!*

- Intel Core 2 Duo T9400 processor (2.53 GHz dual core)
- Up to 1 GB/s system and up to 250 MB/s slot bandwidth
- 1 GB (1 x 1 GB DIMM) dual-channel 800 MHz DDR2 RAM standard, 4 GB (1 x 4 GB DIMMs) maximum
- 80 GB integrated hard-drive standard
- 10/100/1000BASE-TX Ethernet
- 4 Hi-Speed USB ports
- ExpressCard/34 slot
- DVI-I video connector
- IEEE 1284 ECP/EPP parallel port
- GPIB (IEEE 488) controller
- RS232 serial port
- Internal PXI trigger bus routing
- Watchdog timer

Software

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

PXI System Configuration

- Complete PXI system configuration at **ni.com/pxiadvisor**

Overview

The NI PXIe-8108, a high-performance embedded controller based on the Intel Core 2 Duo T9400 processor, is designed for use in PXI Express and CompactPCI Express systems. With its 2.53 GHz dual-core processor, 800 MHz DDR2 memory, and 1 GB/s total system bandwidth, the NI PXIe-8108 is ideal for applications requiring intensive analysis, signal and image processing, and high-throughput data acquisition. This embedded controller in a PXI Express chassis offers a compact, high-performance, PC-based platform for test, measurement, and control applications.

CPU	Intel Core 2 Duo T9400 Processor (2.53 GHz dual core)
Front-side bus	1066 MHz
L2 cache	6 MB
Dual-channel 800 MHz DDR2 RAM, standard	1 GB (1 x 1 GB)
Dual-channel 800 MHz DDR2 RAM, maximum	4 GB (1 x 4 GB)
Hard drive (standard option), minimum	80 GB SATA (5400 rpm)
Hard drive (extended temperature and 24/7 option), minimum	80 GB SATA (5400 rpm)
10/100/1000BASE-TX (gigabit) Ethernet	✔
GPIB (IEEE 488) controller	✔
Serial port (RS232)	✔
Parallel port	✔
Hi-Speed USB ports	4
ExpressCard/34 slot	✔
Watchdog/trigger SMB	✔
Installed OS	Windows Vista Business, Windows Vista Business (downgraded to Windows XP Professional)[1]

[1]Contact National Instruments or visit ni.com/pxiadvisor for information on other available operating systems.

Table 1. NI PXIe-8108 Features

Dual-Core Processor

The NI PXIe-8108 includes the dual-core Intel Core 2 Duo T9400 processor. Dual-core processors contain two cores, or computing engines, in one physical package. They can simultaneously execute two computing tasks, which is advantageous in multitasking environments such as Windows Vista or Windows XP, where multiple applications run simultaneously. Multithreaded system development environments, such as NI LabVIEW, can take full advantage of the two processing cores on the NI PXIe-8108 by automatically separating their tasks into independent threads. With its dual-core processor, this controller can simultaneously execute two of these threads. Figure 1 compares the SYSmark 2007 overall performance of the NI PXIe-8108 controller with other PXI Express embedded controllers.

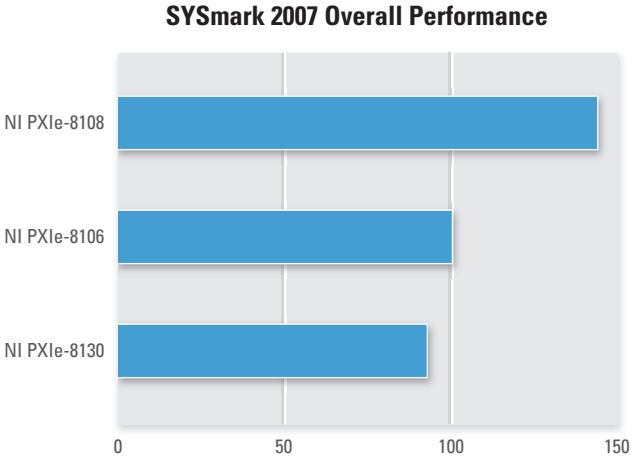

Figure 1. Embedded Controller Benchmarks

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Hardware

With state-of-the-art packaging, the NI PXIe-8108 integrates the Intel Core 2 Duo T9400 processor and all standard and extended PC I/O ports into a single unit. By integrating many I/O ports on the controller, all active slots in the chassis remain available for measurement and control modules. This rugged one-piece controller design minimizes integration issues and eliminates the need for complex cabling to daughter boards. The NI PXIe-8108 block diagram is shown in Figure 2.

Peripheral I/O

This controller includes high-performance peripheral I/O such as 10/100/1000BASE-TX (gigabit) Ethernet and four Hi-Speed USB ports for connection to a keyboard, a mouse, a CD-ROM/DVD-ROM drive for software installation, or other standard PC peripherals such as 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 NI PXIe-8108 controller includes an integrated GPIB (IEEE 488) controller, which provides control of external instrumentation, saving additional cost and a slot.

Memory

The NI PXIe-8108 uses single-channel 800 MHz DDR2 SDRAM, which makes the controller ideal for data-intensive applications requiring significant analysis. It has a single SO-DIMM socket for the DDR2 SDRAM. 1 GB (1 x 1 GB DIMM) of RAM is standard with upgrade options to 4 GB.

Extended Temperature and 24/7 Operation Option

This 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 70 °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.

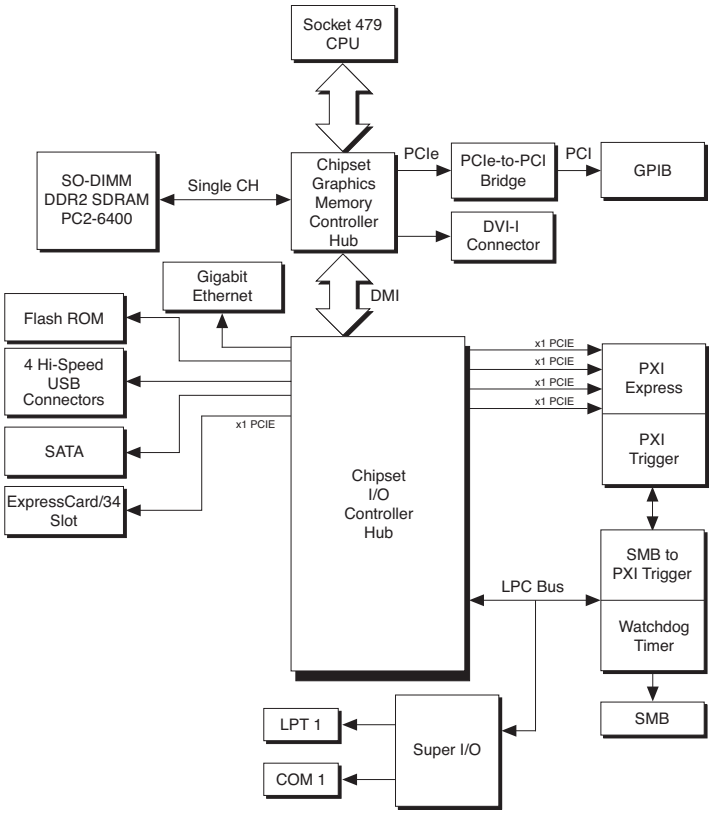

Figure 2. NI PXIe-8108 Block Diagram

ExpressCard

The NI PXIe-8108 features an ExpressCard/34 slot. ExpressCard uses the PCI Express and Hi-Speed USB serial interfaces to provide up to 2.5 Gb/s of bidirectional throughput. Use the ExpressCard/34 slot to add a second gigabit Ethernet port to your system or additional peripheral I/O such as external hard drives, RAID arrays, 802.11 wireless LAN, IEEE 1394, Bluetooth, or various memory adapters.

Video

This controller includes a Mobile Intel GM45 Express Chipset (Graphics and Memory Controller Hub) that has an integrated graphics processing unit. 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. Additionally, the NI PXIe-8108 features a DVI-I video connector that is compatible with digital (DVI) and analog video (VGA) monitors. A DVI-I to VGA adapter is included with the controller for use with VGA monitors.

Dual Monitor Support

The DVI-I video port on the NI PXIe-8108 is capable of supporting simultaneous DVI and VGA output. With this built-in capability, you can connect a digital and an analog monitor or two analog monitors to your PXI system at the same time with independent displays. This negates the need for a separate PXI or CompactPCI video module to connect two monitors to your PXI system. A DVI-I (male) to DVI-D (female) and VGA (female) splitter is required for connecting the two monitors.

USB Peripherals

National Instruments offers a USB-to-dual-PS/2 keyboard/mouse adapter cable 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/DVD-ROM and USB floppy drives for use with your embedded controller. Connect these drives to your embedded controller for easy software installation and upgrades. Both are completely powered through the USB ports, 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 I/O

National Instruments offers numerous plug-in modules to add more peripheral I/O to your PXI system. With the wide variety of peripheral I/O modules available, you can choose modules that add communication with serial, IEEE 1394, and SCSI, in addition to numerous others. You also can obtain modules for controlling other PXI or VXI/VME systems. Visit **ni.com/pxiadvisor** to configure a system with additional peripheral I/O modules.

Software

The NI PXIe-8108 comes with the following minimum set of software already installed:

- Microsoft Windows OS (contact National Instruments or visit **ni.com/pxiadvisor** for a list of available Microsoft OSs and for localized versions)
- NI-VISA and NI-488.2 drivers
- Drivers for all built-in I/O ports (Table 1)

With an NI system assurance program added to a PXI system order, your embedded controller is shipped already configured with all software and drivers applicable for your system. For example, assume you order a PXI system that includes LabVIEW and NI TestStand software, as well as data acquisition modules, a digitizer, an arbitrary waveform generator, and a digital multimeter (DMM). With NI system assurance programs, NI not only assembles and tests your system but also fully configures the embedded controller with the appropriate NI-DAQmx, NI-SCOPE, NI-FGEN, and NI-DMM drivers as well as LabVIEW and NI TestStand.

To configure a complete PXI system with NI system assurance programs, contact National Instruments or visit **ni.com/pxiadvisor**.

Hard-Drive-Based Recovery Image

The NI PXIe-8108 embedded controller is shipped with a factory image of the software installation stored on a separate partition of the hard drive. In the case of software corruption, you can invoke a recovery tool during the controller's boot-up process that can use this backup image to restore the controller to its shipping software configuration. You also can use this recovery tool to create custom images that you can store on external mass storage devices such as a USB memory stick, USB hard drives, and USB CD/DVD drives. With this ability, you can create custom backup images that you can use to either recover an NI PXIe-8108 controller or replicate the installation on other NI PXIe-8108 controllers. For more information on this tool, refer to KnowledgeBase 2ZKC02OK.

Ordering Information

For online configuration of a complete PXI system, including NI system assurance programs, visit **ni.com/pxiadvisor**.

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

NI PXIe-8108

- Base 781033-xx
- Extended Temperature and 24/7 ..... 781034-xx

Step 2. Replace "xx" to select installed OS.

Windows Vista Business (English) ..... -02

Windows Vista – downgraded to Windows XP Professional (English) ..... -01

Localized Windows XP or Other OS[1] ..... -00

[1]Contact National Instruments or visit **ni.com/pxiadvisor** for the latest operating systems.

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

Standard:

- 1 GB (1 x 1 GB DIMM)

Recommended upgraded memory configurations:

- 2 GB (1 x 2 GB DIMM must be purchased)
- 4 GB (1 x 4 GB DIMM must be purchased)

2 GB DDR2 RAM for NI PXIe-8108 780446-2048

4 GB DDR2 RAM for NI PXIe-8108 780446-4096

Step 4. Accessories[1]

80 GB (or greater) 2.5 in. SATA blank HDD spare/replacement 779175-03

80 GB (or greater) 2.5 in. SATA extended temp hard-drive upgrade 779175-07

32 GB 2.5 in. SATA solid-state hard-drive upgrade 779175-08

250 GB (or greater) 2.5 in. SATA hard-drive upgrade 779175-06

DVI-I (male) to DVI-D (female) and VGA (female) splitter 780868-01

USB-to-dual-PS/2 keyboard/mouse adapter cable 778713-02

External USB CD-ROM/DVD-ROM drive 778492-01

External USB floppy drive 778492-02

USB English keyboard and optical mouse 779660-01

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

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

NI FPM-1017 (17 in. flat panel monitor) 779559-01

NI FPT-1015 (flat panel touch screen with VGA interface and USB) 779560-01

GPIB port adapter cable, 2 m 183285-02

[1]For additional peripheral I/O modules, including serial, IEEE 1394, and SCSI, visit **ni.com/pxiadvisor**.

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 T9400 (2.53 GHz dual-core)
Chipset	Mobile Intel GM45 Express Chipset
Front-side bus	1066 MHz
System memory (RAM)	1 GB dual-channel DDR2 RAM PC2 6400 (standard); 4 GB dual-channel DDR2 RAM PC2 6400 (maximum)
PXI Express 4-link configuration	4 x1 links
Ethernet	10/100/1000BASE-TX, RJ45 connector
Hard drive	
Base	80 GB minimum, 5400 rpm, internal 2.5 in., 9.5 mm Serial ATA 1.0 interface
Extended temperature and 24/7 operation option	80 GB minimum, 5400 rpm, 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

	Current (A)	
Voltage (V)	**Typical**	**Maximum**
+3.3	2.25	3.00
+5	1.25	1.80
+12	2.00	2.80
-12	0.00	0.00
+5 V_{AUX}	0.33	0.40

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	0.983 kg (2.17 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 NI 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

- 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

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Hardware Services

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NI system assurance programs are designed to make it even easier for you to own an NI system. These programs include configuration and deployment services for your NI PXI, CompactRIO, or Compact FieldPoint system. The NI Basic System Assurance Program provides a simple integration test and ensures that your system is delivered completely assembled in one box. When you configure your system with the NI Standard System Assurance Program, you can select from available NI system driver sets and application development environments to create customized, reorderable software configurations. Your system arrives fully assembled and tested in one box with your software preinstalled. When you order your system with the standard program, you also receive system-specific documentation including a bill of materials, an integration test report, a recommended maintenance plan, and frequently asked question documents. Finally, the standard program reduces the total cost of owning an NI system by providing three years of warranty coverage and calibration service. Use the online product advisors at **ni.com/advisor** to find a system assurance program to meet your needs.

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