

Deterministic Ethernet Expansion Chassis

NI 9144 **NEW!**

- Real-time distributed I/O over standard Ethernet cable
- 8 slots for C Series I/O modules
- Compact size (28 by 9 by 6 cm)
- 2 Ethernet ports for daisy chaining additional expansion chassis
- Industrial specifications for harsh environments
 - -40 to 70 °C
 - 50 g shock, 5 g vibration

NI C Series I/O Modules

- Sensor-specific signal conditioning per module
- Up to 24-bit resolution
- Up to 256 channels per chassis

LabVIEW Development Software

- LabVIEW
- LabVIEW Real-Time Module



Chassis	Module Slots	Channels per Chassis	Analog Resolution
NI 9144	8	Up to 256 analog input, 128 analog output, or 256 digital I/O	Up to 24 bits

Overview and Distributed Applications

The NI 9144 expansion chassis adds deterministic Ethernet I/O to your NI CompactRIO or NI programmable automation controller (PAC) system. This 8-slot rugged chassis for NI C Series modules communicates deterministically over an open, real-time Ethernet protocol called EtherCAT. You can use CompactRIO controllers or real-time PXI systems with an NI PXI-8231/8232 gigabit Ethernet interface as the master controller for the distributed system. Then you can daisy chain multiple NI 9144 slave chassis from the master controller to expand time-critical applications.

The NI 9144 is an industrial-grade chassis designed for extreme ruggedness, reliability, and a wide -40 to 70 °C operating range. To customize your measurement and control system, select from more than 30 analog and digital C Series modules. Plus, you can take advantage of the software configuration and NI LabVIEW programming to make adding real-time expansion I/O easy.

Software

With the introduction of the LabVIEW Real-Time Module 8.6, you can easily add deterministic expansion I/O to a graphical programming environment. The out-of-box experience for the NI 9144 simply involves installing the NI-Industrial Communications for EtherCAT driver on the NI

master controller. Then LabVIEW automatically recognizes all connected slaves and their modules. LabVIEW also provides I/O variables, which offer instant access to the physical I/O values using a simple drag-and-drop motion. With I/O forcing and live test panels, I/O variables can be used to monitor system performance and implement advanced troubleshooting.

C Series Modules

As a modular expansion system, the NI 9144 chassis provides the flexibility to incorporate more measurement types and channels by simply plugging in additional I/O modules. Plus, attaching another expansion chassis adds even more module slots for your system. Not only are all I/O modules automatically synchronized in each chassis, but all the expansion chassis in the network are synchronized with each other as well.

All C Series modules for single-point analog and digital I/O are supported, giving you direct connectivity with a wide variety of sensors and actuators. Each module contains built-in signal conditioning and isolation for extended voltage ranges and industrial signal types, such as thermocouples, resistance, voltage, current, and strain. Like the NI 9144 chassis, all modules are UL tested and operate in industrial temperature and shock environments. Plus, C Series I/O modules are reusable in other NI hardware platforms, such as embedded CompactRIO, NI CompactDAQ for USB, and Wi-Fi data acquisition.

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C Series Module Compatibility

Analog Input

- NI 9219 – Universal
- NI 9211 – Thermocouple
- NI 9217 – RTD
- NI 9201 – 10 V (12-bit)
- NI 9205 – 10 V (16-bit)
- NI 9215 – 10 V (16-bit)
- NI 9239 – 10 V (24-bit)
- NI 9221 – 60 V (12-bit)
- NI 9229 – 60 V (24-bit)
- NI 9206 – 600 V isolation
- NI 9203 – ± 25 mA current
- NI 9237 – Universal strain

Analog Output

- NI 9263 – 10 V (4 ch)
- NI 9264 – 10 V (16 ch)
- NI 9265 – 20 mA (4 ch)

Digital Input

- NI 9401 – DIO TTL (sink/source)
- NI 9403 – DIO TTL (sink/source)
- NI 9411 – 24 V
- NI 9421 – 24 V (sink)
- NI 9422 – 24 V (sink/source)
- NI 9423 – 30 V (sink)
- NI 9425 – 24 V (sink)
- NI 9426 – 24 V (source)
- NI 9435 – 250 V

Digital Output

- NI 9472 – 30 V (source)
- NI 9474 – 30 V (source)
- NI 9475 – 60 V (source)
- NI 9476 – 36 V (source)
- NI 9477 – 60 V (sink)
- NI 9481 – Relay (4 ch)
- NI 9485 – Relay (8 ch)

Ordering Information

NI 9144780438-01

BUY NOW!

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

Deterministic Ethernet Expansion Chassis

Specifications

Network

Network interface.....	100BASE-TX Ethernet
Compatibility.....	EtherCAT
Communication rates.....	100 Mb/s
Maximum cabling distance.....	100 m/segment

Power Requirements

Power supply range.....	9 to 30 V
Recommended power supply.....	48 W, 24 VDC
Power consumption.....	20 W maximum

Physical Characteristics

Screw-terminal wiring.....	24 to 12 AWG copper wire with 10 mm (0.39 in.) of insulation stripped from the end
Torque for screw terminals.....	0.5 to 0.6 N · m (4.4 to 5.3 lb · in.)
Dimensions.....	284 by 88.1 by 58.9 mm (11.2 by 3.47 by 2.32 in.)
Weight.....	906 g (32.7 oz)

Safety Voltages

V terminal to C terminal.....	30 V max, Measurement Category I
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Safety Standards

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

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

Note: For UL, hazardous location, 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.

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/EEC; 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.

Hazardous Locations

U.S. (UL).....	Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, AEx nA IIC T4
Canada (C-UL).....	Class I, Division 2, Groups A, B, C, D, T4; Class I, Zone 2, Ex nA IIC T4
Europe (DEMKO).....	Ex nA IIC T4

Environmental

The NI 9144 chassis is intended for indoor use only, but it may be used outdoors if mounted in a suitably rated enclosure.

Operating temperature.....	-40 to 70 °C
Storage temperature.....	-40 to 85 °C
Ingress protection.....	IP 40
Relative humidity.....	10 to 90%, noncondensing
Maximum altitude.....	2,000 m
Pollution degree.....	2

Shock and Vibration

To meet these specifications, you must panel mount the EtherCAT system and affix ferrules to the ends of the power terminal wires.

Operating shock (IEC 60068-2-27).....	30 g, 11 ms half sine, 50 g, 3 ms half sine, 18 shocks at 6 orientations
Operating vibration Random (IEC 60068-2-64).....	5 g _{rms} , 10 to 500 Hz
Sinusoidal (IEC 60068-2-6).....	5 g, 10 to 500 Hz

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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integrators. Services range from start-up assistance to turnkey system integration. Visit ni.com/alliance.



OEM Support

We offer design-in consulting and product integration assistance if you want to use our products for OEM applications. For information about special pricing and services for OEM customers, visit ni.com/oem.

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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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