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Deterministic Ethernet Expansion Chassis

NI 9144 **NEW!**

- Real-time distributed I/O over standard Ethernet cable
 - Programmable 2M gate Xilinx Spartan-3 FPGA
 - 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
 - LabVIEW FPGA 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 eight-slot rugged chassis for NI C Series modules communicates deterministically over an open, real-time Ethernet protocol called EtherCAT. Multiple NI 9144 slave chassis may be daisy-chained from the master controller to expand time-critical applications. Supported master controllers all have two Ethernet ports and include platforms such as CompactRIO, real-time PXI, and Industrial Controller. 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 50 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 LabVIEW, 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. The LabVIEW Real-Time Module 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. The NI 9144 also has a 2M gate Xilinx field-programmable gate array (FPGA) that is programmable with the LabVIEW FPGA Module, giving you high-speed and customizable I/O timing, inline processing, and control.

C Series Modules

As a modular expansion system, the NI 9144 chassis features 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.

For the complete catalog of supported C Series modules, visit ni.com/info and enter **cseries**. The modules are listed under the categories for Deterministic Distributed I/O.

Ordering Information

NI 9144.....780438-01

Accessories

PS-15 power supply, 24 VDC, 5 A, universal power input.....781093-01

NI 9978 4-pos screw terminal power supply plugs (quantity 5)....196938-01

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 Mbits/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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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 (IEC 60664).....	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
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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

Safety Standards

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

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

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- 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

Note: For the standards applied to assess the EMC of this product, refer to the Online Product Certification section.

Note: For EMC compliance, operate this product according to the documentation.

CE Compliance

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC) Online Product Certification

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and 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.

Deterministic Ethernet Expansion Chassis

Environmental Management

National Instruments is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial not only to the environment but also to NI customers. For additional environmental information, refer to the NI and the Environment Web page at ni.com/environment. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

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.

电子信息产品污染控制管理办法（中国 RoHS）



中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。关于 National Instruments 中国 RoHS 合规性信息，请登录 ni.com/environment/rohs_china。(For information about China RoHS compliance, go to ni.com/environment/rohs_china.)

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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

System Assurance Programs

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.

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

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