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Find the *National Instruments NI 9477* at our website: ***Click HERE***

Technical Sales

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Ordering Information | Detailed Specifications | Pinouts/Front Panel Connections
For user manuals and dimensional drawings, visit the product page resources tab on ni.com.

Last Revised: 2014-11-06 07:14:28.0

NI 9477

60 V, Sinking Digital Output, 32 Ch Module





- 32 channels, 8 µs digital output module
- 5 V to 60 V output range, sinking digital outputs
- Up to 1 A per channel (20 A per module)
- 60 VDC, CAT I isolation
- Industry-standard 37-pin D-SUB connector
- -40 °C to 70 °C operating, 5 g vibration, 50 g shock

Overview

The NI 9477 is a 32-channel, 8 µs sinking digital output C Series module for any NI CompactDAQ and CompactRIO chassis. Each channel is compatible with 5 V to 60 V signals and features 1,000 Vrms withstand isolation from channel to earth ground. The module can sink up to 625 mA per channel continuous current on all channels and is capable of sinking up to 20 A of current per module (1 A per channel maximum). You can wire NI 9477 channels in parallel to sink up to 20 A of current to a single actuator, motor, or solenoid. The module contains an industry-standard 37-pin D-SUB connector for low-cost cabling to a wide variety of 37-pin accessories from NI or other vendors. It also works with industrial logic levels and signals to directly connect to a wide array of industrial relays, solenoids, and motors.

The NI 9477 is a serial digital module, so it cannot be used to perform counter operations when installed in an NI CompactDAQ chassis.

Recommended Accessories
-NI 9923 front-mount D-SUB to screw terminals

Box Contents
-1 NI 9477 C Series module
-1 NI 9477 Operating Instructions and Specifications manual

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Comparison Tables

Product Name	Signal Levels	Direction	Channels	Update Rate	Continuous Current	Connectivity
NI 9375	12, 24 V	Sinking Input, Sourcing Output	16 In, 16 Out	7 µs In, 500 µs Out	100 mA/ch	Spring Terminal, 37-Pin D-SUB
NI 9472	12, 24 V	Sourcing Output	8	100 µs	750 mA/ch	Screw Terminal, 25-Pin D-SUB
NI 9474	12, 24 V	Sourcing Output	8	1 µs	1 A/ch	Screw Terminal
NI 9475	5, 12, 24, 48, 60 V	Sourcing Output	8	1 µs	1 A/ch	25-Pin D-SUB
NI 9476	12, 24 V	Sourcing Output	32	500 µs	250 mA/ch	37-Pin D-SUB
NI 9477	5, 12, 24, 48, 60 V	Sinking Output	32	8 µs	1 A/ch (20 A per Module)	37-Pin D-SUB
NI 9478	5, 12, 24, 48 V	Sinking Output	16	7 µs	1.2 A/ch	37-Pin D-SUB

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Application and Technology

NI C Series Overview



NI C Series modules are engineered to provide high-accuracy measurements to meet the demands of advanced DAQ and control applications. Each module contains measurement-specific signal conditioning to connect to an array of sensors and signals, bank and channel-to-channel isolation options, and support for wide temperature ranges to meet a variety of application and environmental needs all in a single rugged package. With more than 100 C Series modules to choose from for measurement, control, and communication, you can connect your applications to any sensor on any bus.

Most C Series I/O modules work with both the NI CompactDAQ and NI CompactRIO platforms. The modules are identical, and you can move them from one platform to the other with no modification.

NI CompactRIO Platform



Powered by the NI LabVIEW reconfigurable I/O (RIO) architecture, CompactRIO combines an open embedded architecture with small size, extreme ruggedness, and hot-swappable industrial I/O modules. Each system contains an FPGA for custom timing, triggering, and processing with a wide array of modular I/O to meet any embedded application requirement.

Configure Your Complete NI CompactRIO System

NI CompactDAQ Platform



NI CompactDAQ is a portable, rugged data acquisition platform that integrates connectivity and signal conditioning into modular I/O for directly interfacing to any sensor or signal. Using NI CompactDAQ with LabVIEW, you can easily customize how you acquire, analyze, present, and manage your measurement data. From research to development to validation, NI provides programmable software, high-accuracy measurements, and local technical support to help ensure you meet your exact measurement application requirements.

Configure Your Complete NI CompactDAQ System

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Ordering Information

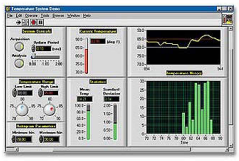
For a complete list of accessories, visit the product page on ni.com.

Products	Part Number	Recommended Accessories	Part Number
NI 9477 Digital Output Front-Mount			
NI 9477 with Front-Mount Accessories Requires: 1 Terminal Block ;	779517-01	**Terminal Block:** screwTerminal - NI 9923 Front-mount D-SUB to screw terminals	781503-01

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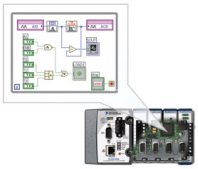
Software Recommendations

LabVIEW Professional Development System for Windows



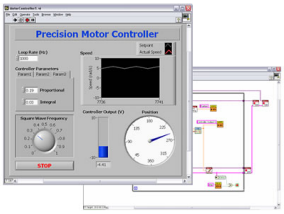
- Advanced software tools for large project development
- Automatic code generation using DAQ Assistant and Instrument I/O Assistant
- Tight integration with a wide range of hardware
- Advanced measurement analysis and digital signal processing
- Open connectivity with DLLs, ActiveX, and .NET objects
- Capability to build DLLs, executables, and MSI installers

NI LabVIEW FPGA Module



- Design FPGA applications for NI reconfigurable I/O (RIO) hardware targets
- Program with the same graphical environment used for desktop and real-time applications
- Execute control algorithms with loop rates up to 300 MHz
- Implement custom timing and triggering logic, digital protocols, and DSP algorithms
- Incorporate existing HDL code and third-party IP including Xilinx CORE Generator functions
- Included in the LabVIEW Embedded Control and Monitoring Suite

NI LabVIEW Real-Time Module



- Design deterministic real-time applications with LabVIEW graphical programming
- Download to dedicated NI or third-party hardware for reliable execution and a wide selection of I/O
- Take advantage of built-in PID control, signal processing, and analysis functions
- Automatically take advantage of multicore CPUs or set processor affinity manually
- Includes real-time OS, development and debugging support, and board support
- Purchase individually or as part of a LabVIEW suite

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Support and 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.

Technical Support

Get answers to your technical questions using the following National Instruments resources.

- **Support** - Visit ni.com/support to access the NI KnowledgeBase, example programs, and tutorials or to contact our applications engineers who are located in NI sales offices around the world and speak the local language.
- **Discussion Forums** - Visit forums.ni.com for a diverse set of discussion boards on topics you care about.
- **Online Community** - Visit community.ni.com to find, contribute, or collaborate on customer-contributed technical content with users like you.

Repair

While you may never need your hardware repaired, NI understands that unexpected events may lead to necessary repairs. NI offers repair services performed by highly trained technicians who quickly return your device with the guarantee that it will perform to factory specifications. For more information, visit ni.com/repair.

Training and Certifications

The NI training and certification program delivers the fastest, most certain route to increased proficiency and productivity using NI software and hardware. Training builds the skills to more efficiently develop robust, maintainable applications, while certification validates your knowledge and ability.

- **Classroom training in cities worldwide** - the most comprehensive hands-on training taught by engineers.
- **On-site training at your facility** - an excellent option to train multiple employees at the same time.
- **Online instructor-led training** - lower-cost, remote training if classroom or on-site courses are not possible.
- **Course kits** - lowest-cost, self-paced training that you can use as reference guides.
- **Training memberships** and training credits - to buy now and schedule training later.

Visit ni.com/training for more information.

Extended Warranty

NI offers options for extending the standard product warranty to meet the life-cycle requirements of your project. In addition, because NI understands that your requirements may change, the extended warranty is flexible in length and easily renewed. For more information, visit ni.com/warranty.

OEM

NI offers design-in consulting and product integration assistance if you need NI products for OEM applications. For information about special pricing and services for OEM customers, visit ni.com/oem.

Alliance

Our Professional Services Team is comprised of NI applications engineers, NI Consulting Services, and a worldwide National Instruments Alliance Partner program of more than 700 independent consultants and integrators. Services range from start-up assistance to turnkey system integration. Visit ni.com/alliance.

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Detailed Specifications

The following specifications are typical for the range –40 to 70 °C unless otherwise noted. All voltages are relative to COM unless otherwise noted.

Output Characteristics	
Number of channels	32
Output type	Sinking
Output voltage (V_O)	$I_O \cdot R_O$
External power supply	
Operating range	0–60 VDC
Reversed-voltage protection	None
Continuous output current (I_O)	
On each channel	1 A, up to 20 channels
Module current (sum of all channels)	20 A max
Output impedance (R_O)	0.065 Ω max
Isolation barrier (DO- or COM-to-earth ground)[1]	
Rated voltage	60 VDC
Isolation voltage	1,000 V_{rms}, verified by a 5 s dielectric withstand test
Short-circuit protection	None
Maximum update rate	8 µs
Propagation delay	1 µs max
MTBF	717,920 hours at 25 °C; Bellcore Issue 6, Method I, Case 3, Parts Count Method

Note Contact NI for Bellcore MTBF specifications at other temperatures or for MIL-HDBK-217F specifications. Go to ni.com/certification and search by module number or product line for more information about MTBF and other product certifications.

Power Requirements	
Power consumption from chassis	
Active mode	130 mA max
Sleep mode	5 µA max
Thermal dissipation at 70 °C	
Active mode	1.5 W max
Sleep mode	25 µW max

Physical Characteristics

If you need to clean the module, wipe it with a dry towel.

Weight	145 g (5.1 oz)

Hazardous Locations

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

Safety

Maximum Voltage [2]

Channel-to-COM	60 VDC, Measurement Category I

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as MAINS [3] voltage. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special hardware, limited-energy parts of hardware, circuits powered by regulated low-voltage sources, and electronics.

Caution Do not connect the NI 9477 to signals or use for measurements within Measurement Categories II, III, or IV.

Isolation Voltages

Channel-to-channel isolation	None
Channel-to-earth ground isolation	
Continuous	60 VDC, Measurement Category I
Withstand	1,000 V_{rms}, verified by a 5 s dielectric withstand test

Environmental

National Instruments C Series modules are intended for indoor use only but may be used outdoors if installed in a suitable enclosure. Refer to the manual for the chassis you are using for more information about meeting these specifications.

Operating temperature (IEC 60068-2-1, IEC 60068-2-2)	–40 to 70 °C
Storage temperature (IEC 60068-2-1, IEC 60068-2-2)	–40 to 85 °C
Ingress protection	IP 40
Operating humidity (IEC 60068-2-56)	10 to 90% RH, noncondensing
Storage humidity (IEC 60068-2-56)	5 to 95% RH, noncondensing
Maximum altitude	2,000 m
Pollution Degree (IEC 60664)	2

Shock and Vibration

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

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
Operating shock (IEC 60068-2-27)	30 g, 11 ms half sine, 50 g, 3 ms half sine, 18 shocks at 6 orientations

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

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

Emissions	EN 55011 Class A at 10 m FCC Part 15A above 1 GHz
Immunity	Industrial levels per EN 61326-1:1997 + A2:2001, Table A.1
EMC/EMI	CE, C-Tick, and FCC Part 15 (Class A) Compliant

Note For EMC compliance, operate this device with shielded cabling.

CE Compliance

This product meets the essential requirements of applicable European Directives, as amended for CE marking, as follows:

- Low-Voltage Directive (safety); 73/23/EEC
- Electromagnetic Compatibility Directive (EMC); 89/336/EEC

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

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 module number or product line, and click the appropriate link in the Certification column.

[1] Refer to the *Hazardous Locations* section for more information about safety and isolation voltages.

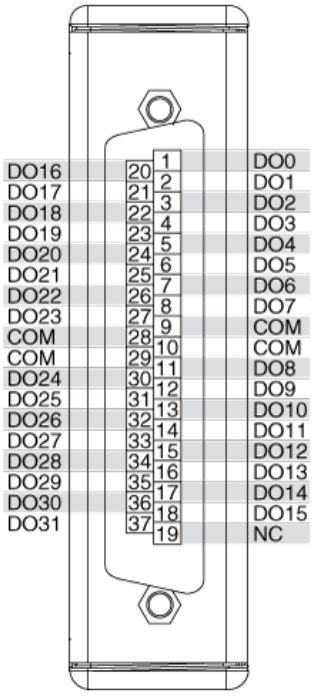
[2] The maximum voltage that can be applied or output between V_{sup} and COM without creating a safety hazard.

[3] MAINS is defined as a hazardous live electrical supply system that powers hardware. Suitably rated measuring circuits may be connected to the MAINS for measuring purposes.

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Pinouts/Front Panel Connections



NI 9477 Pin Assignments

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