DATASHEET

NI 9262

1 MS/s/ch Simultaneous, ±10 V, 6-Channel C Series Voltage Output Module

- DSUB connectivity
- 60 V DC, CAT I, channel-to-earth isolation
- 16-bit resolution

The NI 9262 is a simultaneously updating analog output module. It features overvoltage protection, short-circuit protection, low crosstalk, fast slew rate, high relative accuracy, and NIST-traceable calibration. The NI 9262 module includes a channel-to-earth ground isolation barrier for safety and noise immunity.

Kit Contents	• NI 9262 • NI 9262 Getting Started Guide
Accessories	• NI 9923 Screw-Terminal Block

Vertrieb durch AMC

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C SERIES ANALOG OUTPUT MODULE COMPARISON							
Product Name	**Module Type**	**Signal Ranges**	**Channels**	**Update Rate**	**Isolation**	**Resolution**	**Connectivity**
NI 9260	Voltage Output	3 V RMS	2	51.2 kS/s/ch	None	24-Bit	BNC, mini XLR
NI 9262	Voltage Output	±10 V	6	1 MS/s/ch	60 V DC Ch-Earth	16-Bit	37-Pin DSUB
NI 9263	Voltage Output	±10 V	4	100 kS/s/ch	250 V RMS Ch-Earth	16-Bit	Screw Terminal, Spring Terminal
NI 9264	Voltage Output	±10 V	16	25 kS/s/ch	250 V RMS Ch-Earth (Spring) 60 V DC Ch-Earth (DSUB)	16-Bit	Spring Terminal, 37-Pin DSUB
NI 9265	Current Output	0 mA to 20 mA	4	100 kS/s/ch	250 V RMS Ch-Earth, Vsup-Earth, COM-Earth	16-Bit	Screw Terminal
NI 9266	Current Output	0 mA to 20 mA	8	24 kS/s/ch	250 V RMS Ch-Earth (Screw) 60 V DC Ch-Earth (DSUB)	16-Bit	Screw Terminal, 37-Pin DSUB
NI 9269	Voltage Output	±10 V	4	100 kS/s/ch	250 V RMS Ch-Ch 250 V RMS Ch-Earth	16-Bit	Screw Terminal

NI C Series Overview

NI provides more than 100 C Series modules for measurement, control, and communication applications. C Series modules can connect to any sensor or bus and allow for high-accuracy measurements that meet the demands of advanced data acquisition and control applications.

- Measurement-specific signal conditioning that connects to an array of sensors and signals
- Isolation options such as bank-to-bank, channel-to-channel, and channel-to-earth ground
- -40 °C to 70 °C temperature range to meet a variety of application and environmental needs
- Hot-swappable

The majority of C Series modules are supported in both CompactRIO and CompactDAQ platforms and you can move modules from one platform to the other with no modification.

CompactRIO

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

CompactDAQ

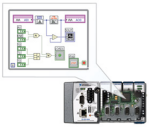
CompactDAQ is a portable, rugged data acquisition platform that integrates connectivity, data acquisition, and signal conditioning into modular I/O for directly interfacing to any sensor or signal. Using CompactDAQ with LabVIEW, you can easily customize how you acquire, analyze, visualize, and manage your measurement data.

Software

LabVIEW Professional Development System for Windows

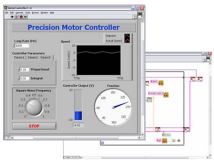
- Use advanced software tools for large project development
- Generate code automatically using DAQ Assistant and Instrument I/O Assistant
- Use advanced measurement analysis and digital signal processing
- Take advantage of open connectivity with DLLs, ActiveX, and .NET objects
- Build DLLs, executables, and MSI installers

NI LabVIEW FPGA Module



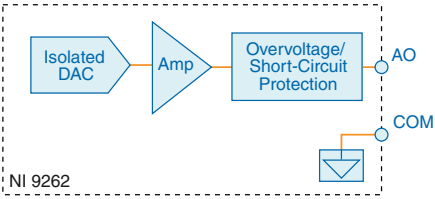
- Design FPGA applications for NI RIO hardware
- Program with the same graphical environment used for desktop and real-time applications
- Execute control algorithms with loop rates up to 300 MHz
- Implement custom timing and triggering logic, digital protocols, and DSP algorithms
- Incorporate existing HDL code and third-party IP including Xilinx IP generator functions
- Purchase as part of 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
- Take advantage of real-time OS, development and debugging support, and board support
- Purchase individually or as part of a LabVIEW suite

Circuitry



Each channel has a digital-to-analog converter (DAC) that produces a voltage signal. Each channel also has overvoltage and short-circuit protection.

NI 9262 Specifications

The following specifications are typical for the range -40 °C to 70 °C unless otherwise noted.

Caution Do not operate the NI 9262 in a manner not specified in this document. Product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it to NI for repair.

Output Characteristics

Number of channels	6
DAC resolution	16 bits

Output range	
Minimum	±10.669 V
Maximum	±10.812 V
Typical	±10.742 V
Current drive	
Per channel	±10 mA
All channels (trip)[1]	±16 mA
All channels (hold)[1]	±9 mA maximum
Capacitive drive	1 nF
Output impedance	0.6 Ω
Power on state[2]	0 V
Power off state[3]	High Z
Overvoltage protection (AO-to-COM)	± 30 V maximum

Dynamic Characteristics

Minimum update time[4]	1.5 µs
Maximum update rate	
CompactDAQ (NI-DAQmx)	1 MS/s
CompactRIO	
FPGA user-controlled I/O sampling[5]	1 MS/s
FPGA I/O nodes	600 kS/s
Noise (0.1 Hz to 1 MHz)	150 µV RMS

1 The module will typically provide up to the all channels (trip) current before the limit activates. Once the limit activates, the typical total available current will drop to the all channels (hold) current to limit internal power dissipation. The module will not recover from the limit until the static current drawn drops below this typical hold current. NI recommends that you lower the static current required to drive the loads on all channels to a level below the all channels (hold) current if you expect to activate the limit.

2 When the module powers on, a glitch occurs for 500 µs peaking at -3 V.

3 The power-down voltage peaks at -3 V then discharges to 200 mV in 100 ms. You can add a load to reduce peak voltage.

4 The minimum amount of time between the start of a write and the update of the DAC output when using NI-DAQmx or CompactRIO FPGA user-controlled I/O sampling.

5 FPGA user-controlled I/O sampling provides low-level access to write data and update sample timing. This allows for faster update rates than the minimum update time by overlapping or pipelining writes and updates. Visit *ni.com/info* and enter the info code `samplerate` for information about FPGA user-controlled I/O sampling.

Slew rate	5 V/µs
Channel-to-channel crosstalk (10 kHz)	-100 dB
Settling time	
0.1% accuracy	
±20 V step	10 µs
1 LSB accuracy	
±20 V step, 100 pF	17 µs
±1 V step, 100 pF	6 µs
±0.1 V step, 100 pF	5 µs
INL (best fit)	±2 LSBs maximum
DNL	±1 LSB maximum
Stability	
Offset drift	±10 µV/°C
Gain drift	±5 ppm/°C
Glitch energy	9 nV · s (6 mV for 3 µs)

Table 1. Accuracy

	Measurement Conditions	Percent of Reading (Gain Error)	Percent of Range[6] (Offset Error)
Calibrated	Maximum (-40 °C to 70 °C)	0.2%	0.08%
	Typical (25 °C)	0.06%	0.01%
Uncalibrated[7]	Maximum (-40 °C to 70 °C)	0.46%	0.2%
	Typical (25 °C)	0.2%	0.08%

NI 9262 Safety Voltages

Connect only voltages that are within the following limits.

AO-to-COM	±30 V maximum
Isolation	
Channel-to-channel	None

[6] Range equals 10.742 V.

[7] Uncalibrated accuracy refers to the accuracy achieved when acquiring in raw or unscaled modes where the calibration constants stored in the module are not applied to the data.

Channel-to-earth ground	
Continuous	60 V DC, Measurement Category I
Withstand	1,000 V RMS, verified by a 5 s dielectric withstand test

Measurement Category I is for measurements performed on circuits not directly connected to the electrical distribution system referred to as *MAINS* voltage. MAINS is a hazardous live electrical supply system that powers equipment. This category is for measurements of voltages from specially protected secondary circuits. Such voltage measurements include signal levels, special equipment, limited-energy parts of equipment, circuits powered by regulated low-voltage sources, and electronics.

Caution Do not connect the NI 9262 to signals or use for measurements within Measurement Categories II, III, or IV.

Note Measurement Categories CAT I and CAT O are equivalent. These test and measurement circuits are for other circuits not intended for direct connection to the MAINS building installations of Measurement Categories CAT II, CAT III, or CAT IV.

Power Requirements

Power consumption from chassis	
Active mode	950 mW maximum
Sleep mode	450 µW maximum
Thermal dissipation (at 70 °C)	
Active mode	1.5 W maximum
Sleep mode	250 mW maximum

Hazardous Locations

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

Safety Compliance and Hazardous Locations Standards

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

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA C22.2 No. 61010-1
- EN 60079-0, EN 60079-15
- IEC 60079-0: Ed 6, IEC 60079-15; Ed 4
- UL 60079-0; Ed 6, UL 60079-15; Ed 4
- CSA C22.2 No. 60079-0, CSA C22.2 No. 60079-15

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

Electromagnetic Compatibility

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

- EN 61326-1 (IEC 61326-1): Class A emissions; Industrial immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- EN 55022 (CISPR 22): Class A emissions
- EN 55024 (CISPR 24): Immunity
- AS/NZS CISPR 11: Group 1, Class A emissions
- AS/NZS CISPR 22: Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia and New Zealand (per CISPR 11) Class A equipment is intended for use only in heavy-industrial locations.

Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generate radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations and certifications, and additional information, refer to the *Product Certifications and Declarations* section.

CE Compliance

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

- 2014/35/EU; Low-Voltage Directive (safety)
- 2014/30/EU; Electromagnetic Compatibility Directive (EMC)
- 2014/34/EU; Potentially Explosive Atmospheres (ATEX)

Product Certifications and Declarations

Refer to the product Declaration of Conformity (DoC) for additional regulatory compliance information. To obtain product certifications and the DoC for NI products, visit *ni.com/product-certifications*, search by model number, and click the appropriate link.

Shock and Vibration

To meet these specifications, you must panel mount the system.

Operating vibration	
Random (IEC 60068-2-64)	5 g_{rms}, 10 Hz to 500 Hz
Sinusoidal (IEC 60068-2-6)	5 g, 10 Hz 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

Environmental

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 °C to 70 °C
Storage temperature (IEC 60068-2-1, IEC 60068-2-2)	-40 °C to 85 °C
Ingress protection	IP40
Operating humidity (IEC 60068-2-78)	10% RH to 90% RH, noncondensing
Storage humidity (IEC 60068-2-78)	5% RH to 95% RH, noncondensing
Pollution Degree	2
Maximum altitude	5,000 m

Indoor use only.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Commitment to 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 the product life cycle, all NI products must be disposed of according to local laws and regulations. For more information about how to recycle NI products in your region, visit *ni.com/environment/weee*.

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`.)

Calibration

You can obtain the calibration certificate and information about calibration services for the NI 9262 at *ni.com/calibration*.

Calibration interval	2 years

Vertrieb durch AMC

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