

SPECIFICATIONS

NI ELVIS RIO Control Module

This document lists the specifications for the NI ELVIS RIO Control Module. The following specifications are typical for the 10 °C to 35 °C operating temperature range unless otherwise noted.



Caution Do not operate the NI ELVIS RIO CM 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.

Processor and FPGA

Type	Xilinx Z-7010
Speed	667 MHz
Cores	2

Operating System



Note For minimum software support information, visit ni.com/info and enter the Info Code `swsupport`.

Supported operating system	NI Linux Real-Time (32-bit)
Required software	
NI LabVIEW 2016 ELVIS RIO Control Software Bundle	LabVIEW 2016 ELVIS RIO Control Toolkit, LabVIEW 2016 Development System, LabVIEW 2016 Real-Time Module

Memory

Nonvolatile	512 MB
-------------	--------

Volatile

DDR3	256 MB
Clock frequency	533 MHz
Data bus width	16 bits



Note For information about the life span of the nonvolatile memory and about best practices for using nonvolatile memory, visit ni.com/info and enter the Info Code SSDBP.

USB Port

USB host port	USB 2.0 Hi-Speed, with standard A connector
USB device port	USB 2.0 Hi-Speed, with standard B connector

Analog Input

Aggregate sample rate	500 kS/s
Resolution	12 bits
Overvoltage protection	± 16 V
Configuration	8 single-ended channels (4 channels per connector)
Input impedance	>500 k Ω acquiring at 500 kS/s; 1 M Ω powered on and idle; 4.7 k Ω powered off
Recommended source impedance	3 k Ω or less
Nominal range	0 V to +5 V
Absolute accuracy	± 50 mV
Bandwidth	>300 kHz

Analog Output

Maximum update rate (simultaneous)	345 kS/s/ch
Resolution	12 bits
Overvoltage protection	± 16 V
Startup voltage	0 V after FPGA initialization

Configuration	4 single-ended channels (2 channels per connector)
Nominal range	0 V to +5 V
Absolute accuracy	±50 mV
Current drive	3 mA
Slew rate	0.3 V/μs

Digital I/O

Number of lines	
DIO	16 per connector
Serial	1 UART.RX per connector 1 UART.TX per connector
Direction control	Each DIO line individually programmable as input or output
Logic level	5 V compatible LVTTTL input; 3.3 V LVTTTL output
Input logic levels	
Input low voltage, V_{IL}	
Minimum	0 V
Maximum	0.8 V
Input high voltage, V_{IH}	
Minimum	2.0 V
Maximum	5.25 V
Output logic levels	
Output high voltage, V_{OH} sourcing 4 mA	
Minimum	2.4 V
Maximum	3.465 V
Output low voltage, V_{OL} sinking 4 mA	
Minimum	0 V
Maximum	0.4 V
Minimum output pulse width	20 ns

Maximum frequencies for secondary digital functions

SPI	4 MHz
PWM	100 kHz
Quadrature encoder input	100 kHz
I ² C	400 kHz

UART lines

Maximum baud rate	230,400 bps
Data bits	5, 6, 7, 8
Stop bits	1, 2
Parity	Odd, Even, Mark, Space
Flow control	XON/XOFF

Power Outputs



Caution Exceeding the power limits may cause unpredictable device behavior.

+5 V power output

Output voltage	4.75 V to 5.25 V
Maximum current on each connector	100 mA

+3.3 V power output

Output voltage	3.0 V to 3.6 V
Maximum current on each connector	150 mA

Power Requirements



Note The NI ELVIS RIO CM is powered by the ELVIS II Series Workstation.

Maximum power consumption	13 W
---------------------------	------

Physical Characteristics

Weight	245 g
--------	-------

Safety 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 61010-1



Note For UL and other safety certifications, refer to the product label or the [Online Product Certification](#) section.



Caution Using the NI ELVIS RIO CM in a manner not described in this document may impair the protection the NI ELVIS RIO CM provides.

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; 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 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, refer to the [Online Product Certification](#) section of this document.

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)

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.

Environmental



Caution Clean the NI ELVIS RIO CM with a soft, nonmetallic brush. Make sure that the device is completely dry and free from contaminants before returning it to service.

Operating temperature	10 °C to 35 °C
Storage temperature (IEC 60068-2-1, IEC 60068-2-2)	-20 °C to 70 °C
Operating humidity (IEC 60068-2-78)	10% RH to 90% RH, noncondensing
Storage humidity (IEC 60068-2-78)	10% RH to 90% RH, noncondensing
Maximum altitude	2,000 m
Pollution Degree (IEC 60664)	2

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 *Minimize Our Environmental Impact* 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.)

Worldwide Support and Services

The NI website is your complete resource for technical support. At ni.com/support, you have access to everything from troubleshooting and application development self-help resources to email and phone assistance from NI Application Engineers.

Visit ni.com/services for NI Factory Installation Services, repairs, extended warranty, and other services.

Visit ni.com/register to register your NI product. Product registration facilitates technical support and ensures that you receive important information updates from NI.

A Declaration of Conformity (DoC) is our claim of compliance with the Council of the European Communities using the manufacturer's declaration of conformity. This system affords the user protection for electromagnetic compatibility (EMC) and product safety. You can obtain the DoC for your product by visiting ni.com/certification. If your product supports calibration, you can obtain the calibration certificate for your product at ni.com/calibration.

NI corporate headquarters is located at 11500 North Mopac Expressway, Austin, Texas, 78759-3504. NI also has offices located around the world. For telephone support in the United States, create your service request at ni.com/support or dial 1 866 ASK MYNI (275 6964). For telephone support outside the United States, visit the *Worldwide Offices* section of ni.com/global to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.

Refer to the *NI Trademarks and Logo Guidelines* at ni.com/trademarks for information on NI trademarks. Other product and company names mentioned herein are trademarks or trade names of their respective companies. For patents covering NI products/technology, refer to the appropriate location: **Help»Patents** in your software, the `patents.txt` file on your media, or the *National Instruments Patent Notice* at ni.com/patents. You can find information about end-user license agreements (EULAs) and third-party legal notices in the readme file for your NI product. Refer to the *Export Compliance Information* at ni.com/legal/export-compliance for the NI global trade compliance policy and how to obtain relevant HTS codes, ECCNs, and other import/export data. NI MAKES NO EXPRESS OR IMPLIED WARRANTIES AS TO THE ACCURACY OF THE INFORMATION CONTAINED HEREIN AND SHALL NOT BE LIABLE FOR ANY ERRORS. U.S. Government Customers: The data contained in this manual was developed at private expense and is subject to the applicable limited rights and restricted data rights as set forth in FAR 52.227-14, DFAR 252.227-7014, and DFAR 252.227-7015.

© 2016 National Instruments. All rights reserved.

378012A-02 Aug16