NI ELVIS RIO Control Module Specifications

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Specifications

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 kΩ acquiring at 500 kS/s; 1 MΩ powered on and idle; 4.7 kΩ powered off
Recommended source impedance	3 kΩ 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 LVTTL input; 3.3 V LVTTL 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^2C	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 C22.2 No. 61010-1

Note For safety certifications, refer to the product label or the Product Certifications and Declarations 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

Note For EMC declarations and certifications, refer to the Online Product Certification section of this document.

CE Compliance CE

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)
- 2011/65/EU; Restriction of Hazardous Substances (RoHS)
- 2014/53/EU; Radio Equipment Directive (RED)
- 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.

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 ***Engineering a Healthy Planet*** 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.

EU and UK Customers

- **Waste Electrical and Electronic Equipment (WEEE)**—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RoHS**— NI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NI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.)

NI Services

Visit ni.com/support to find support resources including documentation, downloads, and troubleshooting and application development self-help such as tutorials and examples.

Visit ni.com/services to learn about NI service offerings such as calibration options, repair, and replacement.

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

NI corporate headquarters is located at 11500 N Mopac Expwy, Austin, TX, 78759-3504, USA.