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SPECIFICATIONS

IC-3172

Industrial Controller with Reconfigurable I/O

Definitions

Warranted specifications describe the performance of a model under stated operating conditions and are covered by the model warranty.

Characteristics describe values that are relevant to the use of the model under stated operating conditions but are not covered by the model warranty.

- *Typical* specifications describe the expected performance met by a majority of the models.
- *Nominal* specifications describe parameters and attributes that may be useful in operation.

Specifications are *Characteristics* unless otherwise noted.

Conditions

Specifications are valid for the range 0 °C to 55 °C, and 0 °C to 50 °C when Power over Ethernet (PoE) exceeds 30 W.

Physical Characteristics

Caution You can impair the protection provided by the IC-3172 if you use it in a manner not described in this document.

To clean the IC-3172, wipe it with a dry towel.

Dimensions	17.4 cm × 9.3 cm × 16.8 cm (6.9 in × 3.7 in × 6.6 in)
Weight	3.039 kg (6 lbs, 11 oz)

Processor

Type	Intel Core i5-5350U
Base frequency	1.8 GHz
Maximum frequency	2.9 GHz
On-die cache	3 MB

Operating System

Supported Operating System	NI Linux Real-Time 64-bit

Memory

System RAM	
Capacity	8 GB
Type	DDR3L
Speed	1600 MT/s
Nonvolatile storage	
Capacity	4 GB

Power Requirements

Note Supply voltages are measured at the IC-3172 power connectors.

System power (V_1, V_2)	
Supply voltage	9 to 30 VDC, 21.6 to 30 VDC when using Power over Ethernet (PoE)
Maximum power input	150 W
Isolated-output power (V_{ISO})	
Supply voltage	4.5 to 30 VDC
User-replaceable battery	3V BR2032 lithium-carbon monofluoride coin cell, rated to 85 °C

Reconfigurable FPGA

Type	Xilinx Kintex-7 XC7K160T
Number of flip-flops	202,800
Number of 6-input LUTs	101,400
Number of DSP48E1 slices (18 × 25 multipliers)	600
Embedded block RAM	11,700
Number of DMA channels	32
Number of logical interrupts	32

Network Port

Standard	IEEE 802.3 Ethernet, 10BASE-T, 100BASE-TX, 1000BASE-T
Interface	RJ45
Speed	10, 100, 1000 Mbps

PoE-Capable Network Ports

Number of ports	4
Standards	IEEE 802.3 Ethernet, 10BASE-T, 100BASE-TX, 100BASE-T, IEEE 802.3af (PoE) compatible
Interface	RJ45
Speed	10, 100, 1000 Mbps
Supported PoE power classes	0, 1, 2, 3
PoE power output (per port)	15.4 W
Recommended port for IEEE 1588 grandmaster connection	PoE1

USB 3.0 Ports

Number of ports	2
Type	USB 3.0, SuperSpeed

Speed	5 GB/s
Maximum current	900 mA, per port

USB 2.0 Ports

Number of ports	4
Type	USB 2.0, Hi-Speed
Speed	480 Mbit/s
Maximum current	1 A, shared across each pair of ports

DisplayPort

Number of ports	2
Maximum resolution	3840 × 2160 at 60 Hz

RS-485/422/232 Serial Port

Interface	RJ50
Maximum baud rate	115,200 bps
Data bits	5, 6, 7, 8
Stop bits	1, 1.5, 2
Parity	Odd, Even, Mark, Space
Flow control	None
Wire mode	4-wire, 2-wire, 2-wire auto

TTL Inputs/Outputs

Number of channels	8
Type	Bidirectional
Output voltage range	0 V to 5 V
Maximum pulse rate	2 MHz
Minimum pulse detected	500 ns
Power-on state	Input (high-impedance), 10 kΩ pull-up to 5 V

Logic levels	
Input low voltage	0.59 V maximum
Input high voltage	2.57 V minimum
Output low voltage	0.38 V maximum at 1.5 mA
Output high voltage	4.12 V minimum at 1.5 mA

Differential Inputs/Outputs

Number of channels	2
Types	Bidirectional RS-422/RS-485 or single-ended input
Maximum pulse rate	5 MHz, differential
Differential input threshold	±200 mV
Differential output voltage	2.0 V min (R_{LOAD} = 100 Ω, RS-422)
Input voltage range	0 V to 5.5 V
TTL-compatible single-ended logic levels	
Input low voltage	0.8 V
Input high voltage	2.0 V

Isolated Inputs

Type	Current sinking
Number of channels	8
Input voltage	
Input voltage range	0 V to 24 V
Input OFF voltage	0 V to 2.0 V
Input ON voltage	3.3 V to 24 V
Turn-on current	2.5 mA
Maximum pulse rate	100 kHz
Minimum pulse detected	10 µs
Input protection	
Reverse polarity protection	Yes, -30 V
Input voltage (channel to C_{ISO})	30 V maximum
Input current	3.3 mA, internally limited

Isolated Outputs

Type	Current sourcing
Number of channels	8
Supply voltage (V_{ISO})	
Supply voltage range (V_{ISO})	4.5 to 30 VDC
Reverse polarity protection	Yes, -30 V
Maximum output voltage drop	
V_{ISO} = 5 V	1.08 V at 35 mA
V_{ISO} = 24 V	1.18 V at 80 mA
Maximum output current	
V_{ISO} = 5 V	35 mA
V_{ISO} = 24 V	80 mA
Maximum current limit	345 mA
Minimum pulse rate	2.5 kHz (load of 100 kΩ, 300 pF)
Maximum pulse rate	20 kHz (load of 10 kΩ, 300 pF)
Minimum pulse generated	400 µs

Note The isolated outputs have a current limit which will turn off the outputs in case the limit is exceeded. The circuit resets when the output is turned off. Do not draw more than 100 mA from any 24 V isolated output. Do not draw more than 50 mA from any 5 V isolated output. Do not draw more than 640 mA combined from the V_{ISO} pins on the 44-pin D-SUB connector.

Environmental

Indoor use only.

Ingress protection (IEC 60529)	IP20
Temperature (IEC 60068-2-1 and IEC 60068-2-2)	
Operating	0 °C to 55 °C, 0 °C to 50 °C when Power over Ethernet (PoE) exceeds 30 W
Storage	-20 °C to 85 °C
Operating humidity (IEC 60068-2-56)	10% RH to 90% RH, noncondensing
Storage humidity (IEC 60068-2-56)	5% RH to 95% RH, noncondensing
Pollution degree (IEC 60664)	2

Maximum Altitude	2,000 m
Operating shock (IEC 60068-2-27)	50 g, 3 ms half sine, 3 shocks per side 30 g, 11 ms half sine, 3 shocks per side
Operating vibration	
Random (IEC 60068-2-64)	10 to 500 Hz, 5 g_{rms}
Swept Sine (IEC 60068-2-6)	10 to 500 Hz, 5 g

Safety

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.

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 *Online Product Certification* section.

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)

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 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*.

Battery Replacement and Disposal

Battery Directive This device contains a long-life coin cell battery. Refer to the device user manual for instructions on changing the battery. Dispose of this battery separately from municipal waste. For more information about compliance with the EU Battery Directive 2006/66/EC about Batteries and Accumulators and Waste Batteries and Accumulators, visit *ni.com/environment/batterydirective*.

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.)

Where to Go Next

The following documents and resources contain information you may find helpful as you use the IC-3172 in an application. Refer to the National Instruments Product Manuals Library at *http://www.ni.com/manuals* for the most recent versions of product documentation.

- *IC-317x Getting Started Guide*—Explains how to install and configure the device.
- *IC-317x User Manual*—Contains connector pinouts, configuration information, mounting information, and answers to common troubleshooting questions.
- *NI CVS I/O Accessory User Manual*—Contains installation and operation instructions for the CVS I/O Accessory.

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*.

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