

---

# NI-7935

# Specifications

---

2022-07-06



# Contents

NI-7935R Specifications..... 3

# NI-7935R Specifications

This document lists the specifications for the NI-7935R. Specifications are subject to change without notice. For the most recent device specifications, refer to [ni.com/manuals](http://ni.com/manuals). Refer to your adapter module documentation for the adapter module specifications.



**Note** Using the NI-7935R in a manner not described in this document might impair the protection the NI-7935R provides.



**Note** Typical values are representative of an average unit operating at room temperature. These specifications are typical at 25 °C unless otherwise noted.

## FlexRIO Documentation

Document	Location	Description
Getting started guide for your Controller for FlexRIO	Available from the Start menu and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains installation instructions for your FlexRIO system.
Specifications document for your Controller for FlexRIO	Available from the Start menu and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains specifications for your Controller for FlexRIO.
Getting started guide for your adapter module	Available from the Start menu and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains signal information, examples, and CLIP details for your adapter module.
Specifications document for your adapter module	Available from the Start menu and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains specifications for your adapter module.
<b>LabVIEW FPGA Module Help</b>	Embedded in <b>LabVIEW Help</b> and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains information about the basic functionality of the LabVIEW FPGA Module.
<b>Real-Time Module Help</b>	Embedded in <b>LabVIEW Help</b> and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains information about real-time programming concepts, step-by-step

Document	Location	Description
		instructions for using LabVIEW with the Real-Time Module, reference information about Real-Time Module VIs and functions, and information about LabVIEW features on real-time operating systems.
<b>FlexRIO Help</b>	Available from the Start menu and at <a href="http://ni.com/manuals">ni.com/manuals</a> .	Contains information about the FPGA module front panel connectors and I/O, controller for FlexRIO front panel connectors and I/O, programming instructions, and adapter module component-level IP (CLIP).
LabVIEW Examples	Available in NI Example Finder. In LabVIEW, click Help » Find Examples » Hardware Input and Output » FlexRIO.	Contains examples of how to run FPGA VIs and Host VIs on your device.
IPNet	Located at <a href="http://ni.com/ipnet">ni.com/ipnet</a> .	Contains LabVIEW FPGA functions and intellectual property to share.
FlexRIO product page	Located at <a href="http://ni.com/flexrio">ni.com/flexrio</a> .	Contains product information and data sheets for FlexRIO devices.

Table 1. FlexRIO Documentation Locations and Descriptions

## Processor

Type	Xilinx Zynq-7020, XC7Z020 All Programmable SoC, CLG484
Architecture	ARM Cortex-A9
Speed	667 MHz
Cores	2
Real-time clock accuracy	5 ppm

Operating system	NI Linux Real-Time (32-bit)
Nonvolatile memory	512 MB <sup>[1]</sup> , SLC NAND Flash
Volatile memory (DRAM)	512 MB, DDR3
Flash reboot endurance	100,000 cycles <sup>[2]</sup>

For information about the life span of the nonvolatile memory and about best practices for using nonvolatile memory, visit [ni.com/info](http://ni.com/info) and enter the Info Code SSDBP.

## CMOS Battery

Typical battery life with power applied to power connector	10 years
Typical battery life in storage up to 70 °C	10 years

## Internal Reference Clock

### General Characteristics

Clock distribution part number	AD9511 <sup>[3]</sup> ; clock distribution
Oscillator type	VCXO
Oscillator model	Epson Toyocom TCO-2121U2
Frequency	100 MHz <sup>[4]</sup>
Frequency pull range	± 100 ppm

## Typical Specifications

### Frequency stability

Temperature             $\pm 30$  ppm over the operating temperature range

Aging                     $\pm 5$  ppm per year

## Network/Ethernet Port

Number of ports	1
Network interface	10Base-T, 100Base-TX, and 1000Base-T Ethernet
Compatibility	IEEE 802.3
Communication rates	10 Mbps, 100 Mbps, 1000 Mbps auto-negotiated, half/full-duplex
Maximum cabling distance	100 m/segment

## USB Ports

<b>Number of ports</b>	
USB device port	1 standard micro-B connector
USB host port	1 standard A connector
USB interface	USB 2.0, Hi-Speed
Maximum data rate	480 Mb/s per port

Maximum current (USB Host Port)	1 A
---------------------------------	-----

## SD Card Slot

Form factor	MicroSD
SD card support	SD and SDHC standards
Non-volatile memory <sup>[5]</sup>	Up to 32 GB <sup>[6]</sup>

## REF IN

Number of channels	1, single-ended
Connector type	SMA
Frequency	10 MHz
Input impedance	50 $\Omega$
Input coupling	AC
Input voltage range	0.75 V <sub>pk-pk</sub> to 5.2 V <sub>pk-pk</sub>
Absolute maximum voltage	$\pm 8.0$ VDC, 8.0 V <sub>pk-pk</sub> AC
Duty cycle	40% to 60%

## TRIG General Characteristics

Number of channels	1, single-ended	
Connector type	SMA	
Coupling	DC	
<b>Impedance</b>		
Input	10 k $\Omega$	
Output	50 $\Omega$	
Logic level	3.3V CMOS	
<b>Voltage</b>		
$V_{IH\_MIN}$	2 V	
$V_{IL\_MAX}$	0.8 V	
$V_{OH\_MIN}$ (unloaded)	3.1 V	
$V_{OL\_MAX}$ (unloaded)	0.2 V	
Absolute maximum voltage	$\pm 20$ VDC, +21 dBm (7.1 V <sub>pk-pk</sub> )	
<b>Current</b>		
$I_{OH\_MAX}$	12 mA	
$I_{OL\_MAX}$	-12 mA	



## High Speed Serial Ports

Data rate	10.3125 Gbps, 6.25 Gbps, 3.125 Gbps
Connector type	SFP+
Number of TX channels	2
Number of RX channels	2
Supported high speed cable type <sup>[7]</sup>	Electrical/optical
Optical cable power	3.3 V $\pm$ 5%, 500 mA per port, characteristic



**Note** For detailed FPGA and high speed serial port specifications, refer to Xilinx documentation.

## Non-volatile Storage

For information about the life span of the nonvolatile memory and about best practices for using nonvolatile memory, visit [ni.com/info](http://ni.com/info) and enter the Info Code SSDBP.

<b>Non-volatile memory</b>	
SD removable (user supplied)	Up to 32 GB <sup>[8]</sup>
System memory	512 MB

## Reconfigurable FPGA

FPGA	Kintex-7 XC7K410T
------	-------------------

LUTs	254,200
DSP48 Slices (25 × 18 multiplier)	1,540
Embedded Block RAM (kbits)	28,620
Default timebase	40 MHz
Timebase accuracy	±100 ppm, 250 ps peak-to-peak jitter
Data transfers	DMA, interrupts, programmed I/O
Number of DMA channels	16

For detailed FPGA specifications, refer to Xilinx documentation.

## FPGA Digital Input/Output

Number of general-purpose channels	136, configurable as 136 single-ended, 68 differential, or a combination of both <sup>[9]</sup>
<b>Channels per bank</b>	
Bank 0/Bank 1	48
Bank 2	40
Compatibility	Configured through the FPGA and based on the attached adapter module; 1.2 V, 1.5 V, 1.8 V, 2.5 V, and 3.3 V I/O standards (refer to <a href="http://xilinx.com">xilinx.com</a> ).
Protection	Refer to <a href="http://xilinx.com">xilinx.com</a> .

Current	Refer to <a href="http://xilinx.com">xilinx.com</a> .
<b>Maximum I/O data rates</b>	
Single-ended	400 Mb/s
Differential	1 Gb/s for LVDS
Multi-region clock inputs	6
Single-region clock inputs	5
Connection resources	SMA connector (TRIGGER and REF CLK)

## FPGA-Accessible DRAM

Memory size	2 GB
Theoretical maximum data rate	10.5 GB/s

## Power Requirements

The NI-7935R requires a power supply connected to the power connector.



**Caution** You must use either the recommended power supply, or another UL listed ITE power supply with the NI-7935R.



**Caution** Exceeding the power limits may cause unpredictable behavior by the NI-7935R.

Voltage input range	9 V to 30 V (measured at the NI-7935R power connector)
Maximum power consumption <sup>[10]</sup>	60 W
Typical standby power consumption	11.4 W
Recommended power supply	>75 W, 12 VDC
EMC ratings for power input as described in IEC 61000	Short lines, long lines, and DC distributed networks
<p><b>Power input connector</b></p> <p>Power receptacle Weidmuller OMNIMATE Signal, S2C-SMT 3.50/04/90LF 1.8AU BK BX, part number 1993840000</p> <p>Power plug Weidmuller OMNIMATE Signal, B2CF 3.50/04/180F AU BK BX, part number 1993830000</p>	

## Physical

Dimensions (not including connectors)	23.4 cm × 13.1 cm × 4.4 cm (9.21 in. × 5.14 in. × 1.73 in.)
Weight	1,170 g (41.27 oz.)

## Safety Voltages

Connect only voltages that are below these limits.

Positive terminal to negative terminal	30 VDC maximum, Measurement Category I
--	--



**Note** Measurement Categories CAT I and CAT O (Other) are equivalent. The input circuits are not intended for direct connection to the MAINS building installations of Categories CAT II, CAT III, or CAT IV.



**Caution** You can impair the protection provided by the NI-7935R if you use it in a manner not described in this document.

## Maximum Working Voltage at the FlexRIO Adapter Module Connector



**Note** Maximum working voltage refers to the signal voltage plus the common-mode voltage between the NI-7935R and the adapter module.

Channel-to-earth	0 V to 3.3 V, Measurement Category I
Channel-to-channel	0 V to 3.3 V, Measurement Category I



**Caution** Do not use this device for connecting to signals in Measurement Categories II, III, or IV.

## Environment

Maximum altitude	2,000 m (800 mbar) (at 25 °C ambient temperature)
Pollution Degree	2

Indoor use only.

## Operating Environment

Ambient temperature range	0 °C to 40 °C
---------------------------	---------------

Relative humidity range	10% to 90%, noncondensing
-------------------------	---------------------------

## Storage Environment

Ambient temperature range	-40 °C to 71 °C
Relative humidity range	5% to 95%, noncondensing

## Shock and Vibration

Operating shock	30 g peak, half-sine, 11 ms pulse
<b>Random vibration</b>	
Operating	5 Hz to 500 Hz, 0.3 g <sub>rms</sub>
Nonoperating	5 Hz to 500 Hz, 2.4 g <sub>rms</sub>

## Compliance and Certifications

### Safety Compliance 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.

## 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
- 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, certifications, and additional information, refer to the [Product Certifications and Declarations](#) section.

## 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](https://ni.com/product-certifications), search by model number, and click the appropriate link.

## 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](http://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](http://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](http://ni.com/environment/rohs_china)。(For information about China RoHS compliance, go to [ni.com/environment/rohs\\_china](http://ni.com/environment/rohs_china).)

### NI Services

Visit [ni.com/support](http://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](http://ni.com/services) to learn about NI service offerings such as calibration options, repair, and replacement.



Visit [ni.com/register](http://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.

<sup>1</sup> Formatted capacity of nonvolatile memory may be slightly less than this value.

<sup>2</sup> You can increase the flash reboot endurance value by performing field maintenance on the device. If you expect that your application may exceed the maximum cycle count listed in this document, contact NI support for information about how to increase the reboot endurance value.

<sup>3</sup> For additional information about the AD9511, refer to the Analog Devices data sheet at [www.analog.com](http://www.analog.com).

<sup>4</sup> Onboard PLL circuitry divides the 100 MHz onboard oscillator to 10 MHz for use by adapter modules.

<sup>5</sup> For information about the life span of the nonvolatile memory and about best practices for using nonvolatile memory, visit [ni.com/info](http://ni.com/info) and enter the Info Code SSDBP.

<sup>6</sup> 1 GB is equal to 1 billion bytes; formatted capacity might be less.

<sup>7</sup> Use only copper cable cables less than or equal to 3 m. Using copper cables with lengths greater than 3 m invalidates these specifications. If you use cables with a length greater than 3 m, use optical cables.

<sup>8</sup> 1 GB is equal to 1 billion bytes; formatted capacity might be less.

<sup>9</sup> The 136 channels span across three FPGA banks.

<sup>10</sup> The maximum power consumption specification is based on a fully populated system running a high-stress application at elevated ambient temperature, and with

all controllers, adapter modules, and peripheral devices consuming the maximum allowed power.