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NI Single-Board RIO Embedded Control and Acquisition Devices

NI sbRIO-96xx *NEW!*

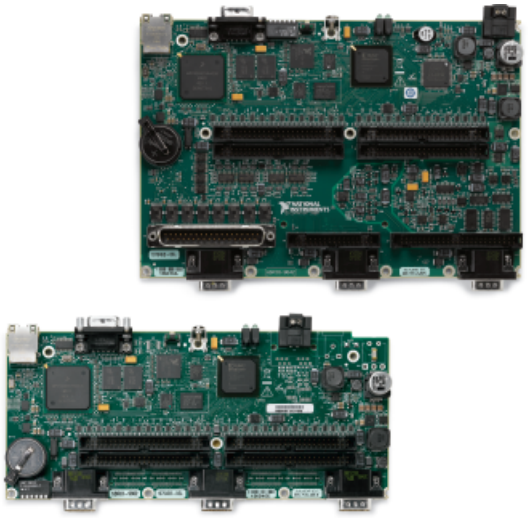
- Integrated real-time controller, reconfigurable FPGA, and I/O on a single board
- Low-cost systems for high-volume OEM applications
- Up to 2M gate Xilinx Spartan-3 FPGA
- Up to 400 MHz Freescale real-time processor
- Up to 128 MB DRAM, 256 MB nonvolatile storage
- 10/100BASE-TX Ethernet port with built-in FTP and HTTP servers and LabVIEW remote panel Web server
- RS232 serial port for peripheral devices
- Low power consumption with single 19 to 30 VDC power supply input
- -20 to 55 °C operating temperature range

LabVIEW Development Software

- LabVIEW Real-Time (VxWorks)
- LabVIEW FPGA

Driver Software

- NI-RIO for reconfigurable embedded systems



Product	Processor Speed (MHz)	DRAM Memory (MB)	Internal Nonvolatile Storage (MB)	FPGA Size (gates)	3.3 V DIO Lines	AI Channels	AO Channels	24 V DI/DO Lines	C Series Expansion (slots)	Size (inches)
sbRIO-9601	266	64	128	1M	110	0	0	0	3	8.2x3.7
sbRIO-9602	400	128	256	2M	110	0	0	0	3	8.2x3.7
sbRIO-9611	266	64	128	1M	110	32	0	0	3	8.2x5.6
sbRIO-9612	400	128	256	2M	110	32	0	0	3	8.2x5.6
sbRIO-9631	266	64	128	1M	110	32	4	0	3	8.2x5.6
sbRIO-9632	400	128	256	2M	110	32	4	0	3	8.2x5.6
sbRIO-9641	266	64	128	1M	110	32	4	32/32	3	8.2x5.6
sbRIO-9642	400	128	256	2M	110	32	4	32/32	3	8.2x5.6

NI sbRIO-96xx Selection Guide

Overview and Applications

NI Single-Board RIO devices are designed to be easily embedded in high-volume applications that require flexibility, high performance, and reliability. NI sbRIO-96xx devices feature an industrial Freescale MPC5200 real-time processor with speeds up to 400 MHz for deterministic real-time applications. The real-time processor is combined via a high-speed internal PCI bus with an onboard reconfigurable Xilinx Spartan-3 field-programmable gate array (FPGA). The FPGA is connected directly to all onboard 3.3 V digital I/O. Each onboard analog and digital I/O module has a dedicated connection to the FPGA as well.

All sbRIO-96xx devices contain 110 bidirectional digital lines. You can select an NI Single-Board RIO device that includes up to 32 analog inputs, four analog outputs, and 32 industrial 24 V digital inputs and digital outputs. In addition to the built-in I/O capabilities, each NI Single-Board RIO device has three connectors for adding board-only versions of NI, third-party, or custom C Series I/O modules.

The sbRIO-96xx devices accept a 19 to 30 VDC power supply and can operate within a -20 to 55 °C temperature range. With the 10/100 Mb/s Ethernet and serial ports, you can communicate with external devices and systems via TCP/IP, UDP, Modbus/TCP, and serial protocols. The built-in real-time controller also features Web (HTTP) and file (FTP) servers.

Embedded Software

The sbRIO-96xx devices are programmed using the NI LabVIEW graphical programming language. The real-time processor runs the LabVIEW Real-Time Module on the Wind River VxWorks real-time operating system (RTOS) for extreme reliability and determinism. You can integrate your C code libraries within LabVIEW Real-Time.

In addition, you can quickly program the onboard reconfigurable FPGA on sbRIO-96xx devices using the LabVIEW FPGA Module for high-speed control, custom I/O timing, and inline signal processing. LabVIEW contains built-in drivers and APIs for handling DMA or interrupt request (IRQ)-based data transfer between the FPGA and real-time processor. You can reuse your existing hardware description language (HDL) libraries and intellectual property (IP) blocks within LabVIEW FPGA.

Ordering Information

NI Single-Board RIO products are available in quantity 100 or higher volumes only. For complete product specifications and accessory information, go to **ni.com/singleboard**.

OEM Pricing Available!

Aggressive discounts are available for high-volume customers. For pricing information, call 800 813 3693 (U.S.).

BUY NOW!

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to **ni.com/singleboard**.

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Specifications

Network

Network Interface	10BASE-T and 100BASE-TX Ethernet
Compatibility	IEEE 802.3
Communication rates	10 Mb/s, 100 Mb/s autonegotiated
Maximum cabling distance	100 m/segment

Power Requirements

Power supply voltage range	19 to 30 V
Power consumption (internal, driving no loads)	
sbRIO-960x	6.00 W
sbRIO-961x	7.50 W
sbRIO-963x	7.75 W
sbRIO-964x	8.00 W

Xilinx Spartan-3 Reconfigurable FPGA

Number of logic cells	
sbRIO-9611/9631/9641	17,280
sbRIO-9612/9632/9642	46,080
Available embedded RAM	
sbRIO-9611/9631/9641	432 kb
sbRIO-9612/9632/9642	720 kb

3.3 V Digital I/O

Number of channels	110
Max current per channel	3mA
Output characteristics	
Output high voltage	2.7 V min; 3.3 V max
Output low voltage	0.07 V min; 0.54 V max
Input characteristics	
Input high voltage	2.0 V min; 5.25 V max
Input low voltage	0 V min; 0.8 V max

Analog Input (sbRIO-961x/963x/964x only)

Number of channels	32 single-ended or 16 differential
ADC resolution	16 bits
Conversion time	4 µs (250 kS/s aggregate)
Nominal input ranges	±10, ±5, ±1, and ±0.2 V

Analog Output (sbRIO-963x/964x only)

Number of channels	4
DAC resolution	16 bits
Update time (one channel)	3 µs
Output range	±10 V

24 V Digital Input (sbRIO-964x only)

Number of channels	32
Input type	Sinking
Digital logic levels	
OFF state	
Input voltage	≤5 V
Input current	≤150 µA
ON state	
Input voltage	≥10 V
Input current	≥330 µA

24 V Digital Output (sbRIO-964x only)

Number of channels	32
Output type	Sourcing
External supply voltage	6 to 35 VDC
Continuous output current on each channel	
No heat sinks	250 mA max
External heat sink added	1.5 A max (20 A max aggregate)

Physical Characteristics

If you need to clean the device, wipe it with a dry towel.

Torque for screw terminals (J3)	0.5 to 0.6 N·m (4.4 to 5.3 lb·in.)
Weight	
sbRIO-960x	198.4 g (7.0 oz)
sbRIO-961x	266.5 g (9.4 oz)
sbRIO-963x	269.3 g (9.5 oz)
sbRIO-964x	292.0 g (10.3 oz)

Safety Voltages

Connect only to voltages that are within these limits.

V-to-C	35 V max, Measurement Category I

Caution: Do not connect to signal or use for measurements within Measurement Category II, III, or IV.

Compliance

National Instruments makes no product safety, electromagnetic compatibility (EMC), or CE marking compliance claims for the sbRIO-961x/963x/964x. The end-product supplier is responsible for conformity to any and all compliance requirements.

Note: For UL and other safety certifications, refer to the product label or visit **ni.com/certification**, search by model number or product line, and click the appropriate link in the Certification column.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers: At the end of their life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers and National Instruments WEEE initiatives, visit **ni.com/environment/weee.htm**.

Environmental

The sbRIO-96xx devices are intended for indoor use only. The sbRIO-96xx devices are intended to be built into a suitable enclosure

Ambient temperature in enclosure

(IEC 60068-2-1, IEC 60068-2-2).....-20 to 55 °C

Storage temperature

(IEC 60068-2-1, IEC 60068-2-2)	-40 to 85 °C
Operating humidity (IEC 60068-2-56)	10 to 90% RH, noncondensingStorage humidity (IEC 60068-2-56)5 to 95% RH, noncondensing
Maximum altitude	2,000 m
Pollution degree (IEC 60664)	2

NI Services and Support



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We offer design-in consulting and product integration assistance if you want to use our products for OEM applications. For information about special pricing and services for OEM customers, visit **ni.com/oem**.

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We also offer service programs that provide automatic upgrades to your application development environment and higher levels of technical support. Visit **ni.com/ssp**.

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