The National Instruments myRIO-1900 is a portable reconfigurable I/O (RIO) device that students can use to design control, robotics, and mechatronics systems. This document contains pinouts, connectivity information, dimensions, mounting instructions, and specifications for the NI myRIO-1900.

**Figure 1.** NI myRIO-1900

| 1  | Ni myRIO-1900                     | 6  | LEDs       |
| 2  | myRIO Expansion Port (MXP) Breakouts (One Included in Kit) | 7  | Mini System Port (MSP) Screw-Terminal Connector |
| 3  | Power Input Cable                | 8  | Audio In/Out Cables (One Included in Kit) |
| 4  | USB Device Cable                 | 9  | Button0 |
| 5  | USB Host Cable (Not Included in Kit) |     |     |
Safety Information

⚠️ Caution ⚠️ Do not operate the hardware in a manner not specified in this document and in the user documentation. Misuse of the hardware can result in a hazard. You can compromise the safety protection if the hardware is damaged in any way. If the hardware is damaged, return it to National Instruments for repair.

Clean the hardware with a soft, nonmetallic brush. Make sure that the hardware is completely dry and free from contaminants before returning it to service.

Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC) stated in the product specifications. These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.

This product is intended for use in commercial locations. There is no guarantee that harmful interference will not occur in a particular installation or when the product is connected to a test object. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any modifications to the product not expressly approved by National Instruments could void your authority to operate it under your local regulatory rules.

⚠️ Caution ⚠️ This product was tested for EMC compliance using myRIO application software. The maximum length for USB cables is 2.0 m (6.6 ft), and the maximum length for signal wires is 30.0 cm (11.8 in.).

⚠️ Caution ⚠️ The mounting keyholes on the back of the NI myRIO-1900 are sensitive to electrostatic discharge (ESD). When handling the device, be careful not to touch inside the keyholes.
Hardware Overview

The NI myRIO-1900 provides analog input (AI), analog output (AO), digital input and output (DIO), audio, and power output in a compact embedded device. The NI myRIO-1900 connects to a host computer over USB and wireless 802.11b,g,n.

The following figure shows the arrangement and functions of NI myRIO-1900 components.

Figure 2. NI myRIO-1900 Hardware Block Diagram
Connector Pinouts

NI myRIO-1900 Expansion Port (MXP) connectors A and B carry identical sets of signals. The signals are distinguished in software by the connector name, as in `ConnectorA/DIO1` and `ConnectorB/DIO1`. Refer to the software documentation for information about configuring and using signals. The following figure and table show the signals on MXP connectors A and B. Note that some pins carry secondary functions as well as primary functions.

**Figure 3. Primary/Secondary Signals on MXP Connectors A and B**
### Table 1. Descriptions of Signals on MXP Connectors A and B

<table>
<thead>
<tr>
<th>Signal Name</th>
<th>Reference</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+5V</td>
<td>DGND</td>
<td>Output</td>
<td>+5 V power output.</td>
</tr>
<tr>
<td>AI &lt;0..3&gt;</td>
<td>AGND</td>
<td>Input</td>
<td>0-5 V, referenced, single-ended analog input channels. Refer to the Analog Input Channels section for more information.</td>
</tr>
<tr>
<td>AO &lt;0..1&gt;</td>
<td>AGND</td>
<td>Output</td>
<td>0-5 V referenced, single-ended analog output. Refer to the Analog Output Channels section for more information.</td>
</tr>
<tr>
<td>AGND</td>
<td>N/A</td>
<td>N/A</td>
<td>Reference for analog input and output.</td>
</tr>
<tr>
<td>+3.3V</td>
<td>DGND</td>
<td>Output</td>
<td>+3.3 V power output.</td>
</tr>
<tr>
<td>DIO &lt;0..15&gt;</td>
<td>DGND</td>
<td>Input or Output</td>
<td>General-purpose digital lines with 3.3 V output, 3.3 V/5 V-compatible input. Refer to the DIO Lines section for more information.</td>
</tr>
<tr>
<td>UART.RX</td>
<td>DGND</td>
<td>Input</td>
<td>UART receive input. UART lines are electrically identical to DIO lines.</td>
</tr>
<tr>
<td>UART.TX</td>
<td>DGND</td>
<td>Output</td>
<td>UART transmit output. UART lines are electrically identical to DIO lines.</td>
</tr>
<tr>
<td>DGND</td>
<td>N/A</td>
<td>N/A</td>
<td>Reference for digital signals, +5 V, and +3.3 V.</td>
</tr>
</tbody>
</table>
The following figure and table show the signals on Mini System Port (MSP) connector C. Note that some pins carry secondary functions as well as primary functions.

**Figure 4. Primary/Secondary Signals on MSP Connector C**

**Table 2. Descriptions of Signals on MSP Connector C**

<table>
<thead>
<tr>
<th>Signal Name</th>
<th>Reference</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+15V/-15V</td>
<td>AGND</td>
<td>Output</td>
<td>+15 V/-15 V power output.</td>
</tr>
<tr>
<td>AI0+/AI0-;</td>
<td>AGND</td>
<td>Input</td>
<td>±10 V, differential analog input channels. Refer to the Analog Input Channels section for more information.</td>
</tr>
<tr>
<td>AI1+/AI1-</td>
<td>AGND</td>
<td>Input</td>
<td>±10 V referenced, single-ended analog output channels. Refer to the Analog Output Channels section for more information.</td>
</tr>
<tr>
<td>AO &lt;0..1&gt;</td>
<td>AGND</td>
<td>Output</td>
<td>±10 V referenced, single-ended analog output channels. Refer to the Analog Output Channels section for more information.</td>
</tr>
<tr>
<td>AGND</td>
<td>N/A</td>
<td>N/A</td>
<td>Reference for analog input and output and +15 V/-15 V power output.</td>
</tr>
<tr>
<td>+5V</td>
<td>DGND</td>
<td>Output</td>
<td>+5 V power output.</td>
</tr>
<tr>
<td>DIO &lt;0..7&gt;</td>
<td>DGND</td>
<td>Input or</td>
<td>General-purpose digital lines with 3.3 V output, 3.3 V/5 V-compatible input. Refer to the DIO Lines section for more information.</td>
</tr>
<tr>
<td>DGND</td>
<td>N/A</td>
<td>N/A</td>
<td>Reference for digital lines and +5 V power output.</td>
</tr>
</tbody>
</table>
Analog Input Channels

The NI myRIO-1900 has analog input channels on myRIO Expansion Port (MXP) connectors A and B, Mini System Port (MSP) connector C, and a stereo audio input connector. The analog inputs are multiplexed to a single analog-to-digital converter (ADC) that samples all channels.

MXP connectors A and B have four single-ended analog input channels per connector, AI0-AI3, which you can use to measure 0-5 V signals. MSP connector C has two high-impedance, differential analog input channels, AI0 and AI1, which you can use to measure signals up to ±10 V. The audio inputs are left and right stereo line-level inputs with a ±2.5 V full-scale range.

Note  For important information about improving measurement accuracy by reducing noise, go to ni.com/info and enter the Info Code analogwiring.

<table>
<thead>
<tr>
<th>Signal Name</th>
<th>Reference</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUDIO IN</td>
<td>N/A</td>
<td>Input</td>
<td>Left and right audio inputs on stereo connector.</td>
</tr>
<tr>
<td>AUDIO OUT</td>
<td>N/A</td>
<td>Output</td>
<td>Left and right audio outputs on stereo connector.</td>
</tr>
</tbody>
</table>
Figure 5 shows the analog input topology of the NI myRIO-1900.

**Figure 5. NI myRIO-1900 Analog Input Circuitry**

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**Analog Output Channels**

The NI myRIO-1900 has analog output channels on myRIO Expansion Port (MXP) connectors A and B, Mini System Port (MSP) connector C, and a stereo audio output connector. Each analog output channel has a dedicated digital-to-analog converter (DAC), so they can all update simultaneously. The DACs for the analog output channels are controlled by two serial communication buses from the FPGA. MXP connectors A and B share one bus, and MSP connector C and the audio outputs share a second bus. Therefore, the maximum update rate is specified as an aggregate figure in the *Analog Output* section of the *Specifications*.

MXP connectors A and B have two analog output channels per connector, AO0 and AO1, which you can use to generate 0-5 V signals. MSP connector C has two analog output channels, AO0 and AO1, which you can use to generate signals up to ±10 V. The audio outputs are left and right stereo line-level outputs capable of driving headphones.

⚠️ **Caution** Before using headphones to listen to the audio output of the NI myRIO-1900, ensure that the audio output is at a safe level. Listening to audio signals at a high volume may result in permanent hearing loss.
Figure 6 shows the analog output topology of the NI myRIO-1900.

**Figure 6. NI myRIO-1900 Analog Output Circuitry**

Accelerometer

The NI myRIO-1900 contains a three-axis accelerometer. The accelerometer samples each axis continuously and updates a readable register with the result. Refer to the Accelerometer section of the Specifications for the accelerometer sample rates.
Converting Raw Data Values to Voltage

You can use the following equations to convert raw data values to volts:

\[ V = \text{Raw Data Value} \times \text{LSB Weight} \]

\[ \text{LSB Weight} = \frac{\text{Nominal Range}}{2^{\text{ADC Resolution}}} \]

where \( \text{Raw Data Value} \) is the value returned by the FPGA I/O Node,
\( \text{LSB Weight} \) is the value in volts of the increment between data values,
\( \text{Nominal Range} \) is the absolute value in volts of the full, peak-to-peak nominal range of the channel,
and \( \text{ADC Resolution} \) is the resolution of the ADC in bits. \((\text{ADC Resolution} = 12)\)

- For AI and AO channels on the MXP connectors,
  \[ \text{LSB Weight} = \frac{5 \text{ V}}{2^{12}} = 1.221 \text{ mV} \]
  \[ \text{Maximum reading} = 4095 \times 1.221 \text{ mV} = 4.999 \text{ V} \]

- For AI and AO channels on the MSP connectors,
  \[ \text{LSB Weight} = \frac{20 \text{ V}}{2^{12}} = 4.883 \text{ mV} \]
  \[ \text{Maximum Positive Reading} = +2047 \times 4.883 \text{ mV} = 9.995 \text{ V} \]
  \[ \text{Maximum Negative Reading} = -2048 \times 4.883 \text{ mV} = -10.000 \text{ V} \]

- For Audio In/Out,
  \[ \text{LSB Weight} = \frac{5 \text{ V}}{2^{12}} = 1.221 \text{ mV} \]
  \[ \text{Maximum Positive Reading} = +2047 \times 1.221 \text{ mV} = 2.499 \text{ V} \]
  \[ \text{Maximum Negative Reading} = -2048 \times 1.221 \text{ mV} = -2.500 \text{ V} \]

- For the accelerometer,
  \[ \text{LSB Weight} = \frac{16 \text{ g}}{2^{12}} = 3.906 \text{ mg} \]
  \[ \text{Maximum Positive Reading} = +2047 \times 3.906 \text{ mg} = +7.996 \text{ g} \]
  \[ \text{Maximum Negative Reading} = -2048 \times 3.906 \text{ mg} = -8.000 \text{ g} \]

DIO Lines

The NI myRIO-1900 has 3.3 V general-purpose DIO lines on the MXP and MSP connectors. MXP connectors A and B have 16 DIO lines per connector. On the MXP connectors, each DIO line from 0 to 13 has a 40 kΩ pullup resistor to 3.3 V, and DIO lines 14 and 15 have 2.1 kΩ pullup resistors to 3.3 V. MSP connector C has eight DIO lines. Each MSP DIO line has a 40 kΩ pulldown resistor to ground. DGND is the reference for all the DIO lines. You can program all the lines individually as inputs or outputs. Secondary digital functions include Serial Peripheral Interface (SPI), General Purpose I/O (GPIO), and 8-Clock Digital I/O (8CI). Digital ground (DGND) is shared for the DIO lines, and analog ground (AGND) is shared for the analog inputs. The MXP connectors have two sets of 16 pullup resistors, and the MSP connector has one set of eight pullup resistors. All DIO lines are driven by the FPGA I/O Node.
Interface Bus (SPI), I2C, pulse-width modulation (PWM), and quadrature encoder input. Refer to the NI myRIO software documentation for information about configuring the DIO lines.

**Figure 7. DIO Lines <13..0> on MXP Connector A or B**

![Diagram showing DIO Lines <13..0> on MXP Connector A or B](image)

**Figure 8. DIO Lines <15..14> on MXP Connector A or B**

![Diagram showing DIO Lines <15..14> on MXP Connector A or B](image)

**Figure 9. DIO Lines <7..0> on MSP Connector C**

![Diagram showing DIO Lines <7..0> on MSP Connector C](image)

When a DIO line is floating, it floats in the direction of the pull resistor. A DIO line may be floating in any of the following conditions:

- when the myRIO device is starting up
- when the line is configured as an input
- when the myRIO device is powering down

You can add a stronger resistor to a DIO line to cause it to float in the opposite direction.

**UART Lines**

The NI myRIO-1900 has one UART receive input line and one UART transmit output line on each MXP connector. The UART lines are electrically identical to DIO lines 0 to 13 on the MXP connectors. Like those lines, UART.RX and UART.TX have 40 kΩ pullup resistors to 3.3 V.

Use LabVIEW Real-Time to read and write over the UART lines.
Using the Reset Button

Pressing and releasing the Reset button restarts the processor and the FPGA.

Pressing and holding the Reset button for 5 seconds, then releasing it, restarts the processor and the FPGA and forces the NI myRIO-1900 into safe mode. In safe mode, the NI myRIO-1900 launches only the services necessary for updating configuration and installing software.

When the NI myRIO-1900 is in safe mode, you can communicate with it by using the UART lines on MXP connector A. You need the following items to communicate with the myRIO device over UART:

- USB-to-TTL serial UART converter cable (for example, part number TTL-232RG-VSW3V3-WE from FTD Chip)
- Serial-port terminal program configured with the following settings:
  - 115,200 bits per second
  - Eight data bits
  - No parity
  - One stop bit
  - No flow control

Using the Wireless Button and LED

For information about using the Wireless button, go to ni.com/info and enter the Info Code myriowirelessbutton.

For information about using the Wireless LED, go to ni.com/info and enter the Info Code myriowirelessled.

Using Button0

Button0 produces a logic TRUE when depressed and a logic FALSE when not depressed. Button0 is not debounced.
Understanding LED Indications

Power LED
The Power LED is lit while the NI myRIO-1900 is powered on. This LED indicates that the power supply connected to the device is adequate.

Status LED
The Status LED is off during normal operation. The NI myRIO-1900 runs a power-on self test (POST) when you apply power to the device. During the POST, the Power and Status LEDs turn on. When the Status LED turns off, the POST is complete. The NI myRIO-1900 indicates specific error conditions by flashing the Status LED a certain number of times every few seconds, as shown in Table 4.

<table>
<thead>
<tr>
<th>Number of Flashes Every Few Seconds</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>The device has detected an error in its software. This usually occurs when an attempt to upgrade the software is interrupted. Reinstall software on the device.</td>
</tr>
<tr>
<td>3</td>
<td>The device is in safe mode.</td>
</tr>
<tr>
<td>4</td>
<td>The software has crashed twice without rebooting or cycling power between crashes. This usually occurs when the device runs out of memory. Review your RT VI and check the memory usage. Modify the VI as necessary to solve the memory usage issue.</td>
</tr>
<tr>
<td>Continuously flashing or solid</td>
<td>The device has detected an unrecoverable error. Contact National Instruments.</td>
</tr>
</tbody>
</table>

LEDs 0 to 3
You can use LEDs 0 to 3 to help debug your application or easily retrieve application status. Logic TRUE turns an LED on and logic FALSE turns an LED off.

Using the USB Host Port
The NI myRIO-1900 USB host port supports Web cameras that conform to the USB Video Device Class (UVC) protocol as well as machine vision cameras that conform to the USB3 Vision standard and are USB 2.0 backward compatible. The NI myRIO-1900 USB host port also supports Basler ace USB3 cameras.

The NI myRIO-1900 USB host port also supports USB Flash drives and USB-to-IDE adapters formatted with FAT16 and FAT32 file systems. LabVIEW usually maps USB devices to the /U, /V, /W, or /X drive, starting with the /U drive if it is available.
Figure 10. NI myRIO-1900 Dimensions, Front

NI myRIO-1900 Physical Dimensions

- Width: 86.0 mm (3.38 in.)
- Height: 118.2 mm (4.65 in.)
- Depth: 111.4 mm (4.38 in.)
- Width excluding screws: 104.5 mm (4.11 in.)
- Height excluding screws: 94.3 mm (3.71 in.)
- Depth excluding screws: 87.5 mm (3.44 in.)
- Width excluding power connector: 80.6 mm (3.17 in.)
- Height excluding power connector: 73.8 mm (2.90 in.)
Figure 11. NI myRIO-1900 Dimensions, Back

Figure 12. NI myRIO-1900 Dimensions, MSP Side

1 Pin 1
Mounting the NI myRIO-1900

Mounting the NI myRIO-1900 Using the Key Holes

You can use the provided key holes on NI myRIO-1900 to mount the device on a flat surface. Install the NI myRIO-1900 as shown in Figure 16. Use Unified #4 or ISO M3 screws to mount the NI myRIO-1900 using the key holes. Panhead screws are suitable for use with the NI myRIO-1900 key holes.
You can use the Panel Mounting Kit for NI myRIO-1900 to mount the device on a flat surface such as a panel or wall. Install the panel mounting kit on the NI myRIO-1900 as shown in Figure 17.

1 Place the panel on the back of the NI myRIO-1900.
2 Slide the panel up to line up the screw holes on the panel and the NI myRIO-1900.
3 Secure the panel to the NI myRIO-1900. You must use the included 4-40 × 1/4 in. screw to attach the panel mounting kit to the NI myRIO-1900. Tighten the screw to 0.76 N · m (6.7 lb · in.) of torque. Do not exceed 0.87 N · m (7.7 lb · in.) of torque.
Fasten the panel mounting kit to the panel or wall using screws appropriate for the surface. The following figure shows the dimensions of the NI myRIO-1900 with the panel mounting kit installed.

**Figure 18.** Dimensions of NI myRIO-1900 with Panel Mounting Kit
Use a cable tie to secure the power and USB cables to the panel mounting kit as shown in Figure 19.

**Figure 19.** Securing the Power and USB Cables to the Panel Mounting Kit
Cables and Accessories

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Description</th>
<th>NI Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power supply</td>
<td>Power supply for NI myRIO-1900</td>
<td>723403-01</td>
</tr>
<tr>
<td>MXP breakouts</td>
<td>Set of five MXP breakout boards</td>
<td>782696-01</td>
</tr>
<tr>
<td></td>
<td>for NI myRIO-1900</td>
<td></td>
</tr>
<tr>
<td>MSP connector</td>
<td>MSP replacement connector plug</td>
<td>765788-01</td>
</tr>
<tr>
<td></td>
<td>for NI myRIO-1900</td>
<td></td>
</tr>
<tr>
<td>Panel mounting kit</td>
<td>Panel mounting kit for NI myRIO-1900</td>
<td>783091-01</td>
</tr>
</tbody>
</table>

Specifications

The following specifications are typical for the 0 to 40 °C operating temperature range unless otherwise noted.

Processor

Processor type ..................................................Xilinx Z-7010
Processor speed.................................................667 MHz
Processor cores ................................................2

Memory

Nonvolatile memory ..........................................512 MB
DDR3 memory.......................................................256 MB
  DDR3 clock frequency ......................................533 MHz
  DDR3 data bus width ........................................16 bits

For information about the lifespan of the nonvolatile memory and about best practices for using nonvolatile memory, go to ni.com/info and enter the Info Code SSDBP.

FPGA

FPGA type ........................................................Xilinx Z-7010

Wireless Characteristics

Radio mode .......................................................IEEE 802.11 b,g,n
Frequency band ..................................................ISM 2.4 GHz
Channel width ....................................................20 MHz
Channels ........................................................... USA 1 to 11, International 1 to 13
TX power .......................................................... +10 dBm max (10 mW)
Outdoor range ................................................... Up to 150 m (line of sight)
Antenna directivity ........................................... Omnidirectional
Security ............................................................. WPA, WPA2, WPA2-Enterprise

USB Ports
USB host port ................................................... USB 2.0 Hi-Speed
USB device port................................................ USB 2.0 Hi-Speed

Analog Input
Aggregate sample rate ...................................... 500 kS/s
Resolution ......................................................... 12 bits
Overvoltage protection ...................................... ±16 V

MXP connectors
  Configuration ............................................ Four single-ended 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

MSP connector
  Configuration ............................................ Two differential channels
  Input impedance ....................................... Up to 100 nA leakage powered on;
                                                 4.7 kΩ powered off
  Nominal range .......................................... ±10 V
  Working voltage (signal + common mode) ... ±10 V of AGND
  Absolute accuracy ..................................... ±200 mV
  Bandwidth ............................................... 20 kHz minimum, >50 kHz typical

Audio input
  Configuration ............................................ One stereo input consisting of two AC-coupled,
                                                 single-ended channels
  Input impedance ....................................... 10 kΩ at DC
  Nominal range .......................................... ±2.5 V
  Bandwidth ............................................... 2 Hz to >20 kHz
Analog Output

Aggregate maximum update rates

- All AO channels on MXP connectors........345 kS/s
- All AO channels on MSP connector
  and audio output channels..................345 kS/s

Resolution .........................................................12 bits

Overload protection ............................................±16 V

Startup voltage ..................................................0 V after FPGA initialization

MXP connectors

Configuration ............................................Two single-ended channels per connector
Range ............................................................0 V to +5 V
Absolute accuracy ........................................50 mV
Current drive ................................................3 mA
Slew rate .......................................................0.3 V/μs

MSP connector

Configuration ............................................Two single-ended channels
Range ............................................................±10 V
Absolute accuracy ........................................±200 mV
Current drive ................................................2 mA
Slew rate .......................................................2 V/μs

Audio output

Configuration ............................................One stereo output consisting of
  two AC-coupled, single-ended channels
Output impedance ........................................100 Ω in series with 22 μF
Bandwidth .................................................70 Hz to >50 kHz into 32 Ω load;
  2 Hz to >50 kHz into high-impedance load

Digital I/O

Number of lines

- MXP connectors ......................................2 ports of 16 DIO lines (one port per connector);
  one UART.RX and one UART.TX line per connector
- MSP connector ......................................1 port of 8 DIO lines

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, $V_{IL}$ ........................................... 0 V min; 0.8 V max
Input high voltage, $V_{IH}$ ....................................... 2.0 V min; 5.25 V max

Output logic levels
Output high voltage, $V_{OH}$
sourcing 4 mA ...................................................... 2.4 V min; 3.465 V max
Output low voltage, $V_{OL}$
sinking 4 mA .............................................................. 0 V min; 0.4 V max

Minimum pulse width................................................. 20 ns

Maximum frequencies for secondary digital functions
SPI ................................................................. 4 MHz
PWM .................................................................... 100 kHz
Quadrature encoder input .................................... 100 kHz
I2C ....................................................................... 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

Accelerometer
Number of axes ..................................................... 3
Range ................................................................. ±8 g
Resolution ............................................................ 12 bits
Sample rate ........................................................... 800 S/s
Noise ................................................................. 3.9 mg$_{rms}$, typical at 25 °C

Power Output
+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
+15 power output
Output voltage.................................+15 V to +16 V
Maximum current .........................32 mA (16 mA during startup)

-15 V power output
Output voltage.................................-15 V to -16 V
Maximum current .........................32 mA (16 mA during startup)

Maximum combined power from +15 V
and -15 V power output ......................500 mW

Power Requirements
NI myRIO-1900 requires a power supply connected to the power connector.

Power supply voltage range ..............6 to 16 VDC
Maximum power consumption .............14 W
Typical idle power consumption ..........2.6 W

Environmental
To meet these specifications, you must operate the NI myRIO-1900 with the window facing away from the mounting surface and ensure that there is at least 1 in. of clearance in front of the window during use.

Ambient temperature near device
(IEC 60068-2-1, IEC 60068-2-2) ..............0 to 40 °C
Storage temperature
(IEC 60068-2-1, IEC 60068-2-2) ..............-20 to 70 °C
Operating humidity (IEC 60068-2-56) ......10 to 90% RH, noncondensing
Storage humidity (IEC 60068-2-56) ......10 to 90% RH, noncondensing
Maximum altitude ...............................2,000 m
Pollution Degree (IEC 60664) ...............2

Indoor use only.

Physical Characteristics
Weight ...............................................193 g (6.8 oz)

Safety

Safety Standards
This product is designed to meet the requirements of the following standards of safety for electrical equipment 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 myRIO-1900 in a manner not described in this document may impair the protection the NI myRIO-1900 provides.

Hazardous Locations
The NI myRIO-1900 is not certified for use in hazardous locations.

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 55022 (CISPR 22): Group 1, Class A emissions
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- AS/NZS CISPR 22: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

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

CE Compliance
This product meets the essential requirements of applicable European Directives as follows:
- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)
- 1999/5/EC; Radio and Telecommunications Terminal Equipment Directive (R&TTE)

Online Product Certification
To obtain product certifications and the Declaration of Conformity (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
Waste Electrical and Electronic Equipment (WEEE)

**EU Customers**  At the end of the product life cycle, all products must be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste and Electronic Equipment, visit [ni.com/environment/weee](http://ni.com/environment/weee).

Regulatory Information

**United States**

**FCC Radio Exposure**

The radiated output power of this device is below the FCC radio frequency exposure limits. Nevertheless, this device should be used in such a manner that the potential for human contact during normal operation is minimized. This device has been evaluated for and shown compliant with the FCC RF Exposure limits under mobile exposure conditions (antennas are greater than 20 cm from a person’s body). This device cannot be co-located with any other transmitter unless approved by FCC.

This product does not contain any user serviceable components. Any unauthorized product changes or modifications will invalidate the warranty and all applicable regulatory certifications and approvals.

**FCC Interference Statement**

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the FCC Rules.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

This wireless adapter generates, uses, and can radiate radio frequency energy. If the wireless adapter is not installed and used in accordance with the instructions, the wireless adapter may
cause harmful interference to radio communications. There is no guarantee, however, that such interference will not occur in a particular installation. If this wireless adapter does cause harmful interference to radio or television reception (which can be determined by turning the equipment off and on), the user is encouraged to try to correct the interference by taking one or more of the following measures:

- Reorient or relocate the receiving antenna of the equipment experiencing the interference.
- Increase the distance between the wireless adapter and the equipment experiencing the interference.
- Connect the equipment to an outlet on a circuit different from which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**Canada**

**Industry Canada (IC) Notices**

This product complies with Industry Canada RSS-210.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, the radio transmitter(s) in this device may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

**Avis d'Industry Canada (IC)**

Cet appareil est conforme aux norme RSS210 d’Industrie Canada.

Cet appareil est conforme aux normes d'exemption de licence RSS d’Industry Canada. Son fonctionnement est soumis aux deux conditions suivantes : (1) cet appareil ne doit pas causer d’interférence et (2) cet appareil doit accepter toute interférence, notamment les interférences qui peuvent affecter son fonctionnement.

Conformément aux réglementations d'Industry Canada, les émetteurs radio de cet appareil ne peuvent fonctionner qu’à l’aide d'une antenne dont le type et le gain maximal (ou minimal) pour ces émetteurs – transmetteurs sont approuvés par Industry Canada. Pour réduire le risque d'interférence éventuelle pour les autres utilisateurs, le type et le gain de l’antenne doivent être choisis de manière à ce que la puissance isotope rayonnée équivalente (p.i.r.e.) minimale nécessaire à une bonne communication soit fournie.
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**Note** Refer to the Declaration of Conformity (DoC) for this product for any additional regulatory compliance information. To obtain 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.

### Singapore

**Complies with IDA Standards**
**DA105692**

### Taiwan R.O.C.

低功率電波輻射電機管理辦法
第十二條經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。
第十四條低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。
前項合法通信，指依電信規定作業之無線電信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。
Mexico
La operación de este equipo está sujeta a las siguientes dos condiciones:
1) es posible que este equipo o dispositivo no cause interferencia perjudicial y
2) este equipo debe aceptar cualquier interferencia, incluyendo la que pueda causar su propia
operación no deseada.

Brazil
Brasil-Aviso da Anatel
Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra
interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a
sistemas operando em caráter primário.

Warranty
For customers other than private individual users in the EU: The NI myRIO-1900 is warranted
against defects in materials and workmanship for a period of one year from the date of shipment,
as evidenced by receipts or other documentation. National Instruments will, at its option, repair
or replace equipment that proves to be defective during the warranty period. This warranty
includes parts and labor.

For private individual users in the EU: Based on your statutory rights, National Instruments
will—through its distributor—cure defects in materials and workmanship within two years from
delivery.

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/niglobal to access the branch office websites, which provide up-to-date contact information, support phone numbers, email addresses, and current events.