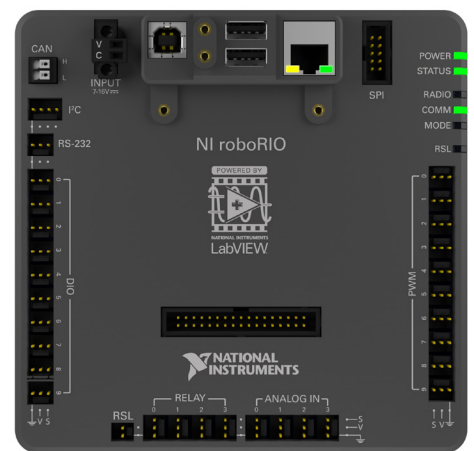
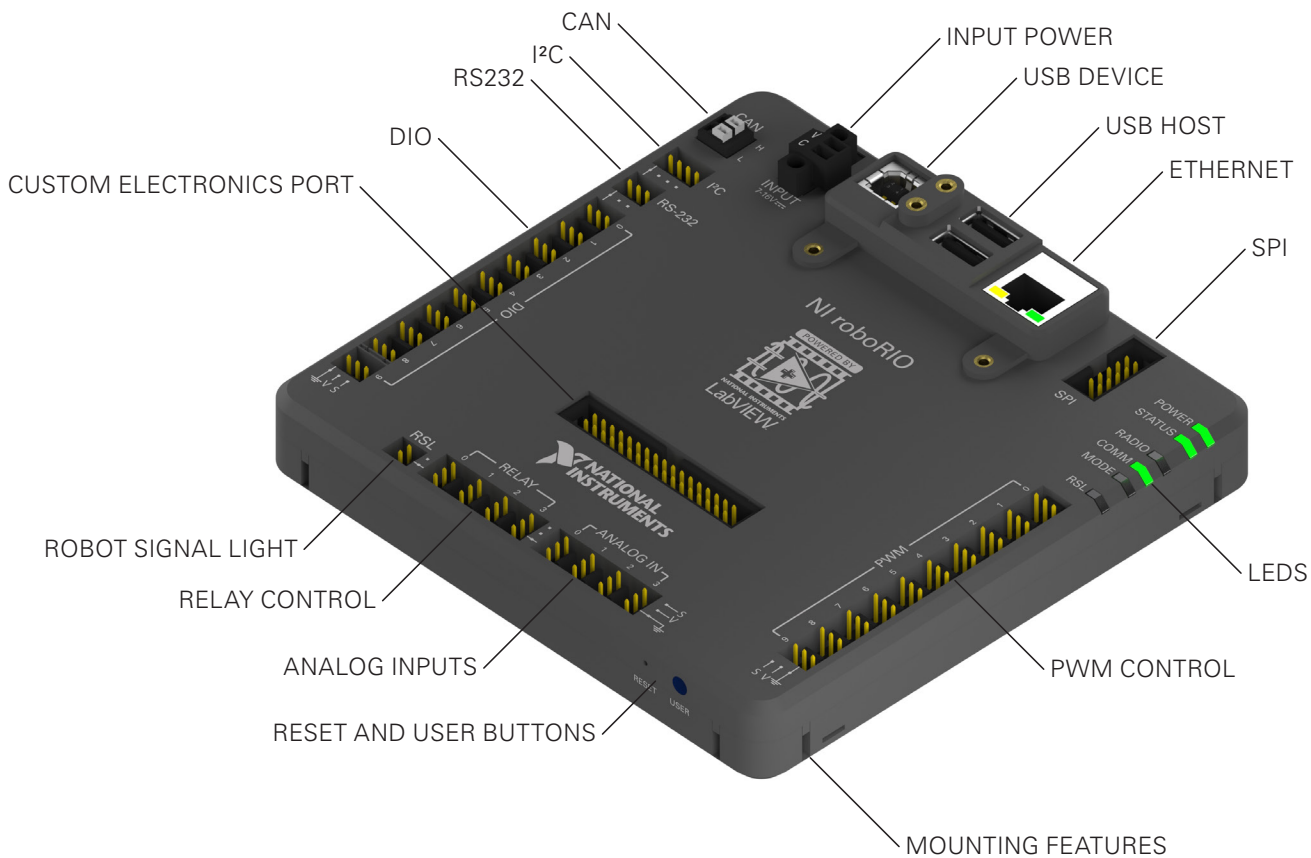




The Next Step in Student Robotics

Introducing NI roboRIO, the new NI LabVIEW reconfigurable I/O (RIO) controller built just for student robotics teams. It's faster, smaller, and more powerful than previous controllers.





Introducing the Next-Generation Robotics Competition Platform

Incorporating industry-standard LabVIEW RIO architecture from National Instruments, the NI roboRIO controller puts the same technology that professional engineers use in the hands of students. NI roboRIO is a robust, reconfigurable controller that, when paired with LabVIEW system design software, makes it possible for *FIRST*[®] teams to design complex robotics systems

faster than ever. It features higher processor performance, a rich I/O set, a smaller footprint, lighter weight, and the ability to integrate with custom electronics. NI built this truly next-generation controller specifically with student robotics competitions in mind. Students will use NI roboRIO starting in the 2015 season of the *FIRST*[®] Robotics Competition (FRC[®]).

2015

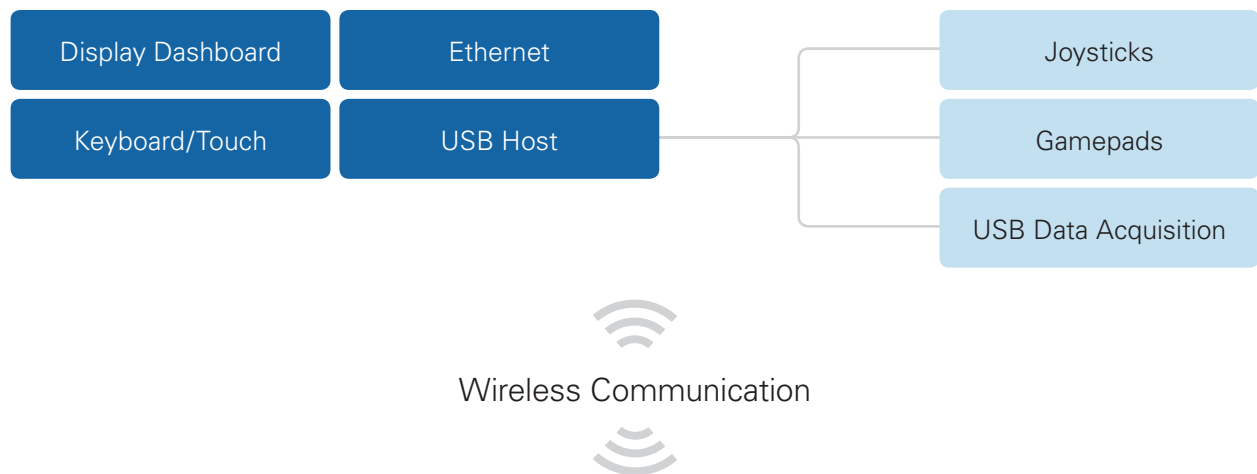
FIRST® Robotics Competition (FRC®)

Control System Overview



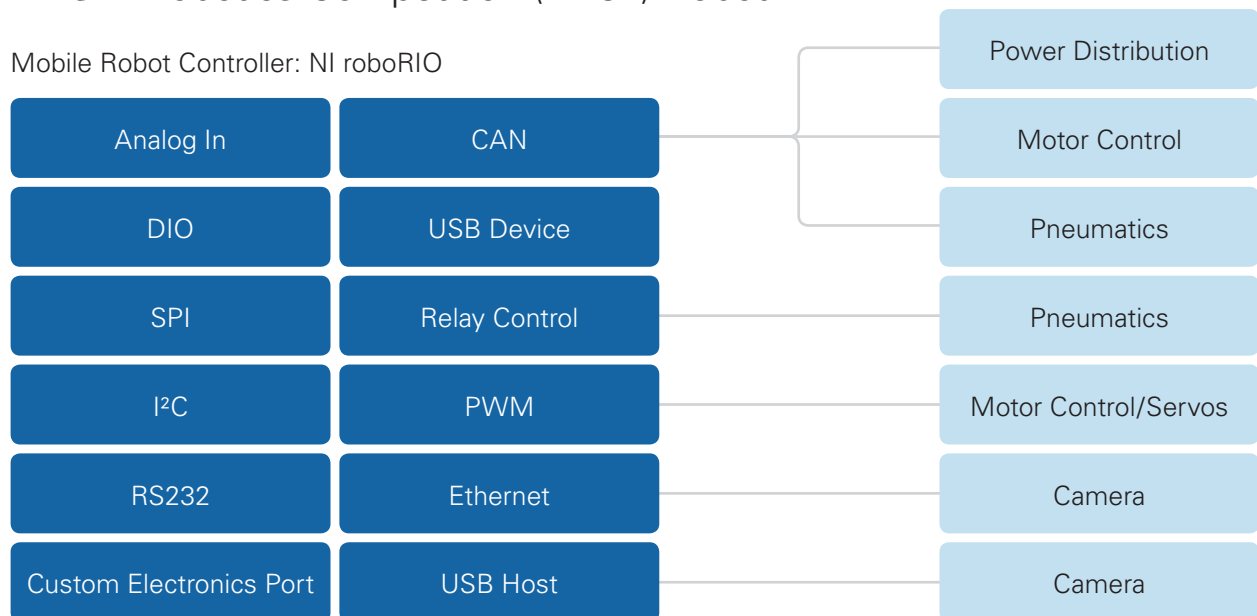
Driver Station: Powered by LabVIEW

Laptop/Tablet



FIRST® Robotics Competition (FRC®) Robot

Mobile Robot Controller: NI roboRIO



Features and Specifications

FPGA With Integrated Dual-Core Real-Time Processor

Platform	Xilinx® Zynq™-7020
Processor	Dual-Core ARM Cortex™-A9 at 667 MHz
System Memory	256 MB RAM
Storage Memory	256 MB NAND
Operating System	Linux with real-time extensions
Language Support	LabVIEW, C++, Java

Physical/Electrical Characteristics

Input Power	6.8 V to 16 V with staged brownout from 4.5 V to 6.8 V
Output 3.3 V (user)	1.5 A maximum
Output 5 V (user)	1 A maximum
Output 6 V (servo)	2.2 A maximum
Dimensions	5.7 in. x 5.6 in.
Weight	Under 12 oz
Operating Temperature	0 °C–40 °C
Storage Temperature	-20 °C–70 °C

I/O and Communication Ports

PWM	20 channels (10 dedicated, 10 shared)
DIO	26 channels (10 dedicated, 16 shared)
Relay Control	4 dual-input channels (FWD/REV)
SPI Master	2 channels (1 dedicated for up to 4 devices, 1 shared for 1 device), up to 1 MHz clock
I ² C	2 channels (1 dedicated, 1 shared), up to 400 kHz
UART	1 RS232 port, 1 TTL port
Analog Input	8 channels, 0 V–5 V, 12-bit, 500 kS/s aggregate
Analog Output	2 channels, 0 V–5 V, 12-bit, 340 kS/s simultaneous
USB Host	2 ports (USB 2.0 High Speed)
USB Device	1 port (USB 2.0 High Speed)
Ethernet	1 port (10/100 Mbit/s)
CAN	1 port (1 Mbit/s)
Accelerometer	Integrated, 3-axis, 800 S/s
Signal Light	12 V Robot Signal Light Output
Custom Electronics Port	Access to shared DIO/PWM/I ² C/SPI, Analog Input, Analog Output, TTL UART, 3.3 V, and 5 V

For more information, visit ni.com/FIRST.

