

# Academic





## It All Starts With Academic

From space exploration to making clean water more globally accessible, the most impressive scientific achievements are also the kind that inspire students to pursue math and science as a career. But once the imagination of future engineers has been captured, we need to keep them interested.

As more educators recognize the benefits of an integrated hardware/software teaching solution and hands-on learning to engage students, I'm excited by our potential to change engineering education for the better.

The key is realizing that theory alone doesn't excite a student's sense of wonder—it's the promise of putting theory to work through the use of real-world tools to "do engineering." With this approach, we not only prepare current students for meaningful careers but also attract new students to a profession that so critically needs them.

Educators must focus on adopting relevant tools and incorporating practical, real-world lessons into the classroom and laboratory. Industry must develop scalable tools, show students how to leverage their creativity through the use of these tools, and make them widely available and affordable. This mutual effort is critical to ensuring student engagement.

It all starts with academic, and here at National Instruments, we're committed to working hand in hand with educators to prepare the students of today to solve the grand challenges of tomorrow.

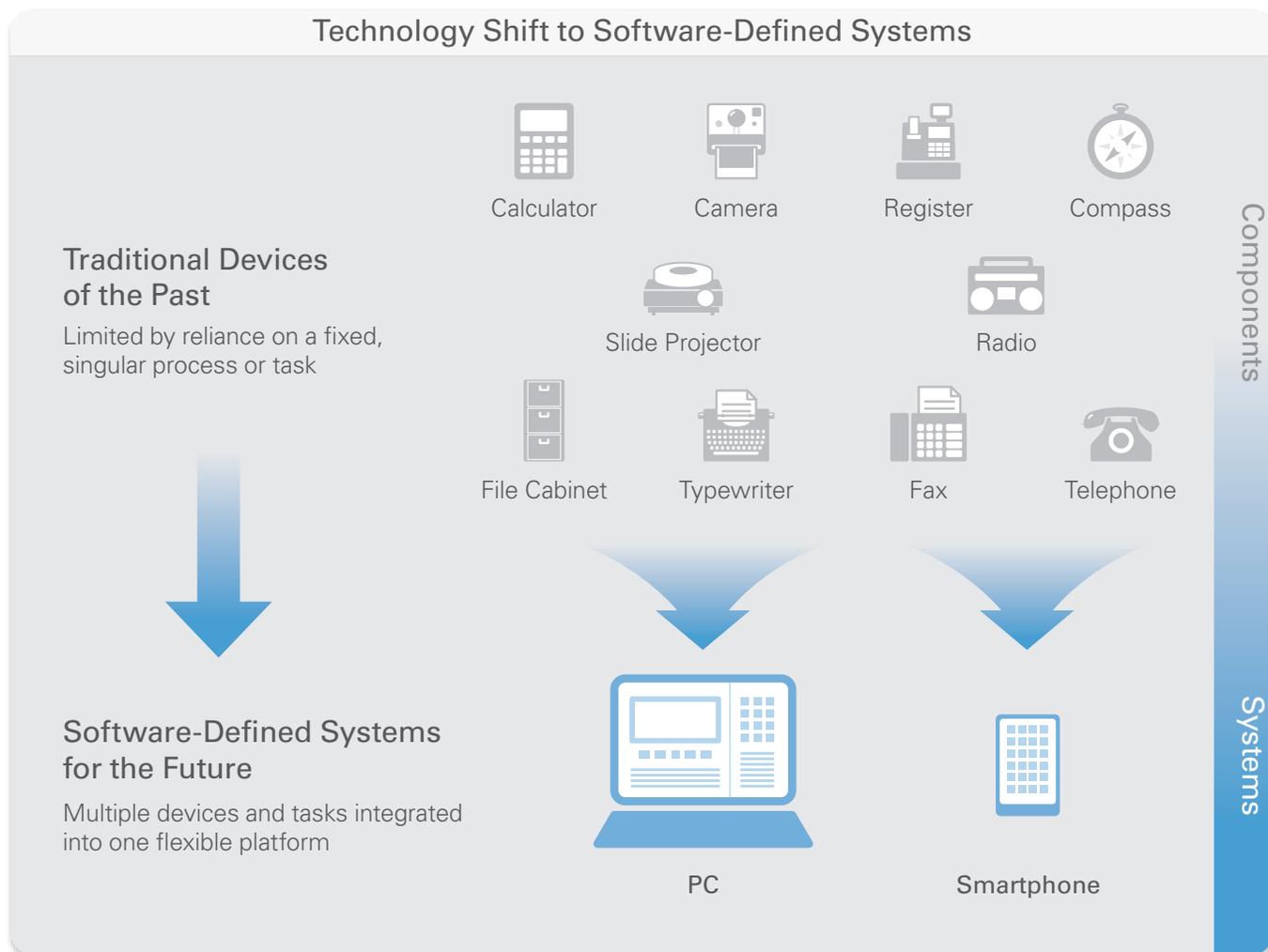
Dr. James Truchard  
Founder and CEO  
National Instruments

# Preparing the Next Generation of Innovators

The first telephones converted human speech into electrical impulses using purely analog methods—no buttons, no encoding—for the sole purpose of connecting one user to another. The smartphones of today? Try tens of millions of transistors powered by software and capable of countless functions. Such is the power of progress and the influences of Moore's law, which says that speed is doubled and cost is halved as technology advances.

As electronic hardware and computer software become ubiquitous in modern systems, the days of designing a single component or focusing on an isolated problem are over. Engineers can now leverage rapid technological growth through integration, while students are expected to understand how single components function in a larger system.

To deliver industry-standard technology to the engineers of tomorrow, NI pairs theory with hands-on learning to create real-world experiences that prepare students to "do engineering." By integrating intuitive software and adaptable hardware to abstract complexity, students can design and test systems faster. Whether students graduate with a degree in mechanical, biomedical, or electrical engineering, it's certain they'll be system designers. And with an array of best-in-class industry and educational hardware and graphical software, National Instruments is the company that provides the tools for the future of system design.



# NI LabVIEW

**Ultimate System Design Software**—LabVIEW system design software provides engineers and scientists with the tools they need to create and deploy measurement and control systems. The heart of the NI education platform, LabVIEW helps students, teachers, and researchers build a wide range of applications in dramatically less time. It is the premier development environment for problem solving, accelerated productivity, and continual innovation. For more information, visit [ni.com/labview](http://ni.com/labview).

The screenshot displays the LabVIEW interface with several key components highlighted by callouts:

- Instant Compilation:** Focus on results while LabVIEW continuously checks syntax during edit time.
- Inherent Parallelism:** Scale performance with automatic multithreading.
- Deployment Targets:** Deploy LabVIEW to thousands of targets such as PCs, real-time controllers, and FPGAs.
- Block Diagram:** Customize system behavior with graphical programming.
- Models of Computation:** Combine and reuse your .m files, C code, HDL, control and simulation models, and more within LabVIEW.
- Signal Processing and Analysis:** Save time with hundreds of built-in function libraries.
- Front Panel:** Quickly create professional user interfaces to showcase your results.
- Seamless Hardware Integration:** Bring real-world signals into LabVIEW from any device.

Integrates directly with:



NI ELVIS



NI myDAQ



NI myRIO



NI CompactDAQ



NI CompactRIO



NI USRP™



NI PXI



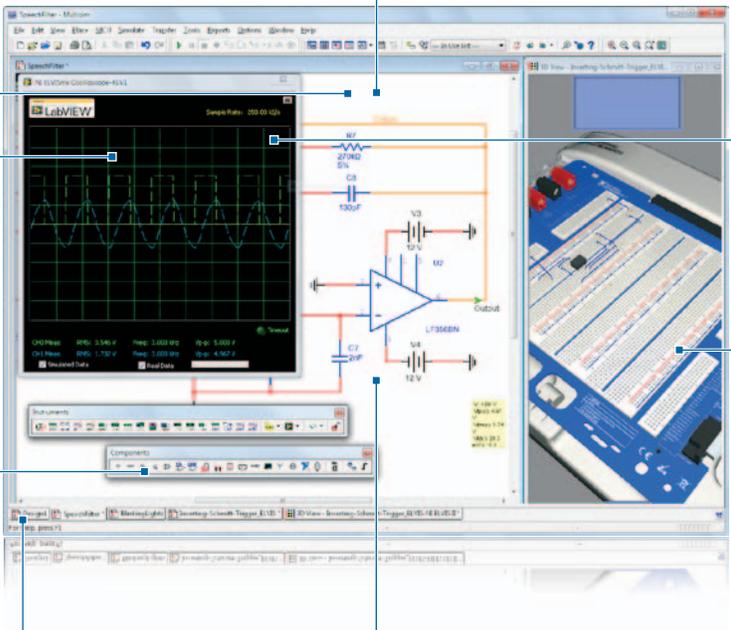
Third-Party

Courseware available at [ni.com/courseware](http://ni.com/courseware)

Relevant courses: [Intro](#) [Circuits](#) [Power Electronics](#) [Measurements](#) [Controls](#) [Embedded](#) [RF/Communications](#)

# NI Multisim

**Superior Circuits Teaching Environment**—Multisim is a comprehensive environment for teaching theory and concepts in analog, digital, and power circuits courses. It is the cornerstone of the NI circuits teaching solution and reinforces electronics fundamentals while preparing students for the laboratory. The pedagogical features of Multisim are built into an intuitive interface powered by industry-standard SPICE simulation. For more information, visit [ni.com/multisim](http://ni.com/multisim).



**Intuitive Analog and Digital Circuits Environment**  
Easy-to-learn features for SPICE and mixed-mode simulation to teach and analyze circuits in multiple courses

**Pedagogical Features**  
Teach with interactive interfaces and rated devices

**Measurement Integration**  
Compare acquired data from NI ELVIS and NI myDAQ with simulation results

**Laboratory Transition**  
Learn how to connect devices and wires on the 3D NI ELVIS breadboard

**24 Powerful Instruments**  
Visualize and investigate circuit behavior

**Final Project Export**  
NI Ultiboard integration helps students design projects for NI myDAQ, NI myRIO, and NI CompactRIO

**Industry-Standard Devices**  
Library containing SPICE models from leading semiconductor manufacturers

Integrates directly with:



NI ELVIS      NI myDAQ

Design for:



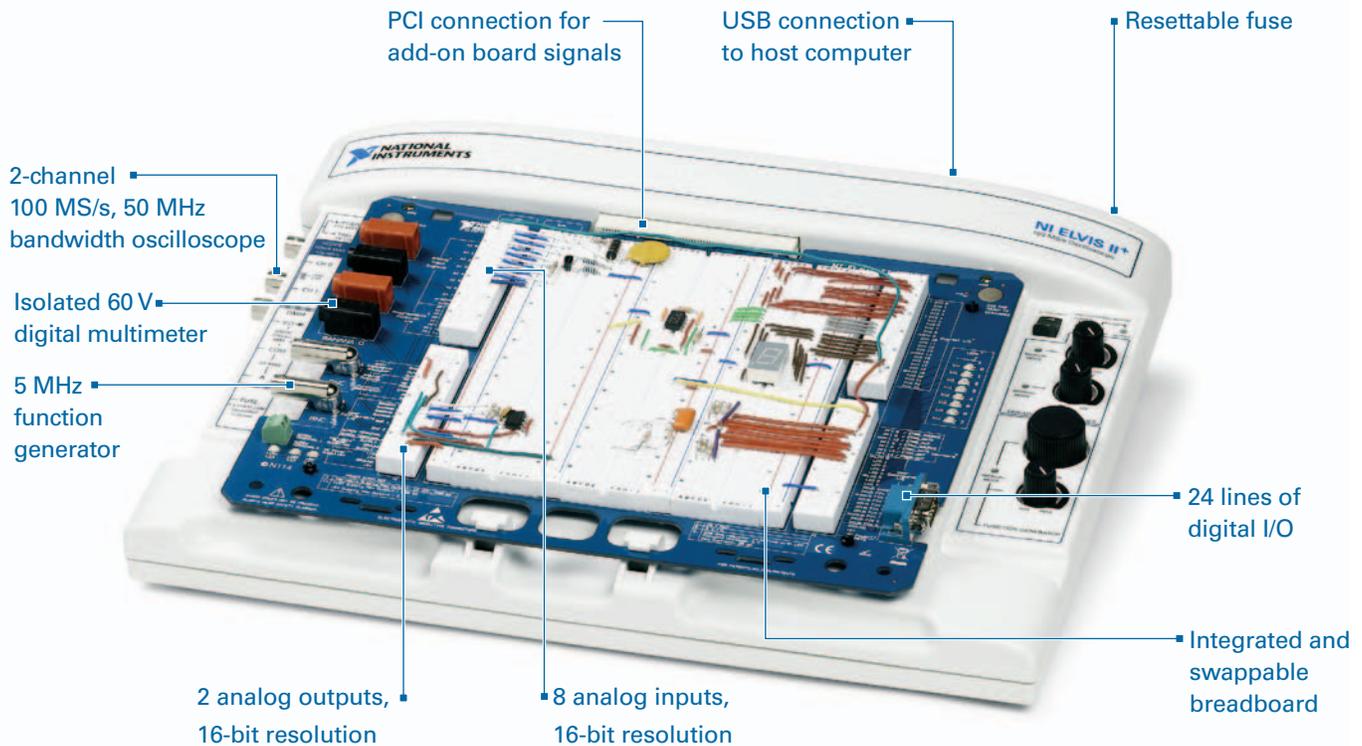
NI myRIO      NI CompactDAQ      NI Single-Board RIO

Courseware available at [ni.com/courseware/circuits](http://ni.com/courseware/circuits)

Relevant courses: [Intro](#) [Circuits](#) [Power Electronics](#) [Measurements](#) [Controls](#) [Embedded](#) [RF/Communications](#)

# NI ELVIS

**Modular, Engineering Education Lab Platform**—Designed specifically for education, NI Educational Laboratory Virtual Instrumentation Suite (NI ELVIS) has the flexibility to engage students in comprehensive experiments with 12 common lab instruments (including an oscilloscope, function generator, multimeter, and Bode analyzer) in a single device. The integrated breadboard helps students easily take circuit measurements, while an ecosystem of application-based add-on boards extend use throughout engineering curriculum. For more information, visit [ni.com/ni-elvis](http://ni.com/ni-elvis).



## Features

- Save space with 12 common lab instruments integrated into one device
- Expand functionality into course specific applications with ecosystem of add-on boards
- Prepare students with industry-standard NI DAQ technology
- Use a platform with a protective case and multiple safety features

## Software

LabVIEW

Multisim

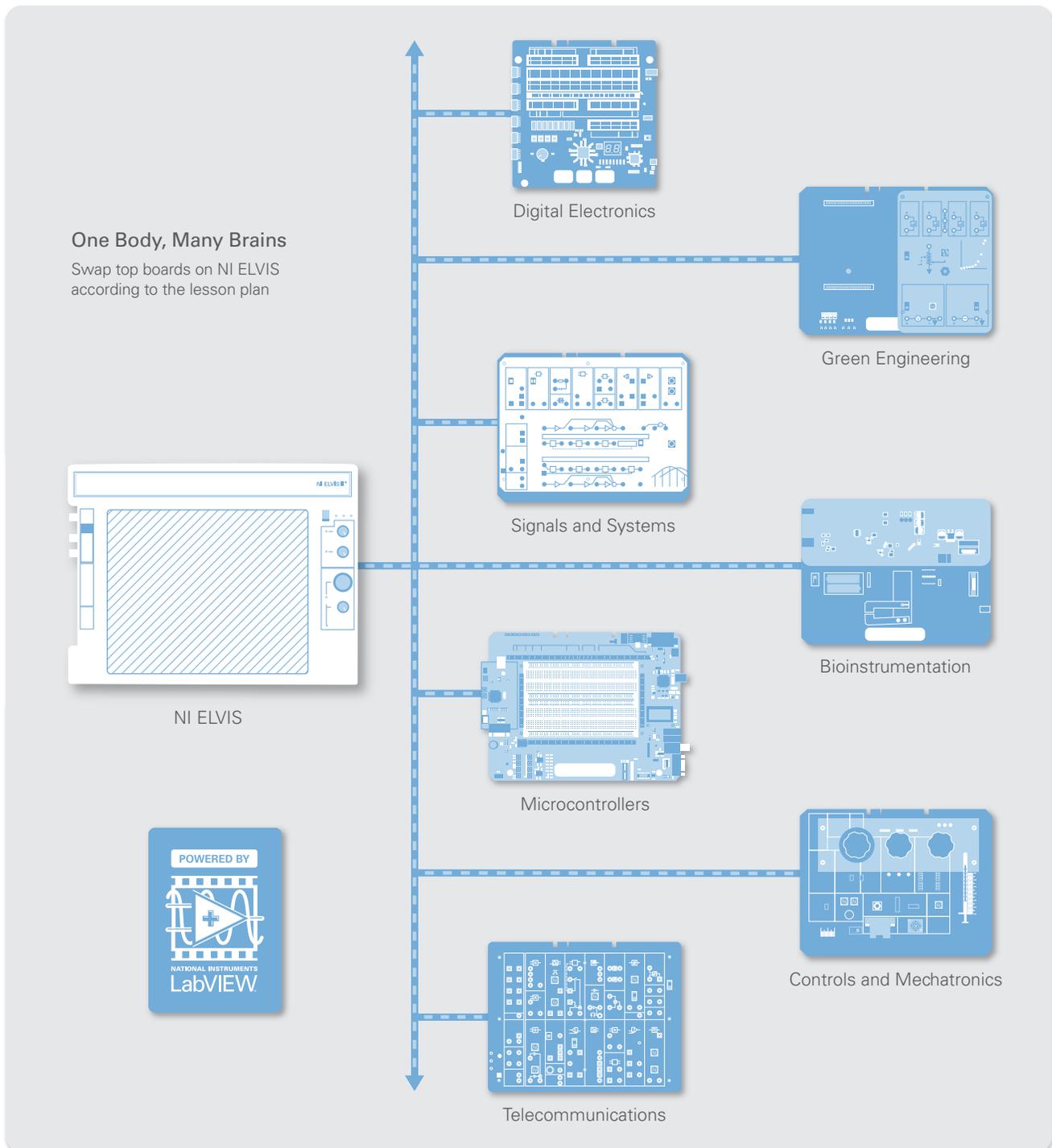
*Also compatible with C/C++, .NET*

 Courseware available at [ni.com/ni-elvis/courseware](http://ni.com/ni-elvis/courseware)

Relevant courses: [Intro](#) [Circuits](#) [Power Electronics](#) [Measurements](#) [Controls](#) [Embedded](#) [RF/Communications](#)

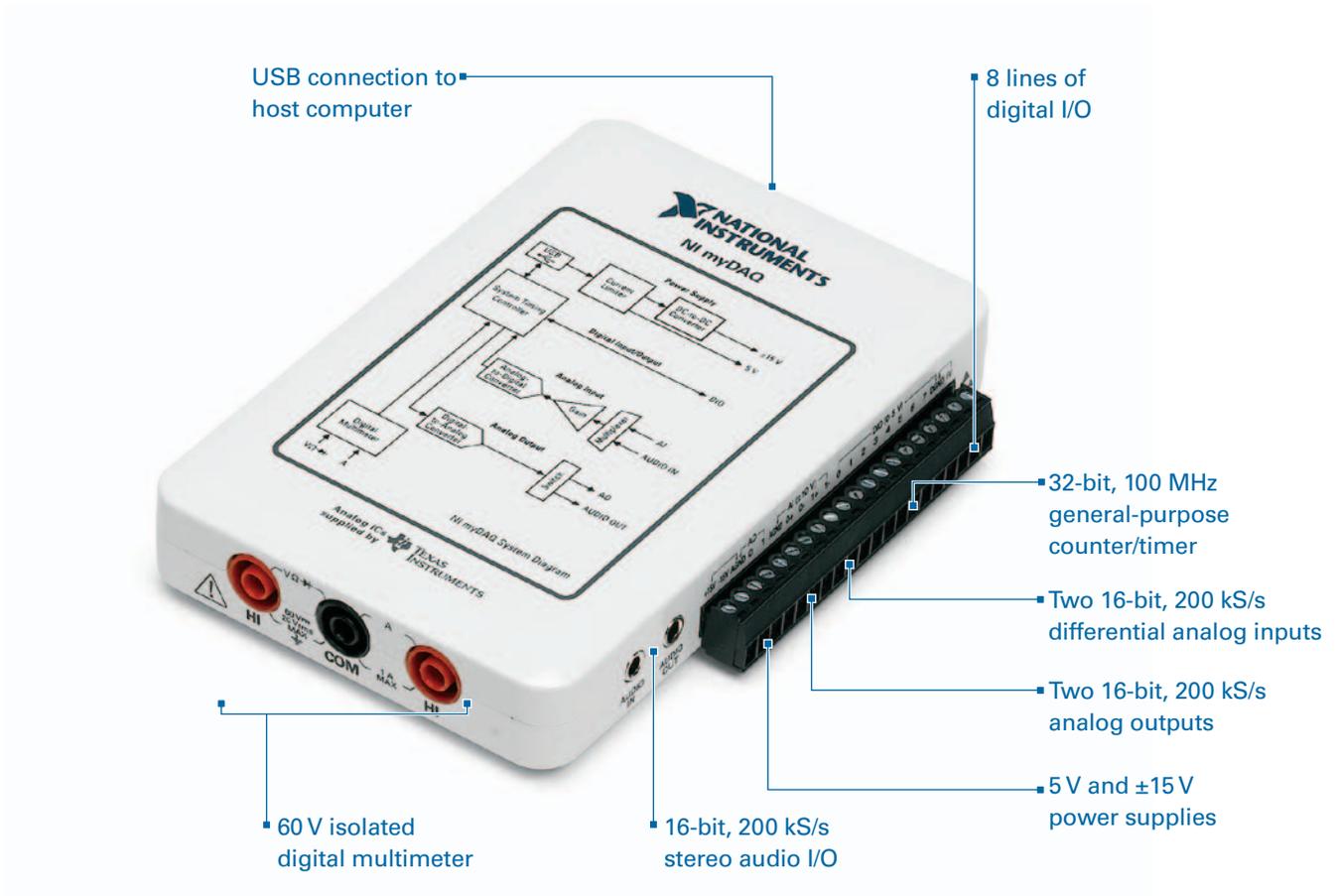
# Teaching Ecosystem

**Interchangeable Add-On Boards and Curriculum for Every Application Area**—Educators can extend the NI ELVIS platform to teach concepts such as controls, telecommunications, fiber optics, embedded design, bioinstrumentation, digital electronics, FPGAs, and more. Add-on boards from partners such as Digilent, Emona, and Quanser feature complementary courseware. See the add-on board ecosystem at [ni.com/ni-elvis/applications](http://ni.com/ni-elvis/applications).



# NI myDAQ

**Portable Measurement and Instrumentation Device**—Designed to expose students to a hands-on learning and project development experience anywhere at any time, the compact and portable NI myDAQ integrates eight common lab instruments into one student-ready device. With access to their own measurement instrument, students gain insight into how textbook theory is applied to real-world settings without having to be in the laboratory. For more information, visit [ni.com/mydaq](http://ni.com/mydaq).



## Features

- Eight common lab instruments in one device
- Ecosystem of plug-in NI miniSystems boards available
- Industry-standard NI DAQ technology framework
- Continuous and finite sampling modes available
- Ruggedized case and safety features for student use

## Software

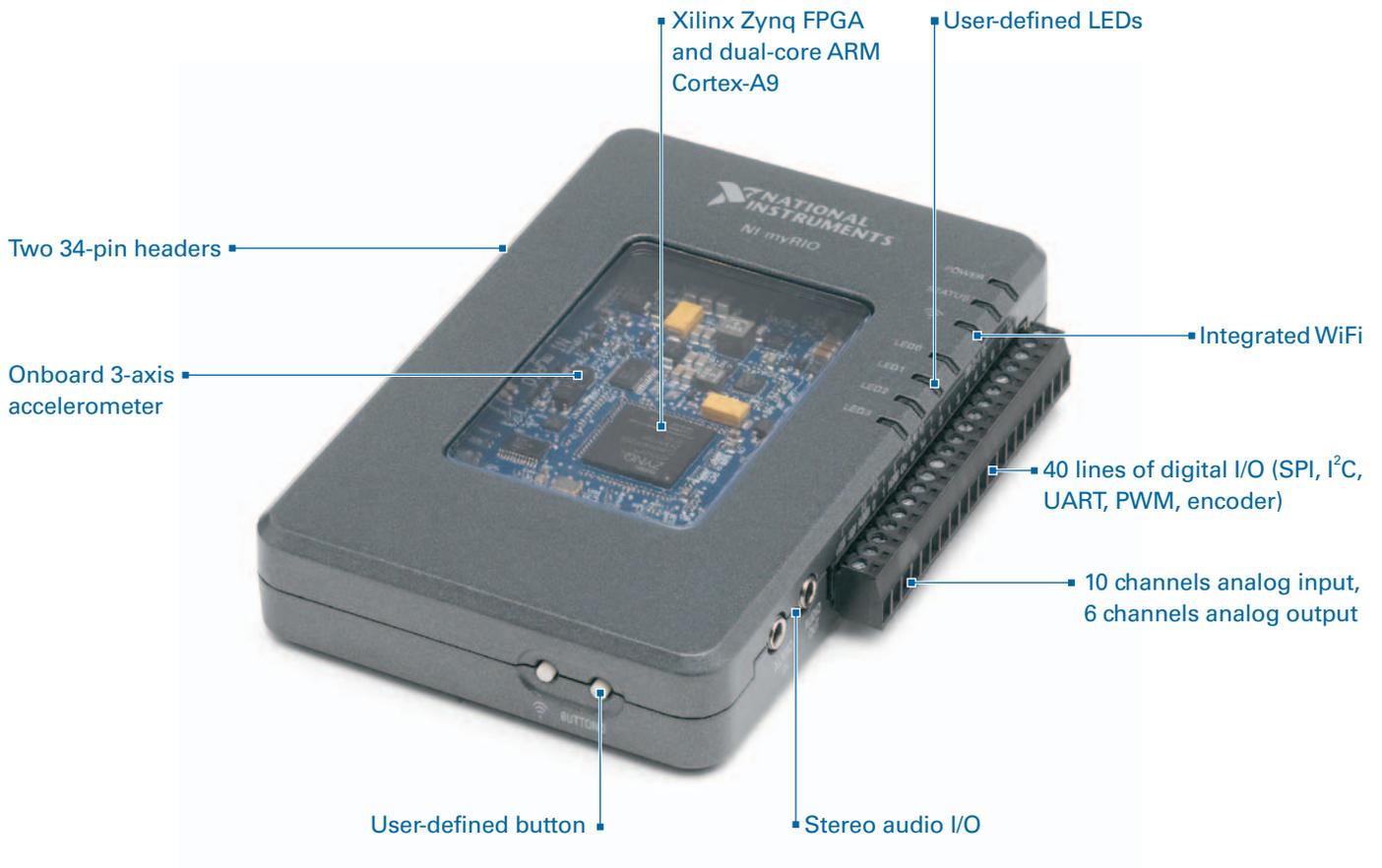
LabVIEW  
Multisim  
LabVIEW MathScript RT Module  
*Also compatible with C/C++, .NET*

Courseware available at [ni.com/courseware/measurements](http://ni.com/courseware/measurements)

Relevant courses: [Intro](#) [Circuits](#) [Power Electronics](#) [Measurements](#) [Controls](#) [Embedded](#) [RF/Communications](#)

# NI myRIO

**Portable, Embedded Student Design Device**—Leveraging industry-standard reconfigurable I/O (RIO) technology from National Instruments, NI myRIO places the power of real-time performance and customizable I/O in the hands of students. With this integrated hardware and software tool, students can quickly create applications on NI myRIO's real-time processor to take advantage of a default FPGA personality that they can customize as projects become more advanced. NI myRIO revolutionizes the way students complete design projects and helps students “do real engineering” in one semester. For more information, visit [ni.com/myrio](http://ni.com/myrio).



## Features

- Fully programmable FPGA through the LabVIEW FPGA Module
- Additional port for USB peripherals
- Comprehensive ecosystem of sensors and actuators
- Code deployment over USB or WiFi
- Minutes to first measurement with enhanced getting started experience

## Software

LabVIEW  
LabVIEW Real-Time Module  
LabVIEW FPGA Module  
LabVIEW MathScript RT Module

*Also compatible with C/C++*

 Courseware available at [ni.com/courseware/controls](http://ni.com/courseware/controls)

Relevant courses: [Intro](#) [Circuits](#) [Power Electronics](#) [Measurements](#) [Controls](#) [Embedded](#) [RF/Communications](#)

# NI CompactDAQ

**Modular, Sensor-Ready Data Acquisition Platform**—NI CompactDAQ is an industry-standard, modular data acquisition platform that can be used in benchtop and laboratory settings or mounted directly to test setups. The ecosystem of I/O modules provide the signal conditioning required to directly connect sensors while the integration with LabVIEW enables customers to acquire, analyze, display, and log data in minutes. For more information, visit [ni.com/cdaq](http://ni.com/cdaq).



## Features

- Quickly integrate into existing lab setups with ready-to-run examples for data acquisition and logging using LabVIEW and text-based languages
- Acquire from multiple sensors and control multiple actuators simultaneously with NI-STC3 timing technology
- Log data in any setting with available desktop mounting stand or mount directly to test apparatus

## Software

LabVIEW  
LabWindows™/CVI  
LabVIEW MathScript RT Module

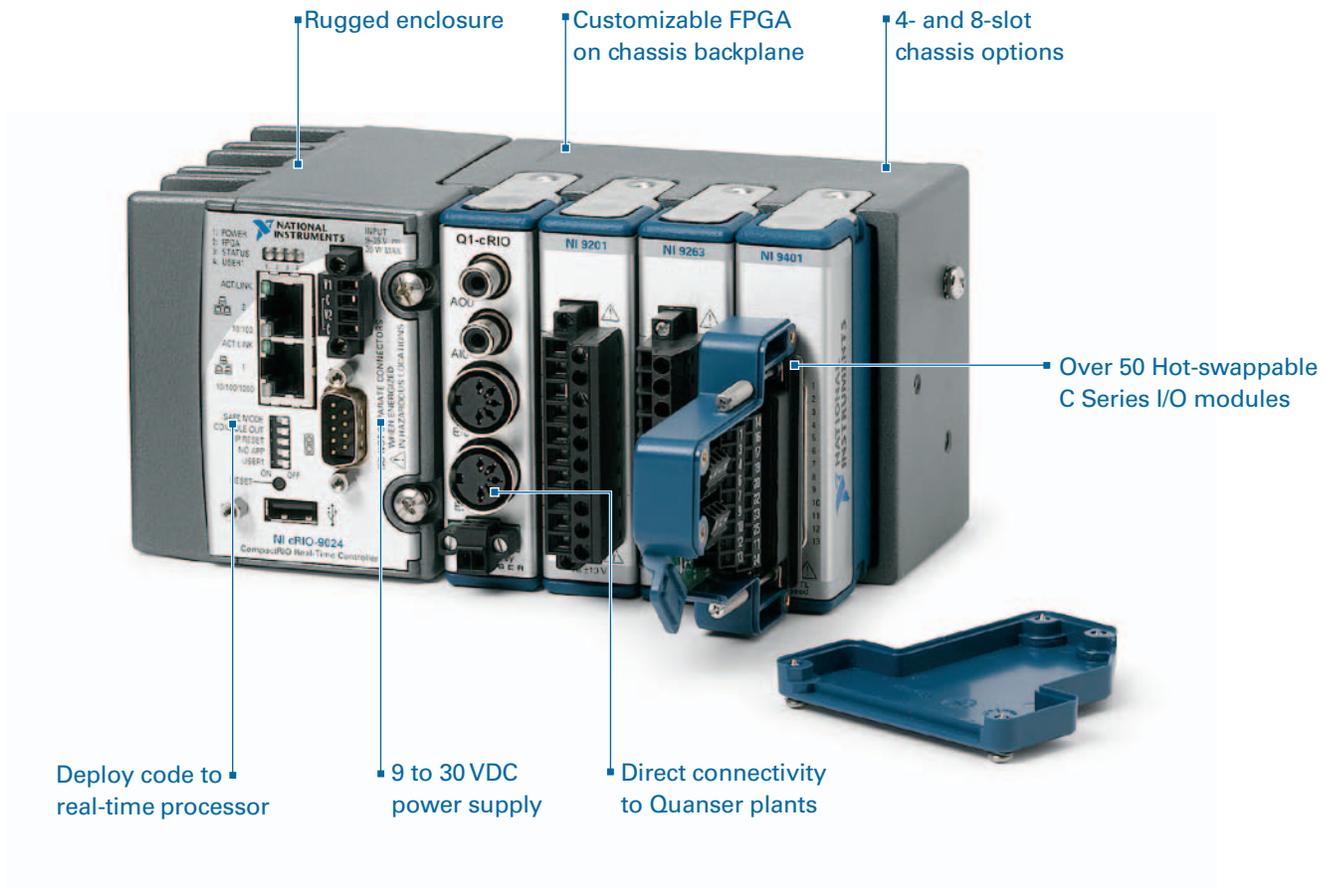
*Also compatible with C/C++, .NET*

 Courseware available at [ni.com/courseware/measurements](http://ni.com/courseware/measurements)

Relevant courses: [Intro](#) [Circuits](#) [Power Electronics](#) [Measurements](#) [Controls](#) [Embedded](#) [RF/Communications](#)

# NI CompactRIO

**Rugged, Reconfigurable Control and Monitoring Platform**—With an FPGA-based backplane and a real-time controller, CompactRIO is an industry-standard platform that delivers deterministic execution of control algorithms. It can be expanded by incorporating various modules including the Quanser Q1-cRIO that provides direct connectivity to Quanser plants, which are widely used for controls and mechatronics teaching and research. For more information, visit [ni.com/crio](http://ni.com/crio).



## Features

- Achieve deterministic loop rates up to 40 MHz for control and data-logging applications
- Expand functionality in controls, mechatronics, and robotics applications with reconfigurable deployment options
- Optimize your control algorithms with high-speed FPGA parallel processing capabilities

## Software

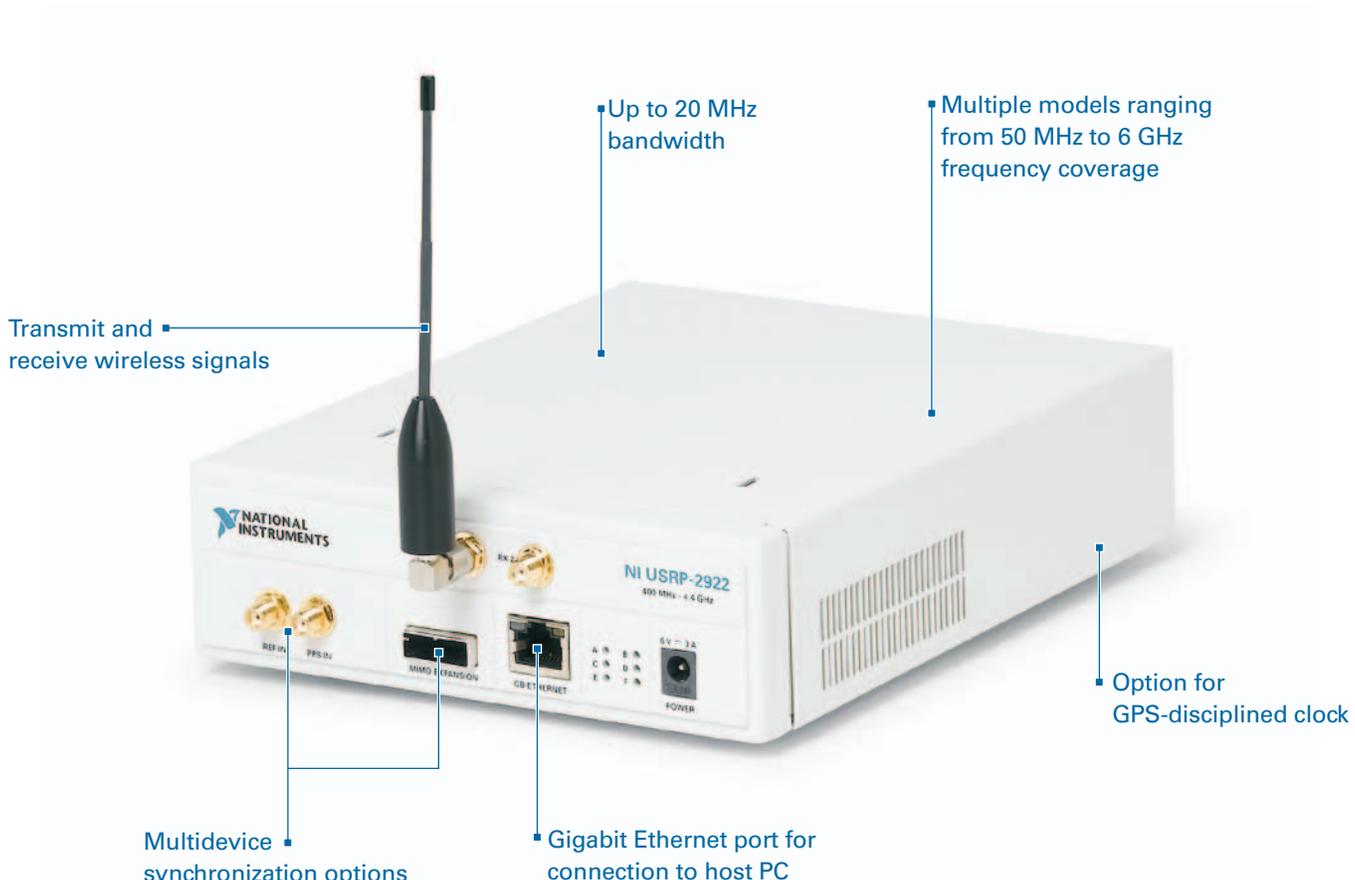
- LabVIEW
- LabVIEW Real-Time Module
- LabVIEW MathScript RT Module
- LabVIEW Control Design and Simulation Module
- LabVIEW FPGA Module

Courseware available at [ni.com/courseware/controls](http://ni.com/courseware/controls)

Relevant courses: [Intro](#) [Circuits](#) [Power Electronics](#) [Measurements](#) [Controls](#) [Embedded](#) [RF/Communications](#)

# NI USRP

**Software Defined Radio Platform**—The LabVIEW design environment with NI USRP™ (Universal Software Radio Peripheral) hardware and courseware provides students hands-on experiences in wireless and digital communications. Cover introductory teaching to advanced research topics using graphical system design and integrate your .m file script algorithms to design a complete wireless communications system. For more information, visit [ni.com/usrp](http://ni.com/usrp).



## Features

- Complete, ready-to-use teaching solution with lab-ready courseware for wireless communications
- Affordable and easy-to-use platform for hands-on learning with real-world wireless signals
- Scalable, from teaching fundamentals to cutting-edge research applications

## Software

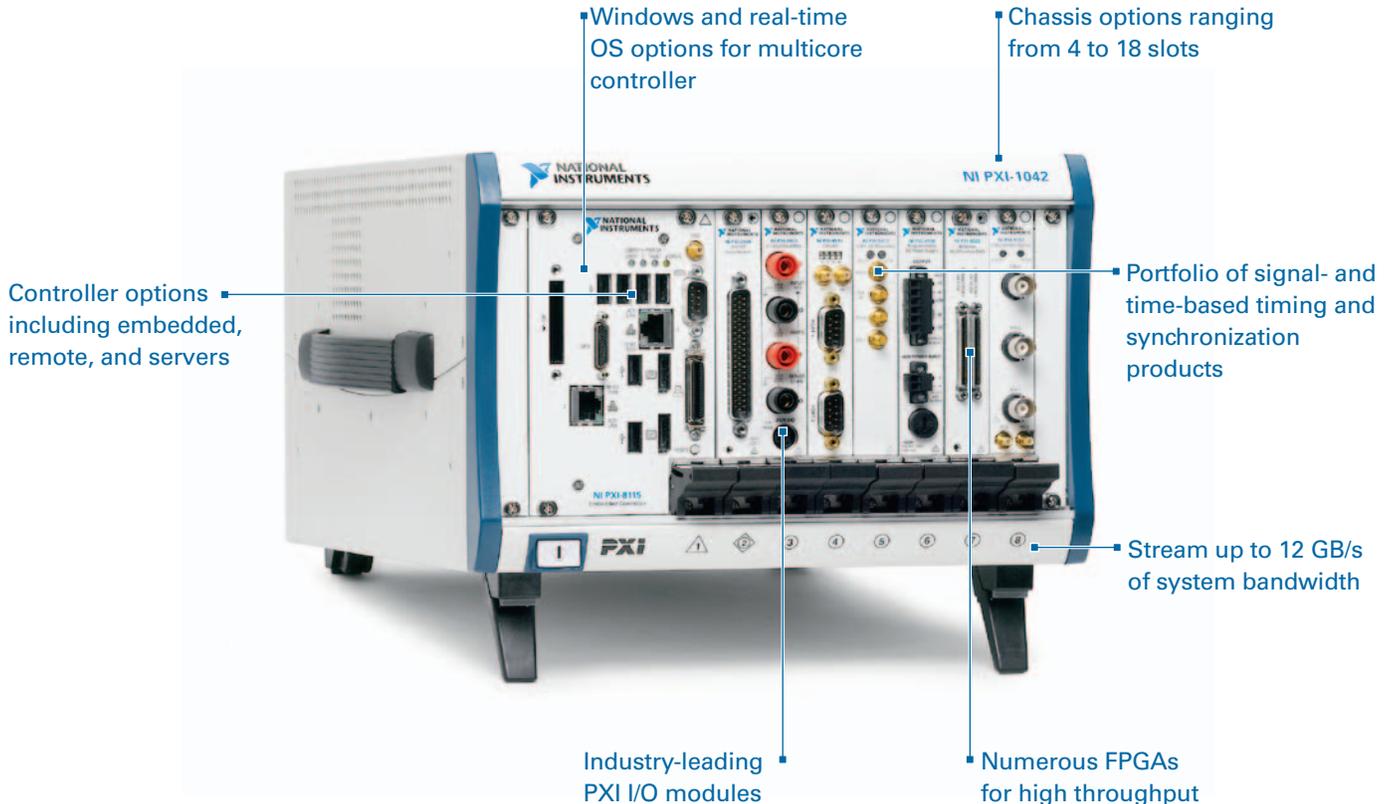
LabVIEW  
LabVIEW MathScript RT Module  
LabVIEW Modulation Toolkit

 Courseware available at [ni.com/courseware/communications](http://ni.com/courseware/communications)

Relevant courses: [Intro](#) [Circuits](#) [Power Electronics](#) [Measurements](#) [Controls](#) [Embedded](#) [RF/Communications](#)

# NI PXI

**PC-Based Platform for Test, Measurement, and Control**—PXI is the industry-leading modular instrumentation platform used to build compact, high-performance automated test systems. The measurement hardware is housed in an industrial chassis that can run as an embedded system or be tethered to a PC through a cabled interface. Benefits specific to PXI include increased channel count, portability, and integrated timing and synchronization. For more information, visit [ni.com/pxi](http://ni.com/pxi).



## Features

- More than 600 NI PXI products ranging from DC to 26.5 GHz, such as digital multimeter, RF, multifunction DAQ, and switches
- Take advantage of the latest technologies for teaching and research such as multicore processing and FPGAs
- Combine up to 17 instruments in a single chassis to save lab space
- Use a tightly integrated hardware and software platform

## Software

LabVIEW  
LabWindows™/CVI  
LabVIEW MathScript RT Module  
Many application specific Software Modules

*Also compatible with C/C++, .NET*

Relevant courses: [Intro](#) [Circuits](#) [Power Electronics](#) [Measurements](#) [Controls](#) [Embedded](#) [RF/Communications](#)

# The NI Academic Program

8,000+

classrooms using NI tools for hands-on learning

200+

LabVIEW Academies in nearly 30 countries

100+

textbooks integrate NI tools in nearly 25 languages

35,000+

companies using NI tools to solve grand challenges

240,000+

students use NI tools each year in *FIRST* and WRO robotics competitions

125+

NI and third-party hardware and software ecosystem elements

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## Features

### LabVIEW Academy

The LabVIEW Academy program provides teaching materials and certifies academic institutions to teach LabVIEW for credit and non credit courses. [ni.com/academy](https://ni.com/academy)

### Case Studies

See how academic institutions are harnessing the power of graphical system design to innovate across a variety of application areas. [ni.com/academic/case-studies](https://ni.com/academic/case-studies)

### K12 Lab

Find resources and lesson plans for science and engineering outreach as well as engaging introductory activities designed for primary and secondary students. [k12lab.com](https://k12lab.com)

### Teaching Materials

Browse hundreds of lab exercises, example programs, tutorials, and projects to help inspire your classroom and laboratory. [ni.com/courseware](https://ni.com/courseware)

### Textbooks

Choose from multiple textbooks, lab manuals, and problem sets developed by leading professors that enable hands-on learning with NI tools. [ntspress.com](https://ntspress.com)

# Recommended Solutions

Application	Portable	Teaching Lab	Industry/Research	Software
Intro to Engineering	 NI myDAQ	 NI ELVIS	N/A	LabVIEW LabVIEW MathScript RT Module
Analog and Digital Circuits	 NI myDAQ	 NI ELVIS	 PXI	Multisim LabVIEW
Power Electronics	 NI myRIO	 NI ELVIS + add-on board	 CompactRIO	Multisim LabVIEW LabVIEW FPGA Module LabVIEW Real-Time Module
Measurement and Instrumentation	 NI myDAQ	 NI ELVIS	 CompactDAQ	LabVIEW LabVIEW MathScript RT Module
Controls and Mechatronics	 NI myRIO	 NI ELVIS + add-on board	 CompactRIO	LabVIEW LabVIEW Real-Time Module LabVIEW Control Design and Simulation Module LabVIEW MathScript RT Module
Embedded Systems	 NI myRIO	 NI ELVIS + add-on board	 CompactRIO	LabVIEW LabVIEW FPGA Module LabVIEW Real-Time Module
RF and Communications	N/A	 USRP	 PXI	LabVIEW LabVIEW Modulation Toolkit LabVIEW MathScript RT Module

# Do Engineering

National Instruments gives educators the tools that enable students to go beyond theory and simulation to actually do engineering throughout their education.

## Support From Local NI Field Engineers

NI has local offices in over 50 countries and a dedicated team of NI engineers to help you find the right solution for your teaching and research applications. [ni.com/global](http://ni.com/global)

## Academic Discounts

Degree-granting institutions with the primary function of educating students are eligible for discounted pricing on hardware and software. [ni.com/education-platform/discounts](http://ni.com/education-platform/discounts)

## Student Design Competition

Share how your students are incorporating LabVIEW into design projects for a chance to win cash prizes and be recognized at NIWeek. [ni.com/studentdesign](http://ni.com/studentdesign)

## NIWeek Academic Forum

The NIWeek Academic Forum unites educators, researchers, and students from around the world every August. [ni.com/niweek/academic-forum](http://ni.com/niweek/academic-forum)

## Training

NI offers various forms of training to help you get up and running faster. Ask your local NI office about special training prices for academics. [ni.com/training](http://ni.com/training)

## Software Licensing

The NI Academic Site License includes the most popular NI software packages for academic institutions at a fraction of the industry price. [ni.com/asl](http://ni.com/asl)



**U.S. Corporate Headquarters**  
11500 N Mopac Expwy Austin, TX 78759-3504  
T: 512 683 0100 F: 512 683 9300 [info@ni.com](mailto:info@ni.com)

**International Branch Offices—[ni.com/global](http://ni.com/global)**

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