Automated Test

Test Software | PXI Modular Instrumentation | Instrument Control

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Choose the Leader in Automated Test

For more than 30 years, National Instruments has advised companies worldwide on ways to build more effective automated test and measurement systems. Today, NI is driving innovation in test system design with software-defined instrumentation. This approach combines the advantages of open, industry-standard PC technologies, modular instrumentation, and proven instrument control options – all powered by the industry’s most comprehensive and widely chosen test system software.

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Reduce Your Cost of Test

The NI software-defined test platform has proven essential in helping thousands of companies reduce test costs in both automated validation and production. Through this approach, companies achieve savings in capital equipment, system development, and maintenance costs and achieve faster test execution. Software-defined instrumentation can help you realize the following benefits:

**Reduced Capital Equipment Costs and System Size**
Deploy a complete test system at a lower cost and with the same footprint as a single traditional instrument.

**Faster Test Execution with Increased Flexibility**
Achieve higher performance with PC data buses, multicore processors, and FPGAs.

**Rapid Test Development**
Design and deploy test systems faster with graphical software development tools.

**Increased System Longevity and Success**
Quickly add functionality as your needs evolve and benefit from world-class services and support.

"We successfully standardized on the National Instruments test platform with NI TestStand, NI LabVIEW, and PXI to reduce our production test costs by 74 percent and save millions of dollars this year and for years to come."

– Kenneth Parfitt, Engineering Manager for RF Communications, Harris Corporation
Test Management Software

Why spend time programming and maintaining your custom sequencing software when you can use ready-to-run software to quickly and easily implement a scalable test framework? NI offers test management software that can help you reduce the cost of your tests, scale your test methodologies according to demand, and maximize your hardware investment. Plus, it’s the preferred choice of the world’s top aerospace, defense, and electronics manufacturing companies.

NI is helping medical device companies reduce test cost, speed development, and meet regulatory standards.
NI Test Management Software Suite

NI TestStand is the backbone of the NI test management software offering. With it, you can develop, manage, and execute test sequences and facilitate integration with enterprise systems. In real-time applications, use NI TestStand to automate NI VeriStand operator tasks including deploying system definitions and loading stimulus profiles.

NI TestStand Software

Accelerate your test and validation software development with this off-the-shelf solution for managing and executing test sequences. Use NI TestStand for specifying execution flow, reporting, database logging, switching, and connecting to other enterprise systems.

- Graphical sequence editor environment
- Interface for calling tests written in any programming language
- Multicore support for high-speed parallel execution

NI VeriStand Software

- Ready-to-use software environment for easily configuring your real-time testing applications, including hardware-in-the-loop (HIL) test systems
- Ability to configure real-time I/O, stimulus profiles, data logging, alarming, and other tasks and to import models from a variety of software environments
- Run-time editable user interface

“Standardizing on the NI platform was a strategic decision. For more than a decade, it has met our escalating needs and helped us save hundreds of thousands of dollars while helping us meet aggressive time-to-market demands.”

– Global Director, Consumer Printer Division, Lexmark Corporation
Test Development Software

It is not uncommon for engineers to exceed budgets and time schedules when they are tasked with using application development environments (ADEs) not designed for automated test. NI offers a variety of industry-leading ADEs that help you increase productivity in test development and reduce your overall costs. And NI offers training, certification, and ongoing support to help ensure your success with NI software and hardware.

For more than 30 years, NI has helped companies worldwide build cost-effective test systems.
Application Development Environments

Engineers worldwide use LabVIEW graphical programming to create automated test systems. Its graphical dataflow language naturally represents data flow and intuitively maps user interface controls for easy viewing and modification. NI also offers LabWindows/CVI, an ANSI C development environment, and Measurement Studio for Microsoft Visual Studio.

LabVIEW

LabVIEW is used by millions of engineers and scientists to develop sophisticated measurement integration with thousands of hardware devices and provides hundreds of built-in libraries for advanced analysis and data visualization.

- Acquire – Capture data from thousands of instruments from hundreds of vendors
- Analyze – Use more than 500 built-in math and signal processing functions
- Present – Display results with custom user interfaces and store data to enterprise systems

LabWindows/CVI

- Proven ANSI C development environment that simplifies hardware connectivity with built-in libraries, instrument drivers, and functions
- Assistants to autogenerated code for data acquisition and instrument control
- Easy user interface design with drag-and-drop editor and controls

Measurement Studio

- Integrated test and measurement toolset into the Visual Studio environment
- Advanced analysis tools for array manipulation, signal processing statistics, and curve fitting
- Hardware integration libraries and instrument drivers for visual studio developers
Industry-Standard Test Platform

PXI is the leading modular instrumentation platform used to build compact, high-performance automated test systems. With more than 1,500 products offered by more than 70 vendors, including Agilent Technologies, National Instruments, and Rohde & Schwarz, it is clear why PXI is the automated test platform of choice for thousands of companies worldwide. Industry analyst Frost & Sullivan forecasts continued strong adoption of PXI with a compounded annual growth rate of 17.6 percent through 2014.
NI PXI Hardware

Choose from a variety of chassis, controllers, and modular instruments to best meet your requirements. NI also offers PXI Express hardware, which extends the rugged PXI platform by integrating PCI and PCI Express signaling into one system to deliver the highest bandwidth, lowest latency, and best timing and synchronization of any test platform.

Controller
- Embedded, multicore controllers (Windows, LabVIEW Real-Time, and Linux)
- Remote PC and laptop control
- LAN, USB, GPIB, and ExpressCard connectivity

NI and Multivendor Modules
- DC to RF measurement modules
- Communications modules for CAN, ARINC, IEEE 1588, and FlexRay
- Digital I/O, frame grabbers, and motion control

Chassis
- 4- to 18-slot, rugged enclosures
- High-speed PCI and PCI Express backplanes
- Integrated timing and synchronization

“PXI Express provides the data throughput and control signals required to support the increased bandwidth necessary for RF and microwave applications. By using NI FPGA-based hardware and LabVIEW, we have been able to quickly develop multiple high-performance measurement modes for several applications.”

Wade Lowdermilk, Engineering Fellow, BAE Systems

Up and Running Faster

NI can save you a significant amount of time and money with both standard and custom services. NI standard system services feature configurations to help standardize your software and hardware as well as the assembly, configuration, test, and documentation of your NI PXI system. For custom system services, NI can work with you to develop a custom deployment system including custom hardware, shipping, and installation.

The PXI specification is governed by the PXI Systems Alliance (www.pxisa.org), an industry consortium of more than 70 vendors who have released more than 1,500 PXI products since its founding in 1998.
Modular Instruments

Choose from a variety of software-configurable NI measurement, signal generation, RF, power, and switch modules to address specific measurement tasks. Because these instruments are modular and software-defined, you can quickly interchange and repurpose them as your test needs evolve. NI modular instruments – available for PXI, PXI Express, PCI, PCI Express, and USB – also provide high-speed test execution by leveraging industry-standard PC and advanced timing and synchronization technologies.

Companies test multiple wireless standards with a single software-defined PXI system.
Flexible, Modular Hardware
A variety of software-configurable NI measurement, signal generation, RF, power, and switch modules is available to meet your needs.

High-Speed Mixed-Signal I/O
- **Digitizer/oscilloscopes**: 2 GS/s sample rates (1 GHz bandwidth)
- **Signal generators**: 400 MS/s sample rates (145 MHz bandwidth)
- **Digital devices**: 400 Mbits/s data rates and programmable voltage levels (-2.0 to 5.5 V)
- **Multifunction data acquisition**: 18 bits, 625 kS/s, 32 channels

High-Precision I/O
- **Multimeters**: 6½- and 7½-digit DMMs
- **Source measure units**: 10 pA sensitivity
- **LCR meters**: 0.25 percent basic accuracy for both inductance and capacitance
- **Audio and vibration analyzers**: 24 bits and 118 dB dynamic range

FPGA-Based Reconfigurable I/O
- **User-defined targets**: Xilinx Virtex FPGA programmable with the LabVIEW FPGA Module
- **NI FlexRIO**: Interchangeable and customizable adapter modules that define the physical I/O
- **IF transceivers**: Built-in digital upconverters and downconverters
- **NI R Series DAQ**: Eight analog and 96 digital I/O lines

RF and Communications
- **Vector signal generator**: 85 MHz to 6.6 GHz with 100 MHz real-time bandwidth
- **Vector signal analyzer**: 10 MHz to 6.6 GHz with 50 MHz real-time bandwidth
- **Modulation capability**: Support for custom and standard analog and digital modulation
- **Protocol toolkits**: WLAN, GPS, WiMAX, MIMO, and more

Switching
- **Topology**: More than 150 multiplexer, matrix, general-purpose, and RF configurations
- **High density**: Up to 256-channel multiplexers and 544-crosspoint matrices
- **High power**: Up to 600 VDC/300 VAC, 12 A
- **Bandwidth**: Up to 26.5 GHz

“We naturally chose NI hardware and software. Not only are they market leaders and trusted advisors in automated test engineering, but their global availability of training courses was a major advantage.”

– Heinz Hennrichs,
Director of Global Production Test Electronics Operations,
Hella KGaA Hueck & Co.
System Success

The NI professional services team consists of NI systems engineers, trainers, and the National Instruments Alliance Partner program, which includes more than 600 independent consultants and integrators worldwide. Alliance members offer in-depth knowledge of NI products and provide services ranging from basic assistance to turnkey systems integration and maintenance. NI also delivers assembly and configuration services so you can use your solution right out of the box.

Virtual instrumentation is driving the next generation of automotive design and test.
Instrument Control for Any Bus
With a hybrid test system based on LabVIEW software and PXI hardware, you can easily integrate instrumentation from a variety of platforms, such as PCI, VXI, USB, GPIB, LAN, and LXI, to meet your test needs. You also can visit the NI Instrument Driver Network at **ni.com/idnet** to access more than 8,000 instrument drivers for LabVIEW, LabWindows/CVI, and Measurement Studio.

Integrate a folding rack-mount 1U LCD monitor, keyboard, and mouse drawer into your system

Choose from more than 8,000 instrument drivers at **ni.com/idnet**

Control traditional instrumentation using GPIB, USB, LXI, serial, LAN, and VXI

Use IEEE 1588 to synchronize highly distributed instruments

Maintain Accuracy with Calibration
All NI measurement hardware is calibrated to nationally and internationally accepted standards, such as ISO 9001, to ensure proper traceability. Once your system is installed, take advantage of built-in calibration features to compensate for measurement errors introduced by the environment, cables, and fixtures. In addition to these features, you can achieve like-new performance of your hardware by returning it to NI for regular calibration service.
Case Studies

NI has helped more than 25,000 companies around the world improve their automated test and measurement strategies. NI customers save time and money while ensuring product quality. Read some of their brief stories below or visit ni.com/automatedtest to read full case studies from these companies and more.

“To improve service and increase productivity, we created an environment of collaboration within our company. An important part of this vision was selecting a global standardized test platform, and NI offers the most complete platform to accomplish this.”

– Vice President of Engineering Test, Major Aerospace Company

**Consumer Electronics Test**

Microsoft Corporation developed a versatile validation and end-of-line production test system for the Xbox and Xbox 360 controllers using LabVIEW and PXI modular instrumentation. With the new test system, Microsoft implemented a test strategy that resulted in a 100 percent increase in test throughput per test station.

**Hardware-in-the-Loop Test**

Siemens, a global leader in clean power generation, required a test system that automates the testing procedures for the control system of its wind turbines. The company turned to LabVIEW software and PXI hardware to create a real-time system for hardware-in-the-loop testing of the regularly updated embedded control software releases that is easy to improve, adapt, and develop for future installations.
Semiconductor Test
When ON Semiconductor needed to replace its costly test system, the company turned to National Instruments and the flexibility of software-defined test. By using LabVIEW software and PXI hardware, the company reduced costs by 3X and increased semiconductor validation time tenfold. And because of the modularity of PXI, tests can quickly be adapted to meet ever-increasing performance and speed requirements.

RF and Communications Test
Harris, an international communications and information technology company, tests RF data transmitters and receivers. Using PXI instruments from NI and an external wide area network transceiver integrated circuit on a custom-printed circuit board, Harris implemented a complete serial bit error rate test system that reduces cost per unit by approximately 4X and offers customization capability to communication interfaces that have added test requirements.

Audio and Video Test
Sony Electronics needed a highly reliable and cost-effective test system for its line of Blu-ray players. The company used LabVIEW and PXI modular instruments to hit its target cost, meet rigid performance requirements set by the Blu-ray Disc Association, and improve test throughput by 33 percent.

Military Electronics Test
Lockheed Martin Simulation, Training & Support (LM STS) developed a standard test system for avionics suppliers to the joint strike fighter program. The system uses NI TestStand and LabWindows/CVI software for the core test management and ANSI C test development. LM STS estimates its standardized approach to the F-35 JSF program has already saved the U.S. government millions of dollars and has the potential to save hundreds of millions more over the life of the program.
Visit ni.com/automatedtest for:

- **Test Development Resources**
  Access white papers and other resources covering strategies for test system development and optimization.

- **Case Studies**
  Read in-depth case studies from companies around the world that are saving time and money using the NI test platform.

- **Software Evaluation and System Specification**
  Download software evaluations and start specifying a test system today with interactive advisors.