PXI & AXIe Instruments, Software, Reference Solutions and Services

Unlocking Measurement Insights

For more than 75 years, Technologies, Inc. has been unlocking measurement insights. Along the way, we've created industry-leading test equipment in the shapes and sizes you've asked for: full-size benchtop, small benchtop, handheld and modular. Our goal is to deliver comprehensive worldwide test solutions — hardware, software, worldwide support and application expertise — to give ***your teams*** what they need to stay on the leading edge in ***your industry***.

Our modular hardware innovations are focused on two specific forms: PXI and AXIe. We're putting our unrivaled performance—and consistent measurement science—into the RF, microwave and high-speed digital instruments in our PXI and AXIe portfolio.

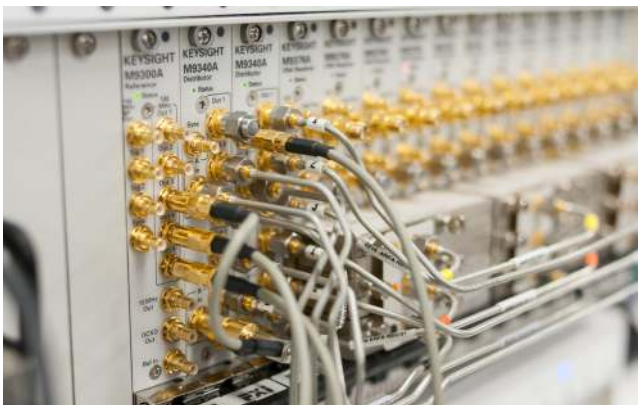
To provide time-saving starting points for test system creation, we're documenting ***Reference Solutions*** that address specific application areas ranging from power amplifier testing to satellite signal monitoring.

Software is an essential element of any test system—and software is downloadable expertise. From first simulation through first customer shipment, we deliver the tools your team needs to accelerate from data to information to actionable insight. We also provide soft front panels and essential utilities that make our modular products usable within minutes out of the box, ensuring rapid time to first measurement.

has the industry's largest network of experienced local application engineers covering RF, microwave and digital—and no one can match their cumulative years of experience.

Keysight's three-year standard warranty—worldwide—is our commitment to superior product quality. Our multi-vendor One-Stop Calibration and uptime services ensure the ongoing accuracy, performance and availability of your instruments. We can create a customized service plan with response times as fast as four hours. Our network of over 50 service locations worldwide and mobile calibration teams, provide greater convenience and flexibility to keep your products and test systems operating to warranted specifications.

Keysight's modular solutions help you tackle your toughest RF, microwave and digital challenges by delivering unrivaled PXI and AXIe performance. Our foundation is the industry's most accurate measurement science, giving you maximum confidence to achieve your first, best measurement and insight into what's next.



KEYSIGHT MODULAR

Unrivaled Performance.
Half the Time to Insight.

Reference Solutions

Gain insights faster with Reference Solutions, proven test systems for specfic applications. Developed to solve critical test issues for specific applications, reference solutions provide a starting point for a test system, including:

- Hardware configurations - PXI, AXIe or benchtop instruments.
- Application software, such as 89600 VSA, Signal Studio and more.
- Open source programming commands provided to perform specific tests and optimize test speed and throughput.

A sample of our reference solutions is provided below. For a complete list, visit:

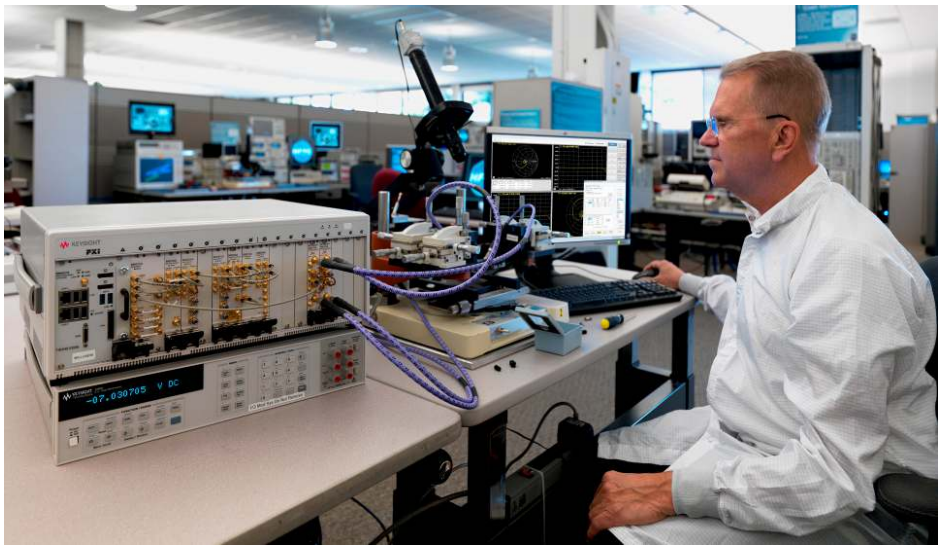


Figure 1. Using Keysight's M937xA PXIe vector network analyzer, M9381A PXIe vector signal generator and M9391A PXIe vector signal analyzer with measurement application software for power amplifier test.

RF PA/FEM Characterization & Test	Rapid, full characterization of next-generation power amplifier modules such as PAD devices, including S-parameter, demodulation, power, adjacent channel power and harmonic distortion measurements are provided by this Reference Solution. Digital pre-distortion and envelope tracking signal generation and analysis are enabled by Keysight's N7614B Signal Studio for power amplifier test software.
5G Channel Sounding	Accelerate 5G channel sounding research with mmWave, ultra-broadband and MIMO solution providing fastest data capture with real-time correlation and wideband MIMO channel processing.
LTE-A Multi-Channel	Quickly set up, measure, visualize and characterize your most complicated multi-channel carrier aggregation, beamforming and MIMO designs. Easily configure and calibrate phase coherent PXIe VSAs, VSGs and software with convenient configuration and calibration utilities.
Automotive Functional Test	This unique, flexible test configuration is designed for reliable automotive body and safety testing. It features 8 PXI slots and 11 slots of sensor signal emulation, waveform analysis, discrete input switching or high-power load switching for a complete functional test solution in a compact space.
Satellite Signal Monitoring	With this fast, flexible, compact and cost effective Reference Solution, you can monitor large blocks of spectrum and perform precise digital modulation analysis with increased configuration flexibility for validating satellite signal integrity.

PXI Instruments - Interoperability, Size, Speed & Scalability

PXI is an open, multi-vendor standard governed by the PXI systems alliance, that ensures interoperability of modules and chassis from different vendors.

The PXIe backplane bus leverages PCI Express® technology, greatly increasing test speed and reducing latency, especially for data and transaction intensive test applications. The bus also enables scalability of the system as test needs change. And PXI can also be integrated into an existing test system of benchtop or AXIe instruments.

Keysight's growing portfolio of PXI instruments extends its measurement expertise to provide the right solution for multiple test scenarios.

Figure 2. Keysight's M9010A PXIe 10-slot chassis with ultra-quiet operation and Gen 3 performance.

PXI Arbitrary Waveform Generators	Choose from wide bandwidth (up to 1 GHz) or FPGA-programmable AWGs, both with precise multi-channel synchronization, high sampling rates and up to 16-bit resolution.
PXI Chassis, Controllers & IO Components	Chassis in 5, 10 or 18-slot sizes with PCI Express® Gen 1, Gen 2 or 3 performance offer multi-chassis connections, and an innovative cooling design that saves rack space and lowers maintenance cost. PXIe controller with Intel i7-4700EQ, 2.4 GHz processor, up to 16 GB RAM and front removable 240 GB solid state drive.
PXI Data Acquisition	Address the need for high input voltage or current ranges often found in functional test with a choice of digital to analog converters and V/I sources. Products include isolated D/A converter with multi-channel high voltage supplies, multi-channel dynamic DAC for typical waveforms generation at high voltages and more.
PXI Digital IO & Stimulus/Response	High channel digital I/O control with up to 50 v and 12.5 mW resolution. Digital stimulus/response provides speed, configuration flexibility, multi-site and pattern generation capability for automated test.
PXI Oscilloscopes & Digitizers	Full-featured oscilloscopes based on Keysight's InfiniiVision benchtop technology, packaged for PXI offer up to 1 GHz bandwidth. Digitizers with on-board FPGAs offer up to 2 GHz bandwidth and 12-bit resolution.
PXI Switches	High-speed, 500 µsec multiplexers, 300 W GP switches, RF and microwave switches up to 40 GHz with low insertion loss and VSWR for excellent signal integrity.
PXI Vector Network Analyzers	Select from full 2-port vector network analyzers that fit in just one slot and high performance multi-port vector network analyzers. Configure up to 32-ports in a single PXI chassis.
PXI Vector Signal Analyzers, Generators & Vector Transceivers	PXI RF and µW vector signal analyzers (9 kHz to 50 GHz), vector signal generator/CW source (1 MHz to 6 GHz) and vector transceiver (60 MHz to 6 GHz), offer high speed measurement capability with up to 160 MHz bandwidth.
Other PXI Instruments	– Amplifier/attenuators – Digital input output – Digital multimeters – Frequency reference – FPGA – Optical extenders – Quad downconverter – Source/measure unit

AXIe Instruments - Truly Advanced, Cutting Edge Technology

AXIe is a next-generation open standard based on Advanced Telecommunications Computing Architecture. By increasing the power and board space available to each slot, higher performance modules have been developed with faster switching speeds, larger power draws and more complex measurement architectures.

An augmented local bus, providing communication and synchronization between slots, facilitates complex multi-instrument configurations, data storage and co-processing. As a result, AXIe instruments provide timing, triggering, and module-to-module data movement features for high-performance test and measurement systems used in aerospace defense, high-energy physics, semiconductor test and other industries.

Figure 3. M8040A 64 GBaud high-performance BERT, M9537A embedded controller in a M9505A 5-slot AXIe chassis.

AXIe products use horizontal configurations for minimal rack space and vertical for larger systems. The chassis and modules complement benchtop and PXI products and include PCIe and LAN interfaces that allow them to act like virtual PXI or benchtop instruments.

AXIe Chassis, Controllers & IO Components	Select from 2-, 5-slot and 14-slot chassis, all fully compatible with the AXIe 1.0 or 2.0 specification. The high performance, one-slot M9537A embedded controller offers AXIe-wide PCIe support, multiple 4K video outputs and more.
AXIe Arbitrary Waveform Generators	From low-observable systems to high-density communications, testing is more realistic with our high resolution, wide bandwidth AWGs. Our wideband AWGs deliver up to 14-bit resolution, 92 GS/s sample rate and 16 channels per AXIe chassis.
AXIe Digitizers	Our revolutionary digitizers capture signals up to 10 GS/s and 12-bit resolution, providing excellent measurement accuracy. With up to 32 channels per module, very high density systems can be configured.
BERTs	Streamline receiver test setup with the highest level of integration and automated stressed eye calibration. We provide highly integrated BERTs for physical layer characterization and compliance testing of NRZ and PAM-4 signals up to 64 GBaud.
Logic & Protocol Analyzers	Address multi-protocol analysis, traffic generation, performance and conformance verification to debug, validate and optimize your designs using high speed protocol standards.

Software & Programming

Speed your project's design to manufacturing cycle with Keysight's PXI and AXIe instruments combined with its portfolio of software. Select from trusted measurement applications for proven performance, usable with both benchtop and modular instruments to enable code re-use and measurement consistency from design to manufacturing. Enhance hardware capability with smart drivers to quickly connect, configure and ensure proper calibration before making measurements. We support multiple programming environments (i.e., Visual Studio. NET, MATLAB, LabView) so that you can use the software of your choice.

X-Series Measurement Applications	X-Series measurement apps transform X-Series and modular signal analyzers into standards-based RF transmitter testers. They provide fast, one-button RF conformance measurements to help you design, evaluate, and manufacture devices and equipment.
89600 VSA Software	The 89600 VSA software is a comprehensive set of tools for demodulation and vector signal analysis. These tools enable you to explore virtually every facet of a signal and optimize your most advanced designs.
Signal Studio Software	Signal Studio software, reduces the time you spend on signal simulation and simplifies signal creation. Its performance-optimized reference signals – validated by – enhance the characterization and verification of your devices.
SystemVue Software	SystemVue is a system-level EDA environment that enables design of the physical layer of next-generation communications systems. Re-use the same verification set-ups, scripts, test vectors and wireless IP as you move from algorithm into testware.
FPGA Design Environment	Designed for the non-programmer, this intuitive, graphical hardware customization platform provides full FPGA programming capability without performance penalty.
Hardware Virtual Instrument (HVI)	Intuitive, flowchart style programming environment enables real-time sequencing, inter-module synchronization and more.
Waveform Creator Software	Waveform Creator provides easy development of complex baseband and vector signals used in the validation and test of digital communications products. Built around a drag-and-drop graphical user interface, Waveform Creator allows quick development of custom multi-format, multi-track waveforms.
IO Libraries Suite	The IO Libraries Suite auto discovers instruments physically connected to your PC and many of those on your local LAN subnet. The PXI/AXIe chassis view in Connection Expert provides details to make it easy to connect and control across instrument platforms.
Command Expert Software	Command Expert is complementary software that provides instrument control in PC application environments, combining instrument commands, documentation, syntax checking and command execution all in one simple interface.
MATLAB Software	MATLAB software, available for purchase from , extends the capabilities of modular hardware. Three MATLAB configurations are available from basic MATLAB capabilities that allow acquisition and analysis of data to full support for signal processing, communications, filter design and automated testing.

List of PXI & AXIe Instruments, Reference Solutions, Software

PXI Instruments	Model #
Amplifier/attenuator	M9352A
Arbitrary waveform generator	M9330A, 31A, 36A
Arbitrary waveform generator - FPGA-programmable	M3201A, 02A, M3300A, 02A
Attenuator – programmable step attenuator	M9168C, 68E, 69E
Attenuator/switch driver	M9170A
Chassis – 5, 10 & 18-slot	M9005A, 10A, 18B, 19A
Controller – embedded controller	M9036A, 37A
CXA-m signal analyzer	M9290A
D/A converter – 8/16-channel isolated	M9185A
Data acquisition module – 32-channel high-voltage	M9216A
Digital IO control	M9187A
Digital stimulus/response with PMU – Pattern editing software for PXIe DSR	M9195B M9192A, 93A
Digitizer – 12-bit	M9203A
Digitizer – FPGA-programmable	M3100A, 02A M3300A, 02A
Digitizer – 2-channel, high-voltage, 20 MSa/s	M9217A
DMM – basic	M9181A
DMM – high performance	M9182A, 83A
Dynamic analog output – 16-channel	M9188A
Frequency reference	M9300A
Measurement accelerator	M9451A
Optical RF amplifier	M9405A
Optical receiver	M9404A
Optical RF reflectometer	M9408A
Optical transmitter	M9403A
Optical USB 2.0	M9406A, 07A
Oscilloscope	M9240A, 41A 42A, 43A
PC adapter – PCIe desktop PC & host adapters	M9048A, 48B, 49A
PCIe cable interface, system modules	M9021A, 22A, 23A, 24A
Quad downconverter	M9362AD01
Source – CW	M9380A
Source/measure unit	M9111A
Switches – dual SP4T solid state	M9161D
Switches – general purpose	M9130A-35A
Switches – DC to 26.5 GHz	M9155C-57C
Switches – DC to 40 GHz	M9155CH40 57CH40
Switches – matrix	M9120A-22A
Switches – multiplexer	M9101A-03A
Switches – RF	M9128A, 46A, 47A, 48A, 49A

PXI Instruments, continued	Model #
VI source – isolated voltage/current source	M9186A
Vector network analyzers	M9370-75A
Vector network analyzer, multiport	M9485A
Vector signal analyzer – up to 50 GHz	M9393A
Vector signal analyzer	M9391A
Vector signal generator	M9381A
Vector tranceiver (VXT)	M9420A, 21A
AXIe Instruments	**Model #**
Arbitrary waveform generator	M8190A, 95A, 96A
BERT - 64 GBaud	M8040A
Chassis: 2, 5 & 14-slot	M9502A, 05A, 14A
Controller – embedded controller	M9537A
Digitizer: 12, 10 & 8-bit	M9703B, 10A, 09A
J-BERT	M8020A
Logic analyzer – 4 Gb/s state mode	U4164A
PC adapter – PCIe desktop PC adapter , host adapters	M9048A, 48B, 49A
PCIe cable interface, system modules	M9021A, 22A, 23A, 24A
Protocol analyzer – MIPI	U4421A, 31A
Protocol analyzer – PCIe	U4301B
System module	M9521A
Software	**Model #**
89600 VSA software	89601B
FPGA design environment	M3602A
Hardware Virtual Instrument platform	M3601A
IO Libraries Suite	E2094
MATLAB software	N6171A
Signal Studio software	N76xxB
SystemVue software	W1461BP
Waveform Creator software	M9099
X-Series measurement applications	Various

Reference Solutions

Reference Solutions
- RF PA/FEM
- LTE/LTE-A multi-channel
- 5G channel sounding
- 5G waveform generation & analysis testbed
- 802.11ad testbed
- Multi-channel antenna calibration
- Satellite signal monitoring
- Automotive functional test
- Radio test

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