Agilent
PXI and AXIe
Modular Products

Catalog
January 2012

DISCOVER the Alternatives…

… Agilent **MODULAR** Products

Agilent Technologies

A Letter from our President

Dear Valued Customer,

I am pleased to present this new edition of the Agilent PXI and AXIe Modular Instruments catalog. Agilent's modular instruments portfolio gives you expert measurement science in the PXI and AXIe form factors.

As you look through it I hope you'll find the measurement modules and companion software required for your test needs. They are optimized for testing applications that require high-performance, high-speed and high-throughput, and enable new capabilities that were not previously available across analog, digital, RF, microwave and lightwave technologies.

Agilent Technologies' Electronic Measurement Group is committed to be your measurement partner on applications that require modular instrumentation.

Give us your feedback; we count on it to ensure that we continue to meet your requirements. I hope you will look to Agilent's innovative products and solutions to help you achieve your business results.

Sincerely,

Guy Séné

Senior Vice President, Agilent Technologies, Inc.
President, Electronic Measurement Group

TABLE OF CONTENTS

SECTION

PRODUCT CATEGORY INDEX

1

PRODUCT CATEGORY INDEX

MODEL	DESCRIPTION	PAGE
PXI DIGITIZING SCOPES AND DIGITIZERS		
M9202A	PXIe IF Digitizer: 12-bit, 1 GHz	69, 95
M9210A	PXI-H Digitizing Scope: 10-bit, 2-4 GS/s	71
M9211A	PXI-H UWB IF Digitizer: 10-bit, 4 GS/s, 3 GHz	73
PXI DIGITAL TO ANALOG CONVERTERS		
M9185A	PXI 8/16-Channel Isolated D/A Converter	77
M9186A	PXI Isolated Single Channel Voltage/Current Source, 100 V	79
PXI FUNCTION AND ARBITRARY WAVEFORM GENERATORS		
M9330A	PXI-H Arbitrary Waveform Generator: 15-bit, 1.25 GS/s	83
M9331A	PXI-H Arbitrary Waveform Generator: 10-bit, 1.25 GS/s	85
PXI PULSE PATTERN GENERATORS		
N2102B	PXI Pattern Generator	39, 89
PXI SPECTRUM AND SIGNAL ANALYZERS		
M9168C	PXI Programmable Step Attenuator	93
M9202A	PXIe IF Digitizer: 12-bit, 1 GHz	69, 95
M9302A	PXI Local Oscillator: 3 GHz to 10 GHz	97
M9351A	PXI Downconverter: 50 MHz to 2.9 GHz	99
M9360A	PXI Attenuator/Preselector: 100 kHz to 26.5 GHz	101
M9361A	PXI Downconverter: 2.75 GHz to 26.5 GHz	103
M9362A-D01	PXIe Quad Downconverter	105
M9392A	PXI Vector Signal Analyzer: 50 MHz to 26.5 GHz	17, 107
AXIe MODULES		
M9502A	AXIe 2-slot Chassis	111
M9505A	AXIe 5-slot Chassis	111
M9536A	AXIe Embedded PC Controller	113
M9703A	AXIe Digitizer 12-bit, 8 Channels	115
M8190A	AXIe Arbitrary Waveform Generator	117
U4154A	AXIe Logic Analyzer 4 Gb/s	119
U4301A	AXIe Protocol Analyzer PCI Express 3.0	121
U4998A	AXIe Protocol Analyzer HDMI 1.4b	123
SOFTWARE APPLICATIONS		
89600 VSA Software	89601B VSA Software, Transportable License, 89601B-200, 89601B-300, 89601B-AYA	125
E2094	IO Libraries Suite 16	127
E2300	Command Expert Software	129
SystemVue	W1461, W1462, W1464, W1465	131

1

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INTRODUCTION TO THE MODULAR ADVANTAGE

High performance and easy test system design...

For your data acquisition or automated test applications, your range of choices is getting bigger and better.

Agilent modular instrumentation is an extension of Agilent's measurement expertise into modular form factors, such as PXI and AXIe. In these form factors, Agilent helps you benefit from a large portfolio of chassis and measurement modules integrated with world-class software applications to get the most trusted measurements in the DC, analog, digital, RF, microwave and lightwave domains.

Our offering includes the industry's first single-vendor modular microwave vector signal analyzer enhanced by Agilent's widely used 89600 VSA software, digitizers, waveform generators, digital multimeters, voltage/current sources (V/I), and a broad range of multiplexers, matrices and general purpose switching products that cover from DC to 26.5 GHz and up to 300 V.

Architecture

High performance, flexible architecture

To ensure that you get the best performance from your test platform, the entire path from the controller to the instrument has been designed for speed.

- PCI Express® IO path from the controller to the instrument enables high-speed connectivity from faster, less-expensive remote controllers.

- High-speed memory-mapped registers reduce firmware overhead and communication latency.

- Optimized software drivers.

Software

Open development software platform

Because a single software platform is rarely the right answer for every test scenario, Agilent provides modules with a comprehensive portfolio of instrument drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice.
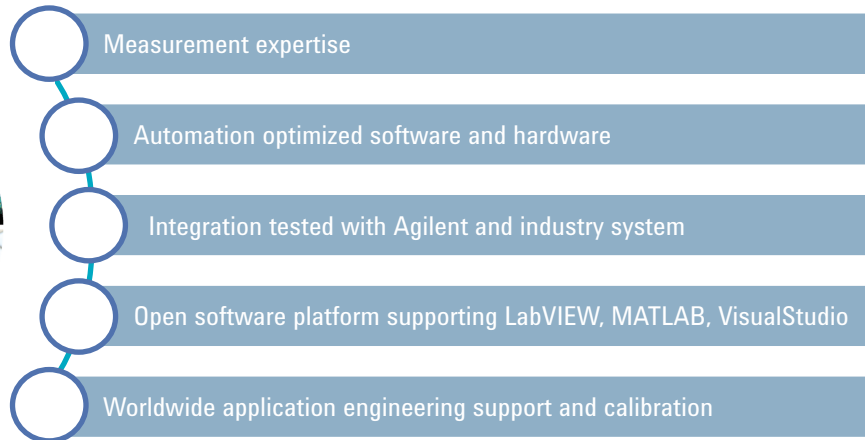
Another important concept is enabling measurement and analysis capabilities that are independent of the underlying hardware. For example, applications such as the Agilent 89600 VSA software and MATLAB support a wide range of Agilent modular products.

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INTRODUCTION TO THE MODULAR ADVANTAGE

Why choose Agilent modular products?

Agilent has been a pioneer in developing and supporting advanced modular platforms. From the early days of leveraging VMEbus and integrating timing and synchronization to create VXI to the popular 34970 and 34980 switching and data acquisition platforms, Agilent is taking its modular expertise to furthering advancements in PXI and AXIe.

- Measurement expertise
- Automation optimized software and hardware
- Integration tested with Agilent and industry system
- Open software platform supporting LabVIEW, MATLAB, VisualStudio
- Worldwide application engineering support and calibration

Measurement expertise

As the premier test and measurement company, Agilent invests heavily in advanced research not only at a product level but at the foundation of the measurement science with Agilent's Technology Leadership Organization and Agilent Research Labs. As a consequence, products integrate decades of signal and measurement optimizations to bring you the most advanced solutions. You benefit from this expertise from the early stages of product design through manufacturing.

Automation optimized software and hardware

With PXI a natural platform for heavily automated environments, Agilent has optimized the measurement hardware, firmware and drivers to give users the lowest latency solutions. This translates directly to lower measurement times and consequently higher test throughput.

Integration tested with Agilent and industry systems

Every product Agilent releases goes through heavy integration testing with common internal hardware and software products and platforms to ensure smooth and seamless operation. As a further step, Agilent has engineered its products to integrate with common industry products for complete system operation.

Open software platform supporting MATLAB, LabVIEW, VisualStudio®

With Agilent's modular open software platform, you have the largest choice of software applications and programming environments with complete support of MATLAB, LabVIEW, and Microsoft VisualStudio software. Furthermore, Agilent provides IVI-COM and IVI-C support for integration into almost any software environment.

Worldwide application engineering support and calibration

With deep domain and application knowledge, our global application engineering team provides the expertise to help you solve your most challenging applications. Agilent's global support centers also ensures that repair and calibration services meet your needs.

INTRODUCTION TO THE MODULAR ADVANTAGE

Is PXI the right choice for your application?

To better understand if PXI is the right choice for your applications, let's take a quick look at some of the benefits that a modular platform such as PXI has versus a standalone box instrument platform.

Discover...	
Modular Platforms	**Standalone Box Platforms**
Higher measurement throughput	Interactive measurements
Greater flexibility/scalability	Time to first measurements
Integrated system	Predictable system performance
Smaller footprint	Lower software investment
Lower power	No infrastructure investment
The PXI Difference	

Modular platform benefits

Higher measurement throughput

Several technical features of PXI allow it to perform tests and measurements quicker. By virtue of leveraging computer-based technology, PXI takes advantage of the latest advances in processors, reducing post-processing time. The PXIe backplane bus also leverages the PC industry's PCI Express® Gen2 technology, greatly increasing throughput and reducing latency. This technology helps transfer information between modules and controller at higher speeds, and will reduce test time, especially for data and transaction intensive test applications. In addition, Agilent PXI systems include a built-in streamlined driver architecture with direct memory access, and the measurement science used to take the measurement.

Greater flexibility and scalability

PXI is an open, multi-vendor standard that is governed by the PXI Systems Alliance (www.pxisa.org). This ensures that modules and infrastructure from different vendors plays well together and also opens the measurement possibilities. In addition, by integrating the bus into the backplane of the chassis, it is possible to continue scaling systems indefinitely using PXI timing and synchronization methods.

Integrated systems

PXI easily integrates into hybrid systems where a test platform is a combination of standalone box, proprietary modular, GPIB, USB, VXI, LXI or even the new AXIe modular form factor. Agilent's IO library suite makes the integration faster, by offering easy connection to both PXI and traditional instruments and reducing system setup and configuration time to mere minutes.

Smaller footprint

The biggest contributing factor aside from taking advantage of Moore's Law of integration and miniaturization is the removal of redundant functions in a integrated system. By abstracting the measurement technology from the processing and user interface functions, PXI removes redundancy and can save up to 80% of the space of a traditional system.

Lower power consumption

By virtue of taking advantage of advances in miniaturization and integration, PXI can limit slot power to 30W and still meet many of the needs of higher-end measurements. This means that a fully loaded 18-slot chassis still uses less than 1000W.

INTRODUCTION TO THE MODULAR ADVANTAGE

Is AXIe the right choice for your application?

What is AXIe?

AXIe is a next-generation open standard based on Advanced Telecom Computing Architecture (AdvancedTCA) with extensions for instrumentation and test. This standard is governed by the AXIe Consortium, a group of leading organizations in the test and measurement industry and is designed to provide users with popular PC interfaces such as TCP/IP and PCI Express to modular configuration slots which provide resources for advanced instrumentation (www.axiestandard.org).

AXIe's key attributes

As a standard, AXIe shares many characteristics with PXI but was designed to supplement the automated test platform standard.

A quick look at a few details reveals the underlying similarities and differences offered by AXIe. As the table shows, AXIe and PXI offer similar latency and transfer speeds because both use PCI Express as the backplane fabric.

Discover the Agilent...		
Feature	**AXIe**	**PXIe**
Chassis base	AdvancedTCA	cPCI, cPCIe
PCIe maximum data bandwidth (Gen2) Single peripheral slot to backplane All peripheral slots to system slot	2 GB/s 10 GB/s (5-slot chassis)	4 GB/s 8 GB/s
PCIe fabric	Yes	Yes
LAN backplane	Yes	No
Local bus	18 pairs required 62 pairs optional	1 line (13 PXI)
Triggers	Bi-directional star trigger 13-signal MLVDS bus	Star trigger (1x TTL, 3x diff per slot) Eight-signal TTL bus
Frequency reference and sync	100 MHz; Yes	10 MHz, 100 MHz; Yes
Power per slot	200 W	30 W
Board space per slot	900 cm²	160 cm²
Modules available	Dozens and growing	>1,000
AXIe and PXI Difference		

INTRODUCTION TO THE MODULAR ADVANTAGE

Is AXIe the right choice for your application?

How is AXIe different than PXI?

While PXI has made a name for itself in automated valida-
tion and manufacturing test applications on the strengths
of its compact size, low power draw, and best in low-cost
commercial off-the-shelf ASICs and technologies, AXIe
balances PXI by providing the complement of these afore-
mentioned features.

> ### *Powerful*
>
> *Truly advanced and cutting edge
> measurement technologies previously
> unavailable to modular instrumentation*

By increasing the power available to each slot from 30
W to 200 W, loosening board space constraints from 160
cm² to 900 cm², and increasing the headroom of each
slot, leading test and measurement providers can now
use AXIe as a platform for truly advanced and cutting
edge measurement technologies previously unavailable
to modular instrumentation. The additional power now
supports extreme ASICs with switching speeds in the tens
of gigahertz and power draws greater than 30 W. The addi-
tional board space will allow the development of complex
measurement architectures with their supporting circuits
all on a single card. Additionally, the extra slot headroom
will allow mezzanine circuits for increased densities
per slot or additional shielding to support very sensitive
circuits. In brief, AXIe finally supports the development of
cutting edge instrumentation in a modular form factor.

> ### *Interconnected*
>
> *Systems designers are now limited only by
> their imagination*

Another subtle difference between the two platforms is the
augmented local bus which allows communications and
synchronization between instrumentation slots. With over
600 GB/s of throughput, local bus now facilitates complex
multi-instrument configurations for channel expansion and
MIMO, data storage and co-processing as well as internal
synchronization and triggering. System designers are now
limited only by their imagination.

AXIe Interoperability

AXIe is built on the same PCI Express backplane fabric as
PXI and the same LAN connectivity as LXI. This allows
the three platforms to co-exist in the same system quite
seamlessly.

In addition, the PXI and AXIe platforms will share the same
software architecture both taking advantage of IVI and
other elements of the driver software stack. AXIe also sup-
ports embedded controllers running user familiar operating
systems such as Windows®. All of this makes AXIe
seamless to develop for and integrate into an advanced
measurement platform.

> ### *Seamless*
>
> *PXI and AXIe share the same software
> architecture and familiar operating systems*

AXIe Products

The AXIe product portfolio includes mainframes, a control-
ler and new modules that offer leading performance in
their categories.

Agilent M8190A Arbitrary Waveform Generator

MODULAR SOFTWARE ENVIRONMENT

Software...the choice is yours

Agilent provides you an open software environment with a variety of drivers for a range of applications that works with your choice of software.

Drivers

Agilent modular instruments come with IVI-COM, IVI-C, LabVIEW and MATLAB software drivers that work in the most popular T&M development environments including, Visual Studio (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, and MATLAB. The instrument drivers provide context sensitive help, complete documentation, and examples to get started quickly on complex tasks.

IO Libraries

Agilent IO Libraries Suite offers seamless integration to modular instruments and traditional instruments. With multiple vendor I/O software installed, you get the best solution with Agilent's open IO Libraries Suite. During installation, the IO Libraries Suite automatically detects National Instrument's software and safely installs the Suite in a side-by-side mode allowing the existing I/O software and Agilent software to work together (see section 16).

Command Expert

Agilent's Command Expert provides FAST and EASY control of instruments using IVI-COM drivers. The interface offers all of the IVI-COM instrument commands and documentation with the ability to run and debug before integrating into other programming environments (see section 16).

Signal Generation Software

Agilent PXI arbitrary waveform generators can be used with a wide portfolio of signal generation software that simplify the creation and editing of waveforms to test your system with realistic signal scenarios. Create waveforms in software application such as MATLAB, Agilent Signal Studio or Agilent SystemVue and load them into the AWG. Superior integration with PXI modules accelerates your design flow.

Vector Signal Analysis Software

Agilent's industry-leading 89600 VSA software helps see through the complexity of emerging and existing industry standards—serving as your window into complex signal interactions.

Software Soft Front Panels

Agilent soft front panels provide easy to use instrument communications. The graphical user interfaces guide developers through module setup. Users can quickly configure the instrument parameters. More sophisticated functions are available through the instrument's numerous programmatic interfaces.
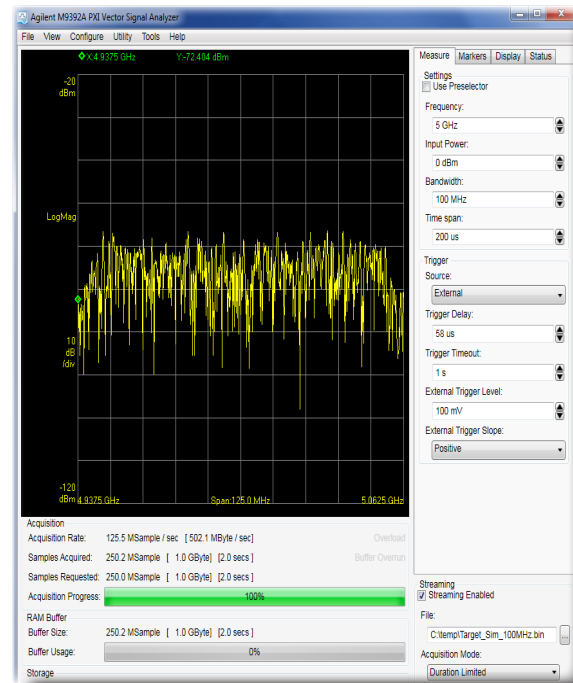
Agilent Vector Signal Analyzer soft front panel

Agilent 89600 VSA software interface

3

ADDRESSING A GROWING RANGE OF APPLICATIONS

Whether you create test solutions for your own company or as a system integrator, Agilent's modular portfolio offers a solid foundation. The bedrock is the testing and verification of electronic components, subsystems and products.

Our recent expansion into modular products is an extension of Agilent's proven measurement expertise. Agilent invites you to experience a large portfolio of chassis and measurement modules integrated with world-class software applications. With our modular instruments—DMMs, digitizers, signal analyzers, arbitrary waveform generators and more—your range of choices is getting bigger and better. Discover the alternatives—with Agilent.

Applications:

- Aerospace and defense
- Automotive test
- Electronic functional test
- Mechatronics
- Radar and wideband signal capture
- Research and development
- Wireless communications

The Modular Tangram

The four-sided geometric symbol that appears throughout this document is called a tangram. This seven-piece puzzle originated in China a few centuries ago. The goal is to create shapes—from simple to complex—that form an identifiable silhouette. As with a tangram, the possibilities may seem infinite as you begin to create a new test system. With a set of clearly defined elements—architecture, hardware, software—Agilent can help you create the system you need, from simple to complex.

DISCOVER the Alternatives ...
                    ... Agilent **MODULAR** Products
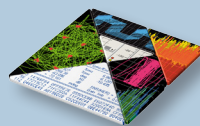
INDUSTRY AWARDS

Agilent's portfolio of PXI and AXIe chassis and modules has received multiple industry awards since its introduction in September 2010. This level of acknowledgment confirms that Agilent's PXI and AXIe modular portfolio is receiving marketplace recognition and demonstrates excellence in creating value for the customers and focusing on improving the customers' return on their investment.

Winners and finalists for these awards are considered the best in the industry. They set the pace through their innovation, vision and technology leadership.

MODULAR PRODUCTS

4

- **Modular Subsystems**
- **Chassis and Controllers**
- **Bit Error Rate Testers**
- **Data Acquisition and Switching**
- **Digital Input Output**
- **Digital Multimeters**
- **Digitizing Scopes and Digitizers**
- **Digital to Analog Converters**
- **Function and Arbitrary Waveform Generators**
- **Pulse Pattern Generators**
- **Spectrum and Signal Analyzers**
- **AXIe Modular Products**
- **Software Applications**

PXI MODULAR SUBSYSTEMS

Agilent modular systems provide complete solutions in a modular, open-system standard as well as system building blocks for signal analysis solutions.

The first complete solution is the M9392A Vector Signal Analyzer system, which consists of 4 PXI and 1 PXIe modules, and delivers a complete microwave vector signal analyzer solution enabling analysis of communications, radar, and avionics signals.

Product features and your benefits

- Frequency range from 50 MHz to 26.5 GHz

- Measure broadband (250 MHz) communications and radar signals with 12-bit, 2 GS/s digitizer

- Real-time wideband RF and microwave data streaming with up to 100 MHz streamed analog bandwidth

Measurement Expertise: Benefit from the Agilent 89600 VSA software to characterize complex, time-varying signals with detailed and simultaneous spectrum, modulation and time waveform analysis.

Simple: Single vendor solution facilitates integration and simplifies technical support.

Open Standard: Modular and software-defined building blocks provide flexible system configurations to meet diverse test needs. Connector compatibility allows easy integration with other test and automation modules in PXIe Hybrid chassis, and the PXI form-factor conforms to government requirements for modular system design.

Fast: Reduced development time enabled with included drivers, soft front panels and programming examples in Visual Studio (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, and MATLAB.

Agilent M9392A PXI Vector Signal Analyzer subsystem

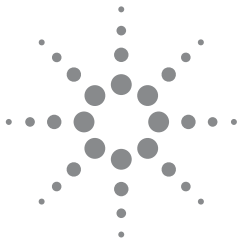*Agilent M9392A PXI Vector Signal Analyzer placed within the M9018A PXI Chassis*

www.agilent.com/find/modular-vsa

MODULAR SUBSYSTEMS

The following pages within this section include a summary of the technical specifications for modular subsystems.

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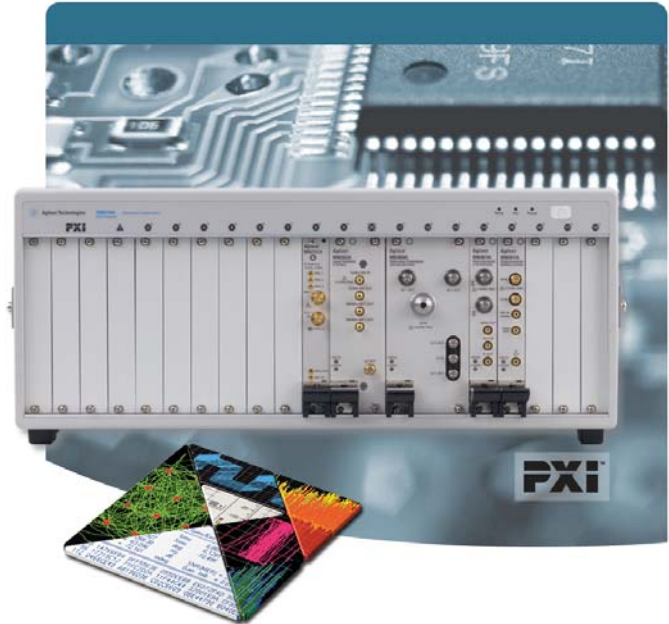
Agilent M9392A PXI Vector Signal Analyzer

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Wireless communications
- Radar and wideband signal capture
- Digital pre-distortion (DPD)

Product Description

The Agilent M9392A is a PXI Vector Signal Analyzer with frequency coverage from 50 MHz to 26.5 GHz with 250 MHz of instantaneous bandwidth and up to 100 MHz streamed analog bandwidth. When combined with the Agilent 89600 VSA software, you will experience a complete Microwave Vector Signal Analyzer solution enabling analysis of communications, radar, and avionics signals in a modular, open-system standard. The M9392A PXI Vector Signal Analyzer system consists of the M9202A PXIe IF Digitizer, M9302A PXI Local Oscillator, M9360A PXI Attenuator/Preselector, and the M9361A and M9351A PXI Downconverter Modules.

... Agilent **MODULAR** Products

Models	
M9392A	Microwave Vector Signal Analyzer

Main Features and Benefits

Product features	Your benefit
Frequency range	50 MHz to 26.5 GHz
12-bit, 2 GS/s digitizer	Measure broadband communications and radar signals
Real-time digital down-conversion (DDC) algorithm	Data decimation, analog performance improvement
Multiple programmatic interfaces	Easy integration into existing test environments and reduced development time
PXI form-factor	Conforms to Modular Open Systems Approach (MOSA)
Seamless integration with Agilent 89600 VSA software	Immediate access to the industry's broadest, most advanced general-purpose and standards-based demodulation and signal analysis

Chassis slot compatibility: cPCI (J1), PXI-1, PXI Hybrid

Specifications

Hardware	
Size	7 or 8 slots-wide multiple modules
Sample rate	2 GS/s
3 dB bandwidth	35 MHz min (preselected, < 3 GHz)
	40 MHz min (preselected, ≥ 3 GHz)
	40 MHz min (< 2.75 GHz, bypass)
	250 MHz min (≥ 2.75 GHz, bypass)
Maximum streamed analog bandwidth (configuration dependant)	up to 50 MHz (with V05 option) up to 100 MHz (with V10 option)
DANL	-158 dBm/Hz, ≤ 9.5 GHz, *(nominal)*
	-147 dBm/Hz, > 9.5 GHz, *(nominal)*
Absolute amplitude accuracy	± 0.6 dB, < 2.75 GHz, *(nominal)*, after field calibration (corrected)
	± 0.5 dB, ≥ 2.75 GHz, *(nominal)*, after field calibration (corrected)
	± 2 dB, *(nominal)*, without field calibration (uncorrected)

Agilent Technologies

Software

The M9392A Vector Signal Analyzer is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice.

A soft front panel interface is provided to monitor and control the PXI Vector Signal Analyzer with the following functions:

- Setting input frequency, power, bandwidth and time span
- Setting trigger functions
- Displaying markers
- Formatting frequency and time displays
- Monitoring hardware status
- Streaming data to file

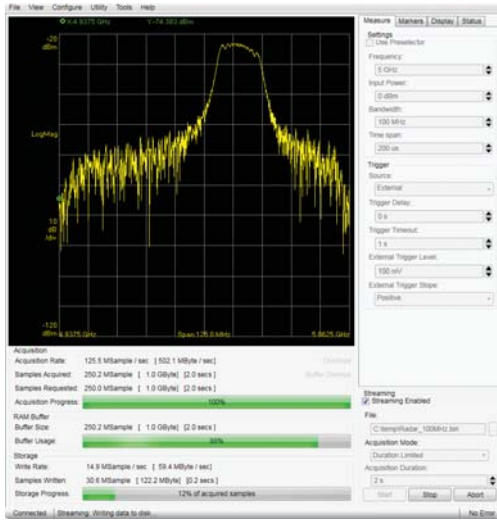|	
Supported operating systems	Microsoft Windows® XP (32-bit), Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Agilent M9392A PXI Vector Signal Analyzer, software interface.

For more information on Agilent Technologies' products, applications, or services, please contact your local Agilent office. The complete list is available at: **www.agilent.com/find/contactus**

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Ordering Information

Typical Product Configuration

Model	Description
M9392A	PXI Vector Signal Analyzer: 50 MHz to 26.5 GHz
89601B	89600 VSA Software, Transportable license
89601B-200	Basic Vector Signal Analysis
89601B-300	Hardware Connectivity
89601B-AYA	Vector modulation analysis
M9018A	18-slot PXIe Chassis
Optional Module	
M9351A	PXI Downconverter: 50 MHz to 2.9 GHz

Related products

M9302A	PXI Local Oscillator: 3 GHz to 10 GHz
M9202A	PXIe IF Digitizer: 12-bit, 2 GS/s
M9360A	PXI Attenuator/Preselector: 100 kHz to 26.5 GHz
M9361A	PXI Downconverter: 2.75 GHz to 26.5 GHz
M9036A	PXIe Embedded Controller

Accessories

Software, example programs, and product information on CD

Cables

Advantage Services: Calibration and Warranty

Agilent Advantage Services is committed to your success throughout your equipment's lifetime.

R1282A	Annual calibration
R-51B-001-3C	1 year return-to-Agilent warranty extended to 3 years
R-51B-001-5C	1 year return-to-Agilent warranty extended to 5 years

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www.agilent.com
www.agilent.com/find/modular
www.agilent.com/find/m9392a
USA: (800) 829-4444

Product specifications and descriptions in this document subject to change without notice.

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5990-6051EN

Agilent Technologies

PXI CHASSIS AND CONTROLLERS

Select Agilent's PXIe chassis when you require high-performance and configurability. The M9018A chassis has unparalleled performance and flexibility including PCI Express Gen 2 performance, 16 PXI hybrid slots, x8 links to peripheral slots, and an innovative cooling design that saves rack space and has lower maintenance costs.

To better fit with your footprint and performance needs, you have the choice between external desktop, laptop, or embedded Agilent controllers.

Product features

Chassis functionality

- 18 total slots including PXIe controller and timing module slots

- 16 PXIe hybrid slots

- Up to 867 W total power and 42 W/slot cooling

Chassis performance characteristics

- Advanced PCIe switch fabric that operates up to Gen 2 speeds

- Twelve x4 and four x8 links to module slots

- Backplane speeds of up to a 4 GB/s data rate from external controller to PXIe module slots

- Innovative cooling design that allows chassis to fit into 4U of rack space in most cases
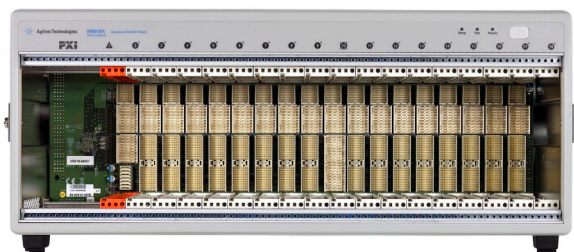
Agilent M9018A PXI Chassis

Agilent M9018A PXI Chassis

www.agilent.com/find/pxi-chassis

Chassis								
	Description	Height	Type # of slots	Number of slots	Maximum data bandwidth	System slot interface	Power supply	Power per slot
M9018A	PXIe Gen 2.0 chassis	4U	PXIe 3U 18-slots	1 system 1 timing 16 hybrid	Module-to-module: 4 GB/s System-to-backplane: 8 GB/s	Configurable: 1x8, 2x8, 4x4	867.5 W	System 140 W PXI hybrid 42 W

PXI I/O and Computer Modules							
	Description	Type # of slots	Processor	RAM (min/max)	HDD	Maximum data bandwidth	Cable interface	System slot interface
M9021A	PCIe® cable interface	3U PXIe 1-slot	NA	NA	NA	4 GB/s	x8 Gen 2 PCIe	x8 Gen 2 PCIe
M9036A	PXIe controller	3U PXIe 3-slots	Intel i5 520E 2.4 GHz	4 GB 8 GB option	160 GB SSD	4 GB/s	N/A	2x8 or 4x4 PCIe Gen 2

External PC cards					
	Description	Type # of slots	Maximum data bandwidth	Cable interface	PC host interface
M9045B	PCIe ExpressCard adaptor: Gen 1	ExpressCard 34 1-slot	250 MB/s	x1 Gen 1 PCIe	x1 Gen 1 PCIe
M9047A	PCIe desktop adaptor: Gen 2	PCIe x8 or x16 1-slot	4 GB/s	x8 Gen 2 PCIe	x8 Gen 2 PCIe

www.agilent.com/find/pxi-chassis
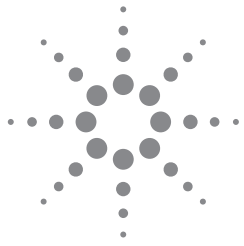
Agilent M9018A 18-Slot PXIe Chassis

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Communications
- Electronics test
- Semiconductor testing

Product Description

The M9018A chassis delivers the ultimate flexibility, compatibility, and performance. With 16 PXIe hybrid slots, it allows the system designer to mix and match the number and location of PXIe and hybrid PXIe-compatible modules. The advanced PCIe® switch fabric can operate up to Gen 2 speeds and can be configured for optimal performance with any PXIe controller. The innovative cooling design allows the chassis to fit in 4U of rack space. When combined with the latest 1U rack-mounted computer, you can build a powerful system using only 5U of rack space.

Models	
M9018A	PXIe chassis

Main Features and Benefits

Product features	Your benefit
16 hybrid slots	Eases system integration with flexibility and compatibility
Gen 2 speeds as well as four x8 and 12 x4 links to module slots	Large data rate supports high-performance applications
Advanced PCIe switching	Provides configuration flexibility
Innovative cooling design	Saves rack space and lowers maintenance cost
867.5 W power supply	Provides power to spare for application requirements

Connector compatibility: PXI-1 and cPCI (J1 only), PXIe, PXI-H

... Agilent **Modular** Products

Specifications and Characteristics

Hardware	
Size	4U
Number of slots	18 total, 16 hybrid-compatible
Power supply output	
220-240VAC input	867.5 W[1]
100-120VAC input	667.5 W[1]
Power dissipation	
System slot	140 W max
User slot	42 W max[2]
System slot link configuration (selectable)	
2-link config for M9021A	1x8 (link 2 inactive)
2-link configuration	2x8
4-link configuration	4x4
Data bandwidth (max)	
Slot-to-slot	4 GB/s
System slot-to-user slots	8 GB/s

1. Depending on the modules used, the M9018A may not meet the power requirements in the PXI hardware specifications and would be considered a low-power chassis. It is recommended that power budgeting be employed, especially at low line.
2. Maximum per slot power dissipation at 55°C with 15°C temperature rise; requires: a) that the chassis bottom is not blocked (1U rack space below or sitting on bench with feet extended) or b) two air inlet modules in slots 9, 10, or 11, and a slot blocker in empty controller slots. Module cooling can be impacted by each module's resistance to air flow.

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Software Information

The M9018A chassis comes with a soft front panel (SFP) graphical interface. This simple software application can be used to monitor and control the PXIe chassis. It has the following functions:

- Trigger configuration
- Chassis fan speed, temperatures, and rail voltage monitoring
- Alarms for fan speed, temperature, and rail voltage
- Chassis information

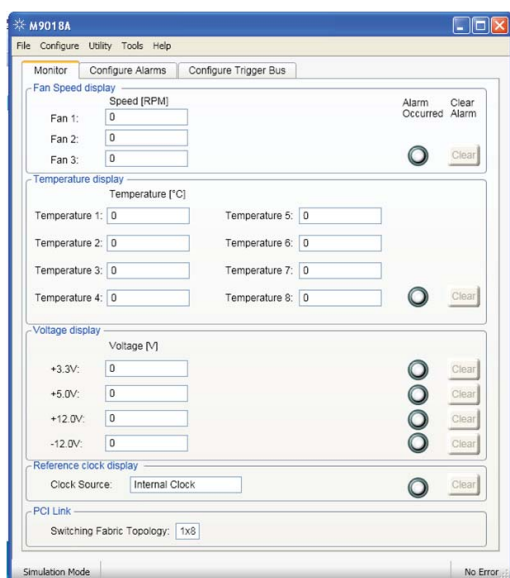|	
Operating systems	Microsoft Windows® XP Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (C/C++,C#, VB.NET), LabVIEW, LabWindows/CVI, MATLAB, VEE
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. M9018A soft front panel
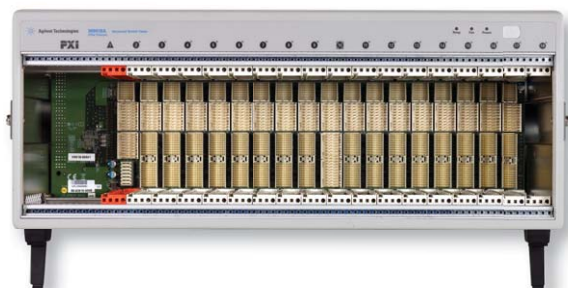
Figure 2. M9018A's all-hybrid backplane

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Typical Product Configuration

Model	Description
M9018A	18-slot PXIe chassis
M9021A	PCIe cable interface
M9047A	PCIe desktop PC adapter
Y1202A	2m PCIe cable

Ordering Information

Model	Description
M9018A	PXIe chassis: 18-slot, 3U, 8GB/s
Opt 900-932	Power cord options

Related products	
M9021A	PCIe cable interface: Gen 2, x8
M9036A	Embedded PXIe PC controller
M9045B	PCIe ExpressCard adaptor: Gen 1
Y1200B	PCIe cable: x1 to x8, 2.0m (used with M9045B)
M9047A	PCIe desktop PC adapter: Gen 2, x8
Y1202A	PCIe cable: x8, 2.0m (used with M9047A)

Accessories	
Y1213A	PXI EMC filler panel kit
Y1214A	Air inlet module kit
Y1215A	Chassis rack mount kit for M9018A

Advantage Services: Calibration and Warranty	

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R1280A	Extended warranty

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Agilent M9021A PCIe Cable Interface

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Communications
- Electronics test
- Semiconductor testing

Product Description

The M9021A PCIe® cable interface provides a link between the M9018A PXIe chassis and an external host computer. Once installed in the chassis and connected to the computer via a standard PCIe cable, the M9021A provides a very high bandwidth serial link between the devices. This link is transparent to computer applications and allows direct control of PXI and PXIe modules. The M9021A utilizes special features built into the M9018A PXIe chassis and is not compatible with the PXIe system slot in other PXIe chassis.

Models	
M9021A	PCIe cable interface

Main Features and Benefits

Product features	Your benefit
Gen 2 speeds and x8 PCIe links	Large data rate supports high-performance applications
Standard PCIe over cable	Use with any computer with an x8 PCIe interface
Transparent operation with application software	Provides ease of installation

Connector compatibility: M9018A

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Characteristics

Hardware	
Size	1 slot 3U
PCIe link configuration	Single, Gen 2 x8 link to M9018A backplane
Data bandwidth (max)	4 GB/s to M9018A backplane 4 GB/s to computer
Front panel connector	x8 PCIe cable connector
Front panel indicators	LEDs for PCIe lane status
Power consumption	5 W *(typical)*
Cable length	Up to a 2 meter passive cable supported

5

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Typical Product Configuration

Model	Description
M9021A	PCIe cable interface
M9047A	PCIe desktop PC adapter
Y1202A	2m PCIe cable

Figure 1. M9047A and Y1202A are recommended for use with the M9021A to connect the M9018A PXIe chassis to the external host computer

Figure 2. M9021A diagram

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Ordering Information

Model	Description
M9021A	PCIe cable interface: Gen 2, x8

Related products	
M9018A	PXIe chassis: 18-slot, 3U, 8GB/s
M9045B	PCIe ExpressCard adaptor: Gen 1
Y1200B	PCIe cable: x1 to x8, 2.0m (used with M9045B)
M9047A	PCIe desktop PC adapter: Gen 2, x8
Y1202A	PCIe cable: x8, 2.0m (used with M9047A)

Advantage Services: Calibration and Warranty	

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R1280A	Extended warranty

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Agilent M9036A PXIe Embedded PC Controller

DISCOVER the Alternatives...

Industries and Applications

- Aerospace/defense
- Communications
- General purpose applications
- Electronic functional test

Product Description

The Agilent M9036A is an embedded PXIe PC controller which enables a compact platform solution. With the 2-link, 2x8 Gen 2 backplane configuration, it is an ideal match for the Agilent M9018A PXIe chassis. This three-slot module easily integrates into hybrid test systems using GPIB, USB, and LAN with the built-in front panel interfaces. Built upon a mid-performance Intel Core i5 dual-core processor with Hyper-Threading Technology, the M9036A is designed for applications in multi-tasking environments.

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Models	
M9036A	PXIe embedded controller

Main Features and Benefits

Product features	Your benefits
Gen 2 PCIe® backplane switches	Enables high-speed peer-to-peer data transfers between M9018A peripheral slots
Intel Core I5 dual-core processor	Ideal for applications in multi-tasking environments
Preloaded with Agilent I/O libraries and operating system	Reduces test system development time
Designed for PXIe systems	Provides choice between embedded and external controllers
Solid-state drive (SSD)	Improves mechanical reliability

Chassis slot compatibility: PXIe system module slot (with two or more controller expansion slots)

Specifications and Characteristics

Hardware	
Size	3-slot, PXIe system module
CPU	Intel i5-520E dual-core at 2.4 GHz
Storage Type Size	2.5" SATA II SSD 160 GB
Memory	4 GB standard, 8 GB optional 8 GB maximum
PXIe PCIe link configuration	2x8 or 4x4 (automatically configured based on chassis configuration)
PXIe PCIe data bandwidth (max)	2 GB/s max to/from the processor 4 GB/s max between PCIe backplane links (2-link mode)
Front panel connections	USB (4), 10/100/1000 LAN (2), VGA 2028x1536 @75 Hz (requires DVI-VGA adapter), DVI-I up to 1920x1200 @60 Hz, GPIB (Micro-D 25-pin), ExpressCard 34 mm slot, PXI trigger in/out (SMB)

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Software Information

The embedded controller supports the Microsoft Windows® 7 operating system and comes with the selected operating system installed. Agilent I/O libraries, including VISA, Agilent Connection Expert, and I/O monitor, are also pre-installed.

Supported operating systems	Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabView
Supported application development environments (ADE)	VisualStudio (VB.NET, C#, C/C++), LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Accessories included with the M9036A

Figure 2. M9036A block diagram

Ordering Information

Typical Product Configuration

Model	Description
M9036A	PXIe embedded PC controller
M9036A-M08	Memory upgrade from 4 GB RAM to 8 GB RAM
M9036A-W76	Windows® 7 operating system (64 bit)
M9018A	18-slot PXIe chassis

Related Products

M9036A-W73	Windows® 7 Pro operating system (32 bit)

Advantage Services: Warranty

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R-51B-001-3C	1 year return to Agilent warranty extended to 3 years

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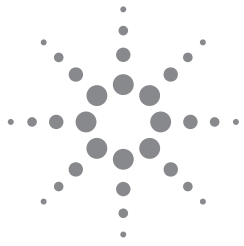www.agilent.com/find/M9036A
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Agilent M9045B PCIe ExpressCard Adapter

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Communications
- Electronics test
- Semiconductor testing

Product Description

The M9045B is a PCIe® interface card that can be used with an Agilent AXIe chassis, such as the M9502A/5A, or a PCIe cable interface, such as the M9021A.

This adapter uses the ExpressCard 34 format typically found in laptop computers. It provides a x1 Gen 1 link to the computer (One Stop OSS-PCIE-HIB2-EC-x1).

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Models	
M9045B	ExpressCard adapter

Main Features and Benefits

Product features	Your benefit
ExpressCard format and low power consumption	Provides a transportable solution
Standard PCIe over cable	Allows use with any computer with PCIe ExpressCard interfaces
Transparent operation with application software	Delivers ease of installation

Characteristics

Hardware	
Card format	PCIe ExpressCard 34
Dimensions	34 mm (1.34 in) x 110.8 mm (4.36 in)
Number of PC slots	1
Data bandwidth (max)	250 MB/s
Connector	x1 PCIe cable connector
Cable length	Up to a 7-meter passive cable supported

*For more complete specifications and manuals, visit the OSS Web site: **http://www.onestopsystems.com/***
This product comes with a one year warranty and can be returned to either Agilent or OSS for warranty service.
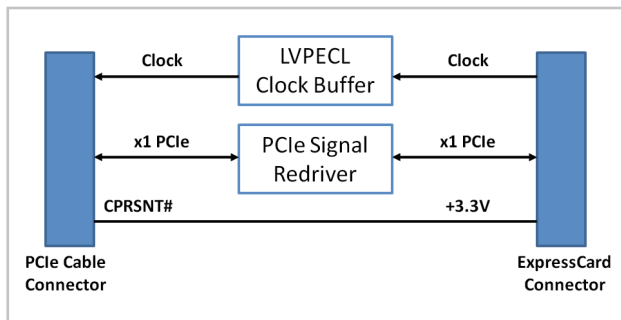
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Figure 1. M9045B and Y1200B

Figure 2. M9045B diagram

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Typical Product Configuration

Model	Description
M9045B	PCIe ExpressCard adapter: Gen 1
Y1200B	PCIe cable

Ordering Information

Model	Description
M9045B	PCIe ExpressCard adapter: Gen 1

Related Products	
M9021A	PCIe cable interface: Gen 2, x8
M9502A	2-slot AXIe chassis
M9505A	5-slot AXIe chassis

Accessories	
Y1200B	PCIe cable: x1 to x8, 2.0m (used with M9045B)

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Agilent Technologies

Agilent M9047A PCIe Desktop PC Adaptor

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Communications
- Electronics test
- Semiconductor testing

Product Description

The M9047A PCIe® desktop PC adaptor is a PC card that can be used with an AXIe chassis, such as the M9502A/ M9505A, or a PXIe chassis and PCIe cable interface, such as the M9018A/M9021A.

The M9047A PCIe interface card from One Stop Systems (One Stop OSS-PCIE-HIB25-x8-H) is compatible with computers that have x8 expansion slots. It provides an extremely high-performance link between the computer and chassis.

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5

Models

Models	
M9047A	PCIe desktop PC adaptor

Main Features and Benefits

Product features	Your benefit
Gen 2 x8 PCIe interface	Enables high-performance applications
Standard PCIe over cable	Connects a PXIe or AXIe chassis to any desktop/ rack-mounted computer with a x8 PCIe slot
Transparent operation with application software	Delivers ease of installation

Specifications and Characteristics

Hardware	
Card format	PCIe half-card format
Computer expansion slot compatibility	x8
Dimensions	55 mm (2.2 in) x 114 mm (4.5 in)
Number of PC slots	1
Data bandwidth (max)	4 GB/s
Connector	x8 PCIe cable connector
Board indicator	LEDs for PCIe lane status
Power consumption	3.75 W (typ)
Cable length	Up to a 2-meter passive cable supported

*For more complete specifications and manuals, visit the OSS Web site: **http://www.onestopsystems.com/***

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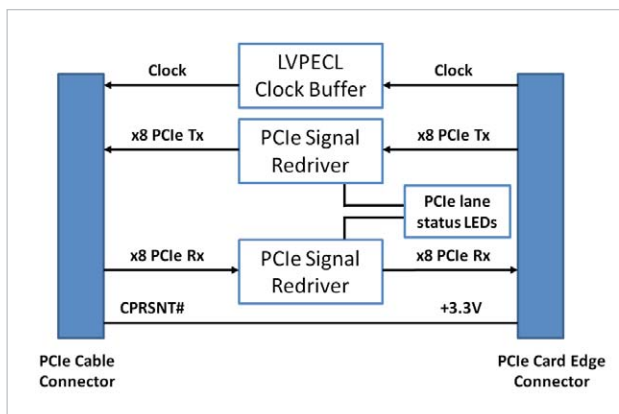
Figure 1. M9047A and Y1202A

Figure 2. M9047A diagram

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Typical Product Configuration

Model	Description
M9047A	PCIe desktop PC adaptor
Y1202A	PCIe cable

Ordering Information

Model	Description
M9047A	PCIe desktop PC adaptor: Gen 2, x8

Related products	
M9021A	PCIe cable interface: Gen 2, x8
M9502A	2-slot AXIe chassis
M9505A	5-slot AXIe chassis

Accessories	
Y1202A	PCIe cable: x8, 2.0m

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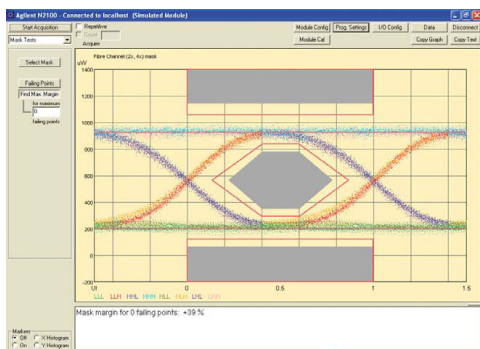
PXI BIT ERROR RATE TESTERS (BERTS)

The Agilent PXI modules address the test of photonic and conventional components in the telecommunications, data communications and computing markets for bit error rate, eye diagram analysis, mask and jitter testing. For the manufacturing industry, this unique test solution combines a modular Bit Error Ratio Tester (BERT) and a Digital Communications Analyzer (DCA), providing a very wide bit rate coverage and excellent performance. Products include a Bit Error Ratio Tester, a Digital Communications Analyzer, a Pattern Generator, and a PXI Synthesizer all suitable for bitrates up to 10.3125 Gb/s.

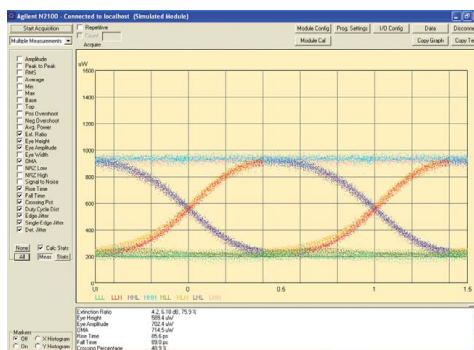## Product features and your benefits

- Eye Diagram, mask analysis and jitter testing in a single instrument

- Low cost and high throughput—ideal for manufacturing test environments

- Significantly smaller than a conventional BERT

- Jitter bathtub display

- Error injection: single error or error rate injection

- Differential data generation and analysis

Agilent PXIT Family of Modules

Agilent N2100B Digital Communication Anaylyzer soft front panels

PXI BIT ERROR RATE TESTERS

Bit Error Rate Testers (BERTS)

	Description	Type # of slots	Bit rate	PRBS patterns	Data patterns	Output voltage range	Outputs	External clock input
N2101B	Bit Error Ratio Tester	PXI-H 3-slot	155 Mb/s to 10.3125 Gb/s	$2^n - 1$, n = 7, 9, 11, 15, 23, 31	K28.5, K28.7, CRPAT, user-loadable 2 kbits	250 mV to 1 V pp	1 x differential ports	500 MHz to 10.7 GHz

Digital Communication Analyzer (DCA)

	Description	Type # of slots	Electrical input	Optial input	Sample rate	Clock input	Clock recovery	Clock input voltage range
N2100B	Digital Communication Analyzer	PXI-H 4-slot	1 channel, single ended AC coupled, 12 GHz	62.5/125 µm fiber, 750–1650 nm, 10.3125 Gb/s	160 MS/s	10 MHz – 11.318 GHz (char.), 0.5 to 1 V pp	<2.7 Gb/s	500 mV to 1 V pp

Pattern Generator

	Description	Type # of slots	Bit rate range	PRBS patterns	Data patterns	Output voltage range	Outputs	Clock input voltage range
N2102B	Pattern Generator	PXI-H 2-slot	622 Mb/s to 10.3125 Gb/s	$2^n - 1$, n = 7, 9, 11, 15, 23, 31	K28.5, K28.7, CRPAT, user-loadable 2 kbits	250 mV to 1 V pp	1 x differential ports	500 mV to 1 V pp

RF Signal Generators (Signal Source)

	Description	Type # of slots	Frequency range	Output power	Phase noise (20 kHz offset)	Switching speed	Output Power accuracy	Software applications
N2099A	RF Synthesizer and Clock Source for N2102B, N2101B	PXI-H 2-slot	Optional 5.25 ± 1 GHz or 10.5 ± 1 GHz	Min +8 dBm (4, 5, 6 GHz); min +6 dBm (9, 10, 11 GHz)	500 MHz	100 ms	±3 dB variation over temperature, frequency	N/A

www.agilent.com/find/pxi-ber

Agilent N2099A Synthesizer

DISCOVER the Alternatives...

Industries and Applications

- Transceiver Test
- Telecommunication Equipment Test
- Fibre Channel, Ethernet, PON, Parallel Optics
- Multi-port system testing
- High port count burn-in test

Product Description

The N2099A PXI synthesizer is tunable over a 2 GHz range and includes synchronous dual RF outputs. There are two options available that cover different frequency ranges depending on the required application.

The N2099A is the ideal clock source for the N2102B.

Models	
N2099A	PXI Synthesizer
N2099A-052	4.25 GHz to 6.25 GHz
N2099A-105	9.5 GHz to 11.5 GHz

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Main Features and Benefits

Product features	Your benefit
Two frequency ranges available between 4.25 and 11.5 GHz	Coverage of an extended range of test applications
10 MHz clock output and two synchronous RF outputs	Provide clock or reference signals to multiple other modules, e.g. BERTs or Pattern Generators
Permanent magnet YIG (PMYTO) based synthesizer	Excellent phase noise performance
Non-volatile storage of set frequency – unit powers up at previously set frequency	Avoids operator errors

Connector compatibility: cPCI, PXI-H, PXI-1

Specifications and Characteristics

Hardware	
Size	2-slot module
Output center frequency	5.25 GHz (option N2099A-052), 10.5 GHz (option N2099A-105)
Frequency tuning range	±1.0 GHz
Output power	+8 dBm (4, 5 and 6 GHz, characteristic) +6 dBm (9, 10 and 11 GHz, characteristic)
Power variation over temperature/frequency	±3 dB
Switching speed, 100 MHz step	100 ms typical
External reference oscillator output frequency (TCXO)	10 MHz

6

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Software

The N2099B Synthesizer and its accompanying software fully comply with PXI specifications. The included Windows application enables the user to control the instrument without any software development required. An ActiveX Control makes integration into custom applications easy.

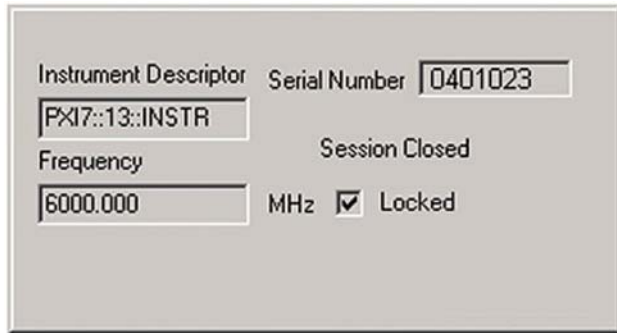|	
Software operating systems	Microsoft Windows® XP (32-bit) Windows 7 (32-bit, 64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. N2099A application view.

Ordering Information

Typical Product Configuration

Model	Description
N2099A	PXI Synthesizer
N2099A-052	4.25 GHz to 6.25 GHz
N2099A-105	9.5 GHz to 11.5 GHz

Related products

N2100B	PXI Digital Communication Analyzer
N2101B	PXI Bit Error Ratio Tester
N2102B	PXI Pattern Generator

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R-50C-011-5	Agilent Calibration - 5 years

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Agilent N2100B Digital Communication Analyzer

DISCOVER the Alternatives…

Industries and Applications

- Test of Optical and Electrical Transceivers
- Telecommunication Equipment Test
- Fibre Channel, Ethernet, PON, Parallel Optics
- Multi-port system testing
- High port count burn-in test

Product Description

The N2100B PXI DCA combines the benefits and measurement capabilities of a real time scope with the bandwidth of a sampling scope, using a coherent patented vector undersampling technique. The N2100B performs accurate eye diagram analysis to characterize the quality of transmitters from 155 Mb/s to 10.3125 Gb/s

Models	
N2100B	PXI Digital Communication Analyzer Module
N2100B-300	155 Mb/s to 10.3125 Gb/s

Main Features and Benefits

Product features	Your benefit
PON and 10 GigE filters available	Extended test capabilities
Smart Post Processing	Allows optical transceiver manufacturers increase throughput
ER Correction Factor	Enables even tighter correlation with other instruments
Eye diagram, mask and jitter testing in a single instrument	Allowing DUT's quality assessment, control and binning
Wide optical bandwidth coverage from 750 nm to 1650 nm	Cover test of optical transmitters for telecommunication and data communication use

Connector compatibility: cPCI, PXI-H, PXI-1

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Specifications and Characteristics

Hardware	
Size	4-slot module
Electrical input	1 channel, single ended AC coupled, 1 v pp (max)
BW of electrical input	12 GHz (characteristic)
Optical input	62.5/125 µm fiber, 750—1650 nm
BW of optical input	10.3125 Gb/s (option 210)
Sample rate	160 Ms/s
Waveform acquisition	1024 points per acquisition, max. 1024 acquisitions
Pattern acquisition mode	Max. 2047 bits pattern length, 128 points per bit, fixed
Clock recovery	<2.7 Gb/s
Clock input frequency range	10 MHz to 11.318 GHz (char.)
Clock input voltage range	0.5 to 1 V pp

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Software

The software suite provided with the N2100B enables easy setup and accelerate time to first measurements.

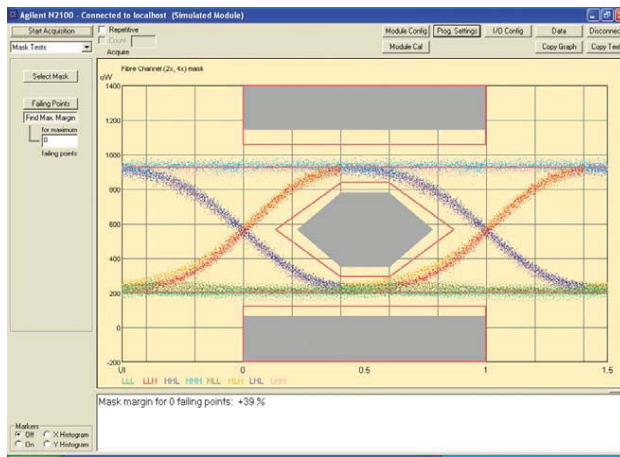|	
Software operating systems	Microsoft Windows® XP (32-bit) Windows 7 (32-bit, 64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

6

Figure 1. Automatic Mask Test Measurement including a call to determine the margin that x number of points fail the "Mask Margin Test"
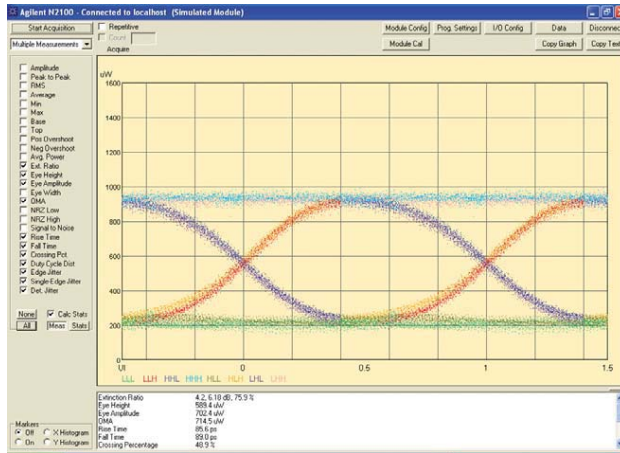

Figure 2. Multiple measurements can be made at the same time.

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Ordering Information

Typical Product Configuration	
Model	Description
N2100B	PXI Digital Communication Analyzer Must choose any 4 different filter rates:
N2100B-300	PXI DCA 155 Mb/s to 10.3125 Gb/s
Option 110	155 Mb/s
Option 120	622 Mb/s
Option 130	1.063 Gb/s
Option 140	1.25 Gb/s
Option 150	2.125 Gb/s
Option 160	2.488/2.5 Gb/s
Option 180	3.125 Gb/s
Option 190	4.25 Gb/s
Option 193	5.0 Gb/s
Option 195	6.25 Gb/s
Option 197	8.5 Gb/s
Option 210	9.95/10.3125 Gb/s

Related products	
N2101B	PXI Bit Error Ratio Tester
N2102B	PXI Pattern Generator
N2099A	PXI Synthesizer

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5990-7670EN

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Agilent N2101B 10.3125 Gb/s Bit Error Ratio Tester

DISCOVER the Alternatives...

Industries and Applications

- Transceiver Test
- Telecommunication Equipment Test
- Fibre Channel, Ethernet, PON, Parallel Optics
- Multi-port system testing
- High port count burn-in test

Product Description

The N2101B PXI 10.3125 Gb/s BERT consists of a high accuracy clock source, data pattern generator, and error detector.
It will automatically perform bit error ratio analysis to characterize the quality of devices at 12 standard internal rates from 155 Mb/s to 8.5 Gb/s.

In conjunction with a synthesizer such as the Agilent N2099A, the N2101B BERT can operate at any rate up to 10.3125 Gb/s.

... Agilent **MODULAR** Products

Models	
N2101B	PXI Bit Error Rate Test Module
N2101B-300	155 Mb/s to 10.3125 Gb/s

Main Features and Benefits

Product features	Your benefit
Significantly smaller than a conventional BERT	Fits well in space constrained test environments
Easily combined with DCA, Synthesizer, Pattern Generator or multiple BERT modules in a PXI chassis	Complete, integrated, modular PXI transceiver test solution
Pattern generation and BER measurements for rates from 155 Mb/s to 8.5 Gb/s	Same test platform for a wide number of formats, including Fibre Channel, GbE, Xaui, PCI Express, OC196/STM64

Connector compatibility: cPCI, PXI-H, PXI-1

Specifications and Characteristics

Hardware	
Size	3-slot module
Pattern generator output Jitter	2.5 ps RMS (max), 1.5 ps RMS (characteristic)
Pattern generator output voltage range	250 mV to 1 V
Rise/ Fall times (20-80%)	25 ps (max), 22 ps (characteristic)
Error detector input (differential)	50 mV to 2 V range, 50 mV sensitivity
External clock input	500 mV to 1 V (characteristic), 500 MHz to 10.3125 GHz
Divided clock rate outputs	1, 2, 4, 8 & 128 (output on separate port)

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Software

The N2101B BERT and its accompanying software fully complies with PXI specifications, enables the user to control the instrument without any user development required. The DLL provides an API through which custom applications can be easily developed to integrate the BERT. An ActiveX Control wrapper for the DLL is included.

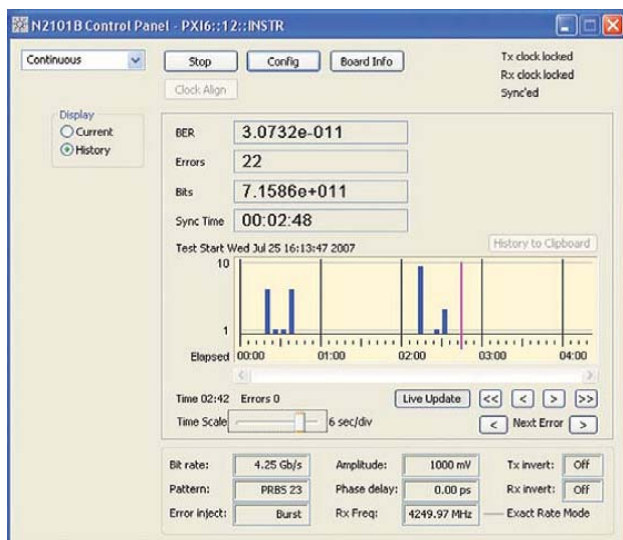|	
Software operating systems	Microsoft Windows® XP (32-bit) Windows 7 (32-bit, 64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Bit Error Rate: History Mode.
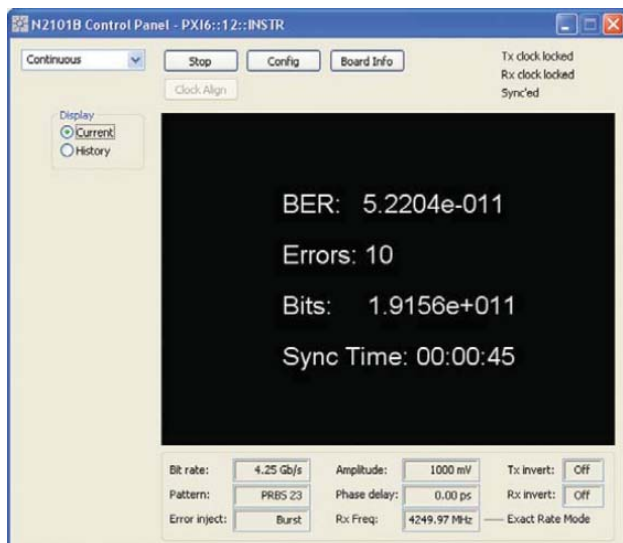
Figure 2. Bit Error Rate: Continuous Mode

Ordering Information

Typical Product Configuration

Model	Description
N2101B	PXI Bit Error Ratio Tester
N2101B-300	155 Mb/s to 10.3125 Gb/s module

Related products

N2100B	PXI Digital Communication Analyzer
N2102B	PXI Pattern Generator
N2099A	PXI Synthesizer

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Agilent N2102B Pattern Generator

DISCOVER the Alternatives...

Industries and Applications

- Transceiver Test
- Telecommunication Equipment Test
- Fibre Channel, Ethernet, PON, Parallel Optics
- Multi-port system testing
- High port count burn-in test

Product Description

The N2102B PXI Pattern Generator is capable of generating a number of low jitter patterns at rates up to 10.3125 Gb/s using an externally supplied clock. ActiveX Controls allow for easy software development and a graphical user interface is provided for manual operation of the module.

Models	
N2102B	PXI Pattern Generator Module
N2102B-300	622 Mb/s to 10.3125 Gb/s

Main Features and Benefits

Product features	Your benefit
PRBS generations $2^n - 1$, (n = 7, 9, 11, 15, 23, 31); user defined patterns with 2048 bits max. length or 16 Kbytes if pattern length is dividable by 64	Flexible, custom pattern generation
2-slot PXI module	Minimum rack space
Clock input	Driven by the N2101B's clock output, the N2102B serves as a detached stimulus for the BERT

Connector compatibility: cPCI, PXI-H, PXI-1

... Agilent MODULAR Products

Specifications and Characteristics

Hardware	
Size	2-slot module
Bit rate operation	622 Mb/s to 10.3125 Gb/s
Output rise/fall time (20% - 80%)	25 ps (max), 22 ps (characteristic)
Output intrinsic jitter	2.5 ps RMS (max), 1.5 ps RMS (characteristic)
Output voltage range	250 mV to 1 V pp
Output voltage resolution	5 mV
Pattern trigger/clock output voltage	1 V pp (characteristic)
Clock input voltage range	500 mV to 1 V pp (characteristic)

6

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Software

The N2102B Pattern Generator and its accompanying software fully comply with PXI specifications. The included Windows application enables the user to control the instrument without any software development required. An ActiveX Control makes integration into custom applications easy.

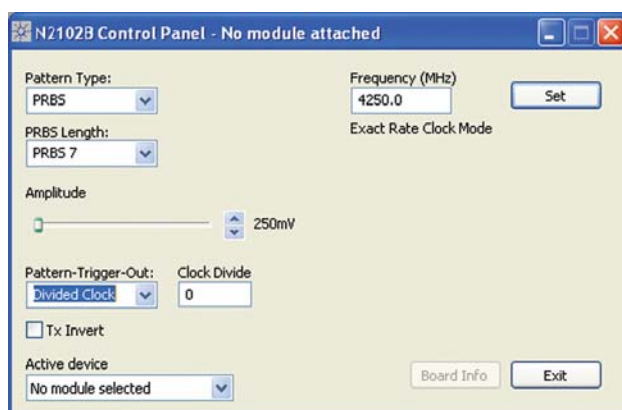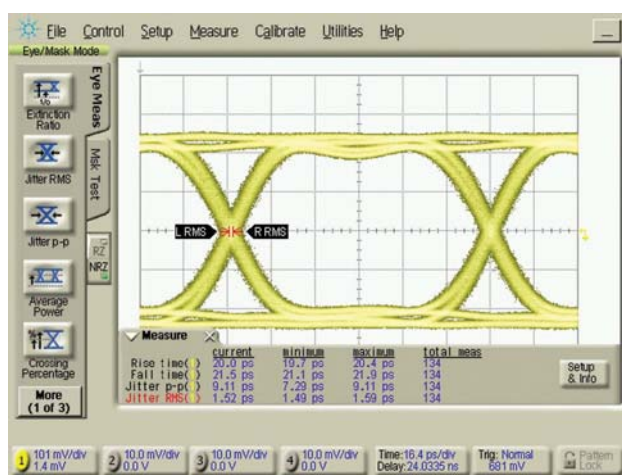|	
Software operating systems	Microsoft Windows® XP (32-bit) Windows 7 (32-bit, 64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. User Friendly Configuration Screen.

Figure 2. The N2102B eye output at 10.3125 Gb/s viewed on the DCA-J.

Ordering Information

Typical Product Configuration

Model	Description
N2102B	PXI Pattern Generator
N2102B-300	622 Mb/s to 10.3125 Gb/s

Related products

N2100B	PXI Digital Communication Analyzer
N2101B	10.3125 Gb/s Bit Error Ratio Tester
N2099A	PXI Synthesizer

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PXI DATA ACQUISITION AND SWITCHING

Whether you use switching to route signals for design verification applications or complex automated function test systems, Agilent has the data acquisition and switch platforms that will allow you to get the job done faster with confidence in your measurement results.

The PXI data acquisition and switch modules deliver modular, high-performance signal connections in the standard PXI platform. Agilent offers a wide selection of performance such as high-speed, 500 usec multiplexer relays, high-power, 300 W general purpose switches and high-density 256 2-wire cross point matrix modules. Additionally, RF and microwave switch technology delivers low insertion loss and VSWR for excellent RF signal integrity and dynamic range when routing RF signals into your measurement equipment.

Data Acquisition

The M9216A is a high voltage, high channel count data acquisition module. The M9216A High Voltage DAQ is capable of parallel measurement of positive voltages that fluctuate between very low and very high levels.

Key Features:

- High voltage range, high channel count
- Simultaneous dual measurement range for each channel
- Auxiliary outputs for additional measurement

Data Acquisition							
	Description	Type # of slots	Channels	Scan Channel Seconds	Min Voltage	Max Voltage	Max Current
M9216A	High voltage DAQ	PXI 2-slot	32 channels	250 kSa.s	1 mV	100 V	0.5 A

Which Data Acquisition and Switch Module is right for you?

- *Select and compare modules*
- *Compare switch platforms*
- *Define a switching solution*
- *Select and compare switch and control modules*

www.agilent.com/find/pxi-switch

PXI DATA ACQUISITION AND SWITCHING

General Purpose Switches

The PXI general purpose switch modules deliver fast, reliable switching in a variety of configurations.

Key Features

- Independent, single-pole, double-throw (Form C) or single-pole, single-throw (form A) switches in a single module
- High-speed , long-life reed relays
- High-power electromechanical relay, handling up to 300 W/2500 VA

General Purpose Switches								
	Description	Type # of slots	Channels	Switching speed (typical)	Max voltage	Current switch & carry	Relay type	Connectors
M9130A	SPDT switch	PXI 1-slot	26 Form C	3 ms	250 Vrms	2 A/2 A	Electro-mechanical	78D connector block or cable
M9131A	SPDT switch	PXI 1-slot	64 Form C	0.5 ms	100 Vrms	1 A/1 A	Reed	200LFH connector block or cable
M9132A	SPST switch	PXI 1-slot	50 Form A	0.5 ms	100 Vrms	1 A/1 A	Reed	200LFH connector block or cable
M9133A	SPST switch	PXI 1-slot	100 Form A	0.5 ms	100 Vrms	1 A/1 A	Reed	200LFH connector block or cable
M9135A	SPST power relay	PXI 1-slot	20 Form A	10.5 ms	250 Vrms 125 Vdc	10 A/10 A	Electro-mechanical	20MSM connector block or cable

Matrix Switches

The PXI matrix switch modules deliver medium to high density switching of multiple channels in a single instance

Key Features

- Up to 256 two-wire cross points can be configured in a single module
- High-speed, long life, reed relays (up to 100 VDC/100 VAC, 20 W
- Higher power electromechanical relays (up to 125 VDC/125 VAC, 60 W)

Matrix Switches								
	Description	Type # of slots	Channels	Switching speed	Max voltage	Current switch & carry	Relay type	Connectors
M9120A	Matrix switch	PXI 1-slot	4 x 32, 2-wire	3 ms	100 Vrms	2 A/2 A	Armature	78 Dsub connector block or cable
M9122A	Matrix switch	PXI 1-slot	8 x 32, 1-wire	3 ms	100 Vrms	2 A/2 A	Armature	50 Dsub connector block or cable

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PXI DATA ACQUISITION AND SWITCHING

Microwave Switches

The new Agilent PXI hybrid switch module series operate from a frequency range of DC to 26.5 GHz, and are used in applications where a rugged switching module is needed in high-density switching systems.

Key Features

- Exceptional 0.03 dB insertion loss repeatability
- High isolation, low SWR
- Long operating life of up to 10 million cycles

Microwave Switches								
	Description	Type # of slots	Frequency range	Insertion loss	Isolation	VSWR	Impedance	Connectors
M9155C	Dual SPDT switch	PXI-H 1-slot	DC to 26.5 GHz	0.25 + 0.027 x f (in GHz) DC: 0.25 dB 8 GHz: 0.47 dB 12.4 GHz: 0.58 dB 18 GHz: 0.74 dB 26.5 GHz: 0.96 dB	DC: 110 dB 8 GHz: 92 dB 12.4 GHz: 82 dB 18 GHz: 70 dB 26.5 GHz: 50 dB	DC to 4 GHz: 1.25 4 to 18 GHz: 1.45 18 to 26.5 GHz: 1.70	50 Ω	SMA (f)
M9156C	Dual transfer switch	PXI-H 2-slots	DC to 26.5 GHz	0.2 dB + 0.025 x f (in GHz) DC: 0.20 dB 8 GHz: 0.40 dB 12.4 GHz: 0.51 dB 18 GHz: 0.65 dB 26.5 GHz: 0.86 dB	DC: 110 dB 8 GHz: 94 dB 12.4 GHz: 85 dB 18 GHz: 74 dB 26.5 GHz: 57 dB	DC to 2 GHz: 1.10 2 to 4 GHz: 1.15 4 to 12.4 GHz: 1.25 12.4 to 20 GHz: 1.40 20 to 26.5 GHz: 1.65	50 Ω	SMA (f)
M9157C	Single SP6T switch	PXI-H 3-slots	DC to 26.5 GHz	0.3 dB + 0.015 x f (in GHz) DC: 0.30 dB 8 GHz: 0.42 dB 12.4 GHz: 0.49 dB 18 GHz: 0.57 dB 26.5 GHz: 0.70 dB	DC to 12 GHz: 90 dB 12 to 15 GHz: 70 dB 15 to 20 GHz: 65 dB 20 to 26.5 GHz: 60 dB	DC to 4 GHz: 1.20 4 to 12.4 GHz: 1.35 12.4 to 20 GHz: 1.45 20 to 26.5 GHz: 1.70	50 Ω	SMA (f)

Multiplexer Modules

The PXI multiplexer modules deliver high-speed signal routing for many channels to a single point and are ideal for routing multiple analog signals to a measurement device.

Key Features

- Available in 1-wire or 2-wire configurations
- High-speed, long-life, reed relays (up to 100 VDC/100 VAC, 20 W)
- Higher power electromechanical relays (up to 100 VDC/100 VAC, 60 W)

Multiplexers							
	Description	Type # of slots	Channels	Switching speed (typical)	Max voltage	Current switch and carry	Relay type	Connectors
M9101A	High-density multiplexer	PXI 1-slot	64 channels, 2-wire	500 µs	100 Vrms	0.5 A/1.0 A	Reed	200LFH connector block or cable
M9102A	High-density multiplexer	PXI 1-slot	128 channels, 1-wire	500 µs	100 Vrms	0.5 A/1.0 A	Reed	200LFH connector block or cable
M9103A	High-density multiplexer	PXI 1-slot	99-channels, 2-Wire	3 ms	100 Vrms	1 A/1 A	Armature	200LFH connector block or cable

PXI DATA ACQUISITION AND SWITCHING

RF Switches

The PXI RF switch modules deliver high-performance, high-density, switching of up to 3 GHz and are available in multiple configurations.

Key Features

- Low insertion loss and VSWR
- Excellent RF signal integrity and dynamic range
- Repeatable RF performance

RF Switches									
	Description	Type # of slots	Frequency range	Insertion loss (typical)	Isolation (typical)	VSWR (typical)	Impedance	Connectors
M9128A	8 x 12 RF matrix switch	PXI 1-slot	300 Mhz	3 dB at 300 MHz	80 dB at 300 MHz	1:2.1 at 300 MHz	50 Ω	SMB connectors
M9146A	Dual 1 x 4 RF multiplexer	PXI 1-slot	3 GHz	1 dB at 3 GHz	45 dB at 3 GHz	1.3:1 at 3 GHz	50 Ω, off channel termination	SMB connectors
M9147A	Quad 1 x 4 RF multiplexer	PXI 1-slot	3 GHz	1.3 dB at 3 GHz	35 dB at 3 GHz	1.5:1 at 3 GHz	50 Ω	SMB connectors
M9148A	1 x 8 RF multiplexer	PXI 1-slot	3 GHz	1.2 dB at 3 GHz	38 dB at 3 GHz	1.2:1 at 3 GHz	50 Ω	SMB connectors
M9149A	1 x 16 high density RF multiplexer	PXI 1-slot	3 GHz	1.3 dB at 3 GHz	38 dB at 3 GHz	1.4:1 at 3 GHz	50 Ω	SMB connectors
M9150A	Dual 1 x 4 RF multiplexer	PXI 1-slot	3 GHz	1.6 dB at 3 GHz	40 dB at 3 GHz	1.6:1 at 3 GHz	75 Ω	SMB connectors
M9151A	Quad 1 x 4 RF multiplexer	PXI 1-slot	3 GHz	1.6 dB at 3 GHz	40 dB at 3 GHz	1.6:1 at 3 GHz	75 Ω	SMB connectors
M9152A	1 x 8 RF multiplexer	PXI 1-slot	3 GHz	2.1 dB at 3 GHz	39 dB at 3 GHz	1.5:1 at 3 GHz	75 Ω	SMB connectors
M9153A	1 x 16 RF multiplexer	PXI 1-slot	3 GHz	1.9 dB at 3 GHz	38 dB at 3 GHz	1.6:1 at 3 GHz	75 Ω	SMB connectors

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# Agilent PXI Multiplexer Switch Modules

DISCOVER the Alternatives...

Industries and Applications

- Aerospace/defense
- Automotive
- Electronic test
- Medical
- Semiconductor

Product Description

The PXI multiplexer modules deliver high-speed signal routing of many different channels to a single point, and are ideal for routing multiple analog signals to a measurement device in automated test environments (ATE) or data acquisition systems.
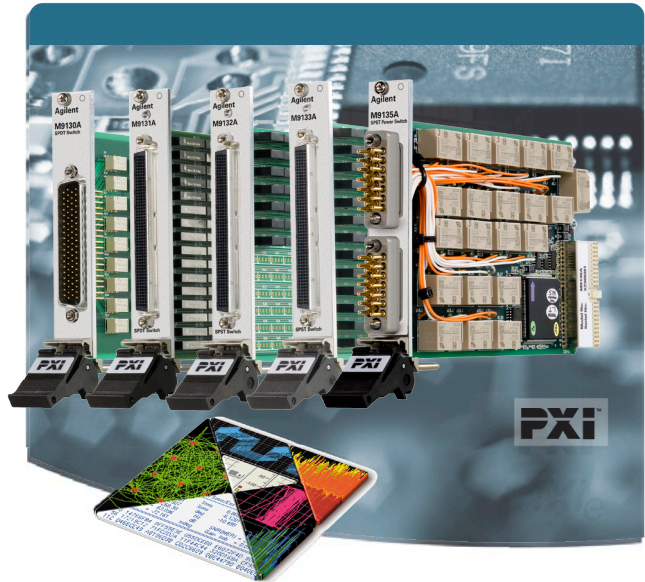
Models	
M9101A	64-ch, 2-wire, reed relays
M9102A	128-ch, 1-wire, reed relays
M9103A	99-ch, 2-wire, armature relays

Main Features and Benefits

Product features	Your benefit
High-speed, long-life reed relays or higher power EM relays	Get the performance you need with 500 usec switches or up to 60W per channel
Modules operate in break-before-make mode	Ensure no two points are connected at the same time
Up to 128 channels in a single module	Scan many points in a compact space
Software drivers support the most common programming environments	Work in your environment of choice and reduce development time
Optional connector block, soft front panels, and Agilent Connection Expert	Fast and easy installation and configuration

... Agilent **Modular** Products

Specifications and Characteristics

Hardware			
	M9101A	M9102A	M9103A
Channels	64	128	99
Switch type	2-wire, reed	1-wire, reed	2-wire, armature
Max volts (CAT 1) *(typ)*		100Vrms	
Max switch/carry rating *(typ)*	0.5A/1.0A	0.5A/1.0A	1A
Max power *(nom)*	10W	10W	60W
Bandwidth *(nom)*	5 MHz	5 MHz	1 MHz
Connectors		200 LFH	

Chassis slot compatibility: cPCI (J1), PXI-1, PXIe Hybrid

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Software Information

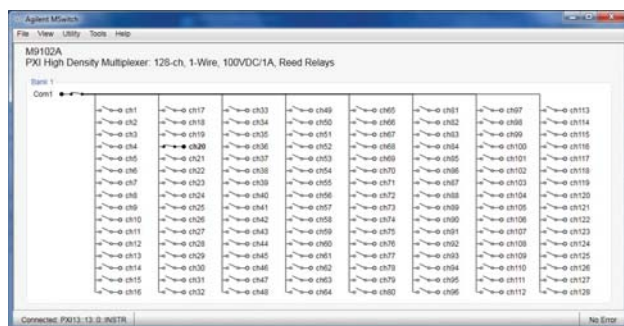|	
Operating systems	Microsoft Windows® XP Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (C/C++,C#, VB.NET), LabVIEW, LabWindows/CVI, MATLAB, VEE
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Soft front panel

Figure 2. PXI connector block

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Ordering Information

Model	Description
M9101A	PXI high-density multiplexer: 64-ch, 2-wire, 100V/1.0A, reed relays
M9102A	PXI high-density multiplexer: 128-ch, 1-wire, 100Vrms/1.0A, reed relays
M9103A	PXI high-density multiplexer: 99-ch, 2-wire, 100Vrms/1A, armature relays

Related products	
M9018A	18-slot PXIe chassis
M9021A	PCIe® cable interface
M9132A	50-ch SPST general purpose switch
M9187A	32-ch digital I/O

Accessories	
Y1182A	PXI connector block: 200-pin, shielded, male (recommended)
Y1189A	PXI connector cable: 200-pin, male-to-female, 1Meter
Y1190A	PXI connector cable: 200-pin, male-to-female, 2Meter

Advantage Services: Warranty	
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Agilent PXI Matrix Switch Modules

DISCOVER the Alternatives...

Industries and Applications

- Aerospace/defense
- Automotive
- Electronic test
- Medical
- Semiconductor

Product Description

The PXI matrix switch modules deliver medium- to high-density switching of multiple channels in a single instance. Any row can be connected to any column—ideal for routing multiple signals between the device under test and instruments.

Models	
M9120A	4x32, 2-wire, armature relays
M9122A	8x32, 1-wire, armature relays

Main Features and Benefits

Product features	Your benefit
Up to 256 1-wire crosspoints	Connect multiple points for high-pin-count applications
Software drivers support the most common programming environments	Work in your environment of choice and reduce development time
Optional connector block, soft front panels, and Agilent Connection Expert	Fast and easy installation and configuration

... Agilent **Modular** Products

Specifications and Characteristics

Hardware		
	M9120A	M9122A
Channels	4x32	8x32
Switch type	2-wire, armature	1-wire, armature
Max volts (CAT 1) *(typ)*	100Vrms	100Vrms
Max switch/carry rating *(typ)*	2.0A	2.0A
Max power *(nom)*	60W	60W
Bandwidth *(nom)*	7.5MHz	5MHz
Connectors	78 Dsub block/cable	50 Dsub block/cable

Chassis slot compatibility: cPCI (J1), PXI-1, PXIe Hybrid

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Software Information

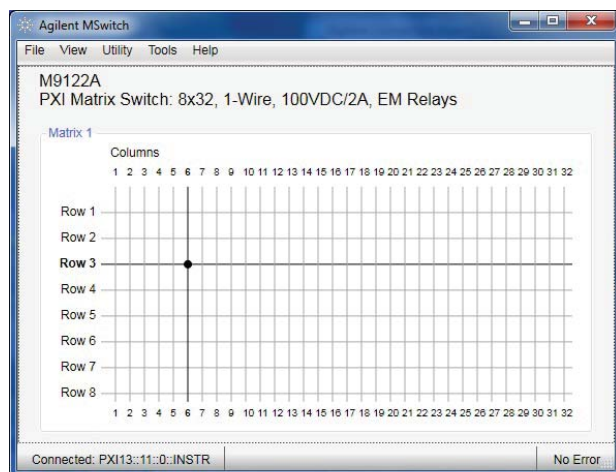|	
Operating systems	Microsoft Windows® XP Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (C/C++,C#, VB.NET), LabVIEW, LabWindows/CVI, MATLAB, VEE
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Soft front panel

Figure 2. PXI connector block

Advantage Services: Warranty

Agilent Advantage Services is committed to your success throughout your equipment's lifetime.

R-51B-001-3C	1-year, return-to-Agilent warranty extended to 3 years

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Ordering Information

Model	Description
M9120A	PXI matrix switch: 4x32, 2-wire, 125V/2A, armature relays
M9122A	PXI matrix switch: 8x32, 1-wire, 2A, armature relays

Related products	
M9018A	18-slot PXIe chassis
M9021A	PCIe® cable interface
M9102A	128-ch, 1-wire multiplexer switch
M9131A	64-ch SPDT general purpose switch
M9187A	32-ch digital I/O

Accessories	
M9120A	
Y1181A	PXI connector block: 78-pin, shielded, female DSub (recommended)
Y1187A	PXI connector cable: 78-pin, male-to-female, 1Meter
Y1188A	PXI connector cable: 78-pin, male-to-female, 2Meter
M9122A	
Y1180A	PXI connector block: 50-pin female DSub (recommended)
Y1185A	PXI connector cable: 50-pin, male-to-female, 1Meter
Y1186A	PXI connector cable: 50-pin, male-to-female, 2Meter

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Agilent PXI RF Switch Modules

DISCOVER the Alternatives...

Industries and Applications

- Aerospace/defense
- Automotive
- Electronic test
- Medical
- Semiconductor

Product Description

The PXI RF switch modules deliver high-performance, bi-directional switching up to 3GHz, and are available in multiple configurations to integrate into a variety of test environments. Modern RF relay technology delivers low insertion loss and VSWR for excellent RF signal integrity and dynamic range when routing RF signals into your measurement equipment. Each switch path is carefully designed to ensure repeatable RF performance.

Models	
M9128A	PXI RF matrix 300 MHz, 50 Ω
M9146A-M9149A	PXI RF multiplexer 3GHz, 50 Ω
M9150A-M9153A	PXI RF multiplexer 3GHz, 75 Ω

Main Features and Benefits

Product features	Your benefit
Modern RF relay technology delivers low insertion loss and VSWR	Excellent RF signal integrity and dynamic range
Each switch path is carefully designed	Repeatable RF performance
Software drivers support the most common programming environments	Work in your environment of choice and reduce development time
Snap-on SMB connections, soft front panels, and Agilent Connection Expert	Fast and easy installation and configuration

Chassis slot compatibility: cPCI (J1), PXI-1 (J1), PXIe Hybrid

... Agilent **Modular** Products

Specifications and Characteristics

Hardware			
RF switches	Configuration	Insertion loss	VSWR (typical)
RF 3GHz, 50 Ω multiplexer switches			
M9146A	Dual 1x4	0.8 dB	45 dB
M9147A	Quad 1x4	1 dB	40 dB
M9148A	1x8	0.8 dB	40 dB
M9149A	1x16	1.2 dB	40 dB
RF 3GHz, 75 Ω multiplexer switches			
M9150A	Dual 1x4	1 dB	45 dB
M9151A	1x4	1.1 dB	40 dB
M9152A	1x8	1 dB	45 dB
M9153A	1x16	1.2 dB	40 dB
RF 300MHz, 50Ω matrix switch			
M9128A	8x12	2 dB[1]	40 dB

1. Refer to matrix performance graph and detailed specifications in data sheet, literature number 5990-6585EN

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Software Information

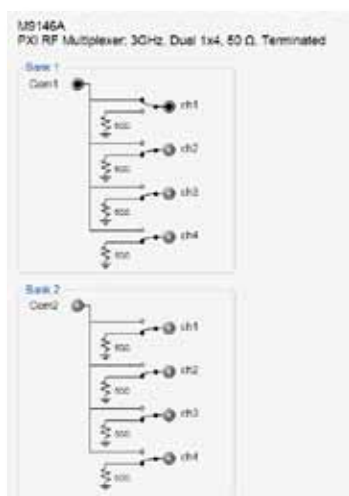|	
Operating systems	Microsoft Windows® XP Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW
Supported application development environments (ADE)	VisualStudio.NET® (C/C++,C#, VB.NET), LabVIEW, LabWindows/CVI, MATLAB, VEE

Figure 1. Soft front panel

Ordering Information

Model	Description
M9128A	PXI RF matrix switch: 300 MHz, 8x12, 50 Ω
M9146A	PXI RF multiplexer: 3GHz, dual 1x4, 50 Ω, terminated
M9147A	PXI RF multiplexer: 3GHz, quad 1x4, 50 Ω, terminated common
M9148A	PXI RF multiplexer: 3GHz, 1x8, 50 Ω
M9149A	PXI high-density RF multiplexer: 3GHz, 1x16, 50 Ω
M9150A	PXI RF multiplexer: 3GHz, dual 1x4, 75 Ω
M9151A	PXI RF multiplexer: 3GHz, quad 1x4, 75 Ω
M9152A	PXI high-density RF multiplexer: 3GHz, 1x8, 75 Ω
M9153A	PXI high-density RF multiplexer: 3GHz, 1x16, 75 Ω

Related products	
M9018A	18-slot PXIe chassis
M9021A	PCIe® cable interface
M9045B	PCIe ExpressCard adaptor: Gen 1
Y1200B	PCIe cable: x1 to x8, 2.0m (used with M9045B)
M9047B	PCIe desktop PC adapter
Y1202A	PCIe cable: x8, 2.0m (used with M9047B)
M9122A	8x32, 1-wire matrix switch
M9103A	99-ch, 1-wire multiplexer switch
M9133A	100-ch SPST general purpose switch
M9187A	32-ch digital I/O

Advantage Services: warranty	
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R-51B-001-3C	1-year, return-to-Agilent warranty extended to 3 years

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# Agilent General Purpose Switch Modules

DISCOVER the Alternatives...

Industries and Applications

- Aerospace/defense
- Automotive
- Electronic test
- Medical
- Semiconductor

Product Description

The PXI general purpose switch modules deliver fast, reliable switching in a variety of configurations. Cycle power to products under test, control indicator, and status lights, or actuate external power relays and solenoids with independent, single-pole, double-throw (Form C) or single-pole, single-throw (Form A) switches in a single PXI module. The line also includes a module that can handle up to 300W/1250W for switching heavy loads or power supplies.
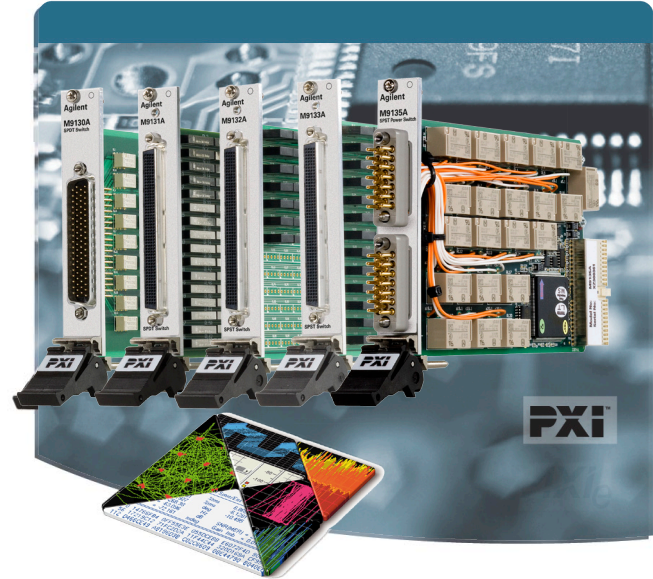
... Agilent **Modular** Products

Models	
M9130A	26-ch, SPDT, armature relays
M9131A	64-ch, SPDT, reed relays
M9132A	50-ch, SPST, reed relays
M9133A	100-ch, SPST, reed relays
M9135A	20-ch, SPST, 10A, 300W

Main Features and Benefits

Product features	Your benefit
Up to 100-channel general purpose EM relays	High-density, general purpose switching in a compact module
Power relay module	Get the performance you need to switch heavy loads with up to 300W (DC resistive load)/1250W (AC resistive load)
Software drivers support the most common programming environments	Work in your environment of choice and reduce development time
Optional connector block, soft front panels, and Agilent Connection Expert	Fast and easy installation and configuration

Specifications and Characteristics

Hardware			
Modules	Max volts (CAT 1) *(typ)*	Max switch/ carry rating *(typ)*	Max power *(nom)*
M9130A 26-ch SPDT, Form C, armature	250Vrms	2A/2A	60W
M9131A 64-ch SPDT, Form C, reed	100Vrms	0.25A/1A	3W
M9132A 50-ch SPST, Form A, reed	100Vrms	1A/1A	25W
M9133A 100-ch SPST, Form A, reed	100Vrms	1A/1A	25W
M9135A 20-ch SPST, Form A, armature	250Vrms/ 125Vdc	5A/5A	300W

Chassis slot compatibility: cPCI (J1), PXI-1, PXIe Hybrid

7

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Software Information

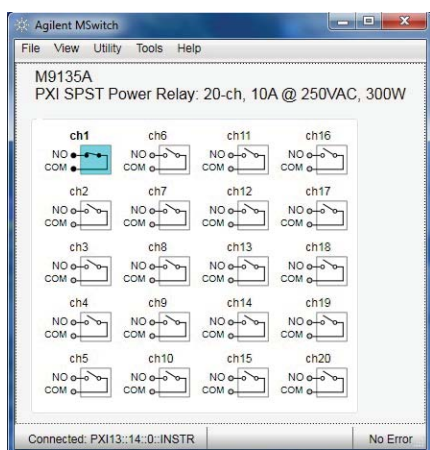| Operating systems	Microsoft Windows® XP Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (C/C++,C#, VB.NET), LabVIEW, LabWindows/CVI, MATLAB, VEE
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Soft front panel

Figure 2. PXI connector block

Advantage Services: Warranty

Agilent Advantage Services is committed to your success throughout your equipment's lifetime.

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Ordering Information

Model	Description
M9130A	PXI SPDT switch: 26-ch, 2A, armature relays
M9131A	PXI SPDT switch: 64-ch, 100Vrms/1A, reed relays
M9132A	PXI SPST switch: 50-ch, 100Vrms/1A, reed relays
M9133A	PXI SPST switch: 100-ch, 100Vrms/1A, reed relays
M9135A	PXI SPST power relay: 20-ch, 10A, 300W

Related products	
M9018A	18-slot PXIe chassis
M9021A	PCIe® cable interface
M9120A	4x32, 2-wire matrix switch
M9101A	64-ch, 2-wire multiplexer switch
M9187A	32-ch digital I/O

Accessories	
M9130A	
Y1181A	PXI connector block: 78-pin, shielded, female DSub (recommended)
Y1187A	PXI connector cable: 78-pin, male-to-female, 1Meter
Y1188A	PXI connector cable: 78-pin, male-to-female, 2Meter
M9131A-M9133A	
Y1182A	PXI connector block: 200-pin, shielded, male (recommended)
Y1189A	PXI connector cable: 200-pin, male-to-female, 1Meter
Y1190A	PXI connector cable: 200-pin, male-to-female, 2Meter
M9135A	
Y1191A	PXI power cable: 20-pin, female-to-unterminated, 1Meter
Y1192A	PXI power cable: 20-pin, female-to-unterminated, 2Meter
Y1193A	PXI power connector: 20-pin, female (universal), solder pin (recommended)

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5990-6354EN

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Agilent M9155/6/7C PXI Hybrid Switch Modules

DISCOVER the Alternatives...

Industries and Applications

- Automatic Test Equipment (ATE)
- RF communications
- Engineering verification
- RF parametric measurements
- Mid and high density switching systems

Product Description

M9155/6/7C is a series of PXI hybrid switch modules based on the PXI Hybrid platform. Operating from DC to 26.5 GHz, these modules come with guaranteed 0.03 dB insertion loss repeatability throughout the operating life.

Models	
M9155C	PXI Hybrid Dual SPDT Coaxial Switch, DC to 26.5 GHz, Unterminated
M9156C	PXI Hybrid Dual Transfer Switch, DC to 26.5 GHz
M9157C	PXI Hybrid Single SP6T Switch, DC to 26.5 GHz, Terminated

Main Features and Benefits

Product features	Your benefit
A readily scaled integrated switching solution to satisfy your unique application platform needs	Peace of mind in switch technology from Agilent who has a proven track record for providing versatile, quality RF and microwave switches
Guaranteed 0.03 dB insertion loss repeatability throughout the operating life of up to 10 million cycles	Reduce downtime for recalibration, improve testing efficiency and hence maximize throughput
Unmatched isolation of 60 dB at 26.5 GHz	Maximize measurement accuracy and system flexibility
Soft front panel is available for each switch module	The embedded graphical user interface ease the trouble-shooting of your PXI systems

Connector compatibility: PXI-H, PXI-1, cPCI

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Specifications

Hardware		
Size	M9155C	1 slot wide
	M9156C	2 slots wide
	M9157C	3 slots wide
Frequency	DC to 26.5 GHz	
Insertion loss*	0.42 dB at 8 GHz	
	0.57 dB at 18 GHz	
	0.70 dB at 26.5 GHz	
Insertion loss repeatability	< 0.03 dB	
Guaranteed operating life	5 million cycles for M9155C	
	2 million cycles for M9156/7C	
Typical operating life	10 million cycles for M9155C	
	5 million cycles for M9156/7C	
Isolation*	90 dB at 8 GHz	
	65 dB at 18 GHz	
	60 dB at 26.5 GHz	
VSWR*	1.35 at 8 GHz	
	1.45 at 18 GHz	
	1.70 at 26.5 GHz	
Impedance	50 Ω	
RF connector	3.5 mm (f) for M9155C	
	SMA (f) for M9156/7C	

*Note: *Refer to data sheet 5990-6269EN for detailed technical specifications.*

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Software

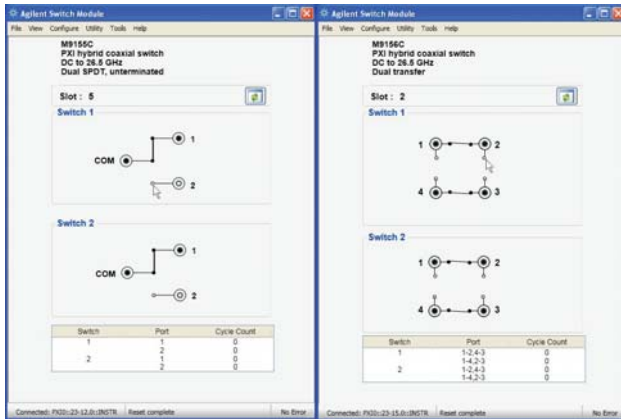| Software development platform	Visual Studio®, C, C++, C#, Visual Basic®, LabVIEW, LabWindows/CVI, MATLAB®, VEE
Supported operating systems	Microsoft Windows® XP SP3, (32-bit), Windows® Vista, (32-bit and 64-bit) Windows® 7 (32-bit and 64-bit)
Included device drivers	IVI-COM, IVI-C, LabVIEW, MATLAB®
Included GUI	Soft front panel
Application code examples	C, C++, C#, Visual Basic®,VEE, MATLAB®

Figure 1. Soft Front Panel for M9155/6/7C.

7

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Ordering Information

Model	Description
☑ M9018A	PXIe Chassis, 18- slots, 3U, 8 GB/s
☑ M9155C	PXIh Coaxial Switch, DC-26.5 GHz, Dual SPDT, Unterminated
☑ M9156C	PXIh Coaxial Switch, DC to 26.5 GHz, Dual Transfer
☑ M9157C	PXIh Coaxial Switch, DC to 26.5 GHz, Single SP6T, Terminated
☑	*Recommended configuration*

Related products

M9392A	PXI Vector Signal Analyzer
M9302A	PXI Local Oscillator
M9351A	PXI Downconverter (50 MHz to 2.9 GHz)
M9360A	PXI Attenuator/Preselector
M9361A	PXI Downconverter (2.75 GHz to 26.5 GHz)

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Agilent M9216A
PXI 32-Channel High Voltage Data Acquisition Module

DISCOVER the Alternatives ...

Industries and Applications

- Automotive
- Electronic test

Product Description

The M9216A is a high voltage data acquisition module that allows simultaneous measurement of eight channels of positive voltages ranging from 1 mV to 100 V. Each channel in the module comes with concurrent 5 V and 100 V measurement ranges, with every channel capable of acquiring digital signals that fluctuate between very low and very high voltage levels without the need for switching ranges and doing separate measurements.

The M9216A module also comes with a built-in 32 to eight multiplexer enabling 32 measurement ports to be connected to the eight acquisition channels expanding it to a full 32-channel acquisition module. Alternatively, these channels can also be routed via an auxiliary output connector for additional measurements without requiring extra multiplexers or pin matrix cards.

The M9216A is capable of doing fast parallel voltage level measurements with guaranteed accuracy, which is ideal for the automotive industry since most automotive applications do not require negative voltage measurements. The M9216A's 16-bit ADC is fully used for positive voltages, giving it better resolution, hence better accuracy.

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Model	
M9216A	32-channel high voltage data acquisition module

Main Features and Benefits

Product features	Your benefit
Large input range with dual concurrent measurement range for each channel	Enables voltage level acquisition to be done for very low and very high voltages without the need for switching ranges
Built-in 32 to 8 multiplexer	Expanding to 32-channel high speed voltage acquisition capability
Auxiliary outputs from the acquisition channels	Enables additional measurements to be done without requiring external multiplexers and pin matrix cards

Specifications

Hardware	
Size	2 slots, 3 U
Resolution	16 bit
Accuracy	Zero offset: 5 V range – 200 uV, 100 V range – 1 mV Gain (% of reading): 5 V range – 0.05%, 100 V range – 0.05% Noise @ 3 sigma: 5 V range – 200 uV, 100 V range – 2 mV

Software	
Supported operating systems	Windows® XP (32-bit) Windows Vista®(32-bit/64-bit) Windows 7 (32-bit/64-bit)
Included device drivers	IVI-COM, IVI-C, LabVIEW G
Included GUI	Soft front panel
Chassis slot compatibility: cPCI(J1, J2), PXI-1, PXIe Hybrid	

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55

Software Applications

The M9216A high voltage data acquisition module is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice. Support includes Microsoft development environments like C/C++, C#,. or VB.NET, LabVIEW and LabWindows/CVI software platforms from National Instruments as well as MATLAB from The MathWorks.

To help you get started and complete complex tasks quickly, the module software support provides context-sensitive help, complete documentation and code examples that allow a quick module set up and basic acquisition functionalities. These code examples can be easily modified, so that the card can be quickly integrated into a measurement system. In addition, the M9216A includes a soft front panel graphical interface. This simple software application can be used to control, verify the functionality and explore the capabilities of the Agilent data acquisition module.

Ordering Information

Typical Product Configuration	
Model	Description
M9216A	M9216A PXI high voltage data acquisition module, 32-channel, 250KS/S, 16-BIT, 100 V input
Advantage Services: Calibration and Warranty	
Agilent Advantage Services is committed to your success throughout your equipment's lifetime.	
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5990-7587EN

Agilent Technologies

PXI DIGITAL INPUT OUTPUT

Agilent Technologies offers digital IO modules to meet your needs for digital sensing and control of simple devices and digital functional testing. In the PXI modular format, Agilent offers a PXI digital IO for system monitoring and controlling devices such as external relays.

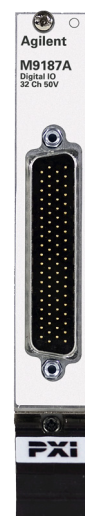## Product Features and your Benefits

Applications

- For monitoring digital states and controlling external devices

Functionality

- 32 input channels with programmable thresholds of 0.3 V to 50 V

- 32 output channels with 0.5 A low sink/0.4 A high source

Performance characteristics

- 100 V input protection

- Fully protected outputs

- High-quality D-Sub connectors

Agilent M9187A Digital IO

Agilent M9187A Digital IO

www.agilent.com/find/pxi-dio

PXI DIGITAL INPUT OUTPUT

Digital IO								
	Description	Type # of slots	Channels	Inputs	Outputs	Speed	Memory	Connectors
M9187A	32 channel digital IO	PXI 1-slot	32 inputs 32 outputs	Up to 50 V	Source 0.4 A sink 0.5 A	1.3 ms all channels	No	78D connector bloc or cable

www.agilent.com/find/pxi-dio
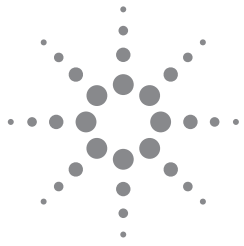
Agilent M9187A PXI Digital I/O Control Module

DISCOVER the Alternatives...

Industries and Applications

- Aerospace/defense
- Automotive
- Electronic test
- Medical
- Semiconductor

Product Description

The M9135A digital I/O control module has 32 input/output channels. The input channels can be used for comparing inputs to user-defined thresholds between 0.3V and 50V, with 12mV setting resolution. Each input is protected up to 100V. The 32 output channels can drive high or low outputs, and are capable of sourcing 0.4A from the high-side or sink 0.5A from the low-side of each channel. These outputs are protected against over-voltage or over-current conditions.

... Agilent **Modular** Products

Models	
M9187A	Digital I/O control, 32 channel

Main Features and Benefits

Product features	Your benefit
32 input/output channels	Provides the flexibility to meet your testing needs
100V input protection and fully protected outputs	Reliable performance
Software drivers support the most common programming environments	Work in your environment of choice and reduce development time
Optional connector block, soft front panels, and Agilent Connection Expert	Fast and easy installation and configuration

Chassis slot compatibility: cPCI (J1), PXI-1, PXIe Hybrid

Specifications and Characteristics

8

Hardware	
Input specifications	
Input impedance	1 MΩ
Max input voltage *(typ)*	100VpK
Thresholds	Dual programmable 0.3 to 50V, 12.5mV resolution
Output specifications	
Max voltage *(typ)*	+50VpK
Max current	0.5A for low-side drivers 0.4A for high-side drivers 10A module total
Output states	Driven high, driven low, or off
Low-side driver output voltage	0.3V @ Isink = 0.5A
High-side driver output voltage	Vext – 1.5V @ Isource = 0.4A

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Software Information

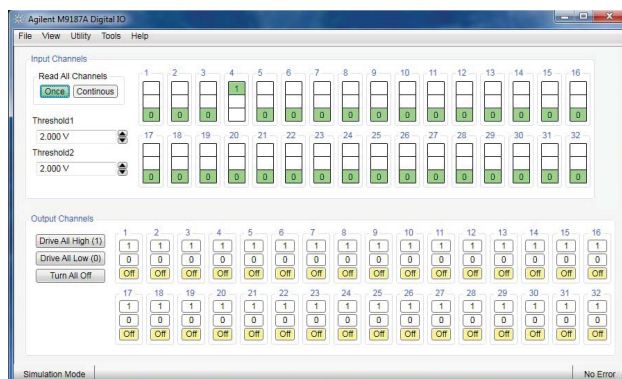|	
Operating systems	Microsoft Windows® XP Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (C/C++,C#, VB.NET), LabVIEW, LabWindows/CVI, MATLAB, VEE
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Soft front panel

8

Figure 2. PXI connector block

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Ordering Information

Model	Description
M9187A	PXI digital I/O: 32 input/output channels 0.3V to 50V

Related products

M9018A	18-slot PXIe chassis
M9021A	PCIe® cable interface
M9120A	4x32, 2-wire matrix switch
M9103A	99-ch, 1-wire multiplexer switch
M9135A	20-ch SPST general purpose switch

Accessories

Y1181A	PXI connector block: 78-pin, shielded, female DSub (recommended)
Y1187A	PXI connector cable: 78-pin, male-to-female, 1Meter
Y1188A	PXI connector cable: 78-pin, male-to-female, 2Meter

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PXI DIGITAL MULTIMETERS

Agilent Technologies M9182A and M9183A Digital Multimeters (DMM) deliver market-leading speed at their price points. These fast reading speeds translate into higher test system throughput and lower cost of test. These DMM modules fit with a broad range of applications, from temperature and frequency measurement to high speed and high volume testing. Agilent's family of PXI digital multimeters deliver results you can trust.

The M9181A delivers a low cost PXI DMM with basic features. This DMM measures common parameters such as DCV, DCI, ACV, ACI, 2 and 4-wire resistance. The M9181A also offers 90 ppm basic DCV accuracy and inputs up to 240 V.

Product features and your benefits

Applications

- DMM measurements in automated systems
- DMM measurements in functional test systems

Functionality

- DCV, DCI, ACV, ACI, 2- and 4-wire resistance
- Frequency/period, capacitance temperature
- Advanced triggering

Performance characteristics

- 40 ppm basic DCV 1-yr accuracy
- Measurement speeds up to 15,000 rdgs/s
- 6½ digits of resolution (22 bits)
- 40 ppm basic DCV 1-yr accuracy
- Measurement speeds up to 15,000 rdgs/s
- Floating isolation (CATII) for inputs up to 300 V
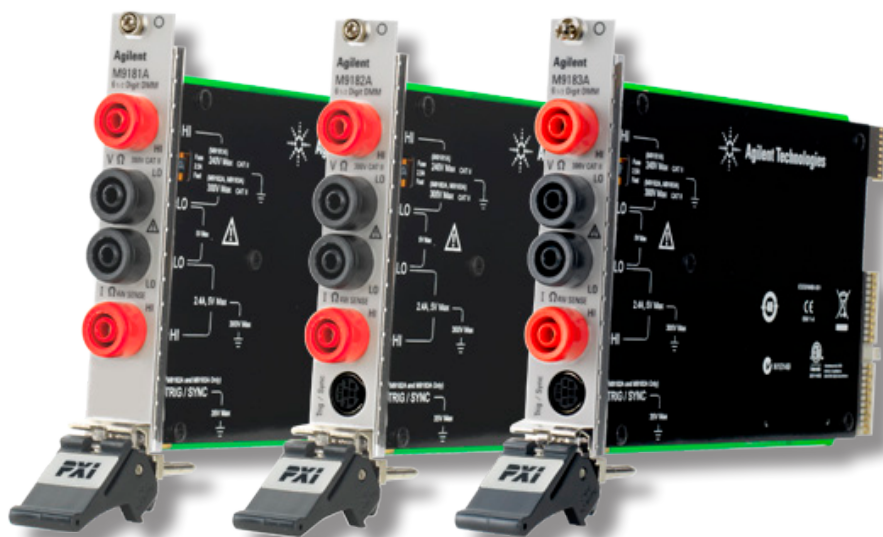
Agilent Digital Multimeters M9181A, M9182A and M9183A

www.agilent.com/find/pxi-dmm

PXI DIGITAL MULTIMETERS

Digital Multimeters								
	Description	Type # of slots	Resolution	Maximum reading rate at 4 ½ digits	Voltage and current	Resistance, temperature, capacitance	Other measurements	DC source
M9181A	Basic features PXI DMM	PXI 1-slot	6½ digits	150 rdfs/s	DCV, DCI, ACV, ACI	2 & 4-wire Ω,	n/a	n/a
M9182A	High-performance PXI DMM	PXI-H 1-slot	6½ digits	4,500 rdgs/sec	DCV, DCI, ACV, ACI	2 & 4-wire Ω, temperature capacitance	Frequency/period	n/a
M9183A	Enhanced performance PXI DMM	PXI-H 1-slot	6½ digits	15,000 rdgs/sec	DCV, DCI, ACV, ACI	2 & 4-wire Ω, temperature capacitance	Frequency/period pulse width, duty cycle, totalizer/event counter	± 10 V ± (1.2 µA to 12 mA)

www.agilent.com/find/pxi-dmm

Agilent M9181A Basic Features PXI DMM

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Automotive
- Electronic test

Product Description

The Agilent M9181A 6½ digit PXI digital multimeter (DMM) offers the most common measurement functions at an affordable price. The M9181A provides six built-in measurement types with all the reliability and stability you would expect from an Agilent PXI DMM.

Main Features and Benefits

Product features	Your benefits
Basic DCV accuracy of 90 ppm	Measurements you can trust
Measurements: DCV, ACV, DCI, ACI 2- & 4-wire Ω	Basic digital multimeter measurements for the most common measurement applications
Software drivers to support the most common programming environments	Work in your environment of choice and reduce development time
Soft front panel and Agilent Connection Expert	Fast and easy installation, configuration, and calibration

Comparison of Agilent PXI DMM Models

	M9181A	M9182A	M9183A
Resolution	6½ digits		
Maximum reading rate at 4 ½ digits	150 rdgs/s	4,500 rdgs/s	15,000 rdgs/s
Measurements and functions	DCV, ACV, DCI, ACI, 2-wire Ω, 4-wire Ω	All M9181A measurements, plus frequency/period, temperature, and capacitance	All M9182A measurements plus duty cycle, counter/totalizer, DC source
Basic DCV accuracy	90 ppm	40 ppm	
Maximum DCV range	200 V	300 V	
Triggering	Immediate	Immediate, analog threshold (pre- and post-trigger), PXI trigger bus	
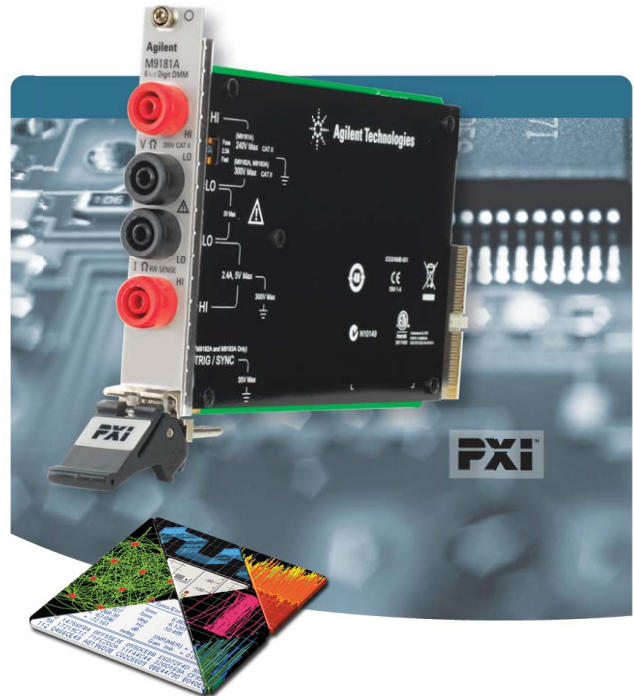
... Agilent **MODULAR** Products

Selected Specifications and Characteristics

Hardware	M9181A
Resolution	6½ digit
DCV basic 1-year accuracy	90 ppm
Maximum reading rate (4½ digits)	150 rdgs/s
Floating Isolation (CAT II)	240 V
Connector Compatibility	PXI-1 (J-1)
Measurement ranges	
DCV, ACV; 4 ranges	200 mV to 200 V
DCI, ACI; 4 ranges	2 mA to 2 A
2- and 4-wire resistance; 6 ranges	200 Ω to 20 MΩ

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Specifications and Characteristics

Sensitivity

Function	Lowest range	Sensitivity
DCV	200.0000 mV	100 nV
ACV	200.0000 mV	100 nV
Resistance	20.0000 Ω	100 µΩ
DCI	2.000000 mA	10 nA
ACI	2.000000 mA	1 nA

Resolution vs. aperture and reading rate for DCV, DCI, Ω

Measurement aperture	Maximum readings per second	Resolution
1.28 s	0.8	6½ Digits (21 bits)
160 ms	6	6 Digits (20 bits)
20 ms	45	5½ Digits (18 bits)
10 ms	85	5 Digits (17 bits)
5 ms	150	4½ Digits (16 bits)

System requirements

Operating systems	Microsoft Windows® XP, Microsoft Windows® Vista, Microsoft Windows® 7 (32/64 bit)

Ordering Information

Model	Description
M9181A	PXI digital multimeter, 6½ digit, basic features
Accessories	
34138A	Test lead set
Related Products	
M9018A	18 slot PXI chassis
M9021A	PCIe cable interface
M9101A	PXI high-density multiplexer, 64 ch, reed relays
M9120A	PXI matrix switch, 4 x 32, armature relays
M9182A	PXI multimeter, 6½ digit, high performance
M9183A	PXI multimeter, 6½ digit, enhanced performance

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Software

Software development platform	Visual Studio® (C, C++, C#, Visual Basic)® LabVIEW, MATLAB
Included GUI	Soft front panel
Application code examples	C/C++, C# Visual Basic

Soft Front Panel

The soft front panel provides easy to use instrument control. The M9181A graphical user interface guides developers through module setup so users can quickly configure the DMM. Use the soft front panel to perform yearly calibration, if desired.
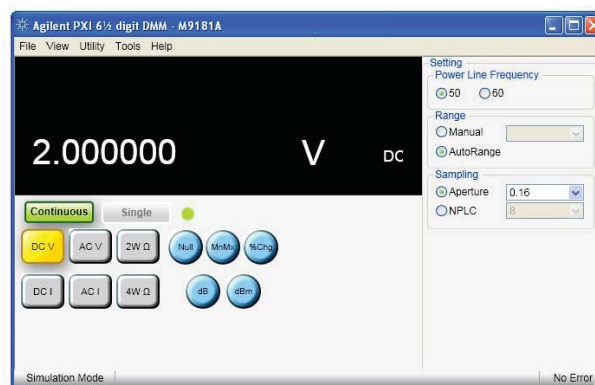
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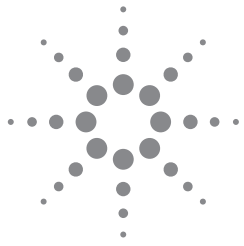
Agilent M9182A/M9183A High-Performance PXI DMMs

DISCOVER the Alternatives...

Industries and Applications

- Aerospace/defense
- Automotive
- Electronic test
- Medical
- Semiconductor

Product Description

Agilent's M9182A and M9183A 6½ digit high-performance PXI digital multimeters offer fast development, fast operation, and reliable results. The M9182A provides nine built-in measurement types with all the accuracy and stability you would expect from an Agilent 6½ digital multimeter (DMM). The M9183A provides the same capabilities as the M9182A plus market-leading measurement speed, additional ranges, and advanced triggering.

Models	
M9182A	PXI Digital Multimeter, 6½ Digit
M9183A	PXI Digital Multimeter, 6½ Digit, Enhanced Performance

Product features	Your benefits
Measurement speeds up to 15,000 readings/second; single reading interval time: 66 µs	Fast single reading test throughput saves functional test time, especially when taking several different measurements with the DMM
Basic DCV accuracy of 40 ppm	Measurements you can trust
Measurements: DCV, ACV, DCI, ACI, 2 & 4-wire Ω, frequency/period, temperature, capacitance	Reduces instrumentation and accessories required
Software drivers support the most common programming environments	Work in your environment of choice and reduce development time
Soft front panels and Agilent connection expert	Fast and easy installation and configuration

... Agilent MODULAR Products

Specifications and Characteristics

Hardware	M9182A	M9183A
Resolution	6½ digit	6½ digit
DCV basic 1-year accuracy	40 ppm	40 ppm
4½ digit rdg/s	4,500	15,000
Triggering	External, threshold level, pre- or post-	
Measurement ranges		
DCV, ACV	200 mV to 300 V	200 mV to 300 V
DCI	2 mA to 2 A	200 nA to 2 A
ACI	2 mA to 2 A	2 mA to 2 A
2 & 4-wire resistance	200 Ω to 20 MΩ	20 Ω to 200 MΩ
Frequency/period	1 Hz to 300 kHz	1 Hz to 300 kHz
Capacitance	1 nF to 10 mF	1 nF to 10 mF
Temperature	Thermocouple (B, E, J, K, N, R, S, T), RTD (6 types), Thermistor (2.25 kΩ, 5 kΩ, 10 kΩ)	

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Specifications and Characteristics

Hardware *continued*	M9182A	M9183A
Other measurements	n/a	Offset compensated ohms, pulse width & duty cycle, totalizer/ event counter
DC Source	n/a	± 10 V, ± 12 mA
Floating isolation (Cat-II)	300 Vrms	300 Vrms
Connector compatibility	cPCI, PXI-H, PXI-1	
Sensitivity		
Function	Lowest Range	Sensitivity
DCV	200.0000 mV	0.1 µV
ACV	200.0000 mV	0.1 µV
Resistance (M9183A)	20.00000 Ω	10 µΩ
Resistance (M9182A)	200.0000 Ω	100 µΩ
DCI (M9183A)	200.0000 nA	0.1 pA
DCI (M9182A)	2.000000 mA	10 nA
ACI	2.000000 mA	1 nA
Capacitance	1000.0 pF	0.1 pF
Resolution vs. aperture and reading rate for DCV, DCI, Ω		
Measurement aperture	Maximum readings per second	Resolution
10 ms	98	6½ digits (22 bits)
625 µs	1,200	5½ digits (18 bits)
130 µs	4,500	4½ digits (14 bits)
2.5 µs (M9183A only)	15,000	4½ digits (14 bits)

System requirements	
Operating systems	Microsoft Windows® XP, Microsoft Windows® Vista (32/64 bit), Microsoft Windows® 7 (32/64 bit)

Software	
Software development platform	Visual Studio® (VB.NET, C#, C/C++), LabVIEW, LabWindows/CVI, VEE, MATLAB
Included GUI	Soft front panel
Application code examples	C/C++®, Visual Basic®

Soft Front Panel

Agilent soft front panel provides easy to use instrument control. The M9182A and M9183A graphical user interface guides developers through module setup so users can quickly configure the DMM.
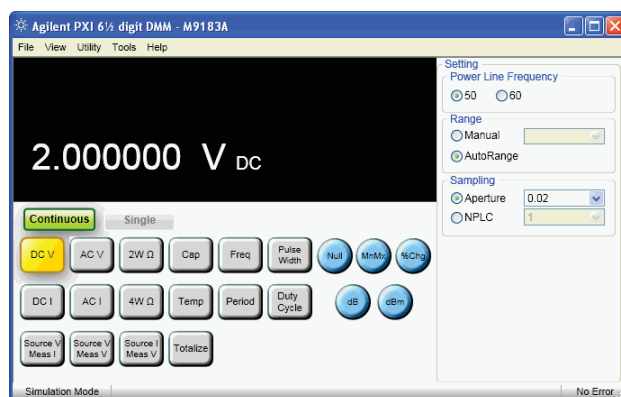
Ordering Information

Model	Description
M9182A	PXI Digital Multimeter-6½ Digit
M9183A	PXI Digital Multimeter-6½ Digit, Enhanced Performance

Accessories	
34138A	Test Lead Set

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PXI DIGITIZING SCOPES AND DIGITIZERS

Agilent offers a wide range of modular digitizers in PXI—including PXI-1, PXI-H and PXIe formats. Agilent digitizers are analog-to-digital converter versatile cards based on a modular architecture enabling an easy integration in customer application systems[1].

Agilent's portfolio of PXI high-speed digitizers are addressing test and measurement applications in industries as widespread as RF/uW, ultrasonics, biotechnology, semiconductors, aerospace and high energy physics. These digitizers are designed to provide very high-speed measurements on wideband signals while keeping high acquisition quality.

Product features and your benefits

Applications

- Multiple-channel scope-like high-speed measurements in Automated Test Systems

- Wideband and high-resolution signal measurements

Functionality

- Scope-like features such as AC/DC coupling and complex triggering

- On-board real-time signal processing

- Large on-board memory

- Various scope-like features (programmable full scale ranges, offsets, impedance, triggering functions, etc)

- Segmented acquisition

Performance characteristics

- Up to 3 GHz instantaneous analog bandwidth and 4 GS/s sampling rate

- 10 to 12-bit resolution

- Up to 500 MB/s data transfer speed

Agilent M9202A PXIe IF Digitizer.

Agilent MD1 soft front panel

High-speed digitizers are also available in other form factors such AXIe, PCI, PCIe, cPCI and VME.

For further information on these products, visit www.agilent.com/find/embedded-digitizers

www.agilent.com/find/pxi-digitizers

PXI DIGITIZING SCOPES AND DIGITIZERS

Digitizing Scopes[1]								
	Description	Type # of slots	Resolution	Number of channels	Max. sample rate	Bandwidth	Memory depth	On-board processing
M9210A	Digitizing scope	PXI-H 1-slot	10-bit	2	2 to 4 GS/s	1.4 GHz	512 MS	N/A
N2100B	10.3125 Gb/s digital communication analyzer	PXI-H 4-slots	12-bit	1 optical, 1 electrical	160 MS/s	12 GHz (electrical), 7.5 GHz (optical, unfiltered)	1 MS	N/A

IF Digitizer[1]								
	Description	Type # of slots	Resolution	Number of channels	Max. sample rate	Bandwidth	Memory depth	On-board processing
M9202A	Digitizer	PXIe 1-slot	12-bit	1	2 GS/s	1 GHz	256 MS	DDC, Virtex-6 FPGA
M9211A	Digitizer	PXI-H 1-slot	10-bit	1	4 GS/s	3 GHz	512 MS	N/A

1. High-speed digitizers are also available in other form factors such PCI, PCIe, cPCI and VME. For further information on these products, visit: www.agilent.com/find/embedded-digitizers.

www.agilent.com/find/pxi-digitizers

Agilent M9202A PXI Express 12-bit Wideband IF Digitizer

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Wireless communications
- Radar and wideband signal capture

Product Description

The M9202A is a single-slot 3U PXIe Wideband IF Digitizer running at 2 GS/s, with up to 1 GHz instantaneous analog bandwidth and utilizing a large DDR3 memory. The M9202A features a Xilinx Virtex-6 FPGA that can implement different functionalities depending on which firmware option you choose. The BAS option provides basic digitizer functionality (signal capture, storing of data, transfer of data, etc), whereas the DDC option, in addition to basic digitizer functionality, implements a real-time digital down-conversion (DDC) algorithm in the 300 MHz to 700 MHz band, enabling improved analog performance and reducing data upload time. Thanks to its PXI Express backplane connection, the M9202A supports continuous data streaming to disk.

... Agilent **MODULAR** Products

Models	
M9202A	PXIe IF Digitizer 12-bit, 1 GHz

Main Features and Benefits

Product features	Your benefit
2 GS/s sampling rate	Fastest 12-bit PXIe Digitizer
Up to 1 GHz bandwidth	Able to capture wide bandwidth signals
512 MB DDR3 memory	Large on-board memory
Real-time digital down-conversion (DDC) algorithm	Data decimation, analog performance improvement
On-board Xilinx Virtex-6 FPGA	On-board processing capability
Software support for easy integration	Reduced development time
PXIe backplane	Fastest digitized data upload, continuous data steaming

Chassis slot compatibility: PXIe Hybrid, PXIe

Specifications and Characteristics

Hardware	
Size	1 slot 3U
Resolution	12 bits
Sample rate	2 GS/s
Bandwidth	30 MHz *(nominal)* to 1 GHz
Streamed analog bandwidth	up to 50 MHz, or up to 100 MHz
Impedance	50 Ω *(nominal)*
Coupling	AC
Full scale (FS) range	+4 dBm (1 V pk-pk in 50 Ω)
Spurious-free dynamic range (SFDR)	60 dBc *(typical)* in basic digitizer mode 84 dBc *(typical)* after digital down-conversion (with DDC option)[1]
Effective number of bits (ENOB)	9 bits *(typical)*
Sample clock sources	Internal (with internal or external 100 MHz ref) or external

1. *Depends on DDC settings*

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Software

The M9202A, as all Agilent high-speed digitizers, includes the Agilent MD1 soft front panel (SFP) graphical interface. This simple software application can be used to control, verify the functionality and explore the capabilities of your high-speed digitizers.

The MD1 SFP contains two main windows, a control window and a display window. The control window, which may be set in either Oscilloscope mode or in Transient Recorder mode, and contains functions that allow you to manipulate the acquisition parameters of the card. The display window shows the full acquisition in the top window, and the lower window may be configured to show either a zoom on part of the waveform or the FFT of the acquired data. In addition, the Agilent MD1 SFP implements several different display settings and standard pre-configured measurements, like standard deviation, peak-peak/RMS value, overshoot, etc.

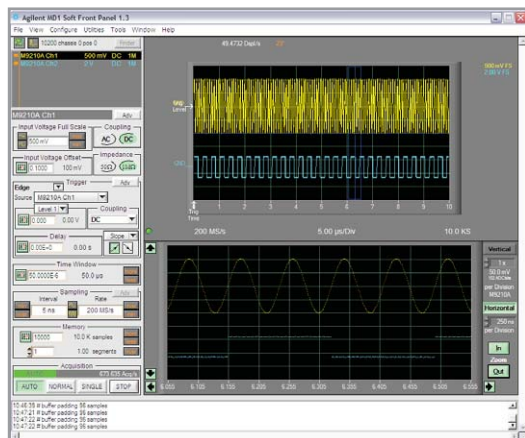|	
Software operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. The Agilent MD1 soft front panel software has two main windows, the acquisition parameters to control the module and the acquired waveform display.

Figure 2. Simplified block diagram of the M9202A PXIe IF Digitizer.

Ordering Information

Typical Product Configuration

Model	Description
M9202A	PXIe IF Digitizer: 12-bit, 1 GHz
M9202A-C01[1]	Single channel
M9202A-F02[1]	Frequency range: 2 GS/s
M9202A-M05[1]	Standard memory: 512 MB
M9202A-BAS[1]	Basic Digitizer firmware

1. These options represent the typical product configuration for the M9202A as a standalone digitizer. For other options and a complete product configuration description, please refer to the data sheet.

Related products

M9302A	PXI Local Oscillator: 3 GHz to 10 GHz
M9351A	PXI Downconverter: 50 MHz to 2.9 GHz
M9361A	PXI Downconverter: 2.75 GHz to 26.5 GHz
M9360A	PXI Attenuator/Preselector: 100 kHz to 26.5 GHz
M9392A	PXI Vector Signal Analyzer
M9211A	PXI-H UWB IF Digitizer: 10-bit, 4 GS/s, 3 GHz
M9018A	18-slot PXIe Chassis
M9021A	PCIe Cable Interface
89601B	89600 VSA Software, transportable license

Accessories

Software and product information on CD *(included)*

Cables *(included)*

Advantage Services: Calibration and Warranty

Agilent Advantage Services is committed to your success throughout your equipment's lifetime.

M9202A-UK6	Commercial calibration certificate with test data
R-51B-001-3C	1 year return-to-Agilent warranty extended to 3 years
R-51B-001-5C	1 year return-to-Agilent warranty extended to 5 years

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5990-6302EN

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Agilent M9210A PXI-H 10-bit Digitizing Scope

DISCOVER the Alternatives...

Industries and Applications

- Aerospace/defense
- Wireless communication
- UWB applications (e.g. radar)
- Semiconductor testing

Product Description

The M9210A is a single-slot 3U PXI-Hybrid high-speed Digitizing Scope featuring 2 channels with 1.4 GHz/300 MHz (50 Ω/1 MΩ input) analog bandwidth and up to 4 GS/s real-time sampling rate. The M9210A Digitizing Scope comes with on-board memory of up to 512 MSamples. Making it the best alternative to the Agilent VXI E1428.

Models	
M9210A	PXI-H high-speed Digitizing Scope 10-bit, 2-4 GS/s

Main Features and Benefits

Product features	Your benefit
10-bit resolution	Best accuracy measurements
Up to 2-4 GS/s real-time sampling rate	Fastest digitizing scope
> 1.4 GHz bandwidth in 50 Ω > 300 MHz bandwidth in 1 MΩ	Measure the fastest signals
Selectable 50 Ω/1 MΩ input	Scope-like input feature
256 MSamples/channel memory	Large on-board memory
Auto-synchronous bus system with picoseconds-level accuracy	Multi-module synchronization
Software support for easy integration	Reduced development time

Chassis slot compatibility: cPCI(J1/J2), PXI-1, PXIe Hybrid

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Specifications and Characteristics

Hardware	
Size	1 slot 3U
Resolution	10 bits
Sample rate	10 MS/s to 2 GS/s (4 GS/s interleaving)
Bandwidth	50 Ω : DC to 1.5 GHz (typical) 1 MΩ: DC to 300 MHz (typical)
Impedance	Selectable 50 Ω/1 MΩ (nominal)
Coupling	Selectable AC/DC
Full scale (FS) range	0.05, 0.1, 0.2, 0.5, 1, 2, 5 V peak-peak in 50 Ω 0.5, 1, 2, 5, 10, 20, 50 V peak-peak in 1 MΩ
Offset range	± 2 V for ≤ 500 mV full scale ranges 50 Ω: ± 5 V for 1 to 5 V full scale ranges 1 MΩ: ± 20 V for 1 to 5 V full scale ranges 1 MΩ: ± 200 V for 10 to 50 V full scale ranges
DC accuracy	± 2.5% FS in 50 mV full scale range ± 2% FS in full scale ranges ≥ 100 mV
Effective Number Of Bits (ENOB)	7.2 in 50 Ω (typical) 7.0 in 1 MΩ (typical)
Sample clock sources	Internal (with internal or external 10 MHz ref) or external

Agilent Technologies

Software

The M9210A, as all Agilent high-speed digitizers, includes the Agilent MD1 soft front panel (SFP) graphical interface. This simple software application can be used to control, verify the functionality and explore the capabilities of your high-speed digitizers.

The MD1 SFP contains two main windows, a control window and a display window. The control window, which may be set in either Oscilloscope mode or in Transient Recorder mode, and contains functions that allow you to manipulate the acquisition parameters of the card. The display window shows the full acquisition in the top window, and the lower window may be configured to show either a zoom on part of the waveform or the FFT of the acquired data. In addition, the Agilent MD1 SFP implements several different display settings and standard pre-configured measurements, like standard deviation, peak-peak/RMS value, overshoot, etc.

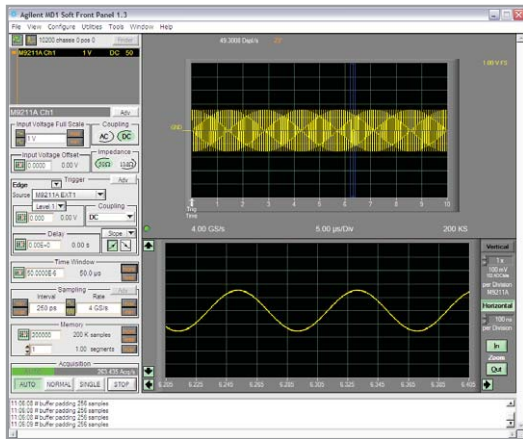| Software operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. The Agilent MD1 soft front panel software has two main windows, the acquisition parameters to control the module and the acquired waveform display.
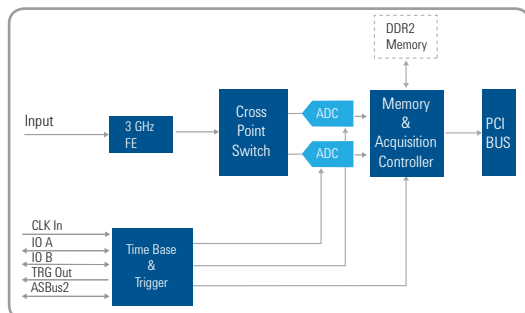

Figure 2. Simplified block diagram of the M9210A PXI-H Digitizing Scope.

Ordering Information

Typical Product Configuration

Model	Description
M9210A	PXI-H high-speed Digitizing Scope: 10-bit, 2-4 GS/s
M9210A-M06[1]	Memory: 64 Msample acquisition

1. For other options and a complete product configuration description, please refer to the data sheet.

Related products

M9211A	PXI-H UWB IF Digitizer: 10-bit, 4 GS/s, 3 GHz
M9362A-D01	PXIe Microwave Quad Downconverter: 10 MHz to 26.5 GHz
M9018A	18-slot PXIe Chassis
M9021A	PCIe Cable Interface

Accessories

M9210A-CD1	Software and product information on CD
U1093A-AS5	AS bus 2 connector

Advantage Services: Calibration and Warranty

Agilent Advantage Services is committed to your success throughout your equipment's lifetime.

M9210A-UK6	Calibration certificate and cal data
R-51B-001-3C	Return-to-Agilent warranty - 3 years
R-51B-001-5C	Return-to-Agilent warranty - 5 years

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10

Agilent M9211A PXI-H 10-bit UWB IF Digitizer

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Wireless communications
- Radar and wideband signal capture

Product Description

The M9211A is a single-slot 3U PXI-Hybrid single-channel ultra-wideband IF Digitizer able to capture signals of up to 3 GHz and running at up to 4 GS/s. The M9211A comes with on-board memory of up to 512 MSamples.

Models	
M9211A	PXI-H high-speed UWB IF Digitizer 10-bit, 4 GS/s, 3 GHz

... Agilent **MODULAR** Products

Main Features and Benefits

Product features	Your benefit
Up to 4 GS/s real-time sampling rate	Fastest IF Digitizer
3 GHz analog bandwidth	Measure the fastest signals
512 MSamples memory	Large on-board memory
Auto-synchronous bus system with picoseconds-level accuracy	Multi-module synchronization
Software support for easy integration	Reduced development time

Chassis slot compatibility: cPCI(J1/J2), PXI-1, PXIe Hybrid

Specifications and Characteristics

Hardware	
Size	1 slot 3U
Resolution	10 bits
Sample rate	10 MS/s to 4 GS/s
Bandwidth	> 3 GHz
Impedance	50 Ω *(nominal)*
Coupling	DC
Full scale (FS) range	+4 dBm (1 V pk-pk in 50 Ω)
Spurious-Free Dynamic Range (SFDR)	53 dB
Sample clock sources	Internal (with internal or external 10 MHz ref) or external

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Software

The M9211A, as all Agilent high-speed digitizers, includes the Agilent MD1 soft front panel (SFP) graphical interface. This simple software application can be used to control, verify the functionality and explore the capabilities of your high-speed digitizers.

The MD1 SFP contains two main windows, a control window and a display window. The control window, which may be set in Oscilloscope Mode or in Transient Recorder Mode, and contains functions that allow you to manipulate the acquisition parameters of the card. The display window shows the full acquisition in the top window, and the lower window may be configured to show either a zoom on part of the waveform or the FFT of the acquired data. In addition, the Agilent MD1 SFP implements several different display settings and standard pre-configured measurements, like standard deviation, peak-peak/RMS value, overshoot, etc.

Software operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

10

Figure 1. The Agilent MD1 soft front panel software has two main windows, the acquisition parameters to control the module and the acquired waveform display.

Figure 2. Simplifed block diagram of the M9211A PXI-H UWB Digitizer.

74

Ordering Information

Typical Product Configuration

Model	Description
M9211A	PXI-H high-speed UWB IF Digitizer: 10-bit, 4 GS/s, 3 GHz
M9211A-M51[1]	Memory, 512 Msample acquisition

1. For other options and a complete product configuration description, please refer to the data sheet.

Related products

M9302A	PXI Local Oscillator: 3 GHz to 10 GHz
M9361A	PXI Downconverter: 2.75 GHz to 26.5 GHz
M9360A	PXI Attenuator/Preselector: 100 kHz to 26.5 GHz
M9202A	PXIe IF Digitizer: 12-bit, 1 GHz
M9210A	PXI-H Digitizing Scope: 10-bit, 2-4 GS/s
M9018A	18-slot PXIe Chassis
M9021A	PCIe Cable Interface

Accessories

M9202A-CD1	Software and product information on CD
U1093A-AS5	AS bus 2 connector

Advantage Services: Calibration and Warranty

Agilent Advantage Services is committed to your success throughout your equipment's lifetime.

M9210A-UK6	Calibration certificate and cal data
R-51B-001-3C	1 year return-to-Agilent warranty extended to 3 years
R-51B-001-5C	1 year return-to-Agilent warranty extended to 5 years

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PXI DIGITAL TO ANALOG CONVERTERS

Agilent's PXI digital to analog converters and V/I sources are capable of supplying high and low voltages levels as well as source currents on one or multiple channels.

Equipped with the ability of supplying a wide range of voltage and current levels, the modules suit perfectly for the automotive industry where high input voltage or current ranges comes as a very common requirement for functional testing.
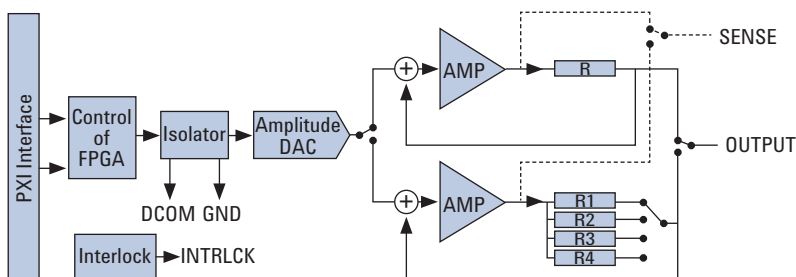
Product Features and your Benefits

- Supply high-voltage levels in parallel of up to 16 channels

- Large voltage current range

- SENSE input for guaranteed accuracy

- High-voltage device protection

86 PXI Isolated Single Channel Voltage/Current Source

Agilent M9185 PXI 8/16-Channel Isolated D/A Converter

M9186A system connections with SENSE input

PXI DIGITAL TO ANALOG CONVERTERS

Applications

- I/O pin parametric leakage
- Bias current
- Impedance
- Threshold and clamp voltage

V/I Source							
	Description	Type # of slots	Channels/ crosspoints	Scan channel/ second	Max voltage	Max current	Frequency range
M9185A	D/A converter	PXI 2-slot (8 channel) PXI 3-slot (16 channel)	8 or 16 channels	N/A	16 V	20 mA	N/A
M9186A	V/I source	PXI 2-slots	1	N/A	100 V at 20 mA 16 V at 200 mA	200 mA	N/A

www.agilent.com/find/pxi-converters

Agilent M9185A
PXI 8/16-Channel Isolated D/A Converter

DISCOVER the Alternatives...

Industries and Applications

- Automotive
- Electronic test

Product Description

The M9185A is a fully independent, isolated digital/analog converter (D/A converter) that is capable of supplying high voltage levels in parallel of up to eight or 16 channels. Each channel is able to output up to 16 V as stimulus signals to device under tests (DUTs). The M9185A comes with two options of eight or 16 channels where the eight channel option is a two-slot PXI module while the 16-channel option is a three-slot PXI module.

The M9185A D/A converter also comes with a built-in SENSE mechanism, which is able to detect the output voltage levels and feedback the information to the circuitry of the converter to compensate for the voltage drop at the receiving end of a DUT. This feature is ideal to ensure the accuracy of the stimulus signals being provided to the DUT for better test performance.

The M9185A D/A converter is capable of supplying high voltage levels of up to ±16 V, which is essential for the automotive industry since automotive applications require operating voltages between 12 V to 14 V. Together with the SENSE mechanism, the M9185A is an ideal module for automotive applications where signal accuracy is of high importance.

Model	
M9185A	8/16-channel D/A converter

Main Features and Benefits

Product features	Your benefit
High output voltage levels	Provides higher voltage levels as stimulus without the need for a pull up circuit
Built-in SENSE mechanism	Enables an auto feedback feature to the DAC compensation circuitry for voltage output adjustments to guarantee better accuracy

Chassis slot compatibility: cPCI (J1, J2), PXI-1, PXIe Hybrid

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Specifications

Hardware		
Size	2-slot for 8-channel, 3-slot for 16-channel, 3 U	
DC Voltage	Range:	±16 V up to 10 mA
	Resolution:	16-bit = 500 µV
	Accuracy:	± (0.05% + 3.0 mV)
DC Current	Range:	±20 mA
	Resolution:	16-bit = 630 nA
	Accuracy:	± (0.09% + 5.0 µA)
Temperature range	Operating:	0° C to 55° C
	Storage:	–40° C to 70° C
Relative humidity	80%, 0° C to 40° C (non condensing)	
Physical characteristics	Dimensions:	

Dimensions:

8-channel, 2-slot: 40.30 mm x 128.40 mm x 215.00 mm (1.59 in x 5.06 in x 8.46 in)

16-channel, 3-slot: 60.50 mm x 128.40 mm x 215.00 mm (2.38 in x 5.06 in x 8.46 in)

Weight: 8-channel: 0.47 kg (1.04 lb)
16-channel: 0.6 kg (1.32 lb)

Output connector: Stacked VHDCI receptacle

11

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Software

Software	
Supported operating systems	Windows® XP (32-bit) Windows Vista® (32-bit/64-bit) Windows 7 (32-bit/64-bit)
Included device drivers	IVI-COM, IVI-C, LabVIEW G
Included GUI	Soft front panel

Software Applications

The M9185A isolated D/A converter module is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice. Support includes Microsoft® development environments like C/C++, C#,. or VB.NET, LabVIEW and LabWindows/CVI software platforms from National Instruments as well as MATLAB from The MathWorks.

To help you get started and complete complex tasks quickly, the module software support provides context-sensitive help, complete documentation and code examples that allow a quick module set up and basic acquisition functionalities. These code examples can be easily modified, so that the card can be quickly integrated into a measurement system. In addition, the M9185A includes a soft front panel graphical interface. This simple software application can be used to control, verify the functionality and explore the capabilities of the M9185A PXI module.

Ordering Information

Typical Product Configuration

Model	Description
M9185A	M9185A PXI D/A converter, 8/16-channel, 16-bit, ±16 V

Options	Description
M9185A-001	8-channel configuration for M9185A
M9185A-002	16-channel configuration for M9185A

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5990-7723EN

Agilent Technologies

M9186A
PXI Isolated Single Channel Voltage/Current Source

DISCOVER the Alternatives ...

Industries and Applications

- Automotive
- Electronic test

Product Description

The M9186A is a two-slot, PXI based V/I source module that enables the sourcing of a voltage or a current to perform measurements on the resultant current or voltage through another module. It consists of two separate amplifiers, denoted "low" and "high" that share a common output connection. The "low" amplifier provides voltages in the range of 16 V at up to 200 mA and the "high" amplifier provides voltages in the range of 100 V at up to 20 mA.

Typical applications for the low-voltage amplifier include I/O pin parametric leakage, bias current, impedance, threshold and clamp voltage. The high voltage amplifier can be applied to help verify the presence of clamp diodes as the outputs of modules that drive inductive loads. Both amplifiers can sense the amount of current flowing while forcing a constant voltage.

A unique feature is the safety interlock for high-voltage amplifiers that automatically disables the high-voltage amplifier and opens all relays when the interlock circuit is broken, providing protection to the device under test during the presence of high voltages.

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Models

M9186A	Isolated single channel V/I source

Main Features and Benefits

Product features	Your Benefit
Large voltage-current range 16 V at 200 mA to 100 V at 20 mA	Enables device under test characterization required in parametric testing of device under test I/O pin
SENSE input	Enables accurate power source supply to device under test
Safety interlock	Protects the device under test from damage due to high voltages

Chassis slot compatibility: cPCI (J1, J2), PXI-1, PXIe Hybrid

Specifications and Characteristics

Hardware

Size	2 slots, 3 U
Resolution	16 bit
Accuracy	±16 V up to 200 mA: 0.02 % + 3 mV
	−10 to + 100 V at up to 20 mA: 0.02 % + 40 mV

Voltage Source Accuracy (% of output + offset)

16 V Range	Up to 200 mA: 0.02 % + 3 mV
	Current Sense using the SENSE pin with respect to OUTPUT:
	200 mA range: 1.5 % + 500 µA 20 mA range: 0.5 % +50 µA 2 mA range: 0.5 % + 10 µA 200 µA range: 0.3 % + 5 µA
−10 to + 100 Range	Up to 20 mA: 0.02 % + 20 mV
	Current Sense using the SENSE pin with respect to OUTPUT: 0.75 % + 300 µA

Current Source Accuracy (% of output + offset)

± 200 mA Range	0.3 % + 500 µA (Over ± 16 V)
± 20 mA Range	0.1 % + 50 µA
± 2 mA Range	0.3 % + 5 µA
± 200 µA Range	0.1 % + 0.5 µA
± 20 mA Range	0.2 % + 200 µA (Over −10 to +100 Vdc)

11

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Software

The M9186A single channel V/I source module is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice. Support includes Microsoft® development environments like C/C++, C#, or VB.NET, LabVIEW and LabWindows/CVI software platforms from National Instruments as well as MATLAB from The MathWorks.

To help you get started and complete complex tasks quickly, the module software support provides context sensitive help, complete documentation and code examples that allow a quick module set up and basic acquisition functionalities. These code examples can be easily modified, so that the card can be quickly integrated into a measurement system. In addition, the M9186A includes a soft front panel graphical interface. This simple software application can be used to control, verify the functionality and explore the capabilities of the Agilent V/I source module.

Supported operating systems	Windows® XP (32-bit) Windows Vista® (32-bit/64-bit) Windows 7 (32-bit/64-bit)
Included device drivers	IVI-COM, IVI-C, LabVIEW G
Included GUI	Soft front panel
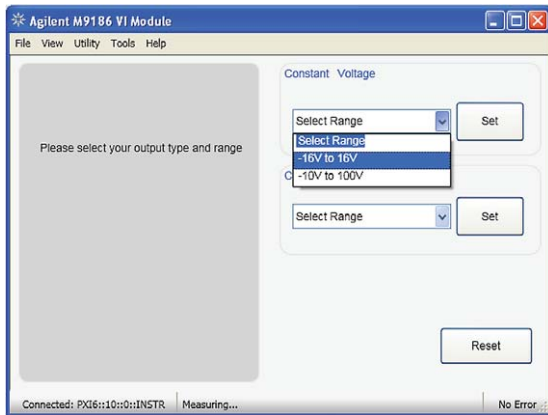
Figure 1. Module configuration - Constant Voltage
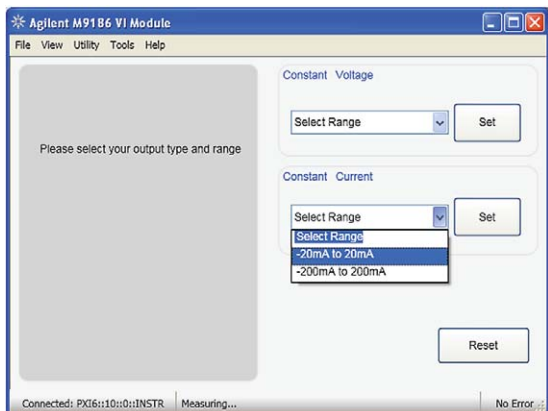
Figure 2. Module configuration - Constant Current

Ordering Information

Model	Description
M9186A	M9186A PXI isolated single channel voltage/current source, 100 V

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Agilent Technologies

PXI FUNCTION AND ARBITRARY WAVEFORM GENERATORS

Agilent's modular arbitrary waveform generators deliver unprecedented performance for creation of complex wideband waveforms. High sampling rate and high bit resolution provided in a single instrument enable designers to create ideal waveforms for accurate test of radar, satellite and frequency agile systems. Providing up to 500 MHz of modulation bandwidths and over 65 dBc of spurious free dynamic range, modular arbitrary waveform generators can be combined with a wideband I/Q upconverter to achieve modulation bandwidth of 1 GHz at microwave frequencies for authentic signal simulations for IF and RF subsystem test.

Product Features and your Benefits

Applications

- High resolution with wide bandwidth
- DDS and Dynamic sequencing options

Functionality

- Very high signal quality arbitrary waveform generator
- Wide bandwidth

Performance characteristics

- 10- or 15-bit resolution
- 1.25 GS/s sampling rate for 500 MHz of bandwidth per channel
- Advanced sequencing engine

Agilent M9331A Arbitrary Waveform Generator 10-bit 1.25 GS/s
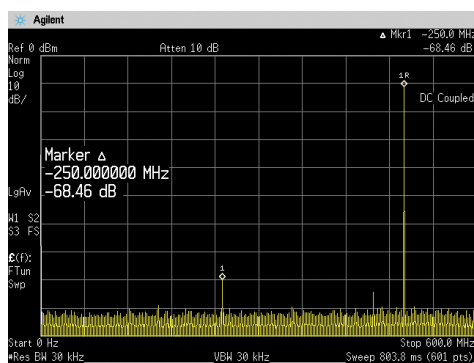
Agilent M9331A soft front panel

www.agilent.com/find/pxi-awg

FUNCTION AND ARBITRARY WAVEFORM GENERATORS

Function and Arbitrary Waveform Generators								
	Description	Type # of slots	Resolution	Number of channels	Bandwidth per channel	Modulation bandwidth	Sampling rate	Memory depth
M9330A	Arbitrary waveform generator	PXI-H 4-slots	15-bit	2 ch	500 MHz	1 GHz	1.25 GS/s	16 MS
M9331A	Arbitrary waveform generator	PXI-H 4-slots	10-bit	2 ch	500 MHz	1 GHz	1.25 GS/s	16 MS

www.agilent.com/find/pxi-awg

Agilent M9330A PXI-H Arbitrary Waveform Generator

DISCOVER the Alternatives…

Industries and Applications

- Aerospace Defense T&M
- Wireless T&M
- Radar test
- Satellite test
- Semiconductor testing

Product Description

The M9330A is a high resolution, wide-bandwidth arbitrary waveform generator (AWG) capable of creating the most realistic waveforms for radar, satellite, and frequency agile communication systems, thanks to its 15-bit vertical resolution and 1.25 GS/s sampling rate.

Models	
M9330A	15-bit, 1.25 GS/s arbitrary waveform generator

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Main Features and Benefits

Product features	Your benefit
1.25 GS/s and 15 bits of vertical resolution per channel	Provides exceptionally realistic wideband waveforms
Dual output channels	Can generate the I and Q components for wideband signal modulation
Extended waveform memory and advanced sequencing engine	Offers long scenario simulations
Multiple module synchronization	Provides multi-emitter simulations
Multiple programmatic interfaces	Enable easy integration into existing test environments

Chassis slot compatibility: cPCI(J1/J2), PXI-1, PXIe Hybrid

Specifications and Characteristics

Hardware	
Size	4 slots, 3U
Resolution	15 bits
Maximum sample rate	1.25 GS/s
Bandwidth	500 MHz per channel, 1 GHz modulated *(nominal)*
Impedance	50 Ω *(nominal)*
Output spectral purity	Harmonic distortion −65 dBc for DC to 500 MHz *(nominal)* Non-harmonic spurious −75 dBc for 1 kHz to 500 MHz *(nominal)*
Phase noise	1 kHz: −95 dBc/Hz *(nominal)* 10 kHz: −115 dBc/Hz *(nominal)* 100 kHz: −138 dBc/Hz *(nominal)* 1 MHz: −150 dBc/Hz *(nominal)*
Noise floor	−150 dBc/Hz *(nominal)*
Sample clock	Internal or external

12

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Software

The M9330A Arbitrary Waveform Generator is supplied with a comprehensive portfolio of module drivers, documentation, examples, and a Soft Front Panel (SFP) graphical user interface to help you quickly develop test systems with your software platform of choice. The SFP graphical interface, named M933x Control Utility, guides developers through module setup and waveform file transfers. Users can quickly configure the instrument's signal conditioning paths, marker and trigger lines, sample and reference clock sources, and simple sequencing functions. More sophisticated sequencing functions are available through the instrument's numerous programmatic interfaces.

Software operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

12

Figure 1. The Agilent M933x Control Utility soft front panel software.

Figure 2. Excellent harmonic and spurious performance are available across the full bandwidth of each channel.

Ordering Information

Typical Product Configuration

Model	Description
M9330A	PXI-H arbitrary waveform generator: 1.25 GS/s, 15-bit
M9330A-M08[1]	Memory: 8 MS per channel
M9330A-125[1]	Clock operation, 1.25 GS/s
M9330A-200[1]	Arbitrary waveform generator software

1. These options show a typical M9330A product configuration. For other available options, please refer to the brochure.

Related products

E8267D	PSG vector signal generator
M9331A	PXI-H Arbitrary Waveform Generator: 10-bit, 1.25 GS/s
M9392A	PXI Vector Signal Analyzer
M9202A	PXIe IF Digitizer: 12-bit, 2 GS/s, 1 GHz
M9018A	18-slot PXIe Chassis
M9021A	PCIe Cable Interface
N7509A	Waveform Generation Toolbox for Wideband Signal Simulation
N7619A	Signal Studio for Multiband OFDM UWB
N7620A	Signal Studio for Pulse Building

Accessories

Y1176A	Kit to synchronize two M933XA series AWG

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Agilent M9331A PXI-H Arbitrary Waveform Generator

DISCOVER the Alternatives…

Industries and Applications

- Telecommunication
- T&M ATE
- Aerospace Defense T&M
- Semiconductor testing

Product Description

The M9331A is a wide-bandwidth arbitrary waveform generator (AWG) capable of creating the ideal waveforms for compliance testing of digital radios targeted for use with communication standards such as MB-OFDM ultra wideband, 802.11n, MIMO, and proprietary wideband formats.

Models	
M9331A	10-bit, 1.25 GS/s arbitrary waveform generator

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Main Features and Benefits

Product features	Your benefit
1.25 GS/s and 10 bits of vertical resolution per channel	Provides wideband waveforms with high signal quality
Dual output channels	Can generate the I and Q components for wideband signal modulation
Extended memory and advanced sequencing engine	Allows for extended simulations of complex waveform propagation models
Multiple module synchronization	Provides multi-emitter simulations suitable for MIMO applications
Multiple programmatic interfaces	Enable easy integration into existing test environments

Chassis slot compatibility: cPCI(J1/J2), PXI-1, PXIe Hybrid

Specifications and Characteristics

Hardware	
Size	4 slots, 3U
Resolution	10 bits
Maximum sample rate	1.25 GS/s
Bandwidth	500 MHz per channel, 1 GHz modulated *(nominal)*
Impedance	50 Ω *(nominal)*
Output spectral purity	Harmonic distortion −50 dBc for DC to 500 MHz *(nominal)* Non-harmonic spurious −75 dBc for 1 kHz to 500 MHz *(nominal)*
Phase noise	1 kHz: −95 dBc/Hz *(nominal)* 10 kHz: −115 dBc/Hz *(nominal)* 100 kHz: −138 dBc/Hz *(nominal)* 1 MHz: −150 dBc/Hz *(nominal)*
Noise floor	−150 dBc/Hz *(nominal)*
Sample clock	Internal or external

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Software

The M9331A Arbitrary Waveform Generator is supplied with a comprehensive portfolio of module drivers, documentation, examples, and a Soft Front Panel (SFP) graphical user interface to help you quickly develop test systems with your software platform of choice. The SFP graphical interface, named M933x Control Utility, guides developers through module setup and waveform file transfers. Users can quickly configure the instrument's signal conditioning paths, marker and trigger lines, sample and reference clock sources, and simple sequencing functions. More sophisticated sequencing functions are available through the instrument's numerous programmatic interfaces.

Software operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. The Agilent M933x Control Utility soft front panel software.

Figure 2. Excellent harmonic and spurious performance are available across the full bandwidth of each channel.

Ordering Information

Typical Product Configuration

Model	Description
M9331A	PXI-H arbitrary waveform generator: 1.25 GS/s, 10-bit
M9331A-M08[1]	Memory: 8 MS per channel
M9331A-125[1]	Clock operation, 1.25 GS/s
M9331A-200[1]	Arbitrary waveform generator software

1. These options show a typical M9331A product configuration. For other available options, please refer to the brochure.

Related products

E8267D	PSG vector signal generator
M9330A	PXI-H Arbitrary Waveform Generator: 15-bit, 1.25 GS/s
M9392A	PXI Vector Signal Analyzer
M9202A	PXIe IF Digitizer: 12-bit, 2 GS/s, 1 GHz
M9018A	18-slot PXIe Chassis
M9021A	PCIe Cable Interface
N7509A	Waveform Generation Toolbox for Wideband Signal Simulation
N7619A	Signal Studio for Multiband OFDM UWB
N7620A	Signal Studio for Pulse Building

Accessories

Y1176A	Kit to synchronize two M933XA series AWG

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PXI PULSE PATTERN GENERATORS

For transceiver and telecommunication equipment test, Agilent Technologies offers a PXI Pulse Pattern Generator instrument capable of generating a number of low jitter patterns at rates up to 10.3125 Gb/s. The N2102B PXIT Pattern Generator is a 2-slot module that can be combined with the N2100B Digital Communication Analyzer module, the N2101B Bit Error Ratio Tester module and the N2099A synthesizer to build a complete Bit Error Rate Tester system to characterize the quality of devices at 12 standard internal rates from 155 Mb/s to 8.5 Gb/s.

Product features

- PRBS Generations 2n -1, (N=7, 9, 15, 23, 31) PAT, user loadable 2 Kbits

- Single error and error rate injection

- Differential data output

- SMA trigger output (clock / 128, pattern, user defined burst enable)

- SMA clock input and output
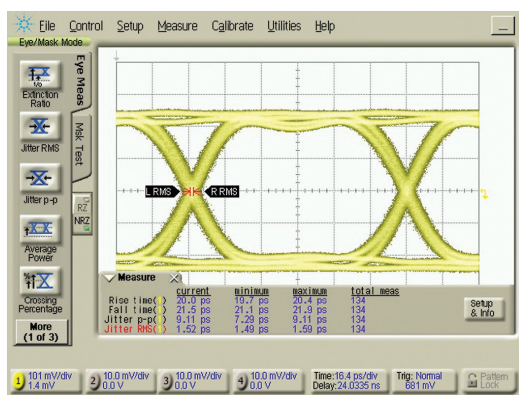
Agilent N2102B PXIT Bert pattern generator

www.agilent.com/find/modular-pulse-pattern

PXI PULSE PATTERN GENERATORS

Pattern Generator								
	Description	Type # of slots	Bit rate range	PRBS patterns	Data patterns	Output voltage range	Outputs	Clock input voltage range
N2102B	Pattern generator	PXI-H 2-slots	622 Mb/s to 10.3125 Gb/s	$2^n - 1$, n = 7, 9, 11, 15, 23, 31	K28.5, K28.7, CRPAT, user-loadable 2 kbits	250 mV to 1 V pp	1 x differential ports	500 mV to 1 V pp

www.agilent.com/find/modular-pulse-pattern

Agilent N2102B Pattern Generator

DISCOVER the Alternatives...

Industries and Applications

- Transceiver Test
- Telecommunication Equipment Test
- Fibre Channel, Ethernet, PON, Parallel Optics
- Multi-port system testing
- High port count burn-in test

Product Description

The N2102B PXI Pattern Generator is capable of generating a number of low jitter patterns at rates up to 10.3125 Gb/s using an externally supplied clock. ActiveX Controls allow for easy software development and a graphical user interface is provided for manual operation of the module.

Models	
N2102B	PXI Pattern Generator Module
N2102B-300	622 Mb/s to 10.3125 Gb/s

... Agilent MODULAR Products

Main Features and Benefits

Product features	Your benefit
PRBS generations $2^n - 1$, (n = 7, 9, 11, 15, 23, 31); user defined patterns with 2048 bits max. length or 16 Kbytes if pattern length is dividable by 64	Flexible, custom pattern generation
2-slot PXI module	Minimum rack space
Clock input	Driven by the N2101B's clock output, the N2102B serves as a detached stimulus for the BERT

Specifications and Characteristics

Hardware	
Size	2-slot module
Bit rate operation	622 Mb/s to 10.3125 Gb/s
Output rise/fall time (20% - 80%)	25 ps (max), 22 ps (characteristic)
Output intrinsic jitter	2.5 ps RMS (max), 1.5 ps RMS (characteristic)
Output voltage range	250 mV to 1 V pp
Output voltage resolution	5 mV
Pattern trigger/clock output voltage	1 V pp (characteristic)
Clock input voltage range	500 mV to 1 V pp (characteristic)

13

Connector compatibility: cPCI, PXI-H, PXI-1

Agilent Technologies

Software

The N2102B Pattern Generator and its accompanying software fully comply with PXI specifications. The included Windows application enables the user to control the instrument without any software development required. An ActiveX Control makes integration into custom applications easy.

Software operating systems	Microsoft Windows® XP (32-bit) Windows 7 (32-bit, 64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. User Friendly Configuration Screen.

Figure 2. The N2102B eye output at 10.3125 Gb/s viewed on the DCA-J.

Ordering Information

Typical Product Configuration

Model	Description
N2102B	PXI Pattern Generator
N2102B-300	622 Mb/s to 10.3125 Gb/s

Related products

N2100B	PXI Digital Communication Analyzer
N2101B	10.3125 Gb/s Bit Error Ratio Tester
N2099A	PXI Synthesizer

Advantage Services: Calibration and Warranty

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PXI SPECTRUM AND SIGNAL ANALYZERS

Our goal is to deliver the measurements you need today and enable new capabilities not previously available. Agilent Technologies PXI Vector Signal Analyzers provide complete solutions enabling analysis of communications, radar, and avionics signals in a modular, open-system standard as well as system building blocks for signal analysis solutions.

The M9392A provides up to 100 MHz bandwidth of continuous, compact, modular and cost effective, gap-less RF and microwave signal capture. It includes basic software tools to enable signal identification and signal export to analysis software such as the 89600 VSA software.

The new M9392A PXI Vector Signal Analyzer when combined with the new M9018A 18-slot PXIe chassis and Agilent 89600 VSA software, delivers a complete microwave vector signal analyzer solution enabling analysis of communications, radar, and avionics signals from 50 MHz to 26.5 GHz with 250 MHz of instantaneous bandwidth. The M9392A PXI Vector Signal Analyzer system consists of the M9202A PXIe IF Digitizer, M9302A PXI Local Oscillator, M9360A PXI Attenuator/Preselector, and the M9361A and M9351A PXI Downconverter modules.

Product features and your benefits

Functionality

- Frequency range: 50 MHz to 26.5 GHz

- Real-time, wideband RF and microwave data streaming

- Modular and software-defined building blocks provide flexible system configurations to meet diverse test needs

- Reduced development time enabled with included drivers, soft front panels and programming examples in Visual Studio (VB.NET, C#, C/C++) VEE, LabVIEW, LabWindows/CVI, MATLAB

Performance characteristics

- 250 MHz bandwidth (≥ 2.75 GHz)

- Up to 100 MHz streamed analog bandwidth

- 2 GS/s sample rate

- Real-time digitizer down conversion algorithm

- 7 or 8-slot wide multiple modules

- Seamless integration with Agilent 89600 VSA software

Agilent M9392A Vector Signal Analyzer system modules
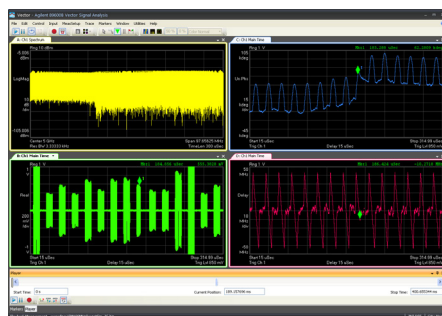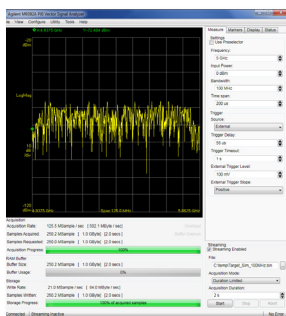
www.agilent.com/find/pxi-vsa

PXI SPECTRUM AND SIGNAL ANALYZERS

Spectrum and Signal Analyzers

	Description	Type # of slots	Frequency range	Phase noise (10 kHz offset)	DANL at 1 GHz	3rd order intercept (TOI) at 1 GHz	Analysis bandwidth	Software applications
M9392A	Microwave Vector Signal Analyzer	PXI PXIe 8-slot	50 MHz to 26.5 GHz	-115 dBc/Hz (at 10 GHz) nominal	-158 dBm/Hz nominal	-10 dBm (two -40 dB tones, 1 MHz apart)	250 MHz (≥ 2.75 GHz)	89600 VSA
M9302A	Local Oscillator	PXI 2-slot	3 GHz to 10 GHz	-115 dBc/Hz (at 10 GHz) nominal	N/A	N/A	N/A	N/A
M9351A	Downconverter	PXI 1-slot	50 MHz to 2.9 GHz	N/A	N/A	-10 dBm (two -40 dB tones, 1 MHz apart)	40 MHz	N/A
M9360A	Attenuator/ Preselector	PXI 3-slot	100 KHz to 26.5 GHz	N/A	N/A	N/A	40 MHz min (3 dB BW, YIG-tuned filter YTF)	N/A
M9361A	Downconverter	PXI 1-slot	2.75 GHz to 26.5 GHz	N/A	N/A	-10 dBm (two -40 dB tones, 1 MHz apart)	250 MHz	N/A
M9202A	IF Digitizer	PXIe 1-slot	2 GS/s (sampling rate)	N/A	-144 dBm/ Hz (noise density)	N/A	30 MHz to 1 GHz	N/A
M9362A-D01	Quad Downconverter	PXI 3-slot	10 MHz to 26.5 GHz	N/A	N/A	N/A	1.5 GHz/ Channel	N/A

Signal Conditioning Modules

	Description	Type # of slots	Frequency range	Bandwidth	Noise figure	TOI	IF center frequency	Min/max power
M9168C	Attenuator	PXI 2-slot	DC to 26.5 GHz	DC to 26.5 GHz	N/A	N/A	N/A	+30 dBm (max)
M9351A	Downconverter	PXI 1-slot	50 MHz to 2.9 GHz	40 MHz	10 dB max	-10 dBm (two -40 dB tones, 1 MHz apart)	500 MHz	-160 dBm/ -30 dBm
M9361A	Downconverter	PXI 1-slot	2.75 GHz to 26.5 GHz	250 MHz	30 dB at 26.5 GHz	-10 dBm (two -40 dB tones, 1 MHz apart)	500 MHz	-30 dBm (max)
M9360A	Attenuator/ Preselector	PXI 3-slot	100 kHz to 26.5 GHz	35 MHz to 120 MHz (3 dB BW, YTF)	N/A	N/A	N/A	+30 dBm (max)
M9362A-D01	Quad Downconverter	PXI 3-slot	10 MHz to 26.5 GHz	1.5 GHz	N/A	N/A	N/A	N/A

RF Signal Generators (Signal Source)

	Description	Type # of slots	Frequency range	Output power	Phase noise (at 10 kHz offset)	Switching speed	Output power accuracy	Software applications
M9302A	Local Oscillator	PXI 2-slot	3 GHz to 10 GHz	16 dBm	-115 dBc/Hz (at 10 GHz), nominal	1 ms	±2 dB	N/A

www.agilent.com/find/pxi-vsa

Agilent M9168C PXI Programmable Step Attenuator Module

DISCOVER the Alternatives...

Industries and Applications

- RF signal path attenuation simulation
- Engineering verification
- RF receiver sensitivity test
- Adjacent channel interference

Product Description

M9168C is a programmable step attenuator module based on the PXI hybrid platform, operating from DC to 26.5 GHz with a guaranteed 0.03 dB insertion loss repeatability for each section throughout the 5 million cycles operating life. Its excellent attenuation accuracy across a wide operating temperature range, ensures precise measurement. M9168C is a signal conditioning module that enhances the measurement accuracy and flexibility of PXI based RF and microwave test systems.

Models

M9168C	PXI Programmable Step Attenuator, DC to 26.5 GHz

Main Features and Benefits

Product features	Your benefit
Guaranteed 0.03 dB insertion loss repeatability throughout the operating life of up to 5 million cycles	Reduce downtime for recalibration, improve testing efficiency, therefore maximizing throughput
Broad attenuation range of 0 to 101 dB with 1 dB step	Maximize measurement accuracy and system flexibility
High attenuation accuracy and flatness of +/- 0.4 dB at 26.5 GHz	Superior attenuation accuracy ensures precise measurements, across a wide temperature range

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Specifications

Hardware	
Size	2 slots wide module
Frequency	DC to 26.5 GHz
Attenuation resolution	1 dB, 5 dB and 10 dB step
Attenuation accuracy	Refer to Table 1 on page 2. Specified across operating frequency of 0°C to 50°C
Repeatability	0.03 dB guaranteed
Life cycle	5 million cycles per section (guaranteed)
Maximum input power	1 W (+30 dBm) avg. 50 W peak, (10 µs max)
Maximum reverse power	1 W avg. 50 W peak (10 µs max)
RF connector	3.5 mm (f), SMA compatible
Connector compatibility: cPCI, PXI-H, PXI-1	

14

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Software

Software development platform	Microsoft Visual Studio with C/C++ Microsoft Visual Studio .NET with C# or Visual Basic, National Instruments LabVIEW, National Instruments, LabWindows CVI, The MathWorks MATLAB, Agilent VEE
Supported Operating Systems	Windows XP SP3, 32-bit Windows Vista 32-bit and 64-bit Windows 7 32-bit and 64-bit
Drivers Provided	IVI-COM, IVI-C, LabVIEW, MATLAB
Included GUI	Soft front panel
Application code examples	C, C++, C#, Visual Basic, VEE, MATLAB

Table 1. M9168C Attenuation Accuracy

Attenuation Setting for Step Ranges (dB)	DC to 18 GHz	18 to 26.5 GHz
1 to 2	0.35	0.4
3 to 6	0.55	0.7
7 to 10	0.7	0.8
11 to 20	1.2	1.4
21 to 40	1.4	1.6
41 to 60	1.9	2.5
61 to 80	2.5	2.7
81 to 101	3.7	4.0
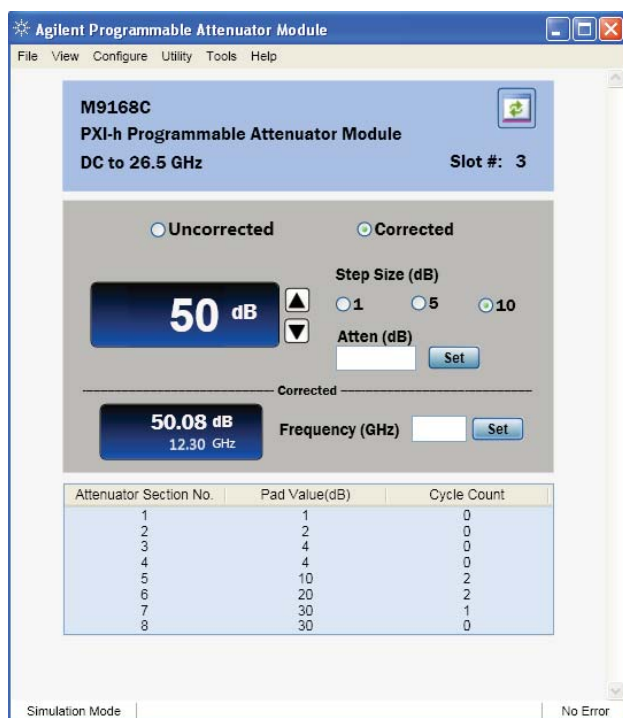
Figure 1. Soft front panel of M9168C provides an intuitive approach for program simulation and troubleshooting

Recommended Configuration

Model	Description
M9018A	PXIe Chassis, 18- slots, 3U, 8 GB/s
M9202A	PXIe IF Digitizer: 12-Bit, 1 GHz
M9361A	PXI Downconverter: 2.75 to 26.5 GHz
M9168C	PXI-h Programmable Attenuator Module, DC to 26.5 GHz

Ordering Information

Typical Product Configuration

Model	Description
M9168C	PXI-h Programmable Attenuator Module, DC to 26.5 GHz

Related products	
M9392A	PXI Vector Signal Analyzer
M9351A	PXI Downconverter (50 MHz to 2.9 GHz)
M9360A	PXI Attenuator/Preselector
M9155/6/7C	PXI Switch Modules, DC to 26.5 GHz

Advantage Services: Calibration and Warranty	
Agilent Advantage Services is committed to your success throughout your equipment's lifetime.	
M9168C-UK6	Commercial calibration certificate with test data included
R-51B-001-C	1 year Return-to-Agilent warranty

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Agilent M9202A PXI Express 12-bit Wideband IF Digitizer

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Wireless communications
- Radar and wideband signal capture

Product Description

The M9202A is a single-slot 3U PXIe Wideband IF Digitizer running at 2 GS/s, with up to 1 GHz instantaneous analog bandwidth and utilizing a large DDR3 memory. The M9202A features a Xilinx Virtex-6 FPGA that can implement different functionalities depending on which firmware option you choose. The BAS option provides basic digitizer functionality (signal capture, storing of data, transfer of data, etc), whereas the DDC option, in addition to basic digitizer functionality, implements a real-time digital down-conversion (DDC) algorithm in the 300 MHz to 700 MHz band, enabling improved analog performance and reducing data upload time. Thanks to its PXI Express backplane connection, the M9202A supports continuous data streaming to disk.

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Models	
M9202A	PXIe IF Digitizer 12-bit, 1 GHz

Main Features and Benefits

Product features	Your benefit
2 GS/s sampling rate	Fastest 12-bit PXIe Digitizer
Up to 1 GHz bandwidth	Able to capture wide bandwidth signals
512 MB DDR3 memory	Large on-board memory
Real-time digital down-conversion (DDC) algorithm	Data decimation, analog performance improvement
On-board Xilinx Virtex-6 FPGA	On-board processing capability
Software support for easy integration	Reduced development time
PXIe backplane	Fastest digitized data upload, continuous data steaming

Chassis slot compatibility: PXIe Hybrid, PXIe

Specifications and Characteristics

Hardware	
Size	1 slot 3U
Resolution	12 bits
Sample rate	2 GS/s
Bandwidth	30 MHz *(nominal)* to 1 GHz
Streamed analog bandwidth	up to 50 MHz, or up to 100 MHz
Impedance	50 Ω *(nominal)*
Coupling	AC
Full scale (FS) range	+4 dBm (1 V pk-pk in 50 Ω)
Spurious-free dynamic range (SFDR)	60 dBc *(typical)* in basic digitizer mode 84 dBc *(typical)* after digital down-conversion (with DDC option)[1]
Effective number of bits (ENOB)	9 bits *(typical)*
Sample clock sources	Internal (with internal or external 100 MHz ref) or external

1. *Depends on DDC settings*

14

Agilent Technologies

Software

The M9202A, as all Agilent high-speed digitizers, includes the Agilent MD1 soft front panel (SFP) graphical interface. This simple software application can be used to control, verify the functionality and explore the capabilities of your high-speed digitizers.

The MD1 SFP contains two main windows, a control window and a display window. The control window, which may be set in either Oscilloscope mode or in Transient Recorder mode, and contains functions that allow you to manipulate the acquisition parameters of the card. The display window shows the full acquisition in the top window, and the lower window may be configured to show either a zoom on part of the waveform or the FFT of the acquired data. In addition, the Agilent MD1 SFP implements several different display settings and standard pre-configured measurements, like standard deviation, peak-peak/RMS value, overshoot, etc.

Software operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. The Agilent MD1 soft front panel software has two main windows, the acquisition parameters to control the module and the acquired waveform display.

Figure 2. Simplified block diagram of the M9202A PXIe IF Digitizer.

14

Ordering Information

Typical Product Configuration

Model	Description
M9202A	PXIe IF Digitizer: 12-bit, 1 GHz
M9202A-C01[1]	Single channel
M9202A-F02[1]	Frequency range: 2 GS/s
M9202A-M05[1]	Standard memory: 512 MB
M9202A-BAS[1]	Basic Digitizer firmware

1. These options represent the typical product configuration for the M9202A as a standalone digitizer. For other options and a complete product configuration description, please refer to the data sheet.

Related products

M9302A	PXI Local Oscillator: 3 GHz to 10 GHz
M9351A	PXI Downconverter: 50 MHz to 2.9 GHz
M9361A	PXI Downconverter: 2.75 GHz to 26.5 GHz
M9360A	PXI Attenuator/Preselector: 100 kHz to 26.5 GHz
M9392A	PXI Vector Signal Analyzer
M9211A	PXI-H UWB IF Digitizer: 10-bit, 4 GS/s, 3 GHz
M9018A	18-slot PXIe Chassis
M9021A	PCIe Cable Interface
89601B	89600 VSA Software, transportable license

Accessories

Software and product information on CD *(included)*

Cables *(included)*

Advantage Services: Calibration and Warranty

Agilent Advantage Services is committed to your success throughout your equipment's lifetime.

M9202A-UK6	Commercial calibration certificate with test data
R-51B-001-3C	1 year return-to-Agilent warranty extended to 3 years
R-51B-001-5C	1 year return-to-Agilent warranty extended to 5 years

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Agilent M9302A PXI Local Oscillator

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Wireless communications
- Radar and wideband signal capture

Product Description

The Agilent M9302A PXI Local Oscillator (LO) is a VCO-based 3 GHz to 10 GHz LO optimized for fast settling time to allow for fast frequency down conversion applications. The fast switching time and low phase noise of this LO make it an ideal component of a microwave vector signal analyzer.

Models	
M9302A	PXI Local Oscillator

Main Features and Benefits

Product features	Your benefit
Frequency range	3 GHz to 10 GHz
0.1 Hz tuning resolution	Greater frequency accuracy
1 ms settling time	Speeds up your test time
Multiple programmatic interfaces	Easy integration into existing test environments and reduced development time
PXI form-factor	Conforms to Modular Open Systems Approach (MOSA)

Chassis slot compatibility: cPCI (J1), PXI-1, PXI Hybrid

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Specifications

Hardware	
Size	2 slot 3U
Phase noise	-115 dBc/Hz at 10 GHz, 10 kHz offset
Frequency switching speed	1 ms, 500 μs, typical
Power	+16 dBm ± 2 dB
Frequency output	REF OUT: 10 MHz, *(nominal)*
	REF 1 OUT: 100 MHz, *(nominal)*
	REF 2 OUT: 100 MHz, *(nominal)*
Amplitude	REF OUT: 0 dBm ± 3 dB (at 25 °C ± 5 °C)
	REF 1 OUT: 0 dBm ± 3 dB (at 25 °C ± 5 °C)
	REF 2 OUT: 0 dBm ± 3 dB (at 25 °C ± 5 °C)
Frequency temperature stability	± 0.5 ppm (over 0 °C to 50 °C)
Aging (after 30 days of operation)	± 1.0 ppm/year

14

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Software

The M9302A Local Oscillator is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice.

A soft front panel interface is provided to monitor and control the PXI Local Oscillator with the following functions:

- Enabling LO
- Setting LO frequency and band switch frequency
- Enabling 10 MHz and 100 MHz REF signals
- Monitoring hardware status

Supported operating systems	Microsoft Windows® XP (32-bit), Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Agilent M9302A PXI Local Oscillator, software interface.
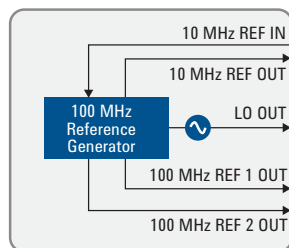
Figure 2. Simplifed block diagram of the M9302A PXI Local Oscillator.

Ordering Information

Typical Product Configuration

Model	Description
M9302A	PXI Local Oscillator: 3 GHz to 10 GHz

Related products

M9202A	PXIe IF Digitizer: 12-bit, 2 GS/s
M9360A	PXI Attenuator/Preselector: 100 kHz to 26.5 GHz
M9361A	PXI Downconverter: 2.75 MHz to 26.5 GHz
M9351A	PXI Downconverter: 50 MHz to 2.9 GHz
M9392A	PXI Vector Signal Analyzer: 50 MHz to 26.5 GHz
M9036A	PXIe Embedded Controller

Accessories

Software, example programs, and product information on CD	
Cables	

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Agilent M9351A PXI Downconverter

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Wireless communication
- Radar and wideband signal capture

Product Description

The Agilent M9351A is a one-slot 3U PXI Downconverter that converts RF signals from 50 MHz to 2.9 GHz into baseband frequency signals for use with Agilent's newest generation of PXI digitizers. The built-in pre-amp enables very low level signal measurements, down to -160 dBm, and the built-in calibration simplifies system power budget calculations.

Models	
M9351A	PXI Downconverter
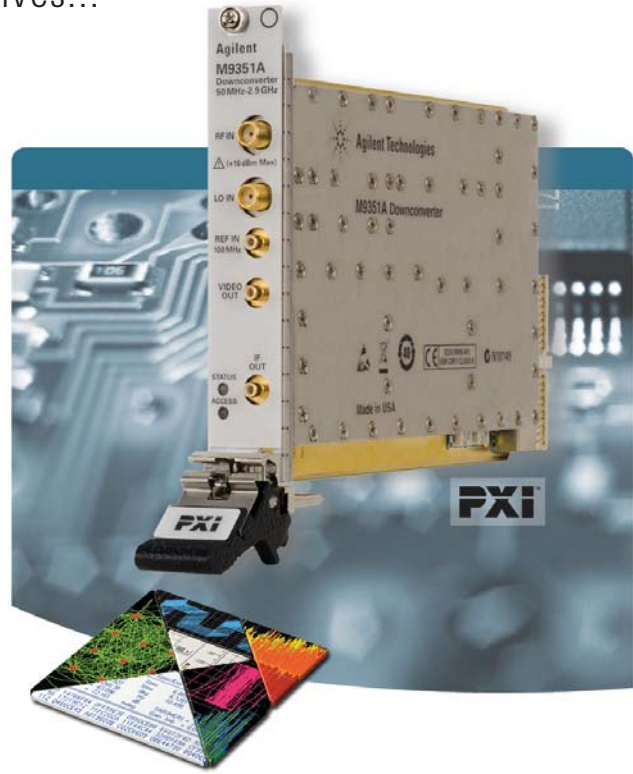
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Main Features and Benefits

Product features	Your benefit
Frequency range	50 MHz to 2.9 GHz
Built-in pre-amp	Able to acquire low-level signals
Image protected conversion	No need for a preselector
Bypass path	Route specific signals directly to the digitizer
40 dB solid state IF attenuator with 0.5 dB steps	Fast IF power control
Multiple programmatic interfaces	Easy integration into existing test environments and reduced development time
PXI form-factor	Conforms to Modular Open Systems Approach (MOSA)

Chassis slot compatibility: cPCI (J1), PXI-1, PXI Hybrid

Specifications

Hardware	
Size	1 slot 3U
Frequency range	50 MHz to 2.9 GHz
	50 MHz to 625 MHz (usable to 1 MHz) (bypass mode)
Operating range	-160 dBm to -30 dBm, *(nominal)*
Bandwidth (3 dB)	40 MHz, min
RF to IF Gain	38 dB, *(nominal)*
Center frequency (user adjustable)	500 MHz, *(nominal)*
Residuals, RF and LO input terminated	-75 dBm
LO input frequency range	3.5 GHz to 6.4 GHz
LO input power	+15 dBm ± 2 dB
Impedance	50 Ω, *(nominal)*

14

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Software

The M9351A Downconverter is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice.

A soft front panel interface is provided to monitor and control the PXI Downconverter with the following functions:
• Setting input frequency and level
• IF Path selection: Normal/Bypassed
• Setting attenuator levels
• Monitoring hardware status

Supported operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Agilent M9351A PXI downconverter, software interface.

M9351A Downconverter (50 MHz to 2.9 GHz)
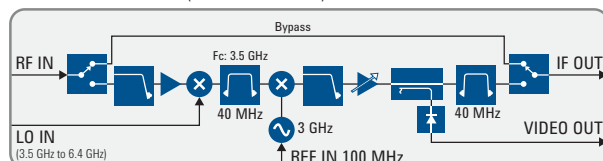
Figure 2. Simplifed block diagram of the M9351A PXI Downconverter.

Ordering Information

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Agilent M9360A PXI Attenuator/Preselector

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Wireless communications
- Radar and wideband signal capture

Product Description

With attributes that provide enough performance to satisfy even the most demanding spectrum analysis applications, the M9360A PXI Attenuator/Preselector is a 3-slot 3U, combination module providing attenuation and preselection signal conditioning for numerous system applications with an electronically tuneable, 4-stage, YIG-tuned filter based RF-input pre-selector, and broadband switches for signal distribution.

Models	
M9360A	PXI Attenuator/Preselector

Main Features and Benefits

Product features	Your benefit
Frequency range	100 kHz to 26.5 GHz
Bypass path	Automatically route signals around the band limited preselector for additional bandwidth
35 MHz to 120 MHz bandwidth (preselected, < 3 GHz)	Allows you to analyze large bandwidth signals
40 MHz to 120 MHz bandwidth (preselected, ≥ 3 GHz)	
70 dB input step attenuator	Increased dynamic range
Multiple programmatic interfaces	Easy integration into existing test environments and reduced development time
PXI form-factor	Conforms to Modular Open Systems Approach (MOSA)

Chassis slot compatibility: cPCI (J1), PXI-1, PXI Hybrid

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Specifications

Hardware	
Size	3 slot 3U
Tuning speed	< 5 ms @ 50 MHz step, *(nominal)*
Maximum power	RF IN: +30 dBm
	LO IN: +20 dBm
3 dB bandwidth	35 MHz min, 120 MHz max (preselected, < 3 GHz)
	40 MHz min, 120 MHz max (preselected, ≥ 3 GHz)
Attenuator	0 dB to 70 dB in 10 dB steps
Switches	SP2T mechanical type

14

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Software

The M9360A Attenuator/Preselector is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice.

A soft front panel interface is provided to monitor and control the PXI Downconverter with the following functions:
- Setting input frequency and level
- Enable/Disable Preselector
- Setting attenuator level
- Setting RF/LO Out: low-band/high-band
- Setting preselector frequency
- Monitoring hardware status

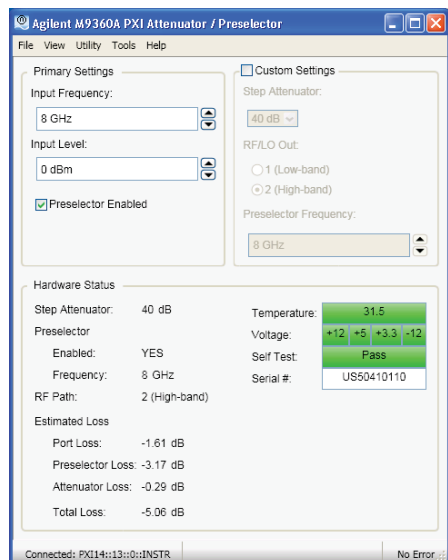| Supported operating systems	Microsoft Windows® XP (32-bit), Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

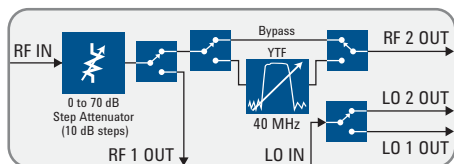Figure 1. Agilent M9360A PXI Attenuator/Preselector, software interface.

Figure 2. Simplifed block diagram of the M9360A PXI Attenuator/Preselector.

Ordering Information

Typical Product Configuration

Model	Description
M9360A	PXI Attenuator/Preselector: 100 kHz to 26.5 GHz

Related products

M9202A	PXIe IF Digitizer: 12-bit, 2 GS/s
M9302A	PXI Local Oscillator: 3 GHz to 10 GHz
M9361A	PXI Downconverter: 2.75 MHz to 26.5 GHz
M9351A	PXI Downconverter: 50 MHz to 2.9 GHz
M9392A	PXI Vector Signal Analyzer: 50 MHz to 26.5 GHz
M9018A	18-slot PXIe Chassis
M9036A	PXIe Embedded Controller

Accessories

Software, example programs, and product information on CD
Cables

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Agilent M9361A PXI Downconverter

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Wireless communications
- Radar and wideband signal capture

Product Description

The M9361A is a one-slot 3U PXI Downconverter that converts microwave signals from 2.75 GHz to 26.5 GHz into baseband frequency signals centered at an IF frequency of 500 MHz. The built-in pre-amp enables very low level signal measurements, down to -160 dBm, and built-in calibration simplifies system power budget calculations.

Models	
M9361A	PXI Downconverter

Main Features and Benefits

Product features	Your benefit
Frequency range	2.75 GHz to 26.5 GHz
250 MHz bandwidth	Able to capture wide bandwidth signals
Built-in pre-amp	Able to acquire low-level signals
40 dB solid state IF attenuator with 0.5 dB steps	Fast IF power control
Auxiliary input/switch for signal routing	Effectively gives you the option to route signals directly from other downconverters to a digitizer without external switching
Multiple programmatic interfaces	Easy integration into existing test environments and reduced development time
PXI form-factor	Conforms to Modular Open Systems Approach (MOSA)

Chassis slot compatibility: cPCI (J1), PXI-1, PXI Hybrid
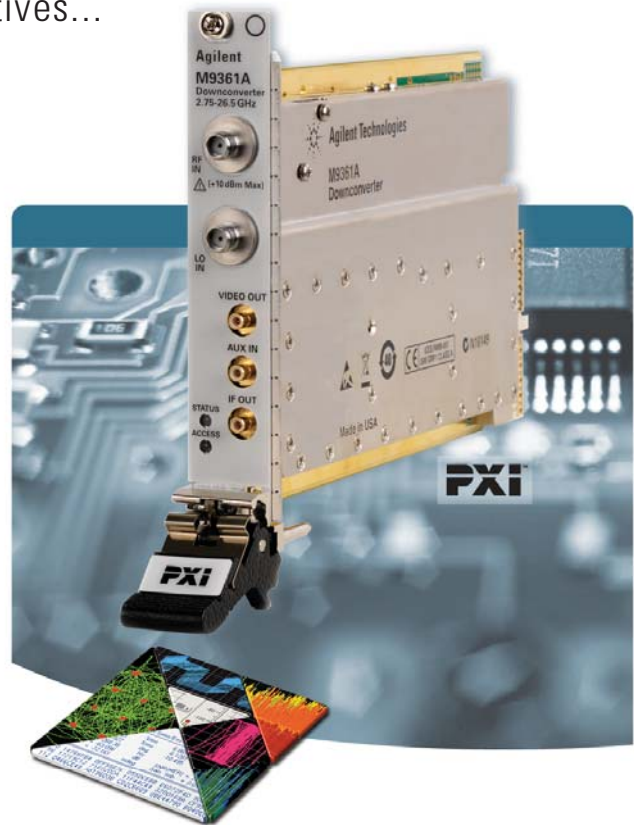
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Specifications

Hardware	
Size	1 slot 3U
Frequency range	2.75 GHz to 26.5 GHz
Operating range	< 9.5 GHz: -160 dBm to -30 dBm, *(nominal)*
	9.5 GHz to 26.5 GHz: -146 dBm to -30 dBm, *(nominal)*
Bandwidth (3 dB)	250 MHz, min
Impedance	50 Ω, *(nominal)*
RF to IF Gain	38 dB, *(nominal)*
Center frequency (user adjustable)	500 MHz, *(nominal)*
Residuals, RF and LO input terminated	-75 dBm
LO input frequency range	3 GHz to 10 GHz
LO input power	+15 dBm ± 2 dB
Impedance	50 Ω, *(nominal)*

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Software

The M9361A Downconverter is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice.

A soft front panel interface is provided to monitor and control the PXI Downconverter with the following functions:

- Setting input frequency and level
- IF Path selection: Normal/AUX IN
- Setting attenuator levels
- Monitoring hardware status

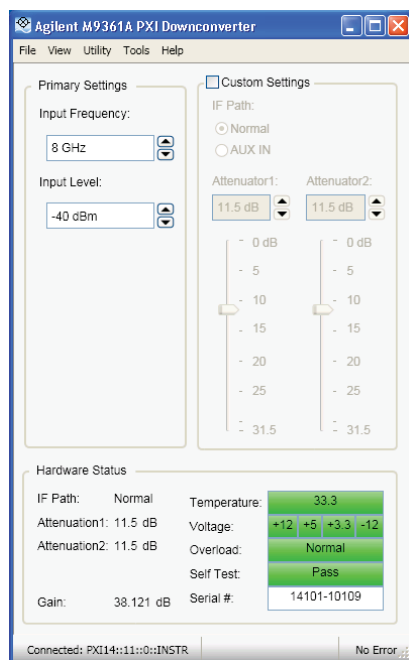|	
Supported operating systems	Microsoft Windows® XP (32-bit), Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Agilent M9361A PXI Downconverter, software interface.

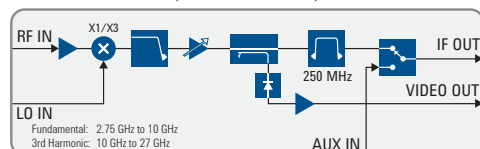Figure 2. Simplifed block diagram of the M9361A PXI Downconverter.

Ordering Information

Typical Product Configuration

Model	Description
M9361A	PXI Downconverter: 2.75 GHz to 26.5 GHz

Related products

M9302A	PXI Local Oscillator: 3 GHz to 10 GHz
M9202A	PXIe IF Digitizer: 12-bit, 2 GS/s
M9360A	PXI Attenuator/Preselector: 100 kHz to 26.5 GHz
M9351A	PXI Downconverter: 50 MHz to 2.9 GHz
M9392A	PXI Vector Signal Analyzer: 50 MHz to 26.5 GHz
M9018A	18-slot PXIe Chassis
M9036A	PXIe Embedded Controller

Accessories

Software, example programs, and product information on CD

Cables

Advantage Services: Calibration and Warranty

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M1282A	Annual calibration
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R-51B-001-5C	1 year return-to-Agilent warranty extended to 5 years

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Agilent M9362A-D01 PXIe
Microwave Quad Downconverter

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Wireless communications
- Radar and wideband signal capture

Product Description

The Agilent M9362A-D01 is a PXIe 3-slot, 4-channel, coherent microwave downconverter with frequency coverage from 10 MHz to 26.5 GHz, along with 1.5 GHz of instantaneous bandwidth per channel. The M9362A-D01 is well suited for wideband signal capture where multiple channels are required for applications such as multi-channel coherent signal analysis, radar, SIGNIT, ELINT, MASINT, EW signal capture and analysis, and RF and microwave recording and analysis.

When combined with an Agilent M9302A Local Oscillator and one or more Agilent M9210A 4GS/s Digitizers, the M9362A-D01 Downconverter can be used to synchronously capture up to 3 signals in up to 1.4 GHz bandwidth, with 10-bit resolution. Full support for IVI-C, IVI-COM, LabVIEW and MATLAB® drivers makes test system integration simple.

... Agilent **Modular** Products

Models
M9362A-D01 PXIe Microwave Quad Downconverter

Main Features and Benefits

Product features	Your benefit
Frequency range	10 MHz to 26.5 GHz
Four-channel synchronous downconversion	Multi-channel coherent signal analysis
PXI form-factor	Conforms to Modular Open Systems Approach (MOSA)
Software support for easy integration	Reduced development time

Specifications

Hardware	
Size	3-slot
Operating Range	10 MHz to 26.5 GHz
Bandwidth	1.5 GHz per channel
Noise Figure	24 dB
Impedance	50 Ω, nominal

14

Chassis slot compatibility: PXIe, PXI Hybrid

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Software

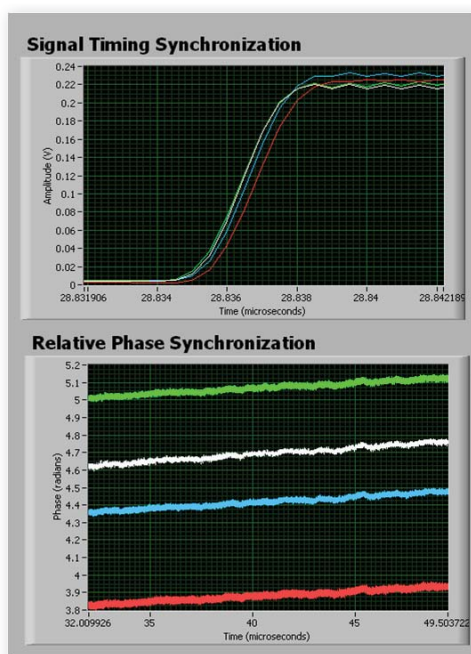|	
Operating systems	Microsoft Windows® XP Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB®
Supported application development environments (ADE)	Visual Studio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB®
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

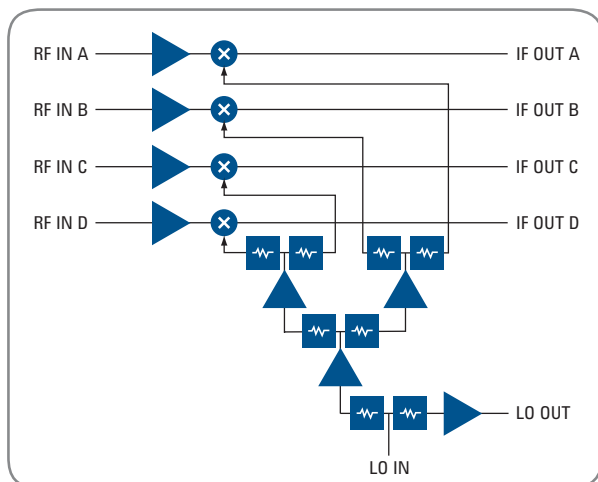Figure 1. M9362A-D01 PXIe Microwave Quad Downconverter, channel synchronization

Figure 2. M9362A-DO1 PXIe Quad Downconverter block diagram

Ordering Information

Typical Product Information

Model	Description
M9362A-D01	PXIe Quad Downconverter: 10 MHz to 26.5 GHz

Related Products

M9302A	PXI Local Oscillator: 3 GHz to 10 GHz
M9210A	PXI-H High-speed Digitizing Scope: 10-bit, 2-4 GS/s
M9018A	18-slot PXIe chassis
M9036A	PXIe Embedded Controller

Accessories

M9130A

Software and product information on CD
Cables

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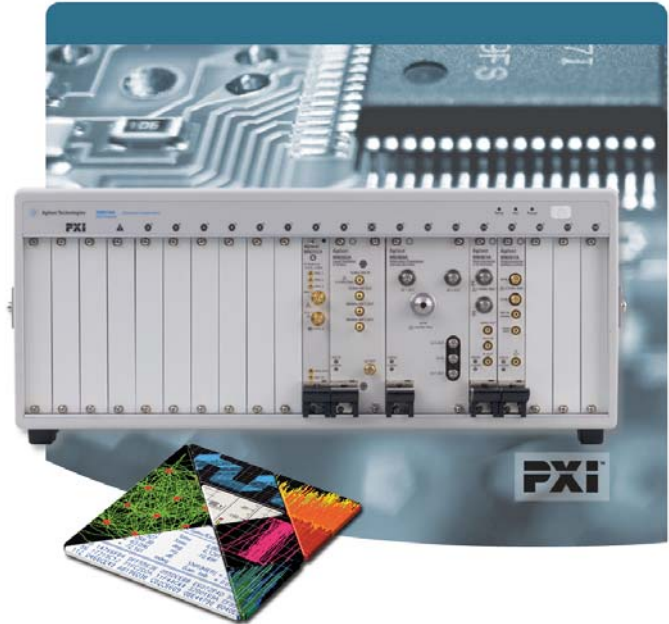
Agilent M9392A PXI Vector Signal Analyzer

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Wireless communications
- Radar and wideband signal capture
- Digital pre-distortion (DPD)

Product Description

The Agilent M9392A is a PXI Vector Signal Analyzer with frequency coverage from 50 MHz to 26.5 GHz with 250 MHz of instantaneous bandwidth and up to 100 MHz streamed analog bandwidth. When combined with the Agilent 89600 VSA software, you will experience a complete Microwave Vector Signal Analyzer solution enabling analysis of communications, radar, and avionics signals in a modular, open-system standard. The M9392A PXI Vector Signal Analyzer system consists of the M9202A PXIe IF Digitizer, M9302A PXI Local Oscillator, M9360A PXI Attenuator/Preselector, and the M9361A and M9351A PXI Downconverter Modules.

... Agilent **MODULAR** Products

Models	
M9392A	Microwave Vector Signal Analyzer

Main Features and Benefits

Product features	Your benefit
Frequency range	50 MHz to 26.5 GHz
12-bit, 2 GS/s digitizer	Measure broadband communications and radar signals
Real-time digital down-conversion (DDC) algorithm	Data decimation, analog performance improvement
Multiple programmatic interfaces	Easy integration into existing test environments and reduced development time
PXI form-factor	Conforms to Modular Open Systems Approach (MOSA)
Seamless integration with Agilent 89600 VSA software	Immediate access to the industry's broadest, most advanced general-purpose and standards-based demodulation and signal analysis

Chassis slot compatibility: cPCI (J1), PXI-1, PXI Hybrid

Specifications

Hardware	
Size	7 or 8 slots-wide multiple modules
Sample rate	2 GS/s
3 dB bandwidth	35 MHz min (preselected, < 3 GHz)
	40 MHz min (preselected, ≥ 3 GHz)
	40 MHz min (< 2.75 GHz, bypass)
	250 MHz min (≥ 2.75 GHz, bypass)
Maximum streamed analog bandwidth (configuration dependant)	up to 50 MHz (with V05 option) up to 100 MHz (with V10 option)
DANL	-158 dBm/Hz, ≤ 9.5 GHz, (nominal)
	-147 dBm/Hz, > 9.5 GHz, (nominal)
Absolute amplitude accuracy	± 0.6 dB, < 2.75 GHz, (nominal), after field calibration (corrected)
	± 0.5 dB, ≥ 2.75 GHz, (nominal), after field calibration (corrected)
	± 2 dB, (nominal), without field calibration (uncorrected)

14

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Software

The M9392A Vector Signal Analyzer is supplied with a comprehensive portfolio of module drivers, documentation, examples, and software tools to help you quickly develop test systems with your software platform of choice.

A soft front panel interface is provided to monitor and control the PXI Vector Signal Analyzer with the following functions:

- Setting input frequency, power, bandwidth and time span
- Setting trigger functions
- Displaying markers
- Formatting frequency and time displays
- Monitoring hardware status
- Streaming data to file

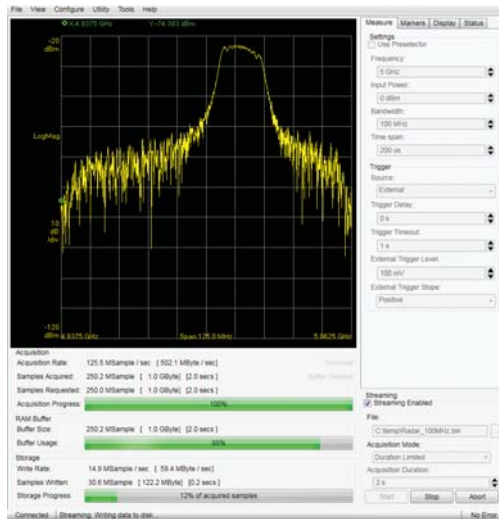|	
Supported operating systems	Microsoft Windows® XP (32-bit), Microsoft Windows® Vista (32/64-bit), Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Agilent M9392A PXI Vector Signal Analyzer, software interface.

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Ordering Information

Typical Product Configuration

Model	Description
M9392A	PXI Vector Signal Analyzer: 50 MHz to 26.5 GHz
89601B	89600 VSA Software, Transportable license
89601B-200	Basic Vector Signal Analysis
89601B-300	Hardware Connectivity
89601B-AYA	Vector modulation analysis
M9018A	18-slot PXIe Chassis
Optional Module	
M9351A	PXI Downconverter: 50 MHz to 2.9 GHz

Related products

M9302A	PXI Local Oscillator: 3 GHz to 10 GHz
M9202A	PXIe IF Digitizer: 12-bit, 2 GS/s
M9360A	PXI Attenuator/Preselector: 100 kHz to 26.5 GHz
M9361A	PXI Downconverter: 2.75 GHz to 26.5 GHz
M9036A	PXIe Embedded Controller

Accessories

Software, example programs, and product information on CD

Cables

Advantage Services: Calibration and Warranty

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R1282A	Annual calibration
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R-51B-001-5C	1 year return-to-Agilent warranty extended to 5 years

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AXIe MODULAR PRODUCTS

AXIe Modular Products

AXIe modular products are designed for high-performance, scalable instrumentation and offer fast data transfers to the host controller. AXIe's product portfolio includes:

- Chassis and Controllers
- Multi-Channel Digitizers
- Arbitrary Waveform Generators
- Logic Analyzers
- PCI Express Protocol Analyzers
- HDMI Protocol Analyzers

Agilent U4154A AXIe Logic Analyzer Module in the M9502A 2-slot AXIe chassis with cables, probes, host PC, and adapters

Building an AXIe system consists of 4 steps:

- Step 1: Choose your 2 or 5-slot AXIe chassis.
- Step 2: Choose your controller; either external (laptop, desktop or rackmount) or embedded controller.
- Step 3: Choose your test modules.
- Step 4: Choose the software environment.

Agilent M8190A AXIe Arbitrary Waveform Generator in the M9502A 2-slot AXIe chassis

Agilent M9703A AXIe Digitizers in the M9505A 5-slot AXIe Chassis

Agilent M9536A AXIe Embedded Controller

Chassis								
Model	Description	Height	Number of slots	Type of slots	Maximum data bandwidth	System slot	Inut power Consumption	Power per slot
M9502A	2-slot AXIe Chassis	2U	2	AXIe 1.0	2 GBps module to module	ESM module included	800 VA	200 W
M9502A	5-slot AXIe Chassis	4U	5	AXIe 1.0	2 GBps module to module	ESM module included	1350 VA	200 W

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AXIe MODULES

Controllers

Model	Description	Type # of slots	Processor	RAM (min/max)	HDD	Maximum data bandwidth	Cable interface	Front panel connections
M9536A	AXIe Embedded PC Controller	AXIe 1.0 1-slot	Intel Xeon EP Quad Core L5518 at 2.13 GHz	8 GB standard, 16 GB optional 24 GB maximum	2.5″ SATA II SSD 160 GB	2GB/s to AXIe backplane	N/A	USB (3), 10/100/1000 LAN (2), VGA (up to 1600x1200), RS-232

Digitizers

Model	Description	Type # of slots	Resolution	Number of channels	Max sample rate	Bandwidth	Memory depth	On-Board processing
M9703A	AXIe Digitizer	AXIe 1.0 1-slot	12-bit	8-4	1.6 GS/s - 3.2 GS/s	DC - 1 GHz	Up to 4 GB (256 MSamples/ch)	Four Xilinx Virtex-6 FPGAs

Arbitrary Waveform Generators (AWG)

Model	Description	Type # of slots	Resolution	Number of channels	Bandwidth per channel	Modulation bandwidth	Sampling rate	Memory depth
M8190A	AXIe Arbitrary Waveform Generator	AXIe 1.0 2-slot	12-bits up to 12 GSa/s 14-bits up to 8 GSa/s	Up to 2 channels	5 GHz	5 GHz	125 MSa/s to 12 GS/s	2 GSa

Logic Analyzer

Model	Description	Type # of slots	Number of channels	Supported Signal Types	Max state data rate	Max state clock	Minimum State clock frequency	Minimum data valid window
U4154A	AXIe Logic Analyzer Moduler	AXIe 1.0 1-slot	136 (Full Channel mode)	Single ended and differential	2.5 Gb/s on 136 channels 4 Gb/s on 68 channels	2.5 GHz	12.5 MHz (single edge) 6.25 MHz (both edges)	100 ps

Protocol Analyzers

Model	Description	Type # of slots	Protocol Supported	Bus Configuration	Speed	Memory Depth	Trigger Sequencer	Test Modes
U4301A	PCIe Gen3 Protocol Analyzer	AXIe 1.0 1-slot	136 (Full Channel mode)	x8 lanes per module	2.5 GT/s (Gen1) 5.0 GT/s (Gen2) 8.0 GT/s (Gen3)	4 GBytes	4 states	Analyzer
U4998A	HDMI 1.4b Analyzer/Generator	AXIe 1.0 1-slot	HDMI 1.4b	1 source 1 sink port	3.4 Gbps	4 GBytes	N/A	Analyzer Generator Compliance

Connectivity External PC cards[1]

	Description	Type # of slots	Maximum data bandwidth	Cable interface	PC host interface
M9045B	PCIe ExpressCard adaptor: Gen 1	ExpressCard 34 1-slot	250 MB/s	x1 Gen 1 PCIe	x1 Gen 1 PCIe
M9047A	PCIe Desktop Adaptor: Gen 2	PCIe x 8 or x 16 1-slot	4 GB/s	x 8 Gen 2 PCIe	x 8 Gen 2 PCIe

[1]*Detailed product information for the connectivity modules is available in section 5 of this catalog.*

Agilent M9502A and M9505A AXIe Chassis

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Communications
- Electronics test
- Semiconductor testing

Product Description

The M9502A and M9505A AXIe chassis are fully compatible with the AXIe 1.0 specification. They provide 2 or 5 slots for AXIe instrument modules, and have an embedded system module that does not take up an instrument slot. The embedded system module provides Gigabit LAN and Gen 2 x8 PCIe® interfaces for connecting the chassis to an external controller. To minimize rack space, the instrument module slots are arranged horizontally. In addition, both the power supply and fan tray can be removed while the chassis remains in the rack for maintenance.

... Agilent **Modular** Products

Models

Models	
M9502A	2-slot AXIe chassis
M9505A	5-slot AXIe chassis

Main Features and Benefits

Product features	Your benefit
Compact size	2-slot chassis is ideal for transportable applications, while 5-slot saves rack space
Gen 2 x4 links to module slots and 62 local bus pairs	Enables high-performance applications
Embedded AXIe system module	System module does not take up a slot, resulting in a smaller chassis
High cooling capacity	Provides cooling for high-performance modules

Connector compatibility: AXIe 1.0

Specifications and Characteristics

Hardware		
	M9502A	**M9505A**
Size	2U	4U
Number of slots	2	5
Power supply output voltage *(nominal)*	50 VDC	52 VDC
Total DC power	520 W	1200 W
Input power consumption	800 VA	1350 VA
System module type	Embedded	
System module front panel connectors	X8 Gen 2 PCIe, multiframe in/out, trigger in/out, clock in/out, and Gbit LAN	
Maximum power dissipation per slot	200 W	
Local bus pairs	62 pairs between adjacent slos	
Data bandwidth	2 GB/s user slot-to-system slot 4 GB/s system slot-to-host	

15

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Software Information

Both AXIe chassis include a built-in Web server for configuration, control, and monitoring of the chassis. This Web server can be accessed by either LAN or PCIe. A soft front panel interface is also provided to monitor and control the AXIe chassis.

- Chassis information
- Chassis LAN configuration
- Instrument module inventory
- Trigger routing setup
- Chassis health (temperature, fan, power supply)

Operating systems	Microsoft Windows® XP Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (C/C++,C#, VB.NET), LabVIEW, LabWindows/CVI, MATLAB, VEE
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. AXIe chassis web server

Typical Product Configuration

Model	Description
M9502A 2-slot AXIe chassis	
M9502A	2-slot AXIe chassis
M9045B	PCIe ExpressCard adapter
Y1200B	PCIe cable: x1 to x8, 2m

Model	Description
M9505A 5-slot AXIe chassis	
M9505A	5-slot AXIe chassis
M9047A	PCIe desktop PC adapter
Y1202A	2m x8 PCIe cable

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PCIe® is a registered U.S. trademark and/or service mark of PCI-SIG.

Ordering Information

Model	Description
M9502A	AXIe chassis: 2-slot with embedded system module
M9505A	AXIe chassis: 5-slot with embedded system module
Opt 900-932	Power cord options

Related products	
M9536A	Embedded AXIe PC controller
M9045B	PCIe ExpressCard adaptor: Gen 1
Y1200B	PCIe cable: x1 to x8, 2m
M9047A	PCIe desktop PC adapter: Gen 2, x8
Y1202A	PCIe cable: x8, 2.0m (used with M9047A)

Accessories	
Y1225A	Rack mount kit for M9502A
Y1226A	Rack mount kit for M9505A
Y1223A	AXIe multi-frame cable: 0.5m
Y1224A	AXIe multi-frame cable: 3m

Advantage Services: Calibration and Warranty	
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R1280A	Extended warranty

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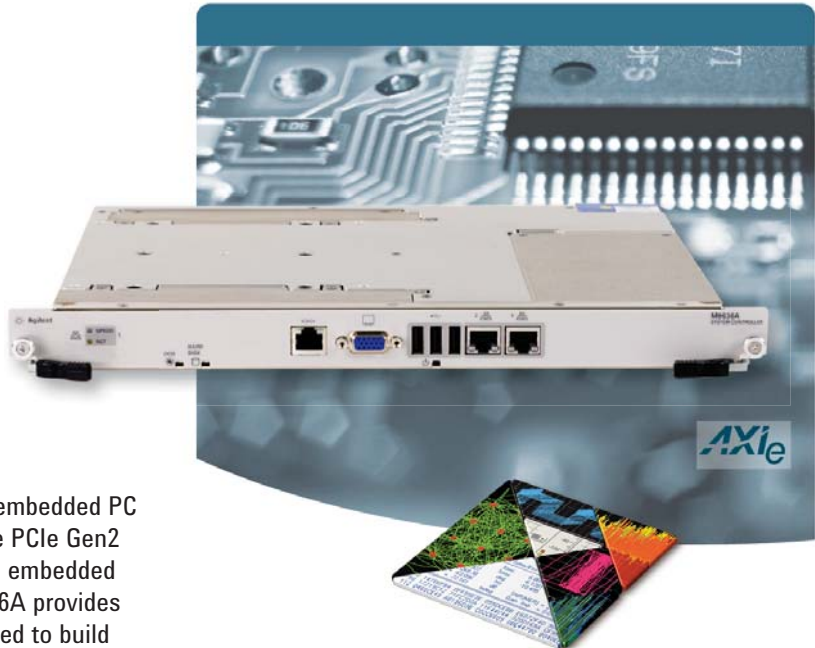# Agilent M9536A AXIe Embedded PC Controller

DISCOVER the Alternatives...

Industries and Applications

- Aerospace/defense
- Communications
- Computation
- Electronic test
- Semiconductor testing
- High-energy physics

Product Description

The Agilent M9536A is an AXIe-compatible, embedded PC controller which provides a high-performance PCIe Gen2 link to the AXIe backplane. It is the first AXIe embedded controller available on the market. The M9536A provides a powerful, one-slot computer that can be used to build compact AXIe systems while also integrating easily with LXI instruments with the built-in Gigabit LAN interface.

... Agilent **Modular** Products

Models	
M9536A	AXIe embedded controller

Main Features and Benefits

Product features	Your benefits
Gen 2 PCIe link to backplane	Faster data transfer rates across the backplane
Intel Xeon EP Quad Core L5518 processor	Faster system performance for multi-threaded applications
16 GB RAM option	Support for large, data-intensive tasks
Preloaded with Agilent I/O libraries and operating system	Reduced test system development time
Designed for AXIe systems	Provides choice between embedded and external controllers
Solid-state drive (SSD)	Improved reliability

Chassis slot compatibility: AXIe 1.0 secondary hub-slot (slot #1 in the M9502A and M9505A)

Specifications and Characteristics

Hardware	
Size	1-slot, AXIe module
CPU	Intel Xeon EP L5518 processor at 2.13 GHz
Storage Type Size	2.5″ SATA II SSD 160 GB
Memory	8 GB standard, 16 GB optional 24 GB maximum
AXIe PCIe link configuration	x4, Gen 2
AXIe PCIe data bandwidth (max)	2GB/s to AXIe backplane
AXIe Ethernet fabric channel	10/100/1000BASE-T
Front panel connections	USB (3), 10/100/1000 LAN (2), VGA (up to 1600x1200), RS-232

15

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Software Information

The embedded controller supports Microsoft Windows® 7 operating systems and comes with the selected operating system installed. Agilent I/O libraries, including VISA, Agilent Connection Expert, and I/O monitor, are also pre-installed.

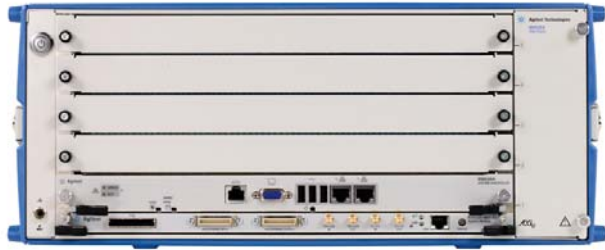|	
Supported operating systems	Microsoft Windows® 7 (32/64-bit)
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

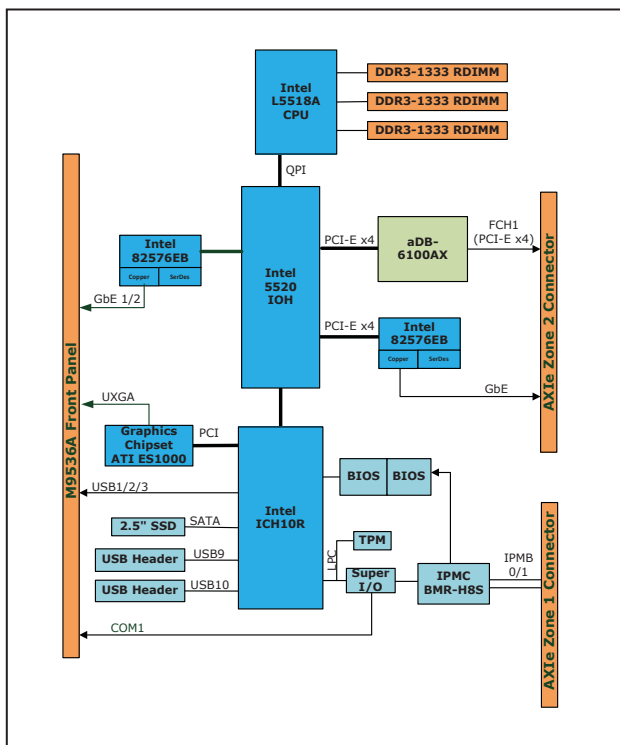*Figure 1. M9536A AXIe embedded PC controller installed in the M9505A AXIe Chassis*

Ordering Information

Typical Product Information

Model	Description
M9536A	AXIe embedded PC controller
M9536A-M16	Memory upgrade from 8GB RAM to 16 GB RAM
M9536A-W76	Windows® 7 Pro operating system (64 bit)
M9505A	5-slot AXIe chassis

Related Products

M9536A-W73	Windows® 7 Pro operating system (32 bit)
M9502A	2-slot AXIe chassis

Advantage Services: Warranty

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R-51B-001-3C	1 year return to Agilent warranty extended to 3 years

Figure 2. M9536A block diagram

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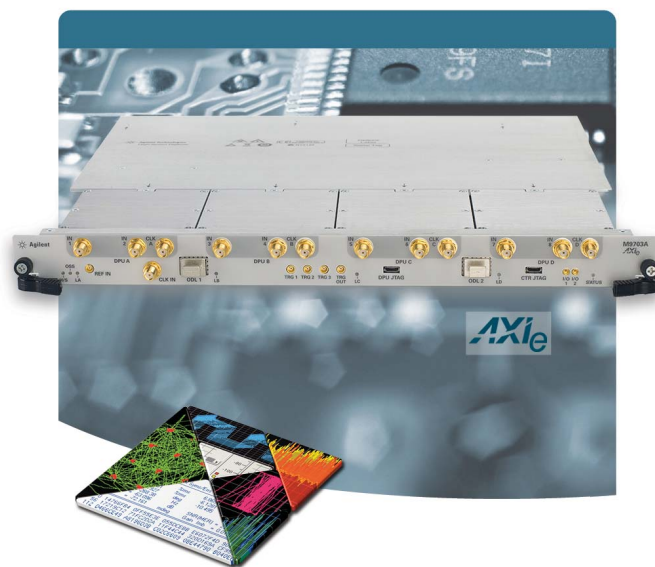# Agilent M9703A AXIe Digitizer 12-bit, 8 Channels

DISCOVER the Alternatives...

Industries and Applications

- Large scale applied physics experiments
- Wideband multi-channel and high-fidelity signal capture

Product Description

The M9703A is a single-slot AXIe wideband digitizer, providing 4 - 8 synchronous channels with 12-bit resolution running at up to 3.2 GS/s, and offering up to 1 GHz analog bandwidth. The Agilent M9703A also provides very long acquisition capability by implementing up to 4 GBytes internal memory. In addition, to ensure high data throughput, the module also provides a PCIe backplane connection.

Models

M9703A	AXIe Digitizer 12-bit, 8 channels

... Agilent MODULAR Products

Main Features and Benefits

Product features	Your benefit
8 channels (4 if interleaving is enabled)	Easily build large scale acquisition systems
12-bit resolution	High dynamic range for the best measurement fidelity
Up to 3.2 GS/s sampling rate	Get very fast measurements on the fastest signals
DC - 1 GHz analog bandwidth	Wideband signal capture
Four on-board Xilinx Virtex-6 FPGAs	High on-board processing capability
Up to 4 GB (256 MSamples/ch) on-board memory	Long data acquisition time
Four lanes (x4) PCIe Gen 2 backplane link	High digitized data throughput

Connector compatibility: AXIe, ATCA

Specifications

Hardware	
Size	1 slot 9U
Resolution	12 bits
Sample rate	1 GS/s to 3.2 GS/s
Bandwidth	DC to 650 MHz 1 GHz additional path option
Impedance	50 Ω (nominal)
Coupling	DC
Full scale (FS) range	1 V / 2 V
Spurious-free dynamic range (SFDR)	66 dBc (nominal)
Effective number of bits (ENOB)	9.4 bits (nominal)
Signal to Noise Ratio (SNR)	59 dB (nominal)

15

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Software

The M9703A includes the Agilent MD1 soft front panel (SFP) graphical interface. This simple software application can be used to control, verify the functionality and explore the capabilities of the Agilent modular high-speed digitizers. The MD1 SFP provides several different measurement and display capabilities, one being a real-time FFT plot of the acquired signal.

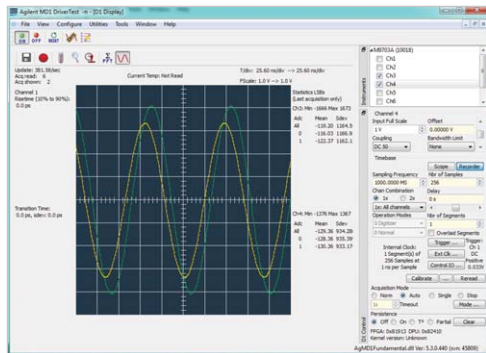| Supported operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor

Figure 1. Agilent M9703A MD1 software front panel (SFP) interface.
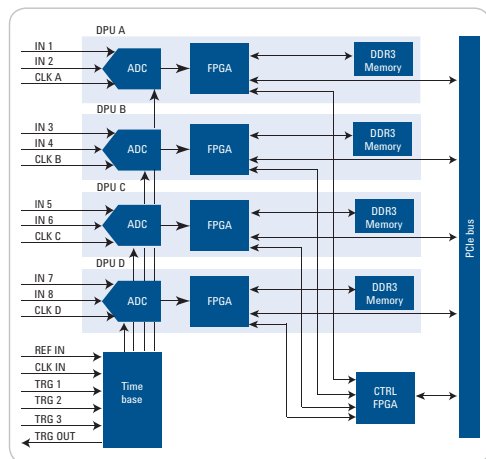

Figure 2. Simplified block diagram of the M9703A AXIe Digitizer.

Figure 3. Five Agilent M9703A AXIe 12-bit digitizers installed in the Agilent M9505A 5-slot AXIe chassis to form a 40-channel 12-bit acquisition system.

Ordering Information

Typical Product Configuration

Model	Description
M9703A	AXIe 12-bit Digitizer
M9703A-SR1[1]	1 GS/s sampling rate
M9703A-SR2	1.6 GS/s sampling rate
M9703A-INT	Interleaved channel sampling functionality
M9703A-F05[1]	650 MHz maximum analog bandwidth
M9703A-F10	1 GHz bandwidth additional path
M9703A-M10[1]	1 GB (64 MS/ch) acquisition memory
M9703A-M20	2 GB (128 MS/ch) acquisition memory
M9703A-M40	4 GB (256 MS/ch) acquisition memory

[1] These options are included in the default configuration of the M9703A

Related products

M9502A	2-slot AXIe chassis
M9505A	5-slot AXIe chassis
M9536A	Embedded AXIe controller
U1092A	AcqirisMAQS Multichannel Acquisition Software

Accessories

Software and product information on CD (included)

Advantage Services: Calibration and Warranty

Agilent Advantage Services is committed to your success throughout your equipment's lifetime.

M9703A-UK6	Commercial calibration certificate calibration with test data
R-51B-001-3C	1 year return-to-Agilent warranty extended to 3 years
R-51B-001-5C	1 year return-to-Agilent warranty extended to 5 years

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5990-8506EN

Agilent Technologies

Agilent M8190A Arbitrary Waveform Generator

DISCOVER the Alternatives...

Industries and Applications

- Aerospace and defense
- Radar and satellite testing
- Wideband signal generation
- Wireless communications
- Consumer and computation
- Education and research

Product Description

From low-observable systems to high-density communications, testing is more realistic with precision arbitrary waveform generation. Now you can take reality to the extreme. An Agilent AWG is the source of greater fidelity, delivering high resolution and wide bandwidth—simultaneously. This unique combination lets you create signal scenarios that push your designs to the limit and bring new insights to your analysis. Get bits and bandwidth—enhance your reality.

... Agilent **Modular** Products

Models
M8190A   AXIe Modular Arbitrary Waveform Generator Module

Main Features and Benefits

Product features	Your benefits
5 GHz analog bandwidth	The modulation bandwidth meets market requirements today and tomorrow
14 bit with 8 GSa/s	Best SFDR in the market
Switchable between 12 bit, 12 GSa/s and 14 bit and 8 GSa/s	Adopt the application to your needs
2 GSa memory	Test your application with realistic scenarios over long periods of time

Specifications and Characteristics

Hardware	
Size	2-slot AXIe module
Sample rate	125 MSa/s to 12 GSa/s
Resolution	12 bits up to 12 GSa/s 14 bits up to 8 GSa/s
Analog Bandwidth	5 GHz
Spurious-free-dynamic range (SFDR)	Up to 80 dBc typical
Harmonic distortion (HD)	Up to -72 dBc typical
Transition times	50 ps (20/80)
Memory depth	2 GSa
Type of output	Single-ended or differential, DC-coupled
Impedance	50 Ω (nom)

Chassis compatibility: AXIe

15

Agilent Technologies

Software Information

The M8190A can be controlled via SCPI commands or through IVI drivers.

|	
Supported operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	IVI-COM, IVI-C, LabVIEW, MATLAB
Supported application development environments (ADE)	Agilent Benchlink Waveform Editor, Agilent Signal Studio, Agilent SystemVue, Agilent Wideband Waveform Center VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, MATLAB
Agilent IO Libraries	Includes: VISA Libraries, Agilent Connection Expert, IO Monitor
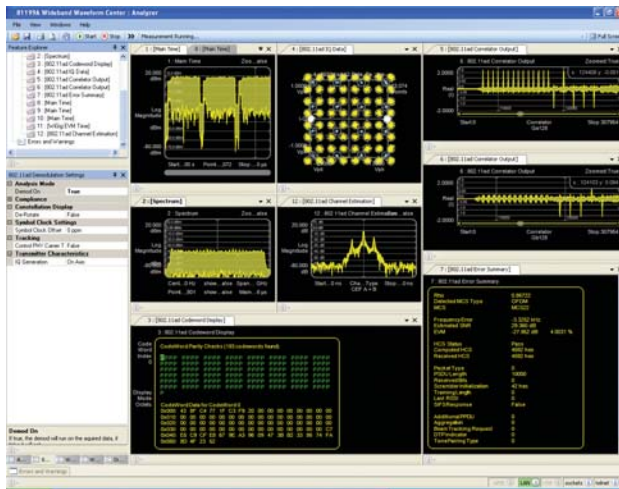
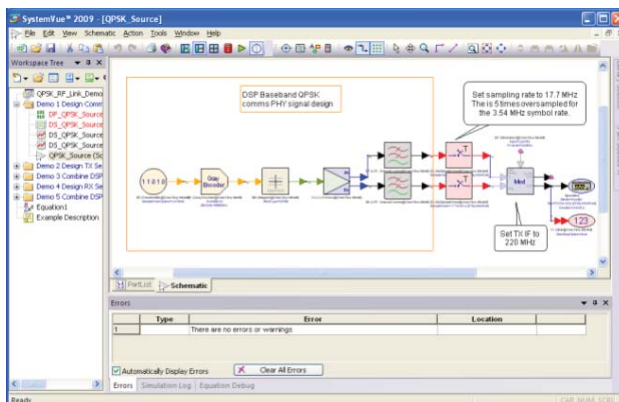*Figure 1. Agilent Wideband Signal Creator for waveform generation.*

Figure 2. M8190A integration into SystemVue.

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Ordering Information

Typical Product Configuration	
Model	Description
M8190A[1]	Product only with required accessories
M8190A-001 M8190A-002	1 channel 2 channel
M8190A-14B	14 bit, 8 GSa/s
M8190A-12G	12 GSa/s, 12 bit
M8190A-02G	2048 MSa per channel

1. Product requires 2-slot or 5-slot chassis with PCIe card adapter and cable

Related products	
M9045B	PCIe ExpressCard adaptor
M9047A	PCIe desktop adaptor
M9502A	2-slot AXIe chassis
M9505A	5-slot AXIe chassis
M9536A	AXIe controller

Advantage Services: Warranty	
Agilent Advantage Services is committed to your success throughout your equipment's lifetime.	
M8190A-Cal	Annual calibration
R-50C-011-3 QC	Agilent Calibration - 3 years
R-50C-011-5 QC	Agilent Calibration - 5 years

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Agilent Technologies

Agilent U4154A 4Gb/s AXIe Logic Analyzer Module

DISCOVER the Alternatives...

Industries and Applications

- Digital debug and logic analysis

- High Speed DDR memory applications

- Analog to digital converter verification

- High-speed ASIC/FPGA debug and validation

Product Description

The Agilent U4154A AXIe logic analyzer system combines reliable data capture up to 136 channels with powerful analysis and validation tools to enable you to quickly and confidently validate and debug high-speed digital designs operating at speeds up to 4 Gb/s. Confidence in the state mode captures, and bus-level signal integrity insight, make the U4154A logic analyzer the ideal tool for DDR memory measurement and debug work.

(Photo shown is a typical AXIe logic analysis system configuration. The U4154A is only the logic analyzer module. Cables, probes, host PC, adapters and chassis are sold separately.)

Models	
U4154A	AXIe Logic Analyzer Module

Main Features and Benefits

Product features	Your benefits
Up to 4 Gb/s state speed	Real time capture on high speed busses
100 ps data valid window	Reliable data capture even with small eye diagrams
12.5 GHz timing zoom	Get simultaneous state and high-resolution timing measurements
Dual sample mode	Sample DDR reads and writes simultaneously Achieves highest data rates
200 M sample memory depth	Debug problems where the cause and symptoms are separated by several seconds
2.5 Gb/s trigger sequencer	Enabling accurate and precise triggering—even on complex burst events

... Agilent **Modular** Products

Specifications and Characteristics

Hardware	
Size	1-slot AXIe module
Number of channels (multiple modules can be merged)	136 (full channel mode) per module
Supported signal types	Single-ended and differential
Max state data rate	2.5 Gb/s on 136 channels 4 Gb/s on 68 channels
Max state clock	2.5 GHz
Minimum state clock frequency	12.5 MHz (single edge) 6.25 MHz (both edges)
Minimum data valid window	100 ps
Minimum eye height	100 mV
Timing sample rate	2.5 GHz (full channel mode) 5 GHz (half channel mode)
Timing zoom sampling rate	12.5 GHz
Max trigger sequence speed	2500 MHz (400ps)

Chassis compatibility: AXIe

Agilent Technologies

Software Information

The U4154A module's graphical user interface is included in the U4000 series application software. The software is downloadable from the product's web page on Agilent.com. The software requires that only U4000A series modules are installed in the AXIe chassis.

Supported operating systems	Microsoft Windows® 7 (32/64-bit) Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit)
Standard compliant drivers	N/A
Application software	U4000 Series Application Software (includes embedded COM server)
Agilent IO Libraries	Only required for Viewscope

Bus level signal integrity insight from eye scans of all signals simultaneously helps engineers rapidly identify signals that require further characterization with an oscilloscope. Eye scan clearly indicates the byte lane shift caused by fly-by routing on this DDR3 2133 Mb/s system.
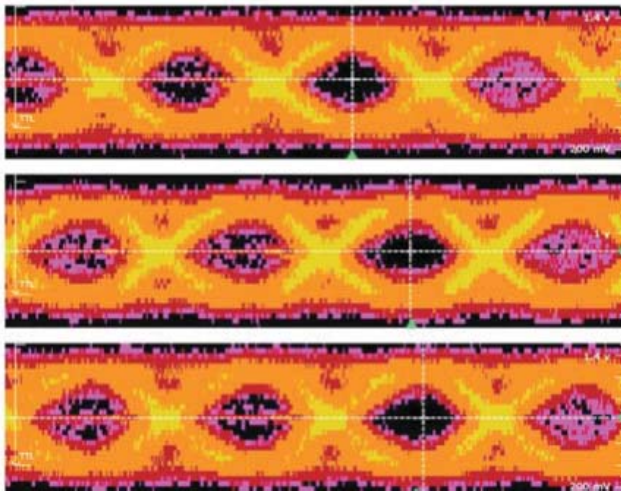

Figure 1. Eye scan measurement.

State waveforms allow engineers to follow signal flow. High resolution Timing Zoom waveform provide precision timing measurements.
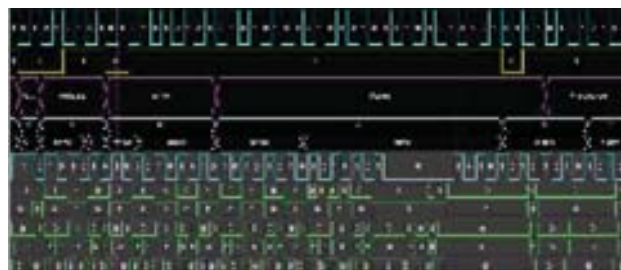

Figure 2. DDR signals timing waveforms.

Ordering Information

Typical Product Configuration	
Model	**Description**
U4154A U4154A-02G	Logic analyzer module State speed 136-channel, 2.5 Gb/s state 68 channel, 4Gb/s state (Other State speed option is –01G 136-channel, 1.4 Gb/s state 68 channel, 2.8 Gb/s state) 16M memory (other memory options include: 2M, 4M, 8M, 32M, 64M, 128M, 200M)
U4201A	Logic analyzer probe cable (4 per U4154A)
Application SW tools and Probes	Refer to ordering information in data sheet 5990-7513EN
M9502A / M9505A	2-slot AXIe chassis 5-slot AXIe chassis Either chassis requires either the M9536A embedded controller or a host PC and PCI express adapter and cable.

Advantage Services: Warranty	
Agilent Advantage Services is committed to your success throughout your equipment's lifetime.	
R-51B-001-5C	Return to Agilent Warranty - 5 years

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Agilent Technologies

Agilent U4301A PCI Express 3.0 Protocol Analyzer Module

DISCOVER the Alternatives...

Industries and Applications

• PCI Express Chipset turn-on, Debug and Validation

• Root Complex and End-point Debug and validation

Product Description

The U4301A helps test engineers and validation labs address the challenges of transitioning to PCIe 3.0 by addressing the high speeds, new encoding scheme, and advanced protocol features.

The U4301A protocol analyzer module supports all PCI Express 3.0 speeds, including 2.5 GT/s and 5.0 GT/s through PCIe 8 GT/s with x1 through x16 support.

... Agilent **Modular** Products

Models	
U4301A	PCIe gen3 protocol analyzer

Main Features and Benefits

Product features	Your benefits
Support for Gen1/Gen2/Gen3, x1 through x16 link width	Support all modes of operation and all generations of PCI Express
Trace capture mode with lane view and triggering	Ensure data visibility even in the face of significant PHY layer issues
4 GB of capture buffer per module	Debug problems where the cause and symptoms are separated by large time gaps
Non-intrusive probing that leverages ESP technology	Reliable capture even with small eye diagrams
Mid-bus, Slot Interposer, and Flying Lead probe, x1 to x16 support	Variety of probing to meet your specific needs

Specifications and Characteristics

Hardware	
Size	1-slot AXIe module
Number of lanes	x16 single direction lanes per module or bi-direction up to x8 lanes per module
Memory depth	4 GB per module (8 GB for x16 lanes)
Supported speeds	2.5 GT/s (Gen1) 5.0 GT/s (Gen2) 8.0 GT/s (Gen3)
Speed detection	Automatic among Gen1, Gen2, Gen 3
Trigger sequencer states	4 states

Chassis compatibility: AXIe

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Software Information

The U4301A comes complete with the Protocol Analysis Software. This software only requires the U4301A PCIe Analyzer module to be installed in the AXIe chassis.

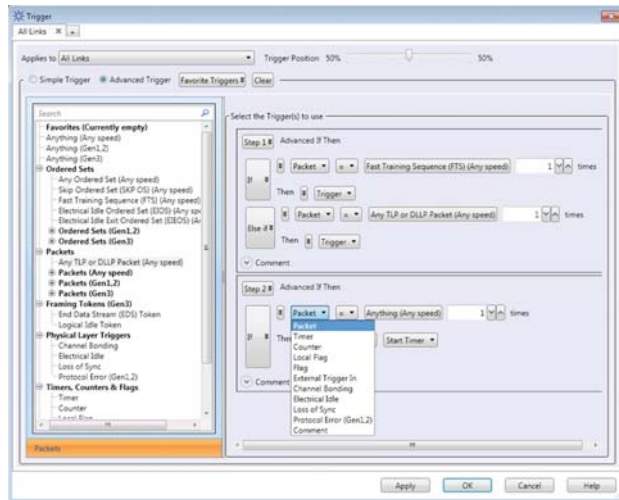|	
Supported operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	N/A
Supported application development environments (ADE)	Agilent PCI Express Protocol Analyzer Software
Agilent IO Libraries	N/A

Figure 1. Full PCI Express Protocol Decoding.

Figure 2. Advanced triggering capabilities.

Ordering Information

Typical Product Configuration

Model	Description
U4301A	Analyzer module for PCIe 8Gbps
U4301A-A08 or U4301A-A16	Analyzer linkwidth x8 or Analyzer linkwidth x16 (2 modules required for x16 analysis)
U4301A-AN3	Analyzer software license for PCIe 8 Gbps
U4301A-AN2	Analyzer software license for PCIe 5 Gbps
U4321A-A08	Slot interposer 3.0 for PCIe 8 Gbps x8
U4322A	Mid-bus probe 3.0 for PCIe 8 Gbps (bi-directional x8)

Related products

M9502A	2-slot AXIe chassis
M9505A	5-slot AXIe chassis
M9536A	AXIe controller

Advantage Services: Warranty

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R-51B-001-5C	Return to Agilent Warranty - 5 years

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Agilent Technologies

Agilent U4998A HDMI 1.4b Protocol Analyzer and Generator Module

DISCOVER the Alternatives...

Industries and Applications

- HDMI Authorized Test Centers (ATCs)

- HDMI chipset debug and validation

- Consumer computer video devices incorporating HDMI debug and validation

Product Description

The Agilent U4998A HDMI 1.4b Protocol Audio Video analyzer and generator module enables you to test your devices to ensure they are HDMI 1.4b CTS compliant. The module supports source and sink compliance testing of video formats, including 4K x 2K, 3D, and deep color, up to the maximum data rate of 3.4 Gbps.

The U4998A's wide range of capabilities enable you to test legal codes, basic protocol, packet type, pixel encoding, video format timing, AVI Infoframe, ACR, audio sample packet jitter, deep color, 3D video format and more.

Product photo shows U4998A module installed in M9502A chassis.

... Agilent **Modular** Products

Models	
U4998A	HDMI 1.4b Analyzer/Generator module

Main Features and Benefits

Product features	Your benefits
Maximum data rate of 3.4 Gbps	Most complete coverage of HDMI data rates. Supports 4K x 2K, 3D and deep color video formats
HDMI 1.4b capture and generation with compliance tests	Gain confidence in obtaining CTS certification of HDMI source and sink devices
Passive monitoring with pass-through and mirror capabilities *(optional)*	Monitor the output of a source device so you can debug and troubleshoot source and sink issues.
Remote control via COM commands	Automate your HDMI testing and remotely control the U4998A using the COM server embedded in the application software

Chassis compatibility: AXIe

Specifications and Characteristics

Hardware	
Size	1-slot AXIe module
Maximum data rate	3.4 Gbps
Memory depth	4 GB
HDMI 1.4b compliance test support	Source Tests: 7-16 through 7-19, 7-23 through 7-40 Sink Tests: 8-16, 8-21, 8-23, 8-25*, 8-29, 8-30*, 8,31, (*with E4887A Signal Generator)
HPD (Hot Plug Detect)	Emulate removal and connection of HDMI cable between tests
Internal frequency counter	Automatically detects clock frequency without external equipment
Operating modes	Capture/compliance Generate/compliance Passive Monitoring (pass-through/mirror)

15

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Software Information

The U4998A module's graphical user interface is included in the U4000 Series application software. The software is downloadable from the product's web page on Agilent.com. The software requires that only U4000A Series modules are installed in the AXIe chassis.

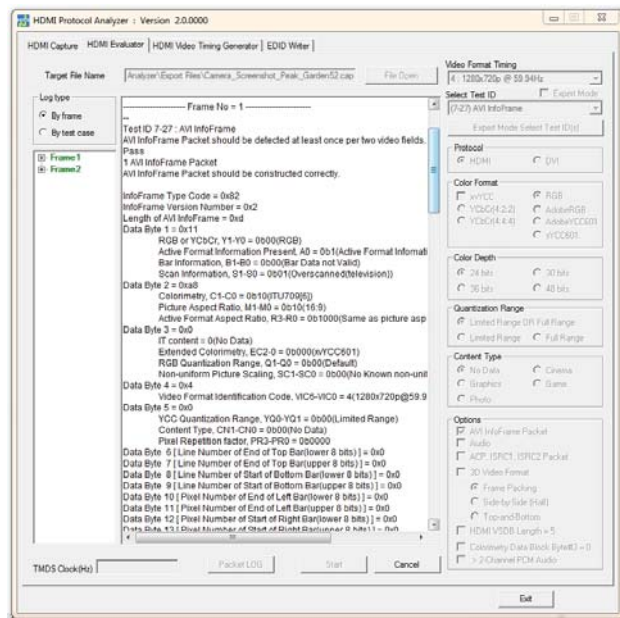|	
Supported operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® Vista (32/64-bit) Microsoft Windows® 7 (32/64-bit)
Standard compliant drivers	N/A
Application software	U4000 Series Application Software (includes embedded COM server) HDMI 1.4a Evaluator Software
Agilent IO Libraries	N/A

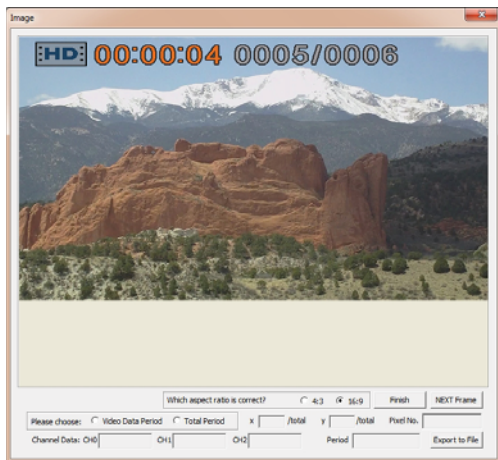*Figure 1. Review the evaluation results and get PASS/FAIL confirmation.*

Figure 2. The video image window allows you to visually inspect the video image.

Ordering Information

Typical Product Configuration

Model	Description
U4998A	HDMI 1.4b Protocol Analyzer & Generator Module
U4998A-PSV	Passive monitoring (pass through/mirror)
M9502A	2-slot AXIe chassis (Requires either external host PC or M9536A AXIe embedded PC controller)
M9045B Y1200B	Connection to Laptop PCIe ExpressCard adaptor: Gen 1 PCIe cable: x4 to x8, 2.0m

Related products

M9536A	AXIe embedded PC controller
M9047A Y1202A	Connection to Desktop PCIe desktop PC adapter: Gen2, x8 PCIe cable: x8, 2.0m
N5998U-DBG	Software license. Export HDMI captured data for further evaluation/analysis

Advantage Services: Warranty

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R-51B-001-5C	Return to Agilent Warranty - 5 years

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SOFTWARE APPLICATIONS

Connect to more types of instruments – *it's never been easier*!

Agilent IO Libraries Suite

Agilent IO Libraries Suite offers FAST and EASY connection to PXI modular instruments and traditional instruments and reduces system setup and configuration time to mere minutes.

Command Expert

Agilent's Command Expert software tool provides fast and easy instrument control with combined instrument commands, documentation, syntax checking and command execution all in one simple interface. Instrument Command Sets are available for instruments that use IVI-COM drivers or Standard Commands for Programmable Instrumentation (SCPI).

Vector Signal Analysis Software

Agilent's 89600 VSA software is your window into what's happening inside complex wireless devices. With views of virtually every facet of a problem, our vector signal analysis tools let you find the "why?" behind unexpected interactions. Whether you're working with emerging or established standards, Agilent's industry-leading 89600 VSA software enables:

- Measurement for more than 70 signal standards and modulation types

- Measurement clarity with 20:20 trace/marker capabilities

- Multi-Domain digital persistence and cumulative history traces

- Signal analysis virtually anywhere in block diagrams
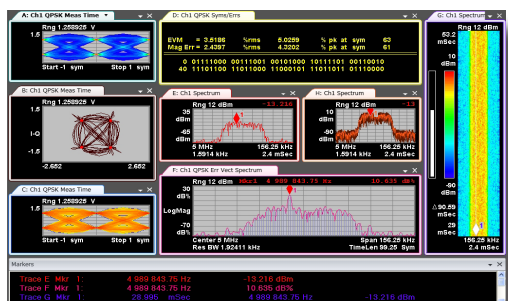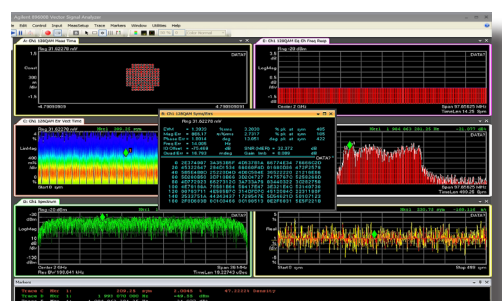
Agilent 89600 VSA Software

SystemVue

SystemVue is a focused electronic design automation (EDA) environment for electronic system-level (ESL) design. It enables system architects and algorithm developers to innovate the physical layer (PHY) of wireless and aerospace/defense communications systems and provides unique value to RF, DSP, and FPGA/ASIC implementers. As a dedicated platform for ESL design and signal processing realization, SystemVue replaces general-purpose digital, analog, and math environments. SystemVue "speaks RF", cuts PHY development and verification time in half, and connects to your mainstream EDA flow.

Key Benefits of SystemVue:
- Best-in-class RF fidelity among today's baseband/PHY environments – allows baseband designers to virtualize the RF and eliminate excess margin

- Superior integration with Test accelerates real-world maturity and streamlines your model-based design flow, from Architectures to Verification

- Priced for networked workgroups to maximize design re-use and capitalize on Baseband & RF synergies Signal analysis virtually anywhere in block diagrams

www.agilent.com/find/modular-software

SOFTWARE APPLICATIONS

The following pages within this section include a summary of the Agilent software applications which complement modular products..

www.agilent.com/find/modular-software

AGILENT IO LIBRARIES

Connect to more types of instruments – *it's never been easier*!

Agilent IO Libraries Suite offers FAST and EASY connection to PXI modular instruments and traditional instruments.

I/O Software Compatibility

With multiple vendor I/O software installed, you get the best solution with Agilent's open IO Libraries Suite. For instance, during installation the IO Libraries Suite automatically detects NI's software and safely installs the Suite in a side by side mode. This allows the existing I/O software and the Agilent software to work together.

Getting started is easy!

1. **Install** Agilent IO Libraries Suite software on your PC.

2. **Connect** the PXI interface cables between your chassis and/or instruments, and your PC.

3. **Detect** interfaces, chassis, and instruments and configure them using Agilent Connection Expert.

In just minutes you have an error-free connection that simply works.
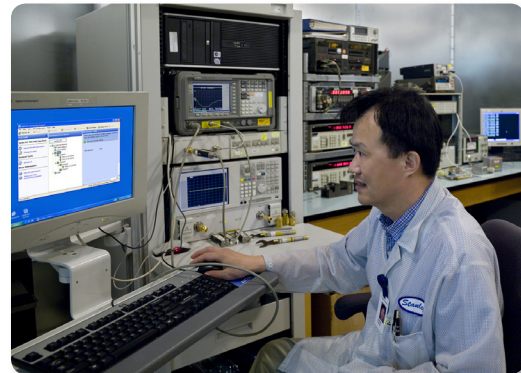
Agilent IO Libraries Suite reduces system setup and configuration time to mere minutes.

- Automatically detects instruments connected to your PC and configures the interfaces.

- Compatible with PXI as well as AXIe, GPIB, USB, Ethernet/LAN, RS-232, and VXI test instruments from a variety of vendors.

- Enables instrument communication for a variety of development environments (Agilent VEE Pro, MATLAB, LabVIEW, Microsoft Visual Studio and more).

16

www.agilent.com/find/iosuite
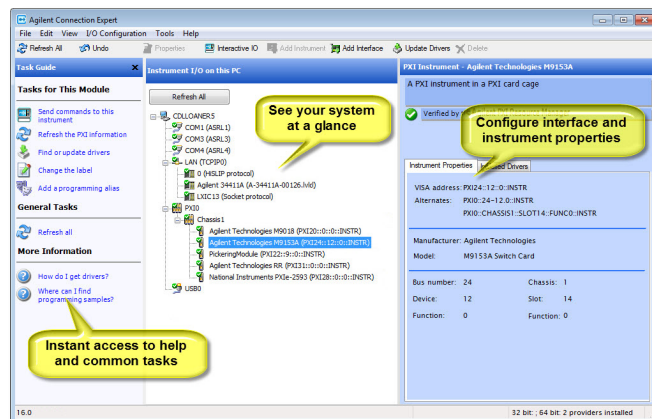
With **more** features and capabilities, you have **more choices** than ever before

New in Agilent IO Libraries Suite 16...

Support for modular instruments

Agilent VISA and Connection Expert now support modular instruments such as PXI (PCI eXtensions for Instrumentation), PXIe (PCI Express eXtensions for Instrumentation), and PCIe™ (PCI EXPRESS®) devices. The PXI Resource manager will discover and display chassis and modules. Since a single platform isn't the right answer for every test scenario, Agilent IO Libraries Suite continues to add new interfaces and new capabilities to the connectivity software.

## Easier ways to find and update instrument and soft front panel drivers

Connection Expert now allows you to search for, verify, and update IVI instrument and soft front panel drivers from the instrument properties view. This will save you time and ensure that the most up to date driver is being used in your application.

Easier to debug programs

IO Monitor allows you to monitor and debug calls through Agilent IVI instrument drivers released after September 18, 2010. This ability to trace instrument I/O traffic can greatly simplify and speed up the debug process.

Automatic notification of updates to the IO Libraries Suite software

When enabled, you can choose to be notified when a newer release of the Agilent IO Libraries Suite is available. As features are added, you will be alerted and can download the software when it is convenient.
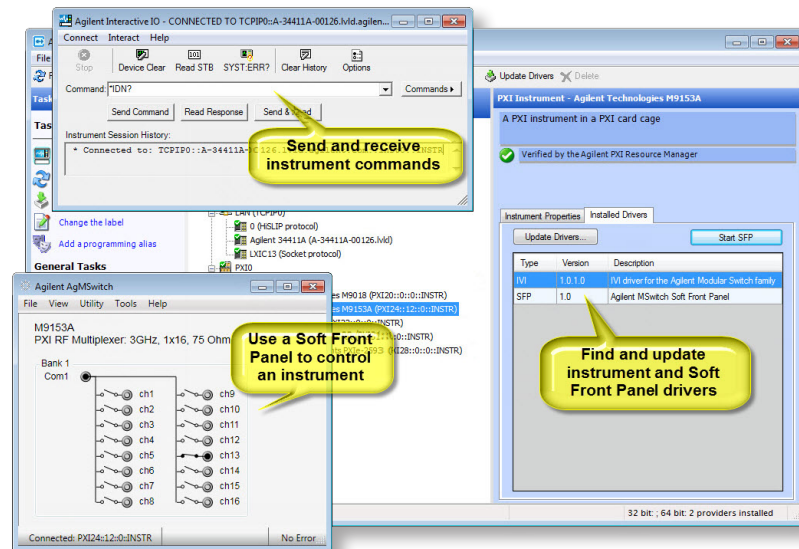
## Supported development environments and supported I/O software

VB6	VISA COM, VISA, SICL, Agilent 488, Excel VBA
C/C++, Managed C++	VISA COM, VISA, Agilent 488
.NET languages (VB.NET, C#)	VISA COM, VISA, Agilent 488
LabVIEW	VISA, Agilent 488
MATLAB	VISA

Note: Agilent IO Libraries Suite supports VEE Pro program development with drivers and/or Direct IO.

I/O utilities

Connection Expert	Automatically scans and configures your instrument IO, helps you get connected quickly and easily and displays the status of your interfaces and instruments.
Interactive IO	Lets you quickly send commands to instruments and read responses.
Interactive LXI	Allows you to send and receive LXI events, monitor, and manage LXI instrument precision clocks.
IO Monitor	Lets you monitor and debug I/O calls made on any of Agilent's supported buses using Agilent SICL, VISA, VISA COM, or Agilent IVI instrument drivers (released after September 18, 2010).
IO control	Provides easy access to the IO Libraries Suite from the Windows system tray.
VXI resource manager	Provides configuration of the IEEE 1394 connection from PC to VXI.
viFind32	Debug utility uses VISA functions to find resources and lists them in a console window.

*   *See the latest information on supported interfaces and operating systems for IO Libraries Suite 16 at www.agilent.com/find/iolib_revmatrix. To identify which versions of IO Libraries support particular operating system and interface combinations, go to www.agilent.com/find/iolib_osmatrix.*

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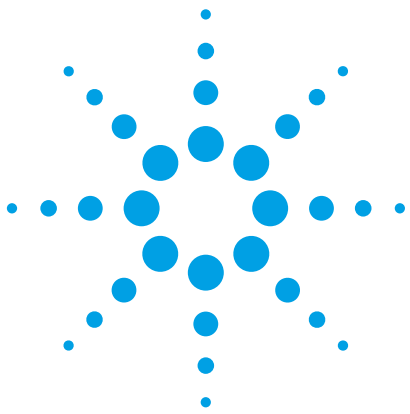
Agilent Command Expert

...for fast and easy instrument control!

Industries and Applications

- Aerospace and Defense
- Electronic Test
- Wireless Communications
- Radar and Wideband Signal Capture
- And others....

Product Description

Agilent's Command Expert is a FREE software tool that provides fast and easy instrument control in PC application environments.

Command Expert combines instrument commands, documentation, syntax checking and command execution all in one simple interface. Instrument Command Sets are available for instruments that use IVI-COM drivers or Standard Commands for Programmable Instrumentation (SCPI).

- Find instrument commands
- Access command documentation
- Verify command syntax
- Build instrument command sequences
- Execute instrument command sequences
- Integrate sequences into PC application environments
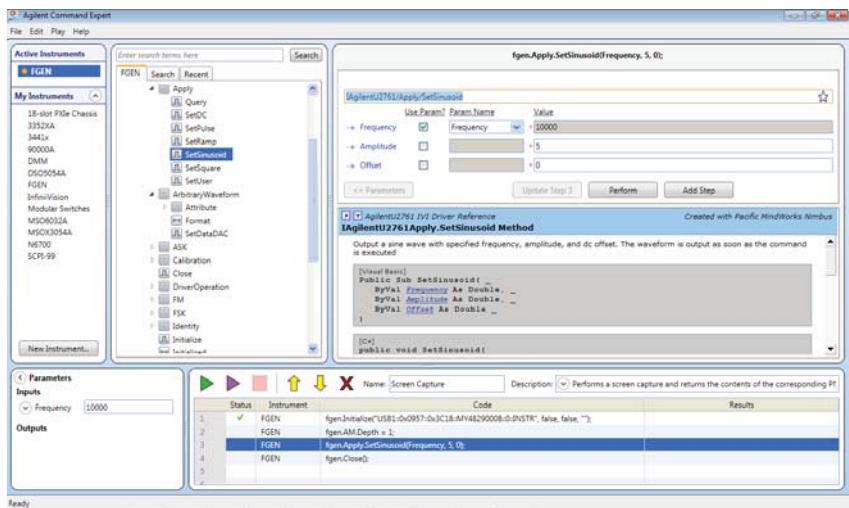
Main Features and Benefits

Product features	Your benefits
Access all IVI-COM commands and documentation in one interface.	Spend less time searching for the right command.
Rapid prototyping of instrument commands within the interface.	Quickly create the right sequence to perform the measurements needed.
Put together sequences before the hardware is available.	Save development time by working Off-Line to build the commands then test the results once the hardware is available.
Integration with Visual Studio, Excel, VEE, SystemVue, and LabVIEW.	Save time and minimize rework with syntax checking available within the program.
Write the sequence once and reuse in other programming environments.	Save time and maximize reuse of code generated.

Connector compatibility: Works with all interfaces

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129
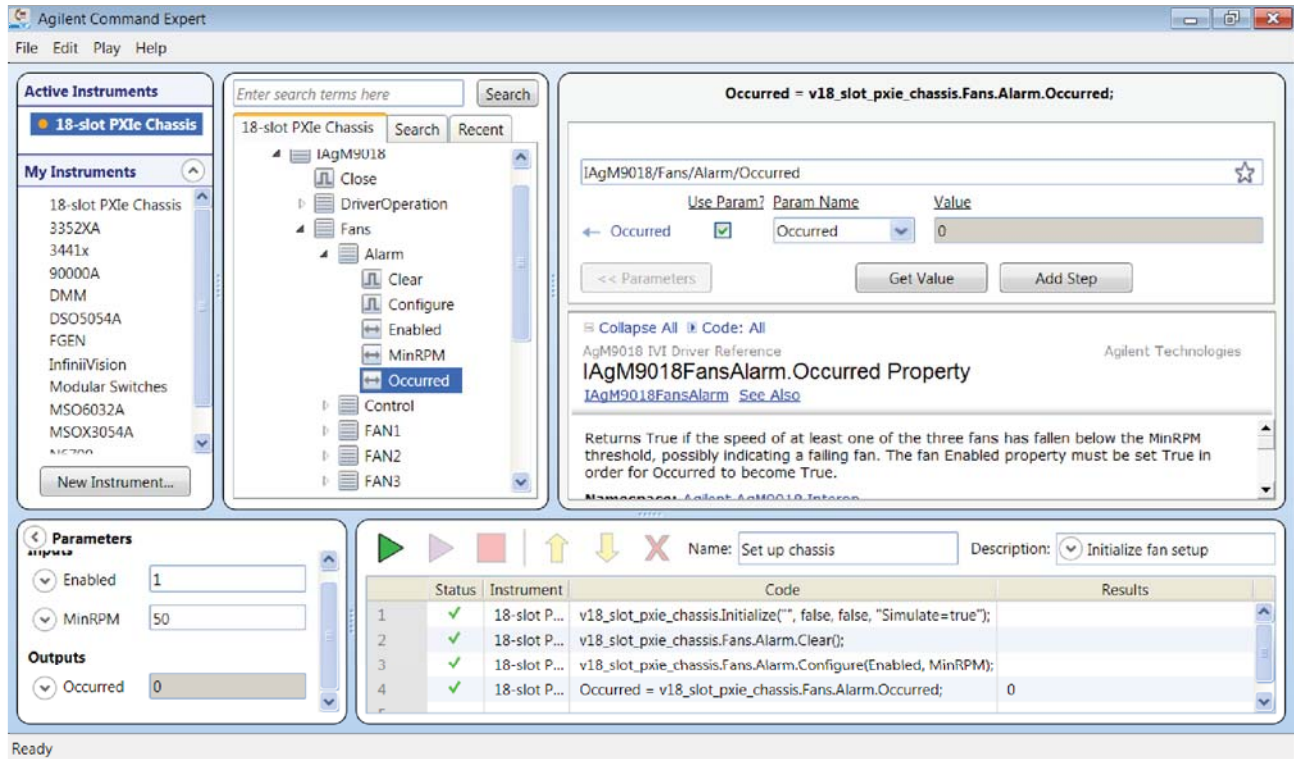
Figure 1. GUI for Agilent Command Expert example for PXI chassis fan control.

Software Information

Software operating systems	Microsoft Windows® 7 (32/64-bit),
Standard compliant drivers	IVI-COM
Supported application development environments (ADE)	VisualStudio® 2005, 2008, 2010 and above VEE Pro 9.2.2 LabVIEW 8.2.1 or above Excel 2007 or Excel 2010
Agilent IO Libraries	Required

Ordering Information

Free Software Download
www.agilent.com/find/commandexpert

Related Products	
E2094	Agilent IO Libraries

16
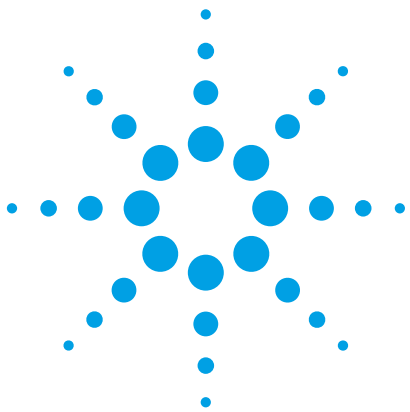
Agilent SystemVue
System-Level Design & Verification Environment

Industries and Applications

Aerospace and Defense R&D Access

- MilComm, SatComm, Radar, Electronic Warfare, Elint

Wireless Communications R&D

- Emerging and Wideband Communications
- Medical, Automotive, PLC, Telemetry, Sensors, & more

Product Description

Agilent SystemVue is a system-level EDA environment that accelerates design and verification of defense and communications systems at the physical layer, where advanced digital signal processing meets RF. SystemVue brings together baseband algorithm modeling, accurate RF, trusted Reference IP, and measurement automation in a single environment for high-performance RF/DSP co-design.

Agilent SystemVue combines with Agilent Modular Products to create an expandable platform for modeling, implementing, and validating next-generation communications systems and defense systems.

A modular approach to the design environment enables a virtual system to be verified from the first day of a project, beginning with simulation models, and gradually incorporating more measurements. As your design is completed into working hardware, SystemVue's simulators transition out of your block diagram, and the Agilent measurement equipment remains to do final verification. This allows continuous model-based design validation from concept to hardware, for earlier "real-world" design maturity, and fewer Baseband-RF design iterations.

Typical Applications

- Signal generation with fading & impairments
- Early standards support
- Accurate component modeling and linearization
- Wideband system validation
- Use simulation to imitate missing hardware components, for early system validation

Main Features and Benefits

Product features	Your benefits
Popular modeling languages: C++, MATLAB .m, HDL, or graphical dataflow schematics	Open, vendor-neutral formats reduce costs and connect Agilent Test with Enterprise EDA tools
Superior RF simulation speed & accuracy, with links to RF EDA	Virtualize RF/MIMO components for earliest system validation with high confidence
World-class IP references for LTE-Advanced, 802.11ac/ad, Radar, and other standards	Create and re-use TX/RX and MIMO verification suites with confidence across the whole lifecycle from design to test
Superior integration of Simulation with Test & Measurement	Bring "Drive Test" accuracy into 4G design, while creating custom personalities around test
Interoperates with a wide variety of Agilent equipment and software, including 89600 VSA and Command Expert	Makes highest use of best-in-category assets, while unifying DSP and RF design lifecycles into a coherent flow

16

Agilent Technologies

Ordering Information

Figure 1. SystemVue's W1716EP Digital Pre-Distortion personality directly controls a M9392A microwave VSA to linearize wideband 4G power amplifiers.

Software Information

Software operating systems	Microsoft Windows® XP (32-bit) Microsoft Windows® 7 (32/64-bit)
Available Add-on Applications and Design Flow Personalities	Fixed-point models, HDL Code-Generation, C++ Code Generation, Adaptive EQ, DPD Builder, MIMO Channel Builder, RF System Architectures
Available Standards Reference Libraries	**Comms:** LTE-Advanced, LTE, HSDPA, HSUPA, WCDMA, CDMA2000® , CDMA, WiMAX™, 802.15.3c, Zigbee, 802.11ad, 802.11a/ac, DVB-S2, DVB-T2, ISDB-T, Custom OFDM, and other formats.
	Radar: Pulsed Doppler, UWB, SAR, DAR, FMCW
Agilent software applications that are tightly integrated with SystemVue	89600 VSA N1010A FlexDCA I/O Libraries (SCPI and IVI-COM) Command Expert Advanced Design System GoldenGate
3rd party applications and development environments that are integrated with SystemVue	Microsoft VisualC++® MATLAB (.m language) Mentor ModelSim (VHDL/Verilog) Xilinx ISE (FPGA synthesis)

Recommended Products & Environments

Core Environment
- W1461BP SystemVue Comms Architect

People who use Agilent Modular Instruments often buy:
- W1716EP Digital Pre-Distortion Builder
- W1905EP Radar Model Library
- W1917EP WLAN Baseband Verification Library (802.11ac)
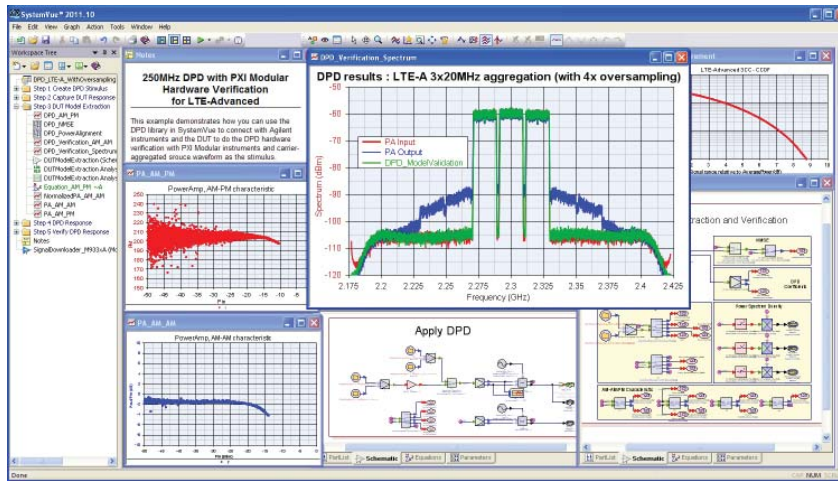- W1918EP LTE-Advanced Baseband Verification Library

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Product specifications and descriptions in this document subject to change without notice.

Key Product Links

Product Info: www.agilent.com/find/eesof-systemvue

Configurations: www.agilent.com/find/eesof-systemvue-configs

Videos: www.agilent.com/find/eesof-systemvue-videos

Request a 30-day Evaluation License: www.agilent.com/find/eesof-systemvue-evaluation

16

Agilent Technologies

RECOMMENDED COMPUTERS

Recommended Computer List

It is important that you have the right complementary test tools and equipment to get the measurements you want. To assist you in determining which computer will work with the Agilent modular platform, extensive testing has been done to produce a list of recommended computers that are compatible with Agilent Technologies' PXI and AXIe chassis.

This personal computer and controller selection guide has been prepared to provide the system designer with a list of tested computers that are compatible with Agilent Technologies PXI and AXIe chassis. The testing in this guide covers both the PCIe® link and enumeration of the chassis.

Agilent Technologies modular chassis tested:

- Agilent M9018A PXIe Chassis
- Agilent M9502A AXIe Chassis
- Agilent M9505A AXIe Chassis

Personal computing devices tested:

- Laptop PC
- Desktop PC
- Tested rack mount PCs
- Tested PXIe embedded PCs

M9045B PCIe ExpressCard Adaptor and Y1200B PCIe Cable

M9018A PXIe 18-slot Chassis

RECOMMENDED COMPUTERS

Testing configurations

Agilent M9018A PXIe chassis	• Tested using cabled PCI Express link with the M9021A PCIe cable interface and PXIe embedded controllers.
	• Testing was performed with only a graphics card in its standard slot and Agilent-recommended PCIe host cable card installed [1]
	• Laptop testing utilized the M9045B ExpressCard and Y1200B PCIe cable
	• Desktop/rack-mounted PC testing utilized the M9047A ExpressCard and Y1202A PCIe cable
	• Various versions of Microsoft Windows® were used for all testing. Upgrading to Windows 7 is recommended
Agilent M9502A AXIe chassis	• Tested using: cabled PCI Express link,
Agilent M9505A AXIe chassis	• Testing was performed with only a graphics card in its standard slot and Agilent-recommended PCIe host cable card installed [1]
	• Laptop testing utilized the M9045B ExpressCard and Y1200A PCIe cable
	• Desktop/rack-mounted PC testing utilized the M9047A ExpressCard and Y1202A PCIe cable
	• Various versions of Microsoft Windows were used for all testing. Upgrading to Windows 7 is recommended

Laptop personal computers [2]

Manufacturer	Model	BIOS	PCIe Link	Compatibility [3]		Comments
				AXIe/DTC	PXIe	
Dell	Precision M4400	A19	x1 Gen 1	yes	yes	no restrictions
Dell	Precision M4500	A04	x1 Gen 1	yes	yes	no restrictions
Dell	Studio 15z	A04	x1 Gen 1	yes	yes	no restrictions
Hewlett Packard	Elitebook 8530p	F.11	x1 Gen 1	yes	no	no restrictions
Hewlett Packard	Elitebook 8440p	68CCU Ver. F.0B	x1 Gen 1	yes	yes	no restrictions
Hewlett Packard	Elitebook 8540w	68CVD Ver. F.0E	x1 Gen 1	yes	yes	no restrictions
Hewlett Packard	6930p	68PCU Ver F.0B	x1 Gen 1	yes	yes	no restrictions
Hewlett Packard	Pavilion dv8	F.17	x1 Gen 1	yes	yes	no restrictions
MSI	A6200	E1681IMR VER. 105	x1 Gen 1	yes	yes	no restrictions

Rackmount personal computers

Manufacturer	Model	BIOS	PCIe Link	Compatibility [1]		Comments
				AXIe/DTC	PXIe	
Kontron	KISS IPC 760	08.00.15	x8 Gen 2	yes	yes	no restrictions

PXIe embedded personal computers

Manufacturer	Model	BIOS	System Slot PCIe Links	Comments
National Instruments	PXIe-8101	4.6.3 (6/5/2009)	4x1 Gen 1	no restrictions
National Instruments	PXIe-8105	1.3.3 (1/1/1992)	Four link: 1x1 and 3x4 Gen 1	no restrictions
National Instruments	PXIe-8108	4.6.3 (10/28/2009)	4x1 Gen 1	no restrictions
National Instruments	PXIe-8133	4.6.3 (4/14/2010)	4x1 Gen 1	no restrictions

1. Compatibility is based on: 1) the ability to fully enumerate a chassis and 2) meeting the PCIe specification at PC slot's rated speed. This is impacted by factors including computer bios and signal path within the computer and cable.

RECOMMENDED COMPUTERS

Desktop personal computers

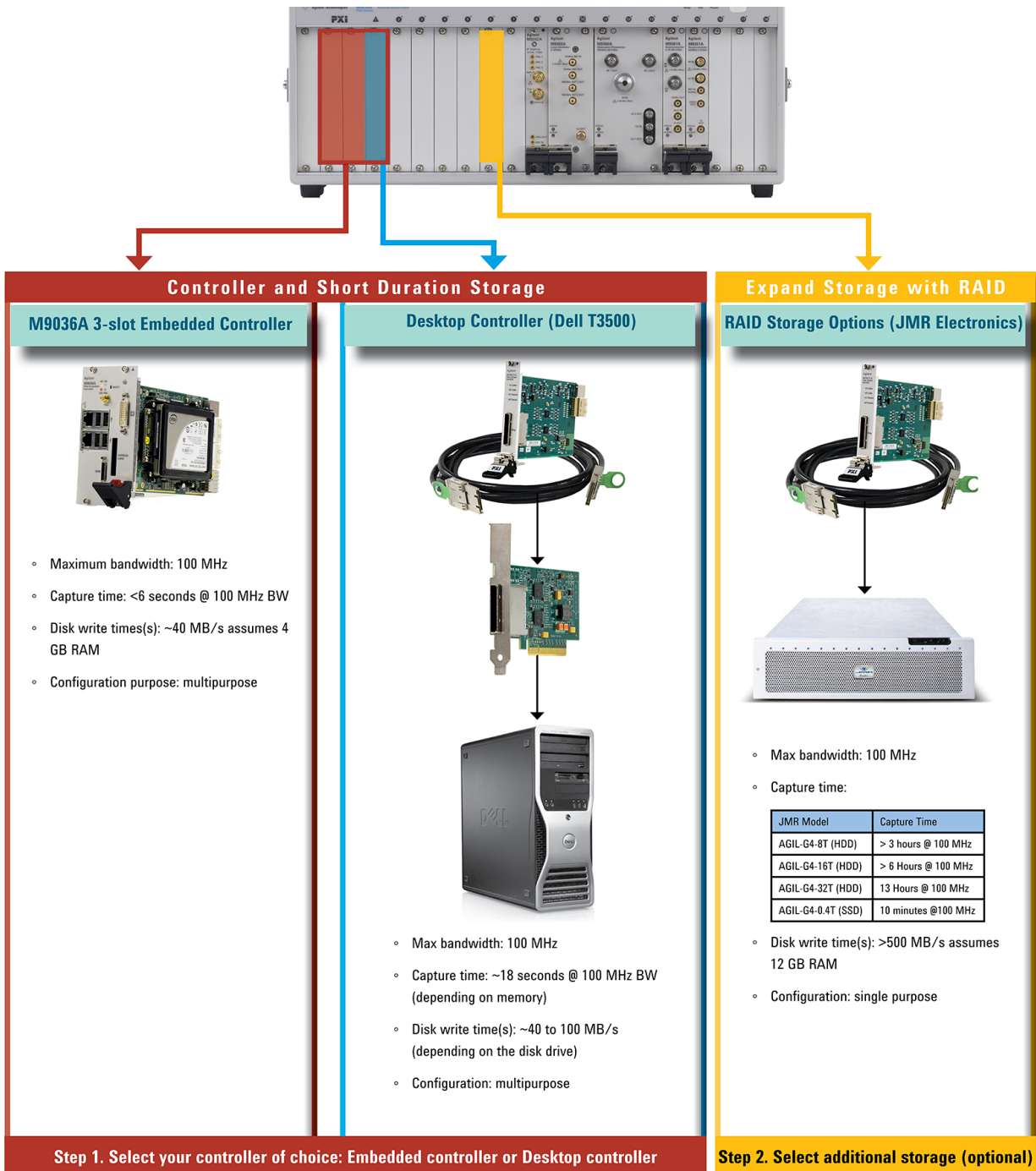| Manufacturer	Model	BIOS	PCIe Link	Compatibility [1]		Comments
				AXIe/DTC	PXIe	
Dell	T3500	From ftp. agilent.com	x8 Gen 2	yes	yes	It is not recommended to use PCIe slot 1 since it requires a BIOS update that is currently unavailable. Dell is currently working on a software update. Check ftp://ftp.agilent.com/pub/mpusup/BIOS for latest information including supported BIOS versions and slot and cable card/link width restrictions.
Dell	T5500	From ftp. agilent.com	x8 Gen 2	yes	yes	It is not recommended to use PCIe slot 1 since it requires a BIOS update that is currently unavailable. Dell is currently working on a software update. Check ftp://ftp.agilent.com/pub/mpusup/BIOS for latest information including supported BIOS versions and slot and cable card/link width restrictions.
Dell	T7500	From ftp. agilent.com	x8 Gen 2	yes	yes	It is not recommended to use PCIe slot 1 since it requires a BIOS update that is currently unavailable. Dell is currently working on a software update. Check ftp://ftp.agilent.com/pub/mpusup/BIOS for latest information including supported BIOS versions and slot and cable card/link width restrictions.
Hewlett Packard	Elite 8000	1.07 Rev. A 10 Sep 2010	x4 Gen 1	yes	no	Only Gen1x4 slot is supported (slot 2)
Hewlett Packard	Z400	3.07 Rev A	x4 Gen 1	yes	no	Only Gen1x4 slot is supported (slot 3)
Hewlett Packard	xw4600	01.22 rev A	x4 Gen 1	yes	no	Only Gen 1x4 slot is supported.
Hewlett Packard	ML150G6 Server	O21	x8 Gen 2	yes	no	Gen 2x16 slot only.

1. Compatibility is based on: 1) the ability to fully enumerate a chassis, 2) meeting the PCIe specification at PC slot's rated speed. This is impacted by many factors including computer bios and signal path within the computer and cable.

RECOMMENDED STORAGE FOR STREAMING APPLICATIONS

When using the M9392A in streaming mode, data storage capacity must be considered. The diagram below describes the three different storage methods available for streaming applications.

The desktop controller configuration shows one model number, but any desktop computer from the tested computer list will work in this configuration (capture time and disk write time will vary by computer).

Choose the configuration that best meets your test needs.

Controller and Short Duration Storage

M9036A 3-slot Embedded Controller

- Maximum bandwidth: 100 MHz
- Capture time: <6 seconds @ 100 MHz BW
- Disk write times(s): ~40 MB/s assumes 4 GB RAM
- Configuration purpose: multipurpose

Desktop Controller (Dell T3500)

- Max bandwidth: 100 MHz
- Capture time: ~18 seconds @ 100 MHz BW (depending on memory)
- Disk write time(s): ~40 to 100 MB/s (depending on the disk drive)
- Configuration: multipurpose

Expand Storage with RAID

RAID Storage Options (JMR Electronics)

- Max bandwidth: 100 MHz
- Capture time:

JMR Model	Capture Time
AGIL-G4-8T (HDD)	> 3 hours @ 100 MHz
AGIL-G4-16T (HDD)	> 6 Hours @ 100 MHz
AGIL-G4-32T (HDD)	13 Hours @ 100 MHz
AGIL-G4-0.4T (SSD)	10 minutes @100 MHz

- Disk write time(s): >500 MB/s assumes 12 GB RAM
- Configuration: single purpose

Step 1. Select your controller of choice: Embedded controller or Desktop controller

Step 2. Select additional storage (optional)

1

CREATING A COMPLETE SOLUTION

As you seek solutions to evolving test challenges, an outside perspective may be useful. Agilent is ready to help by sharing our expertise in benchtop measurements, modular instrumentation and test automation. In specialized applications, our Solutions Partners are ready to work with you—and us—to define and integrate your next-generation test solution.

## Agilent Application Engineering Services

You can rely on the technical experts from Agilent. We know your instruments, and we understand test and measurement. Our services include software development, which can reduce test time and improve repeatability through test automation. We also offer technology training, product training and startup assistance to ensure that you'll maximize your success with your hardware or software purchase.

Areas of focus include test automation; digital design and test; network analysis; wireless communications; and technology refresh, including instrument migration and planning.

Embedding modules in larger systems

In applications around the world, Agilent instrumentation has become an integral part of advanced systems. Even when used as "components" in a larger system, our dependable measurement devices provide exceptional performance that ensures confidence in results—even at the extremes of science.
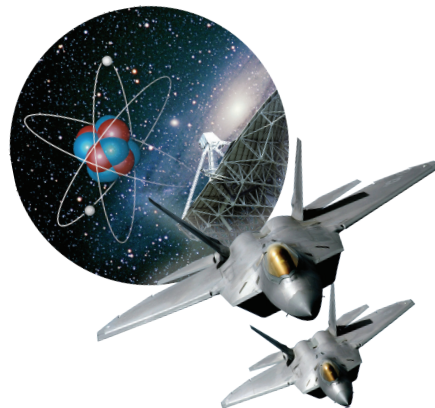
Enhance your application

If your project or system would benefit from improvements in speed, flexibility, openness or size, we'd like to discuss the possibilities. Contact your local Agilent representative.

18

BECOME A PARTNER

Agilent Solutions Partners
...bringing it all together

Agilent's Solution Partners can create an optimized modular test system for you

Modular products have the inherent power and flexibility to provide the building blocks for any test system. However, when time is of the essence and you need a test system that addresses your measurement needs – and fast – Agilent has an extensive network of premier partners to develop systems from Aerospace and Defense to ZigBee.

Agilent's Solutions Partner Program recruits and supports mature, stable companies with the complementary skills to fulfill this role for you. Our Solutions Partners enjoy a preferential relationship and work closely with Agilent to develop systems that take advantage of all the measurement capabilities of our instruments. When you tap into the resources of our partners, you also benefit from this knowledge and experience.

19

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BECOME A PARTNER

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Partner Value

Software to control the system and manage the test flow

Fixturing to interface to the device under test

Racking systems to house the instrumentation and switching

Environmental or anechoic chambers

Services to integrate the elements into a complete system

Training for customers', operators, and engineers

Services to install and support the test system in use

Become a Partner...

Worldwide, there are already over 200 companies involved in the Agilent Solutions Partner Program, but we are always looking for partners who can provide additional solutions for our customers. If you have the skills and expertise that can help expand our modular solutions portfolio, we want to hear from you. As a first step, simply follow the "Become a Partner" link at www.agilent.com/find/solutionspartners, complete and submit the form.

Agilent Technologies
— Solutions Partner

Agilent Technologies
— Strategic Solutions Partner

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— Global Solutions Partner

www.agilent.com/find/modular-partners

SPECIFICATIONS DEFINITIONS

Specifications describe the warranted performance of calibrated instruments that have been stored for a minimum of two hours within the operating temperature range of 0 °C to 55 °C, unless otherwise stated, and after a 45 minute warm-up period. Data represented in this document are specifications unless otherwise noted.

Characteristics describe product performance that is useful in the application of the product, but that is not covered by the product warranty. Characteristics are often referred to as Typical or Nominal values and represented in italics.

Typical describes characteristic performance, which 80% of instruments will meet when operated over a 20 °C to 30 °C temperature range. Typical performance is not warranted.

Nominal describes representative performance that is useful in the application of the product when operated over a 20 °C to 30 °C temperature range. Nominal performance is not warranted.

Note: All graphs contain measured data from several units at room temperature unless otherwise noted.

CUSTOMER SUPPORT AND WARRANTY INFORMATION

Customer Support

For your ease of ordering, the product information pages within this catalog come complete with product descriptions and model numbers. In addition, the ordering information includes: typical product configuration, typical system configuration, related products and accessories.

Product Information: www.agilent.com/findcontactus

or call 1 800 829-4444 US

Repair and Calibration: www.agilent.com/find/infoline

Parts and Accessories: www.parts.agilent.com

Email updates: www.agilent.com/find/emailupdate

For all modular products: www.agilent.com/find/modular

Advantage Services: Calibration and Warranty

What is covered by warranty?

Global Warranty

Agilent Technologies provides an excellent factory warranty with all of its test and measurement equipment. It provides the peace-of-mind that today's high-tech industry requires. Your investment is protected by Agilent's global reach in more than 100 countries (either directly or through distributors). Convenient, the warranty gives you standard coverage for the country in which the product is in use, eliminating the need to ship equipment back to the country of purchase. Agilent warranty services provide:

- All parts and labor necessary to return your instrument to full specified performance

- Recalibration for products supplied originally with a calibration certificate

- Return shipment

Warranty Coverage

Agilent warrants Agilent hardware products against defects in materials and workmanship and that Agilent hardware products conform to Agilent published specifications. Warranty does not cover visible abuse, negligence or shipping damage, nor does it apply to defects resulting from improper or inadequate maintenance or calibration by Customer or unauthorized parties, Customer-supplied software, interfacing or supplies, unauthorized modification or improper use of Product, operation outside of the published environmental specifications for the Product, or improper site preparation or maintenance by Customer. For specific operation environment specifications, refer to the product manual.

Advantage Services: Calibration and Warranty

Agilent Advantage Services is committed to your success throughout your equipment's lifetime.

R1282A	Annual calibration
R-51B-001-3C	1 year return-to-Agilent warranty extended to 3 years
R-51B-001-5C	1 year return-to-Agilent warranty extended to 5 years

www.agilent.com/find/advantageservices

INDEX BY MODEL NUMBER

www.agilent.com/find/modular

INDEX BY MODEL NUMBER (CONTINUED)

MODEL	DESCRIPTION	PAGE
M9146A	PXI RF Multiplexer: 3 GHz, Dual 1x4, 50 Ω, Terminated	49
M9147A	PXI RF Multiplexer: 3 GHz, Dual 1x4, 50 Ω, Terminated Common	49
M9148A	PXI RF Multiplexer: 3 GHz, 1x8, 50 Ω	49
M9149A	PXI RF High Density RF Multiplexer: 3 GHz, Dual 1x16, 50 Ω	49
M9150A	PXI RF Multiplexer: 3 GHz, Dual 1x4, 75 Ω	49
M9151A	PXI RF Multiplexer: 3 GHz, Quad 1x4, 75 Ω	49
M9152A	PXI RF Multiplexer: 3 GHz, 1x8, 75 Ω	49
M9153A	PXI RF Multiplexer: 3 GHz, 1x16, 75 Ω	49
M9155C	PXI Hybrid Dual SPDT Coaxial Switch, DC to 26.5 GHz	53
M9156C	PXI Hybrid Dual Transfer Switch, DC to 26.5 GHz	53
M9157C	PXI Hybrid Single SP6T Switch, DC to 26.5 GHz	53
M9168C	PXI Programmable Step Attenuator Module	93
M9181A	Basic Features PXI DMM	63
M9182A	PXI Digital Multimeter: 6½ digit	65
M9183A	PXI Digital Multimeter: 6½ digit, Enhanced Performance	65
M9185A	PXI 8/16-Channel Isolated D/A Converter	77
M9186A	PXI Isolated Single Channel Voltage/Current Source, 100V	79
M9187A	PXI Digital IO: 32-ch, 0.3 to 50 V	59
M9202A	PXIe IF Digitizer: 12-bit, 1 GHz	69, 95
M9210A	PXI-H Digitizing Scope: 10-bit, 2-4 GS/s	71
M9211A	PXI-H UWB IF Digitizer: 10-bit, 4 GS/s, 3 GHz	73
M9216A	PXI 32-Channel High Voltage Data Acquisition Module	55
M9302A	PXI Local Oscillator: 3 GHz to 10 GHz	97
M9330A	PXI-H Arbitrary Waveform Generator: 15-bit, 1.25 GS/s	83
M9331A	PXI-H Arbitrary Waveform Generator: 10-bit, 1.25 GS/s	85
M9351A	PXI Downconverter: 50 MHz to 2.9 GHz	99
M9360A	PXI Attenuator/Preselector: 100 kHz to 26.5 GHz	101
M9361A	PXI Downconverter: 2.75 GHz to 26.5 GHz	103
M9362A-D01	PXIe Quad Downconverter	105
M9392A	PXI Vector Signal Analyzer: 50 MHz to 26.5 GHz	17, 107
M9502A	AXIe 2-slot Chassis	111
M9505A	AXIe 5-slot Chassis	111
M9536A	AXIe Embedded PC Controller	113
M9703A	AXIe Digitizer 12-bit, 8 Channels	115
M8190A	AXIe Arbitrary Waveform Generator	117
N2099A	PXI RF Synthesizer	33
N2100B	PXI Digital Communication Analyzer	35
N2101B	PXI Bit Error Rate Tester	37
N2102B	PXI Pattern Generator	39, 89
U4154A	AXIe Logic Analyzer 4 Gb/s	119
U4301A	AXIe Protocol Analyzer PCI Express 3.0	121
U4998A	AXIe Protocol Analyzer HDMI 1.4b	123
89600 VSA Software	89601B VSA software, transportable license, 89601B-200, 89601B-300, 89601B-AYA	125
W1461BP	SystemVue Software	131

www.agilent.com/find/modular

INDEX BY PRODUCT DESCRIPTION

www.agilent.com/find/modular

PRODUCT DESCRIPTION	MODEL	PAGE
Digitizer (PXI-H UWB IF Digitizer: 10-bit, 4 GS/s, 3 GHz)	M9211A	73
DMM (PXI Digital Multimeter: 6½ digit)	M9182A	65
DMM (PXI Digital Multimeter: 6½ digit, Enhanced Performance)	M9183A	65
DMM (PXI)	M9181A	63
Downconverter: 2.75 GHz to 26.5 GHz (PXI)	M9361A	103
Downconverter: 50 MHz to 2.9 GHz (PXI)	M9351A	99
IO Libraries Suite	E2094	126
LO (PXI Local Oscillator: 3 GHz to 10 GHz)	M9302A	97
Logic Analyzer 4 Gb/s (AXIe)	U4154A	119
Multiplexer (PXI High Density : 128-ch, 1-wire, 100 Vdc/1 A, Reed Relays)	M9102A	45
Multiplexer (PXI High Density : 64-ch, 2-wire, 100 Vdc/1 A, Reed Relays)	M9101A	45
Multiplexer (PXI High Density : 99-ch, 2-wire, 100 Vdc/1 A, EM Relays)	M9103A	45
Multiplexer (PXI RF Multiplexer: 3 GHz, 1x16, 75 Ω)	M9153A	49
Multiplexer (PXI RF Multiplexer: 3 GHz, 1x8, 50 Ω)	M9148A	49
Multiplexer (PXI RF Multiplexer: 3 GHz, 1x8, 75 Ω)	M9152A	49
Multiplexer (PXI RF Multiplexer: 3 GHz, Dual 1x4, 50 Ω, Terminated Common)	M9147A	49
Multiplexer (PXI RF Multiplexer: 3 GHz, Dual 1x4, 50 Ω, Terminated)	M9146A	49
Multiplexer (PXI RF Multiplexer: 3 GHz, Dual 1x4, 75 Ω)	M9150A	49
Multiplexer (PXI RF Multiplexer: 3 GHz, Quad 1x4, 75 Ω)	M9151A	49
Pattern Generator (PXI)	N2102B	89
Power Relay (PXI SPST Power Relay, 20-ch, 10 A @ 250 Vac, 300 W)	M9135A	51
Protocol Analyzer HDMI 1.4 (AXIe)	U4998A	123
Protocol Analyzer PCI Express 3.0 (AXIe)	U4301A	121
PXI-H Digitizing Scope: 10-bit, 2-4 GS/s	M9210A	71
Quad Downconverter (PXIe)	M9362A-D01	105
RF Multiplexer (PXI RF High Density RF Multiplexer: 3 GHz, Dual 1x16, 50 Ω)	M9149A	49
RF Synthesizer (PXI)	N2099A	33
Software (Command Expert)	E2300	129
Software (SystemVue)	W1461BP	131
Software (89600 VSA)	89601B	125
Switch (PXI Hybrid Dual SPDT Coaxial Switch, DC to 26.5 GHz)	M9155C	53
Switch (PXI Hybrid Dual Transfer Switch, DC to 26.5 GHz)	M9156C	53
Switch (PXI Hybrid Single SP6T Switch, DC to 26.5 GHz)	M9157C	53
Switch (PXI Matrix Switch: 4x34, 2-wire, 100 Vdc/2 A, EM Relays)	M9120A	47
Switch (PXI Matrix Switch: 8x32, 1-wire, 100 Vdc/2A, EM Relays)	M9122A	47
Switch (PXI RF Matrix Switch: 300 MHz, 8x12, 50 Ω)	M9128A	49
Switch (PXI SPDT Switch: 26-ch, 100 Vdc/2 A, EM Relays)	M9130A	51
Switch (PXI SPDT Switch: 64-ch, 100 Vdc/2 A, Reed Relays)	M9131A	51
Switch (PXI SPST Switch: 100-ch, 10 Vdc/1 A, Reed Relays)	M9133A	51
Switch (PXI SPST Switch: 50-ch, 100 Vdc/1 A, Reed Relays)	M9132A	51
System Interface x8 (PCIe cable interface)	M9021A	23
VI Source (PXI Isolated Single Channel Voltage/Current Source, 100 V)	M9186A	79
Vector Signal Analyzer (PXI Vector Signal Analyzer: 50 MHz to 26.5 GHz)	M9392A	17, 107

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The Modular Tangram

The four-sided geometric symbol that appears throughout this document is called a tangram. This seven-piece puzzle originated in China a few centuries ago. The goal is to create shapes—from simple to complex—that form an identifiable silhouette. As with a tangram, the possibilities may seem infinite as you begin to create a new test system. With a set of clearly defined elements—architecture, hardware, software—Agilent can help you create the system you need, from simple to complex.

DISCOVER the Alternatives ...

... Agilent **MODULAR** Products

PXI   www.pxisa.org

AXIe   www.axiestandard.org

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France	0825 010 700*
	*0.125 €/minute
Germany	49 (0) 7031 464 6333
Ireland	1890 924 204
Israel	972-3-9288-504/544
Italy	39 02 92 60 8484
Netherlands	31 (0) 20 547 2111
Spain	34 (91) 631 3300
Sweden	0200-88 22 55
United Kingdom	44 (0) 118 9276201

For other unlisted Countries: **www.agilent.com/find/contactus**

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