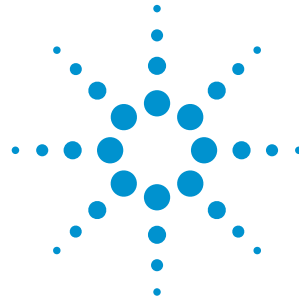


Agilent M9351A PXI Downconverter

50 MHz to 2.9 GHz



Data Sheet

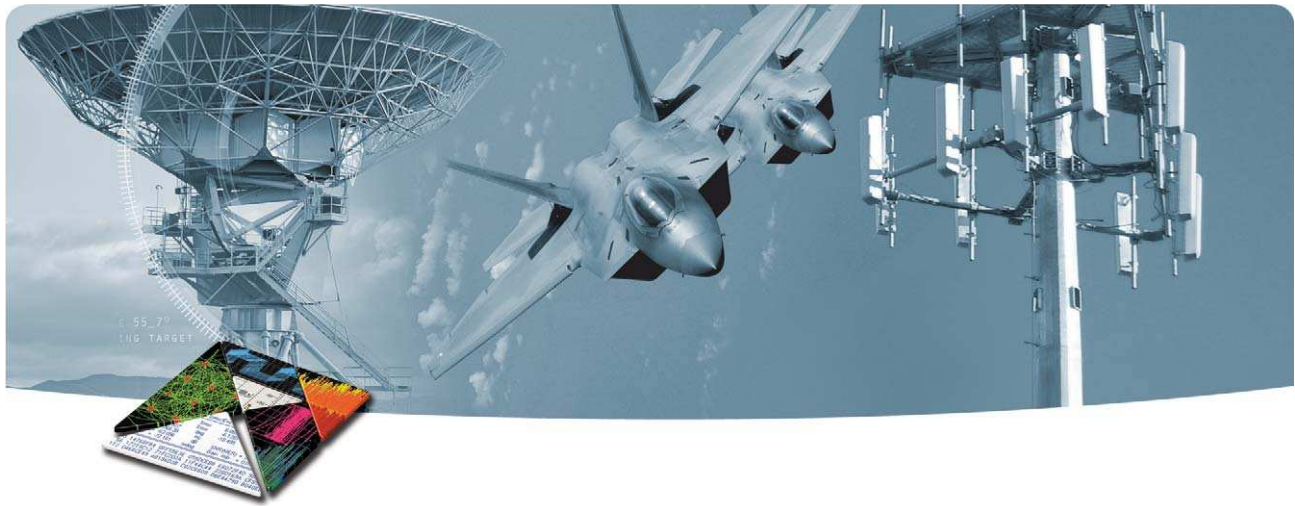


*Challenge the Boundaries of Test
Agilent Modular Products*

Anticipate — Accelerate — Achieve



Agilent Technologies



OVERVIEW

Introduction

The Agilent Technologies M9351A PXI Downconverter is optimized for use with Agilent's newest generation of PXI digitizers for use in Aerospace and Defense applications such as radar and wideband signal capture and in wireless communications applications.

Product description

The M9351A is a one-slot 3U PXI downconverter that converts RF signals from 50 MHz to 2.9 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 the built-in calibration simplifies system power budget calculations.

When integrated in the Agilent M9392A PXI Vector Signal Analyzer, and combined with the VSA software, the M9351A provides a complete signal analyzer solution enabling analysis of communications, radar and avionics signals to 26.5 GHz in a modular open-system standard.

Applications

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

Features

- Frequency range: 50 MHz to 2.9 GHz
50 MHz to 625 MHz (bypass mode),
(useable to 1 MHz)
- 500 MHz IF center frequency
- 40 MHz bandwidth (3 dB)
- Built-in pre-amp for low-level measurements
- Image protected conversion—no need for a preselector
- Bypass path so you can pass your signal straight to digitizer
- Fast IF power control with 40 dB solid state IF attenuator with 0.5 dB steps
- Chassis slot compatibility: cPCI (J1), PXI-1, PXIe Hybrid
- PXI form factor

Customer values

- Multiple programmatic interfaces enable easy integration into existing test environments and reduced development time
- Included drivers, soft front panels and programming examples in VisualStudio® (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, and MATLAB
- Conforms to Modular Open Systems Approach (MOSA)

EASY SETUP ... TEST ... AND MAINTENANCE

Hardware platform

Compliance

The M9351A is PXI compliant, using either a cPCI (J1), PXI-1, or PXIe hybrid slot. Designed to benefit from fast data interfaces, the products can be integrated with other test and automation modules in cPCI (J1), PXI-1, or PXIe Hybrid chassis slots. The PXI format offers high performance in a small, rugged package. It is an ideal deployment platform for many automated test systems. A wide array of complementary PXI products are currently available. Products include multimeters, waveform generators, local oscillators, digitizers, and switch multiplexers.

Software platform

IO Libraries

Agilent IO Libraries Suite offers FAST and EASY connection to instruments and the newest version extends that capability to include modular instruments.

NEW support for PXI -- The Agilent IO Libraries Suite helps you display ALL of the modules in your system, whether they are PXI, PXIe, or PCIe. From here you can view information about the installed software or start the module's soft front panel. Launch the module's soft front panel directly from Agilent Connection Expert.

NEW easy way to find the right driver from Agilent Connection Expert.

Drivers

Agilent provides instrument drivers that work with your choice of software that saves time and preserves software and hardware investments. 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, VisualStudio (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, and MATLAB.

With the multiple drivers included and minimum software adjustments, any Agilent PXI downconverter can be swapped out, replaced, or upgraded with the latest PXI downconverter.

Easy software integration

Included are application code examples for VisualStudio (VB.NET, C#, C/C++), VEE, LabVIEW, LabWindows/CVI, and MATLAB which provide downconverter set up and basic acquisition functionality. These application code examples are easily modified to quickly integrate the module into your measurement system.

Software applications

Agilent soft front panels provide easy to use instrument communications for diagnostics and basic hardware setup. The M9351A's graphical user interface guides developers through module setup. Users can quickly configure the instrument parameters. More sophisticated functions are available through the instrument's numerous programmatic interfaces. The M9351A supports interfaces for Visual Studio, MATLAB, and LabVIEW. The interfaces are implemented using the IVI standard supporting both IVI-COM and IVI-C.

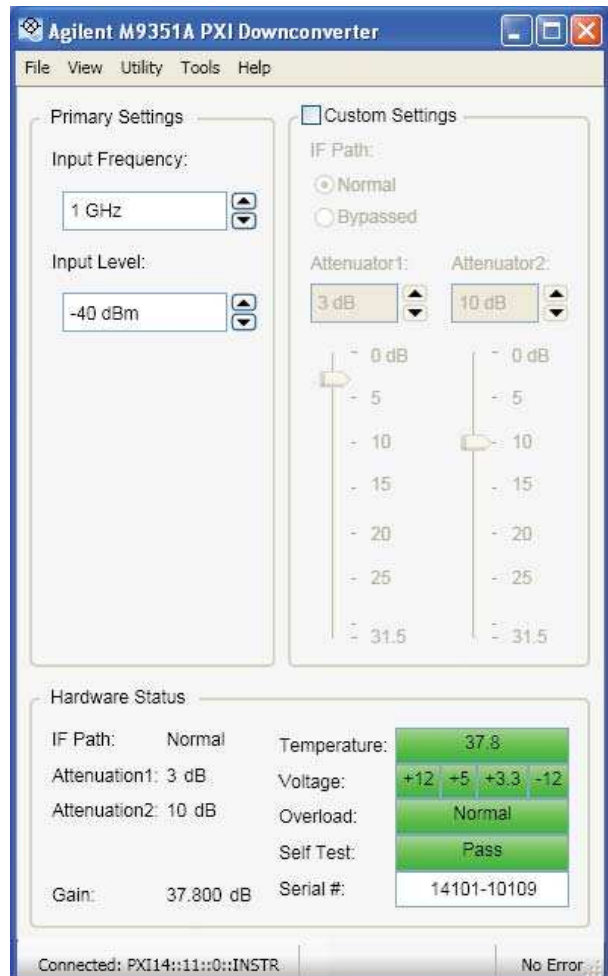


Figure 1. Agilent M9351A PXI Downconverter, software interface

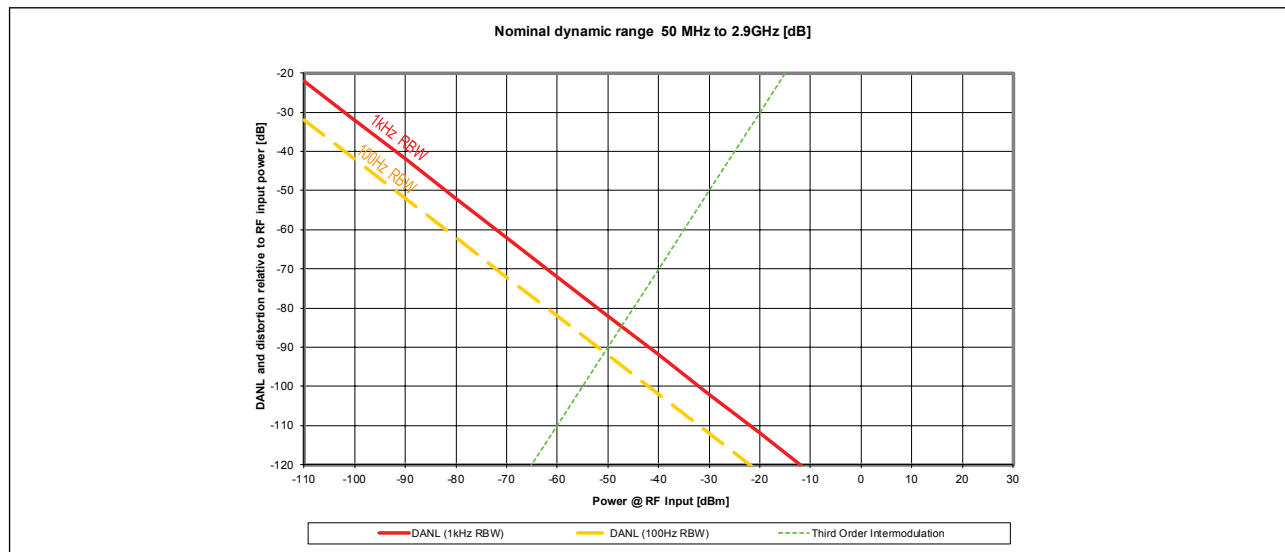
Calibration intervals

The M9351A is factory calibrated and shipped with an ISO-9002, NIST-traceable calibration certificate. A one year calibration cycle is recommended.

TECHNICAL SPECIFICATIONS AND CHARACTERISTICS

RF input specifications

Frequency range	50 MHz to 2.9 GHz 50 MHz to 625 MHz (usable to 1 MHz) (bypass mode)
Operating level range	-160 dBm to -30 dBm, <i>(nominal)</i>
Compression point	-25 dBm min
Maximum power	+10 dBm (continuous without damage), <i>(nominal)</i>
Return loss (50 Ω)	-10 dB, max, <i>(nominal)</i>
IP3 (two -40 dBm RF input tones, 1 MHz apart, referenced to module input)	-10 dBm, min
LO leakage at RF input	-50 dBm, max ² , <i>(nominal)</i>



IF output specifications

Gain (RF to IF)	38 dB, <i>(nominal)</i>
Gain control resolution	37 dB to 68.5 dB, in 0.5 dB steps
Level (user adjustable via IF gain control)	-2 dBm (500 mVp-p), <i>(nominal)</i>
Overload warning	+3 dBm ± 2 dB, <i>(nominal)</i>
Center frequency (user adjustable via LO IN frequency)	500 MHz, <i>(nominal)</i>
Bandwidth (3 dB)	40 MHz, min
LO leakage at IF output	-60 dBm, max ^{2,3}
Residuals, RF and LO input terminated	-75 dBm
Bypass mode loss	2.5 dB max, <i>(nominal)</i>

IF video specifications¹

Output rise time	15 ns at 500 MHz IF out ³
Output fall time	35 ns at 500 MHz IF out ³
DC output level (with -2 dBm IF out)	+1 V, min (polarity positive) ³

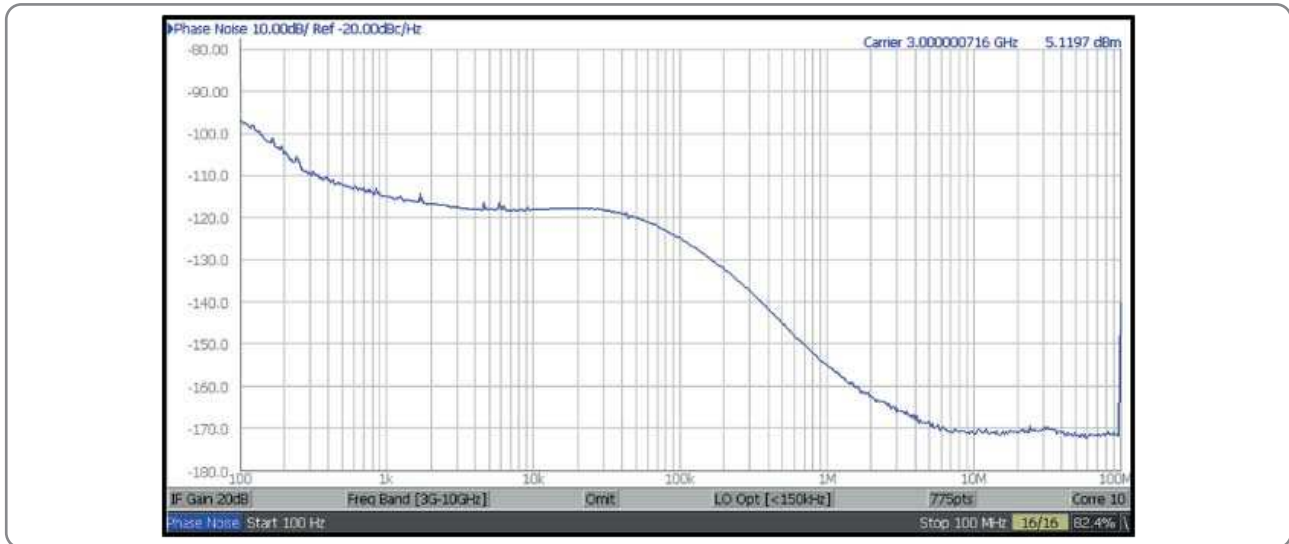
¹ IF video is not available in bypass mode.

² 3 GHz to 10 GHz.

³ At room temperature (25 °C ± 5 °C).

TECHNICAL SPECIFICATIONS AND CHARACTERISTICS, CONTINUED

Internal LO phase noise



LO input specifications

Frequency range	3.5 GHz to 6.4 GHz
Power	+15 dBm \pm 2 dB
Return loss	-10 dB, max, (nominal)
Impedance	50 Ω (nominal)

Reference oscillator input specifications

Frequency range	100 MHz \pm 1 ppm
Power	0 dBm \pm 3 dB
Impedance	50 Ω , (nominal)

Environmental and physical specifications

Temperature range	Operating Non-operating	0 $^{\circ}$ C to 55 $^{\circ}$ C -40 $^{\circ}$ C to +70 $^{\circ}$ C		
Connectors	RF IN LO IN VIDEO OUT IF OUT REF IN	SMA (f) SMA (f) SMB (m) SMB (m) SMB (m)		
EMC		Complies with European EMC Directive 2004/108/EC <ul style="list-style-type: none"> • IEC/EN 61326-2-1 • CISPR Pub 11 Group 1, class A • AS/NZS CISPR 11 • ICES/NMB-001 This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada.		
Warm-up time		15 minutes, max		
Power dissipation:				
+3.3 V	+5 V	+12 V	-12 V	Total power
0.1 A	0.5 A	1.1 A	0.0 A	16 W max
Dimensions		<ul style="list-style-type: none"> • 3U/1-slot PXI/CompactPCI standard • Chassis slot compatibility: cPCI (J1), PXI-1, PXIe Hybrid • Front panel complies with IEEE1101.10 certification and compliance 		
Weight		1.1 lb/0.5 kg		

CONFIGURATION AND ORDERING INFORMATION

Ordering

Model	Description
M9351A	PXI Downconverter: 50 MHz to 2.9 GHz
Includes	Software, example programs, and product information on a CD. Cables.

Accessories

Software, example programs and product information on CD (included)

Cables (included)

M9351A Downconverter (50 MHz to 2.9 GHz)

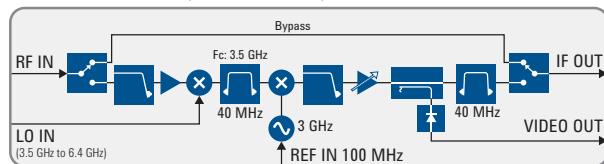


Figure 2. Simplified block diagram of the M9351A PXI Downconverter.

Related products

Model	Description
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 MHz to 26.5 GHz
M9392A	PXI Vector Signal Analyzer: 50 MHz to 26.5 GHz
M9018A	18-slot PXIe Chassis
M9036A	PXIe Embedded Controller ³

Software

Model	Description
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

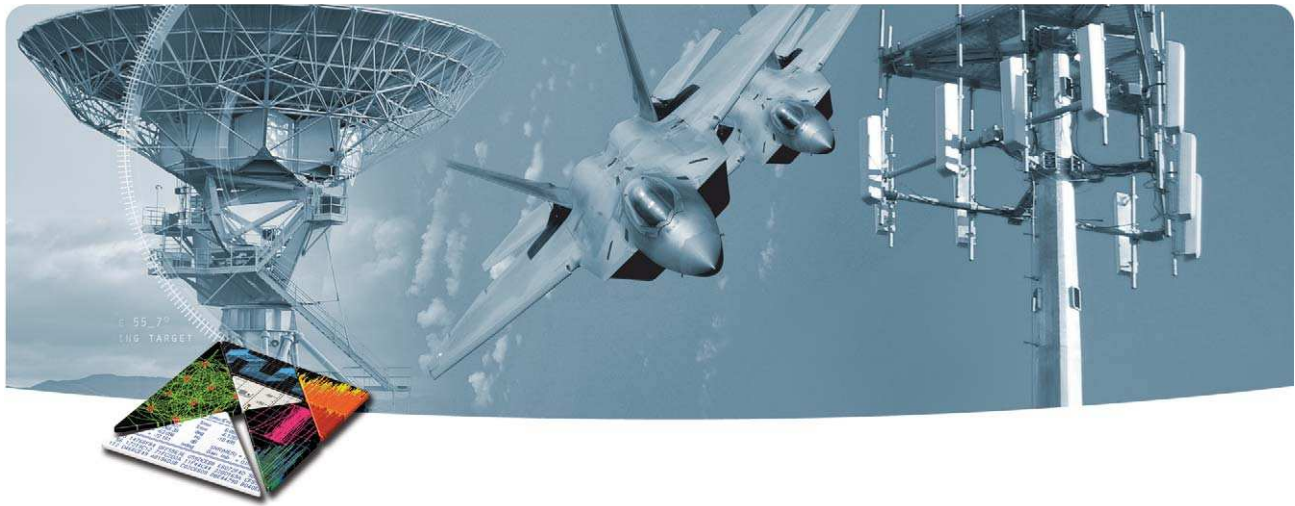
System requirements

Topic	Windows® 7 and Vista Requirements	Windows® XP Requirements
Operating systems	Windows 7 (32-bit and 64-bit) Windows Vista, SP1 and SP2 (32-bit and 64-bit)	Windows XP, Service Pack 3
Processor speed	1 GHz 32-bit (x86), 1 GHz 64-bit (x64) (no support for Itanium 64)	600 MHz or higher required 800 MHz recommended
Available memory	4 GB minimum 8 GB or greater recommended	3 GB minimum
Available disk space ¹	1.5 GB available hard disk space, includes: • 1 GB available for Microsoft .NET Framework 3.5 SP1 ² • 100 MB for Agilent IO Libraries Suite	1.5 GB available hard disk space, includes: • 1 GB available for Microsoft .NET Framework 3.5 SP1 ² • 100 MB for Agilent IO Libraries Suite
Video	Support for DirectX 9 graphics with 128 MB graphics memory recommended (Super VGA graphics is supported)	Super VGA (800 x 600) 256 colors or more
Browser	Microsoft® Internet Explorer 7.0 or greater	Microsoft® Internet Explorer 6.0 or greater

¹ Because of the installation procedure, less memory may be required for operation than is required for installation.

² NET Framework Runtime Components are installed by default with Windows Vista and Windows 7. Therefore, you may not need this amount of available disk space.

³ PC desktop and PC laptop controllers are also available. Please see the M9392A Configuration Guide (literature no. 5990-8254EN) for more information.



WARRANTY AND CALIBRATION

Express Warranty

Reduce downtime with the fastest repair service in the industry. The express warranty upgrades the global warranty to provide:

- 5 day typical turnaround repair service in the US, Japan, China and many EU countries or up to a 10 day improvement in turnaround time in the rest of the world.
- Priority return shipment

Advantage Services: Calibration and Warranty

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

Calibration

R1282A	Annual calibration
M9360-A-UK6	Commercial calibration certificate with test data ¹

Warranty

	Standard warranty is 1 year
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

Express Warranty

R1280X	Express Warranty - 5 day turnaround ¹
--------	--

¹ Options not available in all countries.

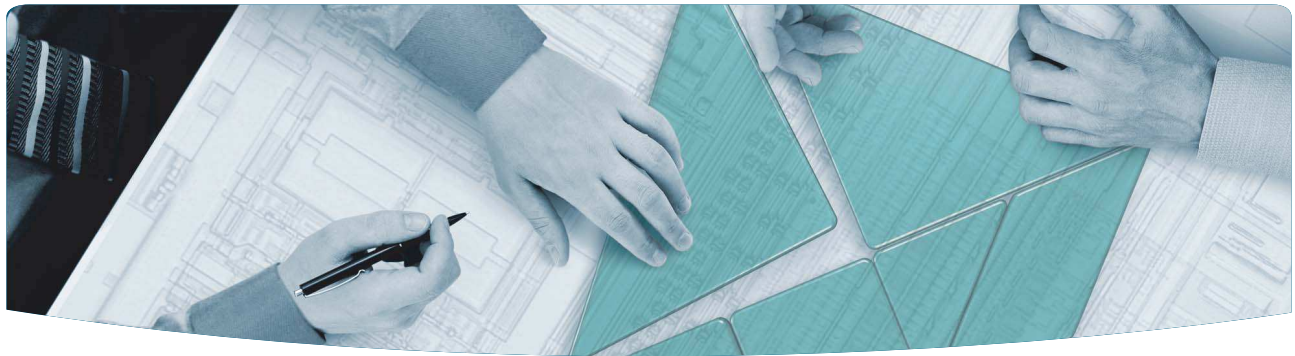
Definitions for specifications

Specifications describe the warranted performance of calibrated instruments that have been stored for a minimum of 2 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.

- **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.



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.



Challenge the Boundaries of Test
Agilent Modular Products

PXI www.pxisa.org

Agilent Solutions Partners
www.agilent.com/find/solutionspartners



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

www.agilent.com/find/advantageservices

Agilent (Dinamic Measurement Group)
DEKRA Certified
ISO 9001:2008
 Quality Management System
www.agilent.com/quality

 **Agilent Email Updates**
www.agilent.com/find/emailupdates

PICMG and the PICMG logo, CompactPCI and the CompactPCI logo, AdvancedTCA and the AdvancedTCA logo are US registered trademarks of the PCI Industrial Computers Manufacturers Group. "PCIe" and "PCI EXPRESS" are registered trademarks and/or service marks of PC-SIG. Microsoft, Windows, Visual Studio, Visual C++, Visual C#, and Visual Basic are either registered trademark or trademarks of Microsoft Corporation in the United States and/or other countries.

www.agilent.com
www.agilent.com/find/modular
www.agilent.com/find/m9351a

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

Americas

Canada	(877) 894 4414
Brazil	(11) 4197 3600
Mexico	01800 5064 800
United States	(800) 829 4444

Asia Pacific

Australia	1 800 629 485
China	800 810 0189
Hong Kong	800 938 693
India	1 800 112 929
Japan	0120 (421) 345
Korea	080 769 0800
Malaysia	1 800 888 848
Singapore	1 800 375 8100
Taiwan	0800 047 866
Other AP Countries	(65) 375 8100

Europe & Middle East

Belgium	32 (0) 2 404 93 40
Denmark	45 45 80 12 15
Finland	358 (0) 10 855 2100
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) 118 927 6201

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

Revised: January 6, 2012

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

© Agilent Technologies, Inc. 2012 Printed in USA, September 7, 2012
 5990-6055EN



Agilent Technologies