

Keysight Technologies

M9309A PXIe Vector Network Analyzer Synthesizer

187.5 MHz to 6 GHz

Data Sheet



Overview

The Keysight Technologies, Inc. M9309A PXIe vector network analyzer synthesizer is a component for the M9485A PXIe vector network analyzer. The M9485A provides a true multiport VNA with up to 12-ports in one chassis.

For more information, see <http://www.keysight.com/find/pxivna>



Figure 1. M9309A PXIe VNA synthesizer

Technical Specifications and Characteristics

Block diagram

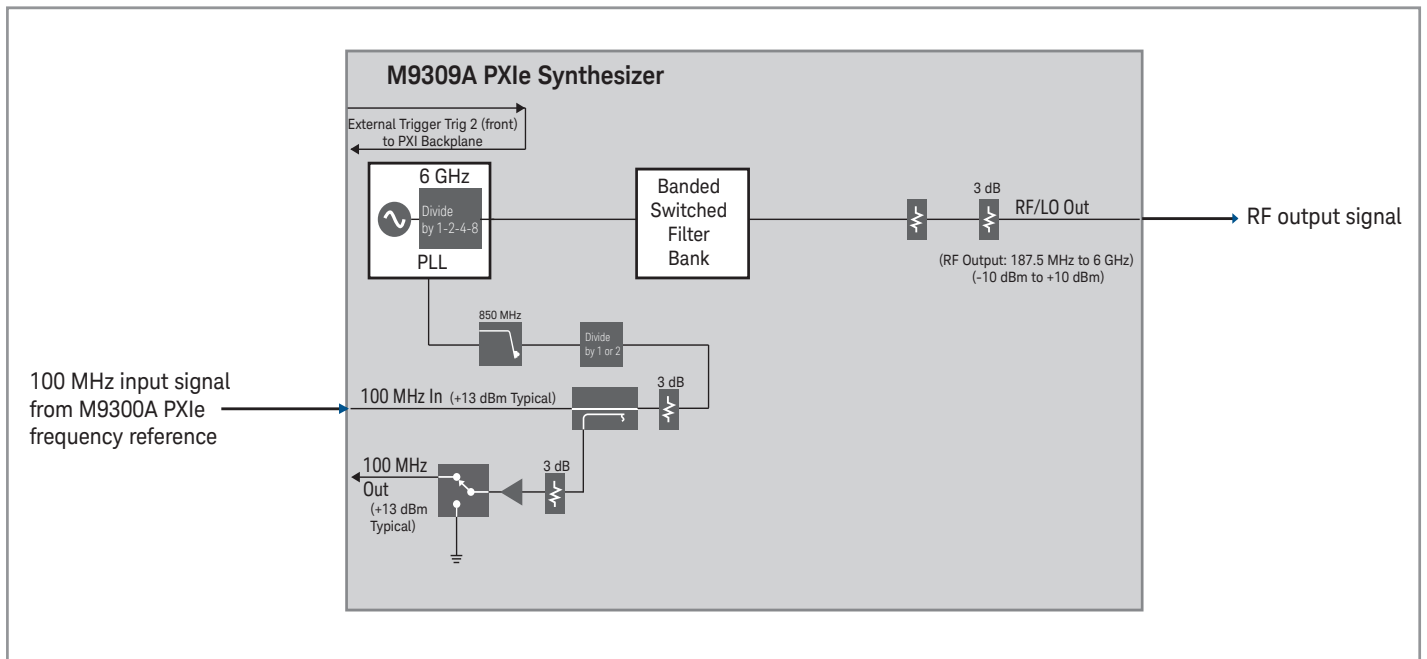


Figure 2. M9309A PXIe vector network analyzer synthesizer block diagram.

Technical Specifications and Characteristics

Definitions for specifications

Temperatures referred to in this document are defined as follows:

- Full temperature range = Individual module temperature of ≤ 73 °C as reported by the module, and environment temperature of 0 to 55 °C.
- Controlled temperature range = Individual module temperature of ≤ 50 °C as reported by the module, and environment temperature of 20 to 30 °C.

Specifications describe the warranted performance of calibrated instruments. Data represented in this document are specifications under the following conditions unless otherwise noted.

- Calibrated instruments have been stored for a minimum of 2 hours within the full temperature range
- 45 minute warm-up time
- Calibration cycle maintained
- When used with Keysight M9300A frequency reference and Keysight interconnect cables

Characteristics describe product performance that is useful in the application of the product. Characteristics are often referred to as *Typical* or *Nominal* values and are italicized.

- **Typical** describes characteristic performance, which 80% of instruments will meet when operated within the controlled temperature range.
- **Nominal** describes representative performance that is useful in the application of the product when operated within the controlled temperature range.

Recommended best practices in use

- Use slot blockers and EMC filler panels in empty module slots to ensure proper operating temperatures. Keysight chassis and slot blockers optimize module temperature performance and reliability of test.
- Set chassis fan to high at environmental temperatures above 45 °C.

Additional information

- All graphs contain measured data from one unit and are representative of product performance within the controlled temperature range unless otherwise noted.
- The specifications contained in this document are subject to change.
- The M9309A is only intended for use as part of the M9485A PXIe vector network analyzer. It is not intended to be used as a standalone instrument.

Technical Specifications and Characteristics

Frequency

Frequency	
Range	187.5 MHz to 6 GHz
Resolution	0.01 Hz
Switching speed ¹	< 100 μ s, nominal

Amplitude

Amplitude	
Settable range	-10 dBm to +10 dBm
Resolution	0.2 dBm, typical
Maximum output power	
\leq 1 GHz	+3 dBm
> 1 GHz	+5 dBm
Power level accuracy	
25 °C \pm 5 °C	\pm 1.5 dB
0 °C to 55 °C	
\leq 3 GHz	\pm 2 dB
> 3 GHz	\pm 3 dB
Output impedance	50 Ω , nominal

1. Time for hardware to settle to within 1 ppm or 1 kHz, whichever is greater and amplitude to settle to within 0.2 dB.

Technical Specifications and Characteristics

Spectral purity

Phase noise	20 kHz offset
1 GHz	-119 dBc/Hz, typical
2 GHz	-114 dBc/Hz, typical
3 GHz	-109 dBc/Hz, typical
6 GHz	-105 dBc/Hz, typical
Harmonics	
Range	≤ 0 dBm
300 MHz to 3 GHz	< -27 dBc

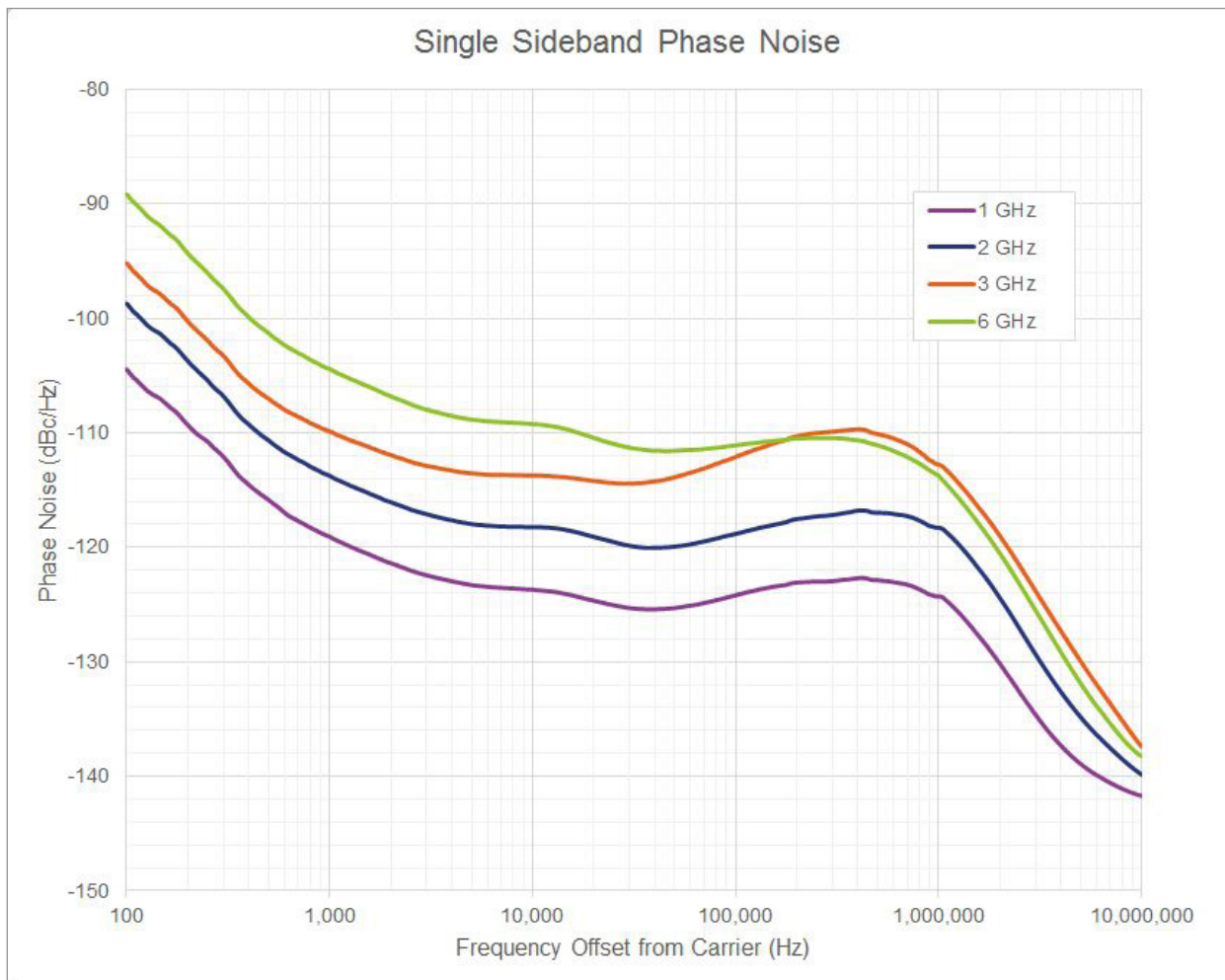


Figure 3: Single sideband phase noise from 100 Hz to 10 MHz offsets, at 1 GHz, 2 GHz, 3 GHz and 6 GHz RF frequencies.

Technical Specifications and Characteristics

Environmental and physical specifications

Operating and storage conditions	
Temperature	
Operating	0°C to 55°C
Non-operating (storage)	-40°C to 70°C
Humidity ¹	Type-tested at 95%, +40°C (non-condensing)
Altitude	Up to 15,000 feet (4,572 meters)
Connectors	RF Out, SMA female

Regulatory characteristics	
EMC	
Complies with the essential requirements of the European EMC Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity):	
<ul style="list-style-type: none"> - IEC/EN 61326-1 - 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.	

Other	
Warm-up time	45 minutes
Size	1 PXIe slot
Dimensions	
Length	210 mm
Width	22 mm
Height	130 mm
Weight	0.535 kg (1.179 lbs)
Power drawn from chassis	≤ 22 W

System requirements

Topic	
Operating systems	Windows 7 (32-bit and 64-bit)
Processor speed	1 GHz 32-bit (x86), 1 GHz 64-bit (x64). No support for Itanium 64.
Available memory	4 GB minimum 8 GB or greater recommended
Available disk space ²	1.5 GB available hard disk space, includes: <ul style="list-style-type: none"> - 1 GB available for Microsoft .NET framework 3.5 SP1 ³ - 100 MB for Keysight IO libraries suite
Video	Support for DirectX 9 graphics with 128 MB graphics memory recommended (Super VGA graphics is supported)
Browser	Microsoft Internet Explorer 7.0 or greater
Keysight IO libraries	Version 16.3.16603.3 or later

1. Samples of this product have been type tested in accordance with the Keysight Environmental Test Manual and verified to be robust against the environmental stresses of storage, transportation and end-use; those stresses include but are not limited to temperature, humidity, shock, vibration, altitude, and power line conditions. Test methods are aligned with IEC 60068-2 and levels are similar to MIL-PRF-28800F Class 3.
2. Because of the installation procedure, less memory may be required for operation than is required for installation.
3. .NET framework runtime components are installed by default with Windows Windows 7. Therefore, you may not need this amount of available disk space.

Software

Instrument connection software



Keysight
IO library

The IO library suite offers a single entry point for connection to the most common instruments including AXIe, PXI, GPIB, USB, Ethernet/LAN, RS-232, and VXI test instruments from Keysight and other vendors. It automatically discovers interfaces, chassis, and instruments. The graphical user interface allows you to search for, verify, and update IVI instrument and soft front panel drivers for modular and traditional instruments. The IO suite safely installs in side-by-side mode with NI I/O software.

Free software download at:
www.keysight.com/find/iosuite

Setup and Calibration Services

Calibration and traceability

Factory calibration	The M9309A PXIe VNA synthesizer ships factory calibrated with an ISO-9002, NIST-traceable calibration certificate.	Included in base configuration
Calibration cycle	A one year calibration cycle is recommended.	
Calibration sites	<ul style="list-style-type: none"> - At Keysight worldwide service centers - On-site by Keysight - By self-maintainers 	For more information visit www.keysight.com/find/infoline
N7800A calibration and adjustment software	The M9309A PXIe VNA synthesizer is supported by Keysight's calibration and adjustment software. This is the same software used at Keysight service centers to automate calibration. The software offers compliance tests for ISO 17025:2005, ANSI/NCCL Z540.3-2006, and measurement uncertainty per ISO Guide to Expression of Measurement Uncertainty.	Licensed software. For more information, visit www.keysight.com/find/calibrationsoftware
Keysight calibration status utility	The Keysight calibration status utility helps ensure your M9309A is calibrated by managing the calibration interval and providing messages regarding instrument and module calibration status.	Included in base configuration

Support

Support		
Core exchange program	Keysight's replacement core exchange program allows fast and easy module repairs. A replacement core assembly is a fully functioning pre-calibrated module replacement that is updated with the defective module serial number, allowing the replacement module to retain the original serial number.	For qualified self maintainers in US only
Self-test utility	A self-test utility runs a set of internal tests which verifies the health of the modules and reports their status.	Included in base configuration

Configurations and Ordering Information

Ordering information

Model	Description
M9309A	PXIe VNA synthesizer: 187.5 MHz to 6 GHz

Related products

Model	Description
M9485A	PXIe vector network analyzer
M9018A	18-slot PXIe chassis
M9037A	PXIe embedded controller
M9389A	PXIe VNA source
M9300A	PXIe frequency reference

Accessories

Model	Description
Y1212A	Slot blocker kit: 5 modules
Y1213A	PXI EMC filler panel kit: 5 slots
Y1214A	Air inlet kit: M9018A 18-slot chassis
Y1215A	Rack mount kit for M9018A 18-slot chassis

Calibration

Advantage services: Calibration	
Keysight Advantage Services is committed to your success throughout your equipment's lifetime	
N7800A	Calibration & adjustment software

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China	800 810 0189
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India	1 800 11 2626
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) 6375 8100

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Austria	0800 001122
Belgium	0800 58580
Finland	0800 523252
France	0805 980333
Germany	0800 6270999
Ireland	1800 832700
Israel	1 809 343051
Italy	800 599100
Luxembourg	+32 800 58580
Netherlands	0800 0233200
Russia	8800 5009286
Spain	800 000154
Sweden	0200 882255
Switzerland	0800 805353
	Opt. 1 (DE)
	Opt. 2 (FR)
	Opt. 3 (IT)
United Kingdom	0800 0260637

For other unlisted countries: www.keysight.com/find/contactus (BP-9-7-17)

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