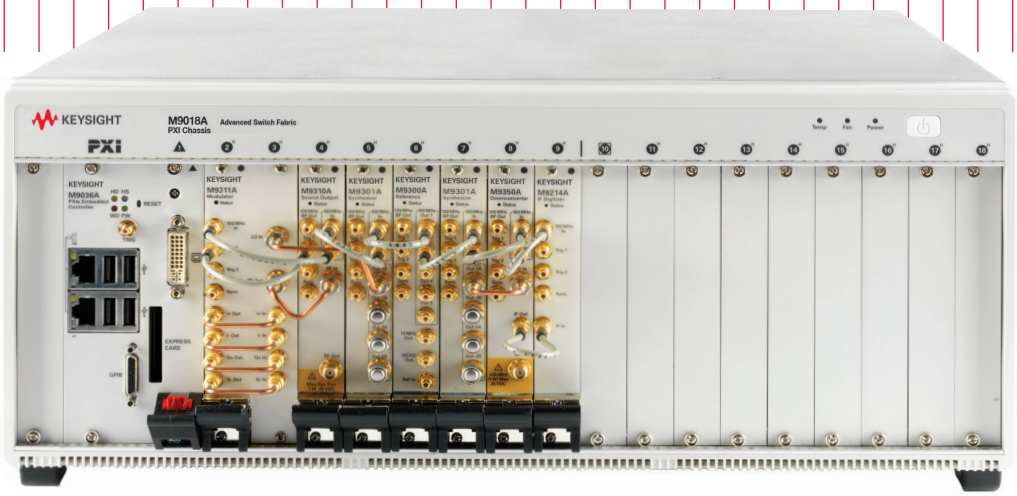
Keysight Technologies

M9381A & M9391A PXIe Vector Signal Generator & Vector Signal Analyzer

1 MHz to 3 GHz or 6 GHz

Configuration Guide



KEYSIGHT TECHNOLOGIES

Overview

This configuration guide contains information to help you configure your M9391A PXIe vector signal analyzer (PXIe VSA), M9381A PXIe vector signal generator (PXIe VSG) or the combined PXIe VSA/G and tailor the system to meet your requirements.

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A. Select Options for M9381A PXIe VSG

Step 1. Start with M9381A PXIe VSG base configuration			
◉	The M9381A PXIe VSG (occupies 4 slots) includes:		
	M9301A M9310A M9311A	PXIe Synthesizer PXIe Source Output PXIe Digital Vector Modulator	– Frequency range 1 MHz – 3 GHz – Modulation bandwidth 40 MHz – Memory 32 MSa – One day start up assistance – Modular interconnect cables – Software, example programs and product information on CD – Return to Keysight Technologies, Inc. warranty – 3 years
Step 2. Choose a frequency range			
◉	M9381A-F03	1 MHz – 3 GHz	Included in base configuration
○	M9381A-F06	1 MHz – 6 GHz	
Step 3. Choose a modulation bandwidth			
◉	M9381A-B04	40 MHz	Included in base configuration
○	M9381A-B10	100 MHz	
○	M9381A-B16	160 MHz	
Step 4. Choose memory size			
◉	M9381A-M01	32 MSa	Included in base configuration
○	M9381A-M05	512 MSa	
○	M9381A-M10	1024 MSa	
Step 5. Add high output power (optional) Minimizes need for external amplification to overcome power loss			
○	M9381A-1EA	High output power	Max output power +18 dBm across the frequency range.
Step 6. Add fast switching speed (optional) Accelerates test throughput			
○	M9381A-UNZ	Fast switching	240 µs RF tuning and 10 µs baseband tuning in list mode
Step 7. Add analog modulation (optional)			
○	M9381A-UNT	Analog modulation	AM, FM, phase, pulse & multitone modulation

B. Select Options for M9391A PXIe VSA

Step 1. Start with M9391A PXIe VSA base configuration			
◉	The M9391A PXIe VSA base configuration (occupies 3 slots) includes:		
	M9301A M9350A M9214A	PXIe synthesizer PXIe downconverter PXIe IF digitizer	– Frequency range 1 MHz – 3 GHz – Analysis bandwidth 40 MHz – Memory 128 MSa (512 MB) – One day start up assistance – Modular interconnect cables – Software, example programs and product information on CD – Return to Keysight warranty – 3 years
Step 2. Choose a frequency range			
◉	M9391A-F03	1 MHz – 3 GHz	Included in base configuration
○	M9391A-F06	1 MHz – 6 GHz	
Step 3. Choose an analysis bandwidth			
◉	M9391A-B04	40 MHz	Included in base configuration
○	M9391A-B10	100 MHz	
○	M9391A-B16	160 MHz	
Step 4. Choose memory size			
◉	M9391A-M01	128 MSa	Included in base configuration
○	M9391A-M05	512 MSa	
○	M9391A-M10	1024 MSa	
Step 5. Add fast switching speed (optional) Accelerates test throughput			
○	M9391A-UNZ	Fast switching	

C. Add M9300A PXIe Frequency Reference(s) Required to Meet Data Sheet Specifications

Step 1. Add a M9300A PXIe frequency reference (occupies 1 slot) One frequency reference required per chassis. It can support up to five VSGs or VSAs			
○	M9391A-300	Adds M9300A PXIe Frequency Reference	Five 100 MHz outputs One 10 MHz output Internal 10 MHz OCXO timebase output

D. Select Controller (either embedded controller or via PC)[1]

Step 1. If selecting an embedded controller, select either M9036A or M9037A [2]

○ M9036A Mid-Performance Embedded Controller
Intel i5-520E dual-core, 2.4 GHz, 4 thread, 4GB RAM

Select the M9036A for mid-performance, lower cost or, if your application requires XP operating system

○ M9037A High-Performance Embedded Controller
Intel i7-4700EQ quad-core processor, 2.4 GHz, 8 thread, 4GB RAM

Select M9037A for the best performance if you have memory intensive applications, multiple applications running in parallel or if a lot of data is sent to the PC from the PXIe chassis. Features removable SSD drive for security and x8 connector from front for connection to second chassis

Step 2. Upgrade from standard memory size (optional)		
For M9036A		
○	M9036A-M08	Memory upgrade from 4 GB to 8 GB RAM
For M9037A		
○	M9037A-M08	Memory upgrade from 4 GB to 8 GB RAM
○	M9037A-M16	Memory upgrade from 4 GB to 16 GB RAM
Step 3. Select an operating system		
For M9036A		
○	M9036A-WE3	Microsoft Windows Embedded Standard 7 (32-bit)
○	M9036A-WE6	Microsoft Windows Embedded Standard 7 (32-bit)
○	M9036A-WXP	Downgrade to Microsoft Windows XP (32-bit)
For M9037A		
○	M9037A-WE3	Microsoft Windows Embedded Standard 7 (32-bit)
○	M9037A-WE6	Microsoft Windows Embedded Standard 7 (32-bit)

1. For list of qualified external controllers, please see Test Computer List Technical Note literature no. 5990-7632EN. The M9021A is used for both PC controllers and can only be used in the M9018A chassis.
2. The M9018A 18-slot chassis includes empty space to the left of the 1st functional slot. The embedded controller occupies that empty space and the 1st functional slot.

D. Select Controller (either embedded controller or via PC)[1] (continued)

To use your Laptop PC as a controller

○	M9045B	PCIe ExpressCard adaptor	
○	Y1200B	PCIe cable	
○	M9021A	PCIe cable interface[2]: 1 slot	

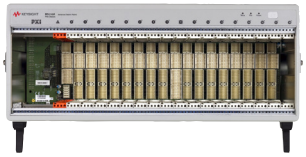
To use your Desktop PC as a controller

○	M9048A	PCIe desktop adaptor	
○	Y1202A	PCIe cable	
○	M9021A	PCIe cable interface[2]: 1 slot	

1. For list of qualified external controllers, please see Test Computer List Technical Note literature no. 5990-7632EN. See physical connections diagram on page 8.
2. The M9021A is used for either PC control option and can only be used with the Keysight M9018A 18-slot chassis.

E. Select a Chassis and Accessories

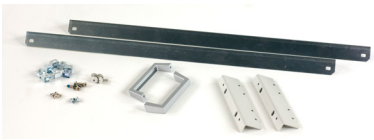
Step 1. Select a chassis

○	M9018A	18-slot PXIe chassis	

Step 2. Choose enough slot blocker kits and EMC filler panels to fill every open slot
Recommended to achieve datasheet specifications

○	Y1212A	Slot blocker kit: 5 slots	
○	Y1213A	PXI EMC filler panel kit: 5 slots	

Step 3. Choose a rack mount kit (optional)

○	Y1215A	Rack mount kit for M9018A 18-slot PXIe chassis	

Step 4 Choose an air inlet kit1 (optional)
Recommended for rack mounted systems with less than 1U space below chassis.

○	Y1214A	Air inlet kit: M9018A 18-slot chassis[1]	

F. Select a Solution Start-Up Kit

Choose a solution level start-up kit (optional)
Includes documentation, configuration software and example programs

○	Y1299A-001	PXI MIMO solution [2]

1. Available in 1-slot, 2-slot or 3-slot options depending on the chassis configuration. For more information, please visit www.keysight.com/find/m9018a
2. Keysight M9018A PXIe chassis required for MIMO capability and 89600 VSA software required for MIMO analysis. See page 11 for 89600 VSA software options.

PHYSICAL CONNECTIONS

Physical Connection Diagram for Controllers

Embedded controller

M9036A
or M9037A
embedded
controller

M9380A PXIe CW Source placed inside the
M9018A PXIe chassis

External laptop PC control options

M9045B PCIe
ExpressCard
adaptor

Y1200B
PCIe cable

M9021A
PXIe cable
interface

Y1202A
PCIe cable

M9048A PCIe
adapter

External desktop PC control options

G. Select Software for M9381A PXIe VSG

Step 1. Start with M9381A base configuration

◉ The M9381A comes standard with the following software:
- Keysight IO Libraries Suite including Connection Expert [1]
- Instrument software, soft front panel, drivers for use with Matlab, LabVIEW, Visual Studio (including VB Net, C#, C/C++), Keysight VEE [2]
- Sample waveforms and programming examples

Step 2. Download free Keysight Command Expert software 4 (optional)

FREE software that provides fast and easy instrument control for the PC. Command Expert combines instrument command sets, command sequences, documentation, syntax checking and command execution in one simple interface. Command Expert helps you to:

- Find instrument commands
- Access command documentation
- Verify command syntax
- Build instrument command sequences
- Execute instrument command sequences
- Integrate sequences in MATLAB, Visual Studio, Excel, LabVIEW, Keysight VEE or Keysight SystemVue PC application environment
- Generate code for command sequences in MATLAB, Visual C#, Visual Basic.NET and Visual C/C++
- Profile command execution time
- Debug command sequences using breakpoints and single stepping

Step 3. Add Signal Studio software 3 (optional)

Provides performance optimized referenced signals validated by Keysight

Perpetual licenses available in fixed (option 9FP), transportable (option 9TP), 5 pack or 50 pack waveforms

Cellular communications		
○	N7600B	Signal Studio for W-CDMA / HSPA+
○	N7601B	Signal Studio for cdma2000® / 1xEV-DO
○	N7602B	Signal Studio for GSM / EDGE / EVO
○	N7612B	Signal Studio for TD-SCDMA / HSDPA
○	N7624B	Signal Studio for LTE / LTE-Advanced FDD
○	N7625B	Signal Studio for LTE / LTE-Advanced TDD
Wireless connectivity		
○	N7606B	Signal Studio for *Bluetooth*®
○	N7615B	Signal Studio for Mobile WiMAX™
○	N7617B	Signal Studio for WLAN 802.11a/b/g/n/ac
Audio/video broadcasting		
○	N7611B	Signal Studio for Broadcast Radio
○	N7623B	Signal Studio for Digital Radio

1. Both IO library (version 16.3 or newer) and Connection Expert software need to be installed on the PC controlling the equipment. To download, visit www.keysight.com/find/iosuite
2. Find latest versions of this software at www.keysight.com/find/m9381a
3. For more information, see Signal Studio brochure, literature number 5989-6448EN.
4. To download or get more information on Command Expert, visit www.keysight.com/find/commandexpert

G. Select Software for M9381A PXIe VSG (continued)

Step 4. Add Waveform Creator Application software[1] (optional)		
○	M9099T	Waveform Creator Application
○	M9099T-LIC	Waveform Creator core with utility and multi-tone plug-ins (required)
○	M9099T-AYA	Digital modulation plug-in
○	M9099T-SVM	SystemVue plug-in (requires SystemVue v2013.08 or later)
○	M9099T-DFW	File based write unencrypted waveform license
○	M9099T-xxx-12M	Adds premium support for the above licenses for one year
Step 5. Add SystemVue software[2] (optional) Provides baseband libraries and applications to validate design concepts in prototypes or manufactured units		
○	W1461	SystemVue Architect
Baseband Libraries and Applications		
○	W1918	LTE - Advanced
○	W1910	LTE
○	W1916	3G - GSM/EDGE/CDMA/cdma2000®/W-CDMA/HSPA+
○	W1911	WiMAX™ 802.16e
○	W1917	WLAN 802.11a/b/g/n/ac
○	W1915	mmWave WPN 802.15c/802.11ad
○	W1919	Global Navigation Satellite System
○	W1914	DVB - x2
○	W1905	Radar
○	W1716	Digital Predistortion Builder
Step 6. Add MATLAB software 3 (optional) Create arbitrary waveforms, customize measurement and data analysis routines, create your own instruments applications and test systems, automate measurements, signal generation, and report generation		
○	N6171A-M01	MATLAB Basic Package
○	N6171A-M02	MATLAB Standard Package
○	N6171A-M03	MATLAB Advanced Package

1. For more information, see Waveform Creator Application Software Technical Overview, literature number 5991-3153EN.
2. For more information, see Wideband Digital Pre-Distortion with SystemVue and PXI Modular Instruments, literature number 5990-8883EN.
3. For more information on MATLAB software, visit www.keysight.com/find/n6171a

H. Select Software for M9391A PXIe VSA

Step 1. Start with M9391A base configuration

◉ The M9391A comes standard with the following software:
- Keysight IO Libraries Suite including Connection Expert [1]
- Instrument software, soft front panel, drivers for use with Matlab, LabVIEW, Visual Studio (including VB Net, C#, C/C++), Keysight VEE [2]
- Sample waveforms and programming examples

Step 2. Download free Keysight Command Expert software 3 (optional)

FREE software that provides fast and easy instrument control for the PC. Command Expert combines instrument command sets, command sequences, documentation, syntax checking and command execution in one simple interface. Command Expert helps you to:

– Find instrument commands
– Access command documentation
– Verify command syntax
– Build instrument command sequences
– Execute instrument command sequences
– Integrate sequences in MATLAB, Visual Studio, Excel, LabVIEW, Keysight VEE or Keysight SystemVue PC application environment
– Generate code for command sequences in MATLAB, Visual C#, Visual Basic.NET and Visual C/C++
– Profile command execution time
– Debug command sequences using breakpoints and single stepping

Step 3. Add X-Series Measurement Applications for Modular Instruments 4 (optional)

Provides essential RF conformance measurements and tasks for specific communications standards.
Transportable, perpetual licenses support up to 4 modular VSAs in one chassis.

○	M9080A	LTE FDD
○	M9082A	LTE TDD
○	M9073A	W-CDMA/HSPA+
○	M9071A	GSM/EDGE/EVO
○	M9079A	TD-SCDMA/HSPA
○	M9076A	1xEV-D0
○	M9072A	cdma2000®/cdmaOne
○	M9077A	WLAN 802.11a/b/g/n/ac

1. Both IO library (version 16.3 or newer) and Connection Expert software need to be installed on the PC controlling the equipment. To download, visit www.keysight.com/find/iosuite
2. Find latest versions of this software at www.keysight.com/find/m9391a
3. To download or get more information on Command Expert, visit www.keysight.com/find/commandexpert
4. For more information, see "Accelerate PXI VSA Measurements with X-Series Measurment Applications", literature number 5991-2604EN.

H. Select Software for M9391A PXIe VSA (continued)

Step 4. Add 89600 VSA Software 1 (optional) Provides time and spectrum mesaurements, powerful displays, data recording and playback, links to Matlab and more		
○	89601B-200	Basic 89600 VSA software
○	89601B-300	Hardware connectivity to over 40 Keysight instruments, including the M9391A PXIe VSA
Measurement options		
○	89601B-AYA	General purpose vector modulation analysis of over 30 types of presets
○	89601B-BHF	Custom OFDM modulation analysis of prprietary and pre-standard OFDM formats
○	89601B-B7R	WLAN 802.11a/b/g/j/p
○	89601B-B7Z	WLAN 802.11n MIMO
○	89601B-BHJ	WLAN 802.11ac MIMO (requires 89601B-B7Z)
○	89601B-BHD	LTE FDD
○	89601B-BHG	LTE-Advanced FDD
○	89601B-BHE	LTE FDD
○	89601B-BHH	LTE-Advanced TDD
○	89601B-B7T	cdma2000®/cdmaOne
○	89601B-B7U	W-CDMA/HSPA+
○	89601B-B7W	1xEV-DO
○	89601B-B7X	TD-SCDMA
○	89601B-B7R	3G Bundle (includes cdma2000®, W-CDMA/HSPA+, 1xEV-DO & TD-SCDMA options)
○	89601B-BHC	RFID

1. For more information, see 89600 VSA software configuration guide literature number 5990-6553EN.

I. Select Services: Warranty, Calibration, Start-Up Assistance

◉		One day start-up assistance	Included in base configuration
◉		Return to Keysight warranty – 3 years	Included in base configuration
○	R-51B-001-5Z	Return to Keysight warranty – 5 years	
○	M9381A-UK6	Commercial calibration certificate with test data for M9381A (M9301A, M9310A, M9311A)	Calibration certificate with measurement results available only at time of purchase.
○	M9391A-UK6	Commercial calibration certificate with test data for M9391A (M9301A, M9350A, M9214A)	Calibration certificate with measurement results available only at time of purchase.
○	M9300A-UK6	Commercial calibration certificate with test data for M9300A	Calibration certificate with measurement results available only at time of purchase.
○	R-51B-001-3X	Express warranty – 5 day turnaround For 3 years	Available in the US, Japan, China and many EU countries
○	R-51B-001-5X	Express warranty –5 day turnaround For 5 years	Available in the US, Japan, China and many EU countries
○	N7800A Calibration and adjustment software		

Global warranty

Keysight provides the peace of mind that today's high tech industry requires. Your investment is protected by Keysight's global reach in more than 100 countries (either directly or through distributors). The warranty gives you convenient standard coverage for the country in which the product is used, eliminating the need to ship equipment back to the country of purchase. Keysight's warranty service provides:

– All parts and labor necessary to return your investment to full specified performance

– Recalibration for products supplied originally with a calibration certificate

– Return shipment

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

One day start-up assistance

A Keysight Technologies applications engineer will get you started quickly by helping you install the modules in a chassis, configure the controller, load software and start making measurements.

Calibration services

The modular products are factory calibrated and shipped with an ISO-9002, NIST-traceable calibration certificate. A one year calibration cycle is recommended. The M9381A PXIe VSG and M9391A PXIe VSA are supported by the Keysight N7800A Calibration Software to perform calibrations that test all product specifications and is compliant with ISO 17025:2005, ANSI/NCSL Z540.3-2006 and Measurement Uncertainty per ISO Guide to Expression of Measurement Uncertainty 1995.

N7800A calibration & adjustment software

The M9381A PXIe VSG and M9391A PXIe VSA are supported by Keysight's calibration and adjustment software. This is the same software used at Keysight's service centers to automate calibration. The software offers compliance tests for ISO 17025:2005, ANSI/NCSL Z540.3-2006, and measurement uncertainty per ISO Guide to Expression of Measurement Uncertainty.

Product Information: www.keysight.com/find/contactus
Or call: 1 800 829-4444 US
Repair and Calibration: www.keysight.com/find/infoline
Parts and Accessories: www.parts.keysight.com
Email Updates: www.keysight.com/find/emailupdate
For all modular products: www.keysight.com/find/modular

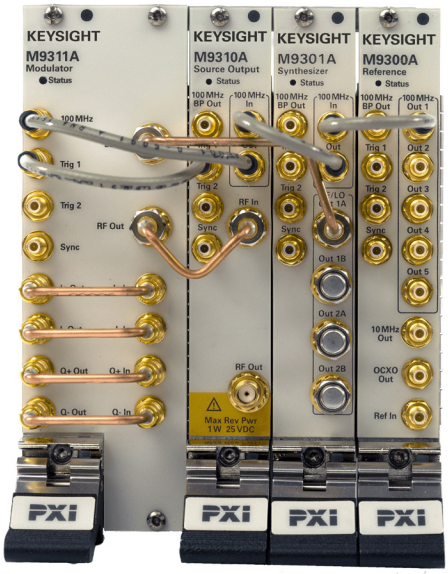
CONFIGURATIONS

In each of the configurations shown below, the M9300A PXIe frequency reference needs to be ordered separately, or as an option to the M9381A PXIe VSG or M9391A PXIe VSA.

Cables for module to module connections are shipped with the product. Additional cables for external connections shipped with the product are listed below.

Please see the M9391A and M9381A startup guide literature number M9300-90090 for detailed cabling diagram and parts list.

Single M9381A PXIe VSG



Additional cables for external connections shipped:
- One 8121-2063 (BNC Male-SMB Female 1200mm)
- One 8121-2175 (SMB Female-SMB Female 300mm)

Single M9391A PXIe VSA

Additional cables for external connections shipped:
- One 8121-2063 (BNC Male-SMB Female 1200mm)
- Two 8121-2175 (SMB Female-SMB Female 300mm)

Single PXIe VSA/G (M9391A + M9381A)

You may order a single channel PXIe VSA/G pre-assembled in a PXI chassis at no additional charge. Please contact your Keysight Sales Representative to order the M9018AC PXI Modular Solutions Configuration.

Cable A1 (8121-2175), above, from the M9311A Trig 2 to M9214A Trig 1 in the left-most PXI VSA/G set is optional. It is used to trigger the PXI VSA from the PXI VSG. Other triggering mechanisms may be employed. The cable is included with the M9391A and M9381A.

Multiple M9381A PXIe VSGs in a single PXIe chassis

Up to four M9381As can be installed in a single M9018A 18 slot PXIe chassis. The cables below are used to connect the M9381A modules to a shared M9300A frequency reference. M9381As can also share a single embedded controller or external PC.

It is recommended that you install the M9381A modules entirely in consecutive slots when using the M9018A chassis. Additional instructions for configuring M9018A PXI backplane triggers are included in the M9381A startup guide, literature number M9381-90001.

Every M9381A comes with two cables listed below to choose from for connecting the M9301A 100 MHz In to the M9300A 100 MHz Out 1 (C1-C4). C1-C4 must be of equal length when operating in a MIMO configuration.

– 8120-5091 Used for connecting signal PXI VSG

– 8021-2175 Used when connecting more than one PXI VSG

Keysight M9018A PXIe chassis is required for MIMO capability.

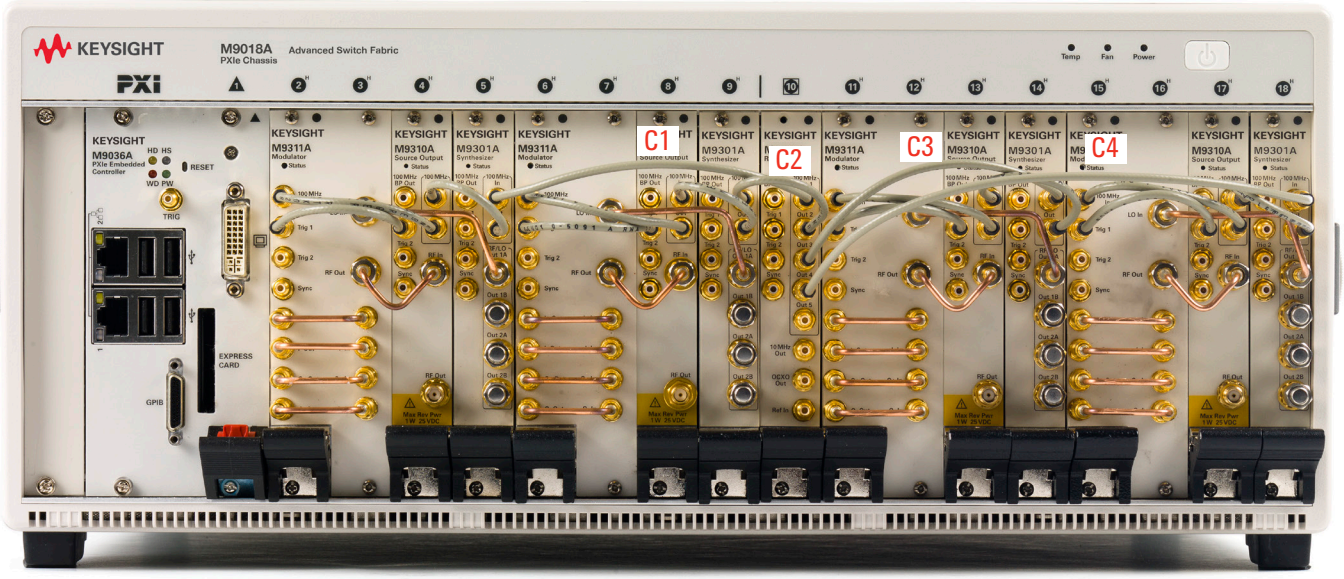


Figure 1. Cable connections for four M9381As in a M9018A PXIe 18-slot chassis.

Multiple M9391A PXIe VSAs in a Single PXIe Chassis

Up to four M9391As can be installed in a single 18 slot PXIe chassis. The cables below are used to connect the M9391A modules to a shared M9300A frequency reference. M9391As can also share a single embedded controller or external PC.

It is recommended that you install the M9391A modules entirely in consecutive slots beginning in slot 4 when using the M9018A chassis. Additional instructions for configuring the M9018A PXI backplane triggers are included in the M9391A and M9381A startup guide literature number M9300-90090.

Every M9391A comes with two cables listed below to choose from for connecting the M9301A 100 MHz IN to the M9300A 100 MHz Out 1 (C1-C4). C1 – C4 must be equal length when operating in a MIMO configuration.

– 8120-5091 Used for connecting single PXI VSA

– 8121-2175 Used when connecting more than one PXI VSA

Keysight M9018A PXIe chassis is required for MIMO capability and 89600 VSA software is required for MIMO analysis.

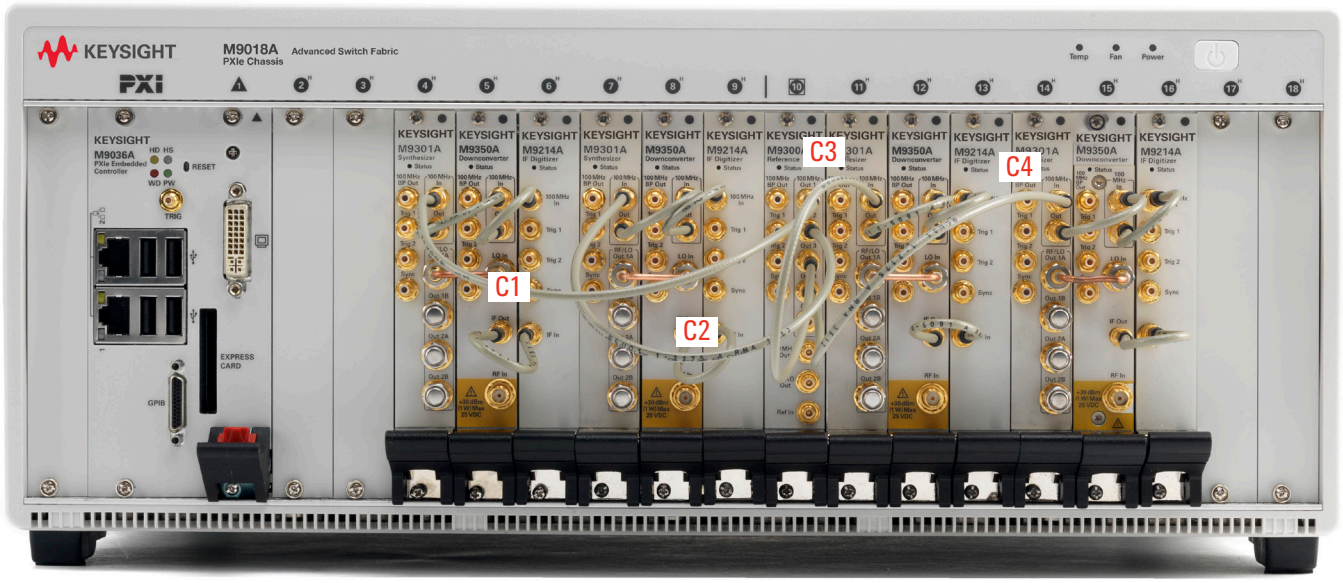


Figure 2. Cable connections for four M9391As in a M9018A PXIe 18-slot chassis.

2x2 Channel PXIe VSA/G (M9391A + M9381A) Configuration in a Single PXIe Chassis

You may order a 2-channel PXIe VSA/G pre-assembled in a PXI chassis at no additional charge. Please contact your Keysight Sales Representative to order the M9018AC PXI Modular Solutions Configuration.

All intermodule cables are shipped with each M9381A and M9391A.

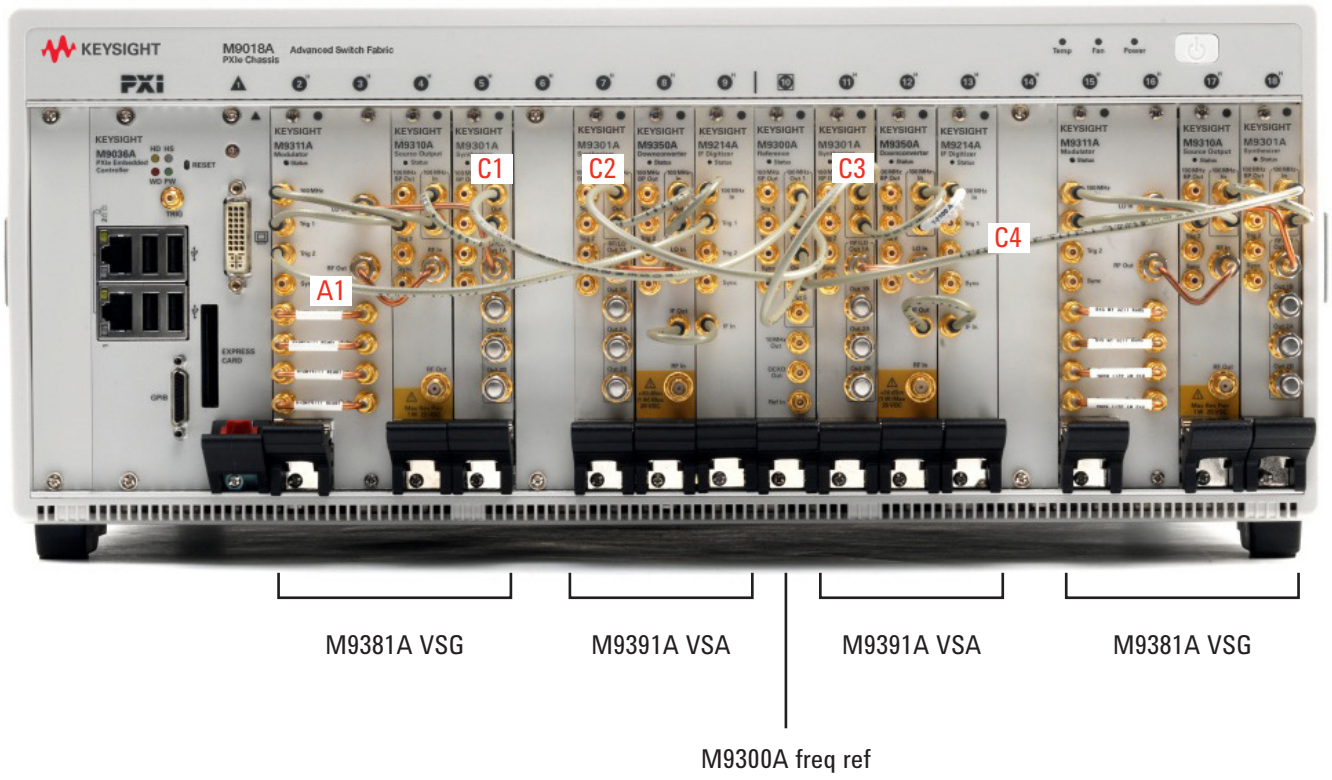
In addition, every M9381A and M9391A comes with two cables listed below to choose from for connecting the M9301A 100 MHz IN to the M9300A 100 MHz Out 1 (C1-C4). C1 – C4 must be equal length when operating in a MIMO configuration.

– 8120-5091 Used for connecting single PXI VSG and/or PXI VSA

– 8121-2175 Used for MIMO cable connections

Note that cable A1 going from the M9311A Trig 2 to M9214A Trig 1 in the left-most PXI VSA/G set is optional. It is used to trigger the PXI VSA from the PXI VSG. Other triggering mechanisms may be employed. Not required for MIMO configuration. For more information, see the M9391A and M9381A Startup Guide, literature number M9300-90090.

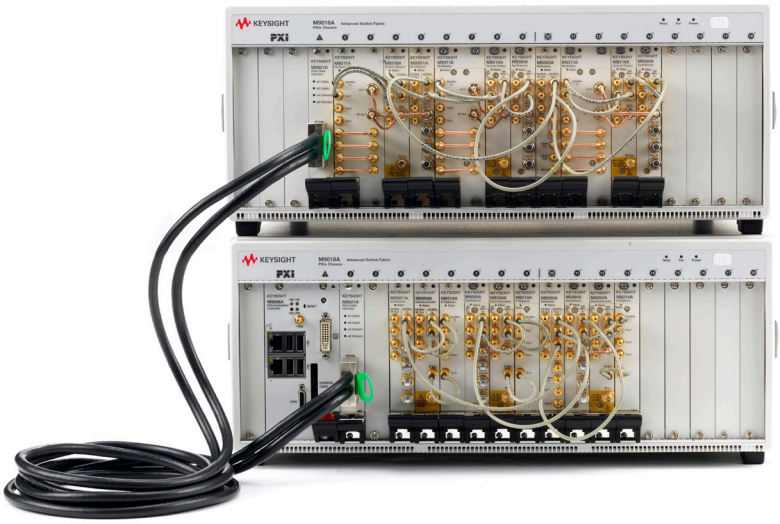
Keysight M9018A PXIe chassis is required for MIMO capability and 89600 VSA software is required for MIMO analysis.



3x3 Channel VSA/G (M9391A + M9381A) Configuration in 2 PXIe Chassis

All intermodule cables are shipped with each M9381A and M9391A. The black cable connecting the 2 chassis (model number Y1202A), must be purchased separately. For notes on intermodule cabling of the M9381A and M9391A, please refer to pages 13 to 15.

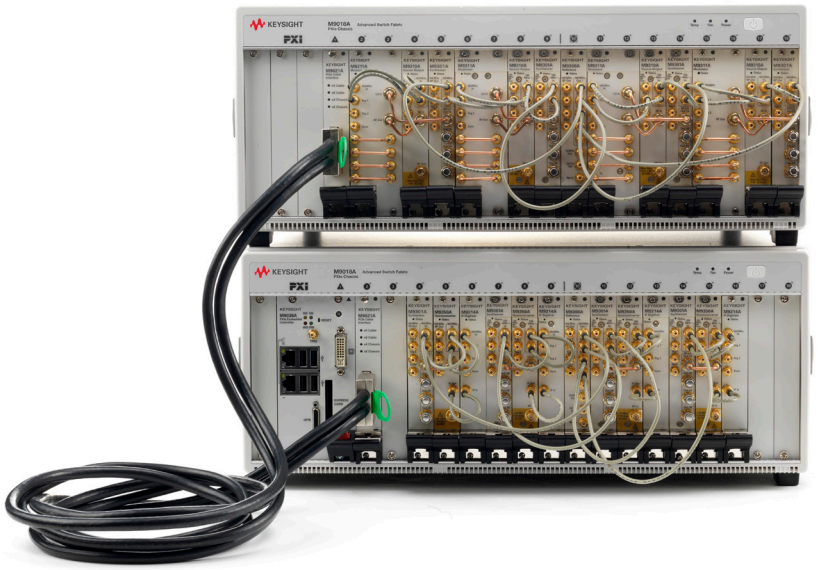
Keysight M9018A PXIe chassis is required for MIMO capability and 89600 VSA software is required for MIMO analysis.



4x4 Channel VSA/G (M9391A + M9381A) Configuration in 2 PXIe Chassis

All intermodule cables are shipped with each M9381A and M9391A. The black cable connecting the 2 chassis (model number Y1202A), must be purchased separately. For notes on intermodule cabling of the M9381A and M9391A, please refer to pages 13 to 15.

Keysight M9018A PXIe chassis is required for MIMO capability and 89600 VSA software is required for MIMO analysis.



Upgrading Your System

Your product can be easily upgraded after the initial purchase. All PXIe VSA and PXIe VSG options are controlled by a licensing key and can be quickly upgraded.

How to upgrade your M9391A PXIe VSA or M9381A PXIe VSG:

1. Contact your Keysight representative to place an order for an option upgrade.
2. You will receive your hardware entitlement certificate via email.
3. Redeem the certificate online by following the instructions provided to receive a license key file.
4. Install the license key file using the Keysight License Manager.
5. Begin using the new capability.

Using a Non-Keysight Chassis

The M9381A and M9391A (with M9300A frequency reference) can be successfully installed in a non-Keysight PXI chassis. Please use the following guidelines.

– Ensure that the chassis has 5 consecutive PXIe or PXI-H slots which can be used by the M9381A or M9391A and M9300A.
– Ensure that the chassis and controller supports peer-to-peer PXI Express I/O switch topology.
– Ensure that controller selected is compatible with chassis.

Keysight M9018A PXIe chassis is required for MIMO capability and 89600 VSA software is required for MIMO analysis.

Please contact your Keysight representative for more detailed information. For technical assistance with non-Keysight equipment, please refer to the equipment manufacturer's website.

PC Requirements for M9381A PXIe VSG and M9391A PXIe VSA Control [1]

	Windows 7 and Vista	Windows XP
Operating system	Windows 7 (32 & 64 bit) Windows Vista, SP 1 & 2 (32 & 64 bit)	Windows XP, SP 3
Processor speed	1.5 GHz dual core (x86 or x64) minimum, 2.4 GHz recommended No support for Itanium64	1.5 GHz dual core minimum, 2.4 GHz recommended
Available memory	4 GB minimum 8 GB recommended	3 GB minimum
Available disk space1	1.5 GB available hard disk space includes: 1 GB for Microsoft.NET framework 3.5 SPI[2] 100 MB for Keysight IO libraries suite 1.5 GB available hard disk space includes: 1 GB for Microsoft.NET framework 3.5 SPI[2] 100 MB for Keysight IO libraries suite	
Video	Support for DirectX 9 graphics with 128 MB graphics recommended (SuperVGA supported)	SuperVGA (800 x 600) 256 colors or more
Browser	Microsoft Internet Explorer 7.0 or greater	Microsoft Internet Explorer 6.0 or greater

1. For a list of computers compatible with Keysight Technologies PXIe M9018A chassis, refer to Tested Computer Technical Note (literature no. 5990-7632EN).
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.

Related Literature

For more detailed product and specification information refer to the following literature and web pages:

– *M9381A PXIe VSG*, Data Sheet (literature no. 5991-0279EN)

– *M9391A PXIe VSA*, Data Sheet (literature no. 5991-2603EN)

– *M9391A PXIe VSA and M9381A PXIe VSG*, Startup Guide *(literature no.* M9300-90090*).*

– *Increase Power Amplifier Test Throughput with the Keysight M9381A PXIe VSG and M9391A PXIe VSA* (literature no. 5991-0652EN)

– *Optimize Transceiver Test Throughput with the Keysight M9381A PXIe VSG and M9391A PXIe VSA* (literature no. 5991-3103EN)

– *Accelerate Development of Next Generation 802.11ac Wireless LAN Transmitters* (literature no. 5990-9872EN)

– *M9018A PXIe 18 slot Chassis Data Sheet* (literature no. 5990-6583EN)

– *M9037A PXIe High Performance Embedded Controller*, Data Sheet (literature no. 5991-3661EN)

– *M9036A PXIe Embedded Controller*, Data Sheet (literature no. 5990-8465EN)

– *X-Series Measurement Applications for Modular Instruments*, Brochure (literature no. 5991-2604EN)

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