Agilent M9392A

PXI Microwave Vector Signal Analyzer

50 MHz to 26.5 GHz



Configuration Guide



Challenge the Boundaries of Test

Agilent Modular Products





OVERVIEW

This configuration guide contains a step-by-step process to help you configure your PXI vector signal analyzer and tailor the system to meet your requirements.

For more detailed product and specification information refer to Agilent M9392A literature and web pages:

- M9392A Datasheet (literature no. 5990-6050EN)
- M9392A Brochure (literature no. 5990-6049EN)
- M9392A Flyer (literature no. 5990-6051EN)
- White Paper, Connecting and Configuring JMR RAID with the M9392A (literature no. 5990-9483EN)
- Application Note, Single Channel Streaming Capability (literature no. 5990-8872EN)
- Application Note, Multichannel Streaming Solution (literature no. 5990-9967EN)
- White Paper, Multichannel Wideband Streaming (literature no. 5991-0221EN)

Configuration steps

- · Select your signal analyzer modules
- · Select your controller
- · Select your chassis and accessories
- · Select your software
- · Select your services

Expand your solution

- · Configure a streaming solution
- · Configure a multichannel signal analysis solution
- · Configure a multichannel streaming solution

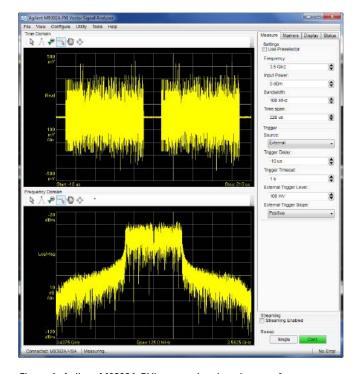


Figure 1. Agilent M9392A PXI vector signal analyzer, software interface

www.agilent.com/find/m9392a

CONFIGURE YOUR PXI VECTOR SIGNAL ANALYZER

A. Select signal analyzer

Options for your M9392A vector signal analyzer		
Description	Number of slots used	Additional information
Option one: Signal analyzer ordering convenience bundle		
M9392A PXI microwave VSA	7 or 8	

Comprised of:

- M9202A digitizer
- · M9302A local oscillator
- M9360A attenuator/preselector
- M9361A 2.75 26.5 GHz downconverter

Includes:

- · Bundled discount
- One day of application engineering consulting
- All required interconnect cables

Optional module:

M9351A 50 MHz–2.9 GHz downconverter

Option two: Build your own with individual modules		
M9202A PXIe IF digitizer	1	Required options when using M9392A software: C01, F02, M05, DDC, V05. (See notes for option descriptions)
M9302A PXI local oscillator: 3 GHz to 10 GHz	2	
M9360A PXI attenuator/preselector: 100 kHz to 26.5 GHz	3	
M9361A PXI downconverter 2.75 GHz to 26.5 GHz	1	
M9351A PXI downconverter: 50 MHz to 2.9 GHz	1	

M9202A options:

- Option C01: single channel operation
- Option F02: frequency range, 2 GS/s (sampling rate)
- Option M05: standard memory of 512 MB
- Option DDC: In addition to basic digitizer functionality, implements a digital down conversion algorithm in the 300 MHz to 700 MHz band improving the analog performance such as spurious free dynamic range (SFDR) or signal to noise ratio (SNR) and reduces data upload time.
- Option V05: 50 MHz BW Streaming
- Option V10: 100 MHz BW Streaming

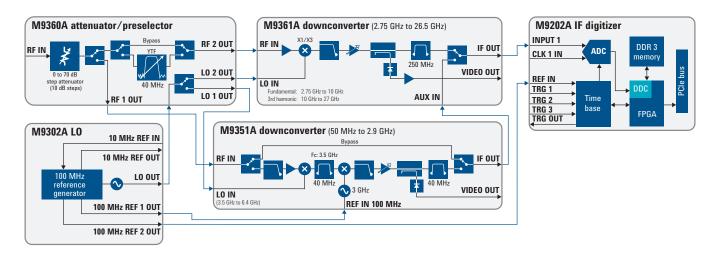


Figure 2. M9392A PXI vector signal analyzer simplified diagram

CONFIGURE YOUR PXI VECTOR SIGNAL ANALYZER

B. Select controller (either Embedded Controller or via PC) ¹ For M9036A Embedded Controller (occupies 1 functional slot) ²

Step 1. Select the memory size		
M9036A-M04	PXIe Embedded Controller with 4 GB Memory	
M9036A-M08	PXIe Embedded Controller with 8 GB Memory Recommended for 64-bit systems	
Step 2. Select an operating system		
M9036A-WE6	Windows embedded standard 7 operating system (64-bit)	
M9036A-WE3	Windows embedded standard 7 operating system (32-bit)	
M9036A-WXP	Downgrade to Windows XP operating system (32-bit)	



To use your laptop PC as a controller

M9045B	PCIe ExpressCard Adaptor	
Y1200B	PCIe Cable	
M9021A ³	PCIe Cable Interface: 1 slot	

To use your desktop PC as a controller

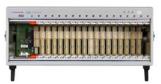
M9048A	PCIe Desktop Adaptor	
Y1202A	PCIe Cable	
M9021A ³	PCIe Cable Interface: 1 slot	

- 1. For list of qualified external controllers, please see Test Computer List Technical Note literature no. <u>5990-7632EN</u>. See physical connections diagram on page 6.
- 2. The M9018A 18-slot chassis includes empty space to the left of the 1st functional slot. The M9036A occupies some of that empty space and the 1st functional slot.
- 3. The M9021A is used for either PC control option and can only be used with the Agilent M9018A 18-slot chassis.

C. Select a chassis and accessories

Step 1. Select your chassis

18-slot PXIe chassis M9018A



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

Y1212A Slot blocker kit: 5 slots



Y1213A PXI EMC Filler Panel Kit: 5 Slots



Step 3. Choose a rack mount kit (optional)

Rack mount kit for M9018A 18-slot Y1215A

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 chassis1



1. Available in 1-slot, 2-slot or 3-slot options depending on the chassis configuration. For more information, please visit www.agilent.com/find/m9018a.

Physical connection diagram for controllers

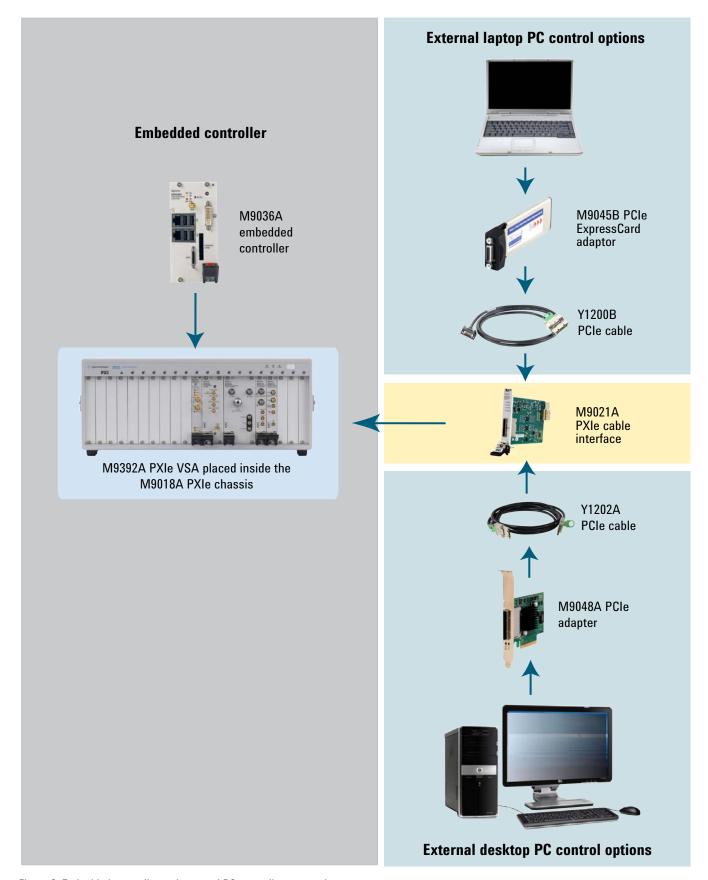


Figure 3. Embedded controller and external PC controller connections.

CONFIGURE YOUR PXI VECTOR SIGNAL ANALYZER

D. Select software

Step 1. Select your software		
Product Description		Additional Information
89601B-200	Basic Vector Signal Analyzer	Required option for use with M9392A
89601B-300	Hardware Connectivity option	Required option for use with M9392A
89601B-AYA	Vector Modulation Analysis	

E. Select services-warranty, calibration and consulting

Step 1. Select your services				
Product	Description			
R1282A	Annual calibration			
Standard	Return-to-Agilent warranty - three years			
R-51B-001-5Z	Return-to-Agilent warranty - five years			
PS-S20-01	Additional AE (application engineer) consulting			
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)			

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

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

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.

Cable and module table

All cables necessary to connect the five PXI modules used to configure the M9392A PXI vector signal analyzer are included with the order. The following diagram and table describe those cables and their required connections. Modules ordered individually ship with cables as well. Torque specification for all SMA connectors is 8 Lb-In (0.904 Nm).

Module	Ref Des	Agilent Part Number	Connection	Cable Description
M9360A	A1	M9360-20001	M9302A LO OUT – M9360A LO IN	Cable, semi-rigid, master LO (SMA-SMA)
M9351A	A2	M9351-20001	M9360A RF 1 OUT – M9351A RF IN	Cable, semi-rigid, (SMA-SMA)
M9361A	A3	M9361-20001	M9360A RF 2 OUT – M9361A RF IN	Cable, semi-rigid, (SMA-SMA)
M9361A	A4	M9361-20002	M9360A LO 2 OUT – M9361A LO IN	Cable, semi-rigid, (SMA-SMA)
M9351A	A5	M9351-20002	M9360A LO 1 OUT – M9351A LO IN	Cable, semi-rigid, (SMA-SMA)
M9351A	B1	8120-5016	M9351A REF IN – M9302A REF 1 OUT	Cable, coaxial, (SMB-SMB (190 mm)
M9351A	B2	8121-2072	M9351A IF OUT – M9361A AUX IN	Cable, coaxial, (SMB-SMB (75 mm)
M9202A	C3	8120-5531	M9361A IF OUT – M9202A INPUT 1	Cable, SMB—SMA coaxial (190 mm)
M9202A	C4	8121-2042	M9302A REF 2 OUT – M9202A REF IN	Cable, A06/A32 80G (SMB-MMCX)
M9202A	N/A	8121-2041 1	N/A	Cable, A06/A32 190G (SMB-MMCX)
M9202A	N/A	8121-2041 1	N/A	Cable, A06/A32 190G (SMB-MMCX)
M9302A	N/A	N/A ²	N/A	N/A
				<u> </u>

^{1.} These cables are not required to configure an Agilent M9392A PXI vector signal analyzer. See the Agilent M9392A PXI vector signal analyzer cabling diagram below. These cables are provided for using the Agilent M9202A PXIe IF digitizer in other applications.

2. No cables are shipped with the Agilent M9302A PXI local oscillator module.

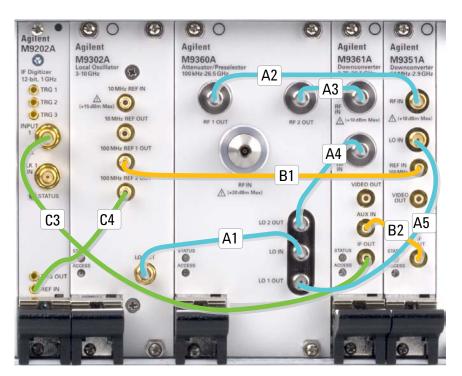


Figure 4. M9392A PXI vector signal analyzer showing cable connection for basic signal analysis

EXPAND YOUR SOLUTION

Configure a streaming solution (single channel)

The M9392A PXI Microwave Vector Signal Analyzer with streaming provides: compact, modular, and cost-effective signal capture up to 100 MHz bandwidth. This enables long gapless capture of signals up to 100 MHz bandwidth to RAID storage solutions. It includes basic software tools to enable signal identification and signal export to analysis software such as the 89600 VSA. External mass storage must be purchased separately. For additional information refer to application note, *Agilent M9392A PXIe Vector Signal Analyzer System with Streaming Capability*, literature no. 5990-8872EN.

Agilent's predefined packages have been tested to guarantee sustained data rates. These predefined mass storage packages ensure performance when used with the recommended controller.

Recommended Controllers

M9036A PXIe Embedded Controller

Dell T3600 (win 7 64 bit O/S, 12 GB RAM, quad core)

Dell T5600 (win 7 64 bit O/S, 12 GB RAM, quad core)

Note: Dell T3500 and T5500 were successfully tested. Testing of Dell T3600 and T5600 in process.

Predefined JMR RAID package

Base configuration includes: Gen 2 5-slot PCIe backplane; x16 PCIe HCA; scalable 16, 3.5 inch storage bay chassis, dual internal SAS expanders and one LSI SAS 9265-8i RAID controller. For additional information refer to white paper, *Connecting and Configuring JMR RAID with the Agilent M9392A*, literature no. 5990-9483EN.

Systems include a 3-year limited warranty and 8/5 tech support

JMR model number	Description
AGIL-G4-8T	Base configuration with 8 TB: 75% short stroked: RAID 0: >3 hours at 100 MHz for single channel
AGIL-G4-16T	Base configuration with 16 TB: 75% short stroked: RAID 0: >6 hours at 100 MHz for single channel
AGIL-G4-32T	Base configuration with 32 TB: 75% short stroked: RAID 0: >13 hours at 100 MHz for single channel
AGIL-G4-0.4T	Base configuration with 400 GB: SLC SSD: RAID 0: 10 minutes at 100 MHz for single channel

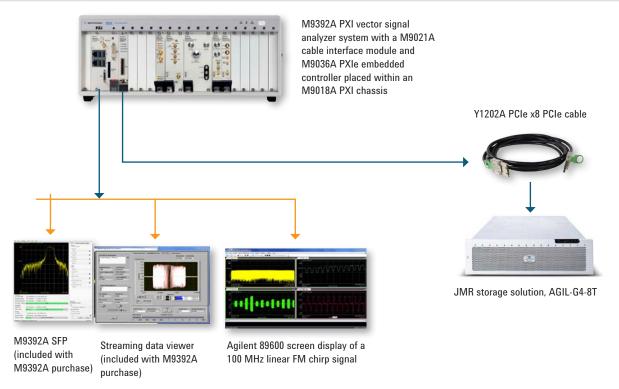


Figure 5. Configure your system to enable the capture of continuous data to disk

Configure a multichannel signal analysis solution

Achieve wide-band multichannel analysis capability by combining 2 PXI vector signal analyzers--Agilent M9392A--in one chassis. The PXI signal analyzer modules allow for configuration flexibility, enabling independent L0 or common L0 configurations. For additional information refer to white paper, *Multichannel Wideband Streaming*, literature no. 5991-0221EN.

Step 1. Choose your configuration

Option One: The Independent LO configuration allows each channel to be tuned to a different frequency. For Channel 2 order an additional M9392A PXI microwave VSA:

all additional M3332A FAI Illicrowave VSA.				
Description	Number of slots used	Additional information		
Signal analyzer ordering convenience bundle				
M9392A PXI microwave VSA	7 or 8			

Comprised of:

- · M9202A digitizer
- · M9302A local oscillator
- M9360A attenuator/preselector
- M9361A 2.75 26.5 GHz downconverter

Includes:

- · Bundled discount
- · One day of application engineering consulting
- · All required interconnect cables

Optional module:

M9351A 50 MHz–2.9 GHz downconverter

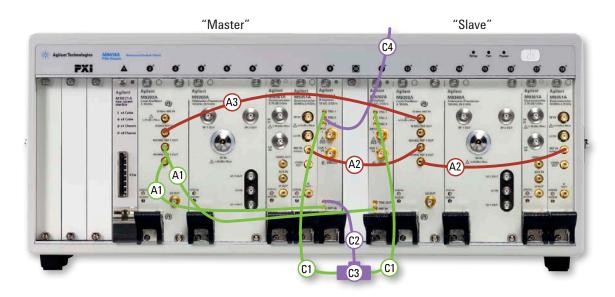
Option Two: The Common LO configuration requires both channels to be tuned to the same frequency. This configuration is only valid for RF frequencies ≤ 10 GHz. For Channel 2 order the following modules:

M9202A PXIe IF digitizer	1	Required options when using M9392A software: C01, F02, M05, DDC, V05. (See notes for option descriptions)
M9360A PXI attenuator/preselector: 100 kHz to 26.5 GHz	3	
M9361A PXI downconverter 2.75 GHz to 26.5 GHz	1	
M9351A PXI downconverter: 50 MHz to 2.9 GHz	1	

M9202A options:

- Option C01: single channel operation
- Option F02: frequency range, 2 GS/s (sampling rate)
- Option M05: standard memory of 512 MB
- Option DDC: In addition to basic digitizer functionality, implements a digital down conversion algorithm in the 300 MHz to 700 MHz band improving the
 analog performance such as spurious free dynamic range (SFDR) or signal to noise ratio (SNR) and reduces data upload time.
- Option V05: 50 MHz BW Streaming
- Option V10: 100 MHz BW Streaming

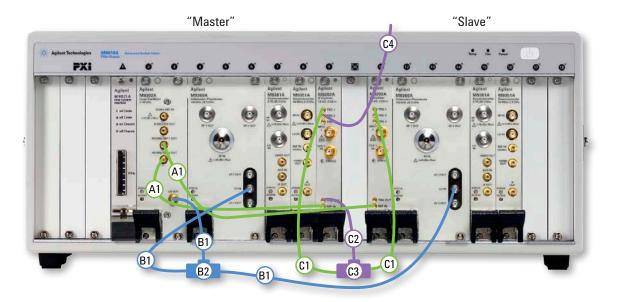
Step	Step 2. Select cable kits				
Optio	Option One: Independent LO configuration cable kits				
Q ty	Ref Des	Connection	Description		
Y124	IA Option 00	1: 10/100 MHz Distribution Kit			
2	A2	"Slave" M9302A 10 MHz REF OUT to M9351A REF IN 100 MHz	Cable assembly, coaxial, A06/A06, 160 MM long		
1	A3	"Master" M9302A 10 MHz REF OUT to "Slave" M9302A REF IN	Cable assembly, coaxial, A06/A06, 205 MM long		
Y1240	OA Option 00	1: Trigger Distribution Kit			
1	C2	"Master" M9202A TRG OUT to TEE	Cable assembly, coaxial, 50-Ω, A06/A32 80 MM LG [SMB-MMCX (f)]		
1	C3		Adapter coaxial TEE male, SMB (m) SMB (m) SMB (m)		
1	C4	M9202A Trig 2	Cable assembly, coaxial , 50-Ω, A12/A32 240 MM LG [MMCX-SMA (m)]		
Cables included with modules					
2	A1	"Master" M9302A REF OUTs to M9202A REF Ins	Cable A06/A32 190G [SMB – MMCX)		
2	C1	TEE to M9202A TRG 1	Cable A06/A32 190G [SMB – MMCX)		



System configuration					
Slot number	Model	Description	Slot number	Model	Description
1	M9021A	PCIe cable interface	10	empty	
2-3	M9302A	local oscillator	11	M9202A	digitizer
4-6	M9360A	attenuator/preselector	12-13	M9302A	local oscillator
7	M9361A	downconverter	14-16	M9360A	attenuator/preselector
8	M9351A	downconverter	17	M9361A	downconverter
9	M9202A	digitizer	18	M9351A	downconverter

Figure 6. Cabling diagram for independent LO configuration

Step	Step 2. Select cable kits (cont)				
Option Two: Common LO configuration cable kits (for RF frequencies ≤10 GHz)					
Q ty	Ref Des	Connection	Description		
Y1241	A Option 002:	LO Distribution Kit			
3	B1	"Master" M9302A LO OUT to TEE and TEE to M9360A LO IN	Cable A06/A12 190 G SMA (m) - SMB (f)		
1	B2		Adapter, coaxial tee male, SMB (m) SMB (m) SMB (m)		
Y1240	A Option 001:	Trigger Distribution Kit			
1	C2	"Master" M9202A TRG OUT to TEE	Cable assembly, coaxial, 50 Ω A06/A32 80 MM-LG [SMB – MMCX (f)]		
1	C3		Adapter, coaxial tee male, SMB (m) SMB (m) SMB (m)		
1	C4	M9202A Trig 2	Cable assembly, coaxial, 50 Ω, A12/A32 240 MM-LG [MMCX-SMA (m)]		
Cable	s included wit	h modules			
2	A1	"Master" M9302A REF OUT(s) to M9202A REF IN(s)	Cable A06/A32 190 G [SMB – MMCX)		
2	C1	TEE to M9202A TRG 1	Cable A06/A32 190 G [SMB – MMCX)		



System Configuration					
Slot number	Model	Description	Slot number	Model	Description
1	M9021A	PCIe cable interface	10	empty	
2-3	M9302A	local oscillator	11	M9202A	digitizer
4-6	M9360A	attenuator/preselector	12-14	M9360A	attenuator/preselector
7	M9361A	downconverter	15	M9361A	downconverter
8	M9351A	downconverter	16	M9351A	downconverter
9	M9202A	digitizer	17-18	empty	

Figure 7. Cabling diagram for common LO configuration

Configure a multichannel streaming solution

Combine multichannel capability with gapless recording to address a wide variety of test needs in wireless communications and aerospace industries.

Agilent's predefined packages have been tested to guarantee sustained data rates. These predefined mass storage packages ensure performance when used with the recommended controller. For additional information refer to white paper, *Multichannel Wideband Streaming*, literature no. 5991-0221EN.

Select signal analysis hardware

Select the signal analysis hardware from the Multi-channel section shown previously.

Recommended controllers

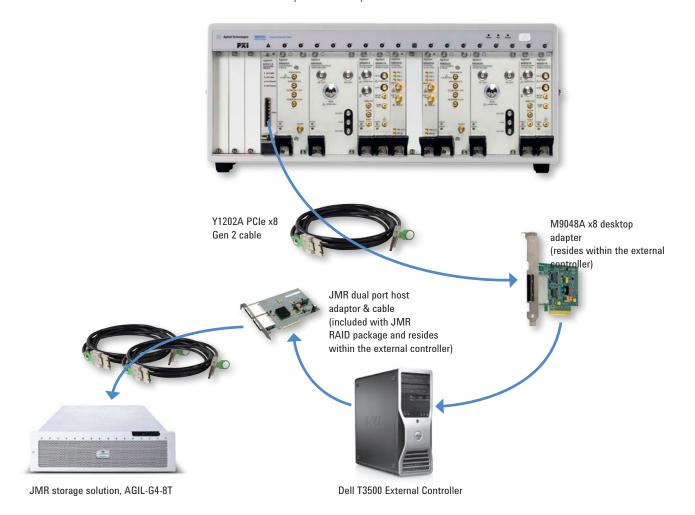
M9036A PXIe Embedded Controller (for ≤ 50 MHz BW) Dell T7600 (win 7 64 bit 0/S, 12 GB RAM, quad core)

Predefined JMR RAID package

Base configuration includes: Gen 2 5-slot PCle backplane; x16 PCle HCA; scalable 16, 3.5 inch storage bay chassis, dual internal SAS expanders and two LSI SAS 9265-8i RAID controllers. For additional information refer to white paper, *Connecting and Configuring JMR RAID with the Agilent M9392A*, literature no. 5990-9483EN.

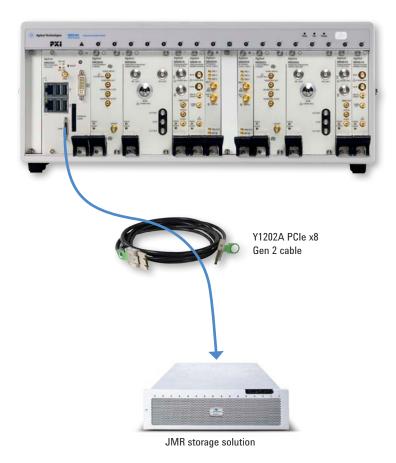
Systems include a 3-year limited warranty and 8/5 tech support

JMR model number	Description
For 100 MHz BW	multi-channel (dual controller)
AGIL-G4-DC-16T	Dual controller configuration with 16TB: 75% short stroked: RAID 0: > 3 hours at 100 MHz per channel for 2 channels
AGIL-G4-DC-32T	Dual controller configuration with 32 TB: 75% short stroked: RAID 0: >6 hours at 100 MHz per channel for 2 channels
For 50 MHz or les	s BW multi-channel (single controller)
AGIL-G4-8T	Base configuration with 8 TB: 75% short stroked: RAID 0: >3 hours at 100 MHz for single channel
AGIL-G4-16T	Base configuration with 16 TB: 75% short stroked: RAID 0: >6 hours at 100 MHz for single channel
AGIL-G4-32T	Base configuration with 32 TB: 75% short stroked: RAID 0: >13 hours at 100 MHz for single channel
AGIL-G4-0.4T	Base configuration with 400 GB: SLC SSD: RAID 0: 10 minutes at 100 MHz for single channel



System configuration					
Slot number	Model	Description	Slot number	Model	Description
1	M9021A	PCIe cable interface	10	empty	
2-3	M9302A	local oscillator	11	M9202A	digitizer
4-6	M9360A	attenuator/preselector	12-13	M9302A	local oscillator
7	M9361A	downconverter	14-16	M9360A	attenuator/preselector
8	M9351A	downconverter	17	M9361A	downconverter
9	M9202A	digitizer	18	M9351A	downconverter

Figure 8. 2-channel solution using desktop controller



System configuration					
Slot number	Model	Description	Slot number	Model	Description
1	M9036A	embedded controller	10	empty	
2-3	M9302A	local oscillator	11	M9202A	digitizer
4-6	M9360A	attenuator/preselector	12-13	M9302A	local oscillator
7	M9361A	downconverter	14-16	M9360A	attenuator/preselector
8	M9351A	downconverter	17	M9361A	downconverter
9	M9202A	digitizer	18	M9351A	downconverter

Figure 9. 2-channel solution using embedded controller.

PC requirements for M9392A control ¹

	Windows 7 and Vista	Windows XP ²
Operating system	Windows 7 (32 & 64 bit) Windows Vista, SP 1 & 2 (32 & 64 bit) ²	Windows XP, SP 3
Processor speed	1.5 GHz Dual Core (x86 or x64) minimum,2.4 GHz recommendedNo support for Itanium64	1.5 GHz Dual Core minimum,2.4 GHz recommended
Available memory ³	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 ⁴ 100 MB for Agilent IO Libraries Suite	1.5 GB available hard disk space includes: 1 GB for Microsoft.NET Framework 3.5 SPI ⁴ 100 MB for Agilent 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 Agilent Technologies PXIe M9018A Chassis, refer to Tested Computer Technical Note (literature no. <u>5990-7632EN</u>).

^{2.} Windows XP and Vista are not supported when using streaming options (M9202A-V05 or M9202A-V10).

^{3.} Because of the installation procedure, less memory may be required for operation than is required for installation.

^{4. .}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.



The modular tangram

The four-sided geometric symbol that appears in this document is called a tangram. The goal of this seven-piece puzzle is to create identifiable shapes—from simple to complex. 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—hardware, software—Agilent can help you create the system you need, from simple to complex.

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

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