M9290A CXA-m PXIe X-Series Signal Analyzer

10 Hz to 3.0, 7.5, 13.6 or 26.5 GHz

KEYSIGHT
TECHNOLOGIES

Overview

This configuration guide contains information to help you configure your M9290A CXA-m PXIe signal analyzer to meet your requirements. Ordering optional capabilities at time of purchase provides the lowest overall cost.

Table of contents

Hardware

A. Select options for M9290A CXA-m PXIe signal analyzer

Step 1. Choose a frequency range (required option; frequency range not upgradeable)			
○	M9290A-F03	Frequency range, 10 Hz to 3.0 GHz	
○	M9290A-F07	Frequency range, 10 Hz to 7.5 GHz	
○	M9290A-F13	Frequency range, 10 Hz to 13.6 GHz	
○	M9290A-F26	Frequency range, 10 Hz to 26.5 GHz	
Step 2. Add a preamplifier			
Enhances sensitivity to detect low-level signals			
○	M9290A-P03	Preamplifier, 100 kHz to 3 GHz	
○	M9290A-P07	Preamplifier, 100 kHz to 7.5 GHz	
○	M9290A-P13	Preamplifier, 100 kHz to 13.6 GHz	
○	M9290A-P26	Preamplifier, 100 kHz to 26.5 GHz	
Step 3. Add a tracking generator			
○	M9290A-T03	Tracking generator, 2 MHz to 3 GHz	
○	M9290A-T07	Tracking generator, 2 MHz to 7.5 GHz	
○	M9290A-T13	Tracking generator, 2 MHz to 13.6 GHz	
○	M9290A-T26	Tracking generator, 2 MHz to 26.5 GHz	
Step 4. Add precision amplitude accuracy			
○	M9290A-PAA	Precision amplitude accuracy	Improves amplitude accuracy to < ± 0.6 dB at full band
Step 5. Choose frequency reference			
◉	Standard	Frequency reference	Aging rate: ± 1 x 10^{-6}/year
○	M9290A-PFR	Precision frequency reference	Reduces frequency drift for more accurate measurements; Aging rate: ± 1 x 10^{-7}/year
Step 6. Choose an attenuator			
◉	Standard	Mechanical attenuator	10 dB steps, 0 to 70 dB
○	M9290A-FSA	Fine resolution step attenuator	Allows 2 dB steps for the full range of the attenuator, up to 7.5 GHz
Step 7. Choose analysis bandwidth			
◉	Standard	10 MHz analysis bandwidth	
○	M9290A-B25	25 MHz analysis bandwidth	
Step 8. Add optional features			
○	N90EMEDPB	Enhanced display package	Includes spectrogram, trace zoom, and zone span
○	N90EMEMCB	Basic precompliance EMI	Perform EMI precompliance measurements with CISPR 16-1-1 detectors and bandwidths; measure at marker is also available
Step 9. Choose localized getting started guides			
○	M9290A-AB1	Getting started guide CXA-m Korean localization	
○	M9290A-AB2	Getting started guide CXA-m Chinese localization	
○	M9290A-ABD	Getting started guide CXA-m German localization	
○	M9290A-ABF	Getting started guide CXA-m French localization	
○	M9290A-ABJ	Getting started guide CXA-m Japanese localization	
○	M9290A-AKT	Getting started guide CXA-m Russian localization	

B. Select controller (Either embedded controller or via PC) [1]

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

○ **M9036A-M04**
Mid-performance embedded controller
Intel i5-520E dual-core, 2.4 GHz, 4 thread, 4 GB RAM

Select the M9036A for mid-performance and lower cost

○ **M9037A-M04**
High-performance embedded controller
Intel i7-4700EQ quad-core processor, 2.4 GHz, 8 thread, 4 GB 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 to 8 GB RAM

For M9037A

○	M9037A-M08	Memory upgrade from 4 to 8 GB RAM
○	M9037A-M16	Memory upgrade from 4 to 16 GB RAM

Step 3. Select an operating system

For M9036A

○	M9036A-W16	Microsoft Windows 10 IoT Enterprise LTSB (64-bit)
○	M9036A-WE6	Microsoft Windows Embedded Standard 7 (64-bit)

For M9037A

○	M9037A-W16	Microsoft Windows 10 IoT Enterprise LTSB (64-bit)
○	M9037A-WE6	Microsoft Windows Embedded Standard 7 (64-bit)

1. For list of qualified external controllers, please see Tested 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.

B. 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 [1] :1 slot	

1. For list of qualified external controllers, please see Tested Computer List Technical Note literature no. 5990-7632EN. See physical connections diagram on page 7.
2. The M9021A is used for either PC control option and can only be used with the Keysight M9018A 18-slot chassis.

C. Select a chassis and accessories

Step 1. Select a chassis

○ M9018A   18-slot PXIe chassis
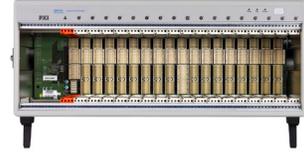
Step 2. Choose enough slot blocker kits and EMC filler panels to fill every open slot

Recommended to achieve data sheet 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 kit [1] (optional)

Recommended for rack mounted systems with less than 1U space below chassis

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

Step 5. Choose a noise source connecting cable (optional)

Required to connect M9290A and Keysight 346 series or SNS series noise source, for noise figure measurement

○ Y1282A

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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

Physical Connection Diagram for Controllers, Chassis and Accessories

Embedded controller

M9036A or
M9037A
embedded
controller

M9290A CXA-m PXIe signal analyzer
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

Software

D. Select software for M9290A CXA-m PXIe signal analyzer

Step 1. Start with M9290A base configuration

◉ The M9290A 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 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 or software (optional)

Note: Keysight offers flexible license types and terms for the measurement applications, refer to page 11 of *Pathwave X-Series applications Brochure (5989-8019EN)*

	Description		Additional information
◉	Spectrum analyzer		Traditional spectrum analysis plus many new and enhanced functions; power measurements based on industry specifications.
○	Analog demodulation	N9063EM0E	One-button measurement for AM/FM/PM demodulation with metrics, tune and listen, and AF spectrum; supports audio output (output voltage proportional to frequency deviation). FM Stereo and RDS are included.
○	Phase noise	N9068EM0E	One-button phase noise measurements in frequency domain (log plot) and time domain (spot frequency).
○	Noise figure	N9069EM0E (requires preamplifier, and Y1282A connecting cable)	One-button noise figure, gain, and related measurements; requires preamplifier to meet specifications; works with Keysight N400xA Series smart noise sources and 346 Series noise sources. Advanced NF measurement features including external LO control over LAN/USB, multi-stage converter tests with system LO, and manual mode to simulate the legacy NF meter.
○	VMA Vector Modulation Analysis	N9054EM0E	Vector signal analysis; high-resolution, FFT-based spectrum and time-domain measurements, time gating, AM/FM/PM demodulation, statistical measurements, general purpose digital modulation for 2-16FSK, 2-8PSK, and 16-1024QAM, as well as more than 15 additional formats.
○	GSM/EDGE/Evo	N9071EM0E	Standard based, one-button GSM/EDGE/Evo measurements.
○	SCPI command language compatibility	N9062EM0E	Adds capability to emulate the R&S FSP/FSU/FSE spectrum analyzers.
○	MATLAB software	N6171A	Extends capability to make custom measurements, analyze and visualize data, create arbitrary waveforms, control instruments and build test systems.
○	W-CDMA/HSPA+	N9073EM0E	Standard-based, one-button W-CDMA/HSPA/HSPA+ measurements.

1. Both IO library (version 17 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/m9290a
3. To download or get more information on Command Expert, visit www.keysight.com/find/commandexpert

Step 3. Add X-Series Measurement Applications or software (optional) (continued)

	Description		Additional information
○	89600 VSA software	89601C (transportable license is standard)	Industry-leading measurement software for evaluating and troubleshooting signals in R&D; PC-based software supporting more than 30 measurement platforms, plus more than 75 signal standards and modulation types including MIMO analysis; transportable between instruments and PCs; www.keysight.com/find/89600vsa.
○	LTE/LTE-Advanced FDD	N9080EM0E	Standard-based, one-button LTE and LTE-Advanced FDD measurements (requires Window 7 OS or above).
○	TE/LTE-Advanced TDD	N9082EM0E	Standard-based, one-button LTE and LTE-Advanced TDD measurements (requires Window 7 OS or above).
○	*Bluetooth®*	N9081EM0E	Standard-based, one-button Bluetooth (BR/EDR, Low Energy 4.0/4/2 and Bluetooth 5) measurements.

Services

E. Select services: Calibration, start-up assistance

◉	M9290A-UK6	Commercial calibration certificate with test data	Calibration certificate only available at time of instrument purchase; only provides measurement results.
○	R-50C-011-3	Calibration Assurance Plan, Return-to-Keysight, 3 years	Keysight tests your instrument against its original specifications and automatically makes adjustments if outside of specified parameters; pre- and post-adjustment measurement data reports also provided
○	PS-S20-01	Service: 1-day start-up assistance	Training on how to operate your instrument effectively.
○	N7800A Calibration and adjustment software		

Calibration services

The modular products are factory calibrated. A one year calibration cycle is recommended. The M9290A CXA–m PXIe signal analyzer is 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 and adjustment software

The M9290A CXA–m PXIe signal analyzer is 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

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

Upgrading your system

Your product can be easily upgraded after the initial purchase. Fast license-key upgrades for performance options that do not require additional hardware:

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 [1, 2].

Installation and testing information is available at:
www.keysight.com/find/cxa-m_upgrades

Description	Upgrade number
○ Add preamplifier, 3 GHz	M9290AU-P03
○ Add preamplifier, 7.5 GHz	M9290AU-P07
○ Add preamplifier, 13.6 GHz	M9290AU-P13
○ Add preamplifier, 26.5 GHz	M9290AU-P26
○ Add track generator, 3 GHz	M9290AU-T03
○ Add track generator, 7.5 GHz	M9290AU-T07
○ Add track generator, 13.6 GHz	M9290AU-T13
○ Add track generator, 26.5 GHz	M9290AU-T26
○ Upgrade to the precision amplitude accuracy	M9290AU-PAA
○ Upgrade to the precision frequency reference	M9290AU-PFR
○ Add fine resolution step attenuator	M9290AU-FSA
○ Increase analysis bandwidth from 10 to 25 MHz	M9290AU-B25
○ Add basic EMI precompliance features	M9290AU-EMC
○ Add enhanced display package	M9290AU-EDP
○ Getting started guide CXA-m Korean localization	M9290AU-AB1
○ Getting started guide CXA-m Chinese localization	M9290AU-AB2
○ Getting started guide CXA-m German localization	M9290AU-ABD
○ Getting started guide CXA-m French localization	M9290AU-ABF
○ Getting started guide CXA-m Japanese localization	M9290AU-ABJ
○ Getting started guide CXA-m Russia localization	M9290AU-AKT

Using an M9290A in a non-Keysight chassis

The M9290A can be successfully installed in a non-Keysight PXI chassis. Please use the following guidelines.
– Ensure that the chassis has 4 consecutive PXIe or PXI-H slots which can be used by the M9290A.
– Ensure that the chassis and controller supports peer-to-peer PXI Express I/O switch topology.
– Ensure that controller selected is compatible with chassis.

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

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1. At the time of manufacture, the hardware related to many of these options was fully adjusted and the option performance was verified to be within its warranted specifications. Within one year of the initial calibration date of the analyzer, this option is fully calibrated with no further adjustment or verification testing.
2. If this analyzer has been adjusted as part of a repair or calibration during its first year, or if the analyzer is more than one year old, additional adjustment and performance verification tests are required to ensure that some newly installed options are functioning properly. However, the completion of these tests does not guarantee that the analyzer meets all warranted specifications.

PC requirements for M9290A control [1]

	Windows 7, Windows 10
Operating system	Windows 7 (32/64 bit) , Windows 10 (64 bit)
Processor speed	Single Core with hyper threading, 1.86 GHz minimum
Available memory	4 GB minimum
	8 GB recommended
Available disk space [1]	4 GB
Video	Support for DirectX 9 graphics with 128 MB graphics recommended (SuperVGA supported)
Browser	Microsoft Internet Explorer 7.0 or greater

Related literature

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

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

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