

# Agilent M9360A PXI Attenuator/Preselector 100 kHz to 26.5 GHz



## Startup Guide



**Agilent Technologies**

## Notices

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### Sales and Technical Support

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- [www.agilent.com/find/M9360A](http://www.agilent.com/find/M9360A) (product-specific information and support, software and documentation updates)
- [www.agilent.com/find/M9392A](http://www.agilent.com/find/M9392A) (product-specific information and support, software and documentation updates)
- [www.agilent.com/find/assist](http://www.agilent.com/find/assist) (worldwide contact information for repair and service)

Information on preventing damage to your Agilent equipment can be found at [www.agilent.com/find/tips](http://www.agilent.com/find/tips).

### Regulatory Compliance

This product has been designed and tested in accordance with accepted industry standards, and has been supplied in a safe condition. To review the Declaration of Conformity, go to <http://regulations.corporate.agilent.com/DoC/search.htm>.

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### Safety Notices

The following safety precautions should be observed before using this product and any associated instrumentation.

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product.

#### WARNING

**If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.**

The types of product users are:

- **Responsible body** is the individual or group responsible for the use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring operators are adequately trained.
- **Operators** use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.
- **Maintenance personnel** perform routine procedures on the product to keep it operating properly (for example, setting the line voltage or replacing consumable materials). Maintenance procedures are described in the user documentation. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.
- **Service personnel** are trained to work on live circuits, perform safe installations, and repair products. Only properly trained service personnel may perform installation and service procedures.

Agilent products are designed for use with electrical signals that are rated Measurement Category I and Measurement Category II, as described in the International Electrotechnical Commission (IEC) Standard IEC 60664. Most measurement, control, and data I/O signals are Measurement Category I and must not be directly connected to mains voltage or to voltage sources with high transient over-voltages. Measurement Category II connections require protection for high transient over-voltages often associated with local AC mains connections. Assume all measurement, control, and data I/O connections are for connection to Category I sources unless otherwise marked or described in the user documentation.

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30V RMS, 42.4V peak, or 60VDC are present. A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.

Operators of this product must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000V, no conductive part of the circuit may be exposed.

Do not connect switching cards directly to unlimited power circuits. They are intended to be used with impedance-limited sources. NEVER connect switching cards directly to AC mains. When connecting sources to switching cards, install protective devices to limit fault current and voltage to the card.

Before operating an instrument, ensure that the line cord is connected to a properly-grounded power receptacle. Inspect the connecting cables, test leads, and jumpers for

possible wear, cracks, or breaks before each use.

When installing equipment where access to the main power cord is restricted, such as rack mounting, a separate main input power disconnect device must be provided in close proximity to the equipment and within easy reach of the operator.

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before: connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.

The instrument and accessories must be used in accordance with its specifications and operating instructions, or the safety of the equipment may be impaired.

Do not exceed the maximum signal levels of the instruments and accessories, as defined in the specifications and operating information, and as shown on the instrument or test fixture panels, or switching card.

When fuses are used in a product, replace with the same type and rating for continued protection against fire hazard.

Chassis connections must only be used as shield connections for measuring circuits, NOT as safety earth ground connections.

If you are using a test fixture, keep the lid closed while power is applied to the device under test. Safe operation requires the use of a lid interlock.

#### CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a **CAUTION** notice until the indicated conditions are fully understood and met.

#### WARNING

A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a **WARNING** notice until the indicated conditions are fully understood and met.

Instrumentation and accessories shall not be connected to humans.

Before performing any maintenance, disconnect the line cord and all test cables.

To maintain protection from electric shock and fire, replacement components in mains circuits – including the power transformer, test leads, and input jacks – must be purchased from Agilent. Standard fuses with applicable national safety approvals may be used if the rating and type are the same. Other components that are not safety-related may be purchased from other suppliers as long as they are equivalent to the original component (note that selected parts should be purchased only through Agilent to maintain accuracy and functionality of the product). If you are unsure about the applicability of a replacement component, call an Agilent office for information.

#### WARNING

**No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers. For continued protection against fire hazard, replace fuse with same type and rating.**

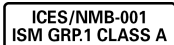
## PRODUCT MARKINGS:



The CE mark is a registered trademark of the European Community.



The C-Tick mark is a registered trademark of the Australian Spectrum Management Agency.



This symbol indicates product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001). It also identifies the product is an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).



This symbol indicates separate collection for electrical and electronic equipment, mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive, 2002/96/EC).



This symbol on an instrument means caution, risk of danger. You should refer to the operating instructions located in the user documentation in all cases where the symbol is marked on the instrument.



This symbol indicates the time period during which no hazardous or toxic substance elements are expected to leak or deteriorate during normal use. Forty years is the expected useful life of the product.



This symbol indicates the instrument is sensitive to electrostatic discharge (ESD). ESD can damage the highly sensitive components in your instrument. ESD damage is most likely to occur as the module is being installed or when cables are connected or disconnected. Protect the circuits from ESD damage by wearing a grounding strap that provides a high resistance path to ground. Alternatively, ground yourself to discharge any built-up static charge by touching the outer shell of any grounded instrument chassis before touching the port connectors.

## CLEANING PRECAUTIONS:

### WARNING

**To prevent electrical shock, disconnect the Agilent Technologies instrument from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally. To clean the connectors, use alcohol in a well-ventilated area. Allow all residual alcohol moisture to evaporate, and the fumes to dissipate prior to energizing the instrument.**

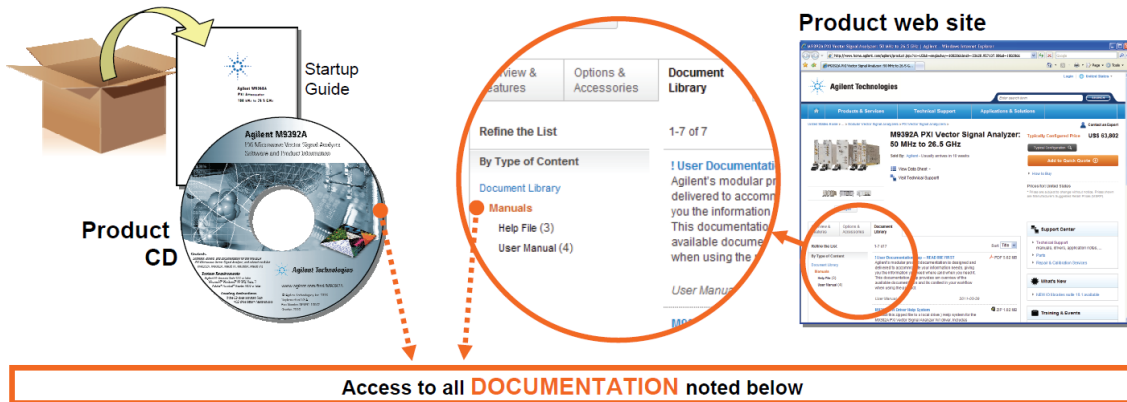
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# Documentation Map



## Startup Guide



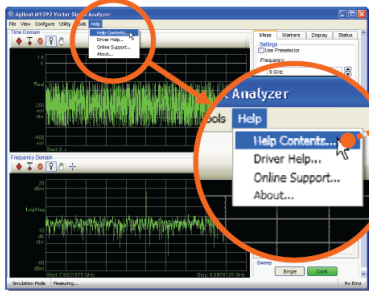
- Unpack product
- Verify shipment
- Install software
- Install hardware
- Verify operation
- Troubleshooting

## Data Sheet

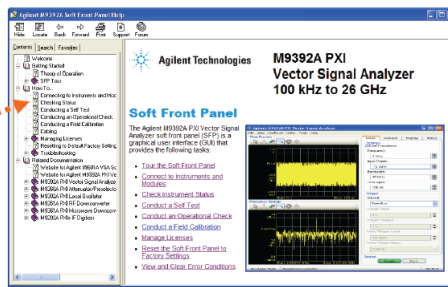


- Product description
- Technical specifications

## Soft Front Panel (SFP) user interface

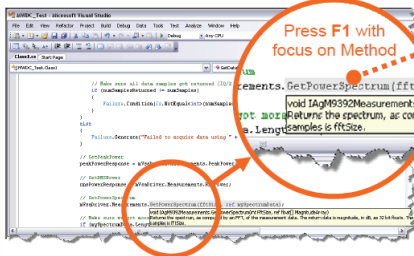


## SFP help system

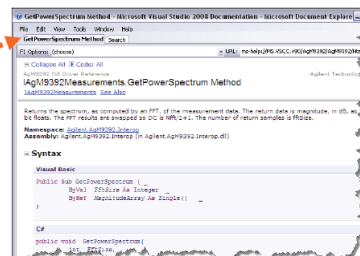


- Theory of operation
- Block diagram
- Configuration
- Self test
- Operational check
- Field calibration
- Troubleshooting

## Visual Studio

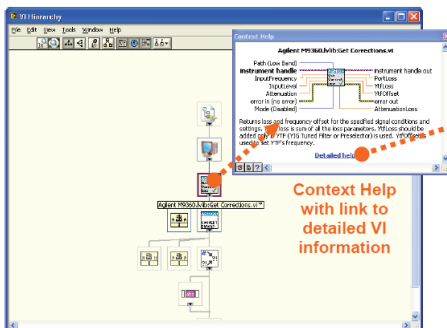


## IVI Driver help system

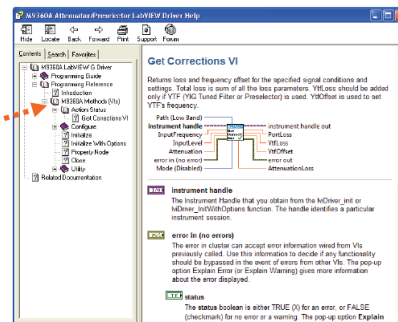


- IVI-COM and IVI-C driver programmer's reference
- Sample programs

## LabVIEW



## LabVIEW Driver help system



- LabVIEW driver programmer's reference
- Sample programs

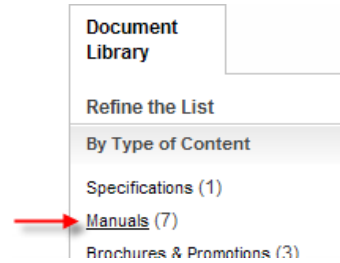
# M9360A Introduction

The scope of this Startup Guide is to detail the processes of receiving and installing the Agilent M9360A PXI Attenuator/Preselector, installing the required software, and verifying basic module operation. If you have any questions after reviewing this information, please contact your local Agilent Technologies Inc. representative or contact us through our website at [www.agilent.com/find/M9360A](http://www.agilent.com/find/M9360A).

## Related Documentation

This Startup Guide and the documentation listed below are on the CD and at [www.agilent.com/find/M9360A](http://www.agilent.com/find/M9360A) (go to **Document Library** > **Manuals**).

- M9360A Soft Front Panel help system
- M9360A device driver API help systems (IVI-C/IVI-COM and LabVIEW G)
- M9360A specifications (Data Sheet)



## Follow the Startup Sequence

**WARNING** Closely follow the startup process flow in this document. Deviating from the sequence can cause unpredictable system behavior, damage your system, and may cause personal injury.

### Step 1: Unpack and Inspect



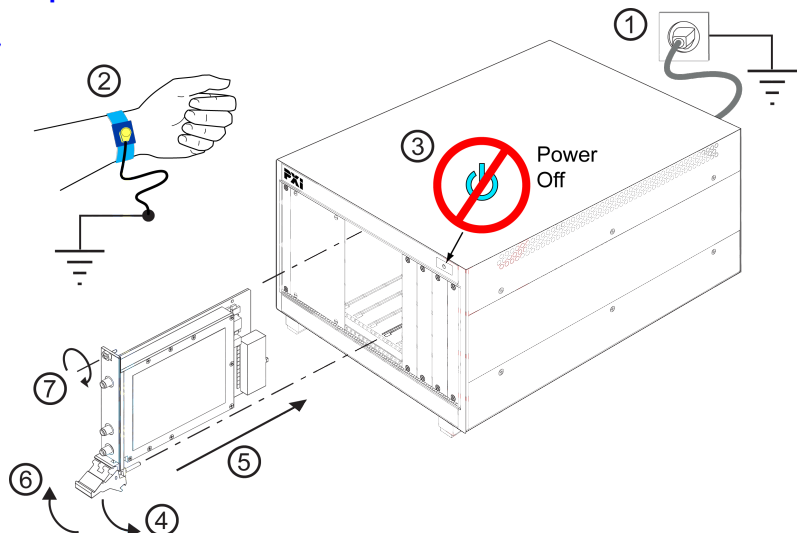
### Step 2: Verify Shipment



### Step 3: Install Drivers and Software



### Step 4: Install Module



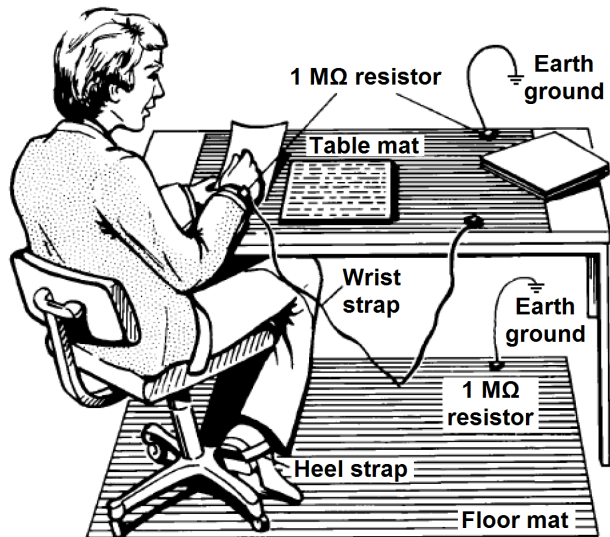


## Step 1: Unpack and Inspect the Module

**CAUTION**

The module is shipped in materials which prevent damage from static. The module should only be removed from the packaging in an anti-static area ensuring that correct anti-static precautions are taken. Store all modules in anti-static envelopes when not in use.

### ESD



Electrostatic discharge (ESD) can damage or destroy electronic components. Use a static-safe work station to perform all work on electronic assemblies. The figure (left) shows a static-safe work station using two types of ESD protection: conductive table-mat and wrist-strap combination, and conductive floor-mat and heel-strap combination. Both types, when used together, provide a significant level of ESD protection. Of the two, only the table-mat and wrist-strap combination provides adequate ESD protection when used alone. To ensure user safety, the static-safe accessories must provide at least 1 MΩ of isolation from ground.

**WARNING**

**DO NOT** use these techniques for a static-safe work station when working on circuitry with a voltage potential greater than 500 volts.

### Inspect for Damage

After unpacking a module, inspect it for any shipping damage. Report any damage to the shipping agent immediately, as such damage is not covered by the warranty (see warranty information at beginning of this document).

**CAUTION**

To avoid damage when handling a module, do not touch exposed connector pins.

**NOTE**

See [www.agilent.com/find/tips](http://www.agilent.com/find/tips) for information on preventing damage to your Agilent equipment.

### Return a Module for Service

Should it become necessary to return a module for repair or service, follow the steps below:

1. Review the warranty information shipped with your product.
2. Contact Agilent to obtain a Return Material Authorization (RMA) and return address. For assistance finding Agilent contact information, go to [www.agilent.com/find/assist](http://www.agilent.com/find/assist) (worldwide contact information for repair and service) or refer to the “Support” information on the product web page at [www.agilent.com/find/M9360A](http://www.agilent.com/find/M9360A).
3. Write the following information on a tag and attach it to the malfunctioning equipment:
  - Name and address of owner. A P.O. box is not acceptable as a return address.
  - Product model number (for example, M9360A).
  - Product serial number. The serial number label is located on the side panel of the module. The serial number can also be read from the Soft Front Panel interface, but only after the hardware is installed.
  - Description of failure or service required.

## Step 2: Verify M9360A Shipment Contents

4. Pack the module in its original ESD bag and packing carton. If the original carton is not available, use bubble wrap or packing peanuts and place the instrument in a sealed container and mark the container “FRAGILE”.
5. On the shipping label, write ATTENTION REPAIR DEPARTMENT and the RMA number.

**NOTE**

If any correspondence is required, refer to the product by serial number and model number.

## Step 2: Verify M9360A Shipment Contents

The following items are included with your Agilent M9360A PXI Attenuator/Preselector order:

- Agilent M9392A PXI Vector Signal Analyzer Software and Product Information CD. It contains software, drivers and all product printed documentation in PDF format). The part number for this CD is M9392-10002
- Agilent IO Libraries Suite CD. The part number for this CD is E2904-60003.
- Agilent M9360A PXI Attenuator/Preselector Startup Guide in hard copy (M9360-90001)
- Calibration certificate
- Commercial calibration certificate with test data (M9360-UK6) if ordered.
- Recalibration letter
- Cable, semi-rigid, Master LO A1 (M9360-20001)

**NOTE**

All the files contained on the CDs are available for download at [www.agilent.com/find/M9360A](http://www.agilent.com/find/M9360A).

## Step 3: Install the Software

### System Requirements

Topic	Requirements		
Operating system	Window XP, Service Pack 3	Windows Vista®, SP1 and SP2 (32-bit and 64-bit), Business, Ultimate, Enterprise, Home Basic, and Home Premium	Windows 7 (32-bit and 64-bit) Starter, Home Basic, Home Premium, Professional, Ultimate, Enterprise
Processor speed	600 MHz or higher required 800 MHz recommended	1 GHz 32-bit (x86), 1 GHz 64-bit (x64), no support for Itanium64	1 GHz 32-bit (x86), 1 GHz 64-bit (x64), no support for Itanium64
Available memory	256 MB minimum,(1 GB or greater recommended	1 GB minimum	1 GB minimum
Available disk space <sup>1</sup>	1.5 GB available hard disk space, includes: <ul style="list-style-type: none"><li>• 1 GB available for Microsoft .NET Framework 3.5 SP1 <sup>2</sup></li><li>• 100 MB for Agilent IO Libraries Suite</li></ul>		
Video	Super VGA (800x600) 256 colors or more	Support for DirectX 9 graphics with 128 MB graphics memory recommended (Super VGA graphics is supported)	Support for DirectX 9 graphics with 128 MB graphics memory recommended (Super VGA graphics is supported)
Browser	Microsoft Internet Explorer 6.0 or greater	Microsoft Internet Explorer 7.0 or greater	Microsoft Internet Explorer 7.0 or greater

<sup>1</sup> Note: Because of the installation procedure, less disk space may be required for operation than is required for installation. The amount of space listed above is required for installation.

<sup>2</sup> Note: .NET Framework Runtime Components are installed by default with Windows Vista. Therefore, you may not need this amount of available disk space.

## Hardware Requirements

Topic	Requirements
Chassis	cPCI(J1), PXI-1, or PXIe hybrid chassis slot.
PXIe system/ host controller	A PXI or PXI Express embedded controller or remote controller (external PC connected to the chassis via a PCI-to-PXI interface) is required.
Embedded controller	Agilent M9036A or an embedded controller that meets the following requirements: <ul style="list-style-type: none"> <li>PXIe system controller (PXI-1 embedded controllers are not compatible)</li> <li>Utilize a 2x8, 4x4, or 1x4 PXIe system slot link configuration.</li> <li>Run one of the operating systems listed in System Requirements (above).</li> </ul>
Remote controller	(for Agilent M9018A chassis use only) Agilent M9021 Cable Interface x8 with one of the following PC interface options: <ul style="list-style-type: none"> <li>Agilent M9045 PCIe ExpressCard Adaptor x1, with cable (for a laptop PC)</li> <li>Agilent M9047 PCIe Desktop Adaptor x8, with cable (for desktop PCs)</li> </ul> Or an equivalent remote controller using a PC running one of the operating systems listed in System Requirements (above).

## Power up the Controller

### CAUTION

If you are using a remote controller and you have installed the interface cable, you must power up the chassis **BEFORE** you power up the PC. When you power down your chassis, Shut Down the PC **BEFORE** you power down the chassis.

If you are using an embedded controller, complete the following steps:

1. Install the embedded controller module into the compatible chassis. The Agilent M9036A PXIe Embedded Controller and Agilent M9018A PXIe Chassis are recommended. Please refer to the embedded controller and chassis documentation for further details.
2. Connect peripherals (mouse, keyboard, monitor).
3. Power up the chassis.

## Install the Software

This installation includes the following:

- Agilent IO Libraries Suite (IOLS), which includes the Agilent Connections Expert. This software is included with your shipment (CD part number E2904-60003), and is also available at [www.agilent.com/find/iosuite](http://www.agilent.com/find/iosuite). This software must be installed first.

### NOTE

Version 16.0 (or newer) of the Agilent IO Libraries Suite is required.

- Instrument software, which includes the SFP, device drivers (IVI-C, IVI-COM, and LabVIEW G) and documentation for all modules and for the M9392A Vector Signal Analyzer. This software is included with your shipment (CD part number M9392-10002), and is also available at [www.agilent.com/find/M9392A](http://www.agilent.com/find/M9392A).

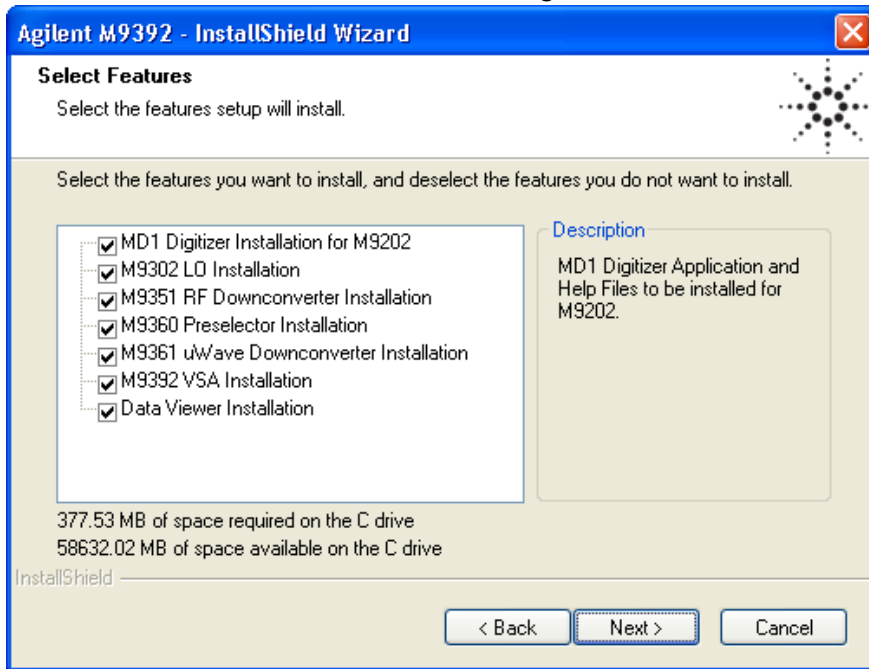
### NOTE

Each module has unique device drivers, soft front panel software and documentation. Performing the software installation offers the opportunity to install software components for one or more of the available modules: Agilent M9202A, M9302A, M9351A, M9360A and M9361A. Notice in the figure following Step 4, the software components for the Agilent M9202A PXIe IF Digitizer are called "MD1 Digitizer Installation for M9202".

## Step 4: Install the Module

### Software Installation Procedure

1. From the Agilent IOLS CD (E2904-60003) browser launch the installer.
2. Follow the installer prompts to install the IO libraries.
3. From the M9392A PXI Vector SignalAnalyzer Software and Product Information CD. (M9392-10002) launch the installer.
4. Follow the installer prompts. Choose a "Complete" installation to install all software and documentation, or a "Custom" installation to select from a listing of modules and other features.



5. After installation is complete, power down the host PC, and then the chassis if using a remote controller.

#### CAUTION

If you are using a remote controller, Shut Down the PC **BEFORE** you power down the chassis. When you restore power, power up the chassis **BEFORE** you power up the PC.

## Step 4: Install the Module

#### CAUTION

PXI hardware does not support "hot-swap" capabilities (changing modules while power is applied to the chassis). Before installing or removing a module to/from the chassis, power off the chassis to prevent damage to the module.

#### NOTE

This module can be used in a chassis with cPCI(J1), PXI-1, or PXIe hybrid slots.

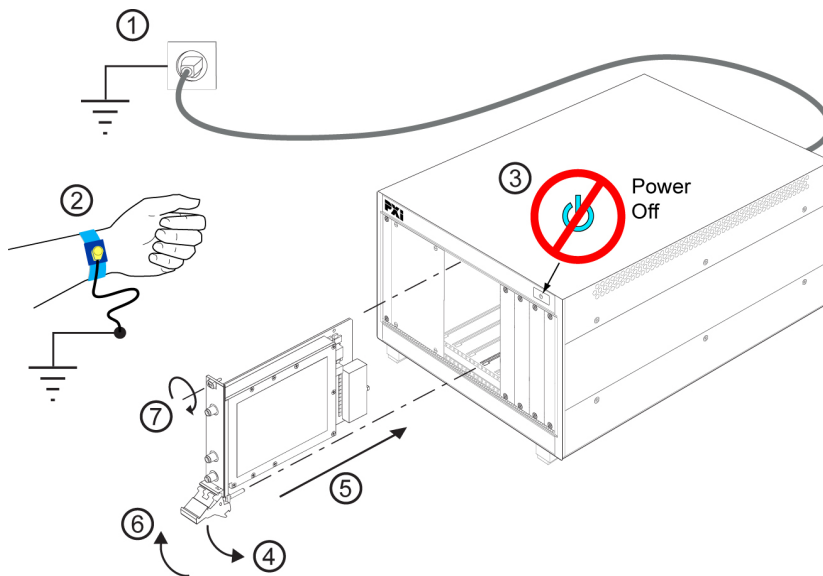
3

The module can be installed in any standard PXI slot marked with a peripheral slot compatibility image (a circle containing the slot number).

7<sup>H</sup>

The module can also be installed in any hybrid PXI slot marked with a peripheral slot compatibility image (the letter "H" and a solid circle containing the slot number).

1. Make sure that the line cord is plugged in to establish earth ground and that the chassis power switch is in the Off (Standby) position.
2. If the chassis has multiple fan speed settings, ensure that the fans are set to automatic.
3. Position the chassis so that there is ample space between the chassis fan intake and exhaust vents. Blockage by walls or obstructions affects the air flow needed for cooling. (Refer to the chassis documentation for more information about cooling).
4. Before installing a module, be sure to remove the plastic thread protectors from the mounting screws. Before inserting the module into the chassis, back the mounting screws out to ensure that there is no interference between the screws and the mounting rails.
5. Holding the module by the injector/ejector handle, slide it into an available PXI (or hybrid) slot, as shown in the figure below.
  - a. Install the module into the PXI slot of the chassis by placing the module card edges into the front module guides (top and bottom).
  - b. Slide the module to the rear of the chassis and ensure that the injector/ejector handle is pushed down in the unlatched (downward) position.
  - c. Slide the module completely into the chassis. When you begin to feel resistance, pull up on the injector/ejector handle to fully inject the module into the chassis.



6. Secure the front panel to the chassis using the two module front-panel mounting screws. Performance may suffer if the screws are not tightened properly.
7. Verify that the PXI chassis fans are operable and free of dust and other contaminants that may restrict airflow.
8. Install all filler panels after installing the module. Missing filler panels may disrupt necessary air circulation in the chassis.
9. If you are using a PC host, such as the Agilent M9021, connect the Cable Interface in the chassis to the PC host per the instructions that came with the Cable Interface.
10. Power up the PXI chassis.
11. Reboot the PC host.
12. Check the status LEDs on the module front panel.

## Agilent M9360A PXI Attenuator/Preselector Front Panel Features

**CAUTION**

The maximum input to the RF input connector (RF IN) must not exceed +30 dBm.



### Front Panel Connectors

Connector	Description
<b>RF IN</b>	This APC 3.5 mm female connector inputs a signal (100 kHz to 26.5 GHz) that can be attenuated and be directed to either the RF 1 OUT connector or the RF 2 OUT connector.
<b>RF 1 OUT</b>	This SMA female connector supplies an output signal (100 kHz to 2.9 GHz) to the RF IN connector of the Agilent M9351A PXI Downconverter.
<b>RF 2 OUT</b>	This SMA female connector supplies an output signal (2.75GHz to 26.5 GHz) to the RF IN connector of the Agilent M9361A PXI Downconverter.
<b>LO IN</b>	This SMA female connector receives the LO signal from the Agilent M9302A Local Oscillator. This LO signal is then internally switched to the LO 1 OUT or LO 2 OUT connector.
<b>LO 1 OUT</b>	This SMB female connector provides the LO signal to the Agilent M9351A PXI Downconverter.
<b>LO 2 OUT</b>	This SMB female connector provides the LO signal to the Agilent M9361A PXI Downconverter.

### Front Panel LEDs

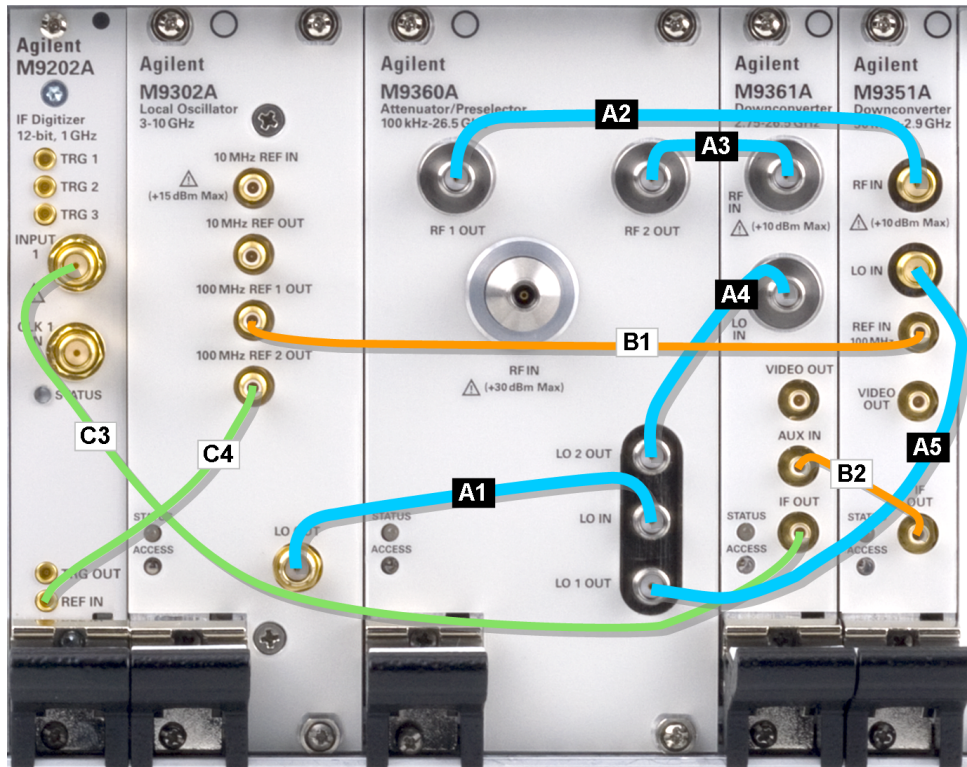
LED	Description
<b>STATUS</b>	<p>This LED indicates the overall health of the M9360A and is a summary of the following LEDs, covering the power supplies and other hardware operations. The M9360A has extensive built-in-test (BIT) and specific issues can be identified by observing the status indicator on the front panel.</p> <p>This LED has four possible states:</p> <ul style="list-style-type: none"> <li>• <b>Green</b> = Power supplies are operational and in specification. It also indicates that all module hardware is operational.</li> <li>• <b>Amber</b> = Power supplies are operational and in specification, but there is a hardware failure.</li> <li>• <b>Red</b> = Power supply failure and a hardware failure.</li> <li>• <b>Off</b> = Power supply failure, but the other module hardware appears to be functional. Since a power supply failure can mask other hardware problems, this is not an indication that only a power supply could be at fault.</li> </ul>
<b>ACCESS</b>	Each time the module is written to, or read from, this amber LED blinks.



## Agilent M9360A PXI Attenuator/Preselector System Connections

This section contains a cabling diagram for the Agilent M9392A PXI Vector Signal Analyzer, a cable and module association table, and a block diagram for the M9360A.

### Agilent M9392A PXI Vector Signal Analyzer Cabling Diagram



### Cable and Module Table

Ships with 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	*	8121-2041	n/a	Cable, A06/A32 190G (SMB-MMCX)
M9202A	*	8121-2041	n/a	Cable, A06/A32 190G (SMB-MMCX)

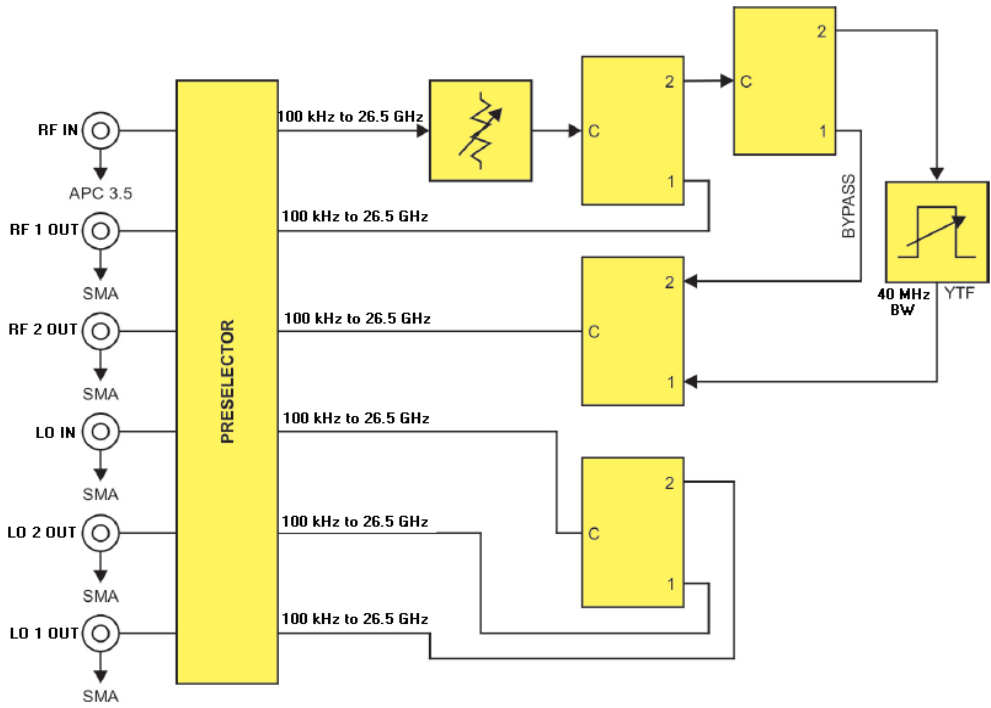
**Torque specification** for all SMA connectors is 8 Lb-In (0.904 Nm).

\* These cables are not required to configure an Agilent M9392A PXI Vector Signal Analyzer. See the Agilent M9392A PXI Vector Signal Analyzer Cabling Diagram above. These cables are provided for using the Agilent M9202A PXIe IF Digitizer in other applications.

No cables are shipped with the Agilent M9302A PXI Local Oscillator module.

**Step 5: Verify Operation of the M9360A Module**

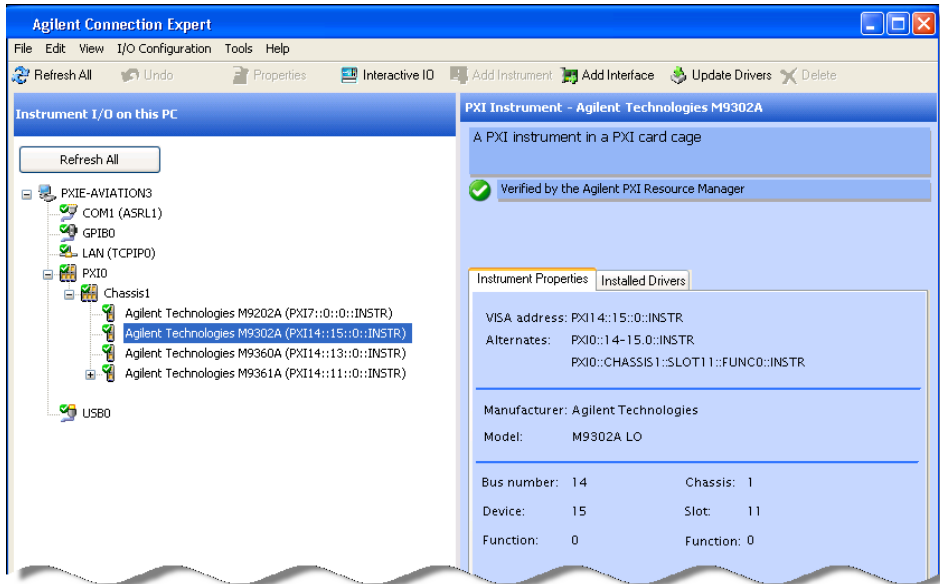
**Agilent M9360A Block Diagram**



**Step 5: Verify Operation of the M9360A Module**

The intention of this step is to verify correct operation of the newly installed module. Run Agilent Connection Expert (from the desktop icon, or from **Start > Programs > Agilent IO Libraries Suite > Agilent Connection Expert**). It will display the modules that are installed. Review the configuration data and then launch the SFP. This will provide control of the module for self test and other operational verification procedures.

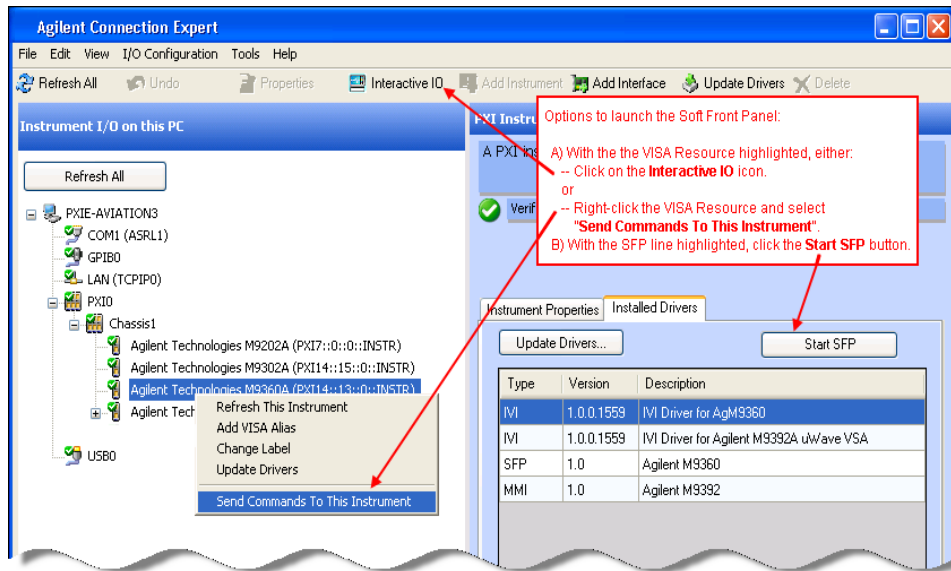
**Agilent M9360A Instrument Properties**



**NOTE** If the module does not appear in the Agilent Connection Expert, restart your PC or embedded controller and start Agilent Connection Expert again.

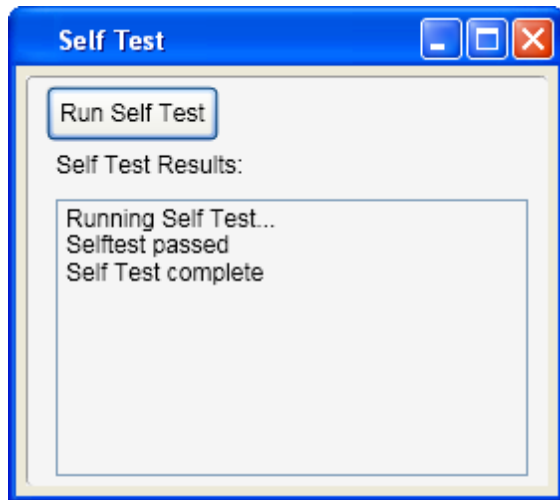


## Agilent M9360A Installed Drivers



## Conduct M9360A Self Test

The purpose of the self test is to verify power and perform an internal check of module sub-components



## Conduct M9360A Operational Check (optional)

### Requirements for Operational Check

The Agilent M9360A PXI Attenuator/Preselector operational check measures the signal paths from the RF IN connector to the RF 1 OUT and RF 2 OUT connectors. The following process demonstrates that all associated switches, connectors, cables and circuitry are operational.

### Required Hardware

To demonstrate that the module works properly requires external equipment – the same equipment that you would use to do a field calibration of the overall VSA. This includes a precision microwave source and a power meter

## Step 5: Verify Operation of the M9360A Module

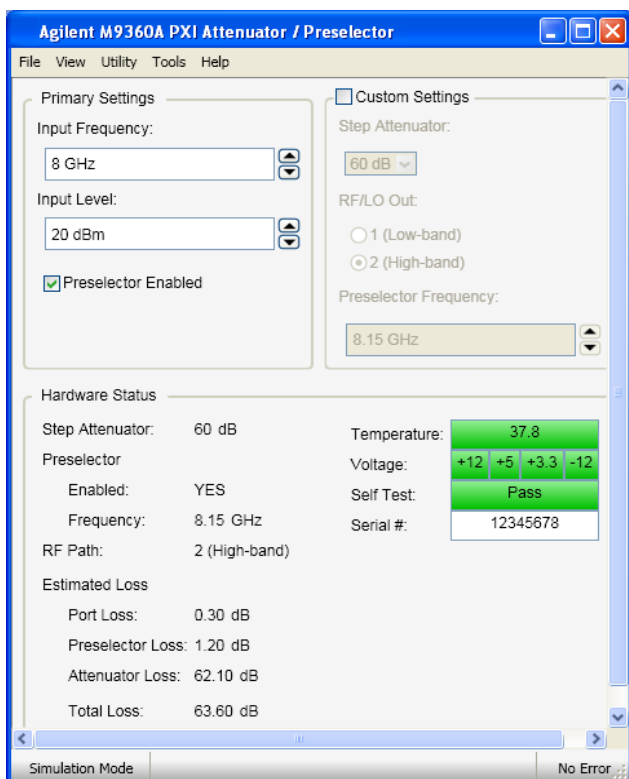
You will not be using the module interconnect cables, so some high-quality flexible 3.5 mm cables will be required, plus adapters to connect the PSG (precision signal generator) and power sensors to 3.5 mm connectors. Please refer to the following table for recommended hardware.

Hardware	Description
Agilent E8257D-532 or E8267D-532	Precision Signal Generator 31.8 GHz
Agilent N1913A or N1914A	Single / Dual Channel Power Meter
Agilent N8485A, Option 100	10 MHz to 26.5 GHz Power Sensor
Agilent 11730A	Power Sensor Cable
Agilent 11667B	Power Splitter
Agilent N9020A-526	Signal Analyzer (optional)

## M9360A Operational Check Procedure

### NOTE

To use a single power meter in place of two power meters and sensors, characterize the PSG output power at the different frequencies and then connect the PSG output directly to the M9360A RF IN. Connect the power sensor to the outputs listed in the procedure below.



### CAUTION

Do not exceed the maximum power level to the RF IN connector (+30 dBm).

1. Run the M9360A soft front panel (SFP).
2. Conduct a Self Test (**Utility > Self Test... > Run Self Test**).
  - a. If self test passes, go to next step.
  - b. If self test fails, the module needs repair (See "[Return a Module for Service](#)" on page 9).

3. Disconnect cables from RF IN, RF 1 OUT, RF 2 OUT, LO IN, LO 1 OUT, and LO 2 OUT
4. Under Primary Settings:
  - a. Deselect Preselector Enabled to remove the YTF and place the M9360A in “bypass” mode (click inside the small square to remove the check mark).
  - b. Set the Input Level to 0 dBm.
5. Select Custom Settings (click inside the small square and a check mark appears).
  - a. Set the step attenuator to 0 dB.
  - b. Verify that RF/LO Out 2 (high band) is selected.
6. Set the PSG output to:
  - a. 0 dBm
  - b. 3 GHz
  - c. RF ON
  - d. Modulation OFF
7. Connect the PSG RF OUTPUT to
  - a. The power splitter input.
  - b. Connect a power sensor to one power splitter output.
  - c. Connect the other power splitter output to the M9360A RF IN.
  - d. Connect the second power sensor to RF 2 OUT.
8. Step the PSG frequency from 3 GHz to 26.5 GHz in 500 - MHz steps
9. The delta between the power meter readings should be  $\leq 7$  dB maximum loss between RF IN and RF2 OUT at each frequency.
10. Using the M9360A SFP, under Custom Settings:
  - a. Increase the attenuation to 10 dB.
  - b. The power meter reading on the RF 2 OUT connector should drop approximately 10 dBm.
  - c. Continue increasing attenuation in 10 dB steps to 20 dB, and 30 dB. Verify that the RF 2 OUT power decreased approximately 10 dB with each step.
11. Deselect Custom Settings (click inside the small square and the check mark disappears).
12. Under Primary Settings:
  - a. Set the Input Frequency to 3 GHz.
  - b. Select Preselector Enabled (click inside the small square and a check mark appears).
  - c. Set the Power Level to -40 dBm (this sets the Preselector internal attenuator to 0 dB).
13. Step the PSG frequency from 3 GHz, to 26.5 GHz in 500 - MHz steps and set the Input Frequency to the same frequency as the PSG.(If the frequency is in italics, press the keyboard return key).
  - a. The delta between the power meter readings should be  $\leq 11$  dB maximum loss between RF In and RF2 OUT at each frequency.
  - b. Deactivate Preselector Enabled (click inside the small square and the check mark disappears).

## M9360A Specifications

14. Under Primary Settings:
  - a. Set the Input Frequency to 2 GHz.
  - b. Move the power sensor from RF 2 OUT to RF 1 OUT.
  - c. Set the PSG to 0 dBm, 100 MHz, RF ON, Modulation OFF.
  - d. Step the frequency from 100 MHz to 3 GHz in 500 - MHz steps.
  - e. The delta between the power meter readings should be  $\leq 2$  dB maximum loss between the RF Input and RF 1 OUT.
15. Under Primary Settings; set the Input Frequency to 5 GHz
16. On the PSG:
  - a. Set the power to 0 dBm, frequency to 3 GHz, RF- ON, Modulation - Off.
  - b. Move the cable from the RF IN to LO IN.
  - c. Move the power sensor from RF 1 OUT to LO 2 OUT.
  - d. Step the PSG frequency from 3 GHz to 10 GHz in 500 - MHz steps.
  - e. The delta in power between LO In and LO 2 OUT should be  $\leq 1$ dB.
17. Under Primary Settings:
  - a. Set Input Frequency to 2 GHz.
  - b. Move the power sensor from LO 2 OUT to LO 1 OUT.
  - c. Step the PSG frequency from 3 GHz to 10 GHz in 500 - MHz steps.
  - d. The delta in power between LO In and LO 1 OUT should be  $\leq 1$ dB.
18. If all measurements are correct the module is working properly, if not the module requires servicing.

### If a Problem is Found

If a problem is found, do the following checks:

1. Verify that all relevant hardware is turned on.
2. Verify that the signal generator is set to the proper power/frequency and that all cables are properly connected. All SMA connector are torqued to 8 Lb-In (0.904 Nm).
3. Check that the Status LED is green.
4. Verify that the ACCESS LED flashes each time that the module is written to.
5. See "[Return a Module for Service](#)" on page 9 for details on sending the module to Agilent Technologies Inc. for service.

## M9360A Specifications

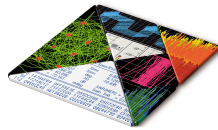
The Data Sheet for the M9360A is included on the Agilent M9392A VSA Software and Product Information CD that came with your module. This document contains specification information. Please check the Agilent website at [www.agilent.com/find/M9360A](http://www.agilent.com/find/M9360A) for the latest updates to this information.





## The Modular Tangram

The four-sided geometric symbol that appears in Agilent modular product literature is called a tangram. The goal of this seven-piece puzzle is to create 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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