



**Agilent M9362A-D01  
PXle Microwave  
Quad Downconverter  
10 MHz to 26.5 GHz**

**Startup Guide**

September 2011

M9499-90001



**Agilent Technologies**

## Notices

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### Sales and Technical Support

To contact Agilent for sales and technical support, refer to the “support” links on the following Agilent web resources:

- [www.agilent.com/find/M9362A-D01](http://www.agilent.com/find/M9362A-D01) (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.**

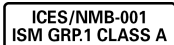
## PRODUCT MARKINGS:



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

### N10149

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.**

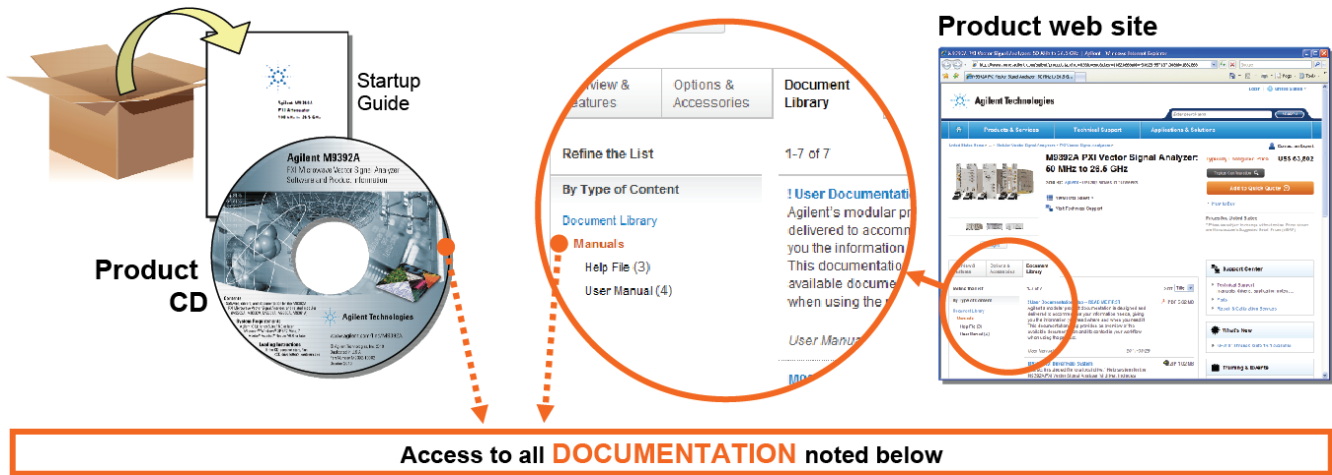
# Table of Contents

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Documentation Map.....	7
Introduction.....	7
Related Documentation.....	7
Step 1: Unpack and Inspect the Module.....	8
ESD.....	8
Inspect for damage.....	8
Return a module for service.....	8
Step 2: Verify Shipment Contents.....	9
Step 3: Install the Software.....	9
System Requirements.....	9
Hardware Requirements.....	10
Power up the Controller.....	10
Install the Software.....	10
Software Installation Procedure.....	10
Step 4: Install the Module.....	11
Front Panel Features.....	13
Connectors.....	13
Status LED.....	13
System Connections.....	14
Typical Cabling Diagrams.....	14
Cable and Module Table.....	16
M9362A-D01 Block Diagram.....	17
Step 5: Verify Operation of the M9362A-D01 Module.....	18
Conduct an Operational Check.....	18
Requirements for Operational Check.....	18
Required Hardware.....	18
Operational Check Procedure.....	19
If a Problem is Found.....	23
Specifications.....	23



# Documentation Map



## Startup Guide



- **Unpack product**
- **Verify shipment**
- **Install software**
- **Install & connect hardware**
- **Verify operation**

## Data Sheet



- **Product description**
- **Technical specifications**

## Introduction

The scope of this Startup Guide is to detail the processes of receiving and installing the Agilent M9362A-D01 PXIe Microwave Quad Downconverter, installing the required software, and verifying basic module operation. If you have any questions after reviewing this information, contact your local Agilent Technologies representative.

## Related Documentation

This Startup Guide and the documentation listed below can be found on the CD that shipped with the product; these documents are also available at [www.agilent.com/find/M9362A-D01](http://www.agilent.com/find/M9362A-D01).

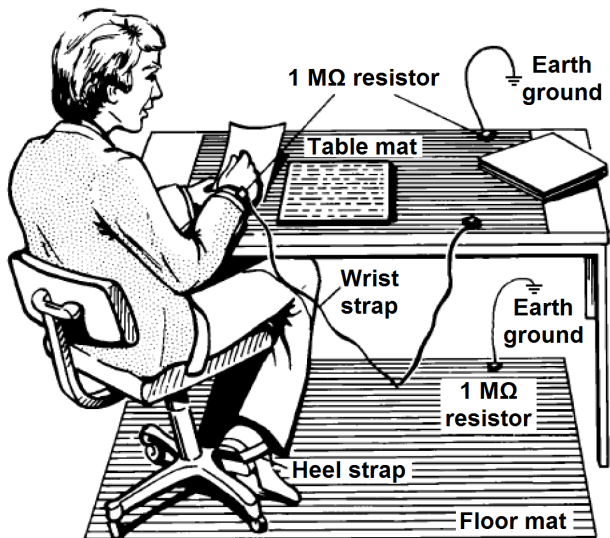
- Agilent M9362A-D01 PXIe Microwave Quad Downconverter Specifications (Data Sheet)

## 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, carefully inspect it for any shipping damage. Report any damage to the shipping agent immediately, as such damage is not covered by the warranty (warranty information can be found at the beginning of this manual).

**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. If you need 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 .
3. Write the following information on a tag and attach it to the malfunctioning equipment:
  - Name and address of owner. P.O. boxes are not acceptable as return addresses.
  - Product model number (for example, M9362A-D01).



- Product serial number (for example, MYXXXXXXXX). The serial number label is located on the side panel of the module.
  - Description of failure or service required.
4. Carefully 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 Shipment Contents

The following items are included with your Agilent M9362A-D01 PXIe Microwave Quad Downconverter order:

- Agilent M9362A-D01 PXIe Microwave Quad Downconverter Product Information CD. It contains all product printed documentation in PDF format. The part number for this CD is M9499-10008.
- Agilent M9362A-D01 PXIe Microwave Quad Downconverter Startup Guide in hard copy (M9499-90001)
- Functional certificate
- Depending on the option that is ordered, a different set of cables is delivered. See [Cables](#).

**NOTE**

All of the files contained on the CDs are available at [www.agilent.com/find/M9362A-D01](http://www.agilent.com/find/M9362A-D01).

## 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	PXIe 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 M9306A 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 into the chassis. The Agilent M9306A PXIe Embedded Controller and Agilent M9018A PXIe Chassis are recommended. Refer to the controller and chassis documentation for details.
2. Connect peripherals (mouse, keyboard, monitor).
3. Power up the chassis.

## Install the Software

This installation includes the following software:

- Agilent IO Libraries Suite (IOLS), which includes the Agilent Connections Expert, 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).

**NOTE**

Version 16.1 (or newer) of the Agilent IO Libraries Suite is required, and must be installed first.

- Instrument software, which includes device drivers and user documentation, is included with your shipment (CD part number M9499-10008), and is also available at [www.agilent.com/find/M9362A-D01](http://www.agilent.com/find/M9362A-D01).

## 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 Agilent M9362A-D01 Software and Product Information CD (M9499-10008) launch the installer.
4. 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 the module into the chassis, power off the chassis to prevent damage to the module.

**NOTE**

This module can be used in a chassis with PXIe and PXI-H hybrid slots.

**3**

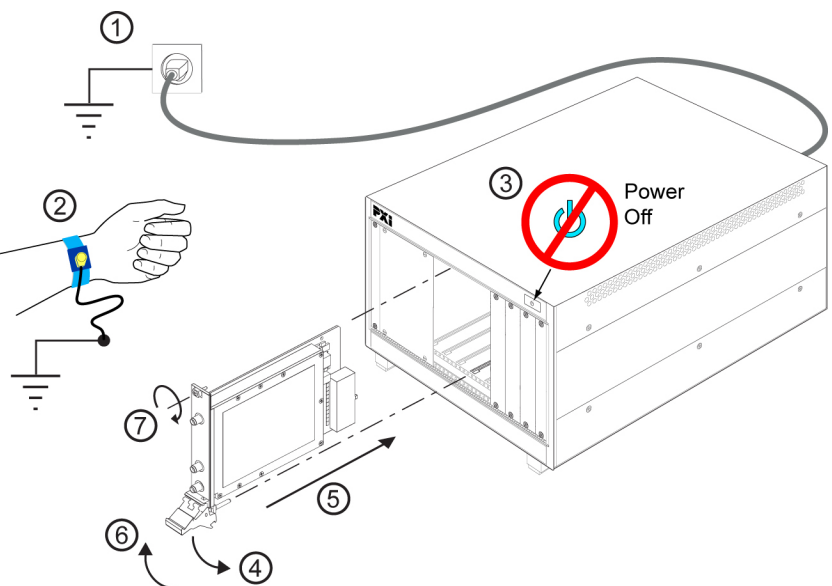
The module can be installed in any standard PXIe slot marked with a peripheral slot compatibility image (a black circle containing the slot number).

**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 black 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.



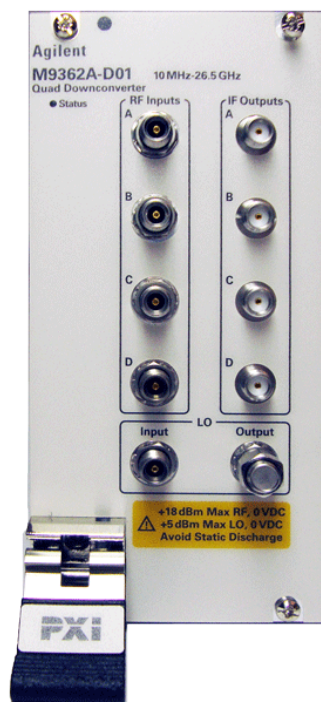
#### Step 4: Install the Module

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.

## Front Panel Features

### CAUTION

The maximum input to any of the RF Input connectors (A, B, C, or D) must not exceed +18 dBm with 0 VDC offset. The maximum input to the LO Input connector must not exceed +5 dBm with 0 VDC offset.



## Connectors

### RF Inputs

<b>A</b>	This APC 3.5 mm female connector inputs a signal (10 MHz to 26.5 GHz, at a maximum of +18 dBm with 0 VDC offset) that will be downconverted and directed to IF Output A.
<b>B</b>	This APC 3.5 mm female connector inputs a signal (10 MHz to 26.5 GHz, at a maximum of +18 dBm with 0 VDC offset) that will be downconverted and directed to IF Output B.
<b>C</b>	This APC 3.5 mm female connector inputs a signal (10 MHz to 26.5 GHz, at a maximum of +18 dBm with 0 VDC offset) that will be downconverted and directed to IF Output C.
<b>D</b>	This APC 3.5 mm female connector inputs a signal (10 MHz to 26.5 GHz, at a maximum of +18 dBm with 0 VDC offset) that will be downconverted and directed to IF Output D.

### IF Outputs

<b>A</b>	This SMA female connector outputs an IF signal (0.007 to 1.5 GHz) that is derived from the RF Input A.
<b>B</b>	This SMA female connector outputs an IF signal (0.007 to 1.5 GHz) that is derived from the RF Input B.
<b>C</b>	This SMA female connector outputs an IF signal (0.007 to 1.5 GHz) that is derived from the RF Input C.
<b>D</b>	This SMA female connector outputs an IF signal (0.007 to 1.5 GHz) that is derived from the RF Input D.

### LO

<b>Input</b>	This APC 3.5 mm female connector inputs a signal (10 MHz to 26.5 GHz, at a maximum of +5 dBm with 0 VDC offset) that is used as the LO to downconvert the RF inputs A, B, C, D and to provide a buffered LO output.
<b>Output</b>	This APC 3.5 mm female connector outputs a signal (10 MHz to 26.5 GHz) that can be used as the LO input to an additional Agilent M9362A-D01 PXIe Microwave Quad Downconverter.

## Status LED

This LED has four possible states:

- **Green** = The power supplies are operational and in specification. It also indicates that all module hardware is operational.
- **Amber** = The power supplies are operational and in specification, but there is a hardware problem.
- **Red** = There is a power supply failure and a hardware failure.
- **Off** = A 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.

#### Step 4: Install the Module

## System Connections

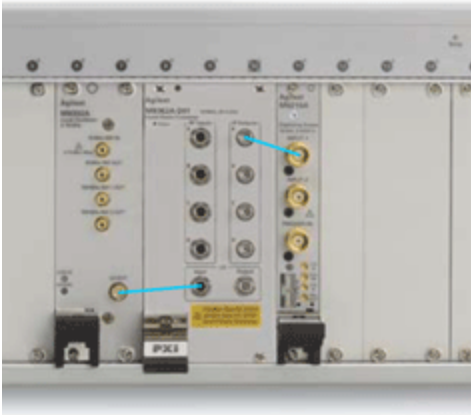
This section contains a cabling diagram for the Agilent M9362A-D01 PXIe Microwave Quad Downconverter, a cable and module association table, and a block diagram for the M9362A-D01.

### Typical Cabling Diagrams

Modules used in the following configurations:

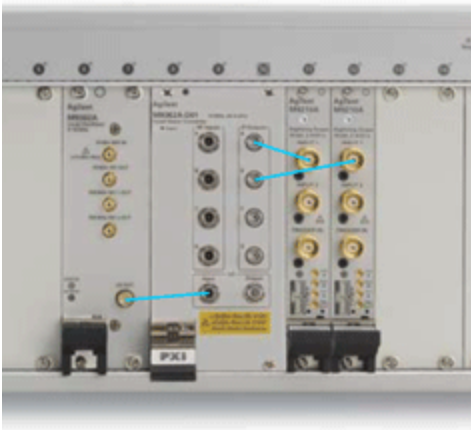
- Agilent M9362A-D01 PXIe Microwave Quad Downconverter
- Agilent M9210A PXI-H High Speed Digitizing Scope: 10-bit, 2.4 GS/s
- Agilent M9302A PXI Local Oscillator

M9362A-D01	Channels	M9210A	BW per channel	M9302A
1	1	1	1.4 GHz	1



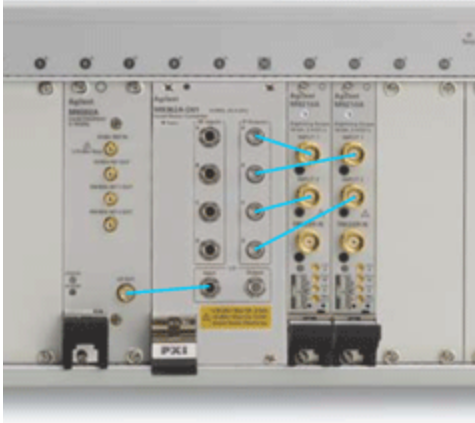
1. Connect the M9302A LO OUT to LO IN of the M9362A-D01.
2. Connect M9362A-D01 IF OUTPUT A to M9210A INPUT 1.

M9362A-D01	Channels	M9210A	BW per channel	M9302A
1	2	2	1.4 GHz	1



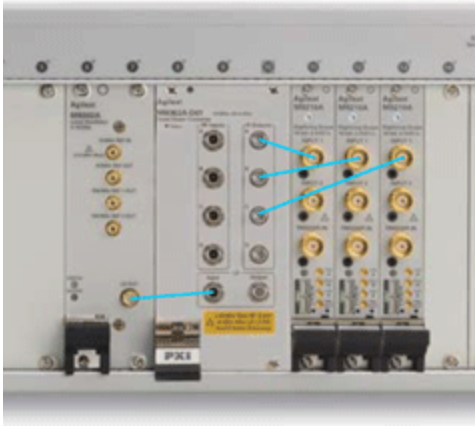
1. Connect the M9302A LO OUT to LO IN of the M9362A-D01.
2. Connect M9362A-D01 IF OUTPUT A to M9210A #1 INPUT 1.
3. Connect M9362A-D01 IF OUTPUT B to M9210A #2 INPUT 1.

M9362A-D01	Channels	M9210A	BW per channel	M9302A
1	4	2	800 MHz	1



1. Connect the M9302A LO OUT to LO IN of the M9362A-D01.
2. Connect M9362A-D01 IF OUTPUT A to M9210A #1 INPUT 1.
3. Connect M9362A-D01 IF OUTPUT B to M9210A #2 INPUT 1.
4. Connect M9362A-D01 IF OUTPUT C to M9210A #1 INPUT 2.
5. Connect M9362A-D01 IF OUTPUT D to M9210A #2 INPUT 2.

M9362A-D01	Channels	M9210A	BW per channel	M9302A
1	3	3	1.4 GHz	1



1. Connect the M9302A LO OUT to LO IN of the M9362A-D01.
2. Connect M9362A-D01 IF OUTPUT A to M9210A #1 INPUT 1.
3. Connect M9362A-D01 IF OUTPUT B to M9210A #2 INPUT 1.
4. Connect M9362A-D01 IF OUTPUT C to M9210A #3 INPUT 1.

**Step 4: Install the Module**

**Cable and Module Table**

M9362A-D01-CA3	Qty	IF JUMPER CABLES for use with Agilent M9210A PXI-H 10-bit High-Speed Digitizing Scope
8121-2066	4	Cable Assembly, SMA (m) to BNC (m), 190 mm



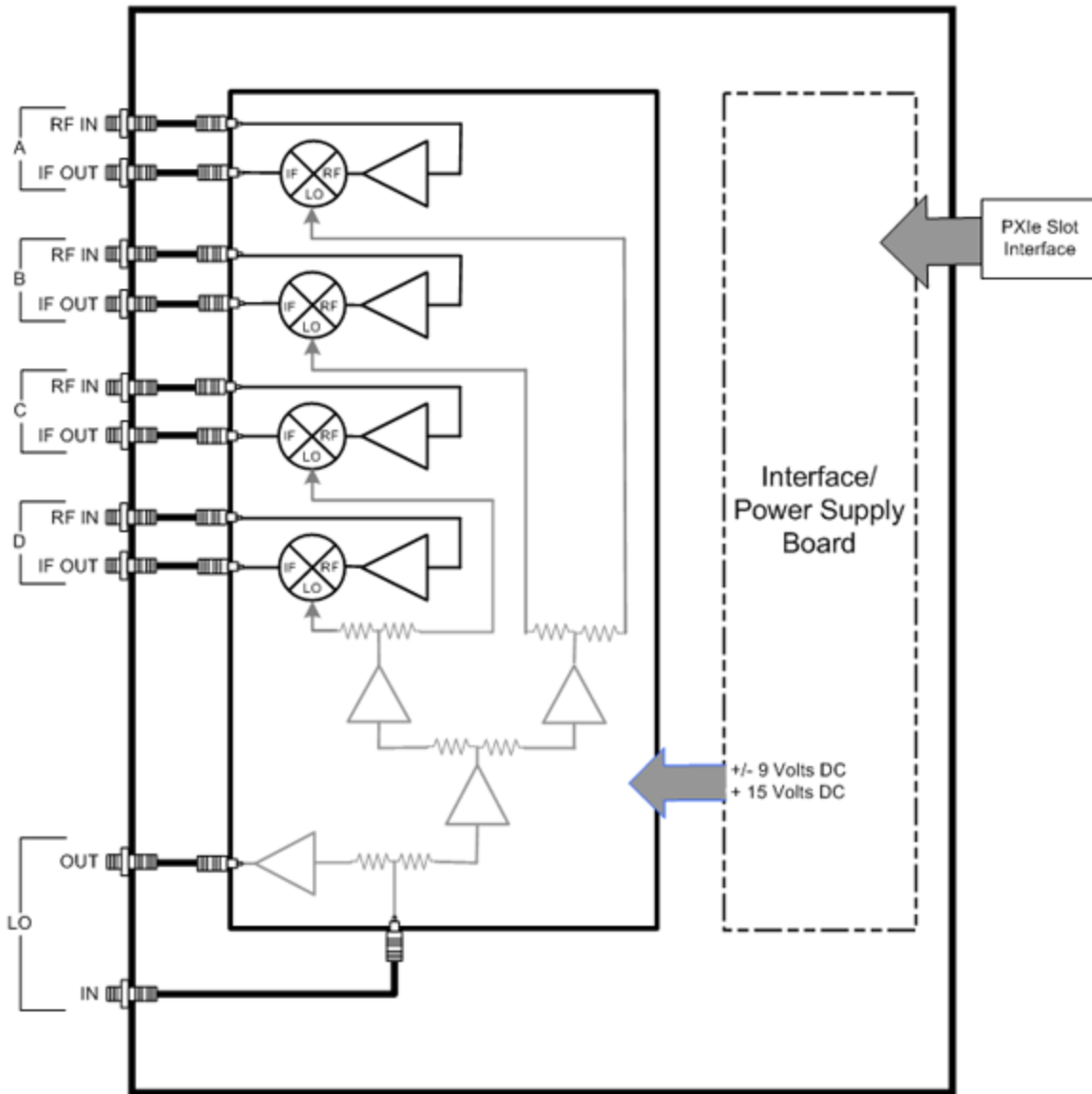
M9362A-D01-CA4	Qty	LO INTERCONNECT KIT for use with Agilent M9302A PXI Local Oscillator
0955-0426	1	Microwave Attenuator, 14 dB
M9499-20032	1	Cable Assembly, SMA (m) to SMA (m) LO-Jumper



See the [Cabling Diagram](#) above.



### M9362A-D01 Block Diagram



## Step 5: Verify Operation of the M9362A-D01 Module

### Conduct an Operational Check

#### Requirements for Operational Check

The Agilent M9362A-D01 PXIe Microwave Quad Downconverter operational check measures the signal paths from the LO IN connector that is split using internal power divider circuitry and supplied to the LO OUT connector and each of the four internal mixers. Internally, the LO signal is mixed with RF input signals supplied through each of the RF IN connectors (A, B, C, and D) and measured at each of the IF OUT connectors (A, B, C, and D). The following process demonstrates that all associated switches, connectors, cables and circuitry are operational.

#### Required Hardware

To demonstrate that the Agilent M9362A-D01 PXIe Microwave Quad Downconverter module is operating properly requires external equipment – the same equipment that would be used to perform a field calibration of the overall Agilent M9362A-D01 PXIe Microwave Quad Downconverter in a system. This external equipment includes two precision signal generators and a power meter with a power sensor and power sensor cable. The module interconnect cables are not used when performing this operational check; instead, two high-quality flexible 3.5 mm cables are needed along with adapters.

Please refer to the following table for recommended hardware.

Hardware	Description
Agilent E8257D-532 or E8267D-532 or equivalent	PSG #1 Precision Signal Generator 31.8 GHz
Agilent E8257D-532 or E8267D-532 or equivalent	PSG #2 Precision Signal Generator 31.8 GHz
Agilent N1913A or N1914A or equivalent	Single / Dual Channel Power Meter
Agilent N8485A, Option 100 or equivalent	10 MHz to 26.5 GHz Power Sensor
Agilent 11730A or equivalent	Power Sensor Cable

### Operational Check Procedure

The following operational checks are performed:

- [Determining PSG Output Power Levels and Compensating for Cable Loss](#)
- [IF OUT A](#)
- [IF OUT B](#)
- [IF OUT C](#)
- [IF OUT D](#)
- [LO IN to LO OUT](#)

### Determining PSG Output Power Levels and Compensating for Cable Loss

#### PSG #1

The following process determines the power levels that the precision signal generator (PSG #1) would have to deliver to each RF INPUT (A, B, C, and D) so that the power level at each RF INPUT is  $-10$  dBm; the actual power level out of PSG #1 must be higher than  $-10$  dBm to compensate for the power loss through the high-quality flexible cable that is connected to the output of PSG #1.

On the precision signal generator (PSG #1):

1. Connect a high-quality flexible cable to the RF OUT connector.
2. Connect a power meter to the other end of this cable.
3. Set the PSG Frequency to 3.5 GHz and adjust the output power of the PSG until the power meter reads  $-10$  dBm at the end of the cable.
4. Note the PSG Output Power at 3.5 GHz and write it down in the following table.
5. Set the PSG Frequency to 8.5 GHz and adjust the output power of the PSG until the power meter reads  $-10$  dBm at the end of the cable.
6. Note the PSG Output Power at 8.5 GHz and write it down in the following table.
7. Set the PSG Frequency to 17.5 GHz and adjust the output power of the PSG until the power meter reads  $-10$  dBm at the end of the cable.
8. Note the PSG Output Power at 17.5 GHz and write it down in the following table.
9. Set the PSG Frequency to 26.0 GHz and adjust the output power of the PSG until the power meter reads  $-10$  dBm at the end of the cable.
10. Note the PSG Output Power at 26.0 GHz and write it down in the following table.

Noted PSG #1 Output Power Levels that Compensate for Cable Loss

PSG #1 Output Frequency	PSG #1 Output Power into the Cable Noted	PSG #1 Output Power into the Cable Expected	Power Meter Reading Measured at the End of Cable
3.5 GHz		$\sim < -9.50$ dBm	$-10$ dBm
8.5 GHz		$\sim < -8.75$ dBm	$-10$ dBm
17.5 GHz		$\sim < -8.00$ dBm	$-10$ dBm
26.0 GHz		$\sim < -7.25$ dBm	$-10$ dBm

## Step 5: Verify Operation of the M9362A-D01 Module

### PSG #2

The following process determines the power levels that the precision signal generator (PSG #2) would have to deliver to LO IN of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter so that the power level at LO IN is 0 dBm; the actual power level out of PSG #2 must be higher than 0 dBm to compensate for the power loss through the high-quality flexible cable that is connected to the output of PSG #2.

On the precision signal generator (PSG #2):

1. Connect a high-quality flexible cable to the RF OUT connector.
2. Connect a power meter to the other end of this cable.
3. Set the PSG Frequency to 4.0 GHz and adjust the output power of the PSG until the power meter reads 0 dBm at the end of the cable.
4. Note the PSG Output Power at 4.0 GHz and write it down in the following table.
5. Set the PSG Frequency to 9.0 GHz and adjust the output power of the PSG until the power meter reads 0 dBm at the end of the cable.
6. Note the PSG Output Power at 9.0 GHz and write it down in the following table.
7. Set the PSG Frequency to 18.0 GHz and adjust the output power of the PSG until the power meter reads 0 dBm at the end of the cable.
8. Note the PSG Output Power at 18.0 GHz and write it down in the following table.
9. Set the PSG Frequency to 26.5 GHz and adjust the output power of the PSG until the power meter reads 0 dBm at the end of the cable.
10. Note the PSG Output Power at 26.5 GHz and write it down in the following table.

Noted PSG #2 Output Power Levels that Compensate for Cable Loss

PSG #2 Output Frequency	PSG #2 Output Power into the Cable Noted	PSG #2 Output Power into the Cable Expected	Power Meter Reading Measured at the End of Cable
4.0 GHz		~ < +0.50 dBm	0 dBm
9.0 GHz		~ < +1.25 dBm	0 dBm
18.0 GHz		~ < +2.00 dBm	0 dBm
26.5 GHz		~ < +2.75 dBm	0 dBm

**Check IF OUT A**

1. Connect the RF OUT of PSG #1, through a high-quality flexible cable, to RF IN A of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
2. Connect the RF OUT of PSG #2, through a high-quality flexible cable, to LO IN of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
3. Connect the power meter to the IF OUT A of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
4. Use the output frequencies and power levels from the above tables for PSG #1 and PSG #2 to set the input frequency and power of the RF IN A and LO IN and then measure IF OUT A.

Measured IF OUT A Power Levels

PSG #1 Output Frequency Applied to RF IN A	PSG #2 Output Frequency Applied to LO IN	Power Level Range Expected at IF OUT A	Power Meter Reading Measured at IF OUT A
3.5 GHz	4.0 GHz	-5 to -11 dBm	
8.5 GHz	9.0 GHz	-5 to -11 dBm	
17.5 GHz	18.0 GHz	-6 to -12 dBm	
26.0 GHz	26.5 GHz	-13 to -18 dBm	

**Check IF OUT B**

1. Connect the RF OUT of PSG #1, through a high-quality flexible cable, to RF IN B of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
2. Connect the RF OUT of PSG #2, through a high-quality flexible cable, to LO IN of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
3. Connect the power meter to the IF OUT B of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
4. Use the output frequencies and power levels from the above tables for PSG #1 and PSG #2 to set the input frequency and power of the RF IN B and LO IN and then measure IF OUT B.

Measured IF OUT B Power Levels

PSG #1 Output Frequency Applied to RF IN B	PSG #2 Output Frequency Applied to LO IN	Power Level Range Expected at IF OUT B	Power Meter Reading Measured at IF OUT B
3.5 GHz	4.0 GHz	-5 to -11 dBm	
8.5 GHz	9.0 GHz	-5 to -11 dBm	
17.5 GHz	18.0 GHz	-6 to -12 dBm	
26.0 GHz	26.5 GHz	-13 to -18 dBm	

## Step 5: Verify Operation of the M9362A-D01 Module

### Check IF OUT C

1. Connect the RF OUT of PSG #1, through a high-quality flexible cable, to RF IN C of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
2. Connect the RF OUT of PSG #2, through a high-quality flexible cable, to LO IN of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
3. Connect the power meter to the IF OUT C of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
4. Use the output frequencies and power levels from the above tables for PSG #1 and PSG #2 to set the input frequency and power of the RF IN C and LO IN and then measure IF OUT C.

Measured IF OUT C Power Levels

PSG #1 Output Frequency Applied to RF IN C	PSG #2 Output Frequency Applied to LO IN	Power Level Range Expected at IF OUT C	Power Meter Reading Measured at IF OUT C
3.5 GHz	4.0 GHz	-5 to -11 dBm	
8.5 GHz	9.0 GHz	-5 to -11 dBm	
17.5 GHz	18.0 GHz	-6 to -12 dBm	
26.0 GHz	26.5 GHz	-13 to -18 dBm	

### Check IF OUT D

1. Connect the RF OUT of PSG #1, through a high-quality flexible cable, to RF IN D of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
2. Connect the RF OUT of PSG #2, through a high-quality flexible cable, to LO IN of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
3. Connect the power meter to the IF OUT D of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
4. Use the output frequencies and power levels from the above tables for PSG #1 and PSG #2 to set the input frequency and power of the RF IN D and LO IN and then measure IF OUT D.

Measured IF OUT D Power Levels

PSG #1 Output Frequency Applied to RF IN D	PSG #2 Output Frequency Applied to LO IN	Power Level Range Expected at IF OUT D	Power Meter Reading Measured at IF OUT D
3.5 GHz	4.0 GHz	-5 to -11 dBm	
8.5 GHz	9.0 GHz	-5 to -11 dBm	
17.5 GHz	18.0 GHz	-6 to -12 dBm	
26.0 GHz	26.5 GHz	-13 to -18 dBm	

**Check LO IN to LO OUT**

1. Connect the PSG #2 RF OUT to LO IN of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
2. Connect the power meter to the LO OUT of the Agilent M9362A-D01 PXIe Microwave Quad Downconverter.
3. Use the output frequencies and power levels from the above tables for PSG #2 to set the input frequency and power of the LO IN and then measure LO OUT.

Measured LO OUT Power Levels

PSG #1 Output Frequency Applied to LO IN	Power Level Range Expected at LO OUT	Power Meter Reading Measured at LO OUT
4.0 GHz	+2.0 to -2.0 dBm	
9.0 GHz	+0.5 to -3.5 dBm	
18.0 GHz	-1.0 to -5.0 dBm	
26.5 GHz	-3.0 to -7.0 dBm	

**If a Problem is Found**

If a problem is found, perform the following checks:

1. Verify that all relevant hardware is turned on.
2. Verify that both PSG #1 and PSG #2 (or their equivalent) is set to the proper power and frequency and that all cables are properly connected.
3. Check that the Status LED is green.
4. See "[Return a module for service](#)" on page 8 for details on sending the module to Agilent Technologies Inc. for service.

**Specifications**

The Data Sheet for the Agilent M9362A-D01 PXIe Microwave Quad Downconverter is included on the Product Information CD that came with your module. This document contains specification information. Please check the Agilent website at [www.agilent.com/find/M9362A-D01](http://www.agilent.com/find/M9362A-D01) 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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