

Startup Guide

Keysight M9521A AXIe System Module (ASM)



Notices

© Keysight Technologies, Inc. 2017

No part of this manual may be reproduced in any form or by any means (including electronic storage and retrieval or translation into a foreign language) without prior agreement and written consent from Keysight Technologies, Inc. as governed by United States and international copyright laws.

Manual Part Number

M9521-90001

Edition

Third Edition, December 2017

Printed in

Malaysia

Published by

Keysight Technologies, Inc.
900 S. Taft Ave.
Loveland, CO 80537 USA

Trademarks

PICMG[®], Compact PCI[®] are registered trademarks of the PCI Industrial Computer Manufacturers Group.

AdvancedTCA[®] and ATCA are registered trademarks of the PCI Industrial Computer Manufacturers Group.

PCI-SIG[®], PCI Express[®], and PCIe[®] are registered trademarks of PCI-SIG.

Technology Licenses

The hardware and/or software described in this document are furnished under a license and may be used or copied only in accordance with the terms of such license.

Declaration of Conformity

Declarations of Conformity for this product and for other Keysight products may be downloaded from the Web. Go to <http://keysight.com/go/conformity>.

You can then search by product number to find the latest Declaration of Conformity.

U.S. Government Rights

The Software is “commercial computer software,” as defined by Federal Acquisition Regulation (“FAR”) 2.101. Pursuant to FAR 12.212 and 27.405-3 and Department of Defense FAR Supplement (“DFARS”) 227.7202, the U.S. government acquires commercial computer software under the same terms by which the software is customarily provided to the public. Accordingly, Keysight provides the Software to U.S. government customers under its standard commercial license, which is embodied in its End User License Agreement (EULA), a copy of which can be found at <http://www.keysight.com/find/sweula>. The license set forth in the EULA represents the exclusive authority by which the U.S. government may use, modify, distribute, or disclose the Software. The EULA and the license set forth therein, does not require or permit, among other things, that Keysight: (1) Furnish technical information related to commercial computer software or commercial computer software documentation that is not customarily provided to the public; or (2) Relinquish to, or otherwise provide, the government rights in excess of these rights customarily provided to the public to use, modify, reproduce, release, perform, display, or disclose commercial computer software or commercial computer software documentation. No additional government requirements beyond those set forth in the EULA shall apply, except to the extent that those terms, rights, or licenses are explicitly required from all providers of commercial computer software pursuant to the FAR and the DFARS and are set forth specifically in writing elsewhere in the EULA. Keysight shall be under no obligation to update, revise or otherwise modify the Software. With respect to any technical data as defined by FAR 2.101, pursuant to FAR 12.211 and 27.404.2 and DFARS 227.7102, the U.S. government acquires no greater than Limited Rights as defined in FAR 27.401 or DFAR 227.7103-5 (c), as applicable in any technical data.

Warranty

THE MATERIAL CONTAINED IN THIS DOCUMENT IS PROVIDED “AS IS,” AND IS SUBJECT TO BEING CHANGED, WITHOUT NOTICE, IN FUTURE EDITIONS. FURTHER, TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, KEYSIGHT DISCLAIMS ALL WARRANTIES, EITHER EXPRESS OR IMPLIED, WITH REGARD TO THIS MANUAL AND ANY INFORMATION CONTAINED HEREIN, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. KEYSIGHT SHALL NOT BE LIABLE FOR ERRORS OR FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH THE FURNISHING, USE, OR PERFORMANCE OF THIS DOCUMENT OR OF ANY INFORMATION CONTAINED HEREIN. SHOULD KEYSIGHT AND THE USER HAVE A SEPARATE WRITTEN AGREEMENT WITH WARRANTY TERMS COVERING THE MATERIAL IN THIS DOCUMENT THAT CONFLICT WITH THESE TERMS, THE WARRANTY TERMS IN THE SEPARATE AGREEMENT SHALL CONTROL.

Keysight Technologies does not warrant third-party system-level (combination of chassis, controllers, modules, etc.) performance, safety, or regulatory compliance unless specifically stated.

Safety Information

CAUTION

A CAUTION denotes a hazard. It calls attention to an operating procedure or practice 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 denotes a hazard. It calls attention to an operating procedure or practice, 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.

Safety Information

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings or operating instructions in the product manuals violates safety standards of design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these requirements.

General

Do not use this product in any manner not specified by the manufacturer. The protective features of this product must not be impaired if it is used in a manner specified in the operation instructions.

Before Applying Power

Verify that all safety precautions are taken. Make all connections to the unit before applying power. Note the external markings described under "Safety Symbols".

Ground the Instrument

Keysight chassis' are provided with a grounding-type power plug. The instrument chassis and cover must be connected to an electrical ground to minimize shock hazard. The ground pin must be firmly connected to an electrical ground (safety ground) terminal at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

Do Not Operate in an Explosive Atmosphere

Do not operate the module/chassis in the presence of flammable gases or fumes.

Do Not Operate Near Flammable Liquids

Do not operate the module/chassis in the presence of flammable liquids or near containers of such liquids.

Cleaning

Clean the outside of the Keysight module/chassis with a soft, lint-free, slightly dampened cloth. Do not use detergent or chemical solvents.

Do Not Remove Instrument Cover

Only qualified, service-trained personnel who are aware of the hazards involved should remove instrument covers. Always disconnect the power cable and any external circuits before removing the instrument cover.

Keep away from live circuits

Operating personnel must not remove equipment covers or shields. Procedures involving the removal of covers and shields are for use by service-trained personnel only. Under certain conditions, dangerous voltages may exist even with the equipment switched off. To avoid dangerous electrical shock, DO NOT perform procedures involving cover or shield removal unless you are qualified to do so.

DO NOT operate damaged equipment

Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until safe operation can be verified by service-trained personnel. If necessary, return the product to an Keysight Technologies Sales and Service Office for service and repair to ensure the safety features are maintained.

DO NOT block the primary disconnect

The primary disconnect device is the appliance connector/power cord when a chassis used by itself, but when installed into a rack or system the disconnect may be impaired and must be considered part of the installation.

Do Not Modify the Instrument

Do not install substitute parts or perform any unauthorized modification to the product. Return the product to an Keysight Sales and Service Office to ensure that safety features are maintained.

In Case of Damage

Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel

CAUTION

Do NOT block vents and fan exhaust: To ensure adequate cooling and ventilation, leave a gap of at least 50mm (2") around vent holes on both sides of the chassis.

Do NOT operate with empty slots: To ensure proper cooling and avoid damaging equipment, fill each empty slot with an AXle filler panel module.

Do NOT stack free-standing chassis: Stacked chassis should be rack-mounted.

All modules are grounded through the chassis: During installation, tighten each module's retaining screws to secure the module to the chassis and to make the ground connection.

WARNING

Operator is responsible to maintain safe operating conditions. To ensure safe operating conditions, modules should not be operated beyond the full temperature range specified in the Environmental and physical specification. Exceeding safe operating conditions can result in shorter lifespan, improper module performance and user safety issues. When the modules are in use and operation within the specified full temperature range is not maintained, module surface temperatures may exceed safe handling conditions which can cause discomfort or burns if touched. In the event of a module exceeding the full temperature range, always allow the module to cool before touching or removing modules from the chassis.

Safety Symbols

CAUTION

A CAUTION denotes a hazard. It calls attention to an operating procedure or practice, 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 denotes a hazard. It calls attention to an operating procedure or practice, 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.

Products display the following symbols:

-  Warning, risk of electric shock
-  Refer to manual for additional safety information.
-  Earth Ground.
-  Chassis Ground.
-  Alternating Current (AC).
-  Standby Power. Unit is not completely disconnected from AC mains when switch is in standby.
-  Antistatic precautions should be taken.
- CAT I IEC Measurement Category I, II, III, or IV
- CAT II
- CAT III
- CAT IV

For localized Safety Warnings, Refer to Keysight Safety document (p/n 9320-6792).



The CSA mark is a registered trademark of the Canadian Standards Association and indicates compliance to the standards laid out by them. Refer to the product Declaration of Conformity for details.



Notice for European Community: This product complies with the relevant European legal Directives: EMC Directive (2004/108/EC) and Low Voltage Directive (2006/95/EC).



The Regulatory Compliance Mark (RCM) mark is a registered trademark. This signifies compliance with the Australia EMC Framework regulations under the terms of the Radio Communication Act of 1992.

ICES/NMB-001

ICES/NMB-001 indicates that this ISM device complies with the Canadian ICES-001.



This symbol represents 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 this product.



South Korean Class A EMC Declaration. This equipment is Class A suitable for professional use and is for use in electromagnetic environments outside of the home.

A 급 기기 (업무용 방송통신기자재) 이 기기는 업무용 (A 급) 전자파적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라 며 , 가정외의 지역에서 사용하는 것을 목적으로 합니다.



Waste Electrical and Electronic Equipment (WEEE) Directive 2002/96/EC

This product complies with the WEEE Directive (2002/96/EC) marking requirement. The affixed product label (see below) indicates that you must not discard this electrical/electronic product in domestic household waste.

Product Category: With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a "Monitoring and Control instrumentation" product.

Do not dispose in domestic household waste.

To return unwanted products, contact your local Keysight office for more information.



Contents

Introduction	9
M9521A AXIe System Module (ASM)	10
Step 1: Unpack and Inspect the Module	11
ESD	11
Inspect for damage.	11
Step 2: Verify shipment contents	12
Step 3: Install the AXIe System Module in the Chassis	13
Step 4: Power-Up the Chassis	15
Indicator LEDs	15
Step 5: Set Up the Host PC.	17
Hardware Connections to the Host PC	18
Power on the Chassis First then the Host Controller	19
Step 6: Install IO Libraries Suite and Connect to the Web Interface.	21
Host PC Requirements	21
Installing the Keysight IO Libraries Suite	22
Using Keysight Connection Expert to Confirm Connection to the M9521A	23
Launch the Web Interface from Keysight Connection Expert	24
Step 7: Install the Software.	27
Launch the Soft Front Panel.	27
Step 8. Next Steps.	28
Host PC/Chassis Interface Topics.	28
Service And Support	32
If you need to return the module for service	32
Keysight On The Web.	32
Keysight by phone	33
Product Warranty	33
Accessories	33
Safety-Related Specifications.	34

Introduction

The Keysight M9521A AXIe System Module is a full module height AXIe System Module (ASM), which manages AXIe chassis functions. The ASM provides these AXIe extensions:

- provides host PC connectivity (Gen 2 PCIe x8 and/or Ethernet)
- sources timing signals (CLK100, SYNC and FCLK)
- routes STRIG (Star Trigger) to instruments through the backplane
- routes trigger signals through an external parallel trigger bus
- six additional ports for bi-directional triggering
- provides backplane PCIe and Ethernet communication between modules

The shared Gen 2 x8 PCIe interfaces from the ASM to an external host PC provides up to a 4 GB/s data rate shared among installed modules.

NOTE

For detailed M9521A usage information, refer to the **Keysight M9514A and M9521A User Manual** (M9514-90005).

NOTE

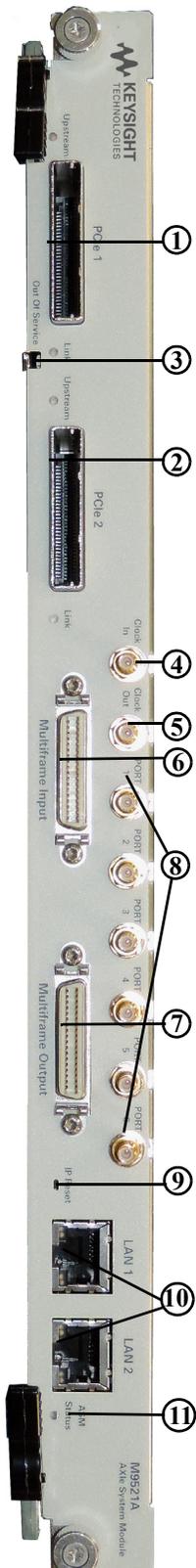
Many computers are not capable of enumerating a sufficient number of PCIe slots to ensure that slots in an external chassis are enumerated. Keysight maintains a document listing the integrated, rack mount, and desktop computers that have been verified to properly enumerate PCIe devices in the AXIe chassis, at www.keysight.com/find/axie-chassis.

For general host PC requirements, such as operating system and RAM requirements, please refer to “**Host PC Requirements**” on page 21.

For the ASM and other installed modules, appropriate control software and instrument drivers must be installed on the host PC.

This Startup Guide, plus additional information, can be found in PDF format on the *AXIe Software and Product Information* CD that came with your module. They are also available on the web at: www.keysight.com/find/M9521A.

M9521A AXIe System Module (ASM)*



The ASM is a full-height AXIe module and must be installed in the controller slot of the AXIe chassis. It performs the following functions:

- monitors chassis temperature and controls variable-speed chassis fans
- acts as a Gigabit Ethernet switch; routes packets across the backplane
- connects an external host PC to the chassis
- synchronizes timing across all modules through the Trigger Bus, using an internal or external clock source

ASM Front Panel

1	PCIe 1	PCIe 1 connector connects a remote host PC to the chassis or connects multiple chassis via PCIe. This upstream connection is Gen 2 compliant PCIe x8.
2	PCIe 2	PCIe 2 connector connects multiple chassis. This downstream connection is Gen 2 compliant PCIe x8.
3	Out Of Service	When red, LED indicates operational failure of the ASM.
4	CLOCK	External clock connections. 10 MHz \pm 100 ppm. SMB connectors with ESD suppression.
	IN	Accepts an externally sourced timing input. Input range 5V peak, AC coupled, 50 Ω terminated, 250 mV minimum swing.
5	OUT	Extends the internal clock source to external instruments. 3.3V AC coupled, 50W output impedance.
6	MULTIFRAME	Synchronizes timing signals with multiple daisy-chained chassis (either 2-slot or 5-slot). 36-pin mini D connectors use accessory Keysight cables.
	INPUT	Communicates to the next higher chassis in a multi-chassis system. The highest chassis is referred to as the Master Chassis
7	OUTPUT	Communicates to the next lower chassis in a multi-chassis system.
8	Ports	External bidirectional, programmable trigger connections.
	Port 1 - Port 6	Adjustable threshold input range -5V to +5V, 250 mV minimum swing.
9	ASM IP Reset	Resets the ASM LAN1/LAN2 ports to factory preset address. (169.254.1.1).
10	LAN 1 LAN 2	Connects the host PC to the chassis, RJ45 connector. Tri-rate 10/100/1000 Base-T, auto crossover. Amber link/activity LED, bicolor speed (Amber = 1Gbps, Green = 100 Mbps, off = 10 Mbps) An embedded controller module does not use this port; it communicates with the ASM through the chassis backplane.
11	ASM Status	The Status indicator is a tri-color LED. Green indicates normal operation. Red indicates a power-up error. Amber indicates chassis is powered and booting.

* The M9521A ASM is different than the Embedded System Module (ESM) used in the Keysight M9502A and M9505A AXIe chassis. They are not interchangeable.

Step 1: Unpack and Inspect the Module

CAUTION

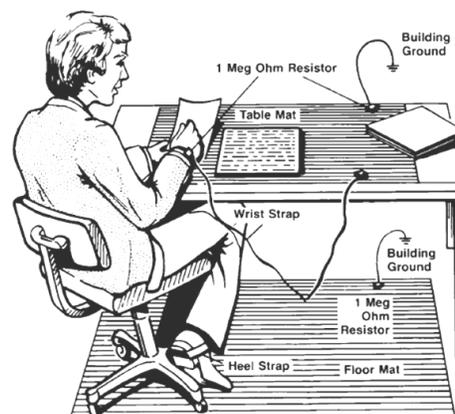
Keysight's AXIe Modules are shipped in materials that prevent static electricity damage. The module should only be removed from the packaging in an anti-static area ensuring that correct anti-static precautions are taken. Store all modules in anti-static envelopes when not in use.

ESD

Electrostatic discharge (ESD) can damage or destroy electronic components. All work on electronic assemblies should be performed at a static-safe work station. The following figure shows an example of a static-safe work station using two types of ESD protection. Purchase acceptable ESD accessories from your local supplier.

- Conductive table-mat and wrist-strap combination.
- 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 $1\text{ M}\Omega$ of isolation from ground.



Inspect for damage

After unpacking the AXIe System 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.

CAUTION

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

Step 2: Verify shipment contents

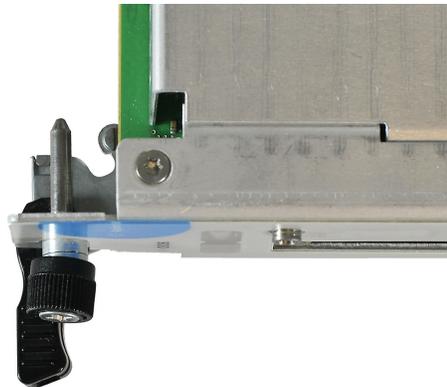
Your shipment should have included the following:

- The Keysight M9521A AXIe System Module that you ordered.
- This printed document (*Keysight M9521A AXIe System Module Startup Guide*).
- An *AXIe Chassis and Controller Software and Product Information CD* (M9514-10001). This CD contains software, drivers and all product printed documentation in PDF format for the module.
- An *Automation-Ready CD with Keysight IO Libraries Suite* (version 17.1 or later).
- Any other accessories that you ordered (cables, connectors, etc.).

Step 3: Install the AXle System Module in the Chassis

Before powering on the chassis, install the AXle System Module (ASM) in the AXle chassis.

- 1 Make certain the AXle chassis is not powered on.
- 2 Locate the top and bottom guide rails for the ASM slot (Slot 7 in the M9514A chassis).
- 3 Align the ASM's circuit board with the chassis guide rails. Slide the ASM gently into the two rails. If the fit is tight, slide the ASM back out and recheck alignment.
- 4 Locate the insertion/extraction handles at each side of the ASM's front panel. Extend the ends of both handles, by pulling them inwards towards each other; the plastic handle end slides about 1 cm on the metal handle shaft. Then fully open the handles by pivoting them out towards you until they are perpendicular to the front panel. The left handle is shown below, from the top view, correctly extended.



- 5 Slide the ASM completely into the chassis. When the module's backplane connectors contact the chassis backplane, you will feel resistance and the two handles will begin to close toward each other. The module's faceplate will be about 1 cm from the chassis front panel.
- 6 Continue nudging the ASM faceplate gently but firmly with your thumbs, until the handles are pressed up against the chassis and the module's front panel lies flush with the chassis' front panel. This seats the module firmly in the chassis backplane. If necessary, gently press inward (toward the chassis) on the handles to ensure full insertion.
- 7 Tighten the captive retaining screws at both top and bottom of the ASM.

CAUTION

Modules are grounded through the chassis. Tighten the module retaining screws to ensure a proper ground connection.

- 8 Retract the handle ends by sliding them outward on their metal shafts, away from each other, toward the chassis edge; this secures them out of the way of test connections.

NOTE

Detailed module installation and removal instructions may be found in the *M9514A and M9521A User Guide*.

At this step, you should also install the AXIe embedded controller (such as the Keysight M9536A) if you are using one. The embedded controller may be installed in any chassis slot except slot 7; however, it is best to install it in outer slots to minimize impact with any modules using the chassis local bus for E-Keying. If you are using an external host PC, do not connect it to the ASM yet.

Proceed to Step 4 to power up the AXIe chassis. Verify that the chassis fans are operating and free of obstructions that may restrict airflow.

CAUTION

Static Electricity—The components and connectors on modules are sensitive to static electricity. To minimize electrostatic damage, take the necessary anti-static precautions. Some AXIe chassis provide a grounding terminal on the front panel, to which you can connect a wrist strap.

Empty Slots—Except for performing initial chassis verification or troubleshooting, do not operate the chassis with empty slots. Always insert a filler panel module or instrument module into empty slots. This is especially important for the slots on either side of an instrument module. This allows proper air flow and cooling, and provides EMI shielding for the chassis and installed components. Leaving slots empty can increase fan speed, raise ambient noise, overheat components, and shut down modules.

ASM—The AXIe System Module is integral to the operation of the chassis. Except for troubleshooting purposes, do not remove the ASM. The ASM is installed in slot 7 of the chassis.

Hot Swap—AXIe does not explicitly support hot swap for instrument modules. Keysight recommends fully powering down the chassis before installing or removing modules.

Embedded Controller Module—Manually initiate a graceful shutdown of the Windows controller operating system and power off the chassis before removing the controller.

Step 4: Power-Up the Chassis

Refer to your AXIe chassis documentation for detailed information on powering-up and powering-down the AXIe chassis. This step ensures that the ASM is properly installed in the AXIe chassis and that the chassis and ASM power-up properly. It is not necessary to connect the chassis or ASM to a host computer for this step. After verifying that all of the status LEDs have turned solid green, please power-down the chassis and proceed to [“Step 5: Set Up the Host PC”](#) on page 17

Indicator LEDs

The M9521A has a Status LED on the front panel (see [“M9521A AXIe System Module \(ASM\)”](#) on page 10). In general, when the Status LED is solid green (not flashing), the ASM is working normally. Refer to the **M9514A and M9521A Service Guide** for more details. The following table indicates the various states (colors) of the ASM Status LED and its general meaning:

LED State (color)	Description
M9521A ASM Status LED	
off	ASM not receiving power. Chassis powered off.
solid amber	Internal power-on self test (POST) is running
flashing amber	Indicates POST failure
flashing green	PCIe startup delay while waiting for instrument modules to be activated. Front panel identification indicator, invoked by web page, IVI function call, or Soft Front Panel to identify specific ASM.
solid green	Shelf Manager & chassis working normally, power-on self tests passed, etc.
solid red	Indicates a serious problem. Connection to the chassis or ASM may not be available due to the nature of the problem, Service required.
M9521A ASM Out of Service (OOS)	
off	Normal operation
solid red	Red while modules being activated, then turns off. If stays red, indicated ASM failure.
M9521A ASM PCIe Link (2 LEDs, one for each connector)	
green	PCIe Link is functional
M9521A ASM Upstream	
amber	Identifies the upstream PCIe port

The M9521A ASM and the Keysight M9514A AXIe chassis have several status LEDs on their front panels. In general, when the status LEDs are solid green (not flashing), the monitored state or circuit is working normally. Refer to the *M9514A Startup Guide* or *M9514A and M9521A User Guide* for information on the chassis **STATUS** LEDs.

Verify the **STATUS** LEDs on your ASM and the AXIe chassis. If either the chassis or the ASM do not power up to a steady green **Status** LED, or either powers up to a steady red **Status** LED, the chassis or ASM has detected a failure and requires service. Immediately power down the chassis and resolve the problem.

Step 5: Set Up the Host PC

Communication with the ASM and installed instrument modules requires a *host PC*, a Windows based computer that may be:

Embedded (takes up slot one in the chassis). An AXIe embedded PC (also commonly called an *embedded controller*) such as the Keysight M9536A, allows for stand-alone test system operation. PCIe and LAN connections from PC to ASM are made directly at the chassis backplane.

NOTE

If you decide to use an embedded controller module as your host PC, you need to install the controller in the chassis before proceeding with this section. See the *M9514A and M9521A User Guide* for detailed module installation instructions.

A separate rack-mounted or desktop PC. To use the chassis PCIe data transfer capabilities, this host PC must have an available PCIe x8 slot and BIOS support for proper enumeration of devices on the PCIe bus. PCIe connection from host PC to ASM requires a PCIe adapter card and cable. Keysight recommends use of a PC, card and cable tested with the AXIe mainframe; a current list can be found at www.keysight.com/find/axie-chassis.

NOTE

To ensure proper system operation, you should use an approved (embedded, rackmount, desktop or laptop) host computer along with an approved PCIe adaptor and cable. While you may use other controllers, the approved computers have verified hardware support for PCIe x8 and their BIOS can properly enumerate multiple instruments on the shared PCIe bus. Keysight provides a list of tested host PCs at www.keysight.com/find/axie-chassis.

General controller requirements (such as operating system and RAM) are listed in “[Host PC Requirements](#)” on page 21.

CAUTION

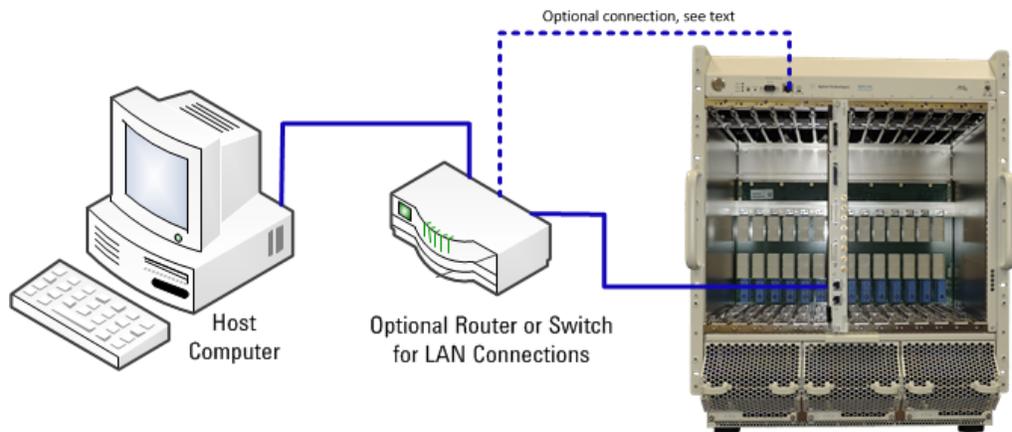
Do not enable the Microsoft Windows sleep or hibernate modes on the host PC. The controller may not perform proper chassis enumeration when it wakes up and unpredictable operation may result.

Hardware Connections to the Host PC

CAUTION

Except where noted, connections between the external host PC and the chassis AXIe System Module (ASM) should be made with both the PC and chassis powered off.

For initial turn-on and testing make a LAN-only connection to the chassis and ASM – this is the simplest connection and doesn't require installation of a PCIe adapter card in the host PC. The host PC can either be connected directly to the chassis and/or ASM with a crossover Gigabit Ethernet cable, or connected through your network with a straight Ethernet cable. The following diagram shows the basic connection.

**NOTE**

The chassis LAN port and Shelf Manager switch provide an access to the chassis Shelf Manager if a non-Keysight ASM is used that does not contain a LAN fabric. In this case, the chassis Shelf Manager is accessible via LAN 0. When using the Keysight M9521A ASM, the LAN0 connector is not used and the Shelf Manager LAN switch should remain in the default ASM (right) position.

For additional host PC and chassis/ASM interface information, refer to [“Host PC/Chassis Interface Topics”](#) on page 28 of this guide. Also, refer to the *M9514A and M9521A User Guide*.

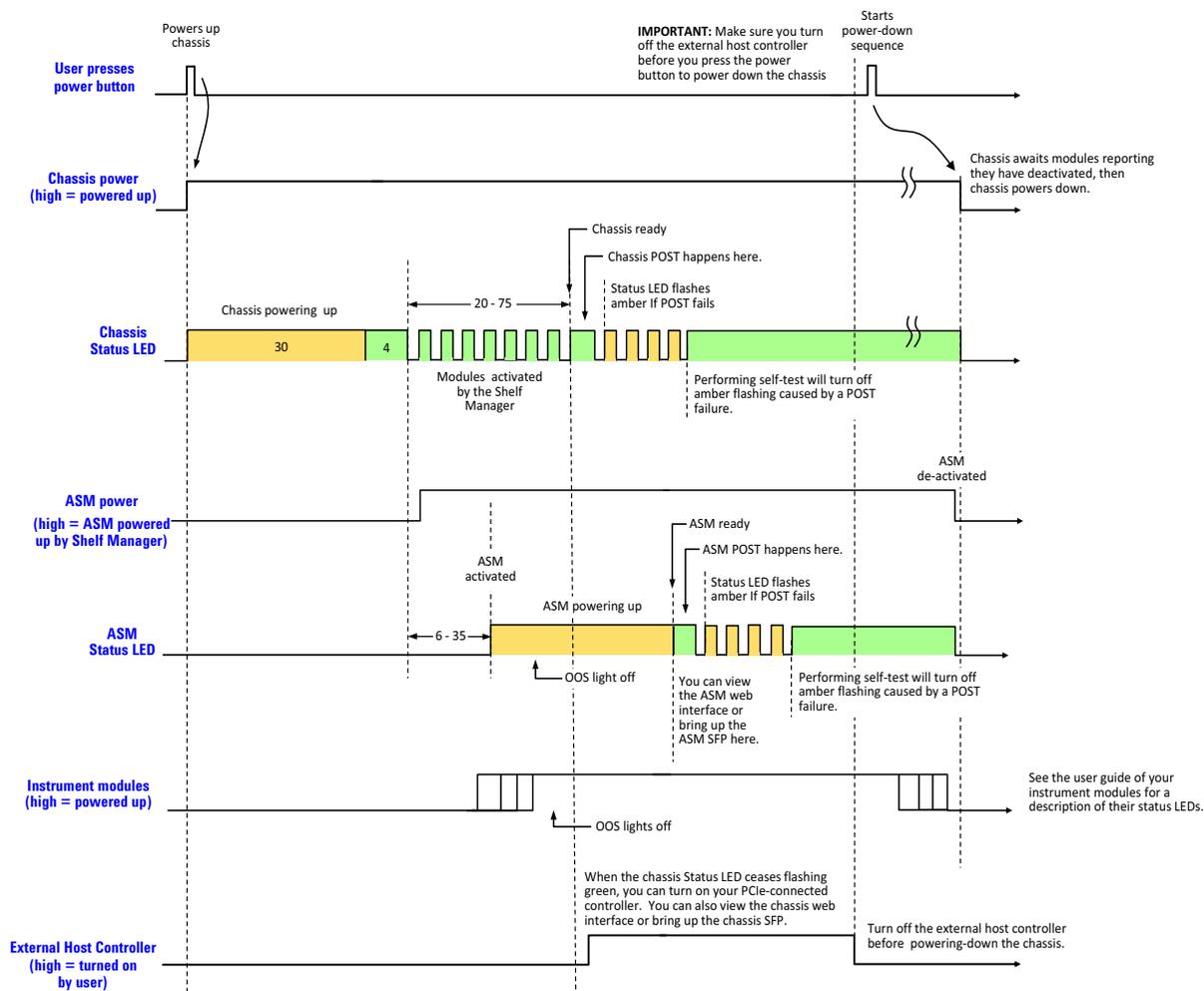
Power on the Chassis First then the Host Controller

CAUTION

The chassis and host PC must be powered up and down in the following sequence. The chassis should be powered up first, which will initiate its built-in self test. During self test, the chassis STATUS LED will be amber. The STATUS LED will blink green and then stay green continuously when the ASM is ready. The ASM then powers up each module slot. The remote host PC should be turned on only after all installed modules have performed their initialization—see your module documentation for initialization information. An embedded controller such as the M9536A handles this sequence automatically.

Chassis, ASM, and External Host Controller Power-up/Power-down Sequence

1. Times are shown in seconds.
2. The times can vary based on the number of modules installed in the chassis and their activation/de-activation times.



In brief, the host PC must be off whenever the chassis is powered up or down. Because modules are not hot-swappable, the chassis must be powered down before modules are added or removed.

While the power sequencing shown above does not apply to an embedded controller (because an embedded controller and chassis are powered simultaneously), an embedded controller must also be restarted (after Windows starts) if the chassis configuration was changed in any way while the chassis and embedded controller were powered on.

Step 6: Install IO Libraries Suite and Connect to the Web Interface

This step describes how to install the Keysight IO Libraries Suite and verify that the chassis can be found by Keysight Connection Expert, which is part of IO Libraries Suite.

You can use either the M9521A Web Interface or the M9521A Soft Front Panel (SFP) to monitor and control the ASM, including triggering, configuring the ASM LAN ports, and monitoring basic health of the ASM. In this step, the Web Interface is used to verify that the host PC can communicate to the chassis. Using the SFP to monitor and control the chassis is described in the *M9521A ASM Soft Front Panel Help File*.

NOTE

IMPORTANT: The installation and setup information in this manual is generic.

Some AXIe modules and systems require a different installation and setup procedure than described in this manual. Refer to the installation documentation supplied with your AXIe module and or system for detailed installation information.

For example, installation of the Keysight IO Libraries is not required for all AXIe systems.

Host PC Requirements

To install and run the required software (Microsoft.NET, Keysight IO Libraries version 17.1 or later, and chassis device drivers), the host PC requires the following:

	For Best Performance
Operating System	Windows 7 (SP1), 32-bit or 64-bit Windows 8.1, 32-bit or 64-bit
Browser	Microsoft Internet Explorer 6 (or later)
Processor	800 MHz or greater
Minimum RAM	4 GB for 32-bit OS 16 GB for 64-bit
Available Hard Disk Space	1.5 GB
Graphics	Support for DirectX 9 graphics with 128MB graphics memory recommended

Keysight's M9536A AXIe Embedded Controller requires Windows Embedded System 7 32- or 64-bit Operating System. 8 GB RAM minimum recommended.

In addition, the host PC must be able to enumerate the AXIe chassis.

NOTE

Many computers are not capable of enumerating a sufficient number of PCIe slots to ensure that slots in an external chassis are enumerated. Keysight maintains a document listing the integrated, rack mount, desktop and laptop computers that have been verified to properly enumerate PCIe devices in the AXIe chassis, at www.keysight.com/find/axie-chassis.

Keysight's M9536A Embedded Controller must have BIOS AG16 or later.

Installing the Keysight IO Libraries Suite

Note that IO Libraries Suite version 17.1 or later is required to access the chassis features. We recommend that you always use the latest version of Keysight IO Libraries.

NOTE

If you are using a Keysight embedded controller such as the M9536A, the Keysight IO Libraries is already installed. Make certain that it is version 17.1 or later. In Keysight Connection Expert, go to `Help>About`.

NOTE

Only one installation of the Keysight IO Libraries Suite is required on the host PC. This installation is used by both the M9521A ASM and the M9514A chassis software that is installed in the next section as well as the drivers associated with each module that you install in the chassis.

NOTE

Two libraries, **IVI Shared Components** and **VISA Shared Components**, are required by the IO Libraries Suite. If these libraries are not already installed on your controller, the IO Libraries Suite installer will install them. If **IVI Shared Components** and **VISA Shared Components** are already installed, the IO Libraries Suite installer will upgrade these libraries to the latest version, if necessary, using the same installation location used by the previous version.

- 1 Insert the *Keysight IO Libraries Suite Automation Ready CD* into the optical drive of your host PC. If you are using an embedded controller such as the Keysight M9536A, you can download the latest IO Libraries Suite at:

www.keysight.com/find/iosuite

- 2 Wait a few seconds for the auto-run window to appear. If the auto-run window does not appear automatically,
 - Click: **Start > Run...**
 - Type: **<drive>:Autorun\IOLibraries.hta**
where <drive> is your optical drive letter.
- 3 Follow the installer prompts to install the Keysight IO Libraries Suite.

Using Keysight Connection Expert to Confirm Connection to the M9521A

This section describes use of Keysight Connection Expert to confirm that the host PC can connect to the ASM. Keysight Connection Expert is installed during the installation of Keysight IO Libraries Suite.

NOTE

This section assumes Keysight IO Libraries Suite version 17.1 or later is installed. Earlier versions of IO Libraries Suite behaved differently. Always use the latest version of Keysight IO Libraries Suite.

NOTE

Keysight Connection Expert will use either the LAN interface or the PCIe interface to connect to the chassis, whichever interface is cabled between the host PC and the chassis. Both of these interfaces appear under the LAN category in Keysight Connection Expert. The listing of the PCIe interface under the LAN category is due to the presence of the Network Interface Controller (NIC) as a chassis PCIe endpoint.

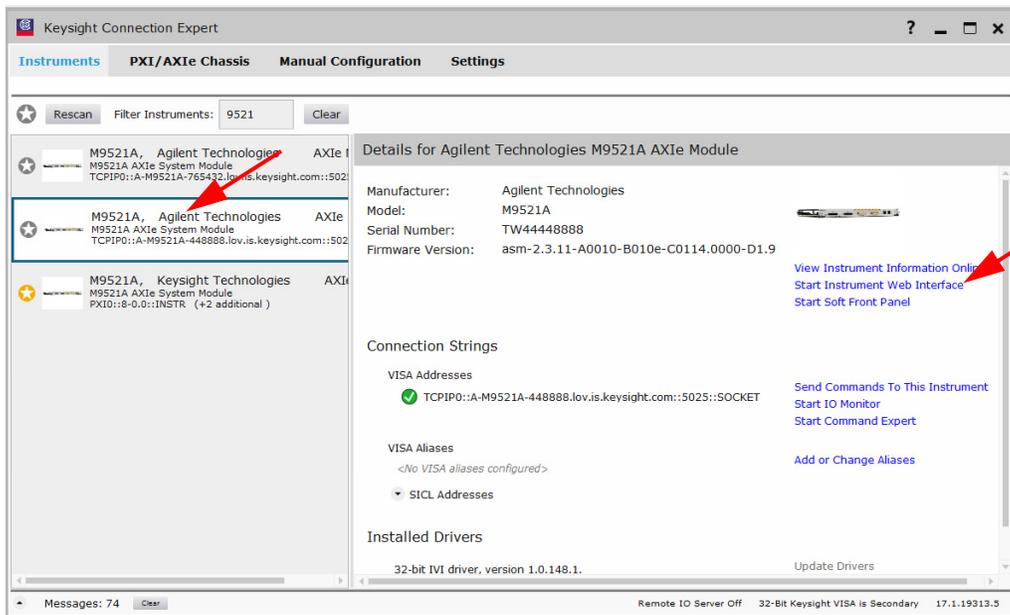
NOTE

The section “[Host PC/Chassis Interface Topics](#)” on page 28 includes a number of interface topics that may be of assistance in establishing a connection between the host PC and the chassis.

Launch *Keysight Connection Expert* using one of the following methods:

- a If you allowed the Automation Ready CD to place an icon () on your desktop, double-click the icon to launch the program.
- b From a Command Prompt window, type:
<c>:\Program Files\Keysight\IO Libraries Suite\KeysightConnectionExpert.exe
to launch the program.

The **Keysight Connection Expert** window displays.



The **Instrument I/O on this PC** pane shows instrument connections on your PC. Note that the AXIe chassis is listed under the PXI0 Interface and the LAN (TCPIP0) interface. You will need to manually add it using the Connection Expert Add LAN dialog.

Launch the Web Interface from Keysight Connection Expert

This section describes how to launch and use the ASM Web Interface. Note that the Web Interface can be accessed over LAN or PCIe, whichever interface is connected. Note also that the ASM soft front panel (SFP) provides significant additional functionality to the Web Interface. However, using the Web Interface requires only a browser on the host PC, whereas using the SFP requires installing the AXIe ASM software (which includes the SFP) on the host PC.

- 1 To launch the ASM Web Interface, click the **Instrument Web Interface...** button. See the screen capture on the previous page. The Web Interface will be displayed in a new window.

NOTE

If you have problems launching the ASM Web interface, check your browser's proxy settings. When Keysight Connection Expert launches a Web interface for an ASM, it hands off the **http://<address>** to the browser or dedicated web application. Therefore, it should not use a proxy.

The home page displays information about your ASM. Click the **Advanced Information** button to view additional information.

Step 6: Install IO Libraries Suite and Connect to the Web Interface

ASM
Firmware
Version →

The three buttons at left are the Web Interface’s menu: At right is a brief description of what you can do on each page.



Home Page - View General Information about the ASM, such as product identification, firmware version and LAN parameters.



LAN Configuration Page - View/change IP address, domain, and subnet. Display service discovery information and LAN status.



Help Page - General help topics and context-based help for the current page.

Note that the M9514A chassis and the M9521A ASM have different web interfaces. Refer to the *M9514A and M9521A User Guide* for detailed information.

The *M9514A and M9521A User Guide* has a chapter covering the Web Interfaces, with examples showing all parameters you can view or configure.

NOTE

On the M9514A LAN Configuration Web Page and the M9521A LAN Configuration Web Page, there is a button labeled, “Reset User-Settable Memory.” This button resets all user-settable non-volatile memory, returning the chassis or ASM to its factory default state.

CAUTION

Clicking on this button resets all user-settable non volatile memory in the chassis or ASM to its factory state. Doing this will interrupt connectivity with the chassis or ASM and will require setting up the chassis or ASM as a new device in Keysight Connection Expert. See the M9514A and M9521A User Guide for detailed information

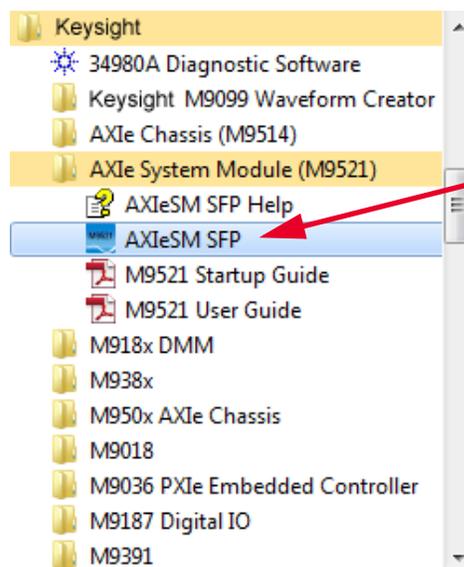
Step 7: Install the Software

You can monitor and control the ASM or the chassis entirely from the Web Interface. To use the ASM Soft Front Panel (SFP) to monitor and control the ASM, and to develop programs to control the ASM, you will need to install the software (IVI or LabVIEW) appropriate for your programming environment. To do so:

- 1 Insert the Keysight *AXIe Chassis and Controller Software and Product Information* CD in the host PC. If you do not have the CD or a CD drive on your PC, you can download the most recent version of the SFP and drivers at www.keysight.com/find/M9521A.
- 2 Select the M9521A menu and click the **Install Driver Software** button and follow the browser prompts to install the drivers you will need.

Launch the Soft Front Panel

As mentioned previously, you can use either the Web Interface or the soft front panel (SFP) to monitor the ASM. Note also that the soft front panel (SFP) provides more functionality than the Web Interface. To launch the SFP, click on the Windows **Start** button. Under **All Programs**, click on **Keysight**, then **AXIe System Module (M9521)**, then **AXIeSM SFP**.



Step 8. Next Steps

Now that you have completed basic ASM startup, Keysight recommends you read the *M9514A and M9521A User Guide*. That User Guide provides detailed information for using all of the features of the ASM such as the Status LED, triggering, the bidirectional ports, etc. To read the User Guide:

- 1 Insert the *AXIe Chassis and Controller Software and Product Information CD* in the host PC. If you do not have the CD or a CD drive on your PC, you can download the most recent version of the SFP and drivers at www.keysight.com/find/M9521A.
- 2 Select the M9514A menu (or the M9521A menu) and click the *M9514A and M9521A User Guide* link to access the document.

Host PC/Chassis Interface Topics

This section describes a number of host PC/ASM interface topics that may be of assistance in establishing a connection between the host PC and the ASM. Unless otherwise noted, these topics relate to interfacing to the ASM itself, not to other modules in the chassis slots.

- 1 If you are using an embedded controller such as the Keysight M9536A, communication with the ASM is through the chassis backplane; external PCIe and Ethernet connections from the embedded controller to chassis are not required.

NOTE

With the Keysight M9536A Embedded Controller installed in the AXIe chassis, do not connect any PCIe cables to the PCIe 1 or PCIe 2 connectors on the ASM.

- 2 If you are using an external desktop or rackmount PC as the host PC, you will need to install a compatible PCIe Cable Adapter in the PC.

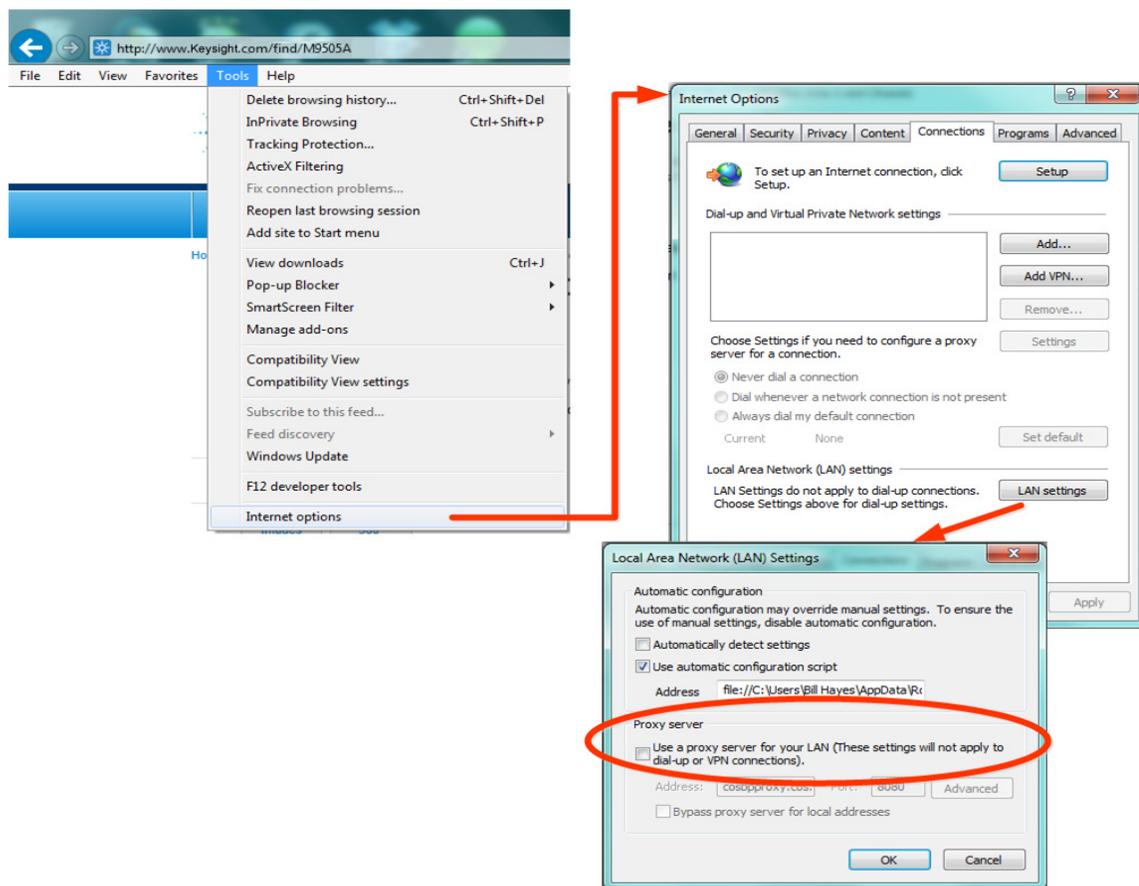
NOTE

If no embedded controller is installed in the chassis, PCIe1 connector is automatically configured as Upstream for connection to an external computer.

The following table lists compatible Keysight adapters and cable:

PCIe x8 Gen 2 Host Cable Adapter	Pass PCIe x8 Cable
Keysight M9048A	Keysight Y1202A (2 meters)

- 3 Network communications over PCIe uses the TCP/IP network protocol because the chassis PCIe endpoint is a Network Interface Controller (NIC). Therefore, when accessed over PCIe, the AXIe chassis will appear as a LAN device in Keysight Connection Expert. When accessed over LAN, the AXIe chassis will, as expected, also appear as a LAN device in Keysight Connection Expert.
- 4 Modules installed in the chassis slots that use the PCIe interface will be displayed by Keysight Connection Expert under the PXIO label, not under the LAN label.
- 5 For a PCIe connection to the chassis, a private IP address beginning with 169.254 will be assigned. If a direct LAN connection is made from the host PC to the chassis, a private IP address beginning with 169.254 will likewise be assigned.
- 6 If you have established a direct LAN connection to the chassis (establishing, for example, a private IP address of 169.254.1.0) and if your browser is configured to use a proxy server, your browser may not be able to display the chassis Web Interface. The example figure below shows how to bring up the **LAN Settings** dialog (in Internet Explorer 8) that is used to configure proxy server settings.



- 7 PCIe is logically an extension of the host PC backplane. If the PCIe interface is used to connect to the chassis, the chassis NIC appears to Windows as if it is installed directly in the PC.

If you are using the PCIe interface to connect to the Keysight AXIe chassis, an Intel PCIe-to-LAN network adapter in the chassis will appear to Windows as a locally installed device in your PC. Most Windows versions provide the necessary Intel network driver for this adapter.

However, if you see the 'Found New Hardware Wizard' dialog on your PC, and if the dialog indicates that software needs to be installed for an Ethernet Controller, you will need to install the Intel PROWin32.exe network driver on your PC. To install this driver, please see the Intel instructions for the PROWin32.exe driver.

If you are interfacing to the chassis using only its LAN interface, the PCIe-to-LAN network adapter will not be visible to your PC, and the aforementioned driver does not need to be installed.

- 8 If the chassis is connected only to LAN, the chassis will attempt to obtain an IP address using DHCP.
- 9 If both PCIe and LAN are connected to the chassis, the LAN VISA resource name is used to connect to the chassis.
- 10 Do not attach a LAN cable after communications has been established over the PCIe cable. Doing this will disrupt PCIe communications, and will not provide LAN communications – the chassis will become inaccessible and rebooting of the PC will be required to restore communications.

If you need both LAN and PCIe communications, connect *both* cables prior to powering-up the chassis.

- 11 If you have connected to the chassis using PCIe and/or LAN, and want to visually confirm that you are, in fact, communicating to the chassis that you believe you are communicating to, you can click the **Turn on Front Panel Identification Indicator** link on the Web Interface home page as highlighted below. This will flash the STATUS LED of the chassis you are interfacing to.

M9521A AXIe System Module (ASM)







Welcome to your _____

Web-Enabled M9521A AXIe System Module (ASM)

Information about this Web-Enabled M9521A:

Instrument:	M9521A
Serial Number:	TW44448888
Description:	M9521A AXIe System Module (ASM)
DNS Hostname:	A-M9521A-448888
IP Address:	156.140.94.115
mDNS Hostname:	A-M9521A-448888.local
mDNS Instrument Name:	Agilent M9521A AXIe System Module (ASM) - TW44448888
VISA TCPIP Connect String:	TCPIP::156.140.94.115::5025::SOCKET
Firmware Revision:	asm-2.3.11-A0010-B010e-C0114.0000-D1.9

 [Advanced information about this Web-Enabled M9521A](#)

Use the navigation bar on the left to access your M9521A and related information.



Turn On Front Panel Identification Indicator



Service And Support

If you need to return the module for service

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

- 1** Review the warranty information shipped with your product.
- 2** Contact Keysight to obtain a return authorization and return address. If you need assistance finding Keysight contact information go to www.keysight.com/find/assist (worldwide contact information for repair and service) or refer to the **Support** information on the product web page at: www.keysight.com/find/M9521A.
- 3** Write the following information on a tag and attach it to the malfunctioning equipment.
 - Name and address of owner. A Post Office box is not acceptable as a return address.
 - Product model number (for example, M9521A)
 - Product serial number (for example, TWXXXXXXXX). The serial number label is located on the side of the module.
 - A description of failure or service required.
- 4** Carefully pack the module in its original ESD bag and carton. If the original carton is not available, use bubble wrap or packing peanuts, place the instrument in a sealed container and mark the container "FRAGILE".
- 5** On the shipping label, write ATTENTION REPAIR DEPARTMENT and the service order number (if known).

NOTE

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

Keysight On The Web

You can find information about technical and professional services, product support, and equipment repair and service on the Web: <http://www.keysight.com>.

Select your country from the drop-down menu at the top. Under *Electronic Test and Measurement*, click on *Services*. The Web page that appears next has contact information specific for your country.

Keysight by phone

If you do not have access to the Internet, call one of the numbers in the table below:

Keysight Call Centers and Regional Headquarters	
United States and Canada:	Test and Measurement Call Center (800) 452 4844 (toll-free in US)
Europe:	(41 22) 780 8111
Japan:	Measurement Assistance Center (81) 0426 56 7832
Latin America:	305 269 7548
Asia-Pacific:	(85 22) 599 7777

Product Warranty

To find warranty information on your M9521A ASM, go to www.keysight.com/find/warranty and enter your model number in the **Product Number** field, and enter the serial number from the chassis rear panel in the **Serial No.** field.

Accessories

The following user-replaceable assemblies and accessories are available from Keysight. Only Keysight approved accessories shall be used:

Accessory	Keysight Model Number
Single Slot AXIe Filler Panel	Y1221A
AXIe MultiFrame Cable 0.5 m	Y1223A
AXIe MultiFrame Cable 3.0m	Y1223A

Other parts originally supplied with the AXIe System Module or chassis may be available from Keysight.

Safety-Related Specifications

This section provides a partial set of safety-related specifications for the Keysight M9521A AXle System Module. Complete specifications are included in the Keysight *M9514A AXle Chassis and M9521A AXle System Module Data Sheet*.

Module Characteristics	
Standards Compliance	AXle 1.0 and 2.0 Specifications
Module form factor	1-slot AXle
Size	30.5 mm W x 350.9 mm H x 292.4 mm D (1.2 in W x 13.8 in H x 11.5 in D)
Weight (nominal)	2.4 kg (5.3 lbs)
Chassis Compatibility	AXle System Module*

* Not compatible with M9502A or M9505A because these chassis do not have a system slot.

Environmental ^{*,†,‡}		
Operating and storage conditions		
	Operating	Storage
Temperature	0° C to 50° C	-25° C to 60° C
Altitude	up to 3000 meters	up to 4600 meters
Humidity	Type tested at 95%, +40° C (non-condensing)	

Vibration
Operating random vibration: type tested at 5 to 500 Hz, 0.21 g rms
Survival random vibration: type tested at 5 to 500 Hz, 2.09 g rms

* Characteristics apply to both M9514A and M9521A unless otherwise noted.

† Samples of this product have been type tested in accordance with the Keysight Environmental Test Manual and verified to be robust against the environmental stresses of storage, transportation and end-use; those stresses include but are not limited to temperature, humidity, shock, vibration, altitude, and power line conditions.

‡ Test methods are aligned with IEC 60068-2 and levels are similar to MIL-PRF-28800F Class 3.

Regulatory*

Safety

Complies with European Low Voltage Directive

IEC/EN 61010-1

Canada: CSA C22.2 No. 61010-1

USA: UL std no. 61010-1

EMC

Complies with European EMC Directive

IEC/EN 61326-1

CISPR Pub 11 Group 1, Class A

AS/NZS CISPR 11

ICES/NMB-001

This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme

Cet appareil ISM est conforme a la norme NMB-001 du Canada

* Characteristics apply to both M9514A and M9521A



This information is subject to change
without notice

© Keysight Technologies 2017

Edition 10, December 2017

Published in USA



M9521-90001

www.keysight.com