Startup Guide

Keysight M9502A 2-Slot and M9505A 5-Slot AXIe Chassis



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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

To prevent electrical shock, disconnect the instrument from mains before 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 a 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 a 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 AXIe 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 may display the following symbols:


Warning, risk of electric shock


The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to the instruction in the documentation.


Earth Ground.


Frame or chassis Terminal.


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
CAT II
CAT III
CAT IV

IEC Measurement Category I, II, III, or IV

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

ON position of the power line switch.


OFF position of the power line switch.


DC Voltage


Three-phase alternating current


Alternating Current (AC).


Standby Power. Unit is not completely disconnected from AC mains when switch is in standby.


Presence of a Laser device


Protective Conductor Terminal


Equipment is protected throughout by double or reinforced insulation


Protective Conductor Terminal



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.


The CE marking is registered trademark of the European Community (if accompanied by a year, it is the year when the design was proven). It indicates that the product complies with all relevant directives.



UK conformity mark is a UK government owned mark. When affixed to the product is declaring all applicable Directives and Regulations have been met in full.

ccr.keysight@keysight.com

The Keysight email address is required by EU directives applicable to our product.

CAN ICES/NMB-001(A)

Canada EMC label.
Interference-Causing Equipment Standard for industrial, scientific and medical (ISM) equipment. Matériel industriel, scientifique et médical (ISM)



CE/ICES/ISM Label.
This is a space saver label that combines three markings - CE with CAN ICES (see above) and ISM (see below).


The RCM mark is a registered trademark of the Australian Communications and Media Authority.



This is a combined marking to indicate product compliance with the Industry-Canadian Interference-Causing Equipment Standard (ICES/NMB-001). This is also a symbol of an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 5).

Safety Symbols (continued)

ISM 1-A

This is a symbol of an Industrial Scientific and Medical Group 1 Class A product. (CISPR 11, Clause 5)

South Korean Certification (KC) mark. It includes the marking's identifier code.

A 급 기기 (업무용 방송통신기자재)
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China Restricted Substance Product Label. The EPUP (environmental protection use period) number in the center indicates the time period during which no hazardous or toxic substances or elements are expected to leak or deteriorate during normal use and generally reflects the expected useful life of the product.



Universal recycling symbol. This symbol indicates compliance with the China standard GB 18455-2001 as required by the China RoHS regulations for paper/fiberboard packaging.

IP x y

This mark indicates product has been designed to meet the requirements of "IP x y", where "x" is the solid particle protection and "y" is the liquid ingress protection.



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

This WEEE 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.

To return unwanted products, contact your local Keysight office, or for more information see http://about.keysight.com/en/companyinfo/environment/takeback.shtml.

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M9502A and M9505A AXIe Chassis
Startup Guide

Introduction

The Keysight M9502A (2-slot) and M9505A (5-slot) AXIe chassis are modular instrument chassis fully compatible with the AXIe 1.0 specification. They allow multiple application-specific instrument modules to share a common chassis frame, power supply, cooling system, PCI Express (PCIe) Gen 2 data bus, Gigabit LAN hub, local bus for module-to-module signaling, and host PC connections. Multiple chassis may be interconnected for scalability, a feature Keysight calls MultiFrame. The full rack chassis provides two or five general purpose peripheral slots that accept 1U AXIe instrument modules. Each module slot has a Gen 2 x4 link (maximum of 2 GB/s data rate per module) to the chassis primary data 'fabric' hub—a x8 PCIe switch and data bus.

Both chassis include a half-height Embedded System Module (ESM), which is a system module which manages chassis functions. The ESM provides all ATCA (Advanced Telecommunications Computing Architecture) shelf manager functions, plus 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
- provides backplane PCIe and Ethernet communication between modules

NOTE

A NOTE calls the user's attention to an important point or special information in the text. This version of the M9505A/M9502A Startup Guide supports and describes features of the chassis firmware revision 1.3.23 (and later). This version of firmware adds features that were not available in previous firmware versions. Refer to the M9502A/M9505A User Guide for detailed information. These features include, but are not limited to:

- **Support for E-Keying**
- **Fan speed adjustable from 35 to 100 (previously it was 8 to 15)**
- **Ability to force the ESM to PCIe Gen 1 speeds**

To identify the chassis firmware revision, see "Launch the Chassis Web Interface from Keysight Connection Expert" on page 26.

To update chassis firmware, refer to the Keysight AXIe chassis web pages:
www.keysight.com/find/M9502A or www.keysight.com/find/M9505A

Other than a Power button and instrument status light, all monitoring, control and communication with the chassis requires a *host PC*. This can be an *embedded* PC specifically designed for use in an AXIe chassis (such as the Keysight M9536A) or *remote* (a rackmount, desktop, or laptop PC).

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

NOTE

In order for a computer to serve as a host PC, its BIOS must support enumeration of the PCIe slots in the AXIe chassis; 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.

For general host PC requirements, such as operating system and RAM requirements, please refer to "System Requirements" on page 21.

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

This Startup Guide provides the basics to get you started with your AXIe chassis, including:

- A high-level overview of the 2-slot and 5-slot AXIe chassis and basic nomenclature
- Unpacking the contents and planning your installation
- Connecting to a host PC
- Loading software
- Verifying basic chassis operation

Detailed instructions for installation, configuration, operation, troubleshooting and service can be found in the *M9502A/M9505A AXIe Chassis User Guide*, provided in PDF format on the *Software and Product Information* CD. Note that you must specifically request this CD when you ordered your chassis.

NOTE

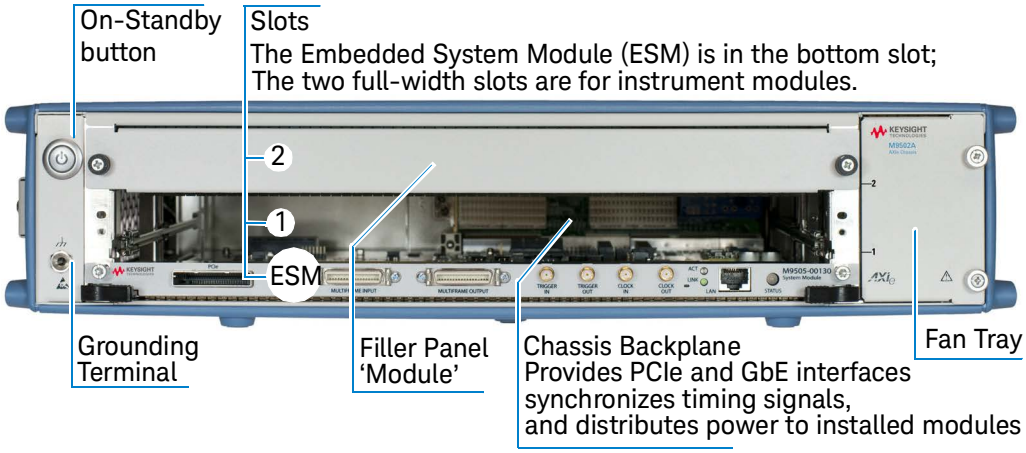
IMPORTANT: The installation and setup information in this manual is generic. Some AXIe modules and systems require a different installation and setup procedure than described in this manual. Refer to the installation documentation supplied with your AXIe module and or system for detailed installation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

For example, installation of the Keysight IO Libraries ("Step 5: Install IO Libraries Suite and Connect to the Web Interface" in this manual) is not required for all AXIe systems.

M9502A 2-Slot AXIe Chassis at a Glance

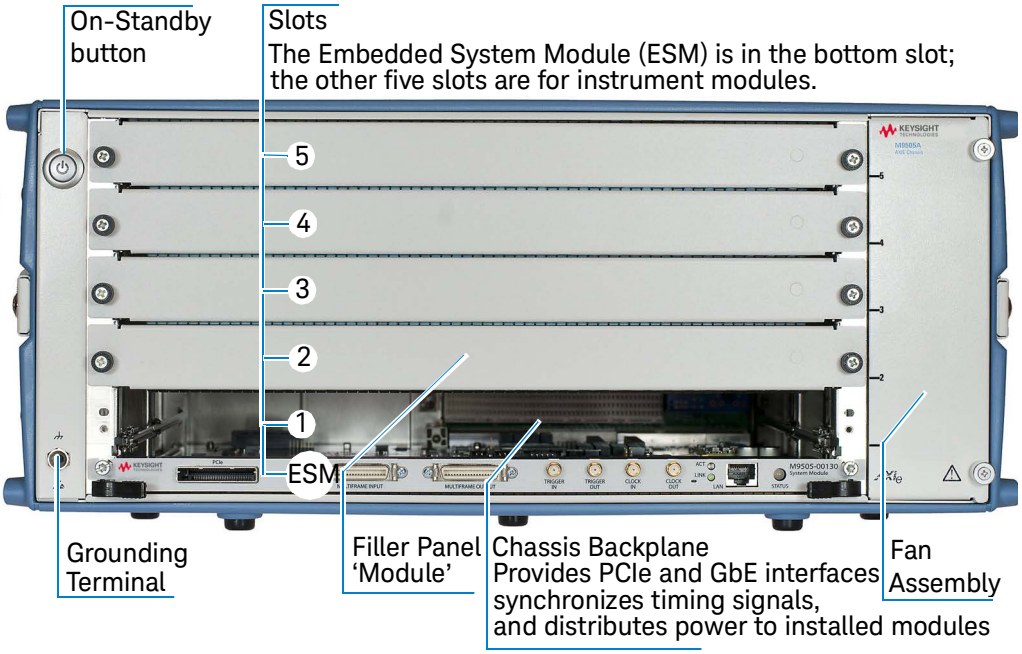
Designed for portable or small system testing, the M9502A is shipped with bumpers and a carry handle installed for benchtop use (these remove for rack mounting), Slot 1 open and a filler panel module installed in Slot 2. The front panel is shown below:

Front Panel

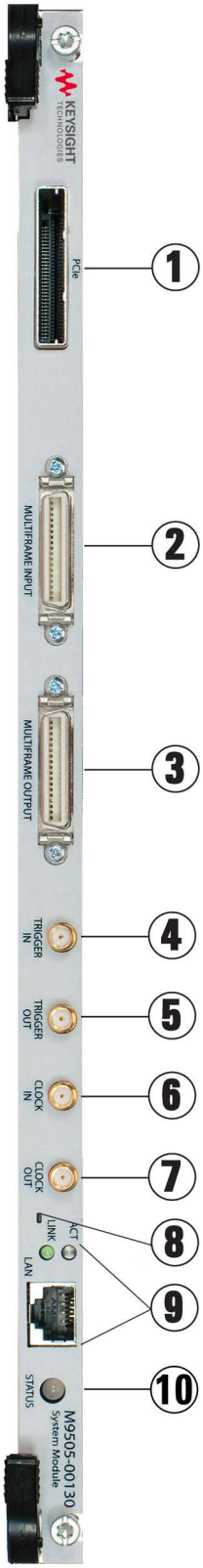


M9505A 5-Slot AXIe Chassis at a Glance

The M9505A is shipped with bumpers and two carry handles installed for benchtop use (these remove for rack mounting), Slot 1 open and filler panel modules installed in Slots 2 through 5. The front panel is shown below:



AXIe Embedded System Module (ESM)



The ESM is installed in a half-height slot at the base of the chassis. It performs the following functions:

- tracks inserted modules and manages power requirements
- monitors chassis temperature and controls variable-speed chassis fans
- monitors module sensors and reports component failures to a system log
- acts as a Gigabit Ethernet switch; forwards frames along 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

ESM Front Panel

1	PCIe	Connects a remote host PC to the chassis via PCIe. Gen 2 compliant PCIe x8 connector.
	MULTIFRAME	Synchronizes timing signals with multiple daisy-chained chassis (either 2-slot or 5-slot). 36-pin mini D connectors use accessory Keysight cables.
2	INPUT	Gets timing signals from the previous chassis.
3	OUTPUT	Provides timing signals to the next chassis. If this chassis is at the head of the chain, it becomes the master, using an internal or external clock to send timing signals to other chassis in the chain.
	TRIGGER	External trigger connections. SMA connectors with ESD suppression.
4	IN	Accepts an external trigger. Adjustable threshold input range -5V to +5V, 250 mV minimum swing.
5	OUT	Extends the parallel trigger bus to external instruments. 3.3V CMOS, 50W line drive, 3-state.
	CLOCK	External clock connections. SMA connectors with ESD suppression.
6	IN	Accepts an externally sourced timing input. Input range -5V to +5V, AC coupled, unterminated, 100 mV minimum swing.
7	OUT	Extends the internal clock source to external instruments. 3.3V CMOS, 50W line drive, 3-state.
8	RESET	Reset chassis. Insert a small pin, hold until Status light turns amber, remove pin.
9	LAN	Connects the host PC to the chassis, RJ45 connector. Tri-rate 10/100/1000 Base-T, auto crossover. Green LINK light and amber ACT light indicate power and port activity. An embedded controller module does not use this port; it communicates with the ESM through the chassis backplane. The LAN port is for communication with the AXIe chassis, not individual modules.
10	STATUS Light	The status indicator light is a bi-color LED. Green indicates normal operation. Red indicates a power-up error. Both lights on (amber) indicates the chassis is powered on and booting.

AXIe Embedded System Module (ESM) Option U20 with USB



The Option U20 ESM provides the same features as the standard ESM and adds a USB 2.0 port*.

NOTE **The USB port is supported only for specific Keysight AXIe modules and software. Refer to the and documentation for the supported modules and software for USB use and operating instructions.**

This USB port provides the following features:

- It enables using the AXIe chassis and the supported USB compatible AXIe modules and software with any host controller that has a USB 2.0 port.
- Either the USB port or the PCIe port may be used -- but not both simultaneously. To change connectivity between USB and PCIe, power down the chassis and host PC. Connect either a USB or PCIe cable, but not both. Power up the system.
- USB provides easy PC connectivity and uses less expensive and longer cables than PCIe. USB is physically hot pluggable, however you must restart the software controlling the module(s) when a USB connectivity change is made. You do not need to reboot the chassis or host PC.
- USB provides control for the chassis and a number of Keysight modules. Please refer to module datasheets and documentation to determine if a particular module is supported. USB-compatible and PCIe compatible modules cannot be used at the same time. If you are controlling an AXIe module via USB, you must change cable connections and reboot the host PC before controlling an AXIe module via PCIe.

STOP!

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

The USB port is supported only through specific Keysight software applications and modules such as the Keysight logic and protocol analyzer software and modules. These AXIe systems that use the USB port may require a different installation and setup procedure than described in this manual. Refer to the installation documentation supplied with your AXIe module or system for detailed installation information.

CAUTION **Some AXIe test system software applications, such as the Keysight logic and protocol analyzer software and modules, sets and uses specific trigger lines in the AXIe chassis. Do not use the AXIe chassis Soft Front Panel (SFP) software or the AXIe chassis web interface to set or reroute any of the AXIe chassis trigger lines. Rerouting any of the trigger lines may cause the application software to not function correctly.**

* The USB port requires AXIe chassis firmware 1.3.37 or later. Refer to M9502A/M9505A User Guide.

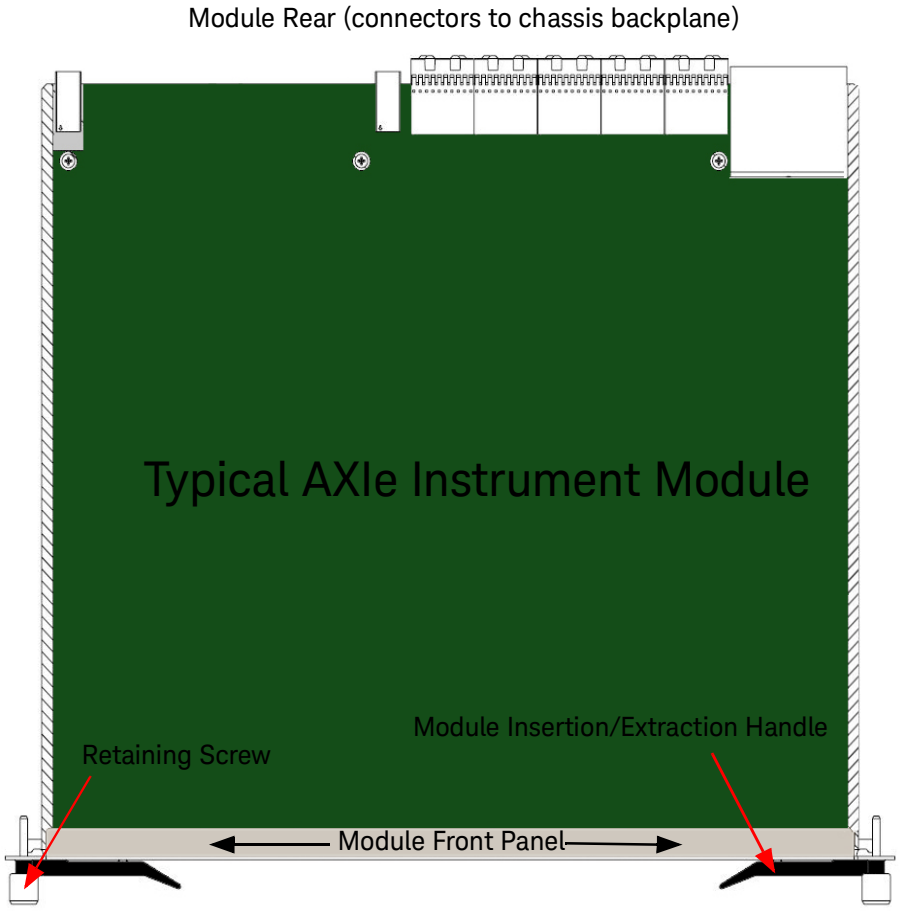
AXIe Instrument Modules

The chassis slots accept AXIe instrument modules. These may comprise one or more instruments for signal injection, data acquisition, and measurement. They can be installed in any available AXIe slot.

There are two special types of instrument modules which, if used, are most typically installed in slot 1 (consult the module vendor for specific slot placement requirements).

- An instrument hub module – a specialty instrument module which also acts as a hub for a secondary vendor-defined data fabric.
- *An embedded controller module* – this is a host PC with a form factor and backplane connections specifically designed for an AXIe chassis such as the Keysight M9536A. It uses the chassis backplane for PCIe and LAN connection to the ESM.

The drawing below illustrates the AXIe module's general layout, backplane connections and chassis fasteners, viewed from the top.



Test connections are made at the module's front panel. The front panel and backplane connectors will vary depending on the module.

AXIe System Block Diagram

A block diagram of a M9505A 5-slot AXIe chassis system is presented on page 7, showing the chassis and the host PC. The key points regarding this diagram are:

- The diagram shows the two host PC interfaces to the chassis: (1) The PCIe interface and (2) the LAN interface. The PCIe interface signals are routed through the chassis PCIe Switch to the slot x4 PCIe signals. The LAN interface signals are routed through the LAN Switch to the slot Gb Ethernet signals. The PCIe interface signals can also be routed to the slot Gb signals (through the network interface card and the LAN Switch). However, the LAN interface signals cannot be routed to the slot x4 PCIe signals.
- The network interface card (NIC) is an Intel 82573L NIC. The PCIe Switch and the NIC provide an x1 path from the chassis PCIe interface to the LAN Switch and, ultimately, the Shelf Manager (described further below).

NOTE

If you're using the PCIe interface to connect to the chassis, the Intel 82573L NIC will appear to Windows as a locally-installed device. While Windows Vista and Windows 7 provide the necessary Intel NIC driver, Windows XP does not natively include the required Intel NIC driver. If you're using the PCIe interface on Windows XP and you see the Found New Hardware Wizard shown on the block diagram, you'll need to install the Intel PROWin32.exe network driver as described in "Step 5: Install IO Libraries Suite and Connect to the Web Interface" on page 21 in this guide.

- Either the M9045 PCIe ExpressCard Adapter or the M9048 PCIe Desktop Adapter are installed in the host PC to provide a PCIe interface. The M9045 PCI Express Card Adapter is used in laptop computers and the M9048 PCIe Desktop Adapter is used in desktop or rack-mount computers. A PCIe cable connects the adapter to the AXIe chassis. For LAN access, a standard Ethernet cable is used to connect between the host PC and the chassis.
- The chassis contains a processor called the *Shelf Manager* that monitors the status of the chassis sensors and the module sensors over the Intelligent Platform Management Bus (IPMB). The Shelf Manager also controls the fan speeds and provides the chassis Web Interface. The Web Interface allows you to use your browser to monitor the status of the chassis and configure certain aspects of chassis operation, such as the trigger subsystem.
- The chassis supports a soft front panel (SFP). The SFP runs on the host PC and provides the same monitor and control functionality as the Web Interface.
- Keysight provides two host PC drivers for the AXIe chassis:

1 **AgM950x** – Also known as the *sensor driver*, this driver interfaces to chassis sensor functionality such as the voltage threshold sensors.

2 **AgM950xSC** – Also known as the *trigger driver*, this driver interfaces to chassis functionality such as the trigger subsystem Crosspoint Switch.

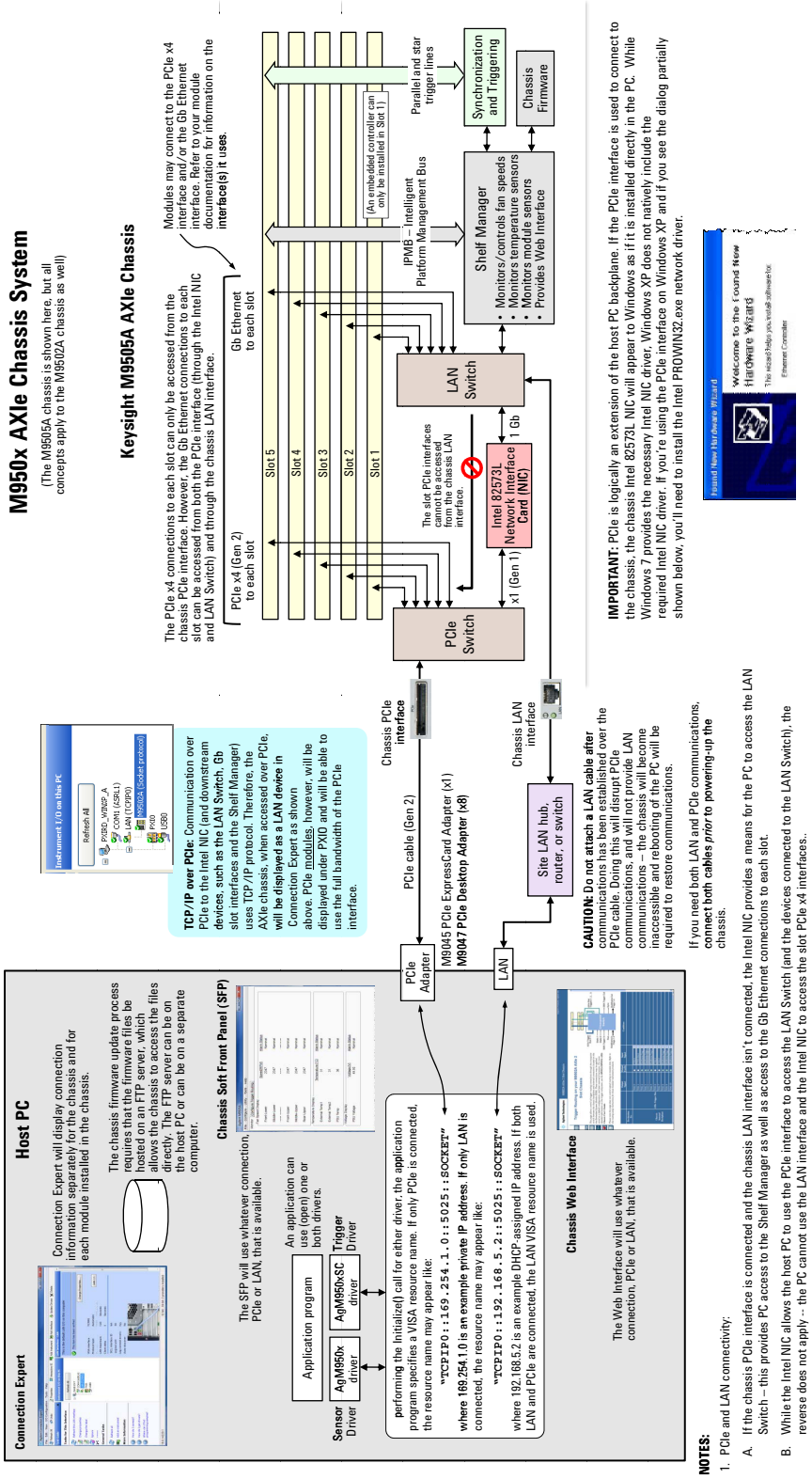
For further information on these drivers, please see the *User Guide*.

- The chassis contains firmware that is customer upgradeable. To determine the current version of your chassis firmware and to check if a later version is available, go to the website below for your product, then click the tabs/links indicated:

M9502A: www.keysight.com/find/M9502A, then Technical Support > Drivers & Software > Firmware Update

M9505A: www.keysight.com/find/M9505A, then Technical Support > Drivers & Software > Firmware Update

The Firmware Update web page also describes how to download and install the chassis firmware.


M950x AXIe Chassis System
(The M9505A chassis is shown here, but all concepts apply to the M9502A chassis as well)
Keysight M9505A AXIe Chassis
Host PC
Connection Expert
Connection Expert will display connection information separately for the chassis and for each module installed in the chassis.
The chassis firmware update process requires that the firmware files be hosted on an FTP server, which allows the chassis to access the files directly. The FTP server can be on the host PC or can be on a separate computer.
Chassis Soft Front Panel (SFP)
The SFP will use whatever connection, PCIe or LAN, that is available.
Application program
AgM950x driver
AgM950xSC driver
Sensor Driver
Trigger Driver
An application can use (open) one or both drivers.
performing the Initialize() call for either driver, the application program specifies a VISA resource name. If only PCIe is connected, the resource name may appear like:
"TCPIP0::169.254.1.0::5025::SOCKET"
where 169.254.1.0 is an example private IP address. If only LAN is connected, the resource name may appear like:
"TCPIP0::192.168.5.2::5025::SOCKET"
where 192.168.5.2 is an example DHCP-assigned IP address. If both LAN and PCIe are connected, the LAN VISA resource name is used.
Chassis Web Interface
The Web Interface will use whatever connection, PCIe or LAN, that is available.
PCIe Adapter
LAN
PCIe cable (Gen 2)
M9045 PCIe ExpressCard Adapter (x1)
M9047 PCIe Desktop Adapter (x8)
Chassis PCIe interface
Chassis LAN interface
Site LAN hub, router, or switch
TCP/IP over PCIe: Communication over PCIe to the Intel NIC (and downstream devices, such as the LAN Switch, Gb slot interfaces and the Shelf Manager) uses TCP/IP protocol. Therefore, the AXIe chassis, when accessed over PCIe, will be displayed as a LAN device in Connection Expert as shown above. PCIe modules, however, will be displayed under PXI0 and will be able to use the full bandwidth of the PCIe interface.
Instrument I/O on this PC
Refresh All
PCIE0_VXI0* A
COM1 (ASRL1)
LAN (TCPIP0)
M9502A (Socket protocol)
PXI0
(GPIB)
The PCIe x4 connections to each slot can only be accessed from the chassis PCIe interface. However, the Gb Ethernet connections to each slot can be accessed from both the PCIe interface (through the Intel NIC and LAN Switch) and through the chassis LAN interface.
PCIe x4 (Gen 2) to each slot
Gb Ethernet to each slot
Modules may connect to the PCIe x4 interface and/or the Gb Ethernet interface. Refer to your module documentation for information on the interface(s) it uses.
Slot 5
Slot 4
Slot 3
Slot 2
Slot 1
(An embedded controller can only be installed in Slot 1.)
IPMB – Intelligent Platform Management Bus
Parallel and star trigger lines
Shelf Manager
• Monitors/controls fan speeds
• Monitors temperature sensors
• Monitors module sensors
• Provides Web interface
Synchronization and Triggering
Chassis Firmware
PCIe Switch
LAN Switch
The slot PCIe interfaces cannot be accessed from the chassis LAN interface.
Intel 82573L Network Interface Card (NIC)
x1 (Gen 1)
1 Gb
CAUTION: 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.
IMPORTANT: PCIe is logically an extension of the host PC backplane. If the PCIe interface is used to connect to the chassis, the chassis Intel 82573L NIC will appear to Windows as if it is installed directly in the PC. While Windows 7 provides the necessary Intel NIC driver, Windows XP does not natively include the required Intel NIC driver. If you're using the PCIe interface on Windows XP and if you see the dialog partially shown below, you'll need to install the Intel PROWIN32.exe network driver.
Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
This wizard helps you install software for:
Ethernet Controller
NOTES:
1. PCIe and LAN connectivity:
A. If the chassis PCIe interface is connected and the chassis LAN interface isn't connected, the Intel NIC provides a means for the PC to access the LAN Switch – this provides PC access to the Shelf Manager as well as access to the Gb Ethernet connections to each slot.
B. While the Intel NIC allows the host PC to use the PCIe interface to access the LAN Switch (and the devices connected to the LAN Switch), the reverse does not apply – the PC cannot use the LAN interface and the Intel NIC to access the slot PCIe x4 interfaces..
2. PCIe Generation ("Gen") 1 peak speed is 2.5 Gb/s per lane. PCIe Gen 2 peak speed is 5.0 Gb/s per lane. Taking into account encoding and other overhead, typical Gen 2 performances in MB/s and GB/s are as follows for x1, x4 and x8: x1: 500 MB/s x4: 2 GB/s x8: 4 GB/s
3. The PCIe Switch internal buffering allows the chassis to communicate to the host PC at 4 GB/s, and simultaneously communicate at 2 GB/s to each of two x4 module slots. Factoring in certain overheads, nominal data rates of 1.85 GB/s per slot can be achieved.
Situations where the above dialog won't be displayed include:
1. If a Windows XP-based host PC contains Intel-based networking, the required Intel NIC driver will likely already be installed – if so, the above dialog won't be displayed.
2. If you're connected to the chassis using only the LAN interface, the NIC will not be visible to the Host Controller PC and the above dialog won't be displayed.

Performing the Startup Steps

The remainder of this Startup Guide describes how to unpack and inspect the chassis, connect it to a host PC, power-up the chassis and verify basic operation. It is not necessary to install modules or device drivers to do this.

Exception: If you decide to use an embedded controller module, such as Keysight's M9536A, as your Host PC, you will need to install it before proceeding to Step 3. Module installation instructions are in the *User Guide*.

Keysight recommends you follow these steps in preparing and turning on the chassis:

Step 1: Unpack and Inspect the Chassis

Step 2: Verify Shipment Contents

Step 3: Power-Up and Power-Down

Step 4: Set Up the Host PC

Step 5: Install IO Libraries Suite and Connect to the Web Interface

Step 6: Install the Chassis Software

Step 7: Next Steps

In Step 7, you will download the *M9502A/M9505A AXIe Chassis User Guide*. Continue with the User Guide to complete installation, learn the chassis's features and operation, and access service information.

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 ("Step 5: Install IO Libraries Suite and Connect to the Web Interface" in this manual) is not required for all AXIe systems.

This product has been designed and tested in accordance with accepted industry standards and has been supplied in a safe condition. The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

WARNING

Use Keysight supplied power cord or one with same or better electrical rating.

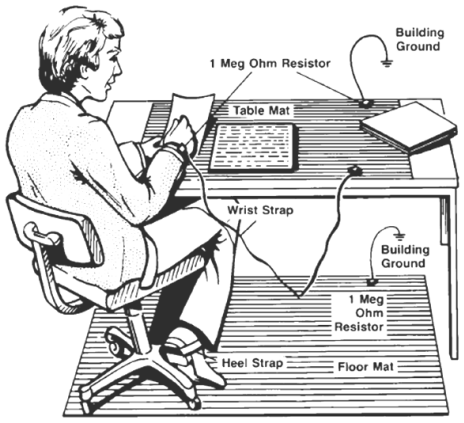
Step 1: Unpack and Inspect the Chassis

CAUTION **Keysight's AXIe chassis and instrument modules are shipped in materials which prevent static electricity damage. These instruments 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 installed.**

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 MW of isolation from ground.

Inspect for damage

After unpacking the chassis, carefully inspect it for any shipping damage. Report any damage to the shipping agent immediately, as such damage is not covered by the warranty.

To find warranty information on your M9502A or M9505A AXIe chassis, go to www.keysight.com/find/warranty and enter your model number (`M9502A` or `M9505A`) in the **Product Number** field, and enter the serial number from the chassis rear panel in the **Serial No.** field.

CAUTION **To avoid damage when handling the AXIe chassis and modules, do not touch exposed connector pins.**

If You Should Need to Return the Chassis for Service

Should you need to return the chassis for service, follow these steps:

1. Review the warranty information for your product.
2. Contact Keysight to obtain a Return Material Authorization (RMA) 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/axie-chassis.
3. Write the following information on a tag and attach it to the malfunctioning equipment.
   - Name and return address of owner. A Post Office box is not acceptable as a return address.
   - Product model number (for example, `M9502A`)
   - Product serial number (for example, `TWxxxxxxxx`). The serial number label is located on the chassis back panel. The serial number can also be read via LAN interface, but only after the software is installed.
   - *Completely describe the failure and service required.* Provide as much detail as possible about your chassis and host PC configuration, the nature of the problem and the conditions under which it occurred.
4. Carefully pack the chassis 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

Your shipment should include the following:

Chassis The Keysight chassis that you ordered. Any AXIe modules you may have ordered from Keysight do not come pre-installed; they will be in separate shipments. When shipping the M9502A/M9505A AXIe Chassis, use original packaging or comparable to avoid damage to the product.

Chassis Power Cord For country of destination.

Startup Guide This document, *AXIe Chassis*, in print.

Software CD (optional, must be ordered when ordering chassis) *Keysight M9502A and M9505A AXIe Chassis Software and Product Information.* This CD covers both the 2-slot and 5-slot AXIe chassis, and includes:

- Keysight M9502A/M9505A AXIe Chassis Startup Guide

  This document (printable PDF).
- *Keysight M9502A/M9505A AXIe Chassis User Guide*

  A complete guide for chassis installation, configuration, operation, troubleshooting and service (printable PDF).
- *Keysight M9502A/M9505A Data Sheet*.

  The Data Sheet contains complete physical and electrical specifications for the chassis (printable PDF).
- Chassis device drivers
- Help files for the Keysight M9502A/M9505A IVI-COM/C AgM950x and AgM950xSC device drivers (CHM files)
- Help file for the Keysight M9502A/M9505A LabVIEW G device drivers (CHM file)

  The interactive help provides instruction for programming the chassis using National Instruments LabVIEW.
- Chassis soft front panel (SFP) and its help file

Product specifications, available accessories, firmware and software may change over time. Please check the Keysight website at www.keysight.com/find/axie-chassis for the latest updates to the product software, guides, data sheet and help files.

Step 3: Power-Up and Power-Down

Circuit Breaker

The chassis circuit breaker is a toggle switch, marked OFF (O) when open and ON (I) when closed:



Circuit Breaker Open (OFF)



Circuit Breaker Closed (ON)

ON/STANDBY Switch

The chassis' button on the front of the chassis is the **ON/STANDBY** switch, lit when the chassis is ON:



STANDBY
(off if power is disconnected or breaker is open)



ON

Power Modes

The chassis has three power modes:

OFF With the power cord removed or the circuit breaker in the open position, the chassis is OFF.

STANDBY With the power cord connected, the circuit breaker closed, and the front panel switch in the standby (not depressed) position, the chassis is in STANDBY mode. Although no power is supplied to the ESM and installed modules when in Standby, the chassis is energized and consumes power. Fans may operate.

ON With the power cord attached, circuit breaker closed, and the front panel switch in the ON (depressed) position, the chassis is ON. Power is supplied to the ESM and installed modules. Fans will operate as dictated by chassis thermal load.

To Power Up the Chassis

Plug-In Chassis Using the supplied cord, connect the chassis to an appropriate AC power main. Use with a ground-fault circuit interrupter (GFCI) is not recommended.

Close Circuit Breaker Close the rear panel circuit breaker (ON position).

Press On/Standby Button Press the chassis' ON/STANDBY switch. It should light when depressed

The STATUS light on the ESM will cycle as follows:

1. Light off - with button in STANDBY mode
2. Amber, steady - after pressing switch, ESM is performing a power-on self-test
3. Green, blinking - for a few seconds after POST
4. Green, steady - successful chassis power-up is complete

1 

2 

4 

If the chassis does not power up to a steady green Status light, or powers up to a steady red light as shown below, the chassis has a failure and requires service.



To Power Down the Chassis

For routine power-down or to cycle power to the chassis, press the chassis **ON/STANDBY** switch. The main chassis fans will gradually drop in speed to off, and the power supply unit (PSU) fans will gradually return to idle speed as the PSU cools. This is normal.

CAUTION **If you are using an embedded controller such as the Keysight M9536A, always shut down the Windows operating system before pressing the chassis ON/STANDBY switch.**

CAUTION **For routine power-down, do not use the circuit breaker to turn the chassis off. Doing so interrupts power to the power supply fans, which may shorten the life of the PSU. Use the front panel On/Standby switch to power down the unit, and allow the PSU fans to return to idle before removing power from the chassis.**

Once the chassis has cooled, you may isolate the chassis from AC power as needed. This is usually done by opening the circuit breaker.

Step 4: Set Up the Host PC

Communication with the Embedded System Module (ESM) 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 module*) allows for mainframe portability and stand-alone test system operation. PCIe and LAN connections from PC to ESM are made directly at the chassis backplane.

NOTE If you decide to use an embedded controller module as your host PC, you will need to install at least that module in the chassis before proceeding with this section. See the *M9502A/M9505A AXIe Chassis User Guide* for complete 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 ESM 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.

A laptop PC. To use the chassis PCIe data transfer capabilities, this PC must have an ExpressCard slot and support proper enumeration of devices on the PCIe bus. PCIe connection from laptop to ESM requires an ExpressCard PCIe cable adapter and cable. Keysight recommends use of a laptop, 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 adapter 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. For the recommended PCIe host adapter cards and cables, see page 18.

General controller requirements (such as operating system and RAM) are listed in "System Requirements" on page 21.

CAUTION You should not enable the Microsoft Windows sleep or hibernate modes on the host PC. The controller may not have 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 host PC and the chassis Embedded System Module (ESM) should be made with both the PC and chassis powered off.**

Physical connections to the host PC may include monitor, mouse, and keyboard; LAN and/or PCIe (to the AXIe chassis); and corporate LAN. Make the following connections as needed.

For Local Control

If you need local access to the host PC, connect a monitor, mouse, and keyboard.

For Remote Control

If you need remote desktop access to the host PC, connect a cable from the PC to your corporate LAN, using Gigabit Ethernet cable.

From AXIe Chassis to the Host PC

The connection between the chassis and the host PC may vary depending on whether you're performing chassis turn-on or using the chassis in production:

- **Turn-on:** Keysight recommends that you make a LAN-only connection to the chassis for initial turn-on — 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 ESM with a crossover Gigabit Ethernet cable, or can be connected through your network with a straight Ethernet cable.
- **Production:** The production connection between the host PC and the chassis depends on your application. For LAN instrument modules or LXI instrument support, connect the host PC to the ESM directly with a crossover Gigabit Ethernet cable, or through your network with a straight cable.

If you're using PCIe modules in the chassis, use the chassis PCIe interface. This will require installing a PCIe adapter card in the host PC. As described in section "AXIe System Block Diagram" on page 7, the PCIe interface may be used to access both the slot PCIe interfaces and the slot Gb interfaces. However, the chassis LAN interface cannot access the slot PCIe interfaces.

For PCIe cable recommendations, see "Specific PCIe Adapter and Cable Recommendations" on page 18. The PCIe adapter card will likely require that you load its device driver for your Windows environment, perhaps before installing the adapter card. Follow the adapter vendor's installation instructions.

NOTE

As shown on the AXIe system block diagram, an Intel network interface card (NIC) is connected to the PCIe switch in the chassis. The NIC will appear to the PC as if it is installed in the PC itself. Therefore, an Intel network driver must be installed on the PC in order for PCIe interface communications through the NIC to work. This driver is not automatically installed for Windows XP Operating systems. Refer to "Install Intel Network Driver on Windows XP, if Needed" on page 24 for installation information.

The chassis supports hybrid operation with both types of modules (PCIe and LAN) installed in the chassis. If needed or desired for flexibility, make both PCIe and Ethernet connections.

Specific PCIe Adapter and Cable Recommendations

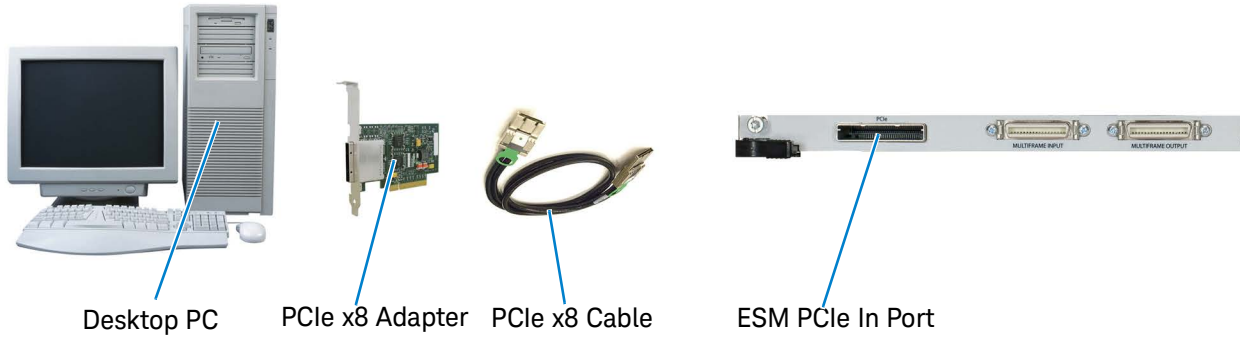
If Using an Embedded Controller This PC (such as the Keysight M9536A) communicates with the ESM through the backplane; external PCIe and Ethernet connections from embedded controller to chassis are not required.

NOTE

With the Keysight M9536A Embedded Controller installed in the AXIe chassis, the x8 PCIe connection on the ESM module is disabled. However, the PCIe cable detect mechanism may reset the hardware when attaching a PCIe cable. This hardware reset may change the LAN (TCPIP) address.

The main power cord is the system disconnecting device. It disconnects the mains circuits from the main supply.

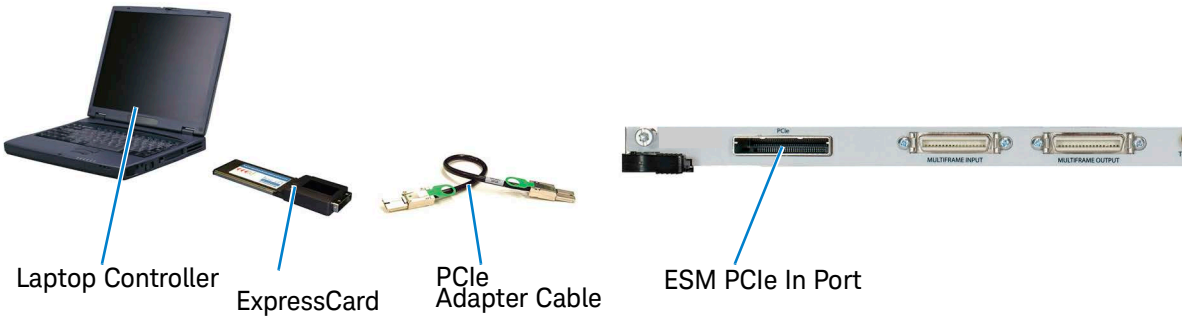
If Using a Desktop or Rackmount PC Install a compatible PCIe Cable Adapter in the PC. Connect the adapter to the ESM PCIe port.



The following *desktop* PCIe adapter card and cable are recommended:

Keysight M9048	Keysight Y1202A (2 meters)

If Using a Laptop PC Install a compatible PCIe ExpressCard Adapter in the laptop PC. Connect the adapter to the ESM on the AXIe chassis.

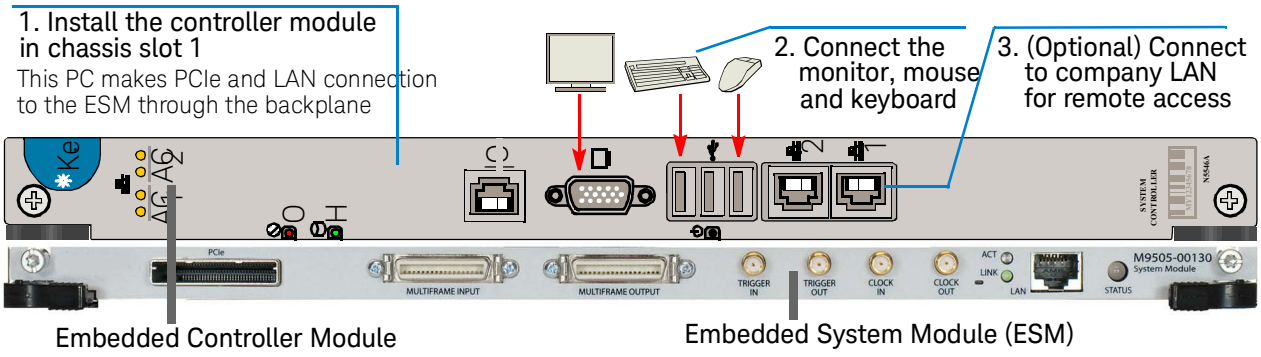


The following *laptop* PCIe adapter card and cable are recommended:.

Keysight M9045	Keysight Y1200A (2 meters)

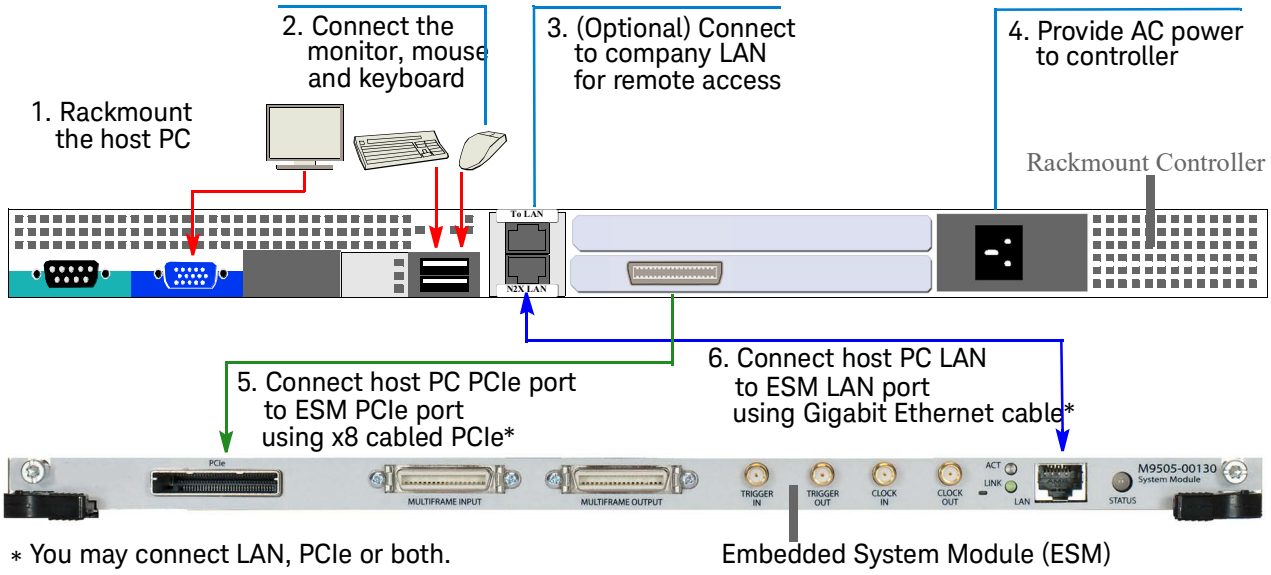
Connection Examples

Example A: Connecting an Embedded Controller



WARNING The main power cord is the system disconnecting device. It disconnects the mains circuits from the mains supply.

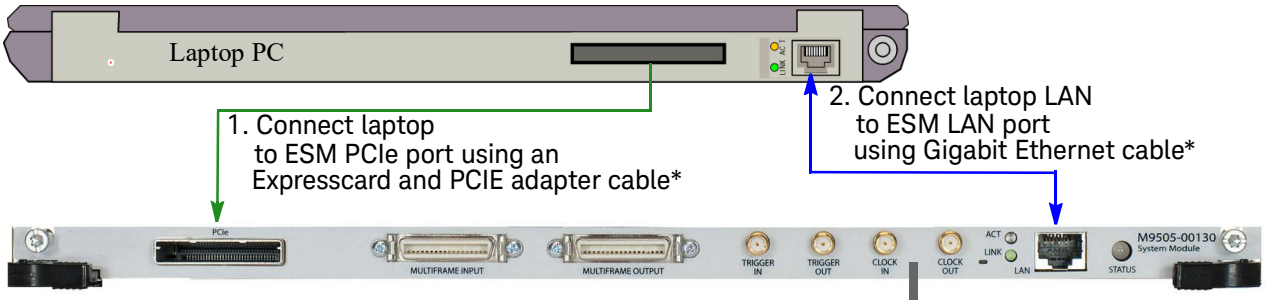
Example B: Connecting a Separate, Rackmounted Host PC (desktop PC is similar)



* You may connect LAN, PCIe or both.

Embedded System Module (ESM)

Example C: Connecting a Laptop PC



* You may connect LAN, PCIe or both.

Embedded System Module (ESM)

Step 5: 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.

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.

As described in section AXIe System Block Diagram on page 7, you can use either the Web Interface or the soft front panel (SFP) to monitor and control the chassis. 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 *M9502A/M9505A AXIe Chassis User Guide*.

System Requirements

To install and run the required software (Microsoft .NET, Keysight IO Libraries, and chassis device drivers), the host PC will need:

Operating System	Win XP SP3 32bit Win 7 SP1 32/64bit Win 8.1 32/64bit
Browser	
Minimum RAM	4 GB
Available Hard Disk Space	
Graphics	Support for DirectX 9 graphics with 128MB graphics memory recommended

Installing the Keysight IO Libraries Suite

Note that IO Libraries Suite version 18.2 or later is required to access the chassis features. We recommend that you always use the latest version of Keysight IO Libraries.

NOTE Only one installation of the Keysight IO Libraries Suite is required on the host PC. This installation is used by both the M950x 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. Download teh latest versin of IO Libraries Suite from: 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.

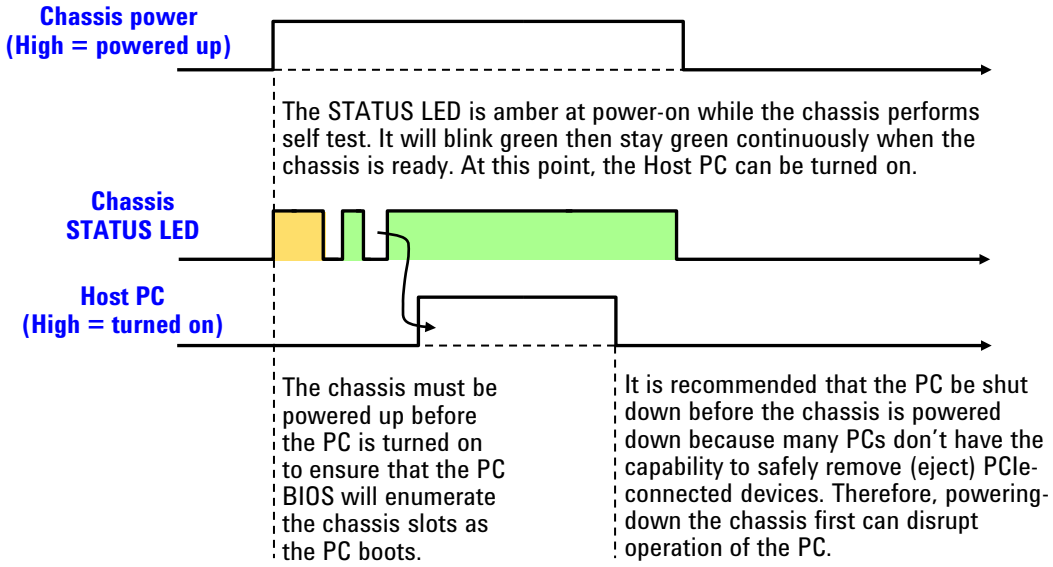
NOTE The latest version can be downloaded from: www.keysight.com/find/iosuite.

Turning on the Chassis

In powering the chassis up or down, please follow the steps listed in "Step 3: Power-Up and Power-Down" on page 14 and the sequences shown below.

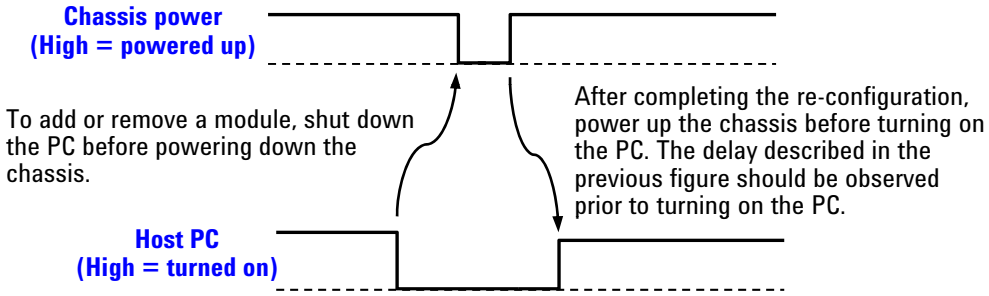
CAUTION

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 ESM is ready. The ESM then powers up each module slot. The PC should be turned on only after all installed modules have performed their initialization—see your module documentation for initialization information.



In brief, the host PC must be off whenever the chassis is powered up or down. The power sequencing shown above doesn't apply to an embedded controller (because an embedded controller and chassis are powered simultaneously).

In the figure below, the previous diagram is applied to the situation where the chassis configuration is changed. Because modules are not hot-swappable, the chassis must be powered down before modules are added or removed. As you can see, the host PC is shut down before the chassis is powered down, and then the PC is turned on after the chassis is powered up.



There are other situations where a host controller restart may need to be performed, including:

- When Windows detects the presence of a new module (that is a new module was added to the chassis without powering down the PC)
- When Keysight Connection Expert fails to detect the presence of the chassis
- Whenever you detect or suspect that the host PC has an incorrect view of how the chassis is configured

Install Intel Network Driver on Windows XP, if Needed

As described in the section "AXIe System Block Diagram" on page 7, the chassis contains an Intel 82573L NIC as a PCIe endpoint. This NIC will appear to Windows as a device installed directly in the host PC. While Windows Vista and Windows 7 provide the necessary Intel NIC driver, Windows XP does not natively include the NIC driver and you will be prompted to install it during the driver installation. If you are using the chassis on Windows XP and if you see the dialog partially shown below, you'll need to install the Intel PROWin32.exe network driver.



To install the Intel PROWin32.exe driver, perform the following steps:

1 Run the PROWin32.exe installation program from either:

Program Files/Keysight/M950x/Network Driver/Windows XP
(for 32-bit Windows XP systems)

2 After driver installation is complete, restart your PC. The Ethernet Controller **Found New Hardware Dialog** should no longer appear.

Using Keysight Connection Expert to Confirm Connection to the Chassis

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

NOTE This section assumes Keysight IO Libraries Suite version 18.2 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 will 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 Intel 82573L NIC as a chassis PCIe endpoint.

NOTE The section "Host PC/Chassis Interface Topics" on page 29 includes a number of interface topics that may be of assistance in establishing a connection between the host PC and the chassis.

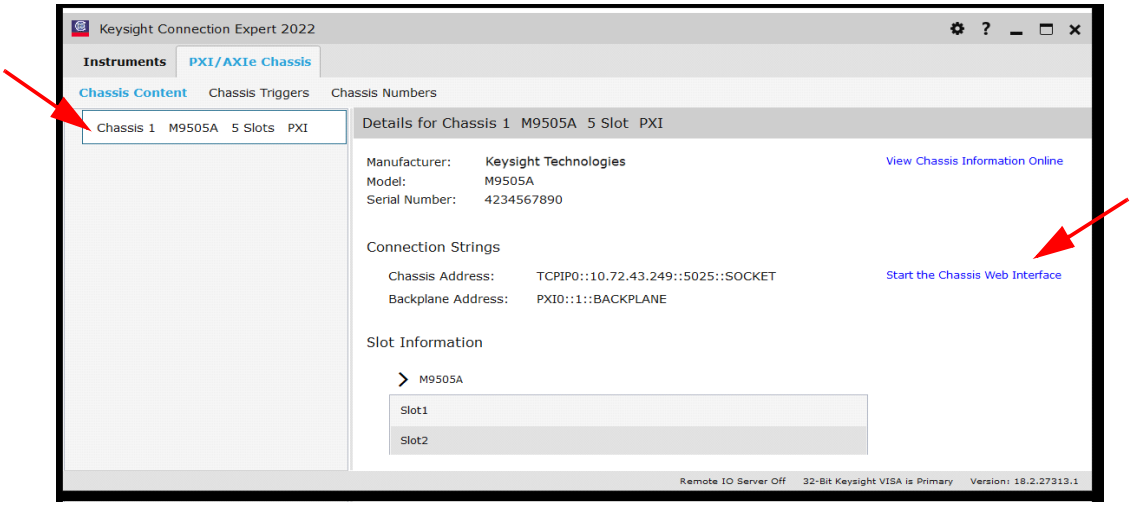
1 Launch *Keysight Connection Expert* using one of these methods:

- From the Windows Start menu, select **All Programs\Keysight IO Libraries Suite\ Keysight Connection Expert** to launch the program.
- 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:



2 The **Instrument I/O on this PC** pane shows instrument connections on your PC. Note that the AXIe chassis (M9505A in this screen capture) is listed under the PXI0 Interface and the LAN (TCPIP0) interface. You may need to manually add it to the LAN interface.

Launch the Chassis Web Interface from Keysight Connection Expert

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

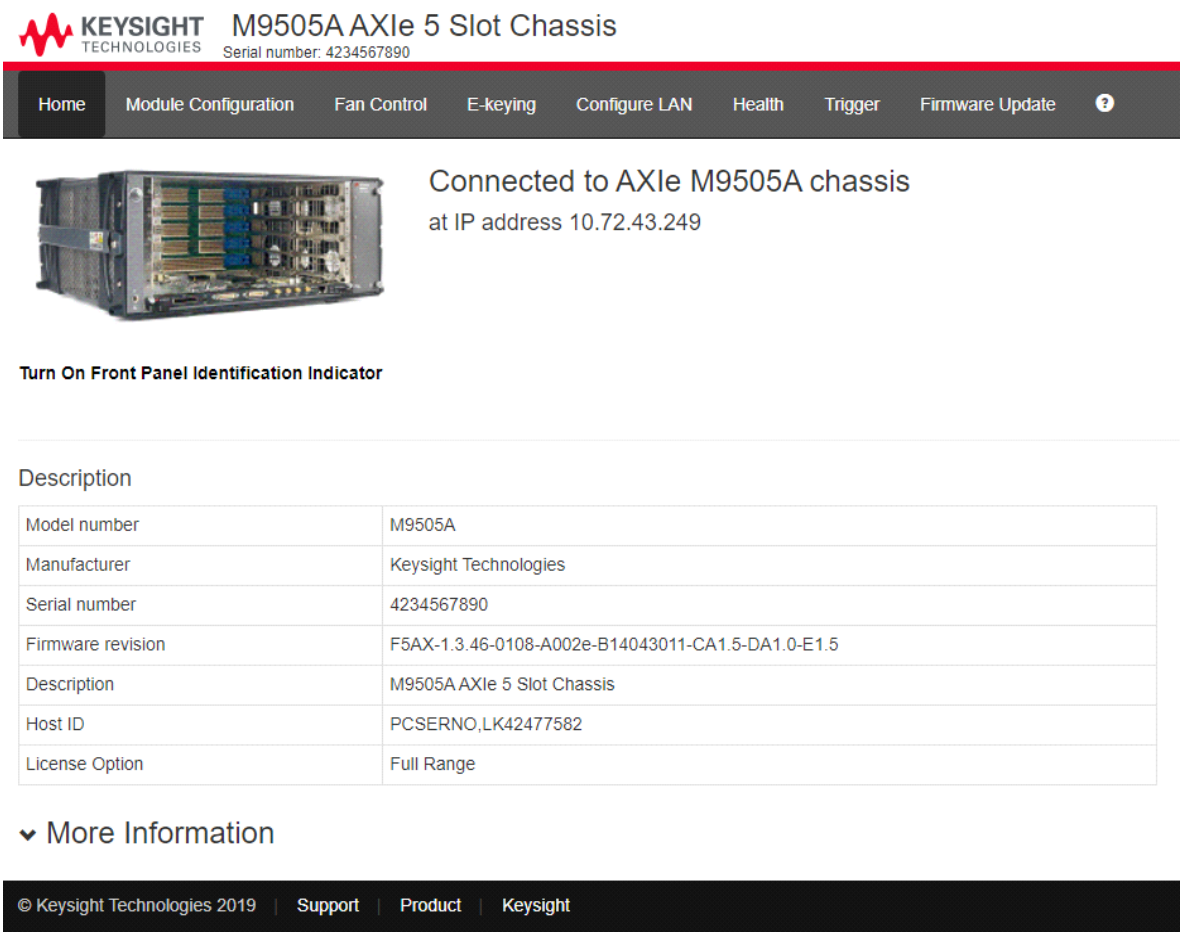
1 To launch the Chassis Web Interface, click the 

button. The Web Interface will be displayed in a new window:

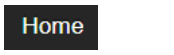
NOTE If IO Libraries Suite is not installed, access to the Web interface is through your browser using the default local address: 169.254.1.0

NOTE If you have problems launching the chassis Web interface, check your browser's proxy settings. When Keysight Connection Expert launches a web interface for a chassis, 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 chassis and the connection to the chassis.



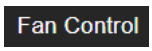
The nine buttons at left are the Web Interface's menu: At right is a brief description of what you can do on each page.



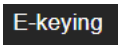
Home Page - View General Information about the chassis, such as product identification, firmware version and LAN parameters.



Module Configuration Page - View Manufacturer, Revision / Part Number and Serial Number for the chassis frame, AXIe System Module (ASM) and any instrument modules installed in the chassis.



Fan Control Page - Display the fan operating level for module cooling.



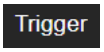
E-keying Page - View the connection protocols each module has with other modules in the chassis over the backplane.



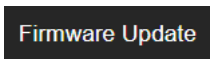
Configure LAN Page - View network and PCIe configuration parameters of the instrument.



Chassis Health Page - Displays read-only diagnostic information on chassis fan speed, voltage rails, and temperature sensors. It also allows you to set a minimum chassis fan speed and provides a link to update chassis firmware.



Trigger Routing Page - View static trigger routing through the Embedded System Module (ESM), using the AXIe chassis crosspoint switch.



Firmware Update Page - To update the chassis firmware on M9502A 2-slot and M9505A 5-slot AXIe chassis, which includes the Embedded System Module (ESM) and chassis backplane.



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

The *M9502A/M9505A User Guide* has a chapter covering the Web Interface, with examples showing all parameters you can view or configure.

Step 6: Install the Chassis Software

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

1 Insert the *AXIe Chassis Software and Product Information* CD in the host PC. If you do not have the CD, you can download the most recent version at www.keysight.com/find/axie-chassis.

2 Click the **Install Driver Software** button and follow the browser prompts to install the drivers you will need.

The *User Guide* describes how to bring up the SFP and how to get started with programming the chassis.

Step 7: Next steps

Now that you have completed basic Startup, Keysight recommends you access and read the *User Guide*. To do so:

1 Insert the *M9502-10001 AXIe Chassis Software and Product Information* CD in the host PC.

When the Software and Product Information CD screen loads, note that the chassis literature is listed at center. You may access all chassis documentation—both CD-based and via Internet links—from the links in this screen.

2 Click the **User Guide** link to access the document.

Host PC/Chassis Interface Topics

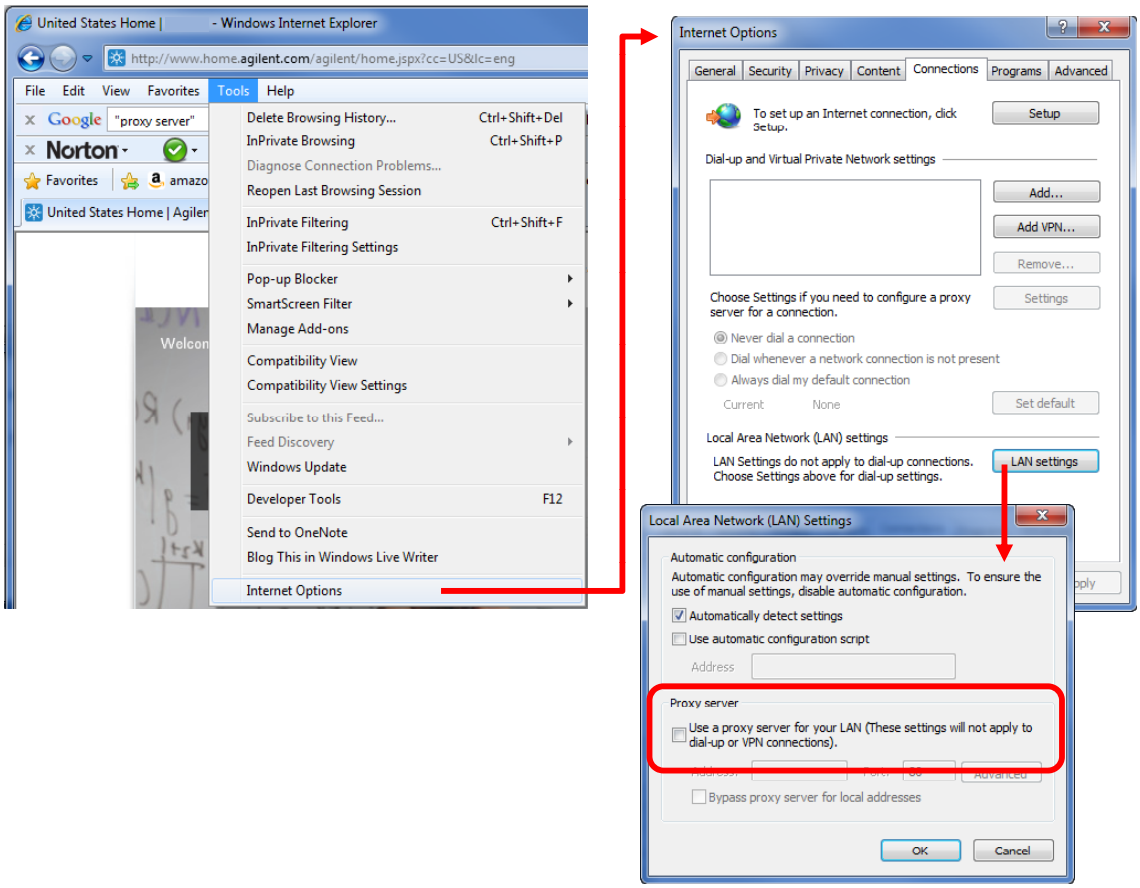
This section lists a number of host PC/chassis interface topics that may be of assistance in establishing a connection between the host PC and the chassis. Unless otherwise noted, these topics relate to interfacing to the chassis components themselves, such as the ESM, not to modules in the chassis slots.

NOTE **The LAN connection to the ESM provides communication to the chassis only -- chassis firmware updates, using the web interface to monitor and control the chassis, etc. It does not provide communication with individual AXIe modules. Use the PCIe connection to control individual AXIe modules.**

1 Chassis communications over PCIe uses the TCP/IP network protocol because the chassis PCIe endpoint is an Intel 82573L 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.

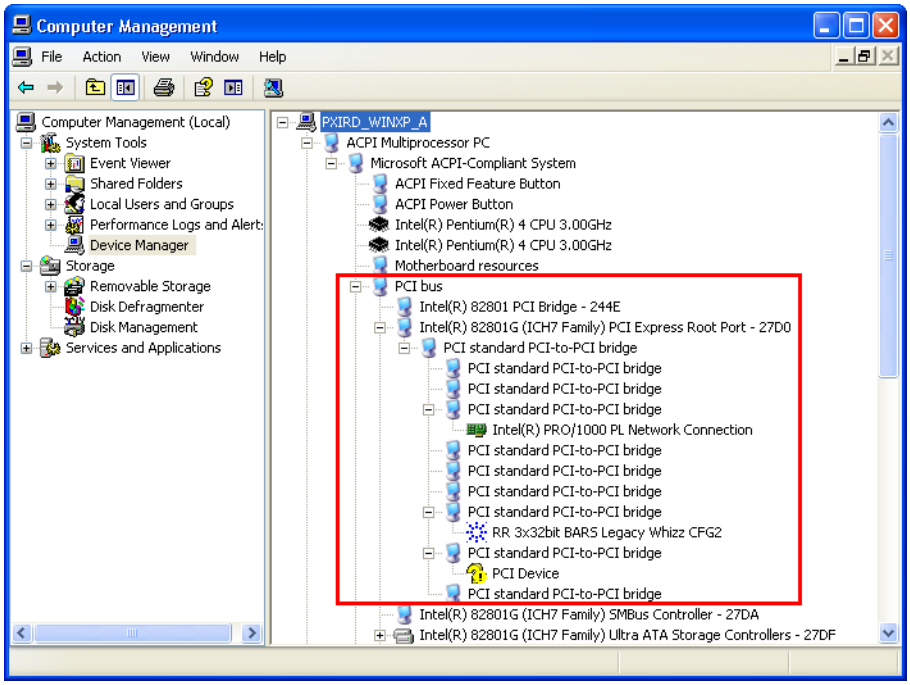
2. Modules installed in the chassis slots that use the PCIe interface will be displayed by Keysight Connection Expert under the PXIO label, not under the LAN label.
3. For a PCIe connection to the chassis, a private IP address beginning with 169.254 will be assigned. If a direct LAN connection is made from the host PC to the chassis, a private IP address beginning with 169.254 will likewise be assigned.
4. The LAN port is used for controlling and monitoring the chassis (i.e., monitoring chassis temperatures, monitoring/setting chassis fan speeds, and setting chassis routing). It is not intended for controlling AXIe modules. The PCIe port is provided for module data transfer and control.
5. 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.



6 PCIe is logically an extension of the host PC backplane. If the PCIe interface is used to connect to the chassis, the chassis Intel 82573L NIC will appear to Windows as if it is installed directly in the PC. While Windows Vista and Windows 7 provide the necessary Intel NIC driver, Windows XP does not natively include the required Intel NIC driver.

If you're using the PCIe interface on Windows XP and if the **Found New Hardware Wizard** dialog appears indicating that an "Ethernet Controller" needs software installed, you'll need to install the Intel PROWin32.exe network driver as described in "Install Intel Network Driver on Windows XP, if Needed" on page 24.

7 The example window below shows the Device Manager view of the PCI bus for an M9502A chassis that contains one recognized PCIe module (the Keysight module), one unrecognized PCIe module ("PCI Device"), plus the Intel NIC. This window was displayed by selecting **Devices by connection** under the Device Manager **View** drop down menu. This information can be useful in both verifying connection to the chassis (the Intel NIC) and verifying connection to the modules installed in the chassis.



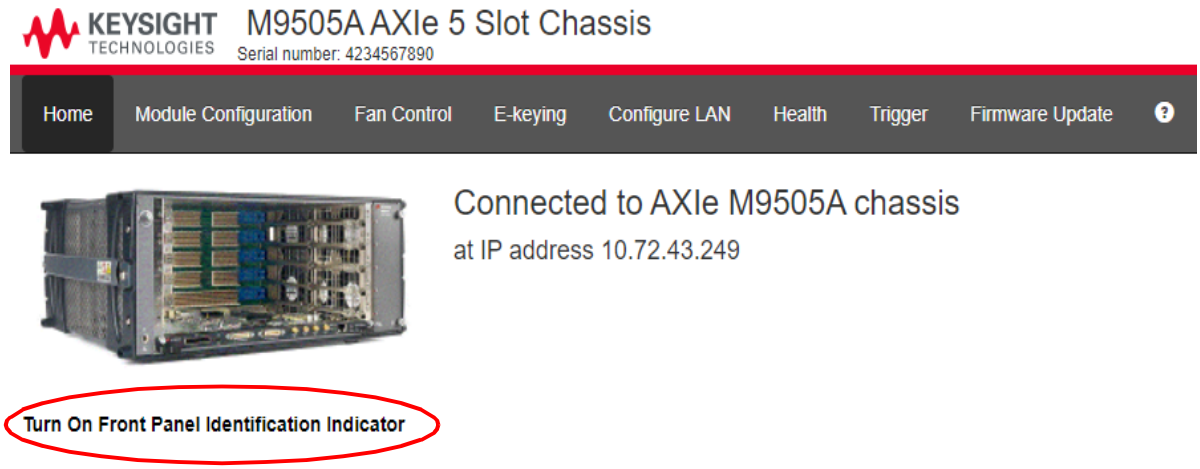
8 If the chassis is connected only to LAN, the chassis will attempt to obtain an IP address using DHCP.

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, interfacing to the chassis that you believe you are interfacing 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.



Safety-Related Specifications

This section (next page) provides a partial set of safety-related specifications for the Keysight M9502A and M9505A AXIe chassis. Complete specifications are included in the Keysight *M9502A/M9505A Data Sheet*.

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.

Regulatory

Safety	
Conforms to the following:	Complies with the essential requirements of the European Low Voltage Directive as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity): - IEC/EN 61010-1 - Canada: CSA C22.2 No. 61010-1 - USA: UL std no. 61010-1
EMC	
Conforms to the following:	Complies with the essential requirements of the European EMC Directive and the UK Electromagnetic Compatibility Regulations 2016 as well as current editions of the following standards (dates and editions are cited in the Declaration of Conformity): - IEC/EN 61326-1 - CISPR Pub 11 Group 1, class A **CAUTION:** This equipment is not intended for use in residential environments and may not provide adequate protection to radio reception in such environments. - AS/NZS CISPR 11 - CAN ICES/NMB-001(A) This ISM device complies with Canadian ICES-001. Cet appareil ISM est conforme a la norme NMB-001 du Canada.

Operating Conditions

Temperature	Humidity	Altitude
0°C to 50°C	*Maximum Relative Humidity (non-condensing): 95%RH up to 40°C, decreases linearly to 57%RH at 50°C*	up to 3000 meters

* From 40°C to 50°C, the maximum% Relative Humidity follows the line of constant dew point

WARNING M9502A and M9505A are rated as a Pollution Degree 2, Installation Category II.

Chassis Weight

Chassis	Weight (as shipped, no modules)	Weight (maximum, all slots filled)
M9502A	7.7 kg	15.7 kg
M9505A	13.3 kg	33.3 kg

AC Power Supply Requirements

	M9502A	M9505A (Serial Number TW51150212 and earlier)		M9505A (Serial Number TW51160201 and later)
Operating voltage range:	100-240VAC	100-120VAC	200-240VAC	100-240VAC
Input frequency range:	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Input power consumption:	800 VA	865 VA	1350 VA	1280VA
Overcurrent protection:	auto recovery	auto recovery		auto recovery
Efficiency (typical):	85-90%	85-93%		85-93%

NOTE The instrument can operate with mains supply voltage fluctuations up to ± 10% of the nominal voltage.

Chassis Power Dissipation

Airflow	Direction
Slot airflow direction	Right to left
Chassis cooling intake	Right side of chassis
Chassis cooling exhaust	Left side of chassis
Power dissipation, per instrument slot	200W maximum* see table below

DC Power Supply Output

	M9502A	M9505A (Serial Number TW51150212 and earlier)	M9505A (Serial Number TW51160201 and later)
DC Output	50V	52V	52V
Total DC Power	520W	100VAC - 120VAC: 680 W 200VAC - 240VAC: 1020 W*	100-240VAC: 1020W*

* M9505A configurations that consume more than 850W (200-240V) or 400W (100-120V) total power across all 5 slots may experience occasional system reset if installed in environments prone to line voltage dropouts in excess of 20ms. In such an event, the PC controlling the chassis will require a restart of reboot. To avoid system resets due to line dropouts, use an uninterruptable power supply.

WARNING The Mains wiring, and connectors shall be compatible with the connector used in the premise electrical system. Failure to ensure adequate earth grounding by not using the correct components may cause product damage, and serious injury.

This information is subject to change without notice
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