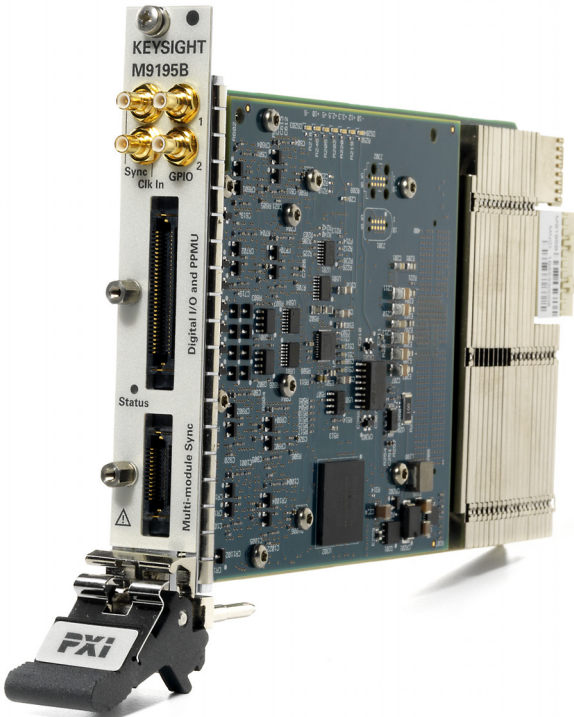


Startup Guide

Keysight M9195A/B PXIe
Digital Stimulus/Response with
PPMU: 250 MHz, 16 channel



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Manual Part Number

M9195-90002

Edition

Sixth Edition, September 2021

Printed in Malaysia

Published by

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

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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

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.

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

CE ICES/NMB-001
ISM GRP 1-A

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.



MSIP-REM-Kst
-BLM9195A

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) 전자파적합기
기로서 판 매자 또는 사용자는 이 점을 주
의하시기 바라 며 , 가정외의 지역에서
사용하는 것을 목적으 로 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.



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M9595A/B PXIe Digital Stimulus/Response Startup Guide

Product Overview

The M9195A and M9195B modules are PXIe Digital Stimulus/Response (DSR) modules. Both offer:

- 16 bidirectional channels with per-pin programmable logic levels
- High speed pattern application and clock rates up to 250Mz
- Flexible, per-bit timing control for fast and accurate waveform development
- Per-pin Parametric Measurement Unit (PPMU) for each channel
- Single site (up to 16 channel) and multi-site (up to four, 4-channel) configurations
- Edit patterns on the fly, without recompiling and downloading the test
- Ability to execute patterns in arbitrary order
- Flexible allocation of deep pattern memory, per channel or per site
- 4 high voltage channels for usages such as flash programming or fuse test
- 4 open drain auxiliary output pins for usages such as fixture relays
- Channel delay adjustment to compensate for cable and fixture propagation delays
- Comprehensive software tool set for quick test development



M9195A versus M9195B

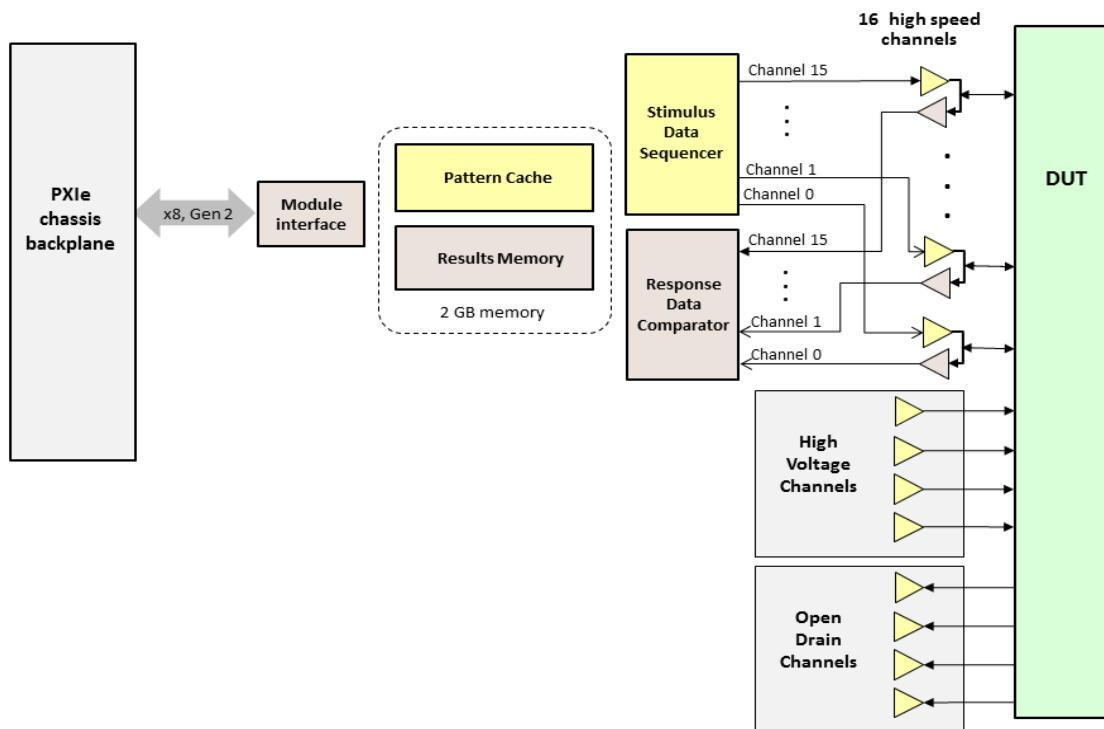
The main distinction is that the M9195B with the multi-module options can support up to 12 synchronized modules handling patterns of up to 192 channels. The M9195B also supports hardware option upgrade licensing.

Common M9195A/B Functionality

The Keysight M9195A and M9195B are ideal for digital integrated circuit design validation and production test environments. Both modules provide fundamental automated test environment features such as high speed pattern application rates up to 250 MHz, per-pin programming of voltage levels, real time compare, per-pin parametric measurement unit (PPMU), deep vector memory, and flexible pattern sequencing. The 16 channel, single-slot PXIe module introduces a high performance pattern sequencer which enables very powerful pattern creation, multiple drive edges per cycle, and supports up to four independent multi-sites to enable quick test development. The M9195A/B modules also provides automatic response delay cable compensation.

Functional Overview

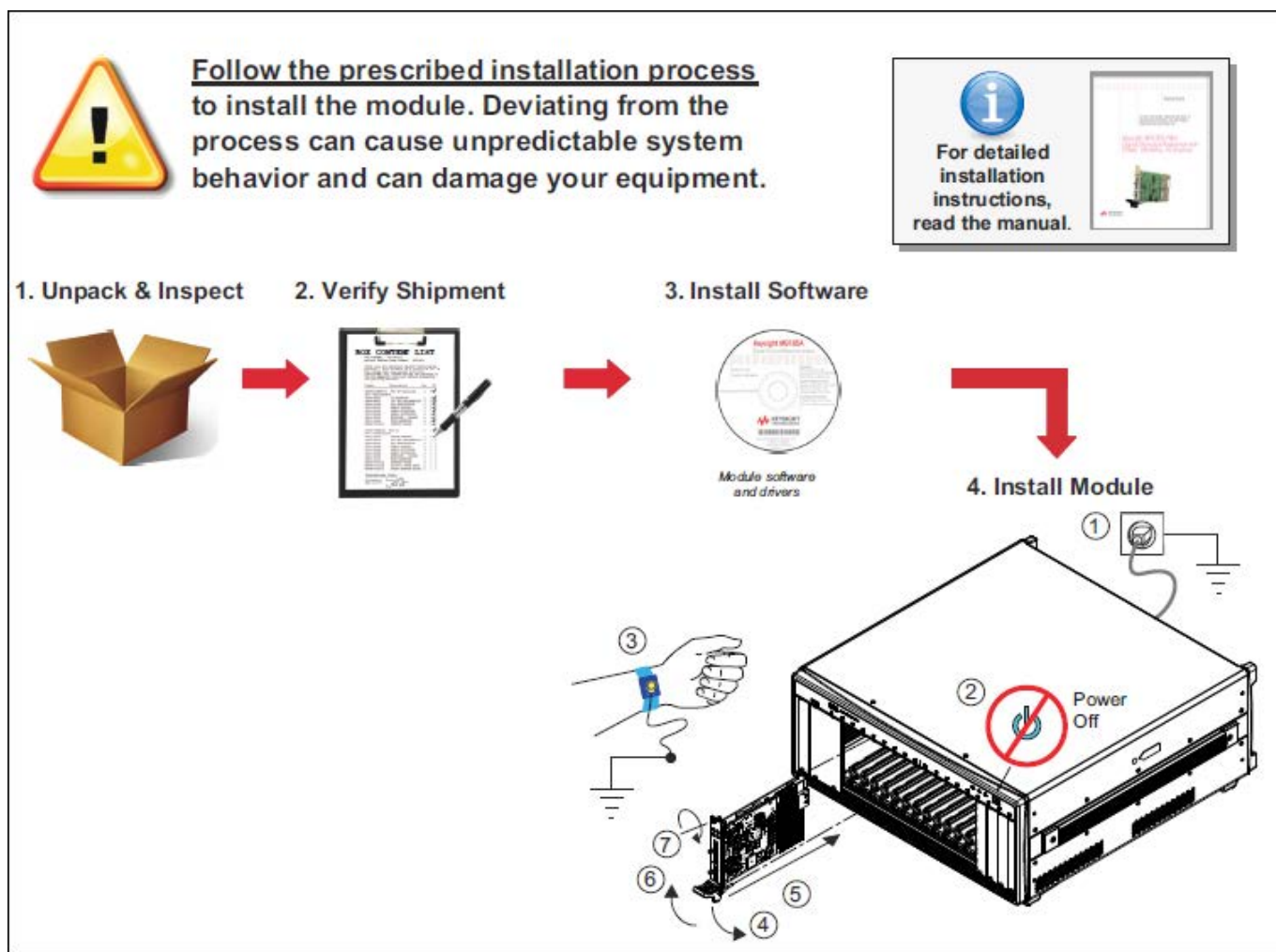
At its most basic level, the M9195A/B DSR modules deliver test vectors to a DUT at up to 250 MHz and compares responses to expected values. Each of 16 channels can be configured for PPMU operation. Four high voltage, and four open drain channels are also available.



Follow the Startup Sequence

WARNING

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



Related Documentation

Manuals and Help Systems

Other Keysight PXI and PXIe Modular Systems

www.keysight.com/find/pxi

M9195A/B Documents and Help Systems

- **Introduction:** This document summarizes current information on the M9195A/B modules including:
 - current release details
 - hardware and software requirements
 - known issues

To see if a later version of this document is available refer to the section in it entitled: *Obtaining the latest KtMDsr Driver and Introduction*.

NOTE

Check the Document Libraries for [M9195A](#) and [M9195B](#) to look for more recent versions of the documents and help systems listed here.

-
- **User Guide:** This document describes the DSR architecture and presents the DSR theory of operation. Configuring and executing the different types of sites are described, plus Information is presented on the different pattern file types.
 - **Programming Guide:** This help system provides overview material for programmers as well as detailed reference material on IVI C and IVI COM APIs for the M9195A/B.
 - **Soft Front Panel (SFP) Help file:** This help systems supports the use of the Software Front Panel. It is inter-linked with the Programming Guide.
 - **LabVIEW Driver Help:** Supports LabVIEW driver for M9195A/B.
 - **Specification Guide:** Contains technical specifications for all manufacturing versions of the M9195A/B PXIe Digital Stimulus/Response module. Specifications published in the data sheet only apply to the current manufacturing version of the module.
 - **Security Guide:** This document details the internal memory locations of the M9195A/B PXIe Digital Stimulus/Response module. It describes instrument security features and the steps necessary to declassify the products through memory sanitization or removal.

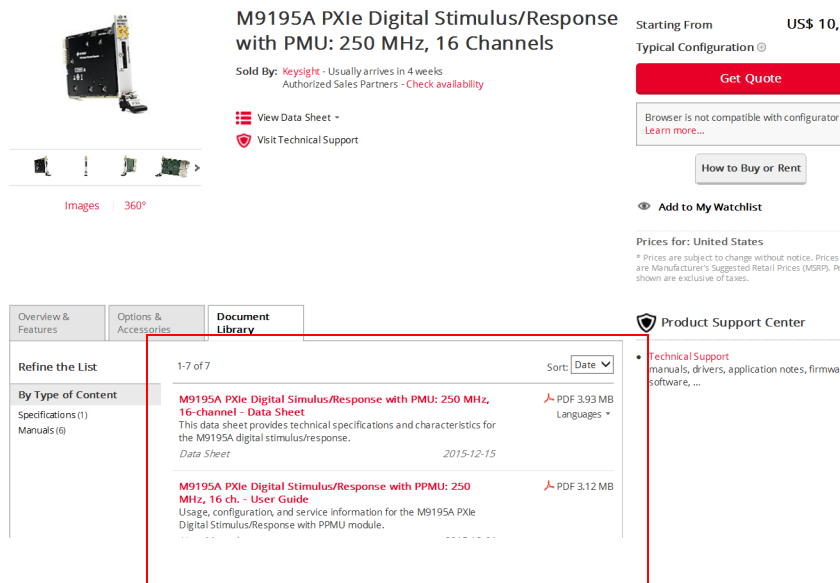
At the Keysight website

Go to the M9195 page on the web:

www.keysight.com/find/M9195A (go to **Document Library**).

www.keysight.com/find/M9195B (go to **Document Library**).

All released M9195A/B help systems and documents are there, including the Introduction.



M9195A PXIe Digital Stimulus/Response with PMU: 250 MHz, 16 Channels

Starting From **US\$ 10**, Typical Configuration

Get Quote

Browser is not compatible with configurator. [Learn more...](#)

How to Buy or Rent

Add to My Watchlist

Prices for: United States
* Prices are subject to change without notice. Prices are Manufacturer's Suggested Retail Price (MSRP). Prices shown are exclusive of taxes.

Product Support Center

- Technical Support manuals, drivers, application notes, firmware software, ...

Document Library

Refine the List

By Type of Content

- Specifications (1)
- Manuals (6)

1-7 of 7

Sort:

M9195A PXIe Digital Stimulus/Response with PMU: 250 MHz, 16-channel - Data Sheet PDF 3.93 MB
This data sheet provides technical specifications and characteristics for the M9195A digital stimulus/response.
Data Sheet 2015-12-15

M9195A PXIe Digital Stimulus/Response with PPMU: 250 MHz, 16 ch. - User Guide PDF 3.12 MB
Usage, configuration, and service information for the M9195A PXIe Digital Stimulus/Response with PPMU module.

NOTE

To quickly get started with the M9195A/B installation process, refer to the M9195A/B Quick Start Poster shipped with the M9195A/B module.

Step 1: Unpack and Inspect the Module

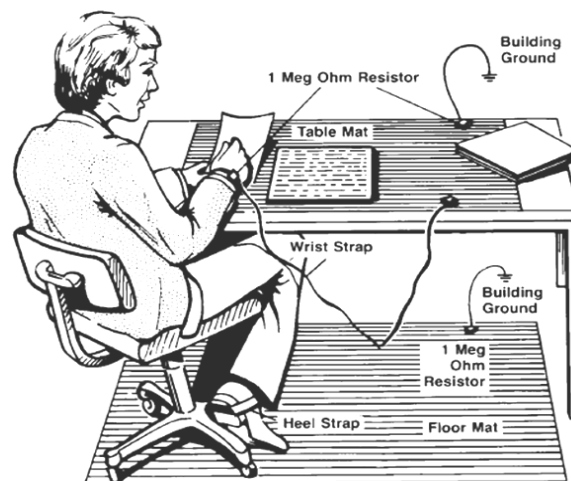
CAUTION

The module is shipped in materials which prevent damage from static electric discharge. 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 M Ω of isolation from ground.

Inspect for damage

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

CAUTION

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

Returning a module for service

Should it become necessary to return your M9195A/B module for repair or calibration, follow the steps below:

NOTE

It is recommended that you include all cables with the module in the case that you return the module for repair or calibration.

Keysight recommends yearly calibration to guarantee specifications and to maintain the highest level of performance. The module calibration can be performed at an authorized service center.

- 1 Review the warranty information shipped with your product.
- 2 Contact Keysight to obtain a Return Material Authorization (RMA) and return address. For 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/M9195B.
- 3 Write the following information on a tag and attach it to the malfunctioning equipment:
 - Name and address of owner. A P.O. box is not acceptable as a return address.
 - Module serial number(s). The serial number label is located on the side panel of the module. The serial number can also be read from the Soft Front Panel interface – after the hardware and software is installed.
 - Description of failure or service required.
- 4 Pack the instrument in its original packaging material. Include all cables. If the original packaging material 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 both serial number and model number.

Step 2: Verify M9195A/B Shipment Contents

M9195A Shipments

The following items are included in your M9195A Shipment:

Quantity	Part Number	Description
1	M9195A	PXIe Digital Stimulus/Response module
1	M9195-90002	Startup Guide for M9195A/B PXIe Digital Stimulus/Response
1	N/A	Certificate of Calibration (including a calibration letter)
1	N/A	Recommended due date for calibration
N/A	N/A	Any options or accessories (such as cables) ordered with your M9195A module (see “M9195A/B Accessories” on page 9).

M9195A Options

The following options are included as standard features in the M9195A.

Option Number	Description
M9195A-M12	Memory, 125 Mvectors/Channel
M9195A-S04	Multi-site configuration
M9195A-SR2	Maximum clock rate, 250 MHz

M9195B Shipments

The following items are included in your M9195B Shipment:

Quantity	Part Number	Description
1	M9195B	PXIe Digital Stimulus/Response module
1	M9195-90002	Startup Guide for M9195A/B PXIe Digital Stimulus/Response
1	N/A	Certificate of Calibration (including a calibration letter)
1	N/A	Recommended due date for calibration
N/A	N/A	Any options or accessories (such as cables) ordered with your M9195B module (see “M9195A/B Accessories” on page 9).

Step 2: Verify M9195A/B Shipment Contents

M9195B Options

The following hardware upgrade options are available on the M9195B. For details on these licenses, see “[Step 7: Check M9195B Licensing \(Optional\)](#)” on page 26.

Option Number	Description
M9195B-M01	Memory, 16 Mvectors/Channel
M9195B-M06	Memory, 64 Mvectors/Channel
M9195B-M12	Memory, 125 Mvectors/Channel
M9195B-S01	Single site enabled
M9195B-S04	Multi-site enabled
M9195B-SR1	Maximum clock rate, 250 MHz
M9195B-SR2	Maximum clock rate, 250 MHz
M9195B-MMS	Multi-module sync

* this option includes an SMB-to-SMB sync connector shipped separately from the M9195B

M9195A/B Accessories

The following table lists the accessories available for the M9195A/B PXIe Digital Stimulus Response module. For more information on accessories, see “[Accessories](#)” on page 38.

Accessory Number	M9195A	M9195B	Option Description
Y1245A	X	X	Single-site Digital Stimulus/Response Cable: 0.5m
Y1246A	X	X	Single-site Digital Stimulus/Response Cable: 1m
Y1247A	X	X	Single-site Digital Stimulus/Response Cable: 2m
Y1248A	X	X	Multi-site Digital Stimulus/Response Cable: 1m
Y1249A	X	X	Multi-site Digital Stimulus/Response Cable: 2m
Y1250A		X	Multi-module sync cable - 4
Y1251A		X	Multi-module sync cable - 12
Y1252A	X	X	Digital Stimulus/Response Calibration Fixture
Y1253A	X	X	Digital Stimulus/Response Evaluation and Prototyping Board
Y1254A	X	X	Digital Stimulus/Response SMA Breakout Cable: 1m
Y1255A	X	X	Digital Stimulus/Response SMA Breakout Cable: 2m

NOTE

For further information on accessories, search the Keysight website with the accessory number.

Step 3: Install the Software

Power up the controller

For external controllers:

CAUTION

If you are using an external controller such as a PC and you have installed the PCIe interface cable to the chassis, you must power up the chassis **BEFORE** you power up the PC. When you power down your chassis, **Shut Down the PC BEFORE** you power down the chassis.

For embedded controllers:

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

- 1 Install the embedded controller module into a compatible PXIe chassis. The Keysight M9037A PXIe Embedded Controller and Keysight M9018A PXI Chassis are recommended. Please refer to your embedded controller and chassis documentation for further details.
- 2 Connect peripherals (mouse, keyboard, monitor).
- 3 Power up the chassis.

Software installation overview

This installation requires the following:

- Keysight IO Libraries Suite (IOLS), which includes the Keysight Connection Expert. This software is available at www.keysight.com/find/iosuite.

NOTE

The IO Libraries Suite must be installed prior to installing the M9195A/B driver.

- M9195A/B instrument software, which includes the Soft Front Panel (SFP), device drivers (IVI-C and IVI-COM), and documentation for the M9195A/B PXIe Digital Stimulus/Response module. This software is available at www.keysight.com/find/M9195B.

Step 3: Install the Software

Software installation procedure

- 1 Install the Keysight IO Libraries Suite from www.keysight.com/find/iosuite. Follow the installer prompts to install the IO libraries.
- 2 Install the M9195A/B product software:
 - a Launch the installer
 - b When the Install Wizard starts, click the **Next** button.
 - c Follow the installer prompts. Read and Accept the License Agreement. Click **Next**.
 - d Choose a **Complete** installation to install all software and documentation. Click **Next**.
 - e Click **Install** to begin the installation.
- 3 Power Down the host PC and then the chassis if using a remote controller PC.

NOTE

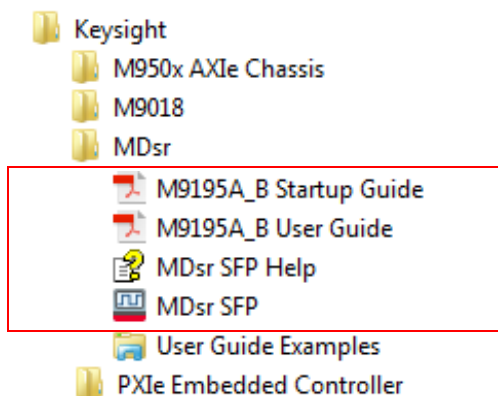
If you are using an external controller, power order matters:

- When powering down, **first power down the PC** (before the chassis)
- When restoring power, **first power up the chassis** (before the PC)

Where to Find the Documentation

At the Windows Start Button

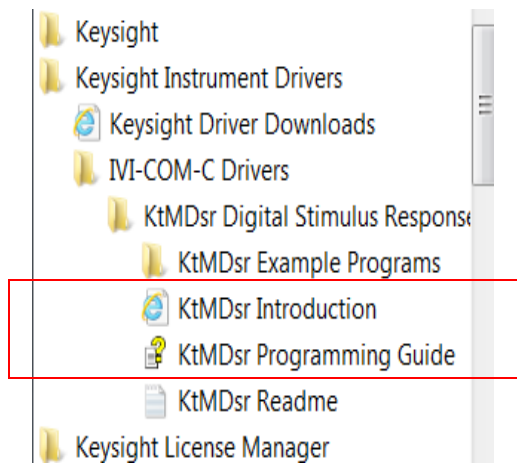
Click through **Start>All Programs>Keysight>MDsr**. The display will appear:



Click on the appropriate icon for:

- Startup Guide
- User Guide
- Software Front Panel (SFP) help system

For additional documentation, go further down the Start button listing to **Start>All Programs>Keysight Instrument Drivers>KtMDSr Digital Stimulus Response**. The display will appear something like:



Here click on the icons for:

- Programming Guide
- KtMDSr Introduction

Step 4: Install the Module

NOTE

When you restore power, **power up the chassis first** - before you power up the host (controller) PC.

CAUTION

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

CAUTION

Ensure the module is aligned correctly before inserting it into the chassis to avoid damaging the instrument.

CAUTION

Ensure the test environment is free of dust and debris.

Chassis requirements for temperature control

The following chassis requirements assure optimal cooling and proper operating temperatures for the DSR module:

- Any empty module slot in the chassis should be fitted with a slot blocker (from kit Y1212A) and EMC filler panel (from kit Y1213A).
- If a PCIe Cable Interface module is used in place of a controller, the open area to the left of the interface module should be filled with the filler panel and bracket (from kit Y1214A).
- All lower and side vents should remain unobstructed.
- Set the chassis fan speed to HIGH. The fan switch is on the rear panel of the M9018A chassis.

The use of a Keysight M9018A Chassis and the above accessories will optimize module temperature performance.

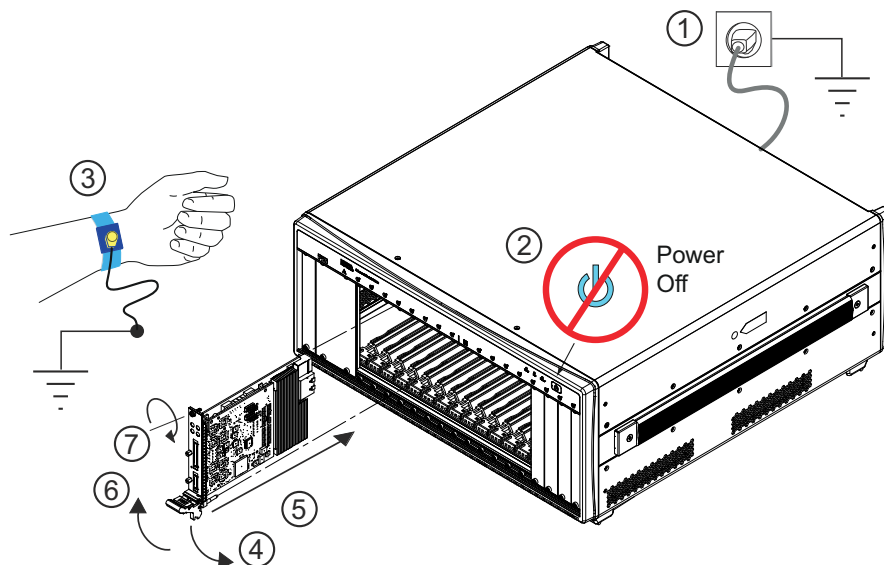
CAUTION

When powering-up the PXI chassis and during the first DSR driver initialization after power-up (from the IVI API or from the M9195A/B Soft Front Panel) make certain that no device-under-test (DUT) is connected to the M9195A/B module.

Module installation procedure

The module can be installed in any PXIe or hybrid PXI slot marked with a peripheral slot compatibility image. Suitable slots will have a solid black circle with a number inscribed. A PXIe slot is represented by a solid black circle (for example, **4**); a hybrid PXI slot is represented by a solid black circle with the letter H in the upper right (for example, **7^H**). For best performance, install the module in a x8 hybrid slot; in the M9018A PXIe chassis, this is slot 2, 6, 11, or 15.

- 1 Make sure that the chassis line cord is plugged into an established earth ground and that the chassis power switch is in the Off (Standby) position.
- 2 If the chassis has multiple fan speed settings, ensure that the fan switch is set to AUTO.
- 3 Position the chassis to provide ample space between the chassis fan intake and exhaust vents. Blockage by walls or obstructions affects the air flow needed for cooling. (Refer to the chassis documentation for more information about cooling).
- 4 If you are using a remote PC as the system controller, install the System Interface Card in slot 1 of the chassis.
- 5 Before inserting the module into the chassis, back the mounting screws out to ensure that there is no interference between the screws and the mounting rails.
- 6 Holding the module by the injector/ejector handle, slide it into an available PXI (or hybrid) slot, as shown in the figure below.
 - a Install the module into the slot of the chassis by placing the module card edges into the front module guides (top and bottom).
 - b Slide the module to the rear of the chassis and ensure that the injector/ejector handle is pushed down in the unlatched (downward) position.



Step 4: Install the Module

- c** Slide the module completely into the chassis. When you begin to feel resistance, pull up on the injector/ejector handle to fully inject the module into the chassis.
- 7** Secure the front panel to the chassis using the two module front-panel mounting screws. Performance may suffer if the screws are not tightened properly.
- 8** Verify that the PXI chassis fans are operable and free of dust and other contaminants that may restrict airflow.
- 9** Install all filler panels after installing the module. Missing filler panels may disrupt necessary air circulation and prevent proper cooling of the chassis.
- 10** If you are using a PCIe Cable Interface module, such as the Keysight M9021, connect the Cable Interface in the chassis to the PC host per the instructions that came with the Cable Interface.
- 11** Power up the PXI chassis.
- 12** Reboot the PC host.
- 13** Proceed to Step 5: Verify Operation of the Keysight M9195A/B PXIe Digital Stimulus/Response module (“[Step 5: Verify Operation of the M9195A/B Module](#)” on page 16).

Step 5: Verify Operation of the M9195A/B Module

In this step you will verify correct operation of the Keysight M9195A/B PXIe Digital Stimulus/Response module. Before running Self Test or Automatic Corrections, ensure that all required software is installed, the chassis is powered on, and all front panel cabling is removed.

Check the Status LED

Check the M9195A/B front panel Status LED.

- When power is first applied, the LED starts in the **Off** state and then changes to **Green** a few moments after PXI enumeration takes place. Depending on how the chassis is loaded with modules, this may take up to a few minutes.
- In general, when the Status LED is solid green, the module is working correctly.
- Refer to the “[Status LED Summary](#)” table on [page 30](#) for the complete list of the LED colors and their meaning.

If the LED does not go on after power is applied, see step 1 in the troubleshooting checklist: [What does the front panel Status LED look like?](#)

Check for M9195A/B with Connection Expert

Verify that Connection Expert recognizes the M9195A/B module.

To do this, after the host system boots up, bring up Connection Expert at the Start Menu (see [Figure 1](#) below), and then enter “M9195” in the Filter Instruments box and as shown in [Figure 2](#) below.

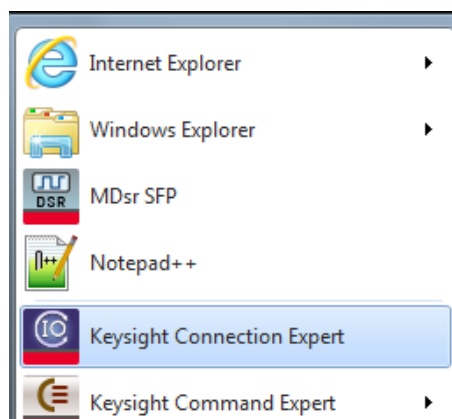


Figure 1 Selecting Connection Expert

Step 5: Verify Operation of the M9195A/B Module

The details on the M9195 should appear as shown **Figure 2** below.

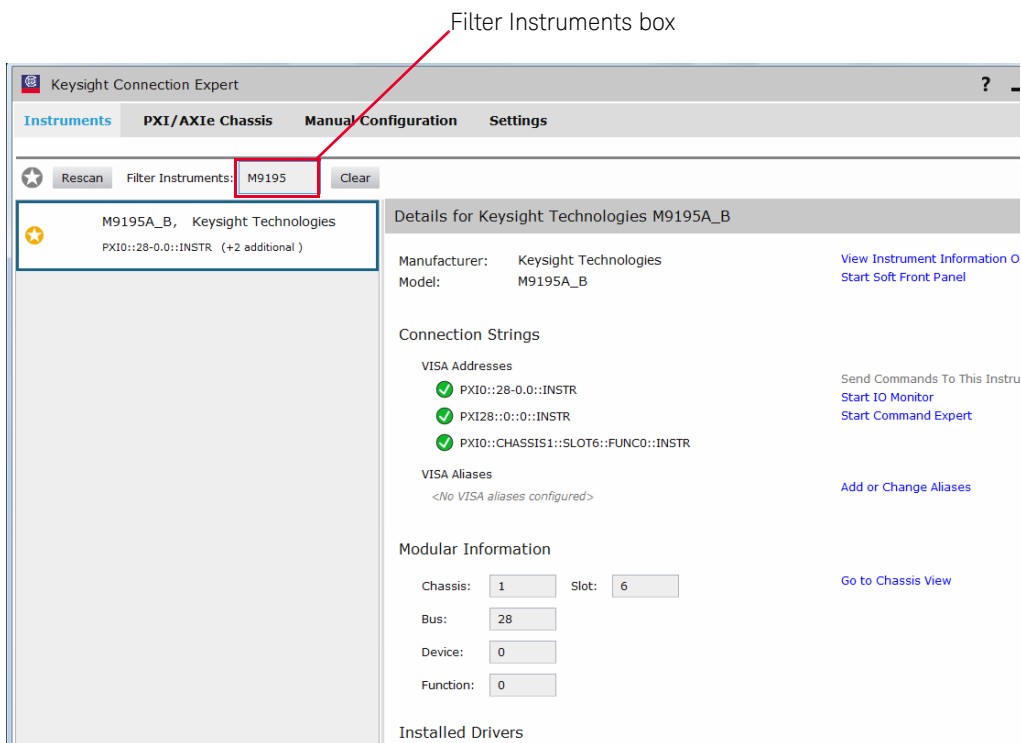


Figure 2 Bring Up M9195A/B Details with Connection Expert

Bring Up Soft Front Panel

The M9195A/B Soft Front Panel (SFP) is required to run Self Test, perform Automatic Corrections, and more. To run the SFP:

- 1 Select **Start > All Programs > Keysight > MDsr > MDsr SFP**.

First, the SFP banner will appear as shown below in [Figure 3](#)



Figure 3 Software Front Panel Banner

After the SFP opens, a **Connect to Instrument** dialog appears, as in [Figure 4](#) below.

Step 5: Verify Operation of the M9195A/B Module

- From the **Connect to Instrument** dialog box, select the M9195A/B module that you want to verify, then click Connect.

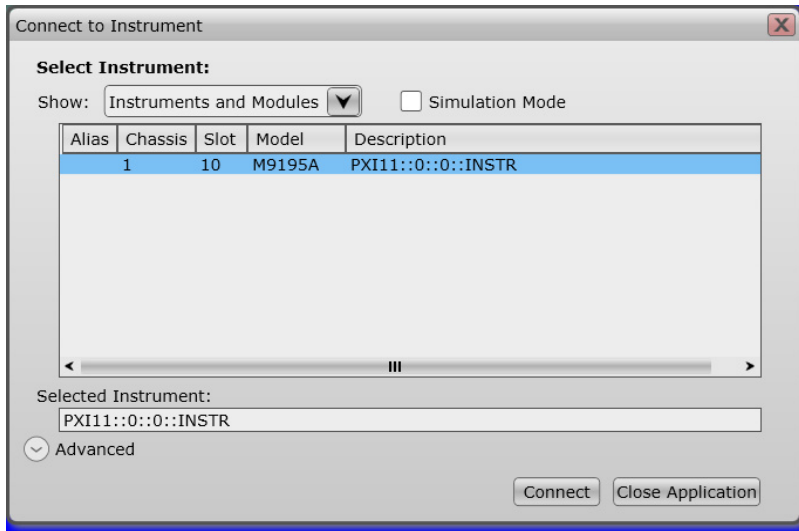


Figure 4 Connect to Instrument dialog box

The SFP should now appear as shown below in [Figure 5](#)

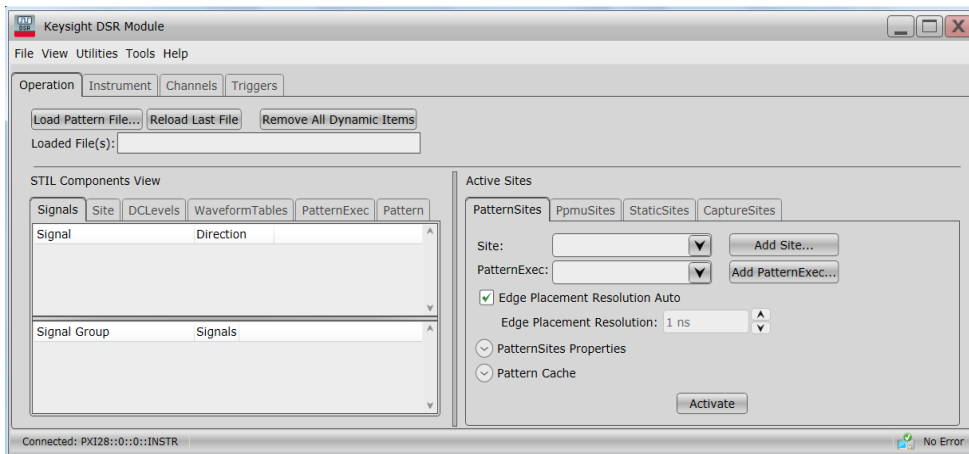


Figure 5 Typical SFP Display

NOTE

If M9195B modules are licensed for multi-module (option M9195B-MMS) use they may be connected to the same SFP. They can be connected to the SFP one at a time, or in a group as shown in [Figure 6](#).

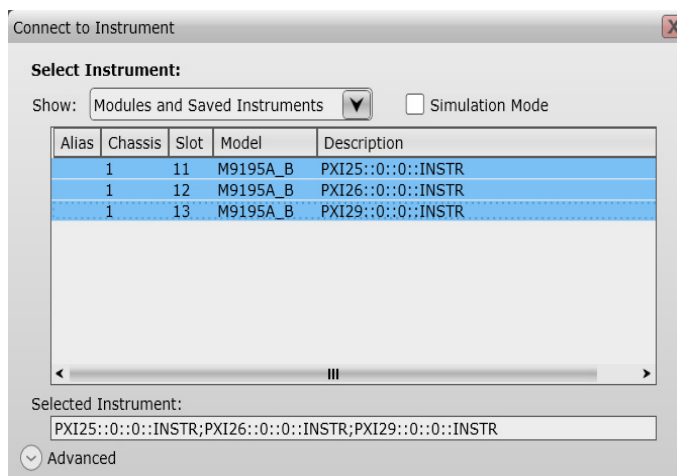


Figure 6 Connecting to Multiple Modules

If the Status indicator on the module front panel turns from green to blue, go on to [“Conduct a Self Test”](#) on page 20.

If the module does not appear in the ‘Connect to Instrument’ dialog box as shown in [Figure 4](#), go to step 2 of the troubleshooting checklist: [Does the M9195A/B appear correctly on Keysight Connection Expert?](#) Then follow with step 3: [Does the M9195A/B \(SFP\) connect?](#)

Conduct a Self Test

Now the M9195A/B is ready to run Self Test from the Soft Front Panel.

CAUTION

Before you initiate the Self Test,

- (a) Disconnect all cables (for accuracy and to prevent damage)
- (b) Save any data that you need (waveforms, cycle instructions, etc.), as Self Test will erase the memory in the module.

Self Test will take from 2 to 5 minutes to complete.

- 1 To start the Self Test, click **Utilities > Self Test...** and the **Run Self Test...** button. Follow all screen prompts.

Step 5: Verify Operation of the M9195A/B Module

Click **Yes** when all cables have been removed.

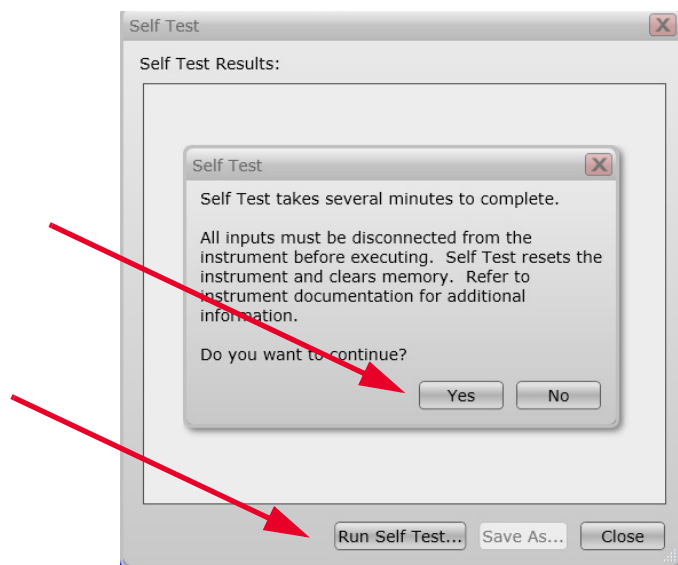


Figure 7 Initiate the M9195A/B Self Test

On multi-module installations the Status LED will briefly turn green at the start and near the end of Self Test.

After the Self Test passes, proceed to “[Step 6: Execute Automatic Corrections](#)” on page 22. Any failures are noted in the display.

NOTE

If Self-Test fails to run, or there are any failure messages appear in the display, go to “[Run Self Test](#)” on page 33 for troubleshooting guidance.

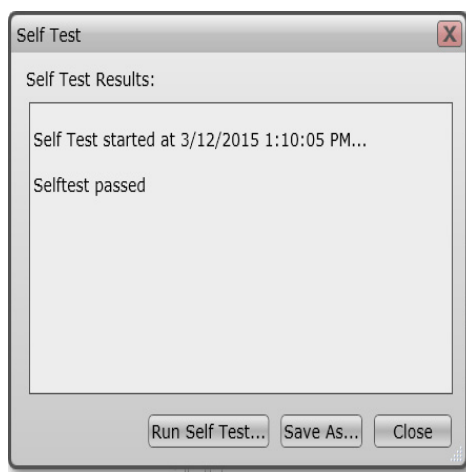


Figure 8 Self Test Completed

Step 6: Execute Automatic Corrections

CAUTION

Before you run Automatic Corrections:

- (a) Disconnect all cables (for accuracy and to prevent damage)
- (b) Save any data that you need (waveforms, cycle instructions, etc.), as Auto Corrections will erase the memory in the module.

Be prepared for Automatic Corrections to take several minutes to complete.

Automatic Corrections is initiated from the Soft Front Panel. Automatic Corrections executes a function that automatically calculates corrections for the M9195A/B. It does not require a calibration fixture or measurement equipment. The name of the specific function is **Execute Automatic Corrections**.

Before calling Automatic Corrections, all cables to external fixtures (inputs to the M9195A/B) **must** be disconnected from the M9195A/B.

The **Automatic Corrections Needed** function returns True if the current module temperature has deviated by more than 5°C from the temperature where automatic corrections were last calculated, or if it has never been run. With this deviation of over 5°C, the measurement values from the PPMU may not be within specifications.

You should run Automatic Corrections at these times:

- When the test system is initially set up (when you first receive and install the M9195A/B in your PXIe system).
- If there has been any change to the test system environment.
- On a regular schedule as necessary; for example, you may want to perform the Automatic Corrections daily, weekly, or monthly.
- When the module temperature has changed more than 5°C from the temperature at which automatic corrections were last calculated.
- Whenever firmware on the module is upgraded or downgraded

NOTE

Keysight recommends yearly calibration to guarantee specifications and to maintain the highest level of performance.

The module calibration can be performed at Keysight service centers.

Automatic Corrections procedure

- 1 Turn on the M9195A/B system, and allow it to warm up for a minimum of 30 minutes.
- 2 Remove all cables from the front of the M9195A/B.

CAUTION

You must remove all cables from the M9195A/B before executing Automatic Corrections. Failure to remove all cables will result in inaccurate adjustment and could result in damage to the M9195A/B and anything attached to the cables (such as your DUT).

- 3 Start the Soft Front Panel (SFP) by clicking **Start > All Programs > Keysight > MDsr > MDsr SFP**.
- 4 The SFP will ask to connect to an instrument.
In the Connect to Instrument dialog (see [Figure 4](#) on page 19), connect to the M9195A/B module for which you want to execute Automatic Corrections.
- 5 Select the **Instrument** tab in the Soft Front Panel as in [Figure 9](#).

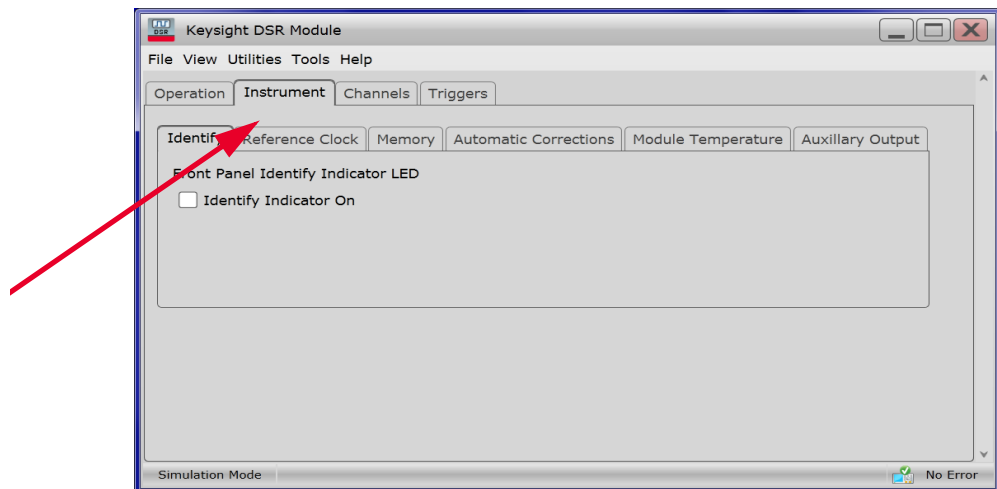


Figure 9 SFP Instrument tab

- 6 Select the **Automatic Corrections** tab in the second row, as in [Figure 10](#).

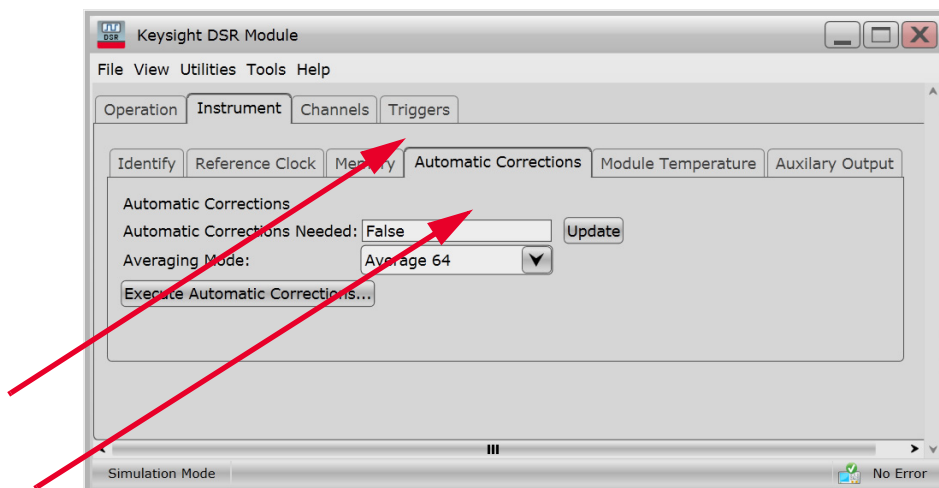


Figure 10 SFP Automatic Corrections tab

- 7 Click the **Update** button in [Figure 10](#); this will update the status of whether Automatic Corrections are required.
- a If the **Automatic Corrections Needed** field contains **False**, Automatic Corrections are not needed; you can skip to the end of this procedure.
 - b If the **Automatic Corrections Needed** field contains **True**, proceed to the next step to execute the automatic corrections.
- 8 Select an **Averaging Mode**.
- **Average64** is a good default if your system does not have power line noise.
 - Use **Window50Hz** if you notice power line noise and your local power is 50 Hz.
 - Use **Window60Hz** if you notice power line noise and your local power is 60 Hz.
- 9 Now, to run Automatic Corrections,
Click the **Execute Automatic Corrections...** button in [Figure 10](#).

Step 6: Execute Automatic Corrections

- 10 If you have not yet removed all cables connected to the M9195A/B, disconnect them as you are prompted by the SFP (as in [Figure 11](#)).

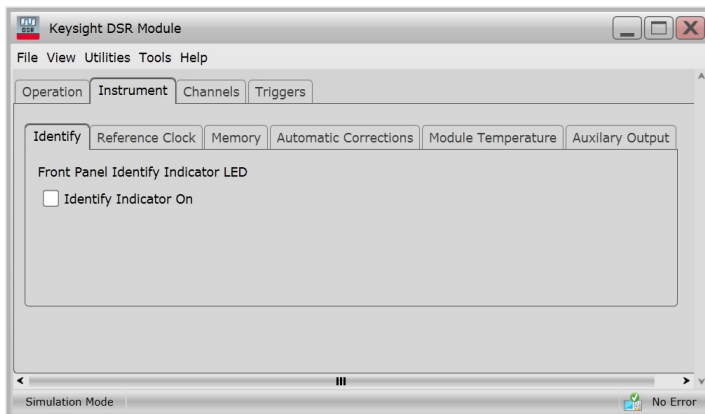


Figure 11 Reminders to disconnect inputs

- 11 Wait for Automatic Corrections to run. This may take several minutes.
 - For multi-module installations, the Status LED on the modules will change to green near the beginning and near the end of the process, and will remain blue at the end.
- 12 When Automatic Corrections completes,
 - Click the **Update** button again (in [Figure 10](#)) to update the Automatic Corrections Needed status.
 - After you update the status, the status should be **False**.

NOTE

If any error messages appear at the top of the SFP display during Automatic Corrections, refer to [“Run Automatic Corrections”](#) on page 33 to for troubleshooting guidance.

Step 7: Check M9195B Licensing (Optional)

Upgrade Options

There are four optional licenses enabling special features on the M9195B. These are:

- *Speed* –The M9195B comes standard supporting 125 MHz (SR1) operation. The M9195B-SR2 license option enables the maximum clock rate of 250 MHz.
- *Memory* – Standard M9195B operation, M9195B-M01, includes memory support of 6 million vectors (Mvectors) of pattern memory per channel. The M9195B-M06 and M9195B-M12 license options enable 64 and 125 Mvectors of pattern memory per channel respectively.
- *Multi-Site Operation* – Standard operation, M9195B-S01, allows single-site configuration of the DSR as 16 synchronized channels, while with the multi-site license (M9195B-S04) the module can be configured with 4 sets of 4 synchronized channels. In multi-site mode, each site has its own independent Stimulus Data Sequencer. This enables site independent clock operation for simultaneous testing. The multi-site capability simplifies test development. Instead of forcing the test engineer to create a single test that encompasses all for sites simultaneously, the user only needs to focus on a single device. The single device test can be easily replicated for the remaining test sites. In addition to the digital pins, each site has a high voltage drive channel and an open drain control channel for relay control.
- *Multi-Module Operation* – Multiple modules are combined and programmed together into a single multi-module instrument. This option includes a SMB to SMB cable which allows multi-module front panels to be daisy-chained together. With the option license (M9195B-MMS), up to 12 modules can be combined to build systems up to 192 channels (requires the MMS option for each module plus the appropriate sync cable, either Y1250A or Y1251A). When modules are combined, they operate in single-site mode and all channels are synchronized to a single Stimulus Data Sequencer. It can include all available IO channels in the installation. There can be multiple PPMU or simple DC level (Static) sites made up of any channels that aren't used in the pattern site.
Typical channel-to-channel skew (including across modules) is ± 300 ps.

The licensing status of a module can be checked by selecting it through the Software Front Panel (SFP) and then going to the About Box in the Help drop-down menus. In the About Box, installed options will be listed after “System Options:”.

Step 7: Check M9195B Licensing (Optional)

Checking Hardware Upgrade Option Licensing

Perform these steps to check if the hardware upgrade option licenses described in the previous section (“Upgrade Options”) are present on a M91915B.

- 1 With the Software Front Panel, check that the M919Bs in question are addressed by the driver:.

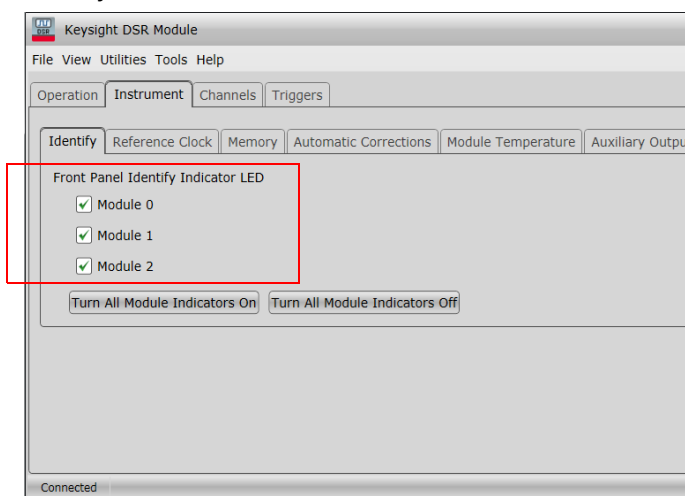


Figure 12 Selecting M9195B to Check Licensing

- 2 Go to the SFP About Box and check to see the licenses listed.

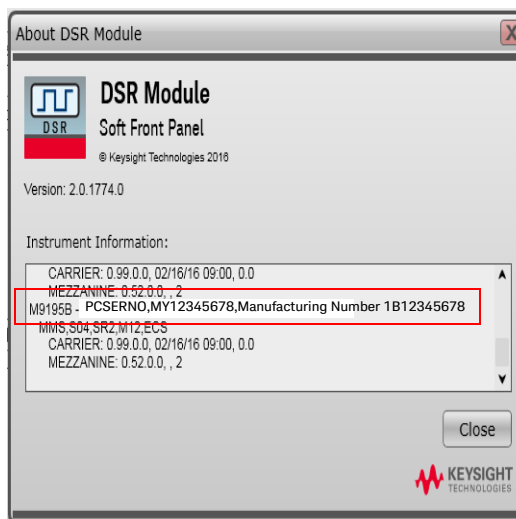


Figure 13 Checking M9195B Licensing

NOTE

In a multi-module configuration, the licensed features are the “least common” across all modules. For example, in a two module M9195B configuration, if one is licensed for M06 and the other from M12, the multi-module installation will operate with M06.

High-Level Diagnostic Tools, Processes and References

This section provides high-level tools, processes, and references to help diagnose problems with an M9195A/B DSR module.

CAUTION

Be sure to take ESD precautions (see [page 6](#)).

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

Specifications

The *Specification Guide* for the M9195A/B is available at www.keysight.com/find/M9195B.

Fault Messages

Some *Self Test* error messages on [page 33](#) may show up during normal operation. They appear near the top of the *Soft Front Panel*.

Troubleshooting Check List

If you are unable to communicate with the M9195A/B, make the following checks:

1 What does the front panel Status LED look like?

Refer to “[Status LED Summary](#)” on page 30.

- *Off* indicates a power supply, or other basic hardware problem.
- *Solid Red* indicates power or temperature problems.

Disconnect all connectors at the M9195A/B front panel. Then cycle power to the chassis before checking if the solid red LED continues.

See “[Chassis Cooling Checks](#)” on page 31.

- *Solid Green* indicates that power and temperature are OK and that PCI enumeration is complete.

If the Status LED does not go solid green within a minute of the computer booting Windows, power down the chassis and repeat the process with the M9195A/B installed in another slot.

- *Solid Blue* indicates that conditions for Solid Green are met and that the IVI driver for the M9195A/B is now initialized.

If the status LED does not go from solid green to solid blue after the *Soft Front Panel* comes up and connects with the M9195A/B, there may be an LED problem. If the *Soft Front Panel* does not come up, see “[Check Software Installation](#)” on page 30.

If the LED goes solid blue and the *Soft Front Panel* comes up, check that the drivers are loaded correctly by flashing the blue LED from the SFP. See “[Check Module Status LED](#)” on page 31.

If an incorrect LED condition repeats and continues, go to “[Returning a module for service](#)” on page 7.

2 Does the M9195A/B appear correctly on *Keysight Connection Expert*?

- Bring up *Connection Expert* and click on the “PXIe/AXIe Chassis” tab then check to see if the M9195A/B in question appears in the correct slot.

If the module is not visible, try shutting down the system, cycling power, and re-starting.

If the M9195A/B still does not show up in *Connection Expert* then power down the chassis and repeat the process with the M9195A/B installed in another slot.

If the M9195A/B does not show up in *Connection Expert*, but the *Soft Front Panel* (SFP) connects to it, then “[Check Software Installation](#)” and, if necessary, re-install all required software in the order describe in the *M9195A/B Startup Guide*.

If the Module continues to not show up in *Connection Expert*, go to “[Returning a module for service](#)” on page 7.

3 Does the M9195A/B (SFP) connect?

If the *Connection Expert* as well as the *SFP* does not connect, go through Step 2 above.

- If the SFP fails to connect to the M9195A/B, then “[Check Software Installation](#)” on page 30 and, if that is OK, try repeating the process with the M9195A/B installed in another slot.

Re-install all required software in the order describe in the *M9195A/B Startup Guide*.

- If the SFP connects, go to “[Troubleshooting with the Soft Front Panel](#)” on page 31.

Status LED Summary

First, check the M9195A/B front panel Status LED. When power is first applied, the LED starts in the Off state and then changes to green after a few moments when PCI enumeration takes place. In general, when the Status LED is solid green the module is working correctly. The following table lists the states (colors) of the Status LED.

Status LED color	Description
Off	Power not applied or a failure in the power supplies or fundamental hardware
Solid Green	Power okay, temperature okay, successful PCI enumeration. In a multi-module installation, the LED will turn to green when running Self Test or Automatic Corrections.
Solid Blue	The LED will go from green to blue when the IVI driver is initialized or the SFP is opened. It will go from blue back to green when the driver is closed (or SFP is closed).
Blinking Blue	Driver or SFP "Identify" operation was activated. If the driver terminates with the LED blinking blue, it will continue to blink blue.
Solid Red	Error condition (power or over temperature, etc., not okay)

Check Software Installation

Verify that the following installations are present. For software check

Start > Control Panel > Programs and Features >

- *Keysight IO Libraries Suite*. See the *Introduction* document (for how to find, see [page 11](#)) for release details.
- *Keysight Digital Stimulus/Response Driver Module* see *Introduction* document (for how to find, see [page 11](#)) for most recent release details.
- System Interface Card, cable and PC PXIe card connections
- If no modules are visible in the SFP "Connect to Instrument" dialog, start *Keysight Connection Expert*, by selecting:

Start > Keysight Connection Expert

If the module is still not visible, power down, move the module to another slot and restart. If the module does not appear, consider re-installing software.

NOTE

The order in which software is installed is critical. It may be necessary to re-install the software.

Chassis Cooling Checks

Power down the chassis and check the following to ensure optimal cooling performance.

- Confirm that the ambient temperature is at or below 45°C (113°F).
- Any empty module slot in the chassis should be fitted with a slot blocker (from kit Y1212A) and EMC filler panel (from kit Y1213A).
- If a PCIe Cable Interface module is used in place of a controller, the open area to the left of the interface module should be filled with the filler panel and bracket (from kit Y1214A).
- All lower and side vents should remain unobstructed.
- Set the chassis fan speed to HIGH. The fan switch is on the rear panel of the M9018A chassis.

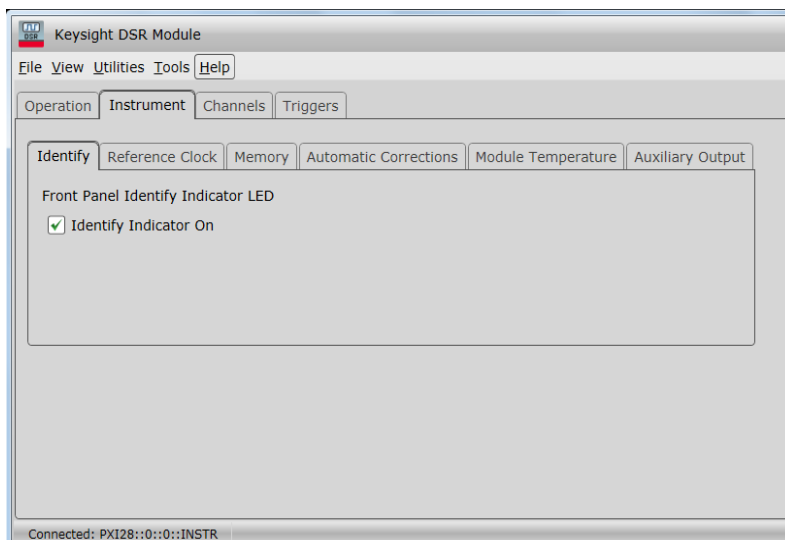
Troubleshooting with the Soft Front Panel

This subsection details four diagnostic checks available through the M9195A/B Front Panel:

- “Check Module Status LED”, see below
- “Check Module Temperature” on page 32
- “Run Automatic Corrections” on page 33
- “Run Self Test” on page 33

Check Module Status LED

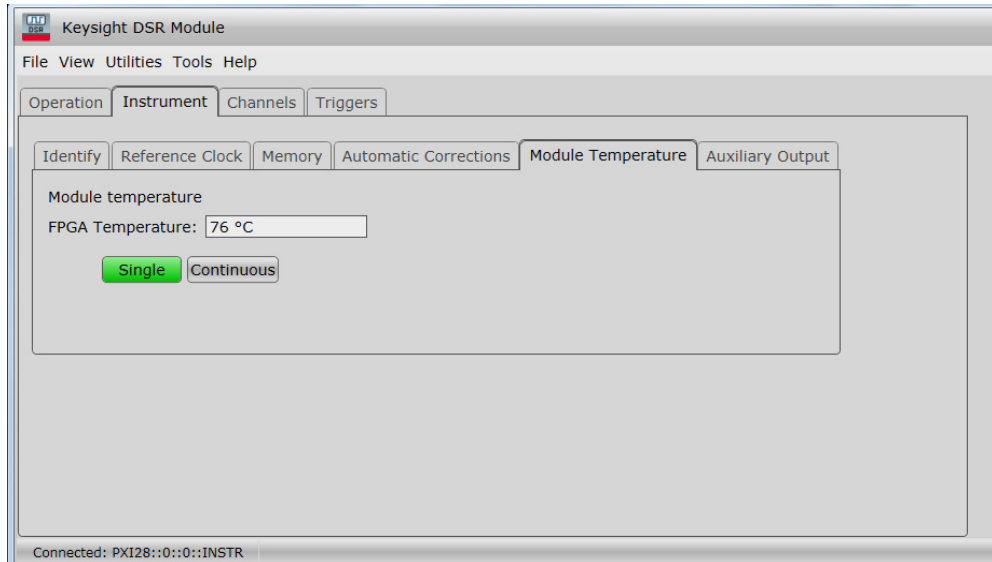
Once the SFP connects to the M9195A/B, select **Instrument** and then **Identity** tabs. Click on *Identify Indicator On*.



If the blue LED does not pulse on and off, run Self Test (see page 33). If the LED still fails to pulse and there are no other problems, go to “Returning a module for service” on page 7. If you wish, turn off the Identify Indicator, once you have checked it.

Check Module Temperature

After the SFP connects to the M9195A/B, select **Instrument** and then **Temperature** tabs. Choose **Single** or **Continuous** and the temperature will appear:



If the FPGA temperature is over 85°C (this will cause the Status LED to go red as described on [page 30](#)), then go to [“Chassis Cooling Checks”](#) on [page 31](#).

If the FPGA temperature remains over 85°C after doing the cooling checks, then go to [“Run Self Test”](#) on [page 33](#).

NOTE

In the event of a serious over-temperature or voltage fault, Self Test will not run.

If temperature remains over the acceptable range, go to [“Returning a module for service”](#) on [page 7](#).

CAUTION

Failure to operate the chassis with the required cooling described in [“Chassis Cooling Checks”](#) on [page 31](#) may result in the [“Overtemperature in FPGA”](#) error message and the appearance that the module has failed. Before returning a module to Keysight due to an overtemperature condition, any chassis cooling deficiencies must be corrected and the module temperature should be re-confirmed.

Run Automatic Corrections

For the procedure see [“Automatic Corrections procedure”](#) on page 23.

Error messages appear in a box at the top of the SFP display.

They are of the form:

```
AutomaticCorrections: Gain constant out-of-range. Verify field wiring removed from channel 0.
```

There are over 50 different varieties of these messages, all with the same remedy: Remove any field wiring from the channels. If all cables are removed from the front panel and there is still a failure, the unit needs to be returned to the factory for further evaluation and repairs (see [“Returning a module for service”](#) on page 7).

Run Self Test

For the Self Test procedure, see [“Conduct a Self Test”](#) on page 20.

Error messages appear in a box at the top of the SFP.

NOTE

The Self Test process includes the Automatic Corrections algorithm. However the adjustments calculated during this Automatic Corrections process are not saved, so running Self Test does not eliminate the need for Automatic Corrections.

For details on error messages that come up during the Automatic Corrections process.

- **“Calibration Fixture must not be connected but it is.”**

Check for no connections. If problem persists, see [“Returning a module for service”](#) on page 7.

- **“DDR3 memory test failed”**

Reset system and re-try test. If problem persists, see [“Returning a module for service”](#) on page 7.

- **“Fault condition: “Overtemperture in FPGA”**

Power down the system and make sure steps in [“Chassis Cooling Checks”](#) on page 31 are in place. Bring the system up, and use the [“Check Module Temperature”](#) on page 32 procedure with Continuous selected to monitor FPGA temperature. If it goes over 85°C, return the board for evaluation and repair. If the FPGA temperature stays below 85°C, re-run Self Test, and if the Fault condition above persists, see [“Returning a module for service”](#) on page 7.

- **"Fault condition: Undervoltage in FPGA due to excessive current draw"**
Power down chassis and disconnect all cables from M9195A/B. If problem persists on power up, power down again and re-seat the M9195A/B in the PXIe card cage. If problem persists, see ["Returning a module for service"](#) on page 7.
- **"FPGA flash memory test failed"**
Reset system and re-try test. If problem persists, see ["Returning a module for service"](#) on page 7.
- **"Keysight IO Version <Current version> is earlier than minimum required"**
See ["Check Software Installation"](#) on page 30.
- **"Ltc2261 test failed"**
See ["Chassis Cooling Checks"](#) on page 31. If problem persists, see ["Returning a module for service"](#) on page 7.
- **"Ltc3880 test failed"**
See ["Chassis Cooling Checks"](#) on page 31. If problem persists, see ["Returning a module for service"](#) on page 7.
- **"Max1031 test failed"**
See ["Chassis Cooling Checks"](#) on page 31. If problem persists, see ["Returning a module for service"](#) on page 7.
- **"Max621 test failed"**
See ["Chassis Cooling Checks"](#) on page 31. If problem persists, see ["Returning a module for service"](#) on page 7.
- **"<ModelNumber> Carrier FPGA Version (<Current rev>) is earlier than minimum required"**
Return any prototype M9195A/B modules, see ["Returning a module for service"](#) on page 7.
- **"Reference Clock PLL has lost lock; selected source is <DStarA / Front Panel / PXI 100>"**
If the problem is with the PXIe_DStarA trigger, reassign reference clock and re-try. If OK on another source, check the source of the PXIe_DStarA trigger.

If the problem is with the Front Panel source, disconnect it and check it with an oscilloscope.

If PXI 100 is indicated, check diagnostics available for the chassis.

Installing Hardware License Options

After purchasing and receiving M9195B, you may choose to purchase hardware license upgrade options. These are described in “Upgrade Options” on page 26

Hardware Options Upgrade Entitlement Certificates will be sent to you by mail, e-mail, or both depending on your request. Follow these steps to install these license options:

- 1 With the M9195B installed in a chassis, bring up the Software Front Panel on the module to be upgraded. Go to the SFP “Hardware Options Upgrade” dialog to start the licensing process.

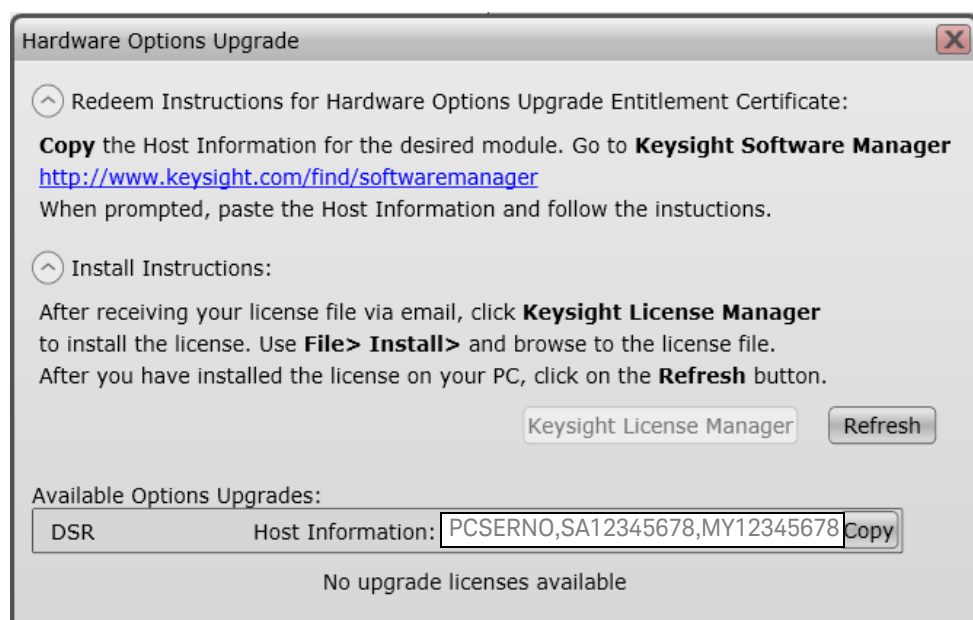


Figure 14 Hardware Options Upgrade Dialog Box

- 2 Follow the instructions in the dialog box above to go to www.keysight.com/find/softwaremanager to get the necessary license files.
- 3 Copy host information from the SFP and paste it into the Keysight Software Manager (KSM).
 - a Note that the information going to KSM includes both the “PC S/N” and the serial number of the M9195B.
- 4 Once the KSM receives the host identification data, it emails a license file for the Hardware Options Upgrade Entitlement Certificate.

- 5 After you have the license file, bring up the Keysight License Manager and install it. In the following case the M12 license install shows the lower-level M6 license.

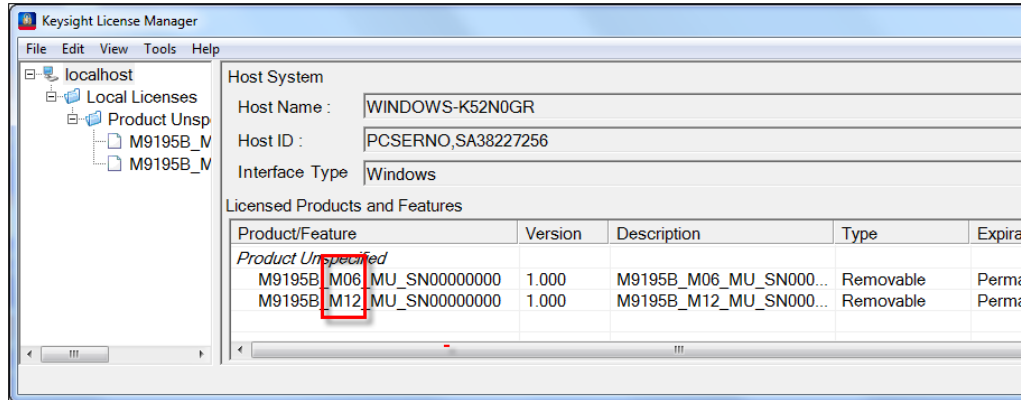


Figure 15 Keysight License Manager with Option M9195B-M12 Installed

- 6 Once the license appears in the Keysight License Manager, go to the Hardware Options Upgrade dialog box and click on 'Apply' to activate the options.

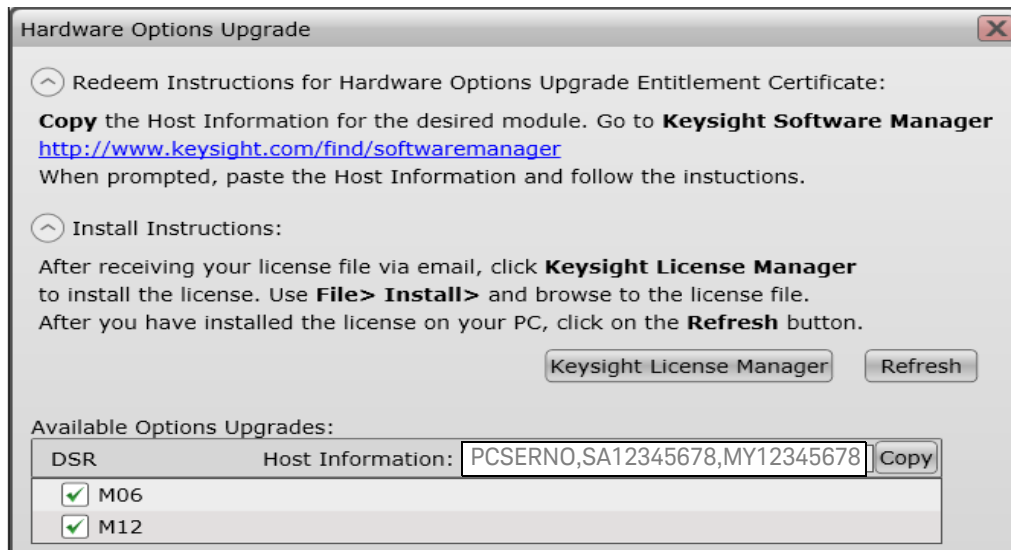


Figure 16 Hardware Options Upgrades after Licenses Installed

- 7 To check that the Hardware Upgrade Option is installed, go to the SFP About dialog box to see if it is displayed.

M9195A/B Front Panel Features

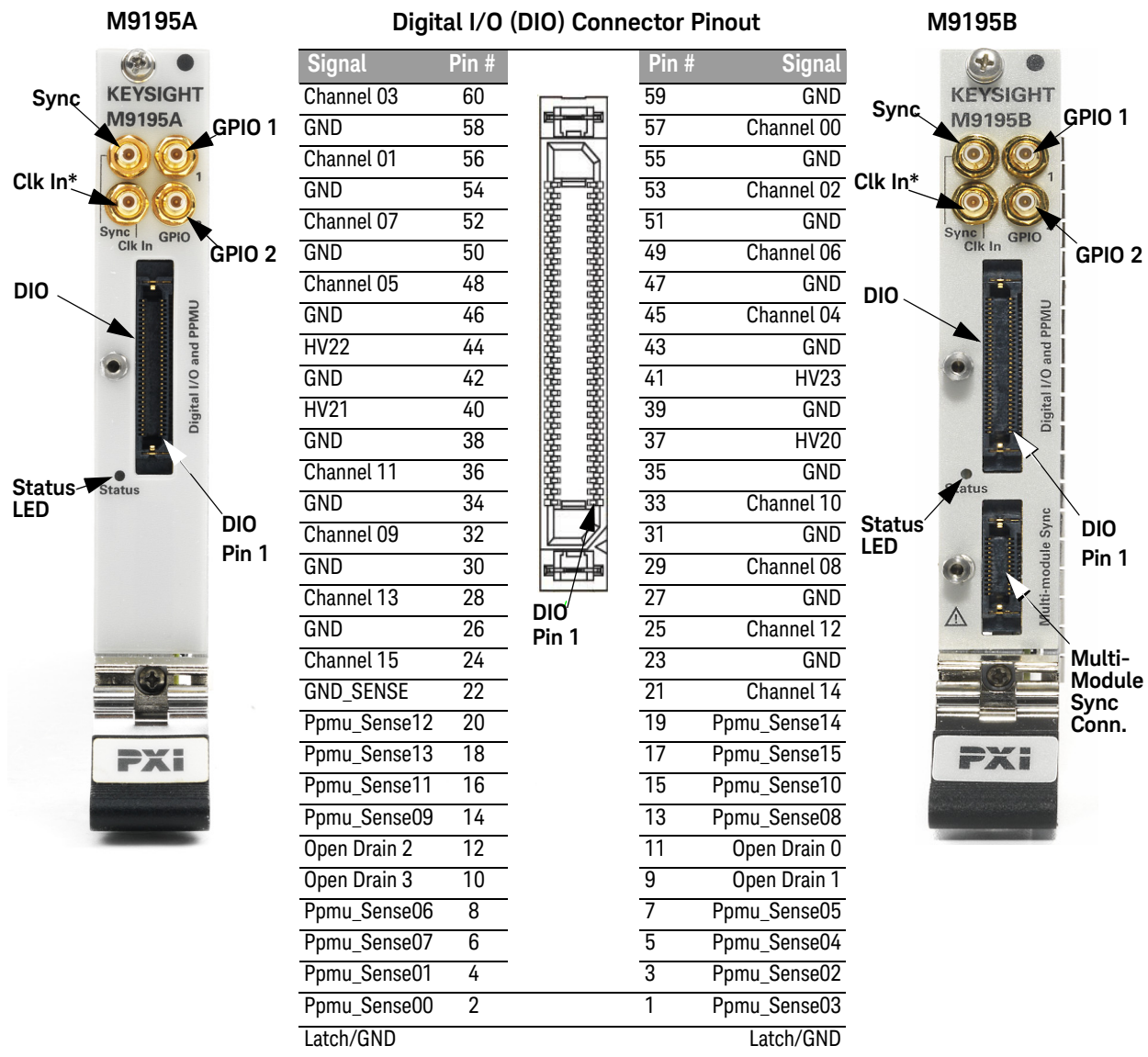


Figure 17 M9195A/B Front Panel and Connector Pin-out

* The CLK In SMB connector allows you to input a 10 MHz or 100 MHz reference clock

Accessories

Accessories available for the M9195A/B modules include:

- Y1245A, Y1246A, Y1247A work with both A and B models

These are all the same cable at lengths of 0.5, 1 and 2 meters. These cables connect the Digital IO Connectors on the front panel (see “M9195A/B Front Panel Features” on page 37) with DUTs or other hardware.
- Y1248A, Y1249A work with both A and B models

These cables allow one M9195A/B module to connect the Digital IO Connector to multiple DUTs or other hardware. The Y1248A is 1 meter in length, while the Y1249A is 2 meters.
- Y1250, Y1251 work with only the B model

These cables connect the Multi-Module Sync connector on a Primary M9195B to other M9195B modules. The Y1250 connects the primary with up to 3 secondary modules, while the Y1251 connects up to 11 secondary modules .
- Y1252A works with both A and B models

This cable assembly supports M9195A/B calibration.
- Y1253A works with both A and B models

This is a prototyping board that may be connect to the Digital IO and PPMU connector on the M9195A/B front panels. It supports development of test fixtures for interfacing to DUTs.
- Y1254A, Y1255A work with both A and B models

These cables connect the Digital IO and PPMU connectors with external hardware using coax to SMA connectors for IO channels and ribbon cables to header receptacles for PPMU sense and open drain lines. The Y1254 and Y1255 come in 1 and 2 meter lengths respectively and support development and troubleshooting of test setups.

NOTE

An additional cable is shipped as part of the Multi-Module Sync option (M9195B-MMS). It uses SMB coax connectors to daisy-chain signals from the Primary M9195B module to multiple Secondary M9195B modules.

CAUTION

Insert the Y125XA cable carefully to avoid damaging the pins.

