

Keysight Technologies

M9170A PXI Attenuator/Switch Driver

Demo Guide



Introduction

The Keysight Technologies, Inc. M9170A is a one-slot PXI attenuator switch driver module that provides the flexibility to drive Keysight's expansive portfolio of RF and microwave step attenuators and electromechanical switches. It is a PXI-hybrid compliant module that comes with a full-featured graphical interface soft front panel (SFP) for easy control and trigger.

- Maximize PXI chassis slot utilization, which ultimately improves testing efficiency
- Ensure biasing compatibility with most switches on the market, increases system flexibility
- Select device models and the subsequent switch paths or attenuation levels
- Intuitive configuration for all Keysight switches and attenuators

This demonstration guide is intended for engineers who wish to learn about the capability and key features of the M9170A. Therefore, it assumes you have basic knowledge of PXI standards and programming. This document provides an overview of the M9170A, and guides you through a step-by-step measurement procedure to quickly configure a switch or attenuator for a PXI system.

Demo Requirements

This guide contains demonstrations using the Keysight M9170A. One or more switches and attenuators are required to fully demonstrate this product. The M9170A works with most switches and attenuators available in the market today; Keysight switches and attenuators are recommended.

There are two sections described below for this demonstration procedure:

- a. Mock-up SFP (simulation mode)
- b. Demo setup with PXI chassis



M9170A can drive multiple switches and attenuators with the point-to-point interconnect

A. Mock-up SFP

This mock-up SFP works only in simulation mode. This means that the mock-up SFP will not be able to control/drive the actual switch and attenuator hardware.

1. Install the Keysight IO Libraries Suite www.keysight.com/find/iosuite (required for the M9170A).
2. Download the master installer.
 - i. To download the master installer, go to www.keysight.com/find/pxidriver
 - ii. Click on **Visit Technical Support** at the top section of the page
 - iii. Click on **Drivers, Firmware & Software** tab.
 - iv. Click on **M9170A PXI Attenuator/Switch Driver Instrument Drivers** and then click on the **Download** icon on the next page.
 - v. Run the **modular_M9170A_1_0_0.exe** file and click **Install M9170A Software**
 - vi. Additional resources are available on this page.



3. Click on **Install M9170A Software** button to install the SFP
4. Once M9170A is installed, you can launch the SFP following the steps below:
Start → All Programs → Keysight → M9170 → M9170 SFP
Learn more about SFP in Appendix 1.

B. Demo setup with PXI chassis

Equipment requirements

- M9170A PXI attenuator/switch driver module
- Demo kit M9170A
 - M9018A PXIe chassis is recommended
 - You can choose remote controller or embedded controller

i. Remote controller

- If using a remote controller, install the cable interface and then power up the host PC.

The Keysight M9021A cable interface is recommended for the M9018A chassis; refer to Keysight M9021A Gen 2, x8 PCIe Cable Interface Module Installation M9021-90001 for further details. It provides a cabled PCIe link between the M9018A chassis and an external host computer.

ii. Embedded controller

- If you are using an embedded controller, complete the following steps:
 - i. Install the embedded controller module into the M9018A PXIe chassis. Refer to the Keysight M9018A data sheet 5990-6583EN for further details.
 - ii. Connect peripherals (mouse, keyboard, and monitor)
 - iii. Power up the chassis

Refer to the M9170A configuration guide 5991-0052EN to choose switches and attenuators that are compatible with the M9170A module.

Example: 87104B (Option 161) match with assembly cable M9170-601.

M9170A Module Installation

Install the M9170A PXI module into the PXI chassis (one slot). Figure 2 block diagram shows cable connections for the M9170A demo.

1. Make sure the chassis power switch is in the Off (Standby) position and unplug the PXI chassis.
2. Holding the module by the injector/ejector handle, slide it into an available PXI (or hybrid) slot, as shown in the figure below.

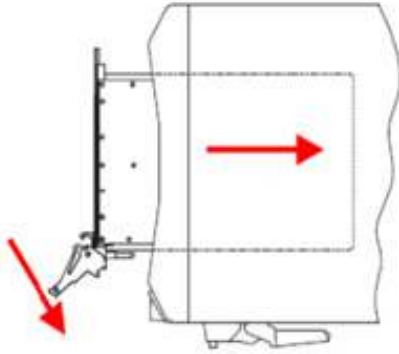


Figure 1. Slot into chassis

- Install the module into the PXI slot of the chassis by placing the module card edges into the front module guides (top and bottom).
- Slide the module to the rear of the chassis and assure that the injector/ejector handle is pushed down in the unlatched (downward) position.
- Slide the module completely into the chassis. When you begin to feel resistance, push up on the injector/ejector handle to fully inject the module into the chassis.

3. Latch the module by pulling up on the injector/ejector handle
4. Connect the System Interface Card in the chassis to host PC (make sure the PC is turned OFF)
5. Plug in and power up the PXI chassis
6. Power up the host PC
7. Connect assembly cable M9170A-601 to 87104B-161 (same method applies to attenuator)
8. Launch the SFP

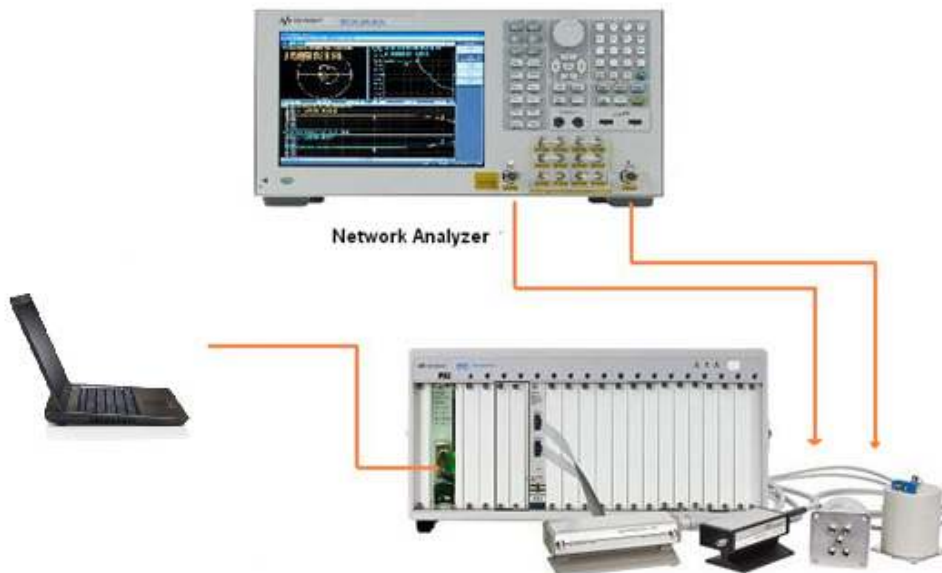


Figure 2. Remote controller connection

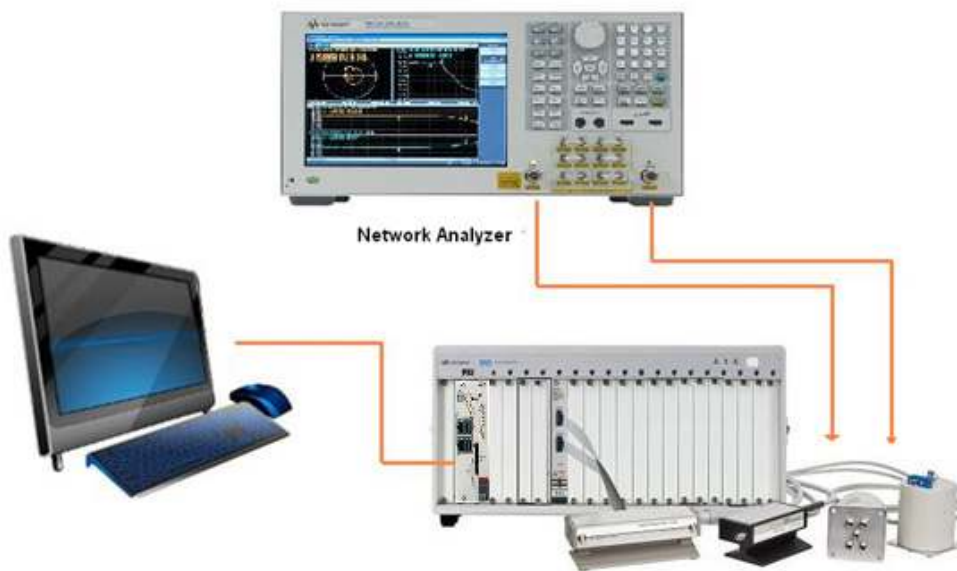


Figure 3. Embedded controller connection

NOTE: The laptop or embedded controller has been pre-installed with all the software and configurations required to run this demonstration.

Starting the Demo

The demo equipment must be turned on between the computer and the instrument. The connection should be properly established. Bank 1 and Bank 2 provide two independent banks of switch and attenuator drive outputs. Click the Switch or Attenuator button and select a device model from the drop-down list.

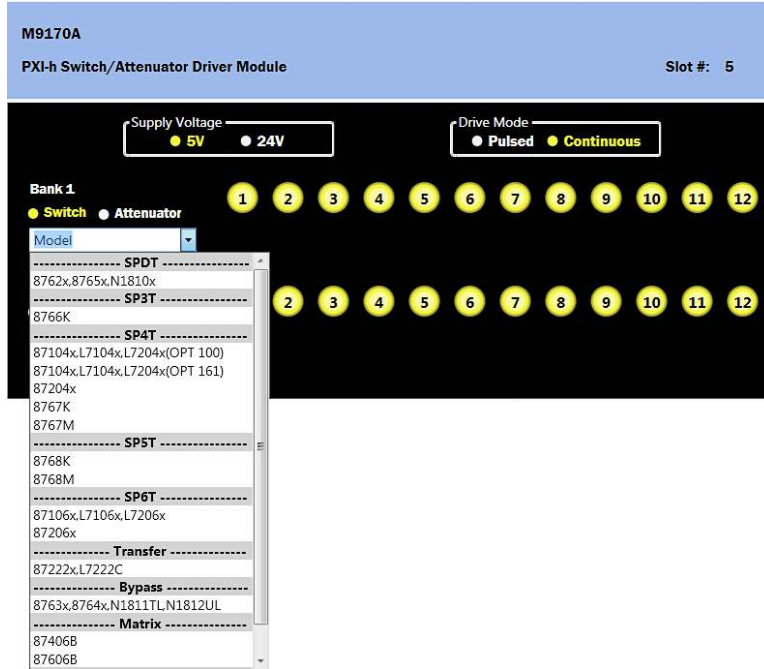


Figure 4. Click the Switch or Attenuator button and select a device model

1. If you select switch model 87104x, you can turn on or off the switches by clicking their respective port buttons. Below is an example:

- Bank 1 with switch 87104x selected
- Supply Voltage at 24 V
- Drive Mode is pulsed

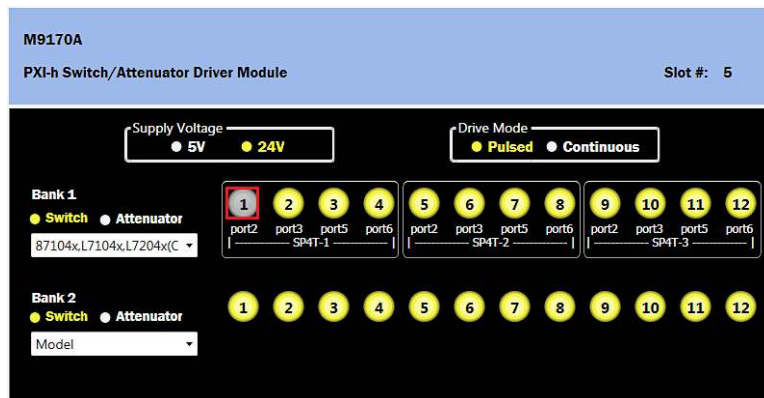


Figure 5. Click on the port according to the desired switching path 87104x

Click on the port according to desired switching path and measure the input and output RF port of that path.

2. If you select switch model 87222x, you can turn on or off the switches by clicking their respective port buttons. Below is an example:

- Bank 1 with switch 87222x selected
- Supply Voltage at 24 V
- Drive Mode is continuous

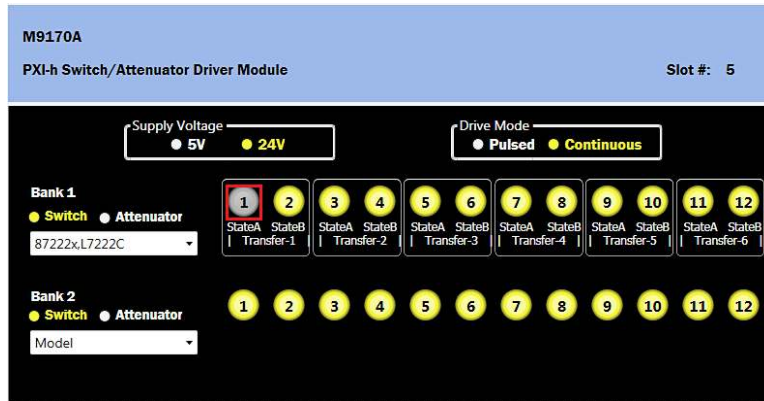


Figure 6. Click on the port according to the desired switching path 87222C

Click on the port according to the desired switching path and measure the input and output RF port of that path.

3. Users can use both Bank 1 and Bank 2 for their applications; Select a switch model from the drop down menu. Below is an example:

- Bank 1 with **switch** 87106x selected, Bank 2 with **switch** N1810x selected
- Supply Voltage at 24 V
- Drive Mode is pulsed

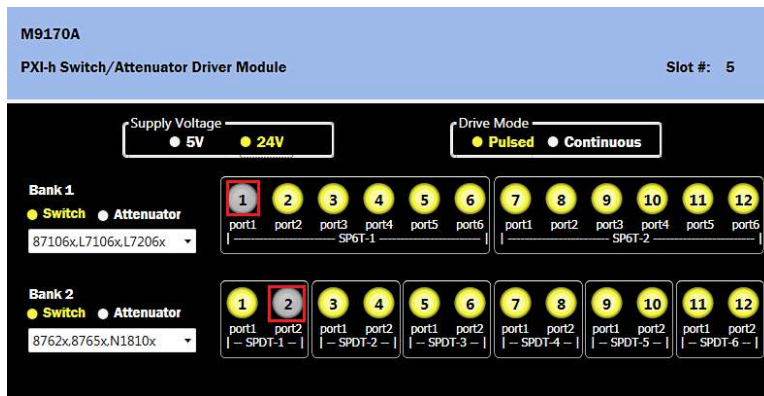


Figure 7. Click on the port according to the desired switching path

Click on the port according to the desired switching path and measure the input and output RF port of that path.

4. If you select an attenuator model, you can select the attenuation level by clicking the respective level buttons. The selected level will be displayed in the **Total Atten (dB)** field. Below is an example:

- Bank 1 with **attenuator** 8495G selected
- Supply Voltage at 24 V
- Drive Mode is Continuous
- The default attenuation is 70 dB (Total Atten (dB) is based on attenuator model selected)

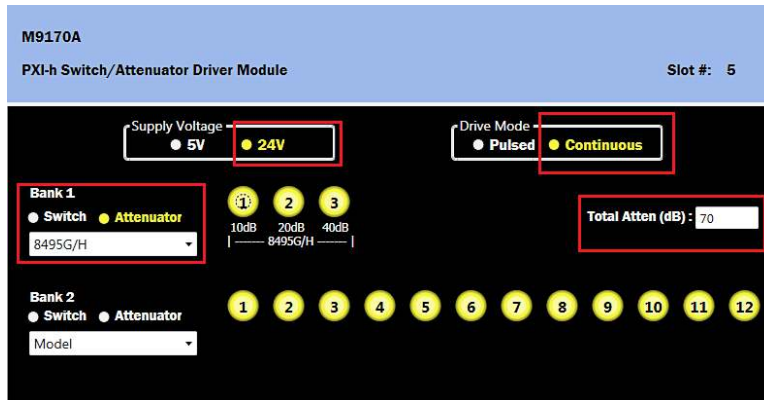


Figure 8. The default attenuation is 70 dB

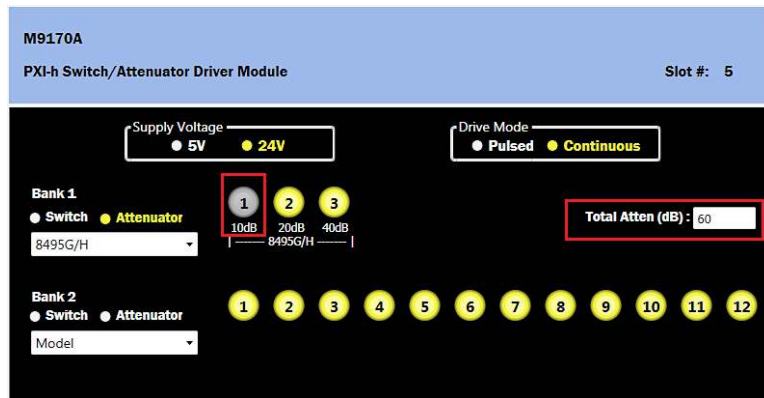


Figure 9. LED OFF de-selects the attenuation

Summary

By following the procedures in this demo guide, you will be able to see the functionality of the M9170A to drive switches and attenuators externally. This guide also applies to chassis from other PXI vendors, as well as compatibility with most PXI programming software.

Appendix 1: SFP simulation mode

Check **Simulation Mode** and select the module model for mock-up SFP

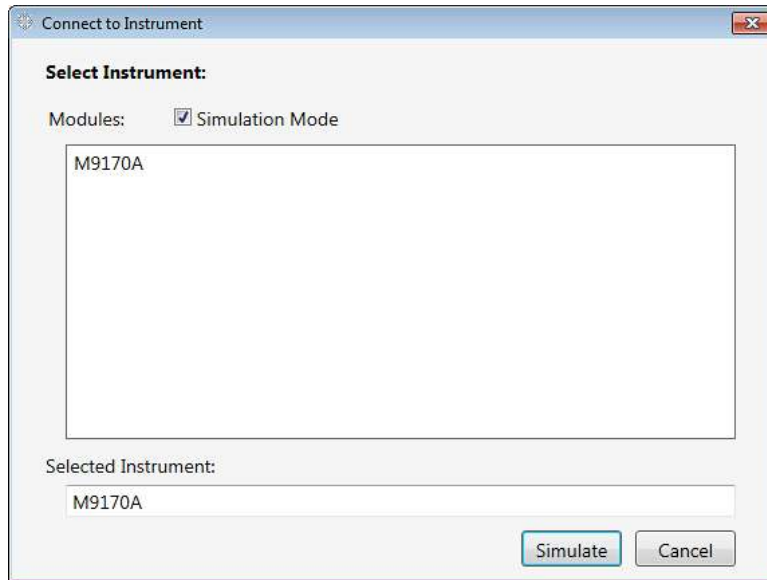


Figure 10. Simulation Mode

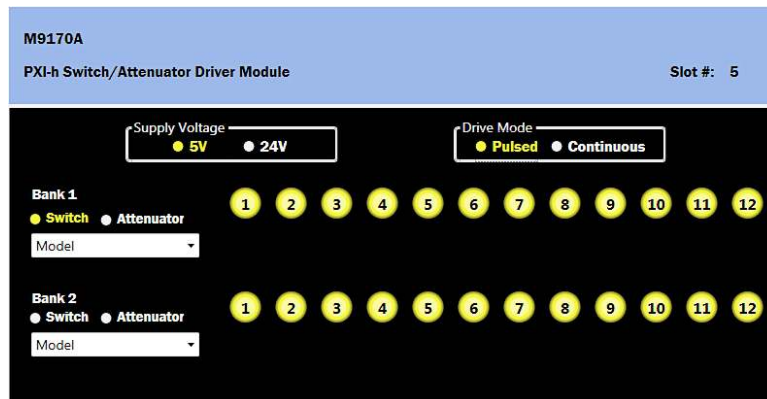


Figure 11. Simulation Mode 2

Appendix 2: Assembly Cable

Cable option	Part number	Description
Option 001	M9170-20005	20 pin to 6x10 pin interface cable assembly
Option 002	M9170-20008	20 pin to 10 pin interface cable assembly
Option 003	M9170-20009	20 pin to 12 pin Viking interface cable assembly
Option 501	M9170-20007	20 pin to 6x9 pin D-Sub interface cable assembly
Option 601	M9170-20004	20 pin to 2x16 pin interface cable assembly
Option 201	M9170-20006	20 pin to bare wire interface cable assembly

For more information on Keysight's PXI switches, go to www.keysight.com/find/pxiswitch

Related Literature

Keysight M9021A Gen 2, x8 PCIe Cable Interface Module Installation, part number M9021-90001

Keysight M9018A PXIe Chassis data sheet, part number 5990-6583EN

M9170A PXI Attenuator/Switch Driver Module, configuration guide, part number 5991-0052EN

M9170A PXI Attenuator/Switch Driver Module, data sheet, part number 5991-0130EN

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