Keysight Technologies
M9170A PXI Attenuator/Switch Driver Module

Data Sheet



KEYSIGHT TECHNOLOGIES

Overview

Introduction

Keysight Technologies, Inc. now provides an attenuator/switch driver based on the modular PXI platform with an emphasis on ease of configuration and operation.

Product description

The Keysight M9170A one-slot PXI attenuator/switch driver module provides flexible drive control for the expansive portfolio of Keysight RF & microwave step attenuators and electromechanical switches. It is a PXI-hybrid compliant module, which comes with a full-featured graphical interface soft front panel (SFP) for ease of control and trigger.

To maximize the PXI chassis slot utilization and improve testing efficiency, the M9170A is able to drive a combination of:

- 12 external SPDT switches or
- 4 external SP4T/6T switches or
- 12 external transfer switches or
- 2 external step attenuators



Occupying just a single slot in a PXI chassis, the M9170A provides an alternative to drive Keysight's broad portfolio of standalone switches and attenuators.

The M9170A also provides over-current protection.

Applications

- Automatic Test Equipment (ATE)
- RF communications
- Engineering verification
- RF parametric measurements
- Mid- and high-density signal routing matrix

Features

- Drive up to 12 external SPDT switches, or 4 external SP4T/6T switches, or 12 transfer switches, or 2 external attenuators [1]
- Dual Voltage supply of 5V and 24V
- Dual variation of driving modes: pulsed and continuous
- Soft front panel provides a dynamic dashboard view and control of the connected attenuators or switches
- Point-to-point interface cable options available to facilitate seamless connection between the module and the various types of Keysight switches and attenuators

Customer values

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

1. The amount of switches and/or attenuators that can be simultaneously driven is restricted by the load current of 2A per bank.

Easy Setup ... Test ... and Maintenance

Hardware Platform

Connectors

The M9170A consists of two independent banks with 12 channels in each bank. Connection to each bank is made via the front panel through a 20-pin connector header. Please refer to the ***M9170A Configuration Guide*** (5991-0052EN) for instructions on point-to-point connection between the driver module and the switches/attenuators.

Interface cables

The M9170A occupies one slot in a PXI chassis and is connected to the external switches and attenuators by selecting one of the six customized interface cables. These cables will facilitate a convenient and secure connection for all devices. By having the interface cable, without mounting the switches or attenuators onto the module, you can freely attach an RF switch to the system to create the shortest length between the switch and the instrument. A shorter RF path ensures minimum power loss.

Compliance

The M9170A is PXI compliant using either a PXI-H, PXI-1 or cPCI slot. Designed to benefit from fast data interfaces, the M9170A can be integrated with other test and automation modules in PXI, Compact PCI, and Hybrid chassis. The PXI format offers high performance in a small rugged footprint and is an ideal deployment platform for many automated test systems. A wide array of complementary PXI products is currently available. Products include multimeters, waveform generators, local oscillators, digitizers, and switch multiplexers.

Software Platform

Drivers

Keysight's M9170A comes complete with software drivers for Windows XP, Windows Vista, Windows 7, and LabVIEW. Also included are application code examples for LabVIEW, LabWindows/CVI, Visual Studio, C, C++, and MATLAB.

Customized interface cables



M9170A-001



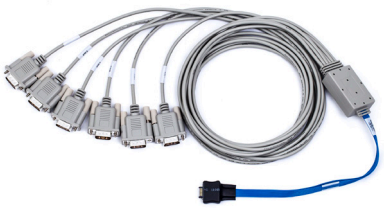
M9170A-002



M9170A-003



M9170A-201



M9170A-501



M9170A-601



M9170A-602

Easy Setup ... Test ... and Maintenance

Soft Front Panel (SFP)

The M9170A graphical user interface guides developers through the module setup process. Users can quickly configure the module parameters. The interfaces are implemented using the IVI standard supporting both IVI-COM and IVI-C. The soft front panel provides an intuitive approach for program simulation and troubleshooting.

Figure 1 below shows the SFP of the M9170A, which allows the user to select the supply voltage, drive mode, and the switch/attenuator model (for each bank).

As shown in Figure 2a and 2b, the SFP provides a list of compatible switches and attenuators that could be driven by the M9170A. The flexibility of this PXI attenuator/switch driver module provides intuitive configuration for all Keysight switches and attenuators.

The soft front panel provides an overall dynamic dashboard view of the switch and/or attenuator status of the switching states and attenuation levels. In addition to the dynamic dashboard view, you can also run IVI command to get the required state and attenuation levels, whether the drive line is in OPEN state or GND state.

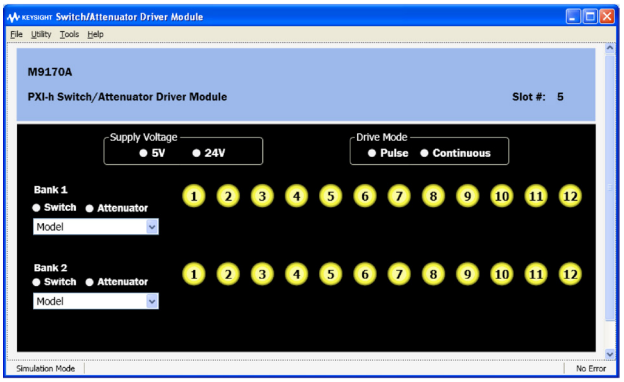


Figure 1. Soft front panel for M9170A

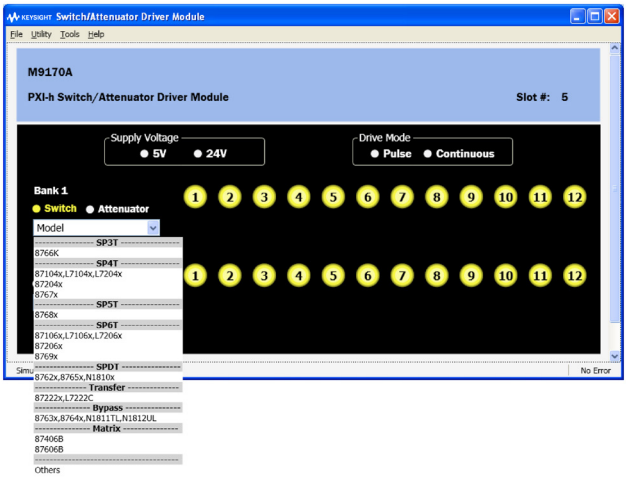


Figure 2a. Selection of switch models via M9170A soft front panel

Detailed configuration information is available in ***Keysight M9170A Configuration Guide, 5991-0052EN***.

Easy software integration

Keysight's M9170A comes complete with software drivers for Windows XP, Windows Vista, Windows 7, and LabVIEW. Also included are application code examples for LabView, LabWindows/CVI, Visual Studio, C, C++, C#, Visual Basic, and MATLAB, which provide the M9170A setup and basic switching functionality. The application code examples are easily modified to quickly integrate the module into your measurement system.

Calibration intervals

The M9170A is factory calibrated and shipped with an ISO-9001, Functional Test Certificate (FTC).

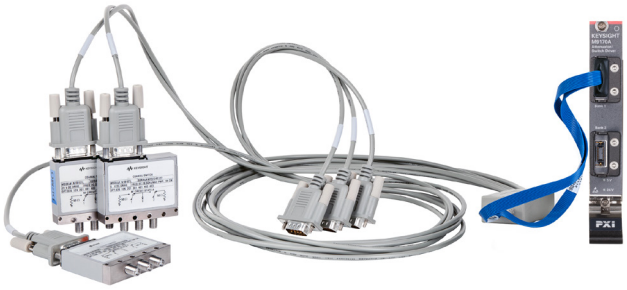


Figure 3. Drive three SPDTs with M9170A using Option 601 interface cable

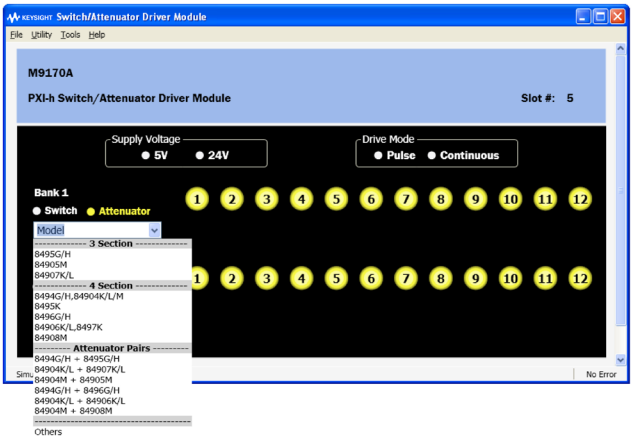


Figure 2b. Selection of attenuator models via M9170A soft front panel

Technical Specifications

Specifications				
Drive Power Supply		M9170A		
Voltage		23 ± 10% 4.5 ± 10%		
Current		1.0A for 24V supply 3.85A for 5V supply		
Power requirements				
Power consumption from the backplane supply is as follows:				
Voltage	+3.3 V	+5 V	–12 V	+12 V
Current	0.5 A	30 mA (min) 5.6 A (max)	0	30 mA (min) 0.8 A (max)
Dynamic characteristics				
Typical operating speed = 17 ms				
Input characteristics				
Channels = 24 single-coil non-latching relay drivers				
Environmental and physical specifications				
Temperature range				
Operating		0 to 55 °C		
Non-operating		–40 to 70 °C		
Relative humidity				
Operating		95% RF at 40 °C, 24 hours cycling, repeated 5 times		
Non-operating		50% RH at –10 to 25 °C, 24 hour cycle		
Vibration				
Operating random		5–500 Hz, 0.3 g RMS		
Vibration				
Survival random vibration		5–500 Hz, 3.41 g RMS		
Shock				
End use handling shock		Half sine wave form, 120 in/s, duration < 3 ms		
Transportation shock		Trapezoidal, 50 g		
Altitude test				
Operating/non-operation		15,000 ft (4600 m)		
ESD immunity				
Air discharge		15 kV per IEC61000-4-2		
Direct discharge		8 kV per IEC61000-4-2		
Safety		This product has input power below the requirements as specified in the Low Voltage Directive (2006/95/EC)		
EMC		EMC Standard: IEC 61326-1:2005 / EN 61326-1:2006 Emissions: CISPR 11:2003 / EN55011:2007 Immunity: IEC 61000-4-3:2002 / EN 61000-4-3:2002 Electrostatic Discharge: IEC 61000-4-2:2001 / EN 61000-4-2-:1995+A1:1998+A2:2001 EMC/EMI:CE, C-Tick		
CE compliance		EMC Compatibility Directive (EMC): 2004/108/EC		
Warm-up time		Refer to PXI Chassis warm up time		
Dimensions				
M9170A		3U PXI/Compact PCI standard Front panel complies with IEEE 1101.10 certification and compliance. 174.8 x 128.7 x 20 mm		
Weight		230 g		
Connector compatibility		PXI-H, PXI-1, cPCI		

Configuration

Software

Model	Description
Software development platform	Microsoft Visual Studio with C/C++ Microsoft Visual Studio .NET with C# or Visual Basic, National Instruments LabVIEW, National Instruments, LabWindows CVI, The MathWorks MATLAB, Keysight VEE
Supported operating systems	Windows XP SP3, 32-bit Windows Vista 32/64-bit Windows 7 32/64-bit
Drivers provided	IVI-COM, IVI-C, LabView, MATLAB
Included GUI	Soft front panel
Application code examples	C, C++, C#, Visual Basic, VEE, MATLAB

Recommended configuration

Model	Description
M9018A	PXIe chassis, 18-slots, 3U, 8 GB/s
M9170A	PXI-h attenuator/switch driver module
M9170A-501	Interface cable, 20 pin to 9 pin DSUB (x6) for N1810x SPDT switch
N1810TL	Coaxial switch, DC up to 67 GHz, SPDT

Module and chassis compatibility

PXI chassis compatibility
Compatible with all chassis conforming to the 3U PXI and 3U cPCI specifications
Compatible with Keysight M9018A PXIe chassis, 18-slots, 3U, 8 Gb/s

Ordering information

Model	Description
M9170A	**PXI-h attenuator/switch driver module**
Options	
001	Interface cable, 20 pin to 10 pin DIP (x6) for transfer switch
002	Interface cable, 20 pin to 10 pin DIP for step attenuator
003	Interface cable, 20 pin to 12 pin Viking connector for step attenuator
201	Interface cable, 20 pin to 16 pin bare wire for solder lug switch
501	Interface cable, 20 pin to 9 pin DSUB (x6) for N1810x SPDT switch
601	Interface cable, 20 pin to 16 pin DIP (x2) for 8710x/L710x switch
602	Interface cable, 20 pin to 16 pin DIP (x2) for 8710x/L710x switch

Related products

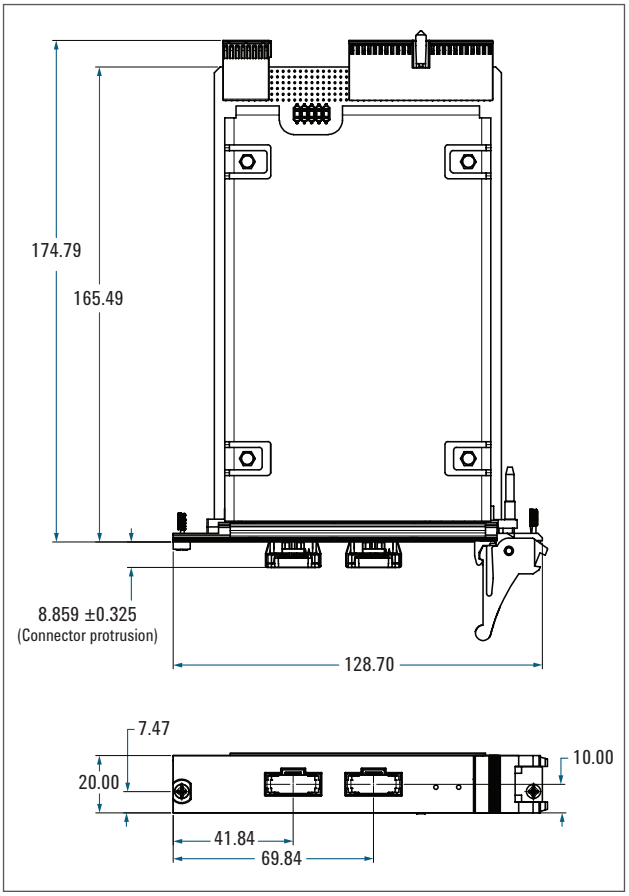
Model	Description
M9018A	PXIe chassis, 18-slots, 3U, 8 GB/s
87106C	Multiport coaxial switch, DC to 26.5 GHz, SP6T
8765C	Coaxial switch, DC to 26.5 GHz, SPDT
8496G	Programmable attenuator, DC to 4 GHz, 110 dB, 10 dB steps
L7104A	Multiport coaxial switch, DC to 4 GHz, SP4T, Terminated
8494H	Programmable attenuator, DC to 18 GHz, 11 dB, 1 dB step
M9155C	PXI dual SPDT coaxial switch, DC to 26.5 GHz, Unterminated
M9157C	PXI single SP6T coaxial switch, DC to 26.5 to GHz, Terminated



Figure 4. M9170A can drive multiple switches and attenuators with the point-to-point interconnect

Mechanical Information

Dimensions are in mm nominal, unless otherwise specified.



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