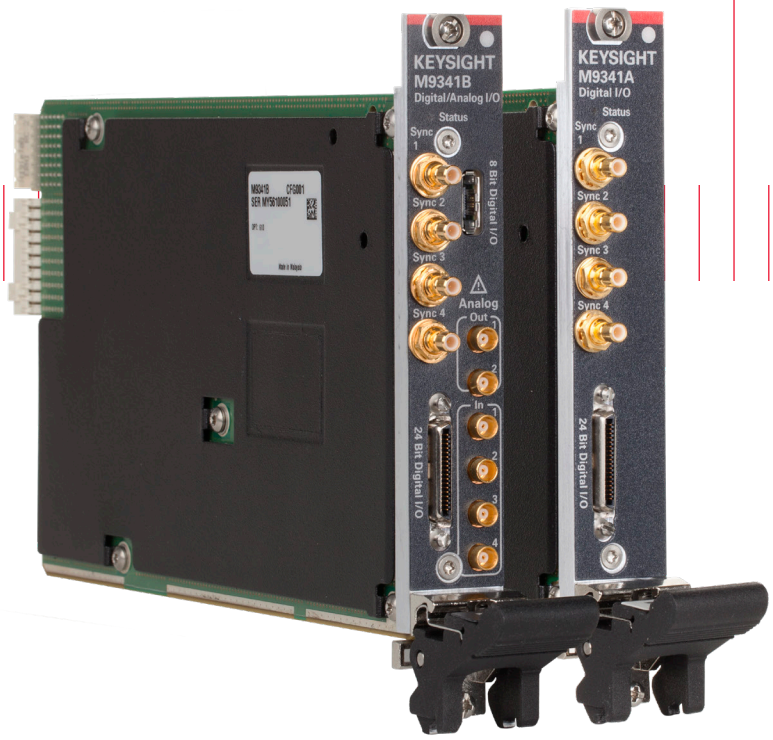
Keysight Technologies
M9341A PXIe Digital I/O
M9341B PXIe Digital/Analog I/O

Data Sheet



KEYSIGHT TECHNOLOGIES

Unlocking Measurement Insights

M9341A

Overview

The Keysight M9341A Digital I/O with the 24-bit digital I/O connector and triggering ports provides communication signals between the PXI vector network analyzer (VNA) installed in the same PXI chassis and an external handler.

This allows the PXI VNA such as the Keysight M937xA and M9485A to be used in an automated test environment, where devices to be tested are inserted into a test fixture by a part handler, and sorted into pass/fail bins by the handler after testing is complete. By connecting the part handler to the M9341A digital I/O connector, the VNA and part handler can synchronize their activities in a way that makes automated testing possible.

The M9341A digital I/O also compatible with the 24-bit digital I/O connector on the rear panel of the Keysight PNA and ENA Series.



Key specifications/features

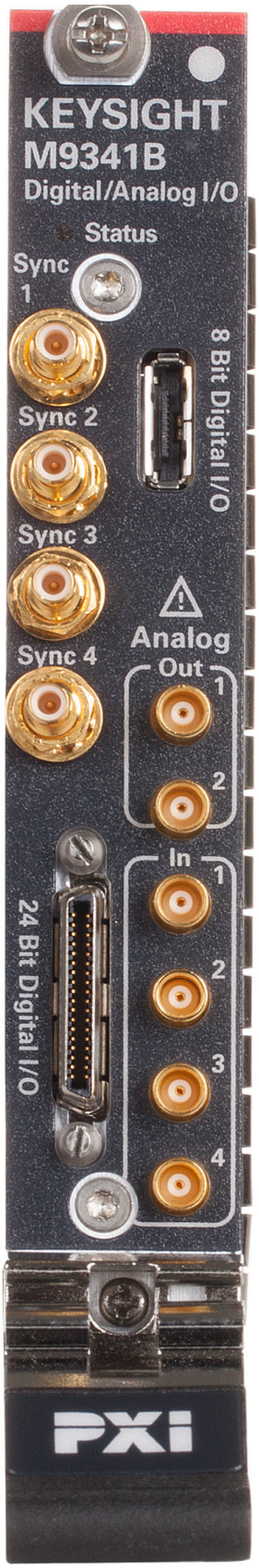
- Digital I/O for communication for the PXI VNA with external peripherals (i.e. handler)
- Synchronized measurements with the PXI VNA in an automated test environment
- Compatible with the 24-bit digital I/O connector on the PNA and ENA

M9341B

Overview

The Keysight M9341B PXIe Digital and Analog I/O is equipped with a 24-bit digital I/O and an 8-bit digital I/O to allow users to control the device under test (DUT) directly with serial or parallel digital signals[1]. For example, the signals from the M9341B can be applied to select operation modes of the RF front-end module which integrates power amplifiers, switches, low noise amplifiers, duplexer or filters in a single component. The operation with the M9341B is synchronized with the measurement sweep by the Keysight PXI VNA such as the M937xA Series or the M9485A, greatly improving measurement throughput.

For more comprehensive analysis, the M9341B has four analog input connectors to allow sensing of DC voltages from the DUT. The measured DC voltage can be displayed on the PXI VNA screen. The 1-slot module also supports two variable DC source outputs to control the DUT, while the DC source current can be monitored during measurements.



Key specifications/features

- 8-bit digital I/O for controlling DUT operation mode with serial/parallel signals
- 24-bit digital I/O for communication for the PXI VNA with external peripherals (i.e. handler)
- Synchronized DC measurements with the PXI VNA. Two DC source outputs (up to ±10 V) with current monitor functions and four DC source inputs for sensing DC voltages from the DUT

1. Serial signals from 8-bit I/O can provide up to 4-channels RFFE-like interface with software selectable clock rate (25 MHz maximum). Please refer to the help file for detail.

Specifications

Definitions

Specification (spec.):

Warranted performance. All specifications apply at 25 °C (± 5 °C) range ambient and module temperature between 27 °C to 39 °C as reported by the module, unless otherwise stated, and 45 minutes after the module has been turned on.[1] Specifications include guard bands to account for the expected statistical performance distribution, measurement uncertainties, and changes in performance due to environmental conditions.

Typical (typ.):

Expected performance of an average unit which does not include guardbands.

General Characteristics:

A general, descriptive term that does not imply a level of performance.

Boundary Conditions:

If the same boundary conditions fall under more than one category in a table, apply the best value.

1. Not only chassis power on but also VNA firmware execution is required to turn on the module.

24 Bit Digital I/O Specification

Description	General Characteristics	Typical
Connector Type	CHAMP 0.8mm, 36 pos Receptacle[1]	
Input Signal		
Logic	3.3 V TTL	
Input Voltage Range	-0.5 V to + 5.5 V	
High-level Input Voltage	+2.0 V Min	
Low-level Input Voltage	+0.8 V Max	
Output Signal		
Logic	3.3 V TTL	
High-level Output Current	-5 mA	
Low-level Output Current	+3 mA	
Output Impedance		100 Ω
Power Supply		
Output Voltage		+4.5 V min, +5.5 V max
Maximum Output Current		100 mA

8 Bit Digital I/O Specification (M9341B Only)

Description	General Characteristics	Typical
Connector Type	ST series, 10 pos receptacle	
Power Supply (VIO)[2]		
Output Voltage		+3.3 V, +1.8 V, or +1.2 V
Voltage Accuracy		±5%
Maximum Output Current		100 mA
Input Signal		
Input Voltage Range		0 V to VIO
Minimum High-level Input Voltage		+2.0 V (at VIO = +3.3 V) +1.17 V (at VIO = +1.8 V) +0.78 V (at VIO = +1.2 V)
Maximum Low-level Input Voltage		+0.8 V (at VIO = +3.3 V) +0.63 V (at VIO = +1.8 V) +0.42 V (at VIO = +1.2 V)
Output Signal		
Minimum High-level Output Voltage		VIO - 0.1 V (at Io = -100µA)
Maximum Low-level Output Voltage		+0.1 V (at Io = 100µA)

1. M9341A-001 provides conversion cable to the 36-pin centronics, female which is compatible with ENA and PNA handler I/F.
2. Some wait time may be required until the voltage reaches the setting value at voltage setting change. See help for more detail.

Analog I/O Specification (M9341B Only)

Description	Specification	Typical/ General Characteristics
Input Ports		
Number of Ports		4
Connector Type		MCX female
Input Voltage Range	±10 V, ±5 V, and ±1 V (selectable)	
Input Impedance		10 MΩ (nom), > 1 kΩ (at power off state)
Measurement Accuracy[1]	At measurement time = 10 ms ±(0.1% reading + 0.2% range)	
Damage Level		±15 V
Output Ports		
Number of Ports		2
Connector Type		MCX female
Output Voltage Range	±10 V	
Output Voltage Resolution		1 mV
Maximum Output Current	Mode 1: ±500 mA (Port 1) and ±100 mA (Port 2) Mode 2: ±50 mA (Ports 1 and 2)	
Output Impedance (at Port)		Mode 1: 0 Ω (nom), Mode 2: 50 Ω (nom)
Output Voltage Ripple and Noise		2 mVrms (20 Hz – 20 MHz)
Output Voltage Accuracy[1, 2]	±(0.2% + 20 mV) at no load with user compensation	±(0.14% + 14 mV) at no load with user compensation ±(0.42% + 40 mV) at no load without user compensation
Output Current Monitor Accuracy		At measurement time = 10 ms Mode 1: ±(1% + 7 mA) Mode 2: ±(1% + 1 mA)

Sync Ports Specification

Description	Connector Type	Typical
Sync 1 to 3	SMB male	
Logic		3.3 V TTL

Miscellaneous

Description	General Characteristics
Size	1 PXIe slot, compatible with PXI hybrid slots
Dimensions	212 mm x 20 mm x 128 mm
Weight (net)	330 g (M9341A), 490 g (M9341B)
Power Drawn from Chassis[3]	5.2 W max (M9341A), 32.0 W max (M9341B) +3.3 V: 0.73 A (M9341A), 2.80 A (M9341B) +5 V: 0 A +12 V: 0.23 A (M9341A), 1.96 A (M9341B) -12 V: 0 A

1. This specification is applied at single usage in the chassis and may be affected by grounding condition.
2. Validation of user compensation: 1 hour and ±3 °C from user compensation. Additional error (typ): 6 mV at 100 mA output (load ≥ 12.1 Ω); 21 mV at 500 mA output (load ≥ 2.2 Ω)
3. At maximum load: Output current from Analog Out Port 1, Analog Out Port 2, +5VIO of 24-bit I/O, and VIO of 8-bit I/O are 500 mA, 100 mA, 100mA, and 100 mA, respectively.

General Characteristics

EMC, safety, environment and compliance

Description	Specification
EMC	
CE ISM 1-A	European Council Directive 2014/30/EC IEC 61326-1:2012 EN 61326-1:2013 CISPR 11:2009 +A1:2010 EN 55011: 2009 +A1:2010 Group 1, Class A IEC 61000-4-2:2008 EN 61000-4-2:2009 4 kV CD / 8 kV AD IEC 61000-4-3:2006 +A1:2007 +A2:2010 EN 61000-4-3:2006 +A1:2008 +A2:2010 3 V/m, 80-1000 MHz, 1.4 - 2.0 GHz / 1V/m, 2.0 - 2.7 GHz, 80% AM IEC 61000-4-4:2004 +A1:2010 EN 61000-4-4:2004 +A1:2010 2 kV power lines / 0.5 kV signal lines IEC 61000-4-5:2005 EN 61000-4-5:2006 1 kV line-line / 2 kV line-ground IEC 61000-4-6:2008 EN 61000-4-6:2009 3 V, 0.15-80 MHz, 80% AM IEC 61000-4-8:2009 EN 61000-4-8:2010 30A/m, 50/60Hz IEC 61000-4-11:2004 EN 61000-4-11:2004 0.5-300 cycle, 0% / 70%
ICES/NMB-001	ICES-001:2006 Group 1, Class A
	AS/NZS CISPR11:2004 Group 1, Class A

General Characteristics continued

EMC, safety, environment and compliance

Description	Specification
	KN11, KN61000-6-1 and KN61000-6-2 Group 1, Class A South Korean Class A EMC declaration: Information to the user: This equipment has been conformity assessed for use in business environments. In a residential environment this equipment may cause radio interference. ※ This EMC statement applies to the equipment only for use in business environment. 사 용 자 안 내 문 | 기기는 업무용 환경에서 사용할 목적으로 적합성평가를 받은 기 가정용 환경에서 사용하는 경우 전파간섭의 우려가 있습니다.
Environment	
	This product complies with the WEEE Directive (2002/96/EC) marking requirements. The affixed label 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 I, this product is classed as a “Monitoring and Control instrumentation” product. Do not dispose in domestic household waste. To return unwanted products, contact your local Keysight office

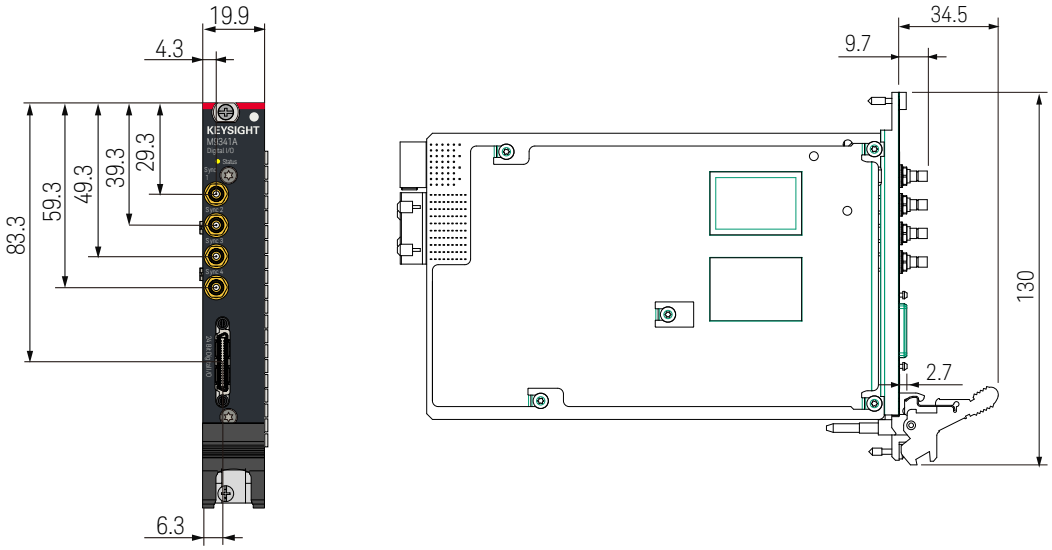
General Characteristics continued

Analyzer environmental specifications

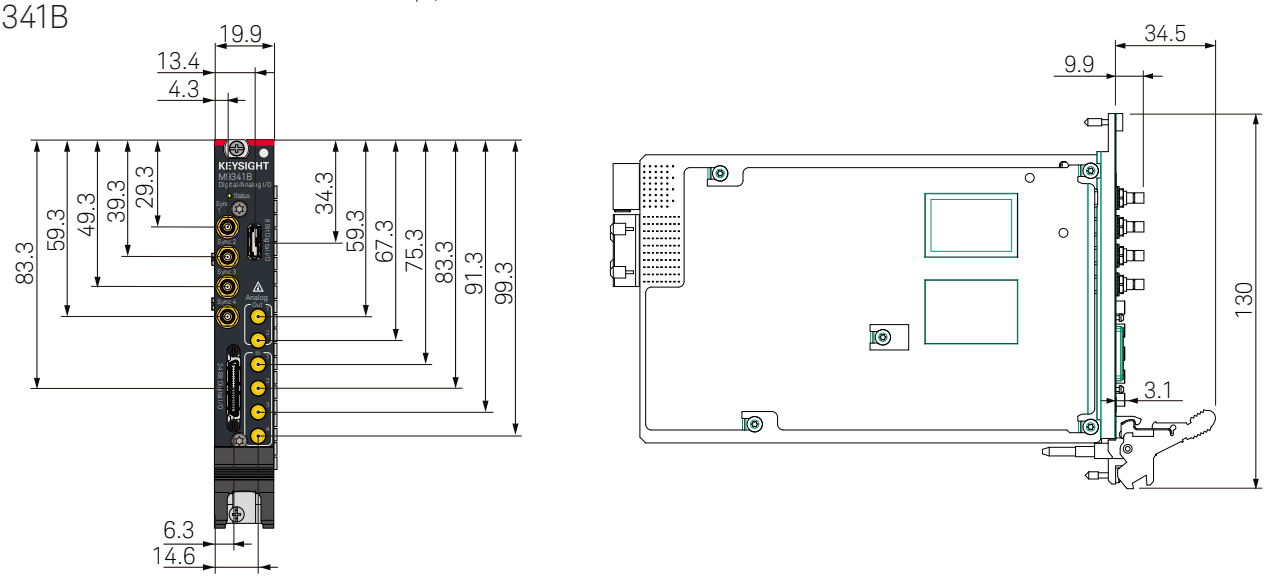
Operating environment	General characteristics
Temperature	0 to 55 °C ambient 0 to 55 °C module temperature
Humidity	20% to 80% at wet bulb temperature < +29 °C (non-condensation)
Altitude	0 to 2,000 m (0 to 6561 feet)
Vibration	0.21 G maximum, 5 Hz to 500 Hz
Non-operating environment	**General characteristics**
Temperature	-40 °C to +70 °C
Humidity	20% to 90% at wet bulb temperature < +40 °C (non-condensation)
Altitude	0 to 4,572 m (0 to 15,000 feet)
Vibration	0.5 G maximum, 5 Hz to 500 Hz

Dimensions

M9341A

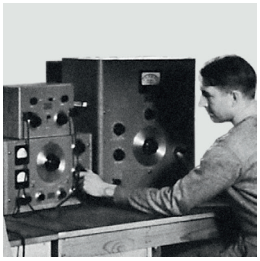


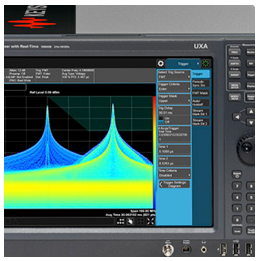
M9341B



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