

**Agilent M9185A
PXI Isolated
8/16-Channel D/A
Converter**

Startup Guide



Agilent Technologies

Notices

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- www.agilent.com/find/M9185A
(product-specific information and support, software and documentation updates)
- www.agilent.com/find/assist
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CAUTION

A **CAUTION** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like 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.

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A **WARNING** notice denotes a hazard. It calls attention to an operating procedure, practice, or the like 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.

The following safety precautions should be observed before using this product and any associated instrumentation.

This product is intended for use by qualified personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product. Refer to the user documentation for complete product specifications.

WARNING

If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

The types of product users are:

- Responsible body is the individual or group responsible for the use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring that operators are adequately trained.
- Operators use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.
- Maintenance personnel perform routine procedures on the product to keep it operating properly (for example, setting the line voltage or replacing consumable materials). Maintenance procedures are described in the user documentation. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.
- Service personnel are trained to work on live circuits, perform safe installations, and repair products. Only properly trained service personnel may perform installation and service procedures.

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30V RMS, 42.4V peak, or 60VDC are present.

A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.

Operators of this product must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock.

Before operating an instrument, ensure that the line cord is connected to a properly-grounded power receptacle. Inspect the connecting cables, test leads, and jumpers for possible wear, cracks, or breaks before each use.

When installing equipment where access to the main power cord is restricted, such as rack mounting, a separate main input power disconnect device must be provided in closed proximity to the equipment and within easy reach of the operator.

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before: connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.

The instrument and accessories must be used in accordance with its specifications and operating instructions, or the safety of the equipment may be impaired.

CAUTION

- Do not exceed the maximum signal levels of the instruments and accessories, as defined in the specifications and operating information, and as shown on the instrument or test fixture panels, or switching card.
 - Chassis connections must only be used as shield connections for measuring circuits, NOT as safety earth ground connections.
 - If you are using a test fixture, keep the lid closed while power is applied to the device under test. Safe operation requires the use of a lid interlock.
 - Instrumentation and accessories shall not be connected to humans.
-

To maintain protection from electric shock and fire, replacement components in mains circuits - including the power transformer, test leads, and input jacks - must be purchased from Agilent. Standard fuses with applicable national safety approvals may be used if the rating and type are the same. Other components that are not safety-related may be purchased from other suppliers as long as they are equivalent to the original component (note that selected parts should be purchased only through Agilent to maintain accuracy and functionality of the product). If you are unsure about the applicability of a replacement component, call an Agilent office for information.

WARNING

No operator serviceable parts inside. Refer servicing to qualified personnel. To prevent electrical shock do not remove covers.

Front and Rear Panels Symbols

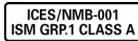


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N10149

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This symbol indicates product compliance with the Canadian Interference-Causing Equipment Standard (ICES-001). It also identifies the product is an Industrial Scientific and Medical Group 1 Class A product (CISPR 11, Clause 4).



This symbol indicates separate collection for electrical and electronic equipment, mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive, 2002/96/EC).



This symbol indicates 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 the product.

Cleaning Precautions

WARNING

To prevent electrical shock, disconnect the Agilent Technologies instrument from mains before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally. To clean the connectors, use alcohol in a well-ventilated area. Allow all residual alcohol moisture to evaporate, and the fumes to dissipate prior to energizing the instrument.

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Introduction

The scope of this Startup Guide is to detail the processes of receiving and setting up the Agilent M9185A PXI Isolated 8/16-Channel D/A Converter, installing the required software, and verifying basic module operation.

If you have any questions after reviewing this information, please contact your local Agilent Technologies, Inc. representative or contact us through our Web site at <http://www.agilent.com/find/M9185A>.

Related documentation

A softcopy of this Startup Guide, and the documentation listed below, can be found on the CD-ROM that is shipped with this product. You can also download them for free through our Web site at www.agilent.com/find/M9185A.

Check the manual revision on the first page of each manual.

- **Startup Guide.** This manual. Printed copy for outdoor use, included with shipment.
- **Agilent M9185A PXI D/A Converter Device Drivers and Help.** Available for IVI-C and IVI-COM, and LabVIEW G drivers.
- **Agilent M9185A PXI D/A Converter Soft Front Panel Software and Help.**
- **Agilent M9185A PXI D/A Converter Data Sheet.**

Step 1: Unpack and Inspect the Module

CAUTION

The M9185A is shipped in materials which prevent damage from static. The module should only be removed from the packaging in an anti-static area after ensuring that correct anti-static precautions are taken. Store all modules in anti-static envelopes when not in use.

ESD precaution

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.

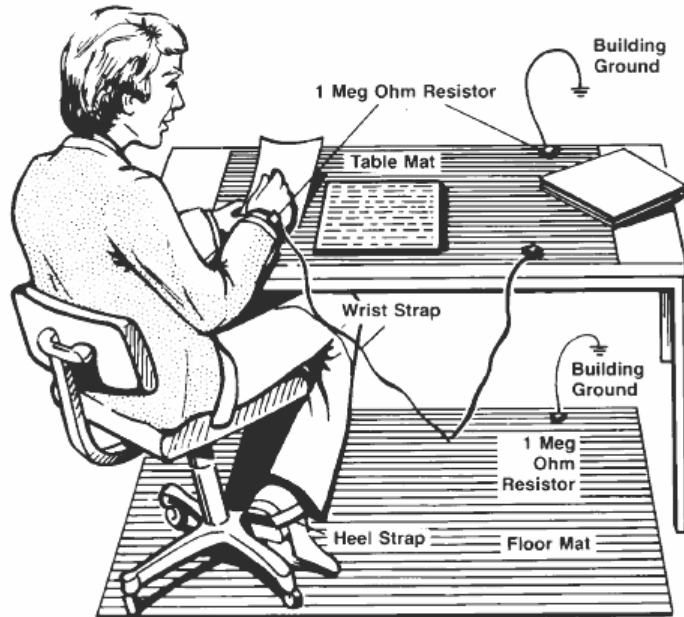


Figure 1 Static-safe work station example

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 Ω of isolation from ground.

WARNING

These techniques for a static-safe work station should not be used when working on circuitry with a voltage potential greater than 500 V.

Inspect the module for damage

After unpacking the M9185A, carefully inspect the unit for any shipping damage. Report any damage to the shipping agent immediately, as such damage is not covered by the warranty (warranty information can be found at the beginning of this manual).

CAUTION

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

NOTE

Information on preventing damage to your Agilent equipment can be found at www.agilent.com/find/tips.

Return the module for service

Should it become necessary to return the M9185A for repair or service, follow the steps below:

- 1 Review the warranty information shipped with your product.
- 2 Contact Agilent to obtain a Return Material Authorization (RMA) and return address. If you need assistance finding Agilent's contact information, go to www.agilent.com/find/assist (worldwide contact information for repair and service) or refer to the Support information on the product web page at www.agilent.com/find/M9185A.
- 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.
 - Product model number (for example, M9185A).
 - Product serial number (for example, MYXXXXXXXXX). 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, but only after the software is installed.
 - Description of failure or service required.
- 4 Carefully pack the module in its original ESD bag and packing carton. If the original carton is not available, use bubble wrap or packing peanuts and place the instrument in a sealed container and mark the container "FRAGILE".
- 5 On the shipping label, write "**ATTENTION REPAIR DEPARTMENT**" and the RMA number.

NOTE

If any correspondence is required, refer to the product by its serial number and model number.

Step 2: Verify the Shipment Contents

The following items are included in the M9185A shipment:

- *M9185A digital-to-analog converter Software and Product Information CD-ROM* (M9185-10001) - contains software, drivers, and all product documentation in PDF format.
- Printed copy of this document, *M9185A Startup Guide*
- Calibration certificate

NOTE

Every PXI module is shipped with a Software and Product Information CD-ROM. The M9185A-CD1 option provides the *M9185A Software and Product Information CD-ROM* (M9185-10001).

All of the files contained on the CD are available for free download at the Agilent Web site at www.agilent.com/find/M9185A.

Step 3: Install the Software

System requirements

Table 1 Minimum system requirements

Operating systems	Windows [®] XP SP3 or later (32-bit) Home or Professional	Windows Vista [®] SP1 and SP2 or later (32-bit and 64-bit) Home Basic, Home Premium, Business, Ultimate, or Enterprise	Windows [®] 7 (32-bit and 64-bit) Starter, Home Basic, Home Premium, Professional, Ultimate, or Enterprise
Processor speed	600 MHz or higher required 800 MHz recommended	1 GHz 32-bit (x86) or 1 GHz 64-bit (x64), Itanium 64 is not supported	1 GHz 32-bit (x86) or 1 GHz 64-bit (x64), Itanium 64 is not supported
Available memory	256 MB minimum (1 GB or more recommended)	1 GB minimum	1 GB minimum
Available disk space ^[1]	1.5 GB available hard disk space, includes: <ul style="list-style-type: none"> • 1 GB for Microsoft[®] .NET Framework 2.0 SP2^[2] • 65 MB for Agilent IO Libraries Suite 	1.5 GB available hard disk space, includes: <ul style="list-style-type: none"> • 1 GB for Microsoft[®] .NET Framework 2.0 SP2^[2] • 65 MB for Agilent IO Libraries Suite 	1.5 GB available hard disk space, includes: <ul style="list-style-type: none"> • 1 GB for Microsoft[®] .NET Framework 2.0 SP2^[2] • 65 MB for Agilent IO Libraries Suite
Video	Super VGA (800 × 600) 256 colors or more	Support for DirectX 9 graphics with 128 MB graphics memory recommended (Super VGA graphics is supported)	Support for DirectX 9 graphics with 128 MB graphics memory recommended (Super VGA graphics is supported)
Browser	Microsoft [®] Internet Explorer 6.0 or greater	Microsoft [®] Internet Explorer 7 or greater	Microsoft [®] Internet Explorer 7 or greater
Chassis	A cPCI, PXI-1, or PXIh chassis peripheral slot. The Agilent M9018A chassis is recommended.		
Interface controller	A PXI or PXIe remote or embedded controller.		
Remote controller	An Agilent M9045A ExpressCard interface (for portable laptops) or Agilent M9047A PCIe interface (for desktop PCs) or equivalent PXI or PXIe remote controllers running one of the above operating systems.		

Table 1 Minimum system requirements

Embedded controller	<p>An Agilent M9021A System Interface Card, or equivalent embedded controller running one of the above operating systems.</p> <p>Note: The embedded controller must be compatible with the Agilent M9018A chassis.</p>
Softwares	<ul style="list-style-type: none"> • Agilent IO Libraries Suite 16.0 and above is required. • Adobe® Reader® version 6.0 or higher is required to view the provided PDF files.

- [1] Because of the installation procedures, less memory may be required for the operation than is required for the installation.
- [2] .NET Framework Runtime Components are installed by default with Windows Vista and Windows 7. Therefore, you may not need this amount of available disk space.

Power up the controller

If you are using a remote controller, power up the host computer.

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

- 1 Install the embedded controller module into a compatible chassis.

Recommended: Agilent M9018A 18 slot PXIe Chassis

- 2 Connect your I/O peripherals (mouse, keyboard, and monitor).
- 3 Power up the chassis.

Install the softwares

The M9185A softwares are located on the bundled CD (M9185–10001). The same softwares are also available for free download at the Agilent Web site: www.agilent.com/find/M9185A.

This installation includes the following:

- Agilent IO Library Suite (IOLS), which includes the Agilent Connection Expert.
- Soft Front Panel (SFP), device drivers (IVI-C and IVI-COM, and LabVIEW G), and related user documentation for the M9185A.

NOTE

Each PXI module has its own device driver (IVI-C and IVI-COM, and LabVIEW G) and soft front panel (SFP) software.

- 1 From the CD browser, launch the installer.
- 2 Follow the installer prompts to install all software and documentation for the M9185A PXI D/A Converter.



Figure 2 InstallShield Wizard for Agilent M9185A

- 3 After installation is complete, power down the chassis (and the host PC if using the remote controller).

Step 4: Install the Module

CAUTION

- The PXI hardware does not support “hot-swapping” capabilities (changing modules while power is applied to the chassis).
- Before installing the M9185A into the chassis, ensure that the chassis is powered off and unplugged to prevent damage to the module.

NOTE

The M9185A module can be used in a chassis with a cPCI, PXI-1, or PXIh chassis peripheral slot.



The module can be installed in any standard PXI slot marked with a peripheral slot compatibility image (a circle containing the slot number).



The module can also be installed in any hybrid PXI slot marked with a peripheral slot compatibility image (the letter “H” and a solid circle containing the slot number).

- 1 Ensure that the chassis power switch is at the Off (Standby) position before you unplug the PXI chassis.
- 2 If the chassis has multiple fan speed settings, ensure that the fans are set to automatic. Do not set the fan speed to low or turn it off.
- 3 Position the chassis so that there is 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 an embedded controller, proceed to [step 5](#). If you are using a remote controller, skip to [step 6](#).

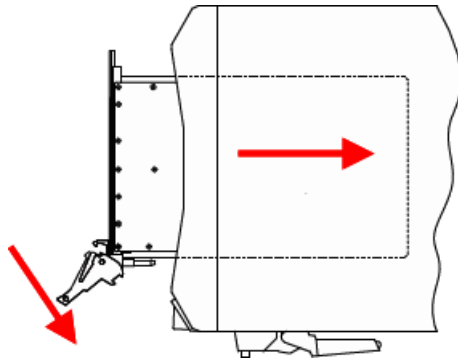


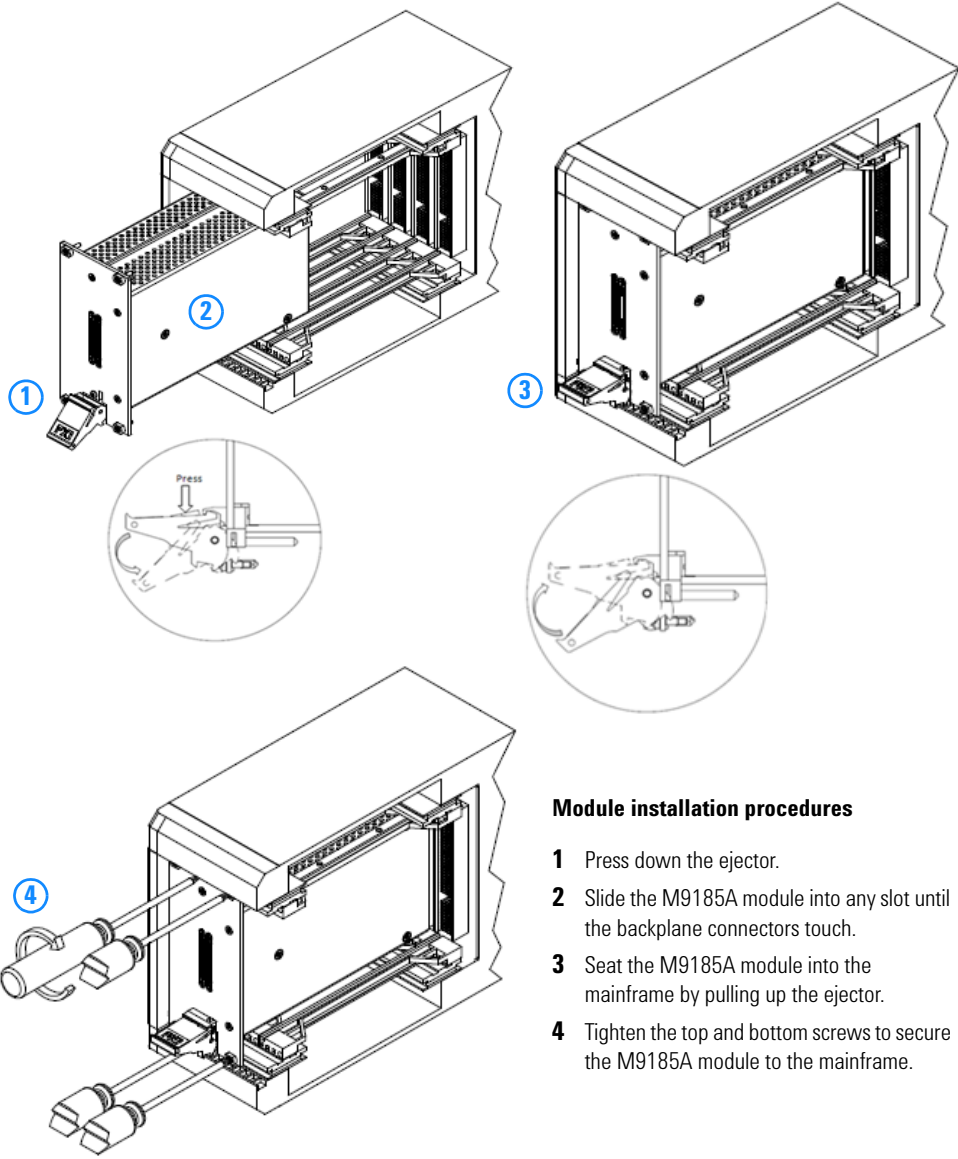
Figure 3 Installing the module to the chassis

- 5 Hold the module by the injector/ejector handle, and slide it into an available PXI (or hybrid) slot, as shown in [Figure 3](#).
 - 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.
- 6 If you are using a remote controller, install the System Interface Card in the chassis.
- 7 Latch the module by pulling up on the injector/ejector handle and secure the front panel to the chassis using the module front-panel mounting screws.
- 8 Tighten the screws on the module (or remote controller) front panel. Performance may suffer if the screws are not tightened properly.
- 9 Verify that the PXI chassis fans are operable and free of dust and other contaminants that may restrict airflow.

- 10** Install all chassis covers and filler panels after installing the module. Missing filler panels may disrupt necessary air circulation in the chassis.
- 11** If you are using a remote controller, connect the System Interface Card in the chassis to host computer.
- 12** Plug in and power up the PXI chassis.
- 13** If you are using a remote controller, reboot the host PC.

WARNING

Tighten the screws on the module front panel. Protection provided by the equipment could be impaired if the screws are not tightened properly.



Module installation procedures

- 1 Press down the ejector.
- 2 Slide the M9185A module into any slot until the backplane connectors touch.
- 3 Seat the M9185A module into the mainframe by pulling up the ejector.
- 4 Tighten the top and bottom screws to secure the M9185A module to the mainframe.

Figure 4 Module installation procedures

M9185A front panel for 8-channel and 16-channel

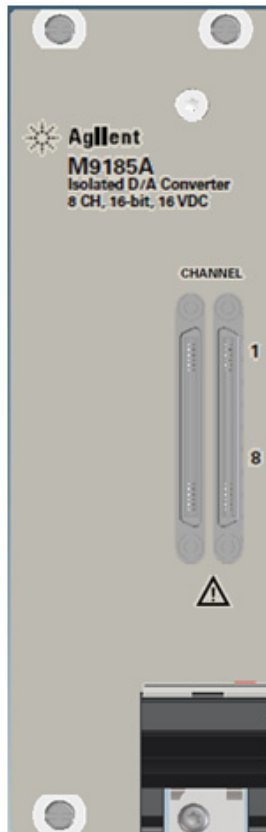


Figure 5 M9185A 8-channel DAC front panel

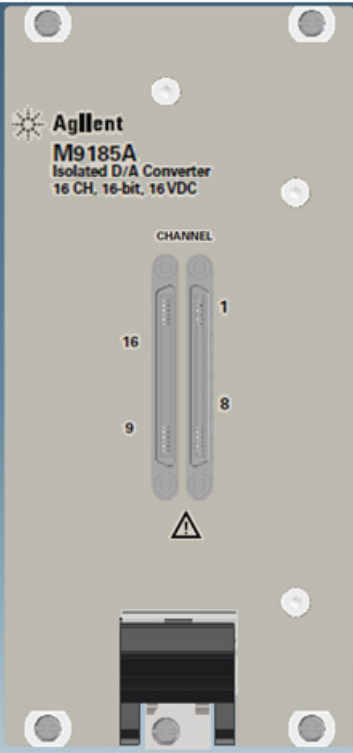


Figure 6 M9185A 16-channel DAC front panel

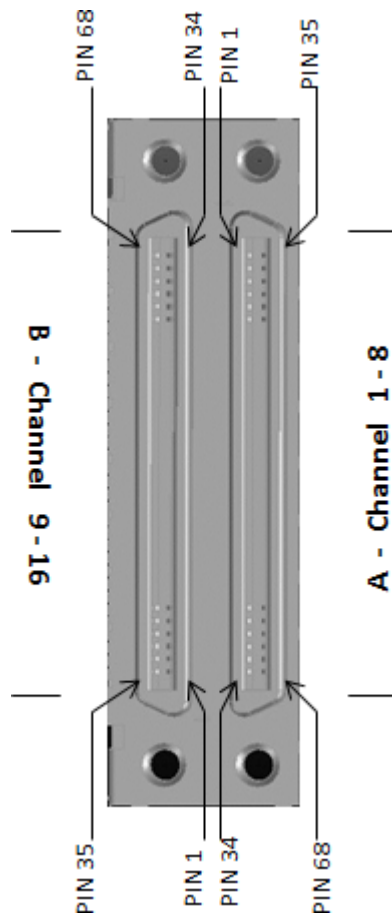


Figure 7 M9185A output connector pinout

Table 2 M9185A output pin assignment (CHAN 1 – 8)

1	CH1_LO	35	CH1_HI
2	CH1_LOS	36	CH1_HIS
3	GND	37	GND
4	CH2_LO	38	CH2_HI
5	CH2_LOS	39	CH2_HIS
6	GND	40	GND
7	CH3_LO	41	CH3_HI
8	CH3_LOS	42	CH3_HIS
9	GND	43	GND
10	CH4_LO	44	CH4_HI
11	CH4_LOS	45	CH4_HIS
12	GND	46	GND
13	CH5_LO	47	CH5_HI
14	CH5_LOS	48	CH5_HIS
15	GND	49	GND
16	CH6_LO	50	CH6_HI
17	CH6_LOS	51	CH6_HIS
18	GND	52	GND
19	CH7_LO	53	CH7_HI
20	CH7_LOS	54	CH7_HIS
21	GND	55	GND
22	CH8_LO	56	CH8_HI
23	CH8_LOS	57	CH8_HIS
24	GND	58	GND
25	GND	59	GND

Table 2 M9185A output pin assignment (CHAN 1 – 8) (continued)

26	CAL_GND	60	CAL_GND
27	CAL_GND	61	CAL_GND
28	DMM_H	62	DMM_L
29	DMM_C	63	CAL_GND
30	CAL_GND	64	CAL_GND
31	CAL_GND	65	CAL_GND
32	GND	66	GND
33	EXT_TRIG_IO	67	GND
34	GND	68	GND

Table 3 M9185A output pin assignment (CHAN 9 – 16)

1	CH9_LO	35	CH9_HI
2	CH9_LOS	36	CH9_HIS
3	GND	37	GND
4	CH10_LO	38	CH10_HI
5	CH10_LOS	39	CH10_HIS
6	GND	40	GND
7	CH11_LO	41	CH11_HI
8	CH11_LOS	42	CH11_HIS
9	GND	43	GND
10	CH12_LO	44	CH12_HI
11	CH12_LOS	45	CH12_HIS
12	GND	46	GND
13	CH13_LO	47	CH13_HI
14	CH13_LOS	48	CH13_HIS

Table 3 M9185A output pin assignment (CHAN 9 – 16) (continued)

15	GND	49	GND
16	CH14_LO	50	CH14_HI
17	CH14_LOS	51	CH14_HIS
18	GND	52	GND
19	CH15_LO	53	CH15_HI
20	CH15_LOS	54	CH15_HIS
21	GND	55	GND
22	CH16_LO	56	CH16_HI
23	CH16_LOS	57	CH16_HIS
24	GND	58	GND
25	GND	59	GND
26	GND	60	GND
27	GND	61	GND
28	GND	62	GND
29	GND	63	GND
30	GND	64	GND
31	GND	65	GND
32	GND	66	GND
33	GND	67	GND
34	GND	68	GND

M9185A system connections

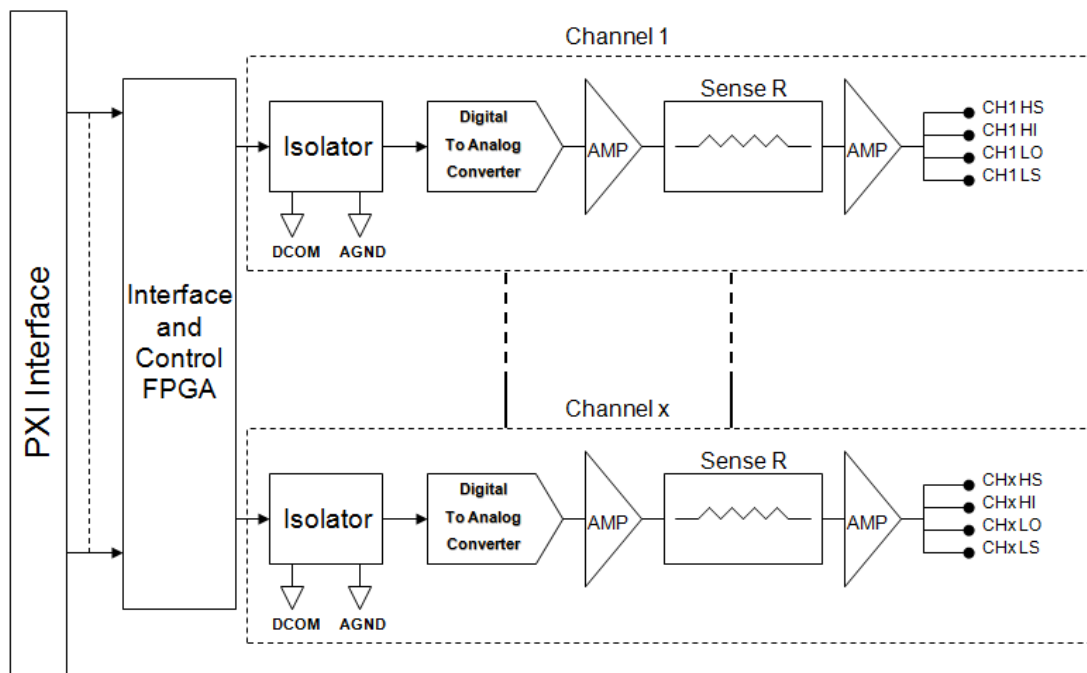


Figure 8 M9185A functional block diagram

Step 5: Verify the Operation of the M9185A Module

The intention of this step is to verify the basic operations of the newly installed module.

Run the Agilent Connection Expert (ACE) by clicking its desktop shortcut icon, or by clicking **Start > All Programs > Agilent IO Library Suite > Agilent Connection Expert**.

The ACE will display all modules that are connected and installed. Review the configuration data and launch the M9185A Soft Front Panel (SFP). The M9185A SFP will provide control over the module for operational verification procedures.

This is a screen capture of the SFP interface:

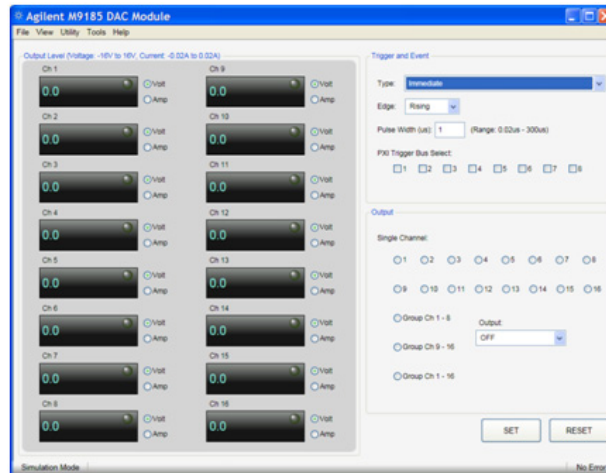


Figure 9 SFP interface

To start, set an output level for a channel. In this example, set Channel 1 to 16 volts.

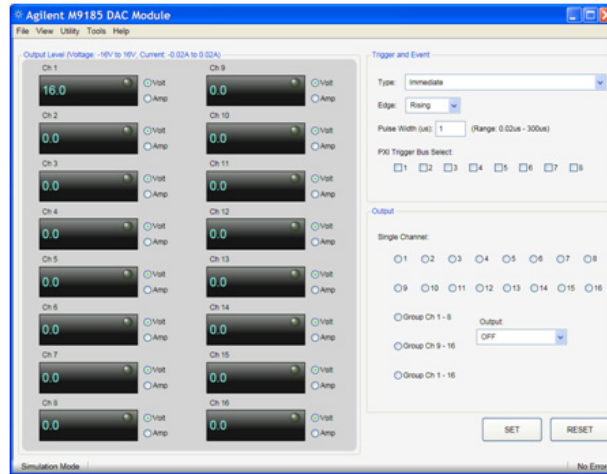


Figure 10 Set an output range

Next, set the trigger type as Immediate.

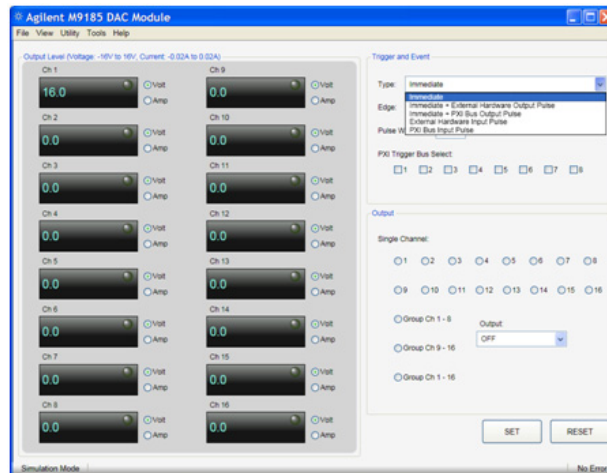


Figure 11 Set the trigger type

Set the single channel to 1 and set the output as ON.

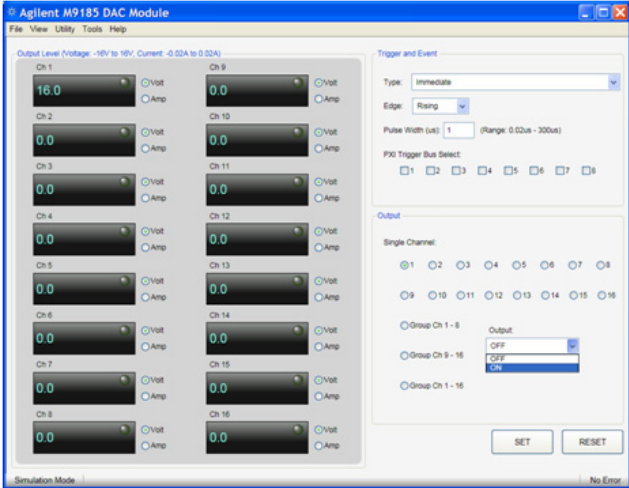


Figure 12 Select the single channel and output

Click SET and a green LED will appear at Channel 1.

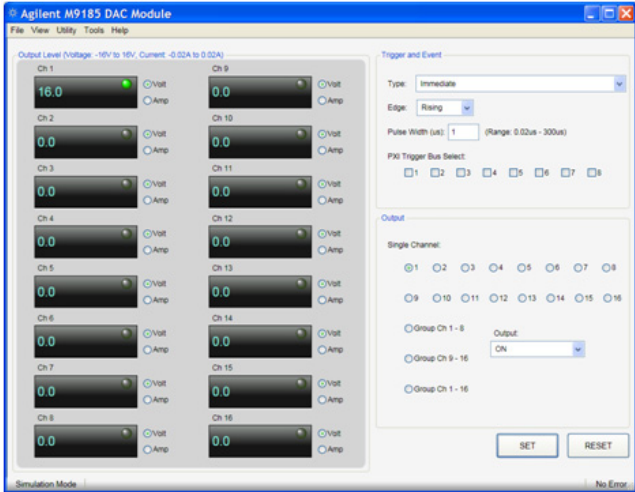


Figure 13 Green LED at Channel 1

You may refer to Agilent *M9185A Soft Front Panel Help* for details on how to use the SFP.

Conduct performance verification (optional)

Requirements for verification

The M9185A is verified by setting a typical dc voltage and current (for example, 16 V and 20 mA) and measuring the output of the selected channel (for example, CH1 HI with respect to CH1 LO) on the front panel connector. The following procedure verifies that all associated relays, connectors, cables, and circuitry are operational.

Required hardware

Verifying the functionality of the module requires external equipment. This includes a 6.5-digit precision multimeter and mating VHDCI cable assembly. Refer to [Table 4](#) for the recommended functionality verification hardware.

Table 4 Required functionality verification hardware

Hardware	Description
Agilent 34411A	6.5-Digit Digital Multimeter
Agilent U2902A	Terminal Board with SCSI-II 68-PIN Connector, 2m

M9185A functionality verification procedure

- 1 Run the M9185A Soft Front Panel (SFP). Configure the module to output 16 V and then 20 mA, starting from Channel 1.
- 2 Connect the channel HI pin to the HI input of the voltmeter.
- 3 Connect the channel LO pin to the LO input of the voltmeter.

- 4 Read the voltmeter. It should display 16 V with the accuracy as specified in the specifications.
- 5 Now configure the module to output 20 mA from the same channel and change the connection of the HI pin to HI input of the ammeter.
- 6 Read the ammeter. It should display 20 mA with the accuracy as specified in the specifications.
- 7 Repeat [step 2](#) to [step 6](#) for each channel for a complete module verification.

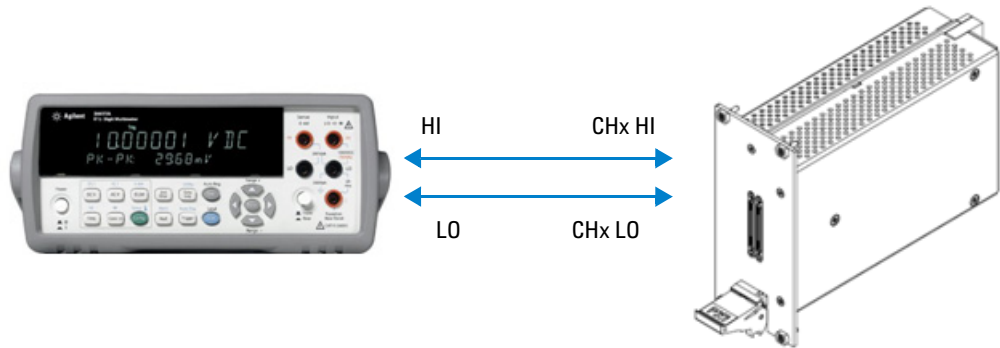


Figure 14 Connections For M9185A verification

If a problem is found

If a problem is found, perform the following checks:

- 1 Verify that all relevant hardware is turned on.
- 2 Verify that the M9185A paths are correctly set from the SFP and that the multimeter is set to the proper voltage measurement range and that cable is properly connected.
- 3 If the problem persists, refer to [“Return the module for service”](#) on page 4 for details on sending the module to Agilent Technologies for service.

NOTE

For current measurement, change the HI connection to that of ammeter.

Specifications

Complete specifications for the M9185A (*M9185A Data Sheet, 5990-7724EN*) are included on the *Agilent M9185A Software and Product Information CD-ROM* that came with your module. Please check the Agilent Web site at www.agilent.com/find/M9185A for the latest updates to these specifications.

www.agilent.com

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