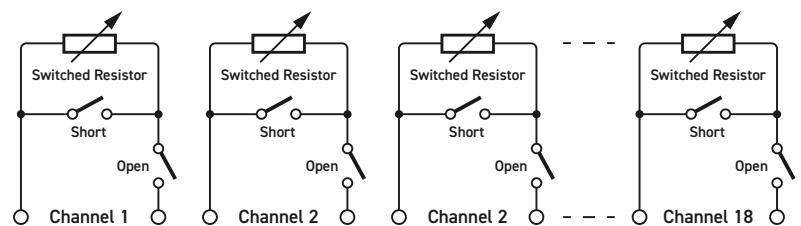


- Available as a PXI or PXIe Module
- High Density Resistor Simulation
- Up To 18 Channels in a One Slot Module
- Resistance Resolution to 0.125 Ω
- Values From 1 Ω to 85.3 M Ω
- Accuracy of up to $\pm 0.1\%$ \pm Resolution
- Short and Open Simulation
- Simple Software Control Through Resistance Calls
- VISA & Kernel Drivers Supplied for Windows
- PXI Versions Supported by PXI or LXI Chassis
- 3 Year Warranty



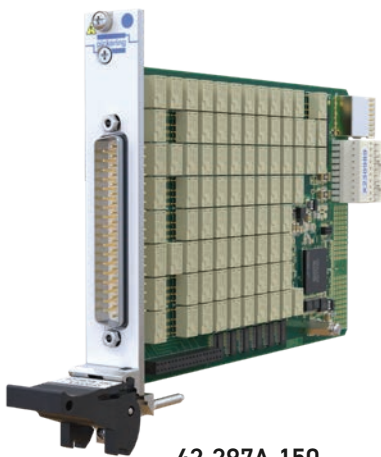
The 40-297A (PXI) and the 42-297A (PXIe) provide a simple solution for applications requiring accurate simulation of resistive sensors. They are available in a variety of resistance ranges and resolutions to meet the needs of functional test systems and are suitable for engine controller testing where resistive sensors provide information such as temperature. Additionally, resistor channels can be set as short or open circuit to simulate a wiring or sensor fault.



Precision Resistor Module (Part No. 4x-297A) Available with Between 3 & 18 Channels

Software control is simplified by the use of resistor value calls. The module uses the setting closest to the requested value, and the user can interrogate the module to find the actual resistance setting used.

A calibration cable can be attached to the module allowing a DMM to verify each channel. This considerably simplifies the checking of the module's calibration. Verification is performed with the UUT disconnected from the module.



**42-297A-150
PXIe Version**

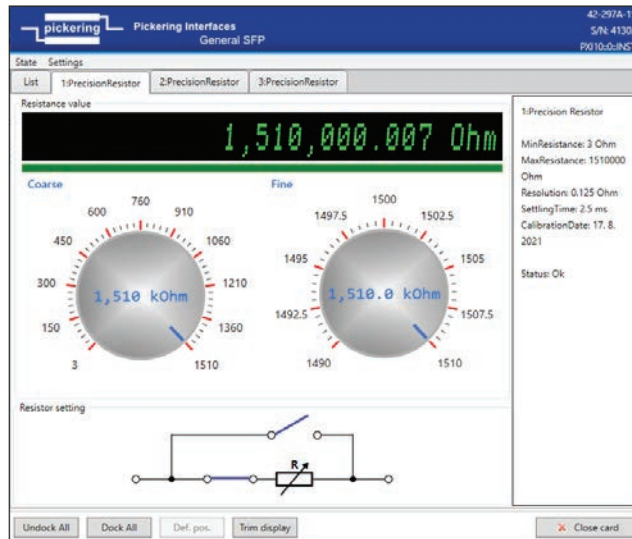
The 4x-297A is available in 70 standard builds in each platform that suit the most common applications:

- A narrow resistance range version with 9 or 18 channels.
- A medium resistance range version with 4 or 9 channels.
- A wide resistance range version with 3 or 6 channels.

For applications requiring greater resolution and accuracy, or to support verification with the UUT connected, consider the **40-260 series Precision Resistor Modules**.

Updated Product Information

This product has been introduced as a “form & fit” update to the 40-297, the changes are to provide PXIe options, higher maximum voltage plus higher resolution range expansion. Otherwise, the electrical performance of the 40-297 and 4x-297A families are very similar, the pinout and software are identical.



Soft Front Panel for Precision Resistor Modules

PXI/PXIe Part Number (Number of Channels)	Resistance Range									Resolution
	1Ω	10Ω	100Ω	1kΩ	10kΩ	100kΩ	1MΩ	10MΩ	100MΩ	
40/42-297A-010 (18) 40/42-297A-110 (9)	█									0.125 Ω
40/42-297A-011 (18) 40/42-297A-111 (9)	█	█								0.25 Ω
40/42-297A-012 (18) 40/42-297A-112 (9)	█	█	█							0.5 Ω
40/42-297A-013 (18) 40/42-297A-113 (9)	█	█	█	█						1 Ω
40/42-297A-014 (18) 40/42-297A-114 (9)	█	█	█	█	█					2 Ω
40/42-297A-015 (18) 40/42-297A-115 (9)	█	█	█	█	█	█				4 Ω
40/42-297A-016 (18) 40/42-297A-116 (9)	█	█	█	█	█	█	█			8 Ω
40/42-297A-020 (9) 40/42-297A-120 (4)	█	█	█	█						0.125 Ω
40/42-297A-021 (9) 40/42-297A-121 (4)	█	█	█	█	█					0.25 Ω
40/42-297A-022 (9) 40/42-297A-122 (4)	█	█	█	█	█	█				0.5 Ω
40/42-297A-023 (9) 40/42-297A-123 (4)	█	█	█	█	█	█	█			1 Ω
40/42-297A-024 (9) 40/42-297A-124 (4)	█	█	█	█	█	█	█	█		2 Ω
40/42-297A-025 (9) 40/42-297A-125 (4)	█	█	█	█	█	█	█	█	█	4 Ω
40/42-297A-026 (9) 40/42-297A-126 (4)	█	█	█	█	█	█	█	█	█	8 Ω
40/42-297A-030 (9) 40/42-297A-130 (4)	█	█	█	█	█					0.125 Ω
40/42-297A-031 (9) 40/42-297A-131 (4)	█	█	█	█	█	█				0.25 Ω
40/42-297A-032 (9) 40/42-297A-132 (4)	█	█	█	█	█	█	█			0.5 Ω
40/42-297A-033 (9) 40/42-297A-133 (4)	█	█	█	█	█	█	█	█		1 Ω
40/42-297A-034 (9) 40/42-297A-134 (4)	█	█	█	█	█	█	█	█	█	2 Ω
40/42-297A-035 (9) 40/42-297A-135 (4)	█	█	█	█	█	█	█	█	█	4 Ω
40/42-297A-036 (9) 40/42-297A-136 (4)	█	█	█	█	█	█	█	█	█	8 Ω
40/42-297A-040 (6) 40/42-297A-140 (3)	█	█	█	█	█					0.125 Ω
40/42-297A-041 (6) 40/42-297A-141 (3)	█	█	█	█	█	█				0.25 Ω
40/42-297A-042 (6) 40/42-297A-142 (3)	█	█	█	█	█	█	█			0.5 Ω
40/42-297A-043 (6) 40/42-297A-143 (3)	█	█	█	█	█	█	█	█		1 Ω
40/42-297A-044 (6) 40/42-297A-144 (3)	█	█	█	█	█	█	█	█	█	2 Ω
40/42-297A-045 (6) 40/42-297A-145 (3)	█	█	█	█	█	█	█	█	█	4 Ω
40/42-297A-046 (6) 40/42-297A-146 (3)	█	█	█	█	█	█	█	█	█	8 Ω
40/42-297A-050 (6) 40/42-297A-150 (3)	█	█	█	█	█					0.125 Ω
40/42-297A-051 (6) 40/42-297A-151 (3)	█	█	█	█	█	█				0.25 Ω
40/42-297A-052 (6) 40/42-297A-152 (3)	█	█	█	█	█	█	█			0.5 Ω
40/42-297A-053 (6) 40/42-297A-153 (3)	█	█	█	█	█	█	█	█		1 Ω
40/42-297A-054 (6) 40/42-297A-154 (3)	█	█	█	█	█	█	█	█	█	2 Ω
40/42-297A-055 (6) 40/42-297A-155 (3)	█	█	█	█	█	█	█	█	█	4 Ω
40/42-297A-056 (6) 40/42-297A-156 (3)	█	█	█	█	█	█	█	█	█	8 Ω

4x-297A Precision Resistor Module Range

Specification

Accuracy:	$\pm 0.2\%$ \pm Resolution @ $< 300 \Omega$, $\pm 0.1\%$ \pm Resolution @ $\geq 300 \Omega$ @ $\pm 10^\circ\text{C}$ from calibration temperature and up to 50% humidity.* (factory calibration @ 21°C)
Fault Simulation:	Open and short circuit (typically $< 0.3 \Omega$)
Max Power:	0.5 W **
Max Voltage:	200 V † or as limited by power
Thermal Offset:	6 μV max
Settling Time:	$< 3 \text{ ms}$ ‡
Software Control:	By resistance calls to module for selected channel.
Calibration:	4-wire resistance measurement of selected channel for verification purposes with UUT removed and a special cable assembly attached. Factory calibration data is stored in the module.
Expected Life (operations):	100 million (10 mA)

* If working at temperatures or humidity outside this range, please contact your local sales office to discuss.

** Or as limited by voltage/current.

† For full voltage rating, signal sources must be fully isolated from mains supply and safety earth.

‡ The total operate time when setting a resistance may be longer depending upon the change requested due to relay sequencing.

Power Requirements - 40-297A

+3.3 V	+5 V	+12 V	-12 V
0.24 A	1.6 A max	0	0

Power Requirements - 42-297A

+3.3 V	+12 V
0.46 A	0.75 A max

Mechanical Characteristics

40-297A - Single slot 3U PXI (CompactPCI card).

42-297A - Single slot 3U PXIe, compatible with PXIe hybrid slot.

3D models for all versions in a variety of popular file formats are available on request.

Connectors

40-297A - PXI bus via 32-bit P1/J1 backplane connector.

42-297A - PXIe bus via XJ3 and XJ4 backplane connectors.

Resistor channel signals via front panel 37-pin male D-Type connector.

Operating/Storage Conditions

Operating Temperature: 0 °C to +55 °C

Humidity: Up to 90 % non-condensing

Altitude: 5000 m

Storage Temperature: -20 °C to +75 °C

Humidity: Up to 90 % non-condensing

Altitude: 15000 m

PXI Product Order Codes

0.125 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 31 Ω	9	40-297A-110	18	40-297A-010
1.5 Ω to 472 Ω	4	40-297A-120	9	40-297A-020
2 Ω to 6.97 k Ω	4	40-297A-130	9	40-297A-030
2.5 Ω to 102 k Ω	3	40-297A-140	6	40-297A-040
3 Ω to 1.51 M Ω	3	40-297A-150	6	40-297A-050

0.25 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 61 Ω	9	40-297A-111	18	40-297A-011
1.5 Ω to 925 Ω	4	40-297A-121	9	40-297A-021
2 Ω to 13.6 k Ω	4	40-297A-131	9	40-297A-031
2.5 Ω to 201 k Ω	3	40-297A-141	6	40-297A-041
3 Ω to 2.97 M Ω	3	40-297A-151	6	40-297A-051

0.5 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 120 Ω	9	40-297A-112	18	40-297A-012
1.5 Ω to 1.81 k Ω	4	40-297A-122	9	40-297A-022
2 Ω to 26.7 k Ω	4	40-297A-132	9	40-297A-032
2.5 Ω to 395 k Ω	3	40-297A-142	6	40-297A-042
3 Ω to 5.82 M Ω	3	40-297A-152	6	40-297A-052

1 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 238 Ω	9	40-297A-113	18	40-297A-013
1.5 Ω to 3.55 k Ω	4	40-297A-123	9	40-297A-023
2 Ω to 52.4 k Ω	4	40-297A-133	9	40-297A-033
2.5 Ω to 773 k Ω	3	40-297A-143	6	40-297A-043
3 Ω to 11.4 M Ω	3	40-297A-153	6	40-297A-053

2 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 470 Ω	9	40-297A-114	18	40-297A-014
1.5 Ω to 6.97 k Ω	4	40-297A-124	9	40-297A-024
2 Ω to 102 k Ω	4	40-297A-134	9	40-297A-034
2.5 Ω to 1.51 M Ω	3	40-297A-144	6	40-297A-044
3 Ω to 22.3 M Ω	3	40-297A-154	6	40-297A-054

4 Ω Resolution*

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 920 Ω	9	40-297A-115	18	40-297A-015
1.5 Ω to 13.6 k Ω	4	40-297A-125	9	40-297A-025
2 Ω to 201 k Ω	4	40-297A-135	9	40-297A-035
2.5 Ω to 2.97 M Ω	3	40-297A-145	6	40-297A-045
3 Ω to 43.8 M Ω	3	40-297A-155	6	40-297A-055

8 Ω Resolution*

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 1.8 k Ω	9	40-297A-116	18	40-297A-016
1.5 Ω to 26.7 k Ω	4	40-297A-126	9	40-297A-026
2 Ω to 395 k Ω	4	40-297A-136	9	40-297A-036
2.5 Ω to 5.82 M Ω	3	40-297A-146	6	40-297A-046
3 Ω to 85.3 M Ω	3	40-297A-156	6	40-297A-056

*Due to the large resolution of the card, actual result on lower resistance will have a larger effect by the \pm resolution than the % accuracy.

PXIe Product Order Codes

0.125 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 31 Ω	9	42-297A-110	18	42-297A-010
1.5 Ω to 472 Ω	4	42-297A-120	9	42-297A-020
2 Ω to 6.97 kΩ	4	42-297A-130	9	42-297A-030
2.5 Ω to 102 kΩ	3	42-297A-140	6	42-297A-040
3 Ω to 1.51 MΩ	3	42-297A-150	6	42-297A-050

0.25 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 61 Ω	9	42-297A-111	18	42-297A-011
1.5 Ω to 925 Ω	4	42-297A-121	9	42-297A-021
2 Ω to 13.6 kΩ	4	42-297A-131	9	42-297A-031
2.5 Ω to 201 kΩ	3	42-297A-141	6	42-297A-041
3 Ω to 2.97 MΩ	3	42-297A-151	6	42-297A-051

0.5 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 120 Ω	9	42-297A-112	18	42-297A-012
1.5 Ω to 1.81 kΩ	4	42-297A-122	9	42-297A-022
2 Ω to 26.7 kΩ	4	42-297A-132	9	42-297A-032
2.5 Ω to 395 kΩ	3	42-297A-142	6	42-297A-042
3 Ω to 5.82 MΩ	3	42-297A-152	6	42-297A-052

1 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 238 Ω	9	42-297A-113	18	42-297A-013
1.5 Ω to 3.55 kΩ	4	42-297A-123	9	42-297A-023
2 Ω to 52.4 kΩ	4	42-297A-133	9	42-297A-033
2.5 Ω to 773 kΩ	3	42-297A-143	6	42-297A-043
3 Ω to 11.4 MΩ	3	42-297A-153	6	42-297A-053

2 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 470 Ω	9	42-297A-114	18	42-297A-014
1.5 Ω to 6.97 kΩ	4	42-297A-124	9	42-297A-024
2 Ω to 102 kΩ	4	42-297A-134	9	42-297A-034
2.5 Ω to 1.51 MΩ	3	42-297A-144	6	42-297A-044
3 Ω to 22.3 MΩ	3	42-297A-154	6	42-297A-054

4 Ω Resolution*

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 920 Ω	9	42-297A-115	18	42-297A-015
1.5 Ω to 13.6 kΩ	4	42-297A-125	9	42-297A-025
2 Ω to 201 kΩ	4	42-297A-135	9	42-297A-035
2.5 Ω to 2.97 MΩ	3	42-297A-145	6	42-297A-045
3 Ω to 43.8 MΩ	3	42-297A-155	6	42-297A-055

8 Ω Resolution*

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 1.8 kΩ	9	42-297A-116	18	42-297A-016
1.5 Ω to 26.7 kΩ	4	42-297A-126	9	42-297A-026
2 Ω to 395 kΩ	4	42-297A-136	9	42-297A-036
2.5 Ω to 5.82 MΩ	3	42-297A-146	6	42-297A-046
3 Ω to 85.3 MΩ	3	42-297A-156	6	42-297A-056

*Due to the large resolution of the card, actual result on lower resistance will have a larger effect by the \pm resolution than the % accuracy.

Support Products

Accessories

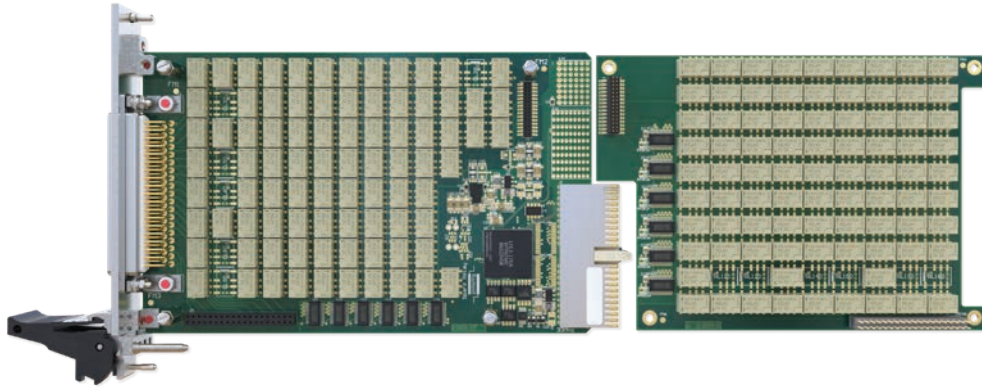
Calibration lead for 4-wire resistance measurement using DMM - 37-pin male D-type to shrouded 4 mm bayonet plugs.

1 m length: 40-975-037-1m

Connection Accessories

For a complete list of connection accessories and documentation for the 40/42-297A module please refer to our [37-pin D-type datasheet \(90-007D\)](#).





View showing the Daughter card of the Precision Resistor

Product Customization

Pickering modules are designed and manufactured on our own flexible manufacturing lines, giving complete product control and enabling simple customization to meet very specific requirements. Customization can include:

- Alternative resistance range
- Alternative resolution
- Different number of channels
- Different performance specifications

All customized products are given a unique part number, fully documented and may be ordered at any time in the future. Please contact your local sales office to discuss.

Other Resistor Modules

Pickering Interfaces manufacture a range of variable resistor modules in PXI and PXIe format. If you have a requirement for a variable resistor module please contact your local sales office with the information below and we will advise you on the best solution for your application.

Lowest Resistance †	<input type="text"/>
Highest Resistance	<input type="text"/>
Resistance Resolution	<input type="text"/>
Overall Accuracy	<input type="text"/>
Maximum Power/Current	<input type="text"/>
Number of Channels (variable resistors)	<input type="text"/>

† Resistance is as measured across the user connector terminals, minimum resistance must have a non-zero value.

PXI & CompactPCI Compliance - 40-297A

The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus and Star Trigger are not implemented.

Uses a 33 MHz 32-bit backplane interface.

PXIe Compliance - 42-297A

The module is compliant with the PXIe Specification 1.0. Local Bus, Trigger Bus & Star Trigger are not implemented.

Safety & CE Compliance

All modules are fully CE compliant and meet applicable EU directives:

Low-voltage safety EN61010-1:2010,
EMC Immunity EN61326-1:2013,
Emissions EN55011:2009+A1:2010.

The 4x-297A is part of a range of Precision Resistor Modules suitable for simulation applications.

For applications that do not require the precision or accuracy of our precision range, look to our [PXI Standard Resistor](#) range which includes models 40-280, 40-281, 40-282, 40-290, 40-291, 40-292, 40-293, 40-294, 40-295 and 40-296.

Pickering's Range of Precision Resistor Modules				
Resistor Type	Channels	Range	Resolution	Model No.
Precision	3	90 Ω to 8 k Ω	<10 m Ω	40-260
Precision	2	1.5 Ω to 2.9 k Ω or 10 Ω to 36 k Ω	<2 m Ω or <15 m Ω	40-261
RTD Simulator	18, 12 or 6	90 Ω to 250 Ω or 900 Ω to 2500 Ω	<8 m Ω or <90 m Ω	40-262
RTD Simulator	24, 20, 16, 12, 8 or 4	40 Ω to 900 Ω , 200 Ω to 4.5 k Ω or 400 Ω to 9 k Ω	<10 m Ω , <50 m Ω or <100 m Ω	40-263
Strain Gauge Simulator	6, 4 or 2	350 Ω , 1 k Ω , 1.5 k Ω , 2 k Ω or 3 k Ω	<2 m Ω , <10 m Ω , <12.5 m Ω , <20 m Ω or <25 m Ω	40-265
High Density Precision	18, 9, 6, 4 or 3	Up to 85.3 M Ω	0.125 Ω , 0.25 Ω , 0.5 Ω , 1 Ω , 2 Ω , 4 Ω or 8 Ω	4x-297A
High Density Precision	18, 9, 6, 4 or 3	Up to 22.3 M Ω	0.125 Ω , 0.25 Ω , 0.5 Ω , 1 Ω or 2 Ω	40-298



Chassis Compatibility

The PXI versions of this module are compatible with the following chassis types:

- All chassis conforming to the 3U PXI and 3U Compact PCI (cPCI) specification
- Legacy and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis
- Pickering Interfaces LXI or LXI/USB Modular Chassis

The PXIe versions of this module are compatible with the following chassis types:

- All chassis conforming to the 3U PXIe specification
- PXIe and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis

Chassis Selection Guide

PXI and PXIe (with PXIe and/or Hybrid slots) Chassis from any Vendor:

- Mix our 1000+ PXI/PXIe switching & simulation modules with any vendor's PXI/PXIe instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization



Pickering LXI or LXI/USB Modular Chassis Only accept our PXI Switching & Simulation Modules:

- Choose from 1000+ Pickering PXI Modules
- Ethernet or USB control enables remote operation
- Low-cost control from practically any controller
- LXI provides manual control via Web browsers
- Driverless software support
- Power sequencing immunity
- Ethernet provides chassis/controller voltage isolation
- Independence from Windows operating system



Connectivity Solutions

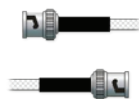
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed to mechanically and electrically mate to our modules. These accessories are detailed in Connector Accessories data sheets, where a complete list and documentation can be found for each accessory.



Connectors & Backshells



Multi-way Cable Assemblies



RF Cable Assemblies



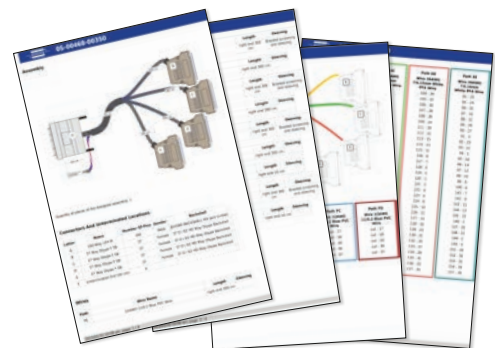
Breakouts



Connector Blocks

We also offer customized cabling and have a free online **Cable Design Tool** that can be used to create custom cable solutions for many applications.

- Fully supported on modern browsers and tablet operating systems.
- Built-in tutorials and videos allow you to get quickly up to speed.
- Store cable assemblies in the Cloud and develop over time.
- Each cable design has a downloadable PDF documentation file detailing all specifications



Start designing your custom cabling, go to pickeringtest.com/cdt

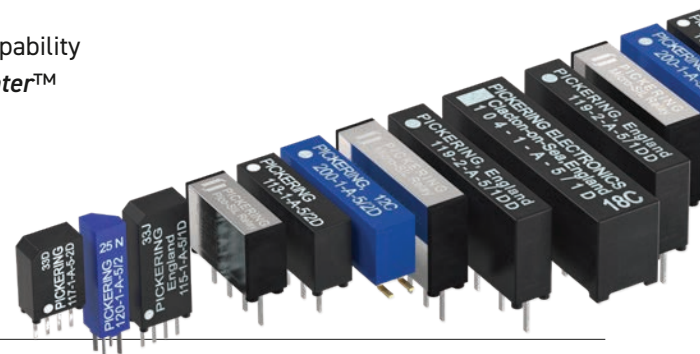
Mass Interconnect

We recommend the use of a mass interconnect solution when an Interchangeable Test Adapter (ITA) is required for PXI/LXI based test systems. Our modules are fully supported by Virginia Panel and MacPanel.

Pickering Reed Relays

We are the only switch provider with in-house reed relay manufacturing capability via our Relay Division. These instrument grade reed relays feature **SoftCenter™** technology, ensuring long service life and repeatable contact performance.

To learn more go to pickeringrelay.com



Programming

Pickering provide kernel, IVI and VISA (NI & Keysight) drivers which are compatible with all Microsoft supported versions of Windows and popular older versions.

For more information go to pickeringtest.com/os

The VISA driver is also compatible with Real-Time Operating Systems such as LabVIEW RT. For other RTOS support contact Pickering. These drivers may be used with a variety of programming environments and applications including:

- **Pickering Interfaces Switch Path Manager**
- **National Instruments** products (LabVIEW, LabWindows/CVI, Switch Executive, MAX, TestStand, VeriStand, etc.)
- **Microsoft Visual Studio** products (Visual Basic, Visual C++)
- **Keysight VEE** and **OpenTAP**
- **Mathworks MATLAB, Simulink**
- **Marvin ATEasy**
- **MTQ Testsolutions Tecap Test & Measurement Suite**
- **Python**

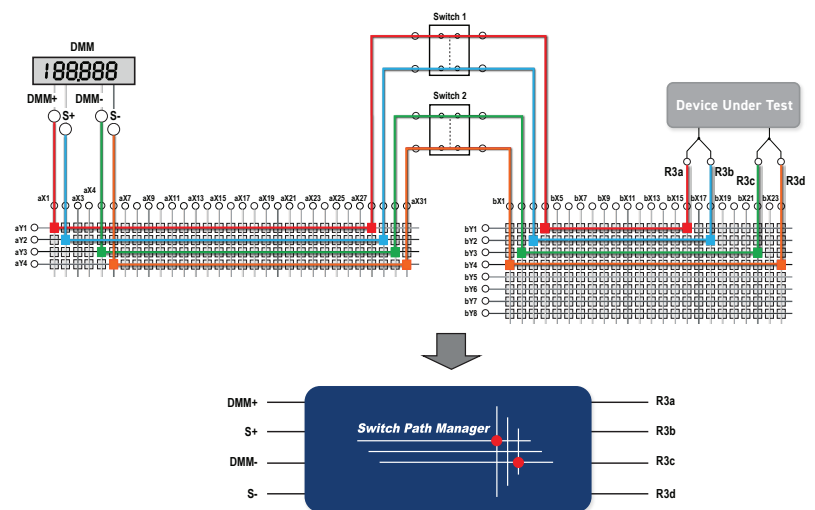
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help you develop test routines with ease.

To learn more about software drivers and development environments go to pickeringtest.com/software

Signal Routing Software

Our signal routing software, Switch Path Manager, automatically selects and energizes switch paths through Pickering switching systems. Signal routing is performed by simply defining test system endpoints to be connected together, greatly accelerating Test System software development.

To learn more go to pickeringtest.com/spm



Diagnostic Relay Test Tools

eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.

To learn more go to pickeringtest.com/ebirst



Three Year Warranty & Guaranteed Long-Term Support

All standard products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available with various levels for your requirements. Although we offer a 3-year warranty as standard, we also include guaranteed long-term support—with a history of supporting our products for typically 15-20 years.

To learn more go to pickeringtest.com/support

Available Product Resources

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