- Available as a PXI or PXIe Module
- Up To 15 W Per Channel
- 1 or 2 Channels in a One Slot Module
- Resistance Resolution to 0.125 Ω
- Values From 1 Ω to 395 kΩ
- Short and Open Simulation
- Simple Software Control Through Resistance Calls
- Drivers Supplied for Windows & Linux, Plus Support for Real-time Systems
- PXI Versions Supported by PXI or LXI Chassis
- 3 Year Warranty

The 40-254 (PXI) and 42-254 (PXIe) are part of a growing range of medium to high power resistor modules, they provide a simple solution for applications requiring up to 15 W of power handling capability. The 4x-254 is available in a variety of resistance ranges and resolutions that meet the needs of most test systems.

Each channel of the 4x-254 is able to simulate short and open circuit conditions that can be caused by faulty wiring or sensors.

Software control is simplified by the use of resistor value calls. The module works out the resistance setting closest to the requested value and sets that value. The user can interrogate the module to find the actual setting used.
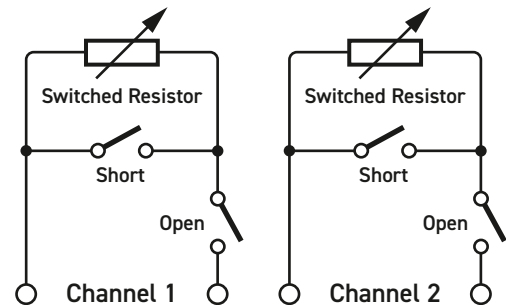
15 W Resistor Module (Part No. 4x-254)
Available With 1 or 2 Channels

42-254 PXIe Version

A calibration cable assembly can be attached to the module in place of the UUT to enable a DMM to be used for verifying the resistor channels. This considerably simplifies the checking of the module's calibration.

The 4x-254 is available in 28 standard builds that suit the most common configurations:

- Narrow resistance range, available in 1 or 2 channel variants.
- Medium resistance range, available in 1 channel variants.
- Wide resistance range, available in 1 channel variants.

For applications requiring greater density with lower power, users should consider the 4x-297A High Density Precision Resistor Modules.

Pickering's Range of PXI Resistor Modules			
Model No.	Description	Channels	Range
40-251	2.5 W Programmable Resistor	1, 2, 4 or 8	Up to 22 MΩ
40-252	5 W Programmable Resistor	1, 2, or 4	Up to 22 MΩ
40-253	10 W Programmable Resistor	1 or 2	Up to 102 kΩ
4x-254	15 W Programmable Resistor	1 or 2	Up to 395 kΩ
40-280/1/2	Selectable	12 to 48	User Specified
40-290	Programmable Resistor	2	0.5 Ω to 32 kΩ
40-291		4	0.5 Ω to 128 Ω
40-292	Programmable Load	1	40 Ω to 295 Ω or 10 Ω to 2.56 kΩ
40-293	Programmable Resistor + SPDT	2 or 4	Up to 131 kΩ
40-294	Programmable Resistor + SPST	2 or 4	Up to 131 kΩ
40-295	Programmable Resistor	3, 6, 5, 10 or 18	Up to 16 MΩ
40-296	Programmable Potentiometer	1, 2, 3, 4, 5 or 9	Up to 16 MΩ
4x-297A	High Density Precision Resistor	3, 4, 6, 9 or 18	Up to 22.3 MΩ
40-298			

Precision Resistor Modules

For applications requiring a Resistor Module with greater resolution (to <2 mΩ) or better accuracy (to <0.03 %), look to our Precision Resistor range which includes models 40-260, 40-261, 40-262, 40-265, and 4x-297A

Custom Resistor Modules

If our range of Resistor Modules does not meet your specific requirements, please contact you local sales office to discuss your application. Customizations include: different start and stop values, current, power, voltage, precision, accuracy, number of channels, connector etc.
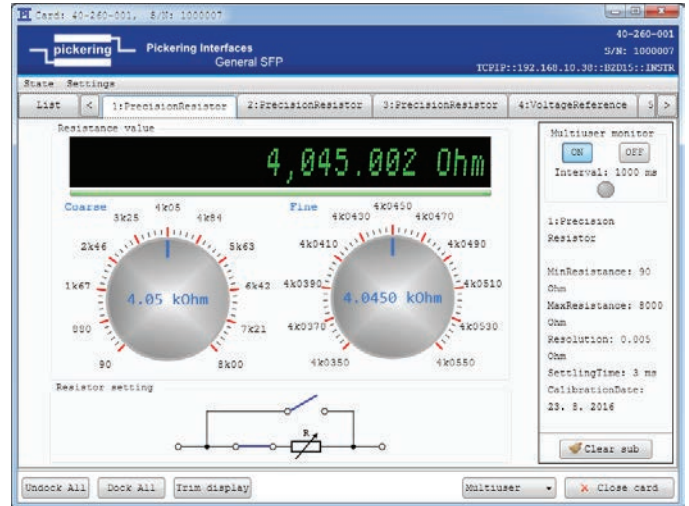
Soft Front Panel for Programmable Resistor Modules

PXI Part Number (Number of Channels)	Resistance Range	Resolution
40-254-010 (2) 40-254-110 (1)		0.125 Ω
40-254-011 (2) 40-254-111 (1)		0.25 Ω
40-254-012 (2) 40-254-112 (1)		0.5 Ω
40-254-013 (2) 40-254-113 (1)		1 Ω
40-254-014 (2) 40-254-114 (1)		2 Ω
40-254-015 (2) 40-254-115 (1)		4 Ω
40-254-016 (2) 40-254-116 (1)		8 Ω
40-254-020 (1)		0.125 Ω
40-254-021 (1)		0.25 Ω
40-254-022 (1)		0.5 Ω
40-254-023 (1)		1 Ω
40-254-024 (1)		2 Ω
40-254-025 (1)		4 Ω
40-254-026 (1)		8 Ω
40-254-030 (1)		0.125 Ω
40-254-031 (1)		0.25 Ω
40-254-032 (1)		0.5 Ω
40-254-033 (1)		1 Ω
40-254-034 (1)		2 Ω
40-254-035 (1)		4 Ω
40-254-036 (1)		8 Ω

4x-254 15 W Programmable Resistor Module Range

Specifications

Accuracy (low power):	±0.3 % ±Resolution @ ±10 °C from calibration temperature (factory calibration @ 21 °C)
Fault Simulation:	Open and short circuit (typically <0.3 Ω)
Power:	15 W maximum per channel †
Maximum Current:	2 A or as limited by power
Maximum Voltage:	200 V* or as limited by power
Settling time:	<3 ms ‡
Number of Operations:	1×10^8 (low power) 1×10^6 (high power)
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.

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

† Or as limited by voltage/current, refer to power plot for guidance.

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

Power Requirements - 40-254

+3.3 V	+5 V	+12 V	-12 V
0.2 A	0.3 A	0	0

Power Requirements - 42-254

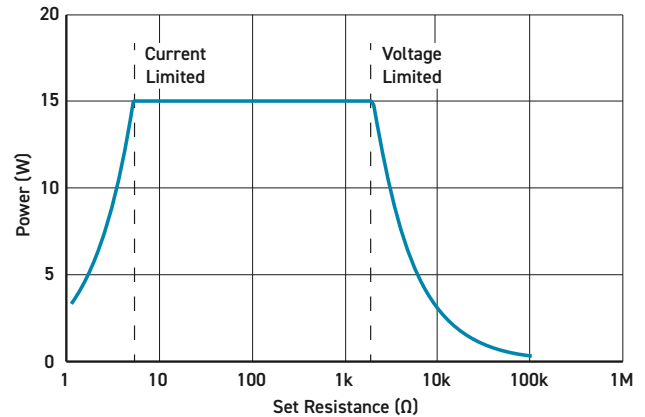| +3.3 V	+12 V
TBC	TBC

Mechanical Characteristics

40-254 - Single slot 3U PXI (CompactPCI card).

42-254 - 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.

4x-254 Maximum Power for a Given Resistance Setting

Connectors

40-254 - PXI bus via 32-bit P1/J1 backplane connector.

42-254 - PXIe bus via XJ3 and XJ4 backplane connectors.

Resistor channel signals via front panel 9-pin male D-Type connector. For pin outs please refer to the operating manual.

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 & CompactPCI Compliance - 40-254

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 - 42-254

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.

PXI Product Order Codes

0.125 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 31 Ω	1	40-254-110	2	40-254-010
1.5 Ω to 472 Ω			1	40-254-020
2 Ω to 6.97 kΩ			1	40-254-030

0.25 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 61 Ω	1	40-254-111	2	40-254-011
1.5 Ω to 925 Ω			1	40-254-021
2 Ω to 13.6 kΩ			1	40-254-031

0.5 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 120 Ω	1	40-254-112	2	40-254-012
1.5 Ω to 1.81 kΩ			1	40-254-022
2 Ω to 26.7 kΩ			1	40-254-032

1 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 238 Ω	1	40-254-113	2	40-254-013
1.5 Ω to 3.55 kΩ			1	40-254-023
2 Ω to 52.4 kΩ			1	40-254-033

2 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 470 Ω	1	40-254-114	2	40-254-014
1.5 Ω to 6.97 kΩ			1	40-254-024
2 Ω to 102 kΩ			1	40-254-034

4 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 920 Ω	1	40-254-115	2	40-254-015
1.5 Ω to 13.6 kΩ			1	40-254-025
2 Ω to 201 kΩ			1	40-254-035

8 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 1.8 kΩ	1	40-254-116	2	40-254-016
1.5 Ω to 26.7 kΩ			1	40-254-026
2 Ω to 395 kΩ			1	40-254-036

PXIe Product Order Codes

0.125 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 31 Ω	1	42-254-110	2	42-254-010
1.5 Ω to 472 Ω			1	42-254-020
2 Ω to 6.97 kΩ			1	42-254-030

0.25 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 61 Ω	1	42-254-111	2	42-254-011
1.5 Ω to 925 Ω			1	42-254-021
2 Ω to 13.6 kΩ			1	42-254-031

0.5 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 120 Ω	1	42-254-112	2	42-254-012
1.5 Ω to 1.81 kΩ			1	42-254-022
2 Ω to 26.7 kΩ			1	42-254-032

1 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 238 Ω	1	42-254-113	2	42-254-013
1.5 Ω to 3.55 kΩ			1	42-254-023
2 Ω to 52.4 kΩ			1	42-254-033

2 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 470 Ω	1	42-254-114	2	42-254-014
1.5 Ω to 6.97 kΩ			1	42-254-024
2 Ω to 102 kΩ			1	42-254-034

4 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 920 Ω	1	42-254-115	2	42-254-015
1.5 Ω to 13.6 kΩ			1	42-254-025
2 Ω to 201 kΩ			1	42-254-035

8 Ω Resolution

Range	Chan.	Order Code	Chan.	Order Code
1 Ω to 1.8 kΩ	1	42-254-116	2	42-254-016
1.5 Ω to 26.7 kΩ			1	42-254-026
2 Ω to 395 kΩ			1	42-254-036

Mother card of the Resistor Module in PXI and PXIe Formats

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 formats. 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 †	
Highest Resistance	
Resistance Resolution	
Overall Accuracy	
Maximum Power/Current	
Number of Channels (variable resistors)	

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

Connection Accessories

For a complete list of connection accessories and documentation for the 4x-254 module please refer to our 9-pin D-type datasheet (90-003D).

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
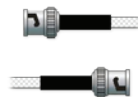
Connectivity Solutions

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.
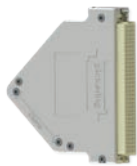
Connectors
& Backshells
Multi-way
Cable Assemblies
RF Cable
Assemblies
Breakouts
Connector
Blocks

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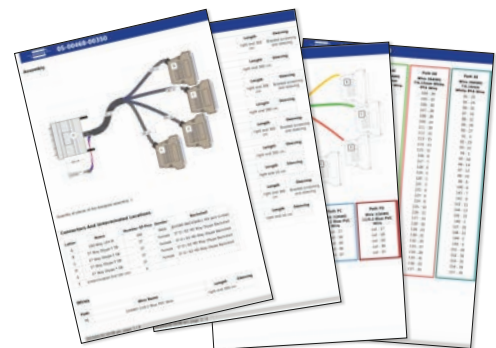
Start designing your custom cabling, go to pickeringtest.com/cdt

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
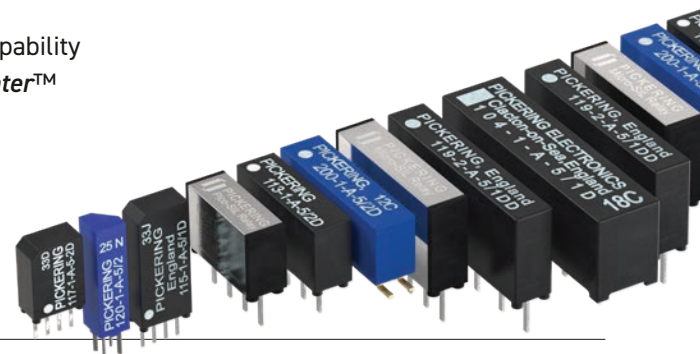
Programming

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 support is provided for LabVIEW Real Time Operating Systems (Pharlap and Linux-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++)
- **Programming Languages** C, C++, C#, Python
- **Keysight** VEE and OpenTAP
- **Mathworks MATLAB, Simulink**
- **Marvin** ATEasy
- **MTQ Testsolutions** Tecap Test & Measurement Suite

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
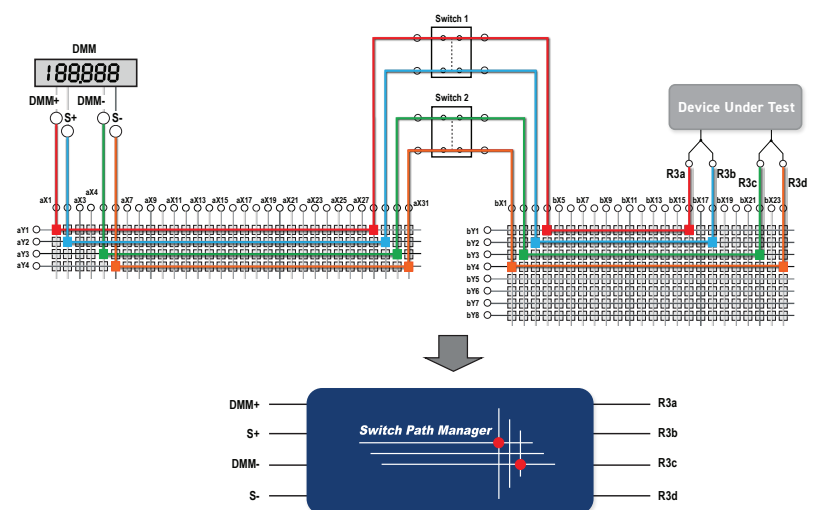
Diagnostic Relay Test Tools

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

We have a library of resources including success stories, product and support videos, articles and white papers as well as application-specific brochures to assist you. We have also published reference books on switching technology and the PXI and LXI standards.

To view, download or request any of our product resources go to pickeringtest.com/resources