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PXI Programmable Resistor Module 40-295/296

- Highest Density Resistor Module
- 8, 12, 16 and 24-Bit Versions
- Up To 18 Channels of 8-Bit Resolution
- Up To 10 Channels of 16-Bit Resolution
- Provides Fully Isolated Variable Resistors
- Available As Adjustable Resistor or Potentiometer
- Built-In Non-Volatile Memory For Calibration Data
- Uses High Reliability Pickering Reed Relays For Maximum Performance
- Up to 2000 Value Changes Per Second
- Special Versions With Non Standard Resistors Built To Order
- VISA & Kernel Drivers Supplied for Windows Plus Soft Front Panel
- Supported by PXI or LXI Chassis
- 3 Year Warranty



The 40-295 is a programmable resistor module with up to 18 resistor chains with 8-bit resolution in a single PXI module. The module to can also be supplied in 12, 16 or 24-bit resolution versions for applications requiring finer resolution, greater resistance range or higher channel count. The module is ideal for simulating sensors for control and management systems, or verifying system response in design verification or manufacturing test.

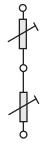
The 40-296 version is wired as a potentiometer with two end connections and a wiper.

The model is available with a variety of channel counts to allow the user to choose the lowest cost solution for their application.

Versions with other resistance values can be provided to meet specific requirements. This includes the fitting of an offset resistor to set the minimum resistance. If versions are required with different resistance ranges, please contact the Pickering Interfaces' Sales Office for assistance.

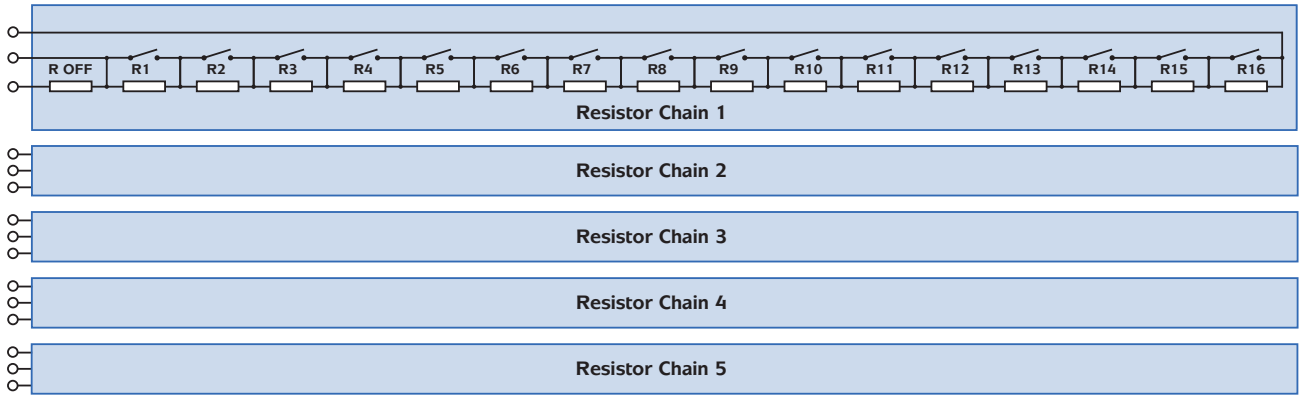
All switches are instrument grade reed relays with low thermal offset voltage to ensure operation under all conditions and a long service life.

The module is supplied with VISA drivers and a soft front panel.

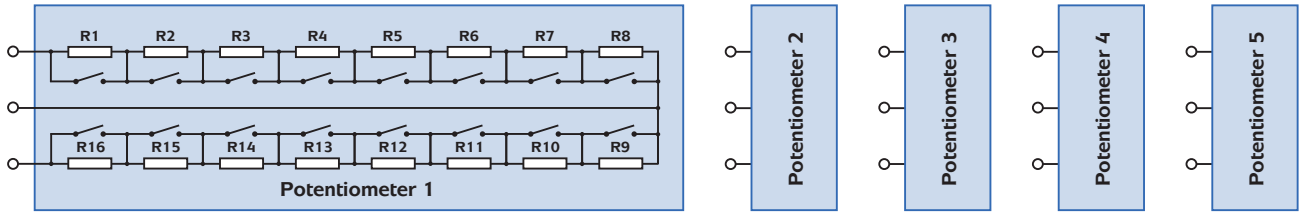
Resolution	Resistance Range	Configuration	Number Per Module
8-Bit	0Ω to 255Ω	 Resistor	10 or 18
12-Bit	0Ω to 4kΩ		5 or 10
16-Bit	0Ω to 65kΩ		5 or 10
24-Bit	0Ω to 16MΩ		3 or 6
8-Bit	0Ω to 255Ω Wiper	 Potentiometer	5 or 9
12-Bit	0Ω to 4kΩ Wiper		2 or 4
16-Bit	0Ω to 65kΩ Wiper		2 or 4
24-Bit	0Ω to 16MΩ Wiper		1 or 3

Programmable Resistor Module Options Overview

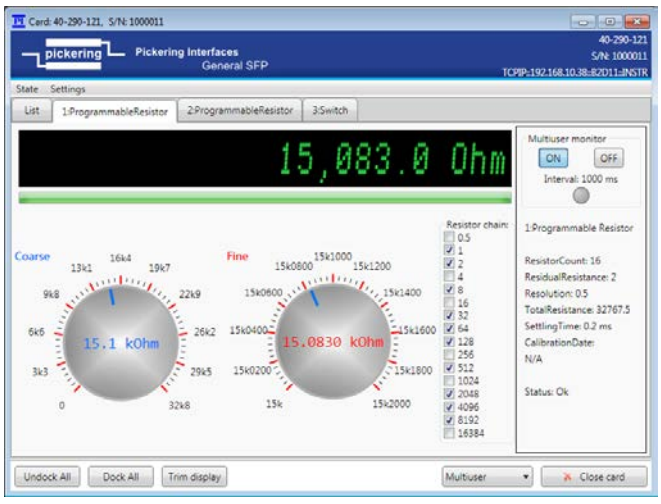
ISSUE 10.0 APR 2018



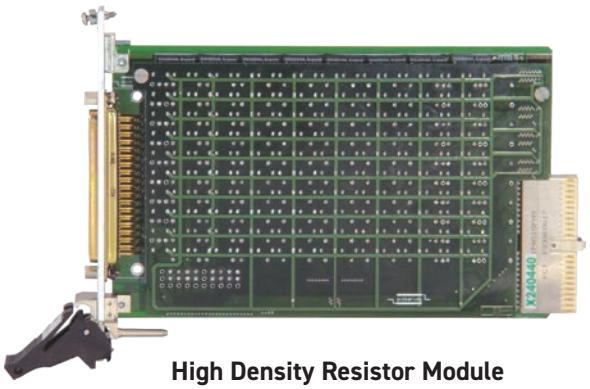
Schematic for 5 x 16 bit Resistor Module 40-295-021-5/16



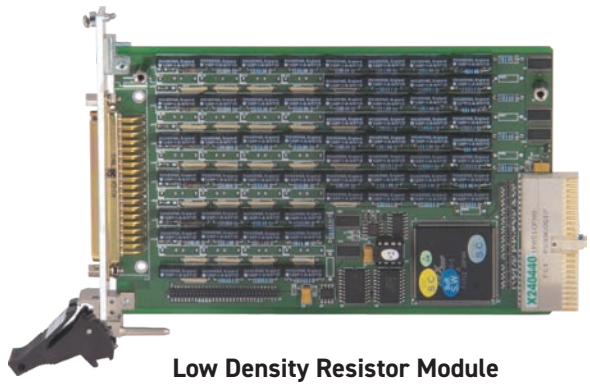
Schematic for 5 x 8 bit Potentiometer Module 40-296-021-5/8



Programmable Resistor Soft Front Panel



High Density Resistor Module (40-295-121/40-296-121)



Low Density Resistor Module (40-295-021/40-296-021)

Relay Type

The 40-295/296 is fitted with Reed Relays (Sputtered Ruthenium type), these offer very long life with good low level switching performance and excellent contact resistance stability.

All reed relays are manufactured by our sister company Pickering Electronics: pickeringrelay.com

Programmable Resistor Specification

Max Switch Voltage:	100V*
Resolution	1Ω
† Accuracy of Fitted Resistor:	±0.5% (0 to 1MΩ) ±1% (>1MΩ)
Residual Resistance, typical: (when chain resistance is set to 0Ω)	1Ω (8-bit) 1.5Ω (12-bit) 2Ω (16-bit) 3Ω (24-bit)
Max Power: Max Switch Current: Max Carry Current:	0.5W 0.5A 1.0A
Operate Time: Release Time:	<0.5ms <0.5ms
Expected Life Low power load: Full power load:	 >1x10^8 operations >1x10^6 operations

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

† Overall accuracy of module is a combination of the fitted resistor accuracy and the relay/track resistance that makes up the residual path resistance.

Power Requirements

+3.3V	+5V	+12V	-12V
0	1.85A (typ 450mA)	0	0

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).
Module weight: 200g (40-295-021-3/24)
240g (40-295-021-10/8)
340g (40-295-121-10/16)

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

Connectors

PXI bus via 32-bit P1/J1 backplane connector.
Resistor channel signals via front panel 37-pin male D-Type connector.

Operating/Storage Conditions

Operating Conditions

Operating Temperature:	0°C to +55°C
Humidity:	Up to 90% non-condensing
Altitude:	5000m

Storage and Transport Conditions

Storage Temperature:	-20°C to +75°C
Humidity:	Up to 90% non-condensing
Altitude:	15000m

PXI & CompactPCI Compliance

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

Uses a 33MHz 32-bit backplane interface.

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.

Resistor Module Order Codes

10 x 8 Bit (0Ω to 255Ω)	40-295-021-10/8
18 x 8 Bit (0Ω to 255Ω)	40-295-121-18/8
5 x 12 Bit (0Ω to 4kΩ)	40-295-021-5/12
10 x 12 Bit (0Ω to 4kΩ)	40-295-121-10/12
5 x 16 Bit (0Ω to 65kΩ)	40-295-021-5/16
10 x 16 Bit (0Ω to 65kΩ)	40-295-121-10/16
3 x 24 Bit (0Ω to 16MΩ)	40-295-021-3/24
6 x 24 Bit (0Ω to 16MΩ)	40-295-121-6/24

Potentiometer Module Order Codes

5 x 8 Bit Pot (0Ω to 255Ω Wiper)	40-296-021-5/8
9 x 8 Bit Pot (0Ω to 255Ω Wiper)	40-296-121-9/8
2 x 12 Bit Pot (0Ω to 4kΩ Wiper)	40-296-021-2/12
4 x 12 Bit Pot (0Ω to 4kΩ Wiper)	40-296-121-4/12
2 x 16 Bit Pot (0Ω to 65kΩ Wiper)	40-296-021-2/16
4 x 16 Bit Pot (0Ω to 65kΩ Wiper)	40-296-121-4/16
1 x 24 Bit Pot (0Ω to 16MΩ Wiper)	40-296-021-1/24
3x 24 Bit Pot (0Ω to 16MΩ Wiper)	40-296-121-3/24

Mating Connectors & Cabling

For connection accessories for the 40-295/296 series please refer to the 90-007D 37-pin D-Type Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

Other Resistor Modules

Pickering Interfaces manufacture a range of variable resistor modules in the PXI 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 †	
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.

Product Customization

Pickering PXI 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.

Chassis Compatibility

This PXI module must be used in a suitable chassis. It is 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



Chassis Selection Guide

Standard PXI or hybrid PXIe Chassis from any Vendor:

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

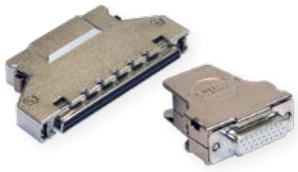


Pickering LXI or LXI/USB Modular Chassis—only accept our 1000+ PXI Switching & Simulation Modules:

- 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

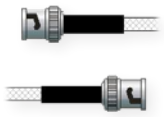
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed to mechanically and electrically mate to our modules.



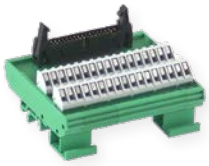
Connectors & Backshells



Multiway Cable Assemblies



RF Cable Assemblies



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.
Visit: pickeringtest.com/cdt to start your design.



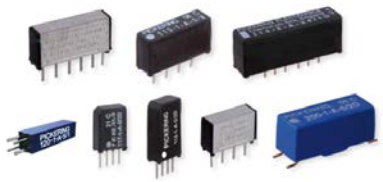
Mass Interconnect

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

Pickering Reed Relays

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

To learn more, please 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 a list of all supporting operating systems, please see: 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
- **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, please 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, please 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, please go to: pickeringtest.com/ebirst



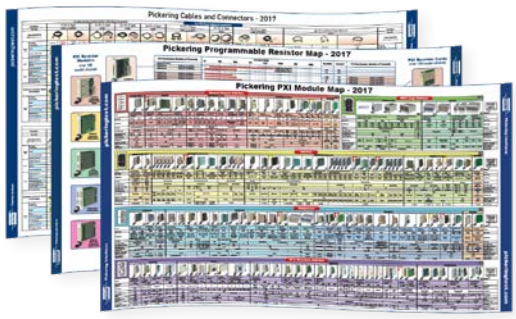
Three Year Warranty & Guaranteed Long-Term Support

All standard products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for a period of three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available for all our modules and systems with various levels to suit 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, please go to: pickeringtest.com/support

Available Product Resources

We have a large library of product resources including success stories, product and support videos, articles, as well as complete product catalogs and product reference maps to assist when looking for the switching, simulation and cable and connector solutions you need. We have also published handy reference books on Switching Technology and for the PXI and LXI standards.







To view, download or request any of our product resources, please visit: pickeringtest.com/resources

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Pickering Interfaces maintains a commitment to continuous product development, consequently we reserve the right to vary from the description given in this data sheet.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

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