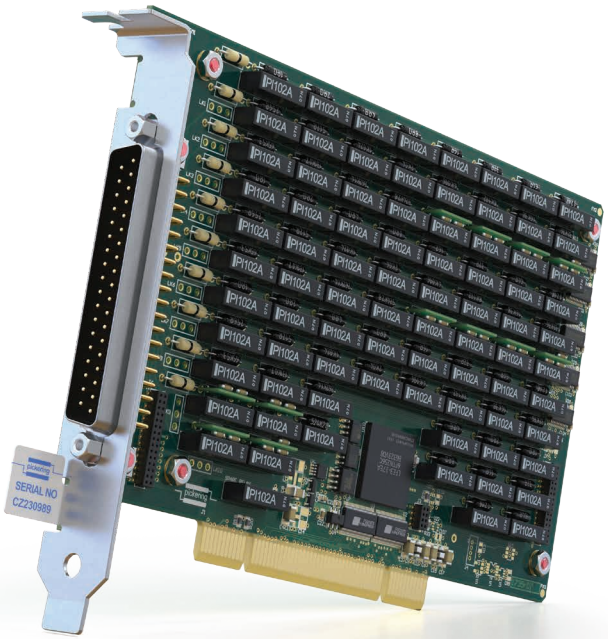
PCI Programmable Resistor/Potentiometer 50-295B/296B

- High Density Resistor Card
- Available in 8, 12, 16, or 24-Bit Resolutions
- Up to 18 Channels of 8-Bit Resolution
- Up to 10 Channels of 16-Bit Resolution
- Provides Fully Isolated Variable Resistors
- Available as an Adjustable Resistor or Potentiometer
- Built-in Non-Volatile Parametric 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
- Relay Cycle Counting Included
- VISA & Kernel Drivers Supplied for Windows Plus Soft Front Panel
- 3 Year Warranty



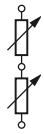
The 50-295B is a programmable resistor card with up to 18-channels of 8-bit resolution resistor chains in a single PCI slot. The flexible architecture allows the card to be supplied with 12-bit, 16-bit or 24-bit resolution for applications requiring finer resolution, greater resistance range or higher channel count. The card is ideal for simulating sensors for control and management systems under test, allowing the user to verify responses in design verification or manufacturing test applications.

The 50-296B version of the card is configured as a potentiometer with two end connections and a wiper for simulating adjustable components.

Versions with other resistor values can be provided for specific applications. The resistor chains include an offset resistor that can be used to set the minimum value.

Requests for these versions can be entered on a simple web based form from the Pickering Interfaces web site, allowing users a quick and easy way of obtaining a quotation.

The card is available in a variety of densities that allow the user to select the most appropriate solution in terms of density and cost for an application.

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

Programmable Resistor Card Options Overview

The card's high channel count enables large systems to be simulated with minimal PCI slot occupancy.

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

To give maximum accuracy each resistor chain has on-board E^2PROM, this allows accurate calibration data to be recorded.

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

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Relay Cycle Counting

To aid with module "health" monitoring all versions are provided with a relay cycle counting feature. The number of operations per contact are stored on the module and can be used to determine if a relay is approaching EOL. This information could allow system connections to be revised so that signals applied to heavily used contacts are swapped with lightly used contacts to prolong the working life of the relay(s).

Updated Product Information

This product has been introduced as a "form & fit" update to the 50-295A/296A, the changes are to provide relay cycle counting and an updated bus interface which will require the use of an updated software driver. Otherwise, the electrical performance is very similar and the software and pinout are identical.

Programmable Resistor Specification

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

Relay Type

The 50-295B/296B is fitted with sputtered ruthenium reed relays, these offer very long life with good low level switching performance and excellent contact resistance stability.
All reed relays are manufactured by our Relay Division. For more information, please visit: pickeringrelay.com

Power Requirements

+3.3 V	+5 V	+12 V	-12 V
230 mA	550 mA	0	0

Mechanical Characteristics

Single slot short PCI format.
Card weight: 330 g
3D models for all versions in a variety of popular file formats are available on request.

Connectors

Resistor connections via a 37-pin male D-Type connector. For pin outs please refer to the operating manual.

PCI Compliance

The 50-295B/296B comply with the PCI Specification 2.0 (issued Feb 2004).

Signalling Environment: 33 MHz, 32-bit Universal (+3.3 V & +5 V).

Safety & CE Compliance

All cards 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.

Operating/Storage Conditions

Operating Temperature:	0 °C to +55 °C
Humidity:	Up to 90 % non-condensing
Altitude:	5000 m
Storage/Transport Temperature:	-20 °C to +75 °C
Humidity:	Up to 90 % non-condensing
Altitude:	15000 m

High Density Resistor Card Order Codes

10 x 8 Bit (0 Ω to 255 Ω)	50-295B-021-10/8
18 x 8 Bit (0 Ω to 255 Ω)	50-295B-121-18/8
5 x 12 Bit (0 Ω to 4 kΩ)	50-295B-021-5/12
10 x 12 Bit (0 Ω to 4 kΩ)	50-295B-121-10/12
5 x 16 Bit (0 Ω to 65 kΩ)	50-295B-021-5/16
10 x 16 Bit (0 Ω to 65 kΩ)	50-295B-121-10/16
3 x 24 Bit (0 Ω to 16 MΩ)	50-295B-021-3/24
6 x 24 Bit (0 Ω to 16 MΩ)	50-295B-121-6/24

High Density Potentiometer Card Order Codes

5 x 8 Bit Pot (0 Ω to 255 Ω Wiper)	50-296B-021-5/8
9 x 8 Bit Pot (0 Ω to 255 Ω Wiper)	50-296B-121-9/8
2 x 12 Bit Pot (0 Ω to 4 kΩ Wiper)	50-296B-021-2/12
4 x 12 Bit Pot (0 Ω to 4 kΩ Wiper)	50-296B-121-4/12
2 x 16 Bit Pot (0 Ω to 65 kΩ Wiper)	50-296B-021-2/16
4 x 16 Bit Pot (0 Ω to 65 kΩ Wiper)	50-296B-121-4/16
1 x 24 Bit Pot (0 Ω to 16 MΩ Wiper)	50-296B-021-1/24
3 x 24 Bit Pot (0 Ω to 16 MΩ Wiper)	50-296B-121-3/24

Other Resistor Cards

Pickering Interfaces manufacture a range of variable resistor cards in the PXI and PCI formats. If you have a requirement for a variable resistor card 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.

Support Products

Mating Connectors & Cabling

For connection accessories for the 50-295B/296B 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.



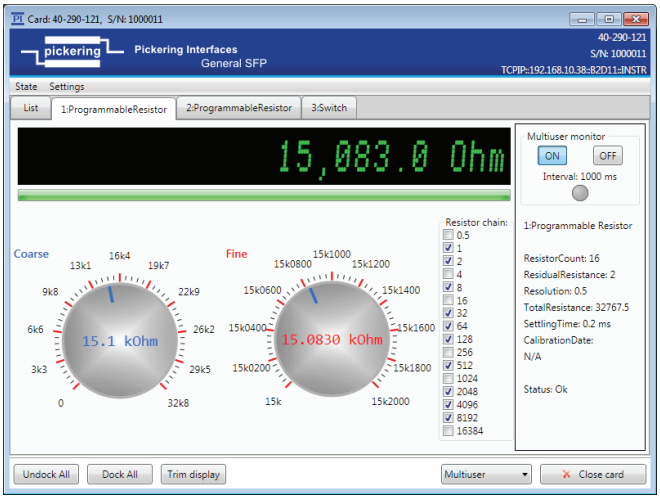
Pickering can supply mating connectors and cable assemblies to enable easy integration of the 50-295B/296B series of PCI cards

Product Customization

Pickering PCI cards 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.



Soft Front Panel for Programmable Resistor Cards

Connectivity Solutions



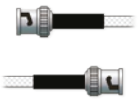
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with **1200+** products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed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



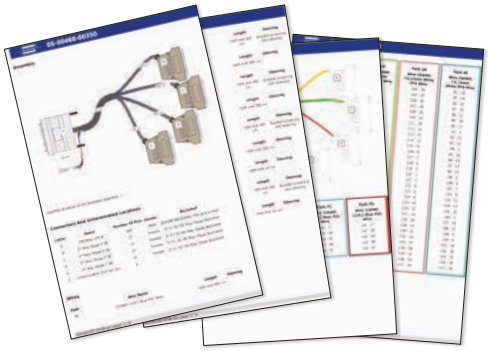
Breakouts



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

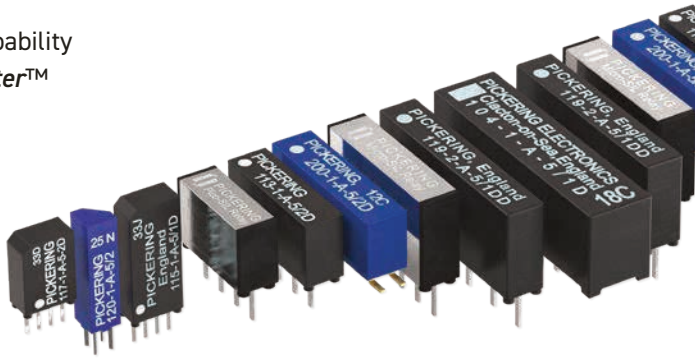
Mass Interconnect

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

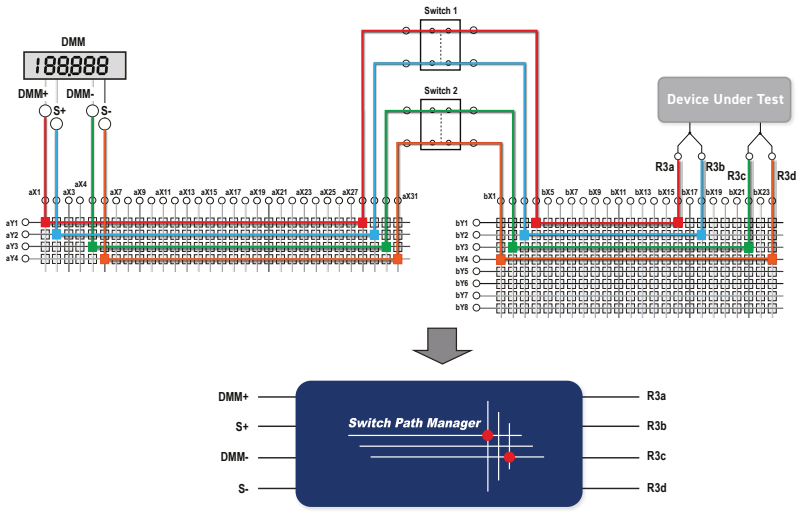
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help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



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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.