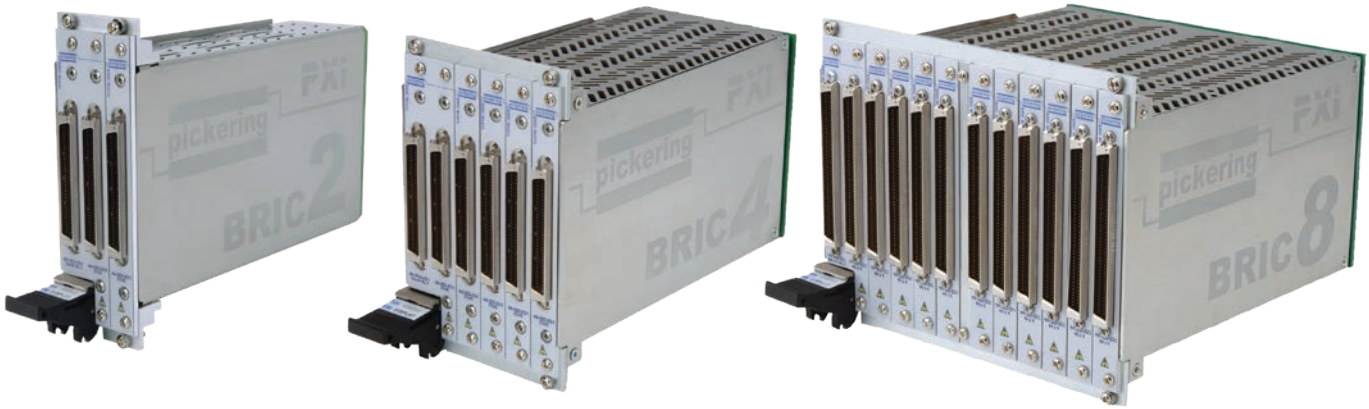
PXI BRIC™ Multi-Slot Matrix 40-560A



- Integrated PXI Matrix Module With Built In High Performance Screened Analog Bus
- Available as 2, 4 and 8 Slot 3U PXI Modules
- 1 Pole Switching
- Switch up to 140 V, 0.5 A, 10 W
- Automatic Isolation Relay Switches Maximizes Bandwidth and Matrix Reliability
- Simplified Maintenance Through The Use of Leaded Reed Relays
- Support in Any PXI Compliant Chassis or Control Through Ethernet in Our LXI Modular Chassis
- VISA, IVI & Kernel Drivers Supplied for Windows
- Built-In Diagnostics - ***BIRST*** ™
- Supported by ***eBIRST*** ™
- 3 Year Warranty

BRIC™ PXI Reed Relay Matrices

The 40-560A PXI BRIC is an ultra high density matrix module. It is available in 2, 4 or 8-slot sizes to suit high performance PXI matrix requirements and is constructed using instrumentation quality reed relays.

With its high level of switching density, the 40-560A PXI matrix allows a complete Functional ATE system to be housed in a single 3U PXI chassis, BRIC modules allow the use of much lower cost 8 or 14 slot PXI chassis.

- **BRIC2** is a 2-slot PXI Module, this can hold up to 3 matrix daughtercards, >1100 crosspoints.
- **BRIC4** is a 4-slot PXI Module, this can hold up to 6 matrix daughtercards, >2200 crosspoints.
- **BRIC8** is an 8-slot PXI Module, which can hold up to 12 matrix daughtercards, >4400 crosspoints.

High Reliability and Easy of Use

All models are constructed using the world's smallest and highest reliability ruthenium reed relays, offering >10^9 operations to give maximum switching confidence with long life and very stable contact resistance.

The 40-560A PXI BRICs are designed to minimize the cost and complexity of cable assemblies to the device under test and instrumentation. Analog busing is housed within the module using a high performance screened analog backplane. Pickering can construct custom cable assemblies for all of our PXI modules, please contact sales office for further assistance.

Built-In Relay Self-Test - *BIRST*

The *BIRST* facility provides a quick and simple way of finding relay failures. No test equipment is required, simply disconnect the UUT from the BRIC's connectors, launch the *BIRST* application and the tool will run a diagnostic test that will find all relays with faulty contacts.

For more information go to: pickeringtest.com/birst

Supported by *eBIRST*

These modules are also supported by *eBIRST*. These test tools simplify switching fault-finding by quickly testing the system and graphically identifying the faulty relay.

For more information go to: pickeringtest.com/ebirst

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Pickering Reed Relay BRIC Advantages

- Only uses the highest quality instrument grade reed relays – be wary of inferior copies.
- Simplified cabling and interconnection for large matrix solutions.
- Extensive accessory support.
- Built in self-test to find defective and degrading relays with full path resistance characterisation.
- Simplified operation through automated isolation relay operation and single matrix presentation.
- Highest density reed relay solution in PXI.
- Simple relay replacement and ease of field service.
- Extensive range of configurations and solutions.
- Fast operation through VISA driver with multiple relay operation in one command or have the convenience and simplicity of IVI drivers.

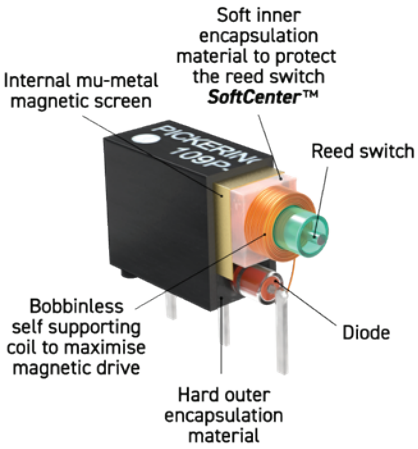
Pickering *SoftCenter*™ Instrumentation Grade Reed Relays

Reed relay switching solutions can only be as good as the relays used, and Pickering uses only the highest quality instrumentation grade reed relays manufactured by our Relay Division.

These are the reed relays of choice for ATE manufacturers, providing the most reliable and consistent switching available in the industry.

Pickering has over 50 years of experience designing relays to the highest quality levels demanded by the ATE industry. We know what makes a good relay and how to construct a reliable relay.

All our reed relays use ***SoftCenter*** construction that allows for the constant expansion and contraction of the reed relay coils and glass body without fear of damage to wires or glass seals. The high performance of reed relays is due to their hermetic structure, and only ***SoftCenter*** provides the means to reliably avoid damage, ensuring long contact life.

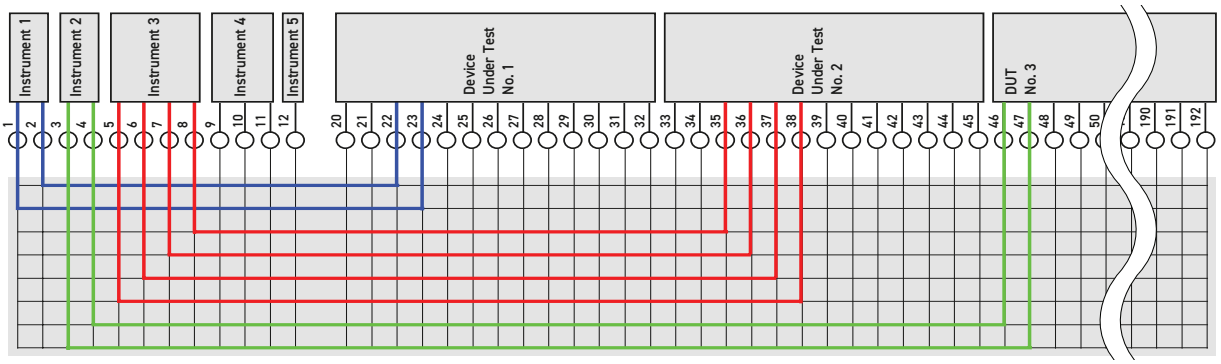


So choose the right matrix solution, and use the best quality reed relays by choosing Pickering Interfaces' reed relay BRICs.

Pickering's Range of BRIC Matrix Modules

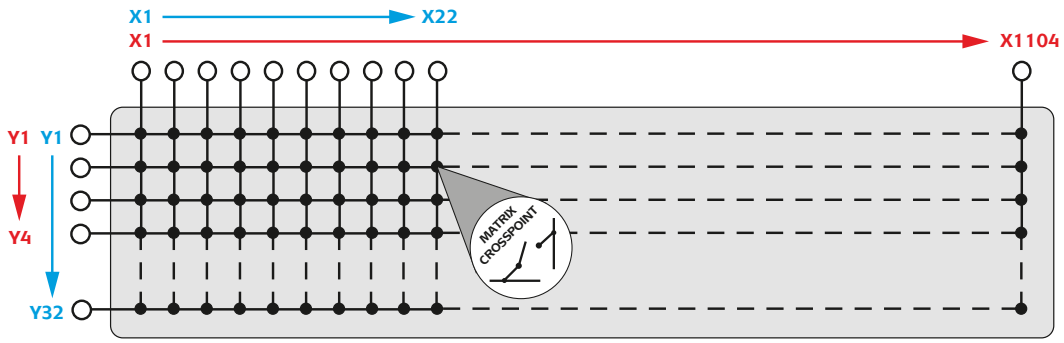
40-558 - 1-Pole Matrix - 0.5 A Reed Relay	
BRIC2	Up to 252x6, 192x8, 126x12 or 96x16
BRIC4	Up to 504x6, 384x8, 252x12 or 192x16
BRIC8	Up to 1008x6, 768x8, 504x12 or 384x16
BRIC12	Up to 1512x6, 1152x8, 756x12 or 576x16
40-559 - 1-Pole Matrix - 1 A Reed Relay	
BRIC2	256x4, 168x6, 128x8, 84x12 or 64x16
BRIC4	Up to 512x4, 336x6, 256x8, 168x12 or 128x16
BRIC8	Up to 1024x4, 672x6, 512x8, 336x12 or 256x16
40-560A - 1-Pole Matrix - 0.5 A Reed Relay	
BRIC2	Up to 276x4, 138x8 or 69x16
BRIC4	Up to 552x4, 276x8 or 138x16
BRIC8	Up to 1104x4, 552x8 or 276x16
40-561A - 1-Pole or 2-Pole Matrix - 0.5 A Reed Relay	
BRIC2	Up to 90x8 or 45x16
BRIC4	Up to 180x8 or 90x16
BRIC8	Up to 360x8 or 180x16
40-562B - 1-Pole or 2-Pole Matrix - 1 A Reed Relay	
BRIC2	Up to 132x4, 66x8, 33x16 or 15x32
BRIC4	Up to 264x4, 132x8, 66x16 or 30x32
BRIC8	Up to 528x4, 264x8, 132x16 or 60x32
BRIC12	Up to 792x4, 396x8, 198x16 or 90x32
40-563A - 1-Pole Matrix - 0.25 A Solid State	
BRIC2	Up to 96x8
BRIC4	Up to 192x8
BRIC8	Up to 384x8
40-565B - 2-Pole Matrix - 2 A Electro-mechanical Relay	
BRIC2	Up to 58x8
BRIC4	Up to 116x8
BRIC8	Up to 232x8
40-566A - 2-Pole Matrix - 2 A Electro-mechanical Relay	
BRIC4	Up to 165x4
BRIC8	Up to 385x4
40-567 - 1-Pole Matrix -2 A Electro-mechanical Relay	
BRIC2	Up to 88x8
BRIC4	Up to 176x8
BRIC8	Up to 352x8
40-568 - 1-Pole Matrix - 2 A Electro-mechanical Relay	
BRIC2	Up to 150x4
BRIC4	Up to 300x4
BRIC8	Up to 600x4
40-596 - 1-Pole Matrix - 2 A Electro-mechanical Relay	
BRIC2	Up to 161x6
BRIC4	Up to 232x6
BRIC8	Up to 464x6
40-597 - 1-Pole Matrix - 2 A Electro-mechanical Relay	
BRIC2	Up to 64x12
BRIC4	Up to 128x12
BRIC8	Up to 356x12
40-598 - 1-Pole Matrix - 2 A Electro-mechanical Relay	
BRIC2	Up to 48x16
BRIC4	Up to 96x16
BRIC8	Up to 192x16

How to use the BRIC matrix to connect instrumentation to the UUT

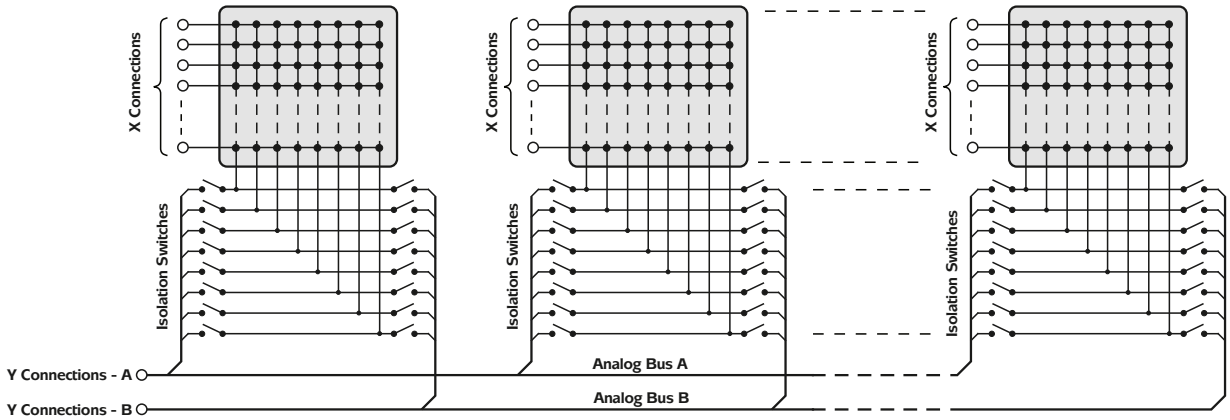


Single Pole Matrices

Single pole 40-560A matrices extend from 46x16 configurations to 1104x4 configurations



Dual Bus Matrices



Relay Type

The 40-560A BRIC modules are fitted with ruthenium sputtered reed relays, these offer very long life with good low level switching performance and excellent contact resistance stability. Spare reed relays are built onto the circuit board to allow easy maintenance with minimum downtime.

All reed relays are manufactured by our Relay Division, for more information please visit: pickeringrelay.com

General Switching Specification

Switch Type:	Ruthenium Reed
Max Switch Voltage:	140 VDC/100 VAC*
Max Power:	10 W
Max Switch Current:	0.5 A
Max Carry Current:	0.5 A
Relay Resistance:	100 mΩ (typical)
On Path Resistance X to X:	1 Ω typical (within same daughter card) 2 Ω typical (across different daughter cards)
Off Path Resistance:	$>1x10^9$ Ω
Thermal Offset:	200 µV (typical)
Typical Operate Time:	1 ms (0.5 ms for -R version)
Expected Life (Operations) Low Power Load: Full Power Load	 $>1x10^9$ $>1x10^6$
Bandwidth For Fully Loaded 276x8 Matrix (40-560A-021-276x8) (for X to Y connection):	20 MHz min, 35 MHz max †
Crosstalk for 40-560A-021-276x8 @1 MHz:	-55 dB
Typical Bandwidth for -R version fully loaded 276 x 8 matrix 40-560A-021-276x8-R:	5 MHz †

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

† Bandwidth is dependent upon configuration, please contact factory for advice concerning alternative configurations.

Maximum Crosspoint Count

The 40-560A has a suggested maximum number of simultaneously operated crosspoints of 50 per BRIC2, 50 per BRIC4 or 100 per BRIC8 (please contact factory for applications requiring higher closure counts).

RF Specification

Bandwidth (-3 dB):	15 MHz (typical)	
Crosstalk (typical):	10 kHz:	-70 dB
	100 kHz:	-60 dB
	1 M Hz:	-40 dB
	10 MHz	-20 dB
Isolation (typical):	10 kHz:	65 dB
	100 kHz:	60 dB
	1 MHz:	50 dB
	10 MHz	30 dB

Power Requirements

+3.3 V	+5 V	+12 V	-12 V
300 mA (typical)	4 A (typical 1 A)	35 mA (typical)	0

Width and Dimensions

Two, four or eight slot 3U PXI module (CompactPCI).

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

Module Weight

	Empty BRIC	Fully Loaded BRIC
BRIC2	0.6 Kg	1.2 Kg
BRIC4	0.9 Kg	2.1 Kg
BRIC8	1.6 Kg	4.0 Kg
BRIC daughter card	0.2 Kg	

Connectors

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

Signals via front panel connectors, for pin outs please refer to the operating manual:

- x4 configurations: 96-pin male micro-D connectors
- x8 & x16 configurations: 68-pin male micro-D connectors

Comparison Between 40-560A, 40-561A & 40-562A BRICs

40-560A: Offers the highest density solution for single pole applications only. It offers a wide bandwidth since all versions are fitted with isolation relays as standard that automatically disconnect unused daughter cards from the backplane (matrices can be supplied as -R versions with the isolation relays removed).

40-561A: Offers a similar electrical specification as the 40-560A but with lower density and more options. It can be supplied with 2-pole switching, providing a very dense solution for 2-pole matrices. Isolation switches are provided on 8-wire Y configurations, but not on 16-wire configurations.

40-562A: For applications requiring a higher electrical rating at the expense of density then choose the 40-562A. The 40-562A is available in 1-pole and 2-pole versions.

40-560A BRIC Matrix Product Order Codes

BRIC2 - 2-Slot **Ultra High Density 1-Pole Matrix**	**40-560A-221-(config)**
BRIC4 - 4-Slot **Ultra High Density 1-Pole Matrix**	**40-560A-021-(config)**
BRIC8 - 8-Slot **Ultra High Density 1-Pole Matrix**	**40-560A-121-(config)**

When ordering 40-560A modules the matrix configuration **must** be specified, this includes the prefix code together with the configuration code, see the tables for specific details.

For the expansion of an existing BRIC matrix or replacement of faulty BRIC daughter cards please contact your local sales office.

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 reed relay types
- Mixture of reed relay types
- Alternative number of relays
- 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.

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 33 MHz 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.

Operating/Storage Conditions

Operating Conditions

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

Storage and Transport Conditions

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

x4 Configuration Options			
	BRIC2 40-560A-221	**BRIC4 40-560A-021**	**BRIC8 40-560A-121**
184x4 Matrix	**-184x4**	**-184x4**	**-184x4**
276x4 Matrix	**-276x4**	**-276x4**	**-276x4**
368x4 Matrix		**-368x4**	**-368x4**
460x4 Matrix		**-460x4**	**-460x4**
552x4 Matrix		**-552x4**	**-552x4**
644x4 Matrix			**-644x4**
736x4 Matrix			**-736x4**
828x4 Matrix			**-828x4**
920x4 Matrix			**-920x4**
1012x4 Matrix			**-1012x4**
1104x4 Matrix			**-1104x4**
x8 Configuration Options			
	BRIC2 40-560A-221	**BRIC4 40-560A-021**	**BRIC8 40-560A-121**
92x8 Matrix	**-92x8**	**-92x8**	**-92x8**
138x8 Matrix	**-138x8**	**-138x8**	**-138x8**
184x8 Matrix		**-184x8**	**-184x8**
230x8 Matrix		**-230x8**	**-230x8**
276x8 Matrix		**-276x8**	**-276x8**
322x8 Matrix			**-322x8**
368x8 Matrix			**-368x8**
414x8 Matrix			**-414x8**
460x8 Matrix			**-460x8**
506x8 Matrix			**-506x8**
552x8 Matrix			**-552x8**
x16 Configuration Options			
	BRIC2 40-560A-221	**BRIC4 40-560A-021**	**BRIC8 40-560A-121**
46x16 Matrix	**-46x16**	**-46x16**	**-46x16**
69x16 Matrix	**-69x16**	**-69x16**	**-69x16**
92x16 Matrix		**-92x16**	**-92x16**
115x16 Matrix		**-115x16**	**-115x16**
138x16 Matrix		**-138x16**	**-138x16**
161x16 Matrix			**-161x16**
184x16 Matrix			**-184x16**
207x16 Matrix			**-207x16**
230x16 Matrix			**-230x16**
253x16 Matrix			**-253x16**
276x16 Matrix			**-276x16**
Further Options - Isolation Relays Removed			
This will improve path resistance by 150 mΩ but will degrade isolation and bandwith.			**-R**

Ordering Information

40-560A Dual Bus BRIC Matrix Product Order Codes

BRIC4 - 4-Slot Ultra High Density Dual Analog Bus 1-Pole Matrix	**40-560-021-(config)**
BRIC8 - 8-Slot Ultra High Density Dual Analog Bus1-Pole Matrix	**40-560-121-(config)**

When ordering 40-560A Dual Analog Bus modules the matrix configuration **must** be specified, this includes the prefix code together with the configuration code, see the tables for specific details.

For the expansion of an existing BRIC matrix or replacement of faulty BRIC daughter cards please contact your local sales office.

Dual Analog Bus Version (Dual 8 Wire)

x8 Configuration Options

	BRIC4 40-560A-021	BRIC8 40-560A-121
92x8 Matrix Dual Analog Bus	**-92x8-M**	**-92x8-M**
138x8 Matrix Dual Analog Bus	**-138x8-M**	**-138x8-M**
184x8 Matrix Dual Analog Bus	**-184x8-M**	**-184x8-M**
230x8 Matrix Dual Analog Bus	**-230x8-M**	**-230x8-M**
276x8 Matrix Dual Analog Bus	**-276x8-M**	**-276x8-M**
322x8 Matrix Dual Analog Bus		**-322x8-M**
368x8 Matrix Dual Analog Bus		**-368x8-M**
414x8 Matrix Dual Analog Bus		**-414x8-M**
460x8 Matrix Dual Analog Bus		**-460x8-M**
506x8 Matrix Dual Analog Bus		**-506x8-M**
552x8 Matrix Dual Analog Bus		**-552x8-M**

Support Products

eBIRST Switching System Test Tool

This product is supported by the *eBIRST* test tools which simplify the identification of failed relays, the required *eBIRST* tools are listed below. This product requires master slave testing and two sets of tools are required together with the master slave cable: **93-970-301**. For more information go to: pickeringtest.com/ebirst

Product	Test Tool	Adaptor	Termination
x4 Config	**93-002-001**	**93-002-226**	**93-016-103**
x8 Config	**93-006-001**	**93-006-222**	**93-015-103**
x16 Config	**93-006-001**	**93-006-222**	**93-015-103**

Spare Relay Kits

Kits of replacement relays are available for the majority of our PXI switching products, simplifying servicing and reducing down-time.

Product	Relay Kit
40-560A	**91-100-010 (Relay Kit 10)**

For further assistance, please contact the Pickering sales office.

Mating Connectors & Cabling

For connection accessories for the 40-560A series BRIC modules please refer to the 90-015D 68-pin micro-D or 90-016D 96-pin micro-D Connector Accessories data sheets where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

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:

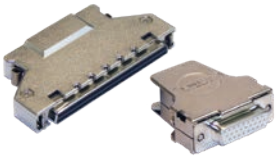
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

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

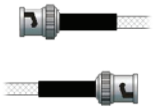
Connectivity Solutions

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

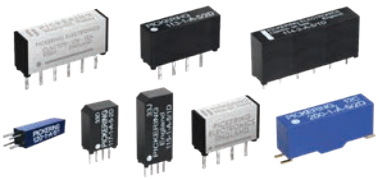
We also offer customized cabling and have a free online **Cable Design Tool** that can be used to create custom cable solutions for many applications. Visit: pickeringtest.com/cdt to start your design.

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 Relay Division. 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

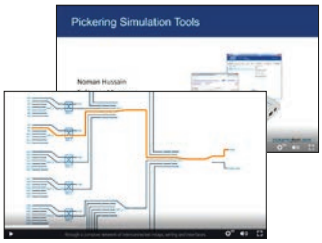
eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
To learn more, please go to: pickeringtest.com/ebirst

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 and white papers as well as application specific product brochures to assist when looking for the switching, simulation and connection 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