PXI BRIC™ High Density FIBO Matrix 40-592

- Integrated PXI Matrix Module With Built In High Performance Screened 8-Channel Analog Bus
- 2 or 3-Pin Breakout Configurations For Fault Simulation and Specialist Test Applications
- Very high Density With a 248x8 Matrix in an 8-slot Module (Including 2-Pin Breakout)
- Load Just The Number of Daughter Switch Cards You Need For Your Application
- Partially Populated Configurations Available - Minimizing Cost for Simpler Fault Condition Applications
- Uses High Reliability Ruthenium Reed Relays for Maximum Performance
- Switches up to 150V, 1A, 20W
- VISA & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- 3 Year Warranty

The 40-592 FIBO (Fault Insertion Break-Out) Matrix is a large-scale high density switching matrix based on the Pickering BRIC format.

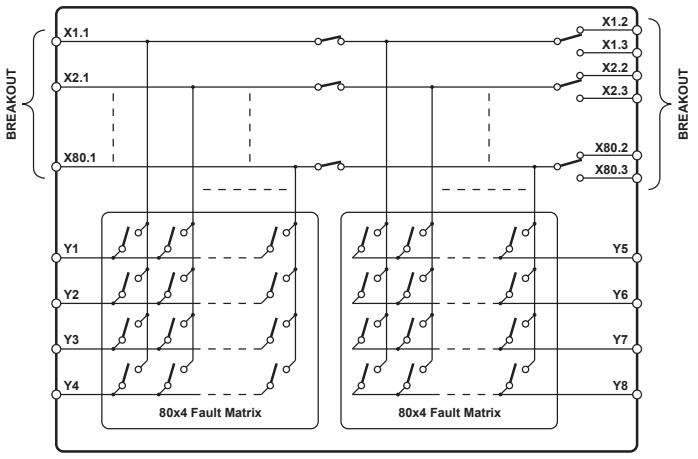
Fault insertion BRICs are designed for applications requiring the simulation of a variety of faults in complex, high pin count, applications involving sensors and control units. Typical faults that can be simulated are open-circuits, short-circuits to ground or battery, or short-circuits between input/output lines. Applications are in automotive and aerospace industries which involve safety or mission critical systems that have to behave predictably when cabling or sensor faults occur.

The FIBO Matrix Module is available as either a BRIC4 containing up to 4 daughter cards or a BRIC8 containing up to 8 daughter cards. This allows the X-bus of the matrix to be expanded in multiples of 31 for the 2-pin breakout version or multiples of 20 for the 3-pin breakout version.

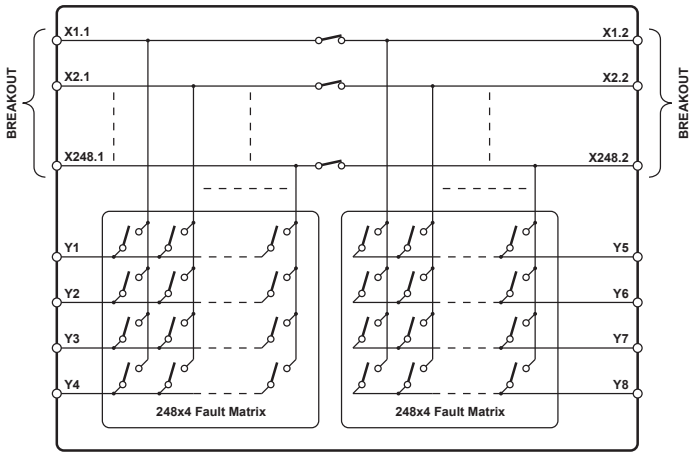
The programmable matrix designed to aid the simulation of faults. It allows measurement controllers and management systems to be automated, ensuring that the test can be performed quickly and reliably.

The fault insertion BRIC uses ruthenium reed relays to ensure a long and trouble free service life.

The backplane interface of the fault insertion BRIC uses a high speed buffered interface that ensure low latency on the the bus, ideal for operation with real time operating systems.



Schematic of the 40-592-021-80x8-3P FIBO High Density Matrix Module with 3-pin breakout (switches are shown in their default state)



Schematic of the 40-592-121-248x8-2P High Density FIBO Matrix Module with 2-pin breakout (switches are shown in their default state)

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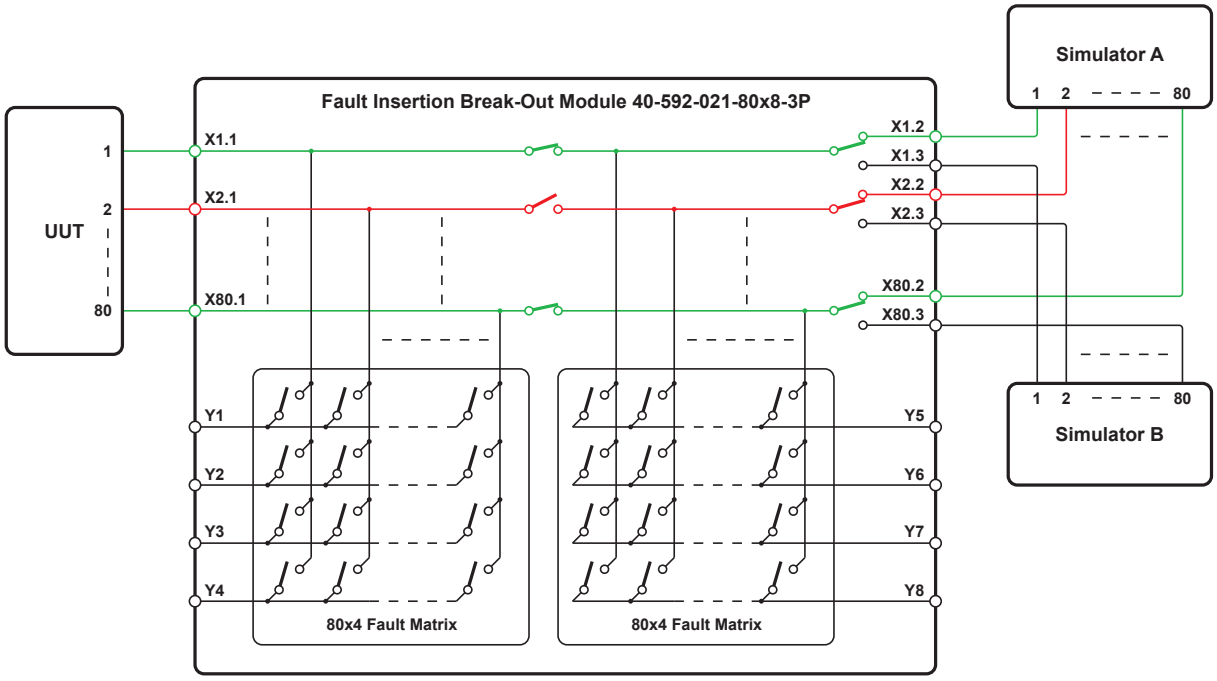
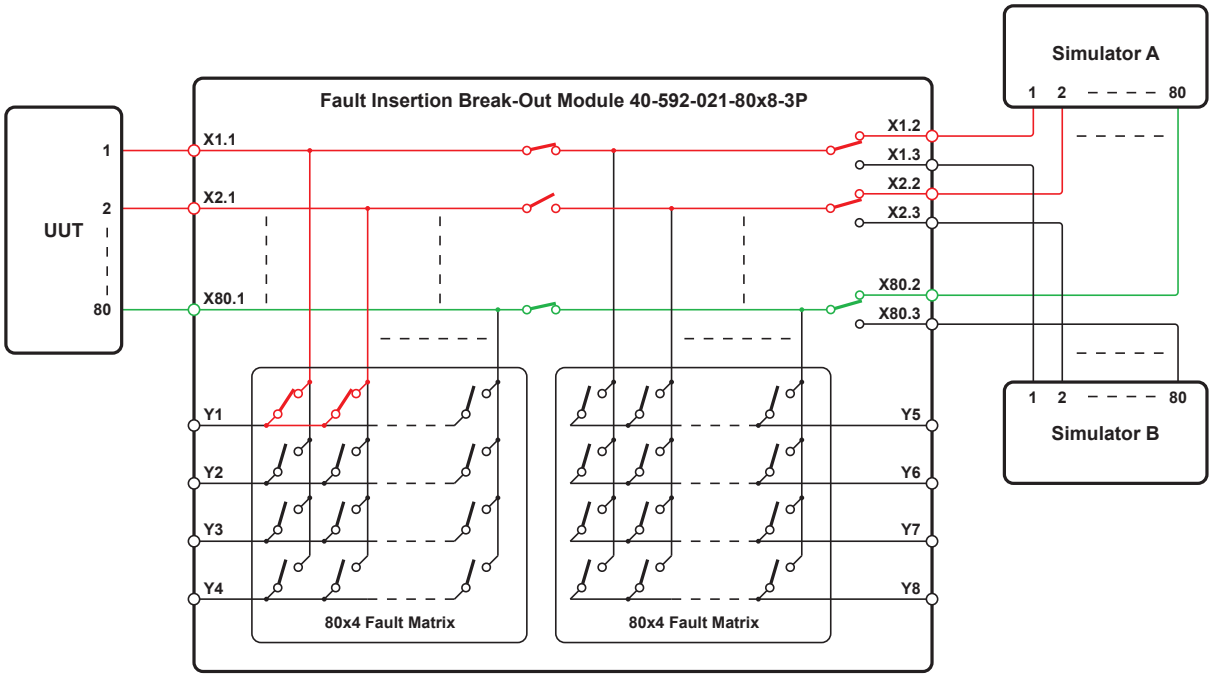
Fault Insertion Examples Using The FIBO Matrix

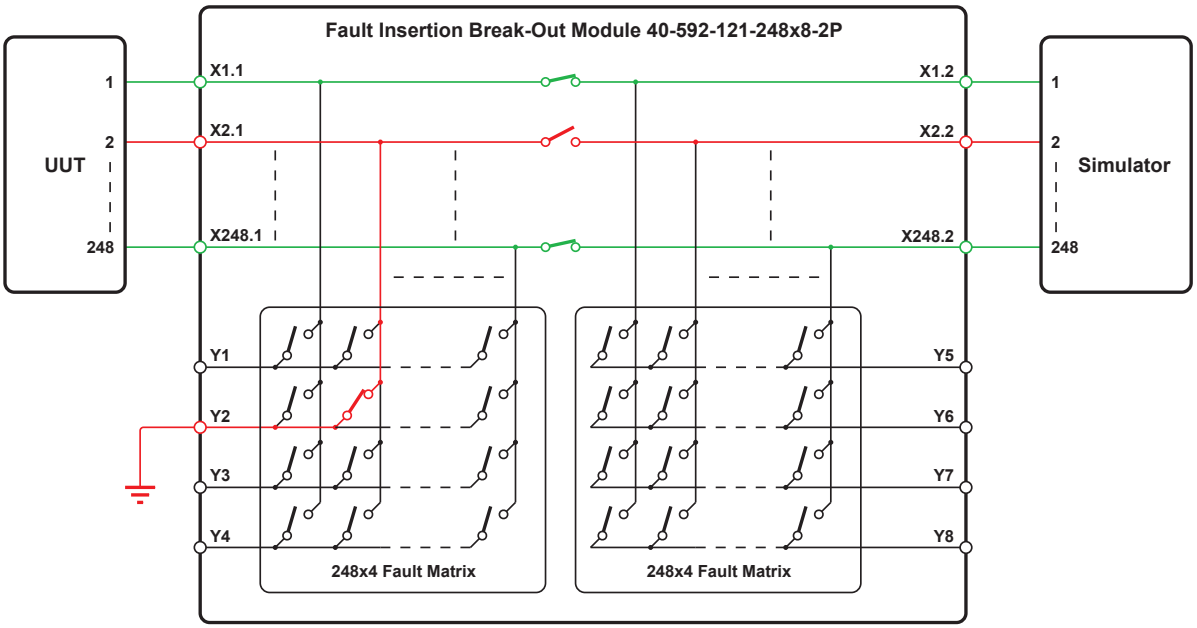
In a typical fault insertion example the X breakout connections are used to connect either a simulated sensor or a real sensor output to the device under test. The isolation switch can be used to disconnect the sensor source and faults can be inserted on either the sensor side or the device side of the isolation switch. Fault networks are connected to the Y axis connections to simulate shorts to ground or to power, or to simulate the effect of leakage paths. High resistance paths can also be simulated either in series with the signal or as a leakage between signal paths.



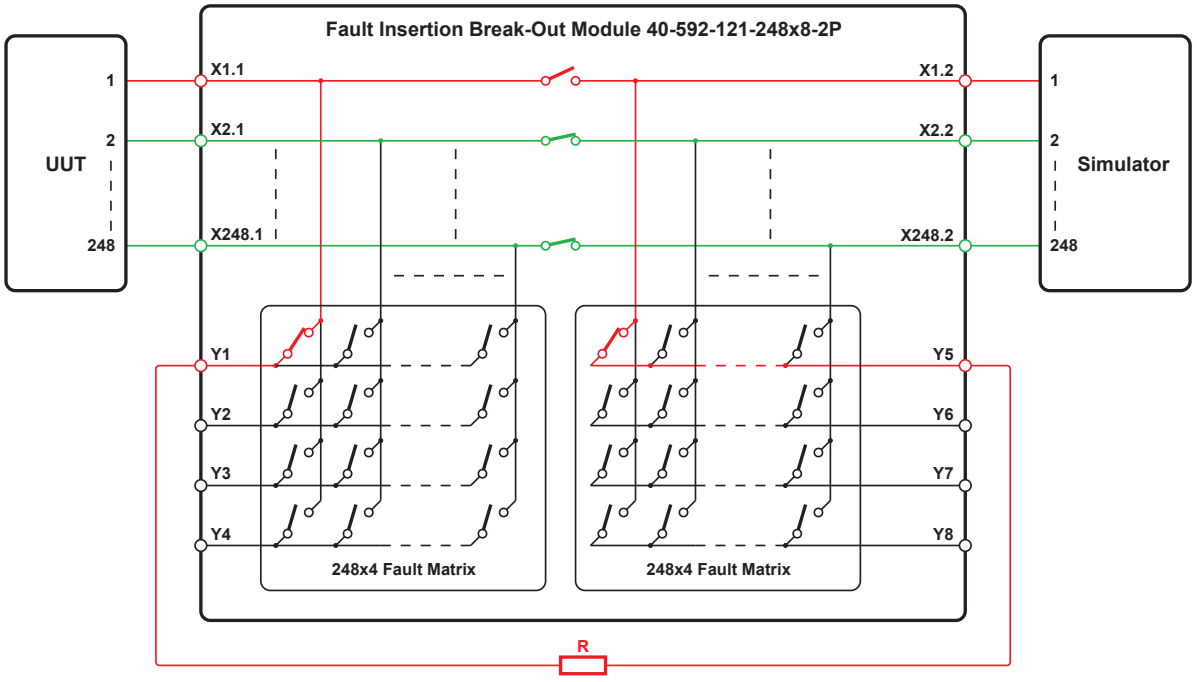
Fault Insertion Example 1: Open Circuit on Breakout 2 of an 80x8 FIBO High Density Matrix Module With 3-pin Breakout



Fault Insertion Example 2: Short Circuit Between Breakout 1 & 2 With Breakout 2 Connection Open Using an 80x8 FIBO High Density Matrix Module With 3-pin Breakout



Fault Insertion Example 3: Signal Short to Ground Using Y2 With Breakout 2 Connection Open Using a 248x8 FIBO High Density Matrix Module With 2-pin Breakout



Fault Insertion Example 4: Adding a Series Resistance Into Breakout 1 Using Y1 and Y5 On a 248x8 FIBO High Density Matrix Module With 2-pin Breakout

For Further Examples of Using The FIBO Matrix Module, Please Refer to The 40-592 User Manual

Relay Type

The 40-592 is fitted with high performance instrumentation grade Reed Relays (Ruthenium sputtered type). These offer very long life with good low level switching performance and excellent contact resistance stability.

Switching Specification

Switch Type:	Ruthenium Reed
Max Switching Voltage:	150VDC/100VAC*
Max Power:	20W
Max Switch Current:	1.0A
Max Carry Current:	1.2A
Initial Path Resistance (2-pin breakout)	
On path through matrix:	<750mΩ
On path through breakout:	<200mΩ
Off path resistance:	$>10^9\Omega$
Initial Path Resistance (3-pin breakout)	
On path through matrix:	<750mΩ
On path through breakout:	<300mΩ
Off path resistance:	$>10^9\Omega$
Thermal Offset:	<30µV
Operate Time:	<500µs †
Release Time:	<500µs †
Expected Life, low power load:	$>1x10^9$ operations
Expected Life, full power load:	$>1x10^6$ operations

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

† 200µs of the time quoted is relay settling time, the remaining time is dependant upon the speed of the controlling computer.

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.

Power Requirements

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

Width and Dimensions

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
BRIC4	0.9Kg	2.1Kg
BRIC8	1.6Kg	4.0Kg
BRIC daughter card	0.3Kg	

Connectors

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

Signals via multiple front panel connectors

- 40-592-121 Up to 8 x 78-pin male D-type connectors
- 40-592-021 Up to 4 x 78-pin male D-type connectors

For pin outs please refer to the operating manual.

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

Special Versions

BRIC modules can be built in special versions, for example where an exact matrix size is required then partly populated daughtercards may be ordered.

Upgrading With Daughtercards

BRIC modules can be upgraded to larger matrix sizes using daughter-cards, please consult your local sales office for further information.

Product Order Codes

BRIC4 - High Density 4-Slot FIBO Matrix	**40-592-021**
BRIC8 - High Density 8-Slot FIBO Matrix	**40-592-121**

When ordering 40-592 FIBO modules the matrix configuration **must** be specified, this consists of the prefix code together with the configuration code. This specifies the number of daughter cards and whether 2 or 3-pin breakout is required as shown in the Configuration Code tables.

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

Mating Connectors & Cabling

For connection accessories for the 40-596 modules please refer to the 90-006D 78-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.

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 relay types
- Mixture of relay types
- Alternative number of relays
- Different performance specifications

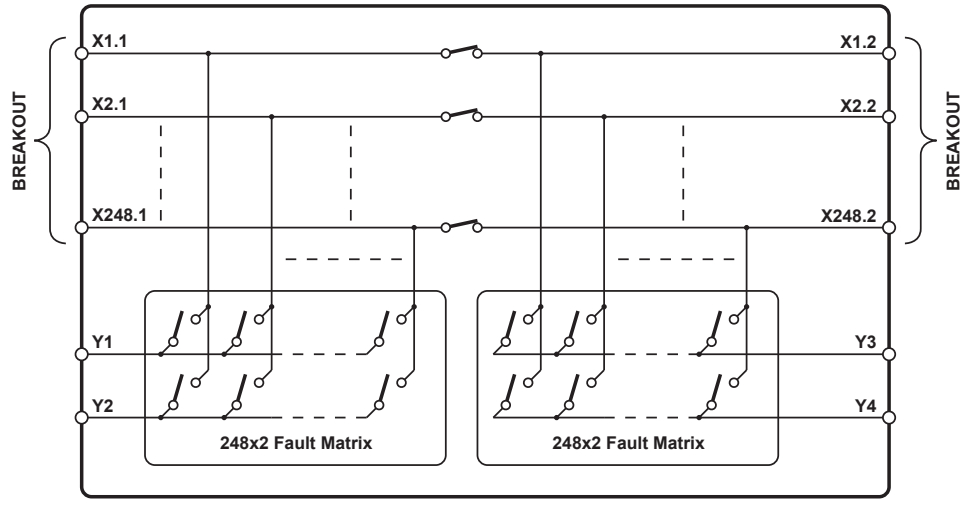
All customized products are given a unique part number, fully documented and may be ordered at any time in the future. Please contact your local sales office to discuss.

3-Pin Breakout FIBO Matrix Configuration Codes		
	BRIC4 40-592-021	BRIC8 40-592-121
20x8 matrix	-20x8-3P	-20x8-3P
40x8 matrix	-40x8-3P	-40x8-3P
60x8 matrix	-60x8-3P	-60x8-3P
80x8 matrix	-80x8-3P	-80x8-3P
100x8 matrix		-100x8-3P
120x8 matrix		-120x8-3P
140x8 matrix		-140x8-3P
160x8 matrix		-160x8-3P

2-Pin Breakout FIBO Matrix Configuration Codes		
	BRIC4 40-592-021	BRIC8 40-592-121
31x8 matrix	-31x8-2P	-31x8-2P
62x8 matrix	-62x8-2P	-62x8-2P
93x8 matrix	-93x8-2P	-93x8-2P
124x8 matrix	-124x8-2P	-124x8-2P
155x8 matrix		-155x8-2P
186x8 matrix		-186x8-2P
217x8 matrix		-217x8-2P
248x8 matrix		-248x8-2P

Partially Populated Versions - Configuration Codes

FIBO BRIC modules can be ordered with partially populated matrix configurations for simpler fault testing applications.
For example a 4-wire Y bus can be specified as follows:
40-592-021-124x4-2P (2-pin breakout 124x4 BRIC4 matrix)
40-592-121-248x4-2P (2-pin breakout 248x4 BRIC8 matrix)
Please consult your local sales office for further information.



Schematic Diagram for an example of a partially populated FIBO Matrix Module with a 4-wire Y-bus (order code 40-592-121-248x4-2P)

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:

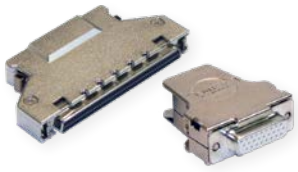
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

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

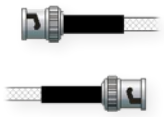
Connectivity Solutions

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.

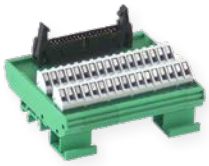


Connectors & Backshells

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

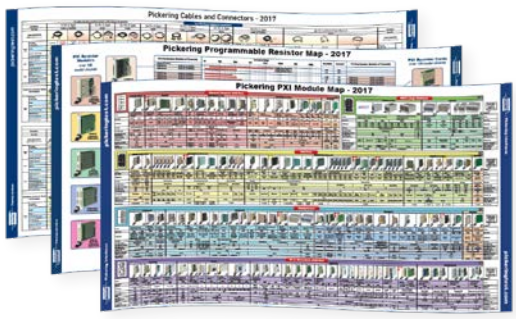
eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
To learn more, please go to: pickeringtest.com/ebirst

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