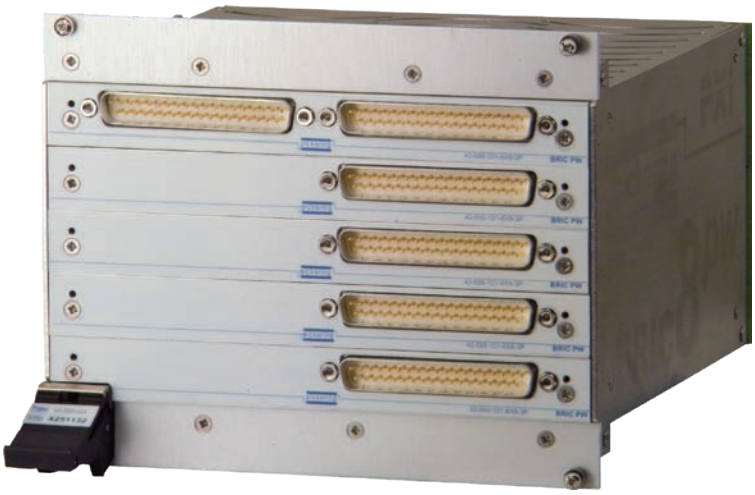
PXI BRIC™ Power FIBO Matrix 40-595A

- Integrated High Power PXI Matrix Module
- Built In High Performance Screened 8-Channel Analog Bus
- 3-Pin Breakout Configuration For Fault Simulation and Specialist Test Applications
- Sizes Up To Dual 30x4 Power Matrix on 5 Daughter Cards
- Load Just The Number of Daughter Switch Cards You Need For Your Application
- Uses Gold Flash Over Silver Alloy Contact Electro-mechanical Relays
- Cross-point Switches 125VDC/250VAC, 10A
- Breakout Switches 125VDC/250VAC, 8A
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- 3 Year Warranty



The 40-595A is a matrix module based on the BRIC format designed for fault insertion applications in safety critical testing. As with other BRIC modules the matrix size can be scaled to suit the application. The 40-595A has a very high current rating of 10 Amps, ideal for higher power systems, and can be used as a conventional matrix.

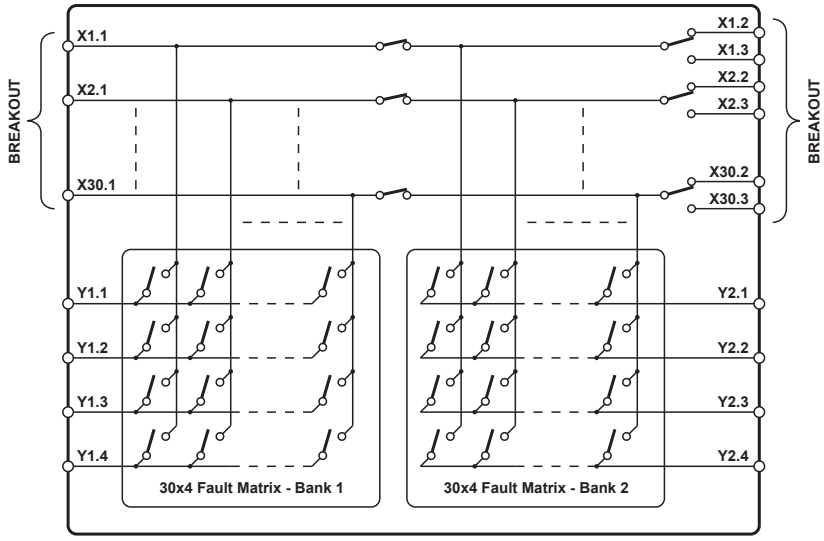
Fault insertion testing is when the response of a controller is assessed with one or more sensors providing poor information. This is to ensure that the controller does not produce an inappropriate response, such as turning an engine or braking system off, risking a serious system failure. Testing in aeronautic, aerospace and automotive environments has to be rigorous and documented to ensure that expensive failures or loss of life do not occur.

The 40-595A allows such testing to be automated, replacing manual test systems that are hard to repeat and document. Referring to the functional diagram, the 40-595 is typically used with a sensor emulation connected to breakout 1.2 or 1.3 and the controller under test connected to 1.1. The connection can be broken and a fault condition can be introduced, such as a short circuit, on the Y axis. The third breakout connection can be used to connect to a poor sensor emulation, allowing the controller to be tested with a more complex sensor present.

The dual bus arrangement allows an external series element to be added across the breakout connections with shunt defects provided by the Y axis.

The 40-595A allows up 8 types of fault to be connected to the Y axis and up to 30 connections to sensors. Modules can be supplied partially loaded for applications that do not require the full number of daughter cards.

User connection is via 37-pin D-type plugs. These are fully supported by our range of cable and connector accessories.



Schematic of the 40-595A-010 Dual 30x4 Power FIBO Matrix Module With 3-Pin Breakout (switches are shown in their default state)

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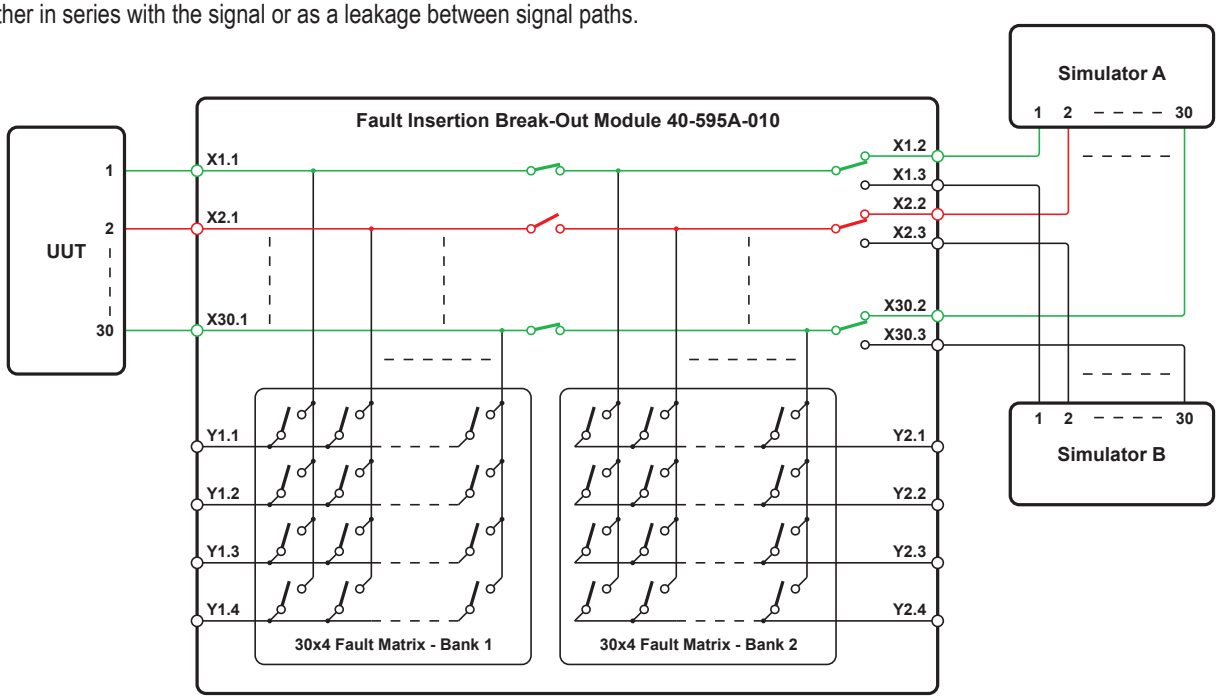
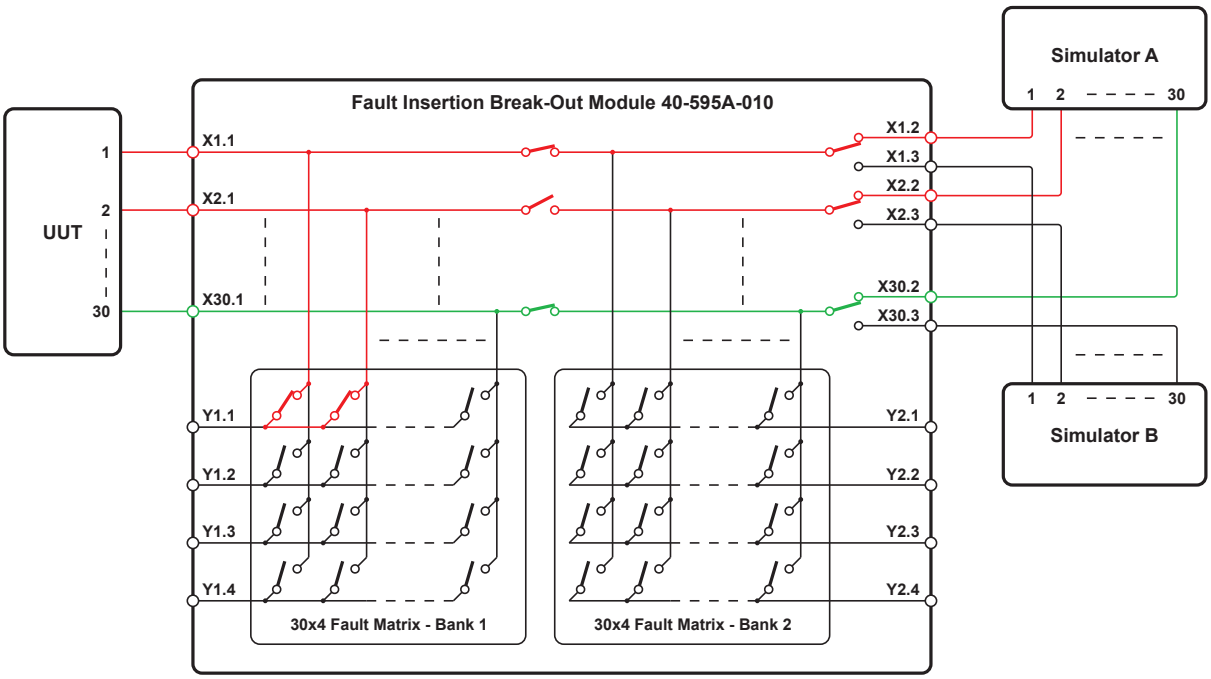
Fault Insertion Examples Using The FIBO Matrix

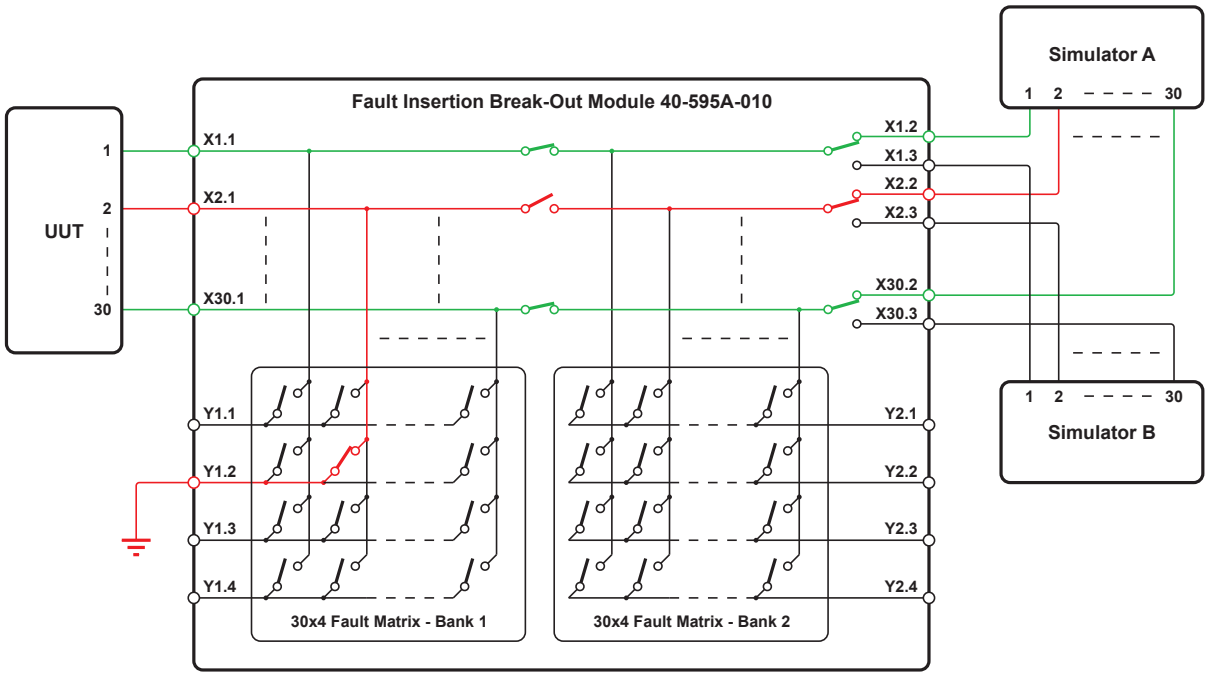
In a typical fault insertion example the X breakout connections are used to connect either a simulated sensor or a real sensor output to the device under test. The isolation switch can be used to disconnect the sensor source and faults can be inserted on either the sensor side or the device side of the 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.



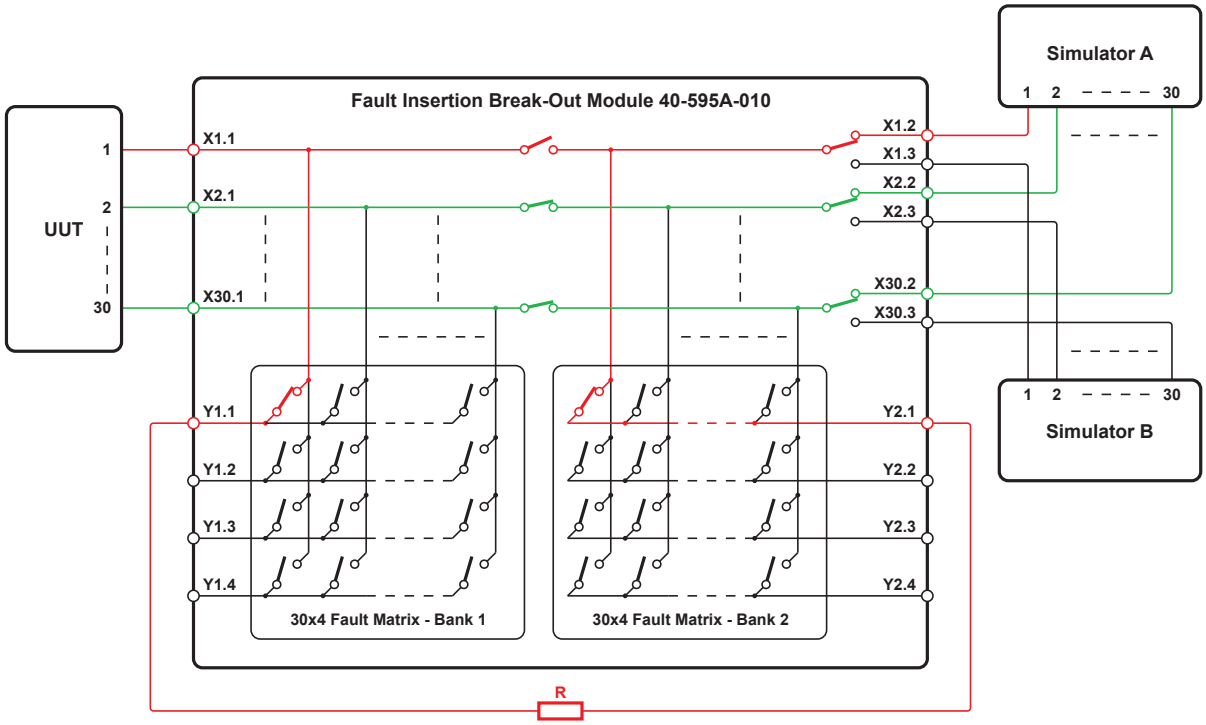
Fault Insertion Example 1: Open Circuit on Breakout 2 of a Dual 30x4 FIBO High Density Matrix Module With 3-pin Breakout



Fault Insertion Example 2: Short Circuit Between Breakout 1 & 2 With Breakout 2 Connection Open Using a Dual 30x4 FIBO High Density Matrix Module With 3-pin Breakout



Fault Insertion Example 3: Signal Short to Ground Using Y1.2 With Breakout 2 Connection Open Using a Dual 30x4 FIBO High Density Matrix Module With 3-pin Breakout



Fault Insertion Example 4: Adding a Series Resistance Into Breakout 1 Using Y1.1 and Y1.2 On a Dual 30x4 FIBO High Density Matrix Module With 3-pin Breakout

For Further Examples of Using The FIBO Matrix Module, Please Refer to The 40-595A User Manual

Relay Type

The 40-595A is fitted with single-pole electro-mechanical power relays, gold-flash over silver alloy contact.

Switching Specification - Crosspoint Relays

Contact Type:	Gold flash over silver alloy
Cold Switching Capacity Maximum Current: Maximum Voltage:	 10A 400VDC/250VAC*
Hot Switching Capacity Maximum Current: Maximum Voltage: Maximum Power:† Min. Switching Capacity:	 10A 125VDC/250VAC* 300W/2500VA 10mA, 5VDC
Initial Path Resistance, On: Path Resistance, Off:	<250mΩ $>1x10^9$Ω
Operate Time:	10ms typical
Expected Life (operations) - resistive load Mechanical Life: At Max. Switch Capacity:	 $>5x10^7$ $>1x10^5$

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

† For variation of maximum hot switching capacity of voltage with current refer to plot.

Switching Specification - Breakout Relays

Contact Type:	Gold flash over silver alloy
Cold Switching Capacity Maximum Current: Maximum Voltage:	 8A 400VDC/250VAC*
Hot Switching Capacity Maximum Current: Maximum Voltage: Maximum Power:† Min. Switching Capacity:	 8A 125VDC/250VAC* 240W/2000VA 10mA, 5VDC
Initial Path Resistance, On: Path Resistance, Off:	<250mΩ $>1x10^9$Ω
Operate Time:	10ms typical
Expected Life (operations) - resistive load Mechanical Life: At Max. Switch Capacity:	 $>5x10^7$ $>1x10^5$

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

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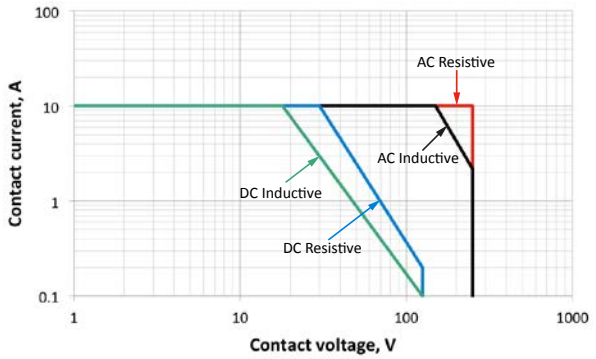
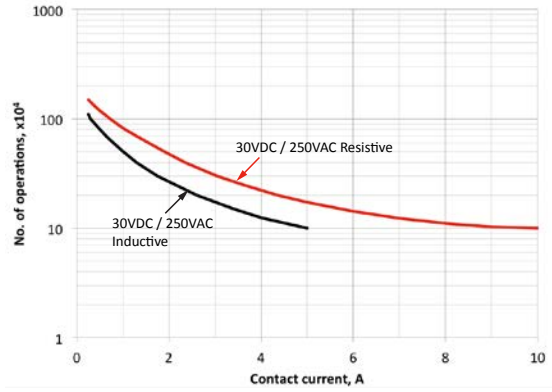
Power Requirements

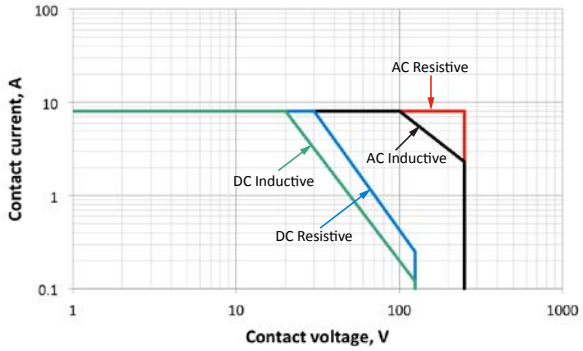
+3.3V	+5V	+12V	-12V
0	2A	0	0



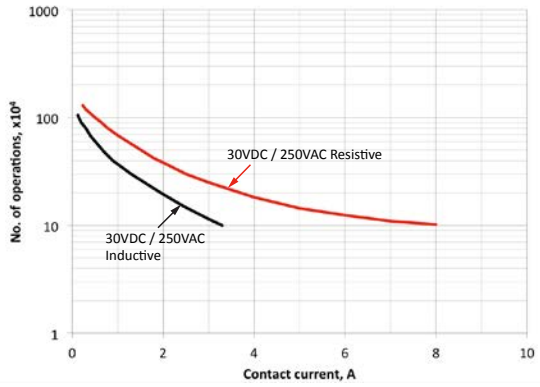
40-595A Current/Voltage Plot - Crosspoint Relays



40-595A Current/Operating Life Plot - Crosspoint Relays



40-595A Current/Voltage Plot - Breakout Relays



40-595A Current/Operating Life Plot - Breakout Relays

Width and Dimensions

Eight slot 3U PXI module (CompactPCI).

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

Connectors

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

Signals via up to 6 x 37-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

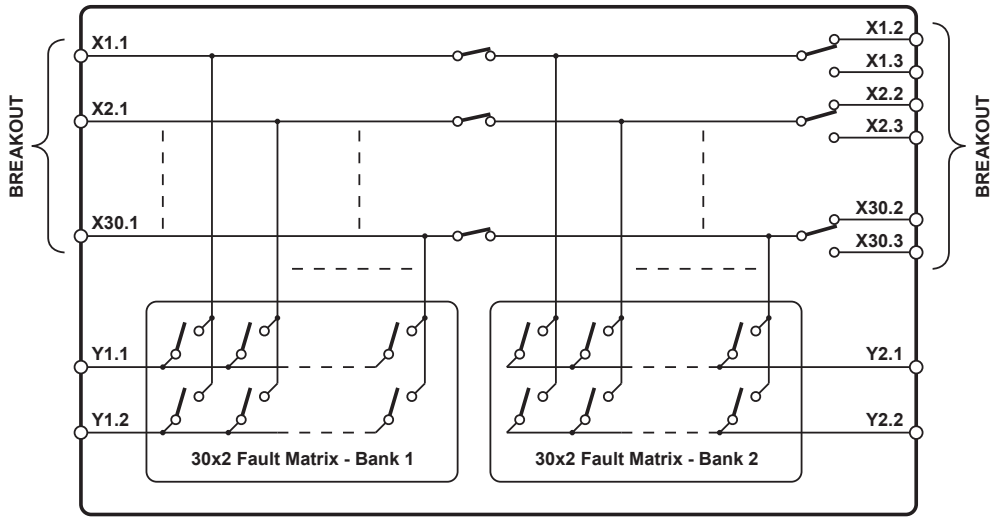
PXI & CompactPCI Compliance

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.



Schematic of the 40-595A-005
Dual 30x2 Power FIBO Matrix Module With 3-Pin Breakout

Ordering Information

Product Order Codes

BRIC8 Power FIBO Matrix with 3-pin breakout	
Dual 6x2 Matrix	40-595A-001
Dual 12x2 Matrix	40-595A-002
Dual 18x2 Matrix	40-595A-003
Dual 24x2 Matrix	40-595A-004
Dual 30x2 Matrix	40-595A-005
Dual 6x4 Matrix	40-595A-006
Dual 12x4 Matrix	40-595A-007
Dual 18x4 Matrix	40-595A-008
Dual 24x4 Matrix	40-595A-009
Dual 30x4 Matrix	40-595A-010

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

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 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.

Support Products

Spare Relay Kits

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

Product	Relay Kit
40-595A	91-100-085

For further assistance, please contact your local Pickering sales office.

Mating Connectors & Cabling

For connection accessories for the 40-595A range 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.

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:

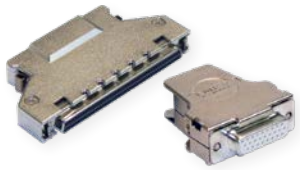
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

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

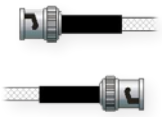
Connectivity Solutions

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.

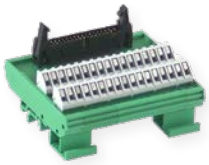


Connectors & Backshells

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.

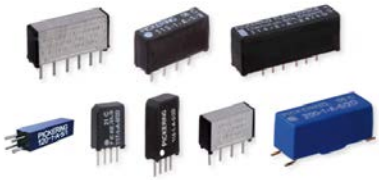
Mass Interconnect

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

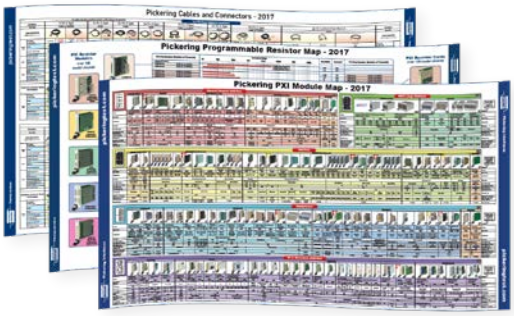
eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
To learn more, please go to: pickeringtest.com/ebirst

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