

PRELIMINARY DATA

- Available as PXI or PXIe Modules
- Switched Guard for Maximum Isolation Resistance - up to $10^{12} \Omega$
- Available in 16x4 and 8x4 Matrix Configurations
- Scalable in X Direction Using Loop-Thru Connectivity
- Uses Custom High Quality Pickering Ruthenium Reed Relays
- VISA, IVI & Kernel Drivers Supplied for Windows
- PXI Version Supported by PXI or LXI Chassis
- 3 Year Warranty



The 40-590 (PXI) and 42-590 (PXIe) are modules that provide a switched guard relay matrix solution with up to $10^{12} \Omega$ channel to channel and channel to ground isolation.

Available with matrix sizes of 16x4 or 8x4, the module can be expanded in the X direction by utilising the front panel loop-thru connectors.

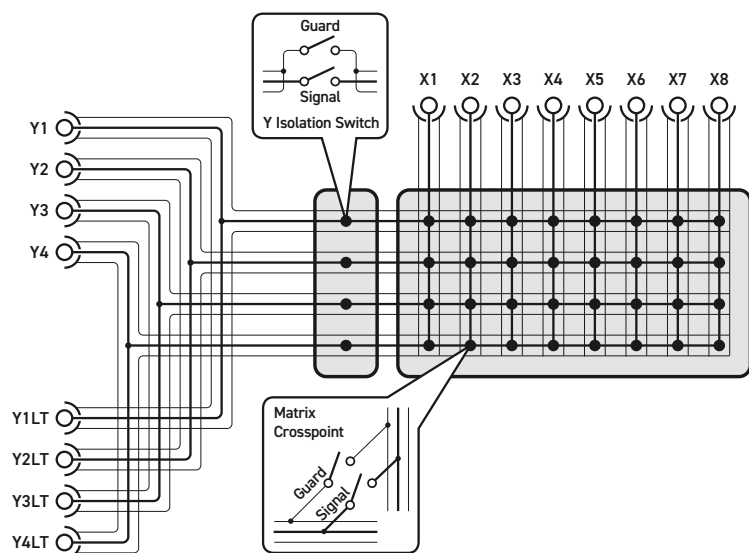
The use of switched guards ensure the matrix has high isolation resistance making it ideal for applications that require low level measurements such as semiconductor test.

Pickering's Range of Switched Guard Modules:

40-121-001	26 x SPST Switches	
40-121-002	13 x SPST Switches	
40-121-011	16 x 2:1 Multiplexers	
40-121-012	8 x 2:1 Multiplexers	
4x-590-101	16x4 Matrix	
4x-590-102	8x4 Matrix	
65-290-001	16x16 Matrix	(plug-in modules for 65-200 LXI Scalable Chassis)
65-290-002	8x16 Matrix	



40-590-102 8x4 Switched Guard Matrix Module in PXI Format



8x4 Switched Guard Matrix Module Switching Diagram (Part No. 4x-590-102)

Matrix Switching Specification

General:	Provides 4 concurrent X to Y connections. Expandable in X direction
Relay Type:	Custom Pickering Reed (Ruthenium Sputtered type)
Maximum Hot Switching Capacity:	250 mA, 40 V *
Maximum Cold Switching Voltage:	100 V *
Maximum Power:	10 W
Bandwidth (-3 dB):	TBC
Operate Time:	0.5 ms
Settling Time:	2 minutes
Initial Path Resistance:	<1 Ω (signal) <0.5 Ω (guard)
Offset Voltage (EMF after 5 min.):	TBC
Offset Current **:	TBC
Isolation Resistance:	Up to 10 ¹² Ω †
Capacitance, Channel Crosstalk (signal-to-signal):	TBC
Capacitance, Guard Crosstalk (signal-to-guard):	TBC
Expected Life (operations):	>1x10 ⁹ (Low Load) >1x10 ⁶ (Full Load)

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

** When zero voltage applied to all input & output ports.

† Point to point utilising the driven guard, 10V drive, 21 °C, 40% RH.

Power Requirements - 40-590

+3.3 V	+5 V	+12 V	-12 V
150 mA	1.8 A	0	0

Power Requirements - 42-590

+3.3 V	+12 V
390 mA	0.9 A

Mechanical Characteristics

40-590 - Single slot 3U PXI (CompactPCI card).

42-590 - Single slot 3U PXIe, compatible with PXIe hybrid slot.

Module weight: 230 g

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

Connectors

40-590 - PXI bus via 32-bit P1/J1 backplane connector.

42-590 - PXIe bus via XJ3 and XJ4 backplane connectors.

Signals via front panel mounted MMCX coaxial connectors for X, Y and YLT.

Operating/Storage Conditions

Operating Temperature: 0 °C to +55 °C

Humidity: Up to 90 % non-condensing

Altitude: 5000 m

Storage Temperature: -20 °C to +75 °C

Humidity: Up to 90 % non-condensing

Altitude: 15000 m

PXI & CompactPCI Compliance - 40-590

The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus & Star Trigger are not implemented. Uses a 33 MHz 32-bit backplane interface.

PXIe Compliance - 42-590

The module is compliant with the PXIe Specification 1.0. Local Bus, Trigger Bus & Star Trigger are not implemented.

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.

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Product Order Codes

PXI 16x4 Switched Guard Matrix	40-590-101
PXI 8x4 Switched Guard Matrix	40-590-102
PXIe 16x4 Switched Guard Matrix	42-590-101
PXIe 8x4 Switched Guard Matrix	42-590-102

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 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.



42-590-101 & 42-590-102 Switched Guard Matrix Modules in PXIe Format

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
4x-590-10x	TBD

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

Mating Connectors & Cabling

For connection accessories for the 4x-590 please refer to the [90-011D](#) RF Connector Accessories data sheet where a complete list and documentation can be found for MMCX connectors.

Pickering Electronics State-Of-The-Art Reed Relays

This module is constructed using custom reed relays manufactured by our Relay Division.

Sputtered Ruthenium

Reed Relays offer maximum performance, they are hermetically sealed and offer a very stable, long life relay contact (typically 10^9 operations) with very fast operate time. Alternative

types such as electro-mechanical armature relays or non-instrumentation grade reed relays are lower cost but do not offer the consistent contact resistance, long life, fast switching speed and low level switching capability of a reed relay.

All of the reed relays used in our switching modules are manufactured by our Relay Division, these offer maximum switching performance. Please visit the reed relay web site at pickeringrelay.com for further information.



Chassis Compatibility

The PXI versions of this module are 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

The PXIe versions of this module are compatible with the following chassis types:

- All chassis conforming to the 3U PXIe specification
- PXIe and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis

Chassis Selection Guide

PXI and PXIe (with PXIe and/or Hybrid slots) Chassis from any Vendor:

- Mix our 1000+ PXI/PXIe switching & simulation modules with any vendor's PXI/PXIe 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 PXI Switching & Simulation Modules:

- Choose from 1000+ Pickering PXI 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



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Connectivity Solutions

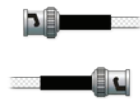
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed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



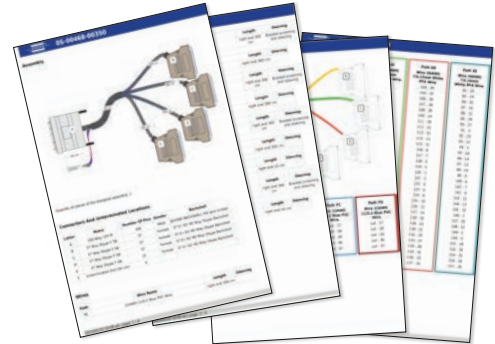
Breakouts



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

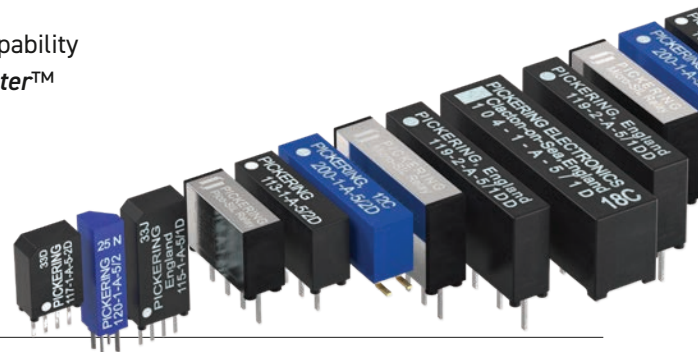
Mass Interconnect

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



PRELIMINARY DATA

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

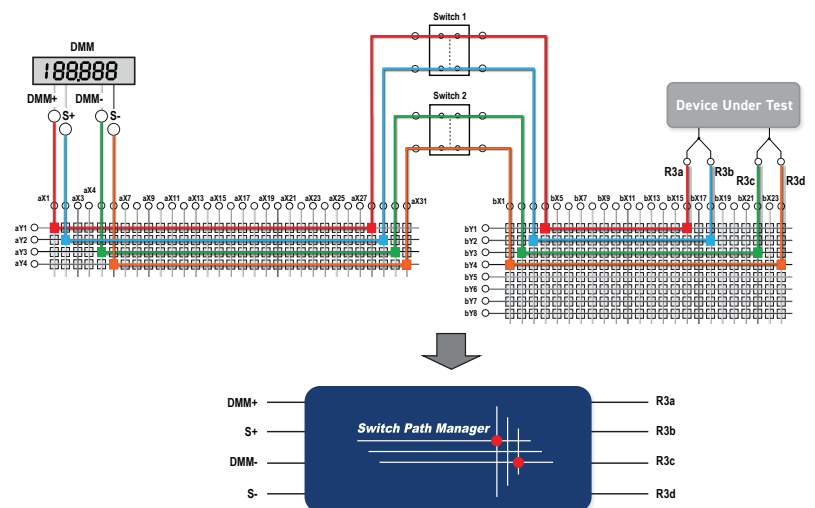
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help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



PRELIMINARY DATA

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

