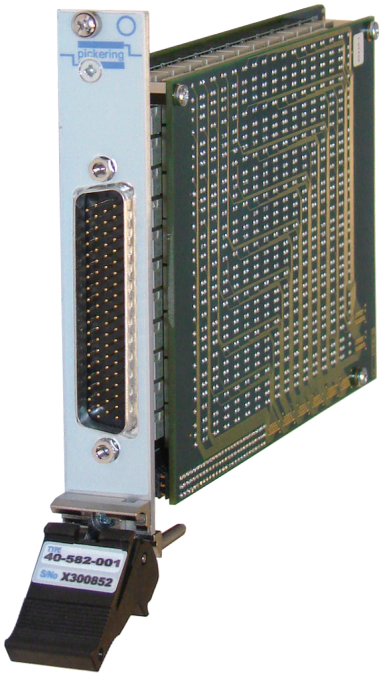
40-582
2-Pole 16x16 Matrix Module

- High Density Single-Slot 3U PXI 2-Pole Matrix With 256 Crosspoints
- Configured as a 16x16 Matrix
- Maximum Current 2A Hot or Cold Switching
- Switch up to 150VDC/100VAC and up to 60W Max Power
- Uses Gold-Plated Contact Electro-mechanical 2-Pole Relays
- VISA/IVI Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Built-In Diagnostics - BIRST™
- Supported by eBIRST
- 3 Year Warranty

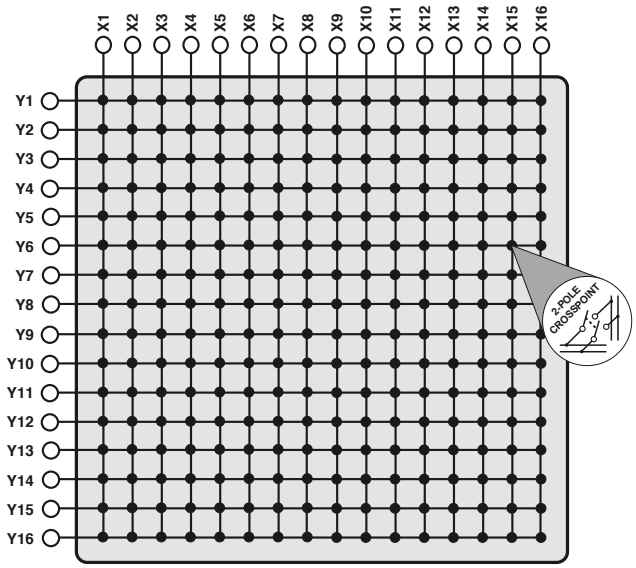


The 40-582 is a 256 crosspoint PXI matrix with dual pole switching. The module consists of a 16x16 matrix of 2-pole electro-mechanical relays with 2A current handling.

The module is designed for switching medium voltage and power signals, typical applications include signal routing in ATE and data acquisition systems. The user signal connection is via a robust 78-pin D-type connector that is fully supported by the wide range of Pickering Interfaces cable and connector accessories.

Built-In-Relay-Self-Test BIRST™

The BIRST facility provides a quick and simple way of finding relay failures within the module. No supporting test equipment is required to run a BIRST test, simply disconnect the UUT from the module's user connector, launch the supplied BIRST application software and the tool will run a diagnostic test that will find all relays with contacts welded closed or with high (open) contact resistance. It makes it simple for systems integrators to diagnose the cause of switching failures in a system.



Switching Diagram for 40-582-001
2-Pole 16x16 Matrix
(each line represents a 2-pole connection)

The BIRST tool compliments any self test diagnostic test tools built into the system since a switch path failure can be caused by switch or by cabling failures. If a system self test identifies a system failure and the BIRST indicates there are no relay failures, chances are the user needs to look for a cabling or programming errors.

If a relay failure is detected by BIRST the user can quickly identify the failed relay, locate the cause of the failure and replace the failed device. More information on the use of the BIRST tool is contained within the module's operating manual. For general information see **BIRST**.

Supported by eBIRST

This product is supported by eBIRST which tests the switching system using an external tool. eBIRST provides a graphical output of its tests which includes an image showing the location of any defective relay. For more information on eBIRST see **93-000D.pdf**

The 40-582 is part of Pickering's family of Very High Density, 256 crosspoint, BIRST enabled PXI matrices, the range is as follows:

- **40-584-001** - 128x2 1-Pole, 2 Amp Matrix
- **40-585-001** - 64x4 1-Pole, 2 Amp Matrix
- **40-586-001** - 32x8 1-Pole, 2 Amp Matrix
- **40-587-001** - 16x16 1-Pole, 2 Amp Matrix

Also available from Pickering is a range of High Density, 128 crosspoint PXI matrices, also fitted with BIRST:

- **40-527-001** - 64x2 1-Pole, 2 Amp Matrix
- **40-528-001** - 32x4 1-Pole, 2 Amp Matrix
- **40-529-001** - 16x8 1-Pole, 2 Amp Matrix

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Switching Specification

Switch Type:	Electro-mechanical
Contact Type:	Palladium-Ruthenium, Gold plated, bifurcated
Max Switch Voltage:	150VDC/100VAC
Max Power:	60W/62.5VA
Max Switch Current:	2A
Max Continuous Carry Current:	2A
Max Pulsed Carry Current Example (for a single switch path):	6A for 100ms (up to 10% duty cycle)
Initial On Path Resistance:	500mΩ
Off Path Resistance:	$>10^9\Omega$
Differential Thermal Offset:	<5µV
Max Number of Simultaneously Closed Crosspoints:	100
Operate Time:	3ms
Expected Life (Operations)	
Very low power load:	$>1x10^8$
Low power load:	$>1.5x10^7$ (0.1A 20VDC)
Medium power load:	$>5x10^6$ (1A 30VDC)
Full power load:	$>1x10^5$ (2A 30VDC)

Bandwidth

Typical Bandwidth	10 MHz

Power Requirements

+3.3V	+5V	+12V	-12V
130mA (typical)	500mA (typical) 1A (max)	70mA (typical)	0

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).

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

Connectors

PXI bus:	32-bit P1/J1 backplane connector
Front panel connector:	78-pin male D-type

Product Order Codes

16x16 Matrix Module, 2-pole (2A, 60W)	**40-582-001**

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 below. For more information see **eBIRST**.

Product	Test Tool	Adapter
All Types	**93-006-001**	**Not Required**

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
All Types	**91-100-001**

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

Mating Connectors & Cabling

For connection accessories for the 40-582 module 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.

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: www.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**
- **MTQ Testsolutions** Tecap Test & Measurement Suite
- **National Instruments** products (LabVIEW, LabWindows/CVI, Switch Executive, MAX, TestStand, VeriStand, etc.)
- **Microsoft Visual Studio** products (Visual Basic, Visual C+)
- **Keysight** VEE • **Mathworks** Matlab • **Marvin** ATEasy

Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries.

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 EN61010-1:2001, EMC Immunity EN61000-6-1:2001, Emissions EN55011:1998.

PXI & LXI Chassis Compatibility

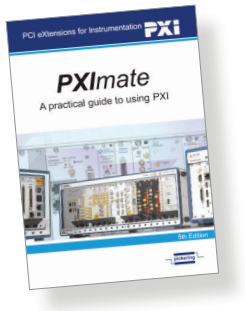
Compatible with all chassis conforming to the 3U PXI and 3U cPCI specification. Compatible with Legacy and Hybrid peripheral slots in a 3U PXI Express chassis.
Compatible with Pickering Interfaces LXI Modular Chassis. For information on driving your switching solution in an LXI environment refer to the LXI Product Guide.

Latest Details

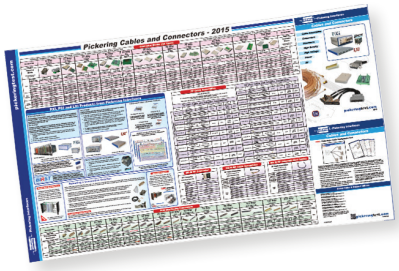
Please refer to our Web Site for Latest Product Details.
www.pickeringtest.com

Please refer to the 200 page Pickering Interfaces "**Connection Solutions**" catalog for the full list of connector/cabling options, including drawings, photos and specifications. Available in either print or as a download.
Alternatively our web site has dynamically linked connector/cabling options, including pricing, for all Pickering PXI modules.

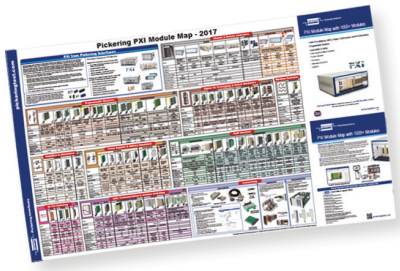
"**The Big PXI Catalog**" gives full details of Pickering's entire range of PXI switch modules, instrument modules and support products.
At over 500 pages, the Big PXI Catalog is available on request or can be downloaded from the Pickering website.



Ever wondered what PXI is all about?
Pickering Interfaces' "**PXImate**" explains the basics of PXI and provides useful data for engineers working on switch based test systems.
The PXImate is available free on request from the Pickering website.



The "**Cables & Connectors Map**" - outlines the cable and connector options available for all PXI Modules.



The "**PXI Module Map**" - a simple fold-out selection guide to all Pickering's 1000+ PXI Modules.

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Pickering Built-In Relay Self Test: BIRST™

Relays have specific voltage and current ratings and can be damaged if these parameters are exceeded – this can happen accidentally during test development and debug. The damaged relays can exhibit a variety of failures including:

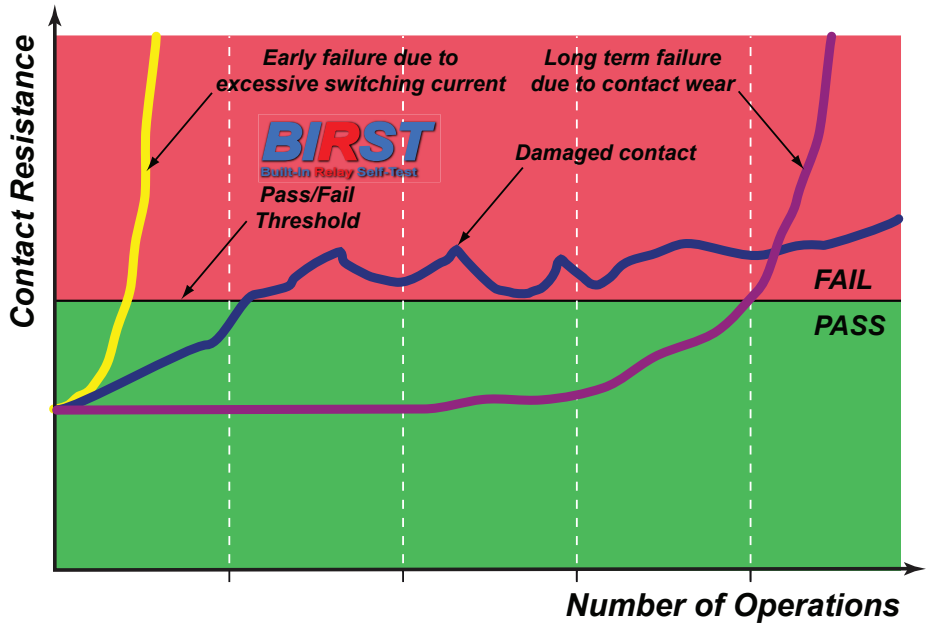
- Permanent or intermittent open/short circuits
- Variable path resistance.

These are often very difficult to diagnose as they can erroneously connect signals together causing unpredictable UUT behaviour.

Historically, complex switching systems on platforms such as VXI and Pickering's System 10/20 GPIB products have included a degree of self test for the relays. But in PXI, the industry has not included self test on switching because of the compromises introduced on density and cost when implementing previous self test architectures. As an alternative, some PXI switching solutions include relay operation counters to attempt to predict when a relay will fail. Although it may be helpful to know how intensively a relay might be being used it is not on its own a good indicator. The disadvantages are:

- Load conditions alone can impact the relay operating life by more than three orders of magnitude.
- Using the measure as a predictive maintenance tool (replacing relays when they have operated a number of times) can easily degrade the reliability of a switching system because of the disturbance that relay replacement causes to adjacent devices (not just relays), the risk of introducing a relay with "infant mortality" and even the potential for damaging the PCB when the change is made, especially if the relays are surface mount devices.

Pickering has greatly improved the test methodology to the extent it is now possible to include full self test in PXI switch modules with minimal impact on cost and switching density, welcome news for users who are used to having such features in their solutions. BIRST will identify any relay failures in the switch module and is also capable of detecting relays with deteriorating contacts which may indicate they are in the process of failing, as shown below.



To conduct a test the user simply disconnects the switching module from the UUT and test instrumentation and runs the supplied application program. No supporting test equipment is needed; the test runs automatically and identifies any defective or suspect relays within the module. If the switch module is connected directly to a Mass Interconnect receiver then BIRST may be executed without removing these connections. The BIRST tool is not intended to entirely displace user-developed self test applications that are built into some ATE systems. This system level test typically uses an external DMM and loop back mechanisms to check for switching and cable harness faults. BIRST conducts its test when the UUT and instrumentation are disconnected from the switching system, if BIRST finds no switching faults and a system level tool does find faults, the problem is with the cabling system. The user does not have to design software to diagnose switching faults, considerably simplifying the design task for system self test.