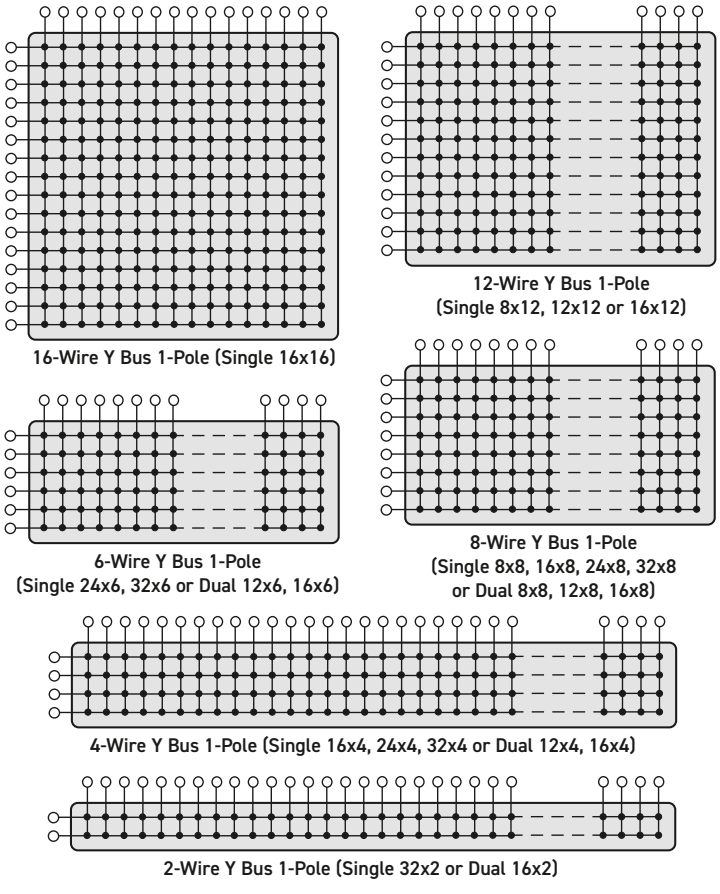
PXI/PXIe High Density Matrix

40/42-520A

- Available as PXI or PXIe Modules
- High Density Reed Relay Matrix Module
- Low/Medium Density Options for Smaller Requirements
- 22 Different Matrix Configurations With up to 256 Crosspoints
- Uses High Reliability Pickering Ruthenium Reed Relays for Maximum Performance
- Fast Operating Speed of 500 µs
- Switch up to 150 V, 1 A with 15 W Max Power
- Relay Cycle Counting Included
- Drivers Supplied for Windows & Linux, Plus Support for Real-time Systems
- PXI Versions Supported by PXI or LXI Chassis
- Supported by ***BIRST*** ™ & ***eBIRST*** ™ Test Tools
- 3 Year Warranty





40/42-520A High Density Matrix Range Overview

The 40-520A (PXI) and 42-520A (PXIe) are high density reed relay matrices with 22 different configurations. Typical applications include signal routing in ATE and data acquisition systems. The user signal connection is via a robust 50-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 test equipment is required, simply disconnect the UUT from the module's connector, 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*

In addition to *BIRST*, these modules are also supported by our *eBIRST* test tools. These tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay. For more information go to: pickeringtest.com/ebirst

Issue 1.1 October 2026

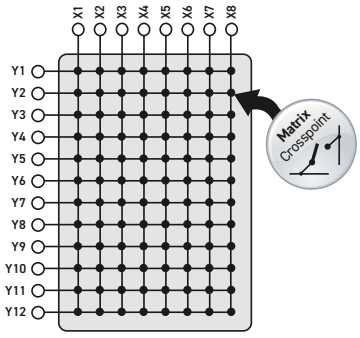
Updated Product Information

These products have been introduced as a "form & fit" update to the 40-520, the changes are to provide PXIe options, relay cycle counting and an updated bus interface which will require the use of an updated software driver. Otherwise, the electrical performance is very similar and the software and pinout are identical.

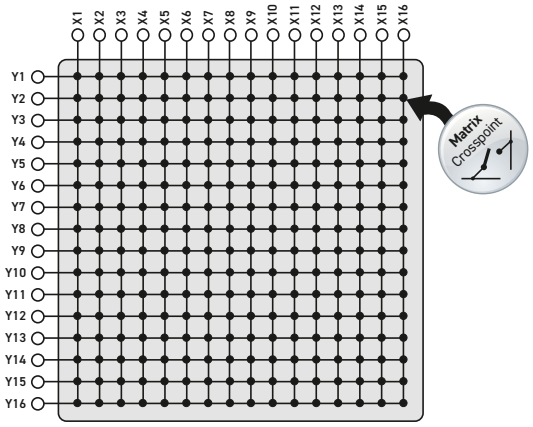
Relay Cycle Counting

To aid with module "health" monitoring all versions are provided with a relay cycle counting feature. The number of operations per contact are stored on the module and can be used to determine if a relay is approaching EOL. This information could allow system connections to be revised so that signals applied to heavily used contacts are swapped with lightly used contacts to prolong the working life of the relay(s).

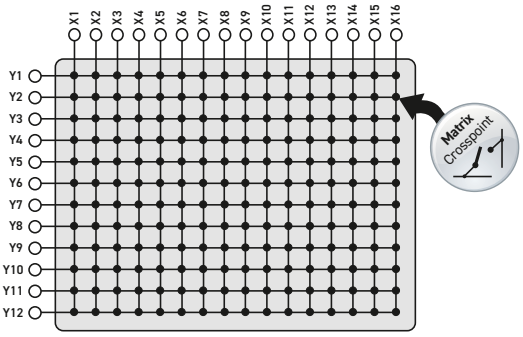
40/42-520A Matrix Range Schematic Diagrams



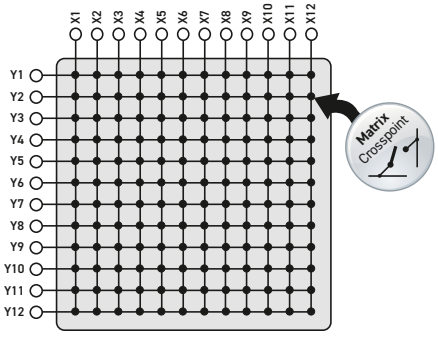
40/42-520A-103 Single 8x12 1-Pole Matrix



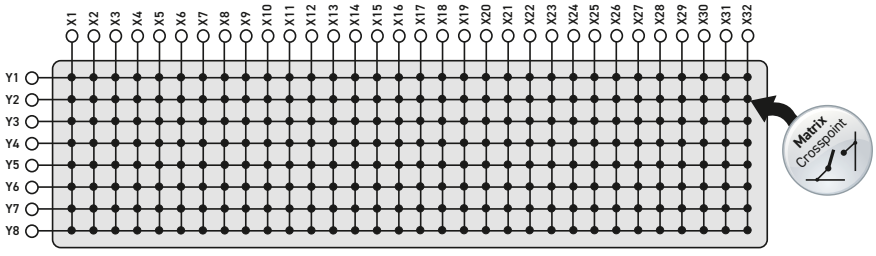
40/42-520A-001 Single 16x16 1-Pole Matrix



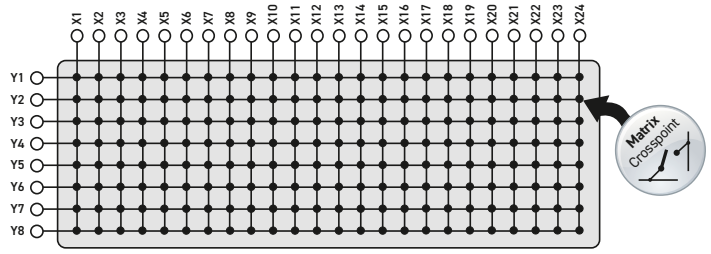
40/42-520A-101 Single 16x12 1-Pole Matrix



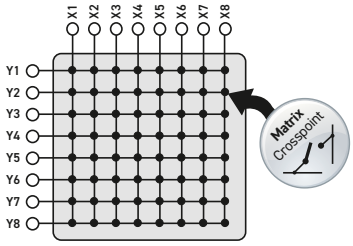
40/42-520A-102 Single 12x12 1-Pole Matrix



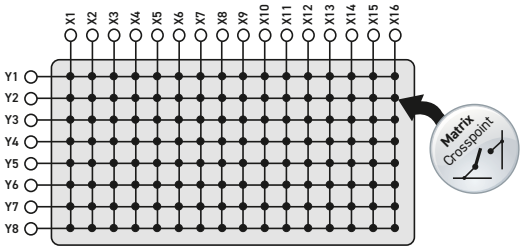
40/42-520A-201 Single 32x8 1-Pole Matrix



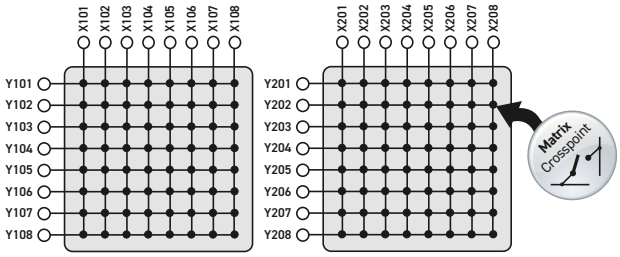
40/42-520A-202 Single 24x8 1-Pole Matrix



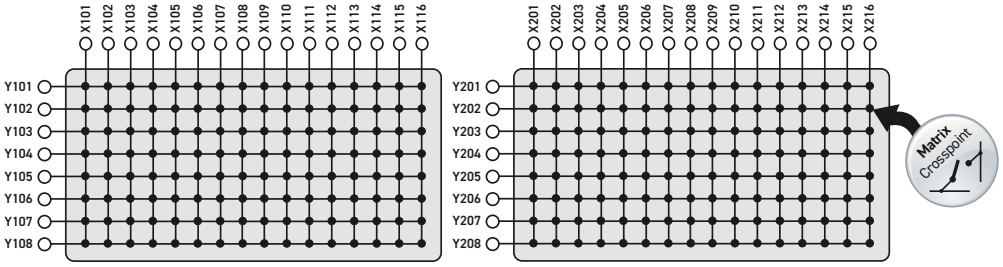
40/42-520A-204 Single 8x8 1-Pole Matrix



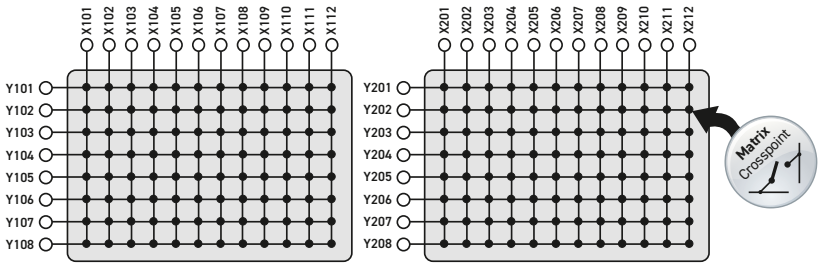
40/42-520A-203 Single 16x8 1-Pole Matrix



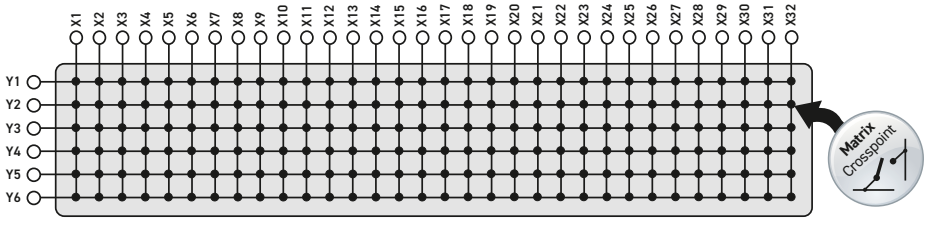
40/42-520A-207 Dual 8x8 1-Pole Matrix



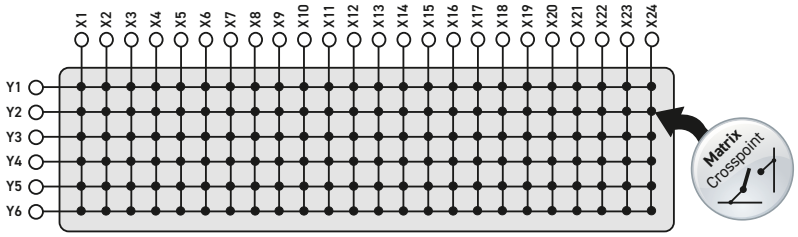
40/42-520A-205 Dual 16x8 1-Pole Matrix



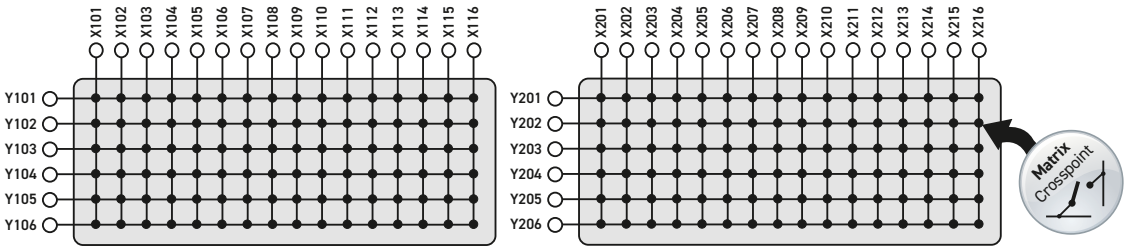
40/42-520A-206 Dual 12x8 1-Pole Matrix



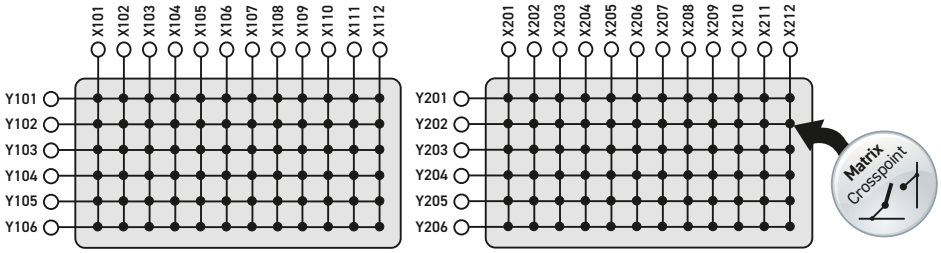
40/42-520A-301 Single 32x6 1-Pole Matrix



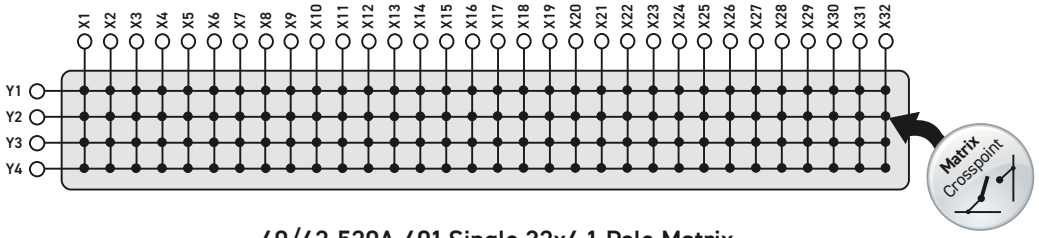
40/42-520A-302 Single 24x6 1-Pole Matrix



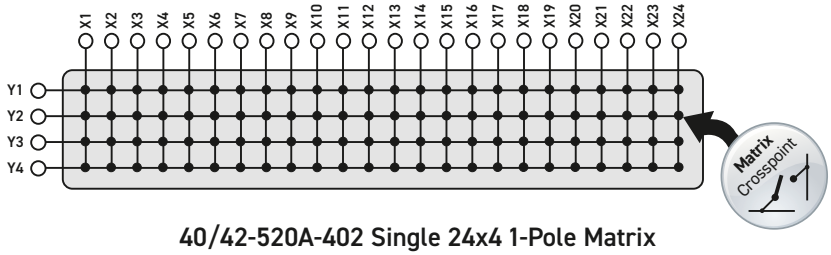
40/42-520A-303 Dual 16x6 1-Pole Matrix



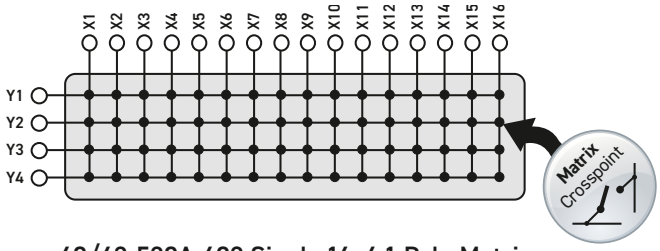
40/42-520A-304 Dual 12x6 1-Pole Matrix



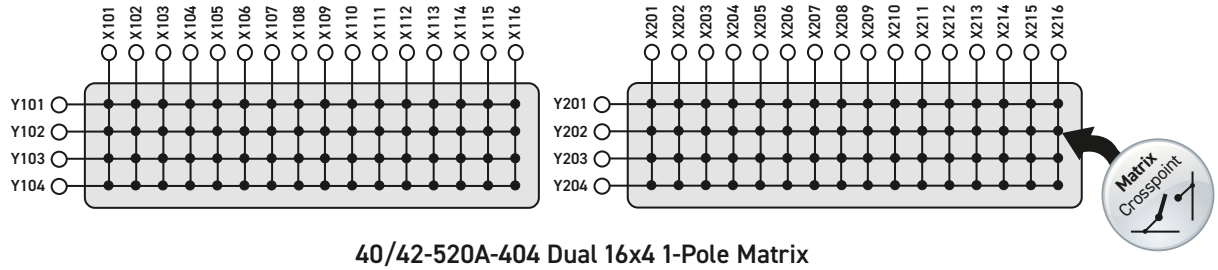
40/42-520A-401 Single 32x4 1-Pole Matrix



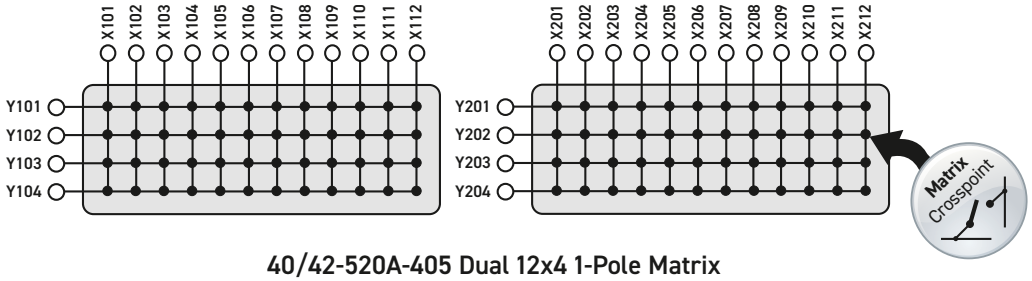
40/42-520A-402 Single 24x4 1-Pole Matrix



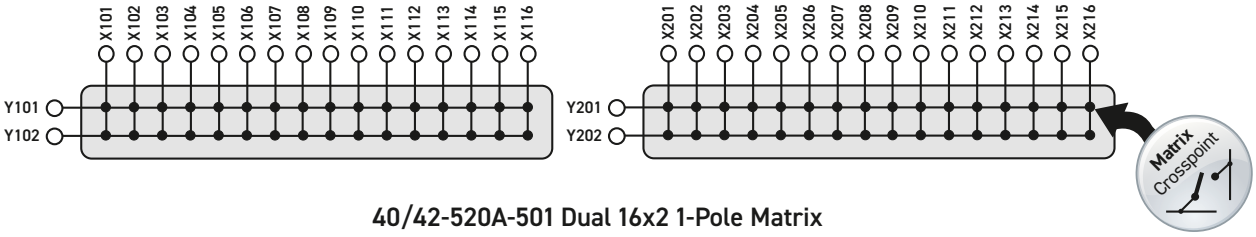
40/42-520A-403 Single 16x4 1-Pole Matrix



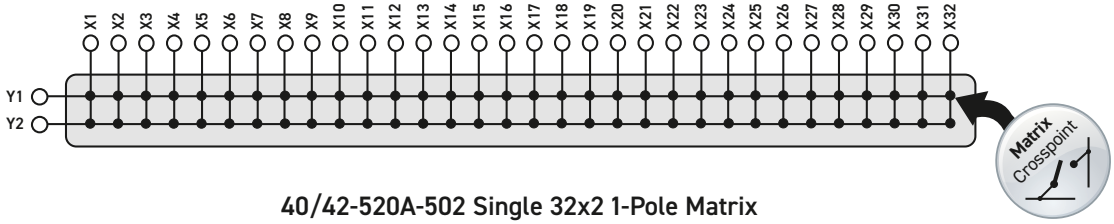
40/42-520A-404 Dual 16x4 1-Pole Matrix



40/42-520A-405 Dual 12x4 1-Pole Matrix



40/42-520A-501 Dual 16x2 1-Pole Matrix



40/42-520A-502 Single 32x2 1-Pole Matrix

Relay Type

The 40/42-520A module is fitted with high quality ruthenium sputtered reed relays, these offer very long life with good low level switching performance and excellent contact resistance stability. A spare reed relay is built onto the circuit board to allow easy maintenance with minimum downtime.

All reed relays are manufactured by our sister company Pickering Electronics: pickeringrelay.com

Switching Specification

Switch Type:	Ruthenium Reed
Max Switch Voltage:	150 VDC/100 VAC*
Max Power: Max Switch Current: Max Carry Current:	15 W/15 VA 1 A 1.2 A
Initial On Path Resistance: Off Path Resistance: Thermal Offset:	<430 mΩ $>10^9$ Ω <100 µV
Operate Time:	0.5 ms (typical)
Expected Life, low power: Expected Life, full power:	$1x10^9$ operations $>5x10^6$ operations

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

Power Requirements - 40-520A

+3.3 V	+5 V	+12 V	-12 V
150 mA	2.5 A	35 mA	0

Power Requirements - 42-520A

+3.3 V	+12 V
400 mA	1.5 A

Mechanical Characteristics

40-520A - Single slot 3U PXI (CompactPCI card).
42-520A - Single slot 3U PXIe, compatible with PXIe hybrid slot.

Module weight: 350 g (maximum)
3D models for all versions in a variety of popular file formats are available on request.

RF Specification

Bandwidth (-3 dB):	20 MHz (typical)	
Bandwidth (VSWR 1.5:1):	9 MHz (typical)	
Crosstalk (typical):	10 kHz:	-70 dB
	100 kHz:	-70 dB
	1 MHz:	-40 dB
	10 MHz	-25 dB
	20 MHz	-20 dB
Isolation (typical):	10 kHz:	60 dB
	100 kHz:	60 dB
	1 MHz:	40 dB
	10 MHz:	20 dB
	20 MHz	15 dB

Connectors

40-520A - PXI bus via 32-bit P1/J1 backplane connector.
42-520A - PXIe bus via XJ3 and XJ4 backplane connectors.
Signals via front panel 50-pin D-Type male connector, for pin outs please refer to the operating manual.

PXI & CompactPCI Compliance - 40-520A

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 - 42-520A

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.

Operating/Storage Conditions

Operating Temperature:	0 °C to +55 °C
Humidity:	Up to 90 % non-condensing
Altitude:	5000 m
Storage/Transport Temperature:	-20 °C to +75 °C
Humidity:	Up to 90 % non-condensing
Altitude:	15000 m

Product Order Codes - PXI Versions

PXI Single 16x16 Matrix Module, 1-Pole	40-520A-001
PXI Single 16x12 Matrix Module, 1-Pole	40-520A-101
PXI Single 12x12 Matrix Module, 1-Pole	40-520A-102
PXI Single 8x12 Matrix Module, 1-Pole	40-520A-103
PXI Single 32x8 Matrix Module, 1-Pole	40-520A-201
PXI Single 24x8 Matrix Module, 1-Pole	40-520A-202
PXI Single 16x8 Matrix Module, 1-Pole	40-520A-203
PXI Single 8x8 Matrix Module, 1-Pole	40-520A-204
PXI Dual 16x8 Matrix Module, 1-Pole	40-520A-205
PXI Dual 12x8 Matrix Module, 1-Pole	40-520A-206
PXI Dual 8x8 Matrix Module, 1-Pole	40-520A-207
PXI Single 32x6 Matrix Module, 1-Pole	40-520A-301
PXI Single 24x6 Matrix Module, 1-Pole	40-520A-302
PXI Dual 16x6 Matrix Module, 1-Pole	40-520A-303
PXI Dual 12x6 Matrix Module, 1-Pole	40-520A-304
PXI Single 32x4 Matrix Module, 1-Pole	40-520A-401
PXI Single 24x4 Matrix Module, 1-Pole	40-520A-402
PXI Single 16x4 Matrix Module, 1-Pole	40-520A-403
PXI Dual 16x4 Matrix Module, 1-Pole	40-520A-404
PXI Dual 12x4 Matrix Module, 1-Pole	40-520A-405
PXI Dual 16x2 Matrix Module, 1-Pole	40-520A-501
PXI Single 32x2 Matrix Module, 1-Pole	40-520A-502

Product Order Codes - PXIe Versions

PXIe Single 16x16 Matrix Module, 1-Pole	42-520A-001
PXIe Single 16x12 Matrix Module, 1-Pole	42-520A-101
PXIe Single 12x12 Matrix Module, 1-Pole	42-520A-102
PXIe Single 8x12 Matrix Module, 1-Pole	42-520A-103
PXIe Single 32x8 Matrix Module, 1-Pole	42-520A-201
PXIe Single 24x8 Matrix Module, 1-Pole	42-520A-202
PXIe Single 16x8 Matrix Module, 1-Pole	42-520A-203
PXIe Single 8x8 Matrix Module, 1-Pole	42-520A-204
PXIe Dual 16x8 Matrix Module, 1-Pole	42-520A-205
PXIe Dual 12x8 Matrix Module, 1-Pole	42-520A-206
PXIe Dual 8x8 Matrix Module, 1-Pole	42-520A-207
PXIe Single 32x6 Matrix Module, 1-Pole	42-520A-301
PXIe Single 24x6 Matrix Module, 1-Pole	42-520A-302
PXIe Dual 16x6 Matrix Module, 1-Pole	42-520A-303
PXIe Dual 12x6 Matrix Module, 1-Pole	42-520A-304
PXIe Single 32x4 Matrix Module, 1-Pole	42-520A-401
PXIe Single 24x4 Matrix Module, 1-Pole	42-520A-402
PXIe Single 16x4 Matrix Module, 1-Pole	42-520A-403
PXIe Dual 16x4 Matrix Module, 1-Pole	42-520A-404
PXIe Dual 12x4 Matrix Module, 1-Pole	42-520A-405
PXIe Dual 16x2 Matrix Module, 1-Pole	42-520A-501
PXIe Single 32x2 Matrix Module, 1-Pole	42-520A-502

Product Customization

Pickering PXI and PXIe 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.



42-520A High Density Matrix Module in PXIe Format

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 go to: pickeringtest.com/ebirst

Product	Test Tool	Adaptor
40/42-520A-xxx	93-005-001	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
40/42-520A-xxx	91-100-097

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

Mating Connectors & Cabling

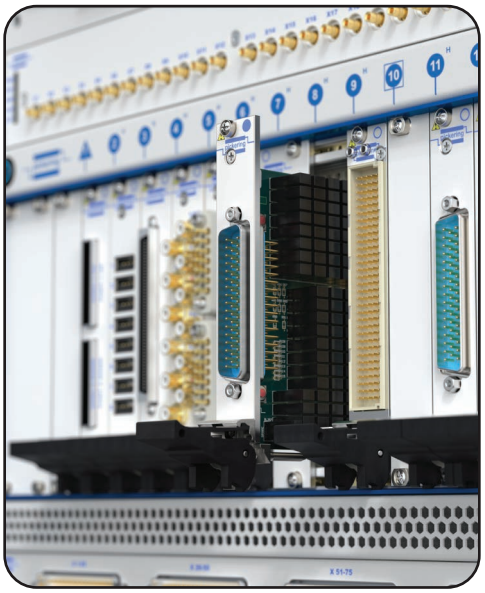
For connection accessories for the 40/42-520A module range please refer to the 90-005D 50-pin D-type Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the website.



Pickering can supply mating connectors and cable assemblies to enable easy integration of the 40/42-520A range of matrix modules

The 40/42-520A is part of a range modules suitable for switching applications that require a mid-range matrix.

Pickering's Range of PXI/PXIe Medium Density Matrix Modules			
Matrix Configuration	Max Switch Voltage	Max Switch/ Carry Current	Model No.
42x4, 32x6, 25x8, 18x12 or 14x16, 1-pole	300 VDC/250 VAC	2 A/2 A	40-505A/506/ 507 A/508/509
16x8, 2-pole	300 VDC/250 VAC	2 A/2 A	40-518A
32x4, 2-pole	300 VDC/250 VAC	2 A/2 A	40-519B
16x16 to 32x2, 1-pole	150 VDC/100 VAC	1 A/1.2 A	40/42-520A
24x8, 1-pole or 2-pole	150 VDC/100 VAC	0.5 A/1 A	40-521
Dual 12x8, 1-pole or 2-pole	150 VDC/100 VAC	1 A/1.25 A	40-522
44x4, 1-pole or 2-pole,	150 VDC/100 VAC	1 A/1.25 A	40-523
46x4, 1-pole	150 VDC/100 VAC	1 A/1.25 A	40-524
34x4 or 16x4, 1-pole	200 VDC/150 VAC	2 A/2 A	40-525A
64x2, 1-pole	300 VDC/220 VAC	2 A/2 A	40/42-527A
32x4, 1-pole	300 VDC/220 VAC	2 A/2 A	40/42-528B
16x8, 1-pole	300 VDC/220 VAC	2 A/2 A	40/42-529B





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

Connectivity Solutions



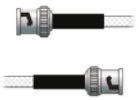
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with **1200+** products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed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



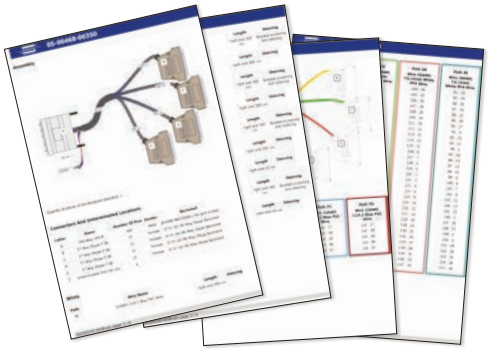
Breakouts



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

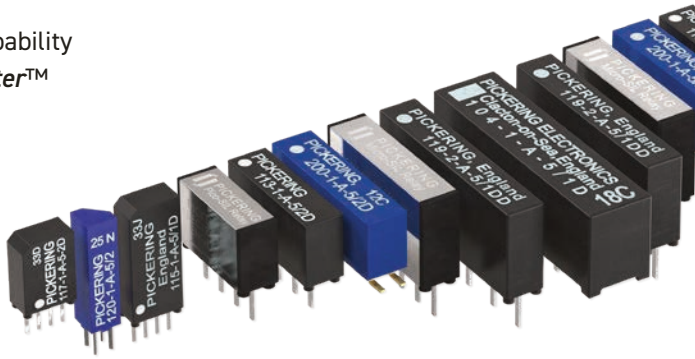
Mass Interconnect

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



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

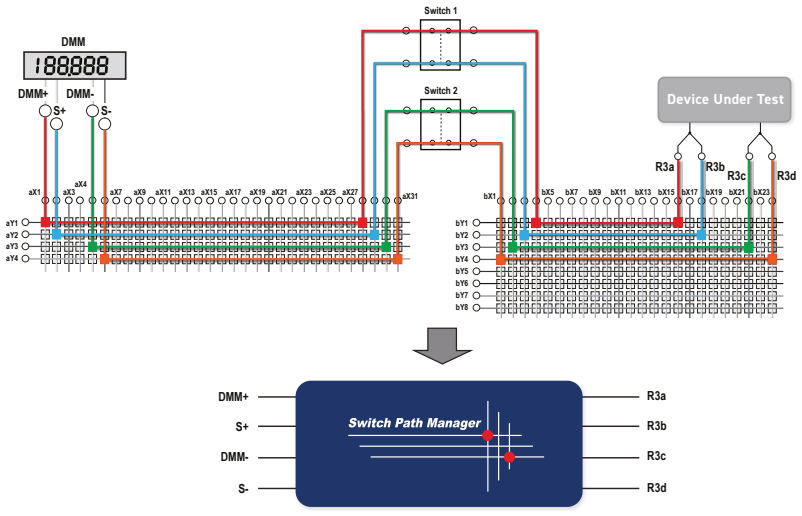
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help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



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



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