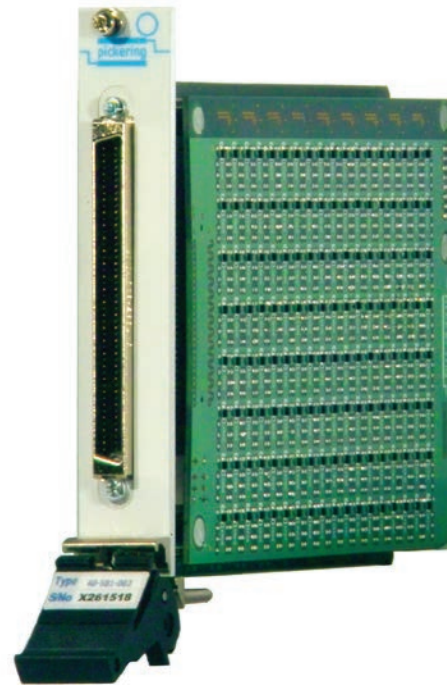- **World's Highest Density Single-Slot 3U PXI 2-pole Matrix module with 264 crosspoints**
- 33x8, 2-Pole Matrix
- Maximum Current 1A Hot or Cold Switching
- Switch up to 150 Volts, with 60W Max Power
- Very Cost Competitive
- Partially Populated Configurations Available & Are Future Upgradable - Minimizing Cost
- Designed With Leaded Relays for Ease of Maintenance & Repair
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Supported by *eBIRST ™*
- 3 Year Warranty

The world's highest density 2-pole single slot 3U PXI Matrix Module, the 40-581 has 264 crosspoints configured as a 2-pole 33x8 matrix. The use of high density electro-mechanical relays means that the 40-581 is a low cost high density matrix solution with current handling up to 1 Amp.

The 40-581 module is suitable for matrix applications where two signals need to be switched simultaneously, for example send and return signals in a telecoms system. It is also suitable for applications where reed relay based matrices do not have sufficient power handling capability.

Larger matrices may be constructed by daisy chaining the common signals from multiple PXI modules. However, for applications that require a very large matrix, Pickering's BRIC™ modules - offering an integrated solution - maybe better suited.

Pickering Interfaces can construct custom cable assemblies for all our PXI modules, please contact sales office for further assistance.

Supported by *eBIRST*

eBIRST switching system test tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.

Choice of Signal Relay Types

40-581 module is fitted with Electro-mechanical Relays (Palladium-Ruthenium, Gold covered) offering good general purpose performance, switching times of 3ms and are lower cost than instrumentation grade reed relays. Overall they offer a good general purpose choice.

Reed relays (sputtered ruthenium type) which are designed solely for high-end instrumentation applications are used in all Pickering's reed relay based matrix modules. They offer very long life up to 1000 million operations, fast operate time of 0.25ms and exceptional low level switching performance. Reed relays are hermetically sealed to ensure consistent and stable contact resistance with long life. All of the reed relays used in our PXI modules are manufactured by our sister company Pickering Electronics: www.pickeringrelay.com.


40-581 2-Pole 33x8 Matrix
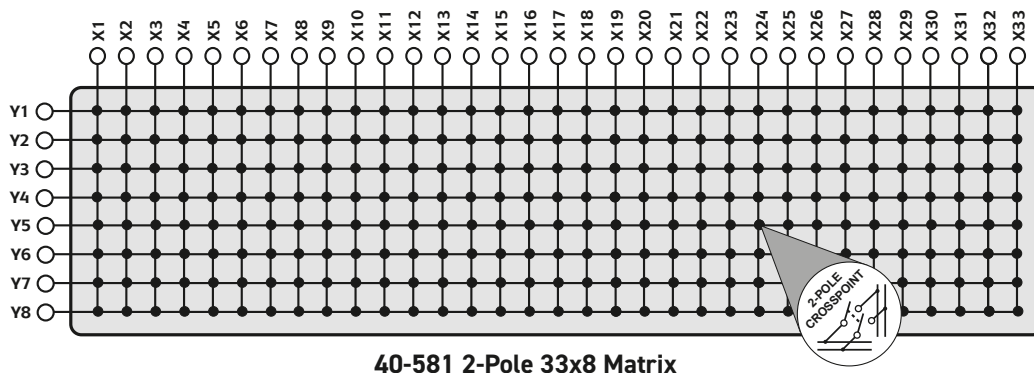
Specific Matrix Configurations

The 40-581 may be ordered partially populated to a specific matrix configuration. The diagrams show some example configurations. A module can be factory populated as required, and updates to increase capacity can be added at any time in the future (on a return to factory basis).

The illustrations below show:

- 40-581 fully populated 33x8 matrix.
- 40-581 partially populated 24x8 matrix.
- 40-581 partially populated 33x6 matrix.

40-581 Fully Populated 33 x 8 2-Pole Matrix

40-581 Partially Populated 24 x 8 2-Pole Matrix

40-581 Partially Populated 33 x 6 2-Pole Matrix
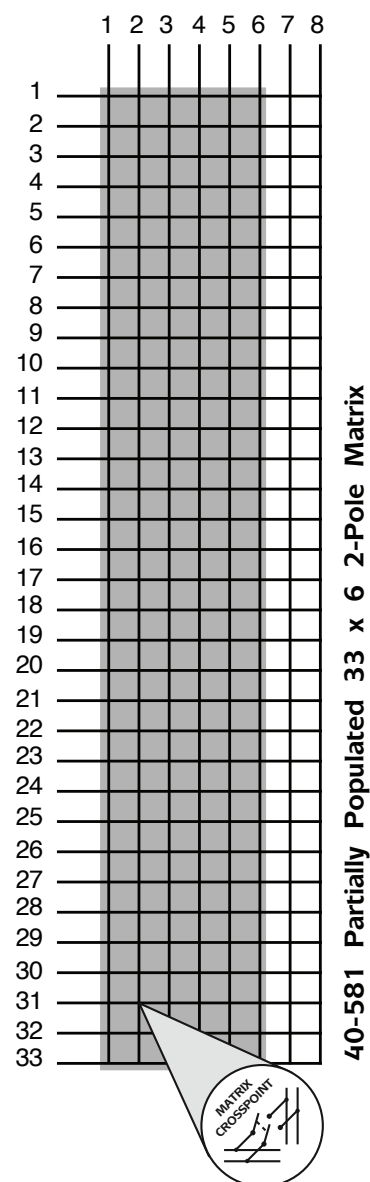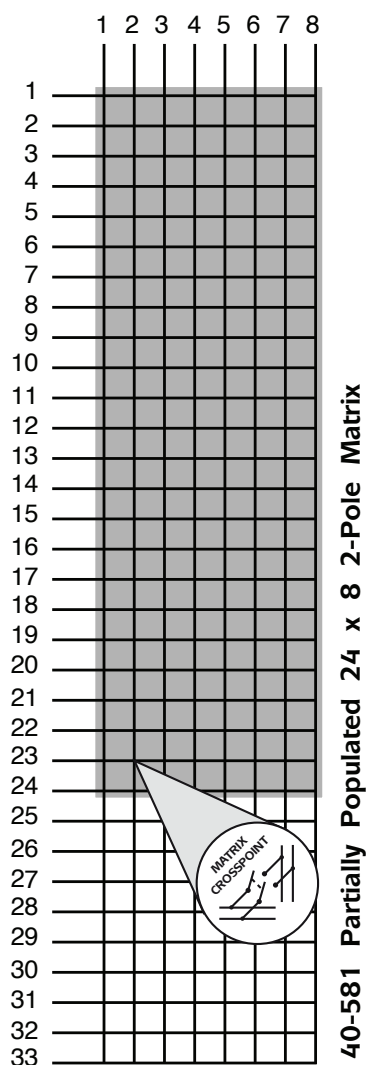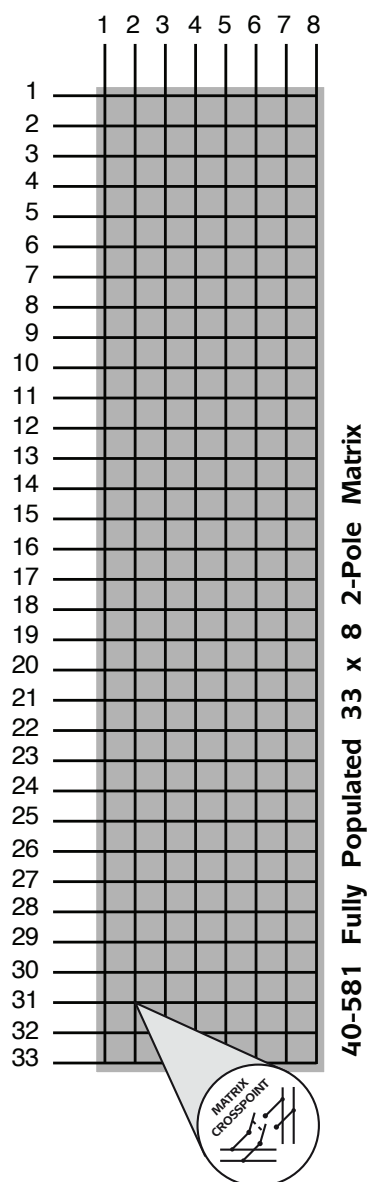
High Density Matrix Product Comparison

Advantages Over Competing PXI High Density Matrix Solutions		
	40-581 Matrix	**Competing PXI High Density Matrix**
World's Highest Density 2-Pole 3U 1-Slot PXI Matrix	Yes	No
Switch 1A Switch 150Volts DC Switch 60W	Yes Yes Yes	No No No
Simple relay replacement	Easy to replace leaded relays.	"Challenging" to replace surface mount relays.
Matrix orderable in lower capacity versions	Yes - Just specify X and Y limits. You pay for just what you need.	No - You pay full price every time whatever your needs.
Upgrade matrix at any time	Yes - Fast turnaround factory upgrade.	No
Terminal block required	No - Just use standard commercial connectors.	Required to configure matrix and offer strain relief.
Robust direct connection to PXI matrix front panel	Yes	Terminal block usually required.
Spare relay conveniently located within PXI module	Yes	No
Relay count tracking	No - Because Pickering provide a Full Matrix Diagnostic Tool the PI-MXT, 90-100.	Yes - But this method is unreliable†
Diagnostic Tool available	Yes	No
DC path resistance	<700mΩ	1000mΩ
Wide selection of screened cable assemblies	Yes	No
LXI Support	Yes (using 60-102/103 Chassis)	No

† Counting relay operations as a way of anticipating failure may prove very misleading, since it takes no account of the relay load (over 95% of relay failures are due to excessive loads). Expected life for a relay will vary by a factor of >1000, dependant upon load type (ranging from $>10^8$ operations for low power loads to $>10^5$ operations for high power loads).

Relay Type

The 40-581 module is fitted with high density electro-mechanical signal relays with palladium-ruthenium gold covered contacts. Leaded relays are used (not SMT types) so in-field maintenance is greatly simplified. In addition a spare relay is built onto the circuit board to allow easy maintenance with minimum downtime.

Switching Specification

Switch Type:	Electro-mechanical
Contact Type:	Palladium-ruthenium, Gold Covered Bifurcated
Max Switching Voltage:	150VDC/100VAC*
Max Power:	60W/62.5VA
Max Switch Current:	1A
Max Carry Current:	1A
Max Pulsed Current Example:	2A for 100ms (up to 10% duty cycle)
Initial Path Resistance - On	<700mΩ (typical 400mΩ) (1A measurement condition)
Path Resistance - Off	>$10^9\Omega$
Differential Thermal Offset:	<10µV
Operate Time:	<3ms
Expected Life (operations)	
Very low power signal load: Low power load (2W): Medium power load (30W): Full power load (60W):	>1×10^8 >1.5×10^7 (0.1A 20VDC) >5×10^6 (1A 30VDC) >1×10^5 (1A 60VDC)

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

Power Requirements

+3.3V	+5V	+12V	-12V
0	1A (380mA typical)	0	0

Width and Dimensions

Single 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 front panel 96-pin male micro-D 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.º

Product Order Codes

Single 33x8 Matrix, 2-Pole	40-581-002

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

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.

Product	Test Tool	Adaptor	Termination
40-581	93-002-001	93-002-226	93-016-103

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
40-581	91-100-001

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

Mating Connectors & Cabling

For connection accessories for the 40-581 module please refer to the 90-016D 96-pin micro-D 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
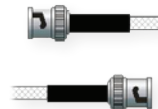- Independence from Windows operating system

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.
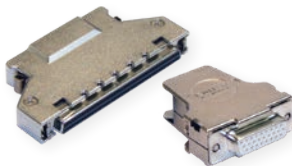
Connectors & Backshells   **Multiway Cable Assemblies**   **RF Cable Assemblies**   **Connector Blocks**

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.

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

Programming

Pickering provide kernel, IVI and VISA (NI & Keysight) drivers which are compatible with all Microsoft supported versions of Windows and popular older versions.

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
- **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.

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.

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.

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.

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 for the PXI and LXI standards.