PXI 12x8 RF Coaxial Matrix 40-726A

- 12x8 RF Coaxial Matrix
- Up to 300MHz Bandwidth
- 50Ω and 75Ω Versions Available
- Easy To Use Loop Thru Options, Enabling Simple Expansion Via Built-In Cabling With No Hidden Expense
- High Density SMB Coaxial Connectors
- 75Ω Version Suitable for Telecoms and High Quality Video Switching
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Selected Builds Supported by *eBIRST* ™
- 3 Year Warranty

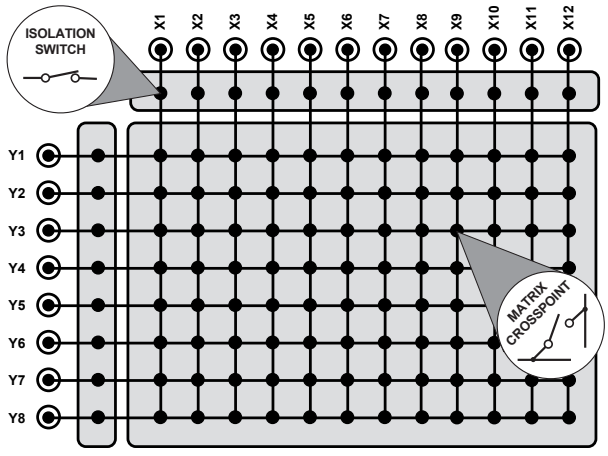
The 40-726A is a 12x8 RF matrix module suitable for switching frequencies up to 300MHz. It is available in either 50Ω or 75Ω versions with front panel SMB coaxial connectors. The module provides a simple and scalable bidirectional matrix for RF frequencies and is intended for the easy construction of high performance matrix switching systems.

All X and Y connections have isolation switches. These can be used to disconnect the matrix from the external test fixture to maximize isolation and RF performance.

Matrix Operation

The 40-726A is a true 12x8 high density matrix, any combination of crosspoints may be selected. Only the signal is switched, all grounds are common.

This module is based on the same construction as the popular 40-725 RF matrix module, but has increased capacity and optional built in loop thru on the Y axis to allowing easy expansion with a minimum loss of bandwidth.



12x8 Coaxial Matrix Schematic Diagram

Other RF Matrix Modules in Pickering's PXI Range:	
40-725	8x9 500MHz, 50Ω/75Ω
40-727	16x4 300MHz, 50Ω/75Ω - Optional Y Loop-Thru
40-728	16x2 300MHz, 50Ω/75Ω - Optional Y Loop-Thru
40-729	8x4 300MHz, 50Ω/75Ω - Optional Y Loop-Thru
40-750	8x2 1.5GHz, 50Ω/75Ω - Y Loop-Thru
40-872	single/dual 2x2 3GHz, 50Ω
40-832	single/dual 2x2 3GHz, 75Ω
45-720A	6U, 16x16 250MHz, 50Ω/75Ω - Y Loop-Thru
Alternative LXI Ethernet Controlled RF Matrices:	
60-760	Single/Dual 24x8 25MHz, 50Ω
60-711	Single/Dual 24x8 25MHz, 75Ω
60-110	Scalable 24x8 to 104x16 200MHz, 50Ω

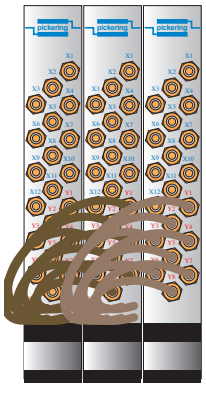
Supported by *eBIRST*

The 50Ω non-loop thru version of the 40-726A is supported by *eBIRST* switching system test tools. These simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
For more information go to: pickeringtest.com/ebirst

Y Axis Loop Thru Option

The easy to use loop thru option allows 40-726A modules to be cascaded to form larger matrices whilst minimizing impact on RF performance, for example 8 modules can be used to construct a 96x8 matrix with bandwidth preserved at over 200MHz.

These versions have built in Y loop-thru cables fitted to the front panel which are simply plugged into the Y connectors of the adjacent matrix module.

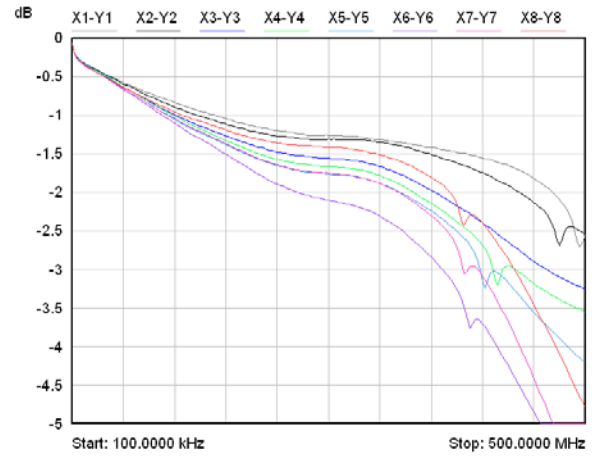


Schematic Showing Construction of a 36x8 RF Matrix (Loop-Thru cables interconnect each 12x8 Matrix module)

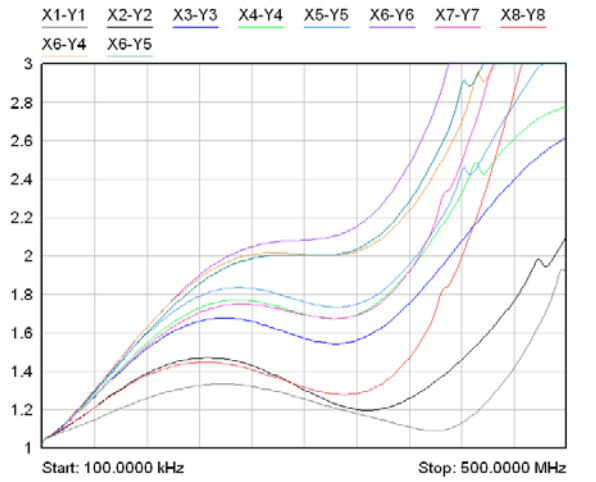
ISSUE 11.2 FEB 2020

RF Performance Plots for 40-726A RF Matrix Module

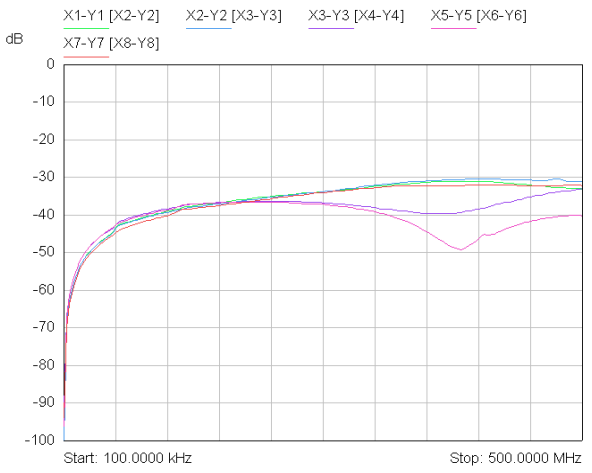
Typical curves are shown for matrix rows/columns with 1 crosspoint set. For optimum insertion loss and VSWR, ensure only one crosspoint is set in any one row/column. **Multiple crosspoints can be set on one row or column but this will seriously degrade RF performance.** Performance is also dependent upon the area of the matrix where the crosspoint is set. Best performance is obtained at the corners (for example X1-Y1), worse performance is obtained in the center (X6-Y4). This is outlined in the insertion loss and VSWR plots which also include the performance of a typical signal path between X3 and Y3. For more information on how performance is distributed throughout the matrix, please refer to the user manual.



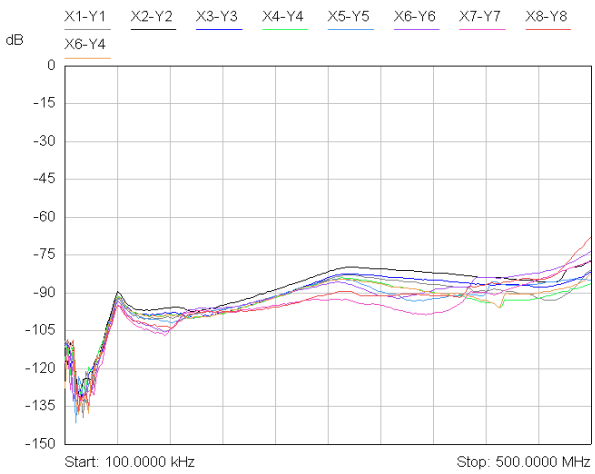
40-726A-511-L (50Ω Version) Insertion Loss to 500MHz



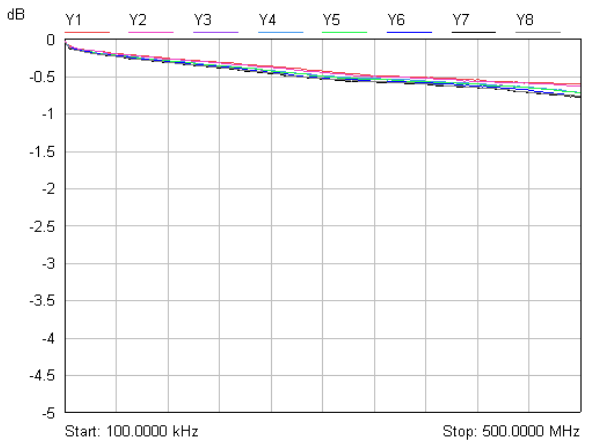
40-726A-511-L (50Ω Version) VSWR Plot to 500MHz



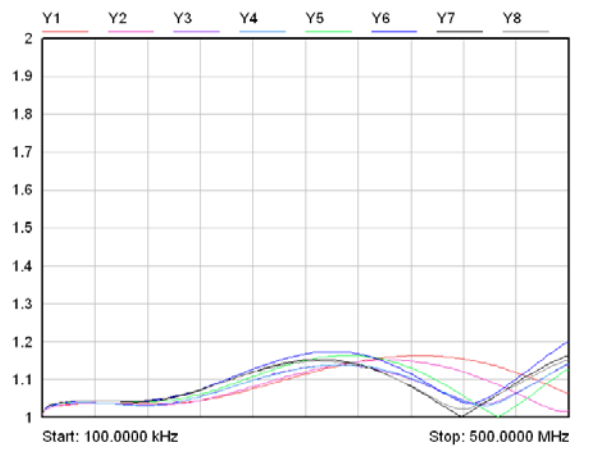
40-726A-511-L (50Ω) Crosstalk to 500MHz



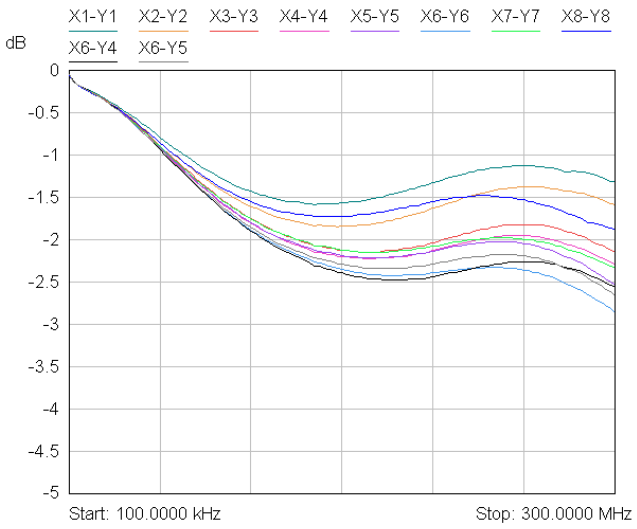
40-726A-511-L (50Ω) Isolation to 500MHz



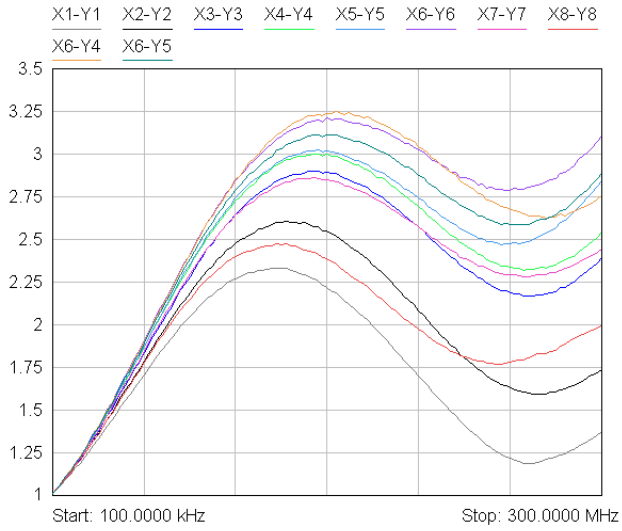
40-726A-511-L (50Ω) Loop-Thru Insertion Loss to 500MHz



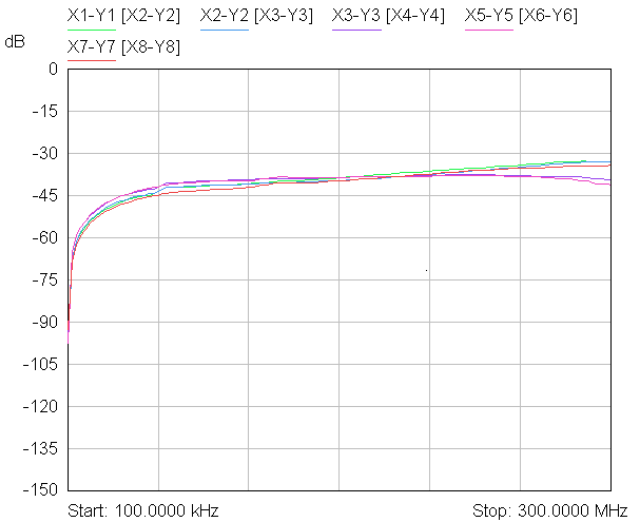
40-726A-511-L (50Ω) Loop-Thru VSWR to 500MHz



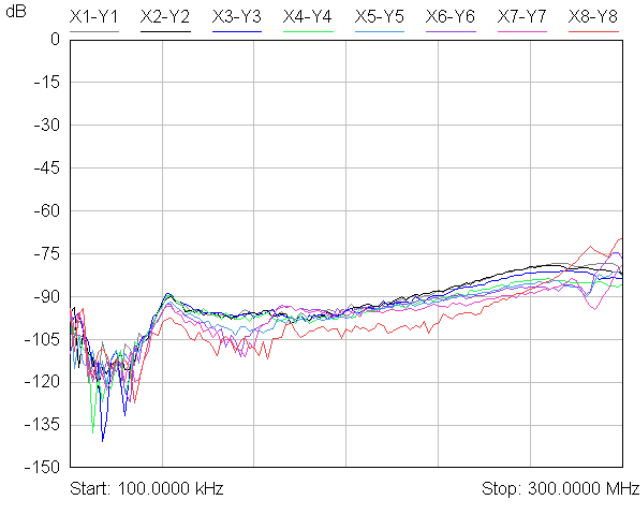
40-726A-751-L (75Ω) Insertion Loss to 300MHz



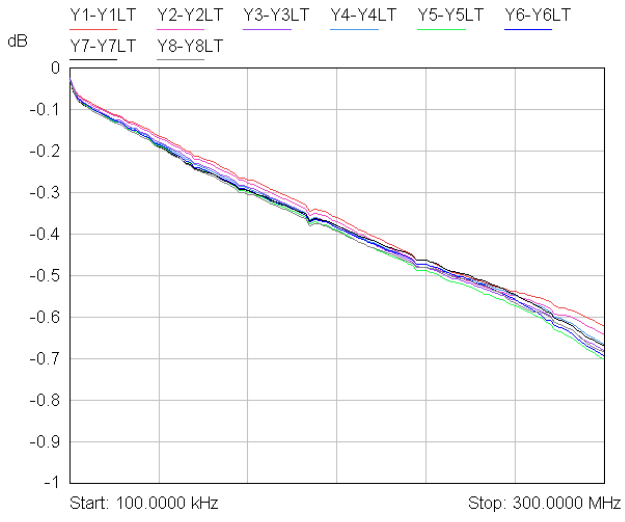
40-726A-751-L (75Ω) VSWR to 300MHz



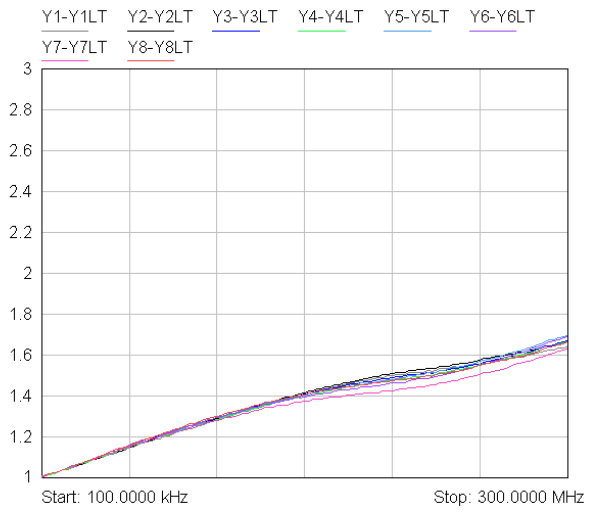
40-726A-751-L (75Ω) Crosstalk to 300MHz



40-726A-751-L (75Ω) Isolation to 300MHz



40-726A-751-L (75Ω) Loop-Thru Insertion Loss to 300MHz



40-726A-751-L (75Ω) Loop-Thru VSWR to 300MHz

Relay Type

The 40-726A RF matrix is fitted with ruthenium sputtered reed relays, these offer very stable switch contact resistance with expected life of 10^9 operations when switching typical RF signals.

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

General Switching Specification

Maximum Voltage:	100VDC*
Maximum Power:	10W
Maximum Switch Current:	0.5A
Maximum Carry Current:	0.5A
Characteristic Impedance:	50Ω or 75Ω
Initial On Path Resistance:	<1000mΩ
Off Path Resistance:	$>10^8$Ω
Thermal Offset:	<30µV
Expected Life (Low Power):	$1x10^9$ operations
Expected Life (Max Power):	$>5x10^6$ operations
Operate Time:	<1ms, 0.5ms typical

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

RF Specification

Maximum Frequency - 50Ω Version:	300MHz
Maximum Frequency - 75Ω Version:	250MHz
Typical Rise Time:	800ps †
Insertion Loss -50Ω Version:	<3dB to 300MHz †
Insertion Loss -75Ω Version:	<3dB to 250MHz †
V.S.W.R. - 50Ω Version:	<2.8:1 to 300MHz †
V.S.W.R. - 75Ω Version:	<3:1 to 100MHz †
Crosstalk - 50Ω Version:	<40dB at 50MHz <28dB at 300MHz
Crosstalk - 75Ω Version:	<40dB at 50MHz <30dB at 250MHz

† RF performance is entirely dependant upon the combination of crosspoints selected, the figures shown are for one selected crosspoint on any X or Y channel only, refer to graphs. For further assistance on getting maximum performance from the 40-726A, please refer to the user manual.

Power Requirements

+3.3V	+5V	+12V	-12V
0	500mA (typ 350mA)	0	0

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).
Module weight: 340g (40-726A-511).
400g (40-726A-751-L)

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

Connectors

PXI bus via 32-bit P1/J1 backplane connector.
X and Y Signals via 20 front panel mounted coaxial SMB connectors.

Versions with **-L** suffix have Y signal loop-thru via 8 off SMB flying leads with a nominal length of 120mm.
A clearance of 80mm from the front panel of the module is required for routing the leads to an adjacent module.

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.

Optional Y-axis loop-thru allows easy expansion. Shown here is a 60x8 RF matrix with over 200MHz bandwidth.

Product Order Codes

PXI 12x8 RF Coaxial Matrix:	
SMB, 50Ω	**40-726A-511**
SMB, 50Ω with loop-thru on Y axis	**40-726A-511-L**
SMB, 75Ω	**40-726A-751**
SMB, 75Ω with loop-thru on Y axis	**40-726A-751-L**

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.

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

40-726A-511 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
40-726A-511	**93-005-001**	**93-005-202A**

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
40-726A	**91-100-004**

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

Mating Connectors & Cabling

For connection accessories for the 40-726A range please refer to the 90-011D RF Cable Assemblies 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:

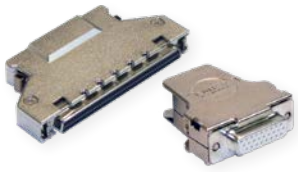
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

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

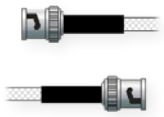
Connectivity Solutions

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.

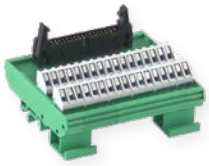


Connectors & Backshells

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.

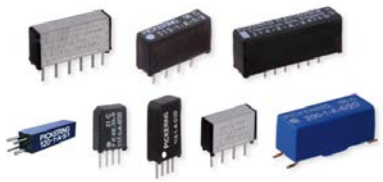
Mass Interconnect

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

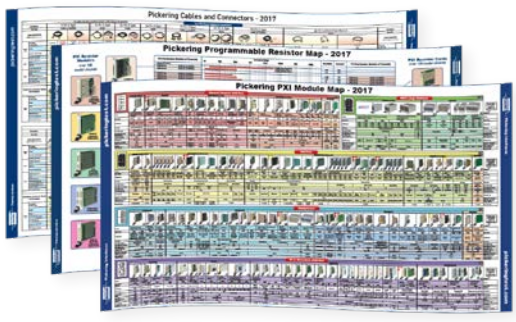
eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
To learn more, please go to: pickeringtest.com/ebirst

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