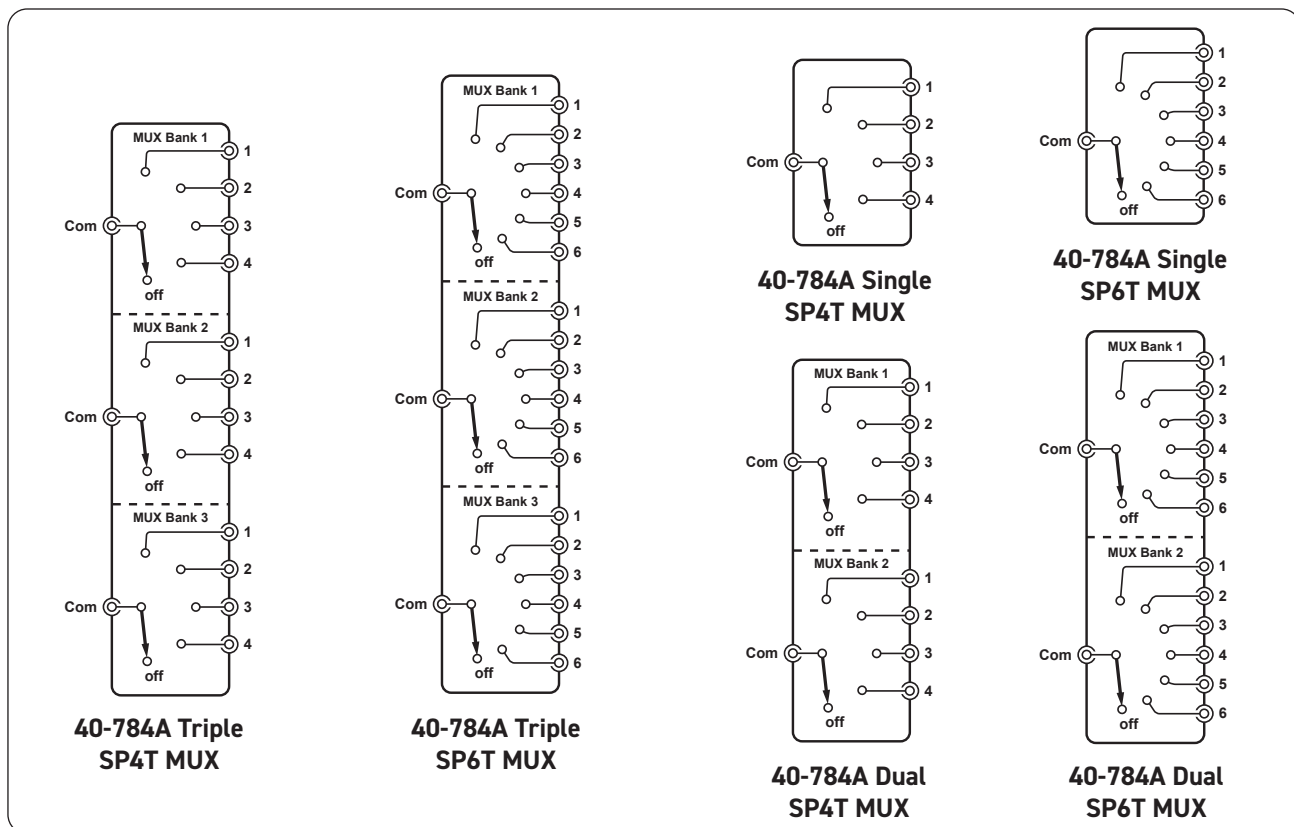- Single, Dual or Triple Subminiature SP6T & SP4T MUXs
- 6 GHz, 18 GHz, 26.5 GHz & 40 GHz Bandwidths
- Custom Versions Available
- Excellent RF & Repeatability Characteristics
- Extended Life For 6 GHz/18 GHz/26.5 GHz Models – 10 M Operations Guaranteed & Typically >25 M!
- Faster Operate Time than Conventional Microwave Relay Solutions (Typically <10.5 ms)
- LED Indication
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI, PXIe Hybrid and Pickering LXI Modular Chassis
- 3 Year Warranty

The 40-784A PXI microwave multiplexer modules have a characteristic impedance of 50 Ω and are capable of switching signals up to 40 GHz. Available in single, dual or triple, SP6T or SP4T formats, they are suitable for constructing complex microwave switching. Connection is by high performance front panel mounted SMA or SMA-2.9 connectors.

These modules provide a high performance solution for RF and microwave switching, the performance at low frequencies providing superior isolation, insertion loss and VSWR to EMR or solid state designs.

For applications where space is critical, users should consider the remote relay versions of the 40-785A which support up to 3 remotely mounted multiplexers from a single PXI slot.


40-784A Triple SP4T MUX

40-784A Triple SP6T MUX

40-784A Single SP4T MUX

40-784A Single SP6T MUX

40-784A Dual SP4T MUX

40-784A Dual SP6T MUX

Switching Specification

|	
Relay Manufacturer:	Radiall
Configuration:	SP6T or SP4T Microwave Multiplexer with 1, 2 or 3 independent banks.
LED Indicators:	Multiplexers have blue LEDs to indicate a closed RF path.
Operate Time:	Typically <10.5 ms
Maximum Cold Switch Voltage:	100 V
Maximum Carry Current:	1 A

Multiplexer Specification - 6 GHz Versions

|	
Characteristic Impedance:	50 Ω
Connectors:	SMA
Bandwidth:	DC to 6 GHz
Maximum RF Carry Power:	220 W (0-3 GHz) 150 W (3-6 GHz)
Isolation:	>80 dB (0-3 GHz) >70 dB (3-6 GHz)
Insertion Loss:	<0.2 dB (0-3 GHz) <0.3 dB (3-6 GHz)
VSWR:	<1:1.2 (0-3 GHz) <1:1.3 (3-6 GHz)
Expected Life (low power):	>10 million operations per position guaranteed (typically >25 million)
Insertion Loss Repeatability:	Within 0.01 dB
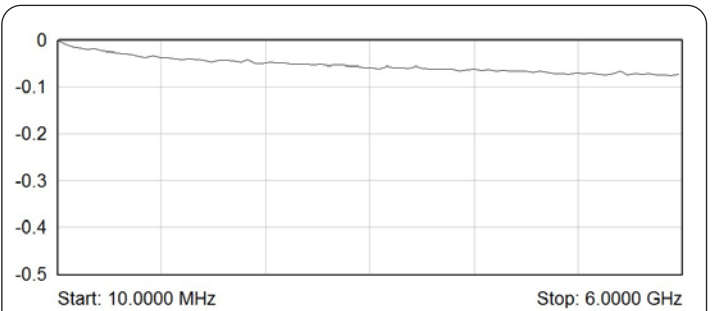
Typical Insertion Loss (dB) Plot for 6 GHz Versions
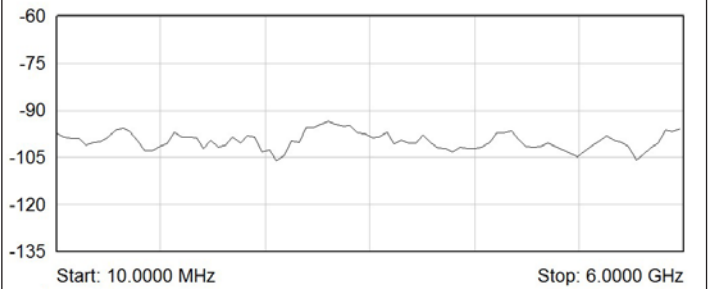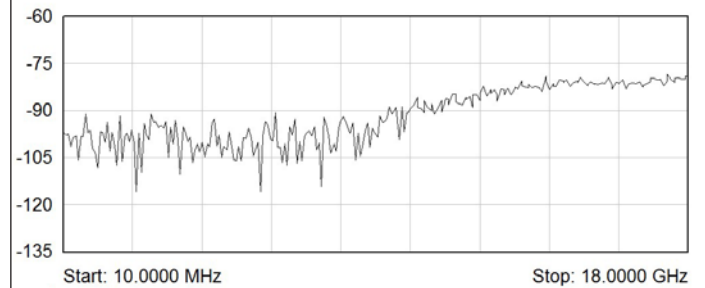

Typical Isolation (dB) Plot for 6 GHz Versions
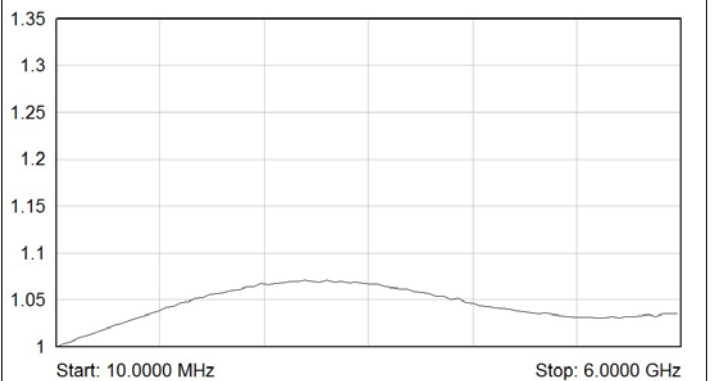
Typical VSWR Plot for 6 GHz Versions
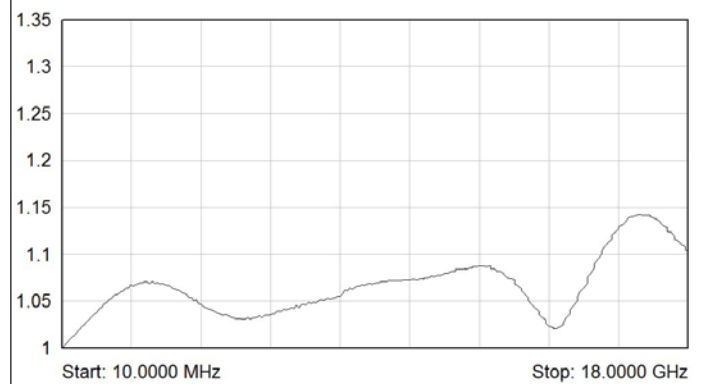
Multiplexer Specification - 18 GHz Versions

Characteristic Impedance:	50 Ω
Connectors:	SMA
Bandwidth	DC to 18 GHz
Maximum RF Carry Power:	220 W (0-3 GHz)
	150 W (3-8 GHz)
	120 W (8-12.4 GHz)
	100 W (12.4-18 GHz)
Isolation:	>80 dB (0-3 GHz)
	>70 dB (3-8 GHz)
	>60 dB (8-12.4 GHz)
	>60 dB (12.4-18 GHz)
Insertion Loss:	<0.2 dB (0-3 GHz)
	<0.3 dB (3-8 GHz)
	<0.4 dB (8-12.4 GHz)
	<0.5 dB (12.4-18 GHz)
VSWR:	<1:1.2 (0-3 GHz)
	<1:1.3 (3-8 GHz)
	<1:1.4 (8-12.4 GHz)
	<1:1.5 (12.4-18 GHz)
Expected Life (low power):	>10 million operations per position guaranteed (typically >25 million)
Insertion Loss Repeatability:	Within 0.025 dB
Propagation Delay Variation (between channels):	<1 ps
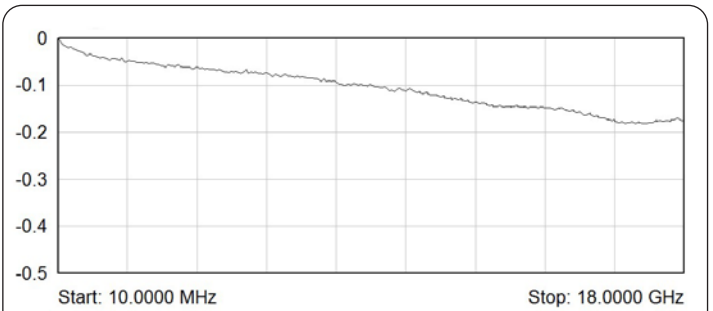
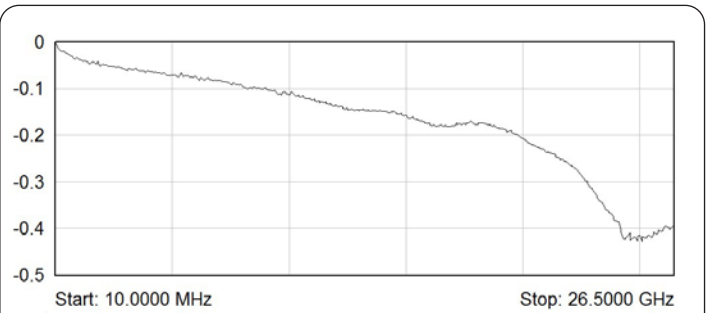
Typical Insertion Loss (dB) Plot for 18 GHz Versions

Typical Isolation (dB) Plot for 18 GHz Versions

Typical VSWR Plot for 18 GHz Versions
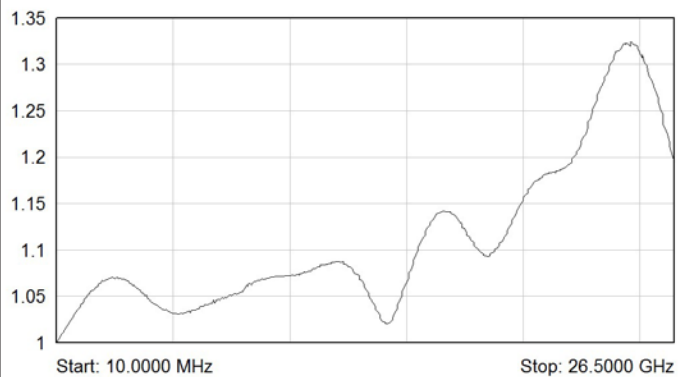
Multiplexer Specification - 26.5 GHz Versions

Characteristic Impedance:	50 Ω
Connectors:	SMA
Bandwidth	DC to 26.5 GHz
Maximum RF Carry Power:	220 W (0-3 GHz) 150 W (3-8 GHz) 120 W (8-12.4 GHz) 100 W (12.4-18 GHz) 40 W (18-26.5 GHz)
Isolation:	>80 dB (0-3 GHz) >70 dB (3-8 GHz) >60 dB (8-12.4 GHz) >60 dB (12.4-18 GHz) >55 dB (18-26.5 GHz)
Insertion Loss:	<0.2 dB (0-3 GHz) <0.3 dB (3-8 GHz) <0.4 dB (8-12.4 GHz) <0.5 dB (12.4-18 GHz) <0.6 dB (18-26.5 GHz)
VSWR:	<1:1.2 (0-3 GHz) <1:1.3 (3-8 GHz) <1:1.4 (8-12.4 GHz) <1:1.5 (12.4-18 GHz) <1:1.6 (18-26.5 GHz)
Expected Life (low power):	>10 million operations per position guaranteed (typically >25 million)
Insertion Loss Repeatability:	Within 0.035 dB

Typical Insertion Loss (dB) Plot for 26.5 GHz Versions
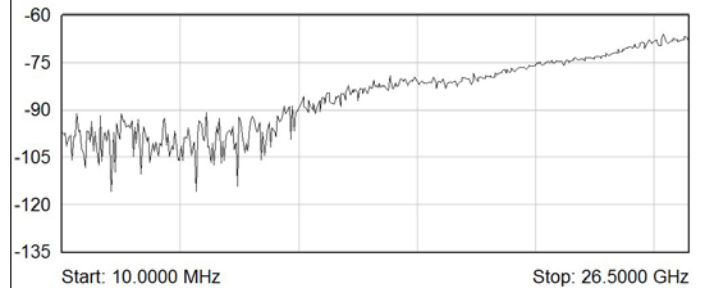
Typical Isolation (dB) Plot for 26.5 GHz Versions

Typical VSWR Plot for 26.5 GHz Versions

Multiplexer Specification - 40 GHz Versions

Characteristic Impedance:	50 Ω
Connectors:	SMA-2.9
Bandwidth	DC to 40 GHz
Maximum RF Carry Power:	60 W (0-3 GHz) 35 W (3-8 GHz) 30 W (8-12.4 GHz) 25 W (12.4-18 GHz) 15 W (18-26.5 GHz) 5 W (26.5-40 GHz)
Isolation:	>80 dB (0-3 GHz) >70 dB (3-8 GHz) >60 dB (8-12.4 GHz) >60 dB (12.4-18 GHz) >55 dB (18-26.5 GHz) >45 dB (26.5-40 GHz)
Insertion Loss:	<0.2 dB (0-3 GHz) <0.3 dB (3-8 GHz) <0.4 dB (8-12.4 GHz) <0.5 dB (12.4-18 GHz) <0.7 dB (18-26.5 GHz) <1.1 dB (26.5-40 GHz)
VSWR:	<1:1.2 (0-3 GHz) <1:1.3 (3-8 GHz) <1:1.4 (8-12.4 GHz) <1:1.5 (12.4-18 GHz) <1:1.7 (18-26.5 GHz) <1:2.2 (26.5-40 GHz)
Expected Life (low power):	>2 million operations per position guaranteed (typically >5 million)
Insertion Loss Repeatability:	Within 0.05 dB

Typical Insertion Loss (dB) Plot for 40 GHz Versions

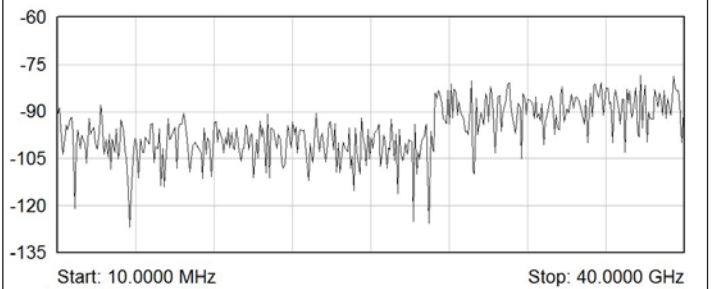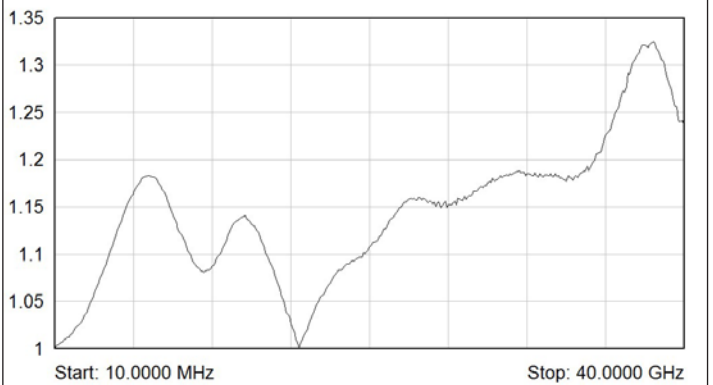**Typical Isolation (dB) Plot for 40 GHz Versions**

Typical VSWR Plot for 40 GHz Versions

Power Requirements

+3.3 V	+5 V	+12 V	-12 V
0	0.2 A	0.75 A	0

Mechanical Characteristics

2 slot 3U PXI (CompactPCI card).
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.
Signals via front panel mounted connectors:

- 6 GHz versions - 50 Ω SMA connectors
- 18 GHz versions - 50 Ω SMA connectors
- 26.5 GHz versions - 50 Ω SMA connectors
- 40 GHz versions - 50 Ω SMA-2.9.connectors.

Operating/Storage Conditions

Operating Conditions

Operating Temperature:	0 °C to +55 °C
Humidity:	Up to 90 % non-condensing
Altitude:	5000 m

Storage and Transport Conditions

Storage Temperature:	-20 °C to +75 °C
Humidity:	Up to 90 % non-condensing
Altitude:	15000 m

PXI & CompactPCI Compliance

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.

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.

40-784A Single SP6T Microwave Multiplexer

40-784A Dual SP4T Microwave Multiplexer

Product Order Codes

		6 GHz	18 GHz	26.5 GHz	40 GHz
Single	SP4T Microwave MUX	40-784A-101	40-784A-121	40-784A-131	40-784A-141
	SP6T Microwave MUX	40-784A-001	40-784A-021	40-784A-031	40-784A-041
Dual	SP4T Microwave MUX	40-784A-102	40-784A-122	40-784A-132	40-784A-142
	SP6T Microwave MUX	40-784A-002	40-784A-022	40-784A-032	40-784A-042
Triple	SP4T Microwave MUX	40-784A-103	40-784A-123	40-784A-133	40-784A-143
	SP6T Microwave MUX	40-784A-003	40-784A-023	40-784A-033	40-784A-043

Custom Configurations

Pickering can also offer mixed configurations of SP4T and SP6T multiplexers with a mix of bandwidths as outlined in the table below. Please contact the sales office with your requirements.

	Frequency	Configuration
MUX Position 1	6 GHz, 18 GHz, 26.5 GHz or 40 GHz	SP4T or SP6T
MUX Position 2	6 GHz, 18 GHz, 26.5 GHz or 40 GHz	SP4T or SP6T
MUX Position 3	6 GHz, 18 GHz, 26.5 GHz or 40 GHz	SP4T or SP6T

Mating Connectors & Cabling

For connection accessories for the 40-784A 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.

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.

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
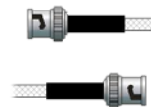- Independence from Windows operating system

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 Relay Division. These instrument grade reed relays feature **SoftCenter™** technology, ensuring long service life and repeatable contact performance. To learn more, please go to: pickeringrelay.com

pickering

pickeringtest.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
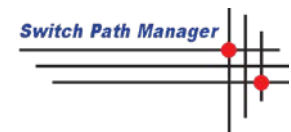
Diagnostic Relay Test Tools

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 and white papers as well as application specific product brochures to assist when looking for the switching, simulation and connection 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

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