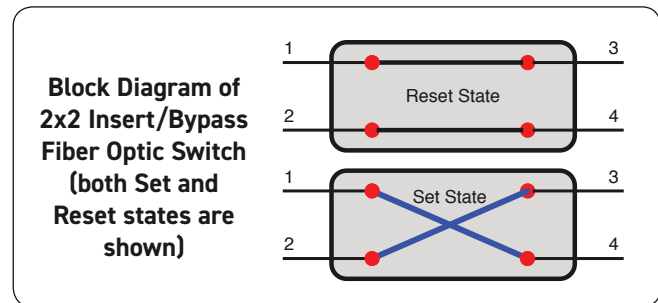


- Single, Dual, Triple or Quad 2x2 Insert/Bypass Fiber Optic Switch
- High Density 1 or 2 Slot Width Modules
- FC/APC, FC/PC or SC/PC Connectors
- Small Form Factor Connectors LC or MU (mini SC)
- 1240 to 1640nm Single Mode
- 700 to 1700nm Multi-Mode
- Return Loss >55dB
- Long Operating Life >10<sup>9</sup> Operations with High Repeatability ± 0.01dB and Good Temperature Stability
- Crosstalk -60dB Typical
- 1ms Typical Switching Time
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- 3 Year Warranty



Pickering PXI Fiber Optic MEMS insert/bypass switch modules are available in single, dual, triple or quad formats with a choice of 5 different connector styles to suit most applications: FC/APC (for optimal performance), FC/PC and SC/PC for general applications and LC and MU for high density applications.

The fiber optic switches connect the common to a channel by redirecting the optical signal into a selected output fiber. This is achieved using Micro-Mechanical Mirrors driven by a highly precise mechanism and activated via an electrical control signal.

The range of MEMS (Micro-Electro-Mechanical-Systems) based optical switches is:

- 40-860-X12 – Single 2x2 Insert/Bypass Switch
- 40-860-X22 – Dual 2x2 Insert/Bypass Switch
- 40-860-X32 – Triple 2x2 Insert/Bypass Switch
- 40-860-X32 – Quad 2x2 Insert/Bypass Switch

Pickering can construct custom optical systems to customers precise requirements. We have a large range of electrical switching modules which can form a complete PXI based telecom switching solution.

MEMS technology offers many advantages over traditional Optical Prism Technology as used in module types 40-810/815/820. MEMS offer similar optical performance but with lower price, higher packing density, faster operate time and much longer operating life.

### Key Features

- Very fast operate time <1ms
- Very long life >10<sup>9</sup> operations
- Return loss greater than 55dB
- High repeatability over a broad range of environmental conditions
- High density

### Applications

- Optical signal routing
- Fiber network configuration
- Fiber Optic Component Test

**40-860-022 Fiber Optic Dual 2x2 Matrix**



## General Specification (All versions)

|  |                              |
|--|------------------------------|
| Fiber Switch Type:   | MEMS                         |
| Internal Fiber Type:   | SM 9/125                     |
| Wavelength:  | 1240 to 1640nm               |
| Insertion loss (2x2):  | 0.8dB Typ                    |
| Return loss (APC version):                                   | 60dB Min                     |
| Return loss (other versions):                                | 55dB Min                     |
| Polarization dependent loss (PDL):                           | 0.05dB Max                   |
| Repeatability:   | ±0.01dB Max                  |
| Crosstalk:   | -60dB Max                    |
| Optical Input Power:   | 300mW Max                    |
| Thermal Stability:<br>(-10 to 75°C insertion loss variation) | 0.2dB Max                    |
| Expected Life:   | >>10 <sup>9</sup> operations |
| Maximum Switching Time:                                      | 1ms                          |
| Cycle Rate:  | 500/sec                      |

## Additional Specification (MM versions)

|                                    |               |
|------------------------------------|---------------|
| Fiber Switch Type:                 | MEMS          |
| Internal Fiber Type:               | MM 62.5/125   |
| Wavelength:                        | 700 to 1700nm |
| Insertion loss (2x2):              | 0.8dB Typ     |
| Return loss (other versions):      | 55dB Min      |
| Polarization dependent loss (PDL): | 0.05dB Max    |

## Power Requirements

|       |                   |      |      |
|-------|-------------------|------|------|
| +3.3V | +5V               | +12V | -12V |
| 0     | 300mA (typ 220mA) | 0    | 0    |

## Mechanical Characteristics

All modules are either 1 or 2 slot 3U PXI (CompactPCI) cards as indicated in Product Order Codes.  
Module weight: 420g (40-860-222).  
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 fiber optic connectors (choice of FC/APC, FC/PC, SC/PC, MU or LC types).

## Other Connector Styles

Pickering can manufacture Fiber Optic Switch modules with other connector styles, please contact sales office for further information.

## 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.



**Pickering Interfaces Will Configure PXI Optical Switching Systems To Customers Exact Requirements Including Custom Cabling**

## Product Order Codes

| <b>2x2 Insert/Bypass Switch Versions</b>         |              |
|--|--------------|
| <b>FC/APC, 1240 to 1640nm, Single-Mode</b>       |              |
| Single 2x2 Insert/Bypass Switch, 1 slot          | 40-860-012   |
| Dual 2x2 Insert/Bypass Switch, 2 slot            | 40-860-022   |
| <b>FC/PC, 1240 to 1640nm, Single-Mode</b>        |              |
| Single 2x2 Insert/Bypass Switch, 1 slot          | 40-860-112   |
| Dual 2x2 Insert/Bypass Switch, 2 slot            | 40-860-122   |
| <b>SC/PC, 1240 to 1640nm, Single-Mode</b>        |              |
| Single 2x2 Insert/Bypass Switch, 2 slot          | 40-860-212   |
| Dual 2x2 Insert/Bypass Switch, 2 slot            | 40-860-222   |
| <b>MU (mini SC), 1240 to 1640nm, Single-Mode</b> |              |
| Single 2x2 Insert/Bypass Switch, 1 slot          | 40-860-312   |
| Dual 2x2 Insert/Bypass Switch, 1 slot            | 40-860-322   |
| Triple 2x2 Insert/Bypass Switch, 2 slot          | 40-860-332   |
| Quad 2x2 Insert/Bypass Switch, 2 slot            | 40-860-342   |
| <b>LC, 1240 to 1640nm, Single-Mode</b>           |              |
| Single 2x2 Insert/Bypass Switch, 1 slot          | 40-860-412   |
| Dual 2x2 Insert/Bypass Switch, 1 slot            | 40-860-422   |
| Triple 2x2 Insert/Bypass Switch, 2 slot          | 40-860-432   |
| Quad 2x2 Insert/Bypass Switch, 2 slot            | 40-860-442   |
| <b>SC, 700 to 1700nm, Multi-Mode</b>             |              |
| Single 2x2 Insert/Bypass Switch, 1 slot          | 40-860-212-M |
| Dual 2x2 Insert/Bypass Switch, 2 slot            | 40-860-222-M |
| <b>ST, 700 to 1700nm, Multi-Mode</b>             |              |
| Single 2x2 Insert/Bypass Switch, 1 slot          | 40-860-512-M |
| Dual 2x2 Insert/Bypass Switch, 2 slot            | 40-860-522-M |

## 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.

## 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



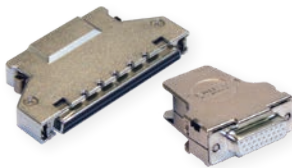
### Pickering LXI or LXI/USB Modular Chassis—only accept our 1000+ PXI Switching & Simulation Modules:

- 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

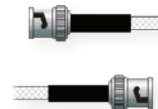
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed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



Connectors & Backshells



Multiwire 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](http://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](http://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](http://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
- **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](http://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](http://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](http://pickeringtest.com/ebirst)

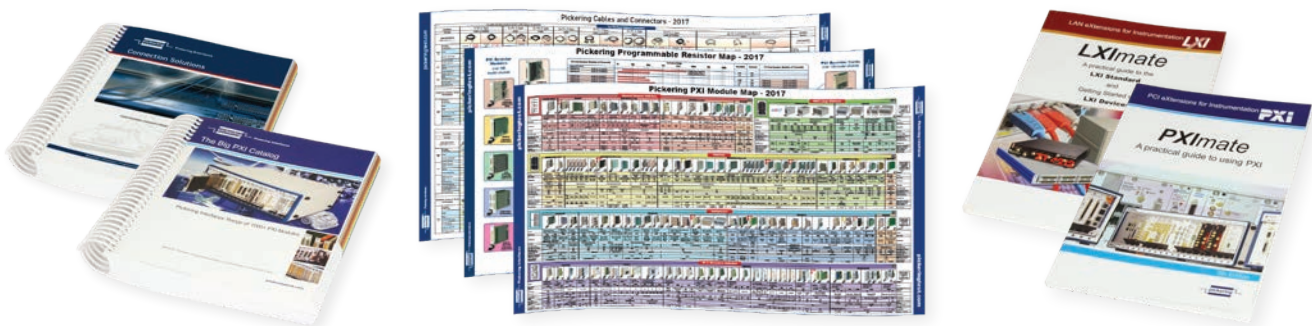


## Three Year Warranty & Guaranteed Long-Term Support

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](http://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 for the PXI and LXI standards.



To view, download or request any of our product resources, please visit: [pickeringtest.com/resources](http://pickeringtest.com/resources)