- 8 Channel, Dual 4 Channel, Dual 8 Channel, 16 Channel or 32 Channel Optical MUX
- MEMS Based Actuation For Long Life and Fast Operation
- Single-Mode or Multi-Mode Fiber Support
- Loop-Thru Option For Easy MUX Expansion
- Relay Cycle Counting Included

- Built-In Scan List Sequence Stores With Triggering Capability
- Compact 1U Form Factor
- LXI Standard 1.4 Compliant
- 3 Year Warranty

The 60-850 and 60-851 are LXI conformant fiber optic multiplexers that use MEMS switching technology to ensure fast and reliable switching of single-mode (60-850) or multi-mode (60-851) optical signals being carried on fiber connections. The 60-850/851 is available with a variety of connector options and in a variety of multiplexer arrangements.

Multiplexer configurations offered are single 8 channel, dual 8 channel, single 16 channel and single 32 channel. Each configuration can be supplied with FC/APC, SC/PC, LC or SC connector types – allowing users to select exactly the model that fits their connection standard. A dual 4 channel version is also available, supporting only multi-mode fiber and with LC connectors. Multiplexer versions are also available with a Loop-Thru connection allowing easy expansion.

All configurations use a MEMS based mirror system that ensures fast switching, long operating life and repeatable insertion loss and isolation characteristics.
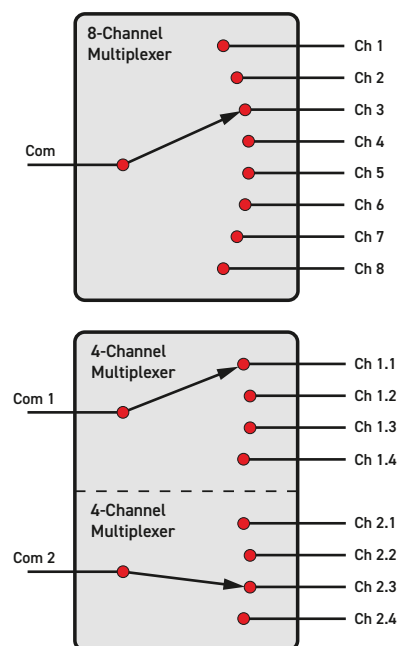
Switching Diagrams of the Optical Dual 4 and Single 8 Channel MUX Configurations

MUX Control

The 60-850/851 is fully LXI conformant through a 1000Base-T Ethernet connection and is supplied with IVI drivers and Direct I/O drivers to allow programmatic control of the optical switches. A built in soft front panel can be accessed through any web browser to provide manual control of the multiplexers in a simple and intuitive way. Controlling the 60-850/851 at long distances could not be simpler, and control can even be gained using links including wireless access points for true control mobility.

Relay Cycle Counting

To aid with "health" monitoring this unit is provided with a relay cycle counting feature. The number of operations per contact are stored on the unit 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).

Sequencing Service and Triggering

The Sequencing service provides the user with the ability to set a series of pre-determined sequences on an LXI unit. These sequences can be triggered by software or one of the sixteen software configurable open collector triggers.

As the operations are grouped together, it will minimize the number of control transactions required to achieve a composite change of target switch state, condensing multiple operations in a single sub-unit into a single operation, thus reducing the overall system switch settling time.

For example, if a user wants to operate matrix crosspoints X1-Y1, X4-Y1, X2-Y2, in the first sequence, only one operation, and one delay, will be used.

Additionally, as the switch state sequences are stored within the LXI controller, the burden on the Host CPU and Ethernet traffic is greatly reduced, and so the overall system latency is also reduced.

This unit features a software reset line which provides the ability for a user supplied reset to be applied to the unit, triggering a software reset of the relays, returning all relays in the unit to their default state. There is also a software fault line available that will be triggered if there is any error detected within the unit. Please note that while these reset and fault lines use dedicated physical connections to the unit, they are software control lines and as such should not be used for safety interlocks etc.
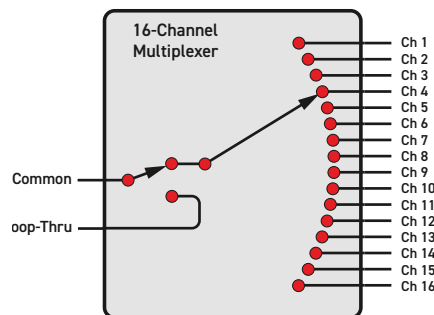
For more information on the Pickering Sequence Manager please refer to our website.
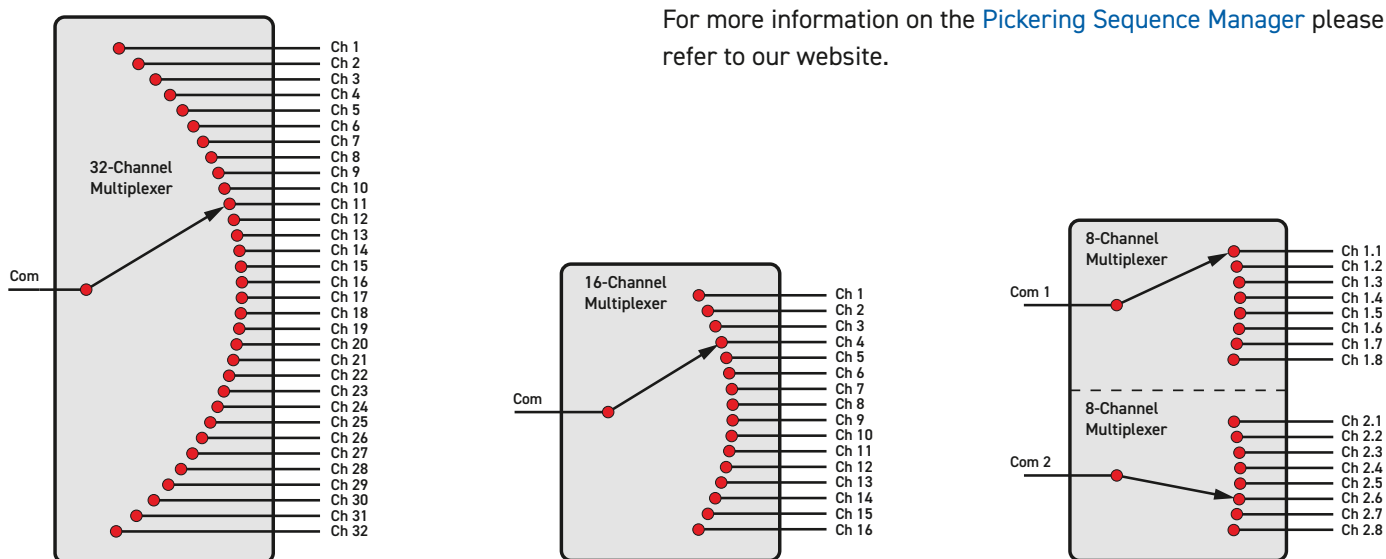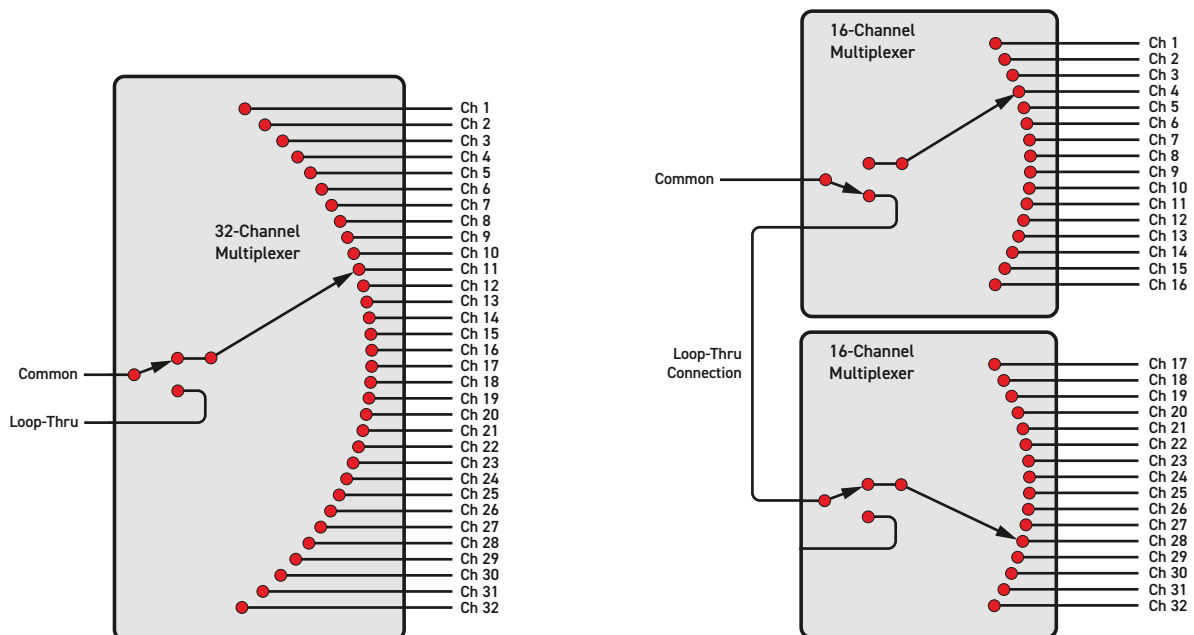

**Switching Diagrams of the Optical
Single 32, Single 16 and Dual 8 Channel MUX Configurations**
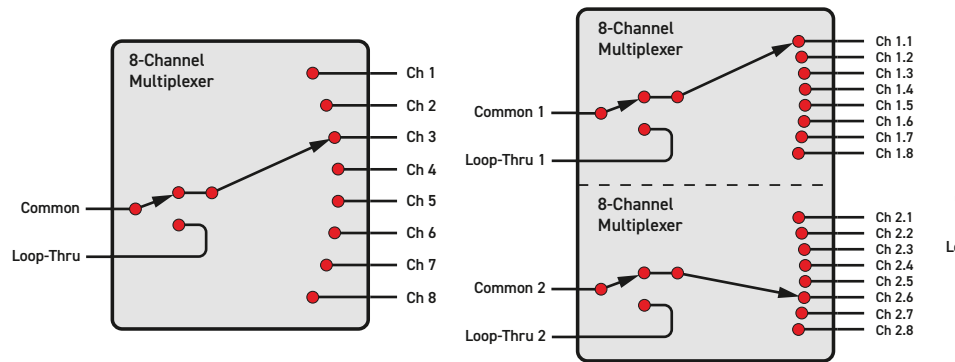
Switching Diagrams for the 8 Channel Optical Multiplexer with optional Loop-Thru switching

Switching Diagram for the 16 Channel Optical Multiplexer
with optional Loop-Thru switching

Switching Diagram for the 32 Channel Optical Multiplexer
with optional Loop-Thru switching

Example Configuration using the Loop-Thru Connection:
Two 60-850/851 16-Channel Multiplexers can be cascaded
to produce a single 32-Channel Optical Multiplexer

Single-Mode Specification

Fiber Switch Type:	MEMS
Available Connector Types:	FC/APC, FC/PC, SC/PC, MU, LC.
Wavelength:	1240 nm to 1640 nm
Internal Fiber Type:	SM 9/125
Insertion Loss:	1 dB typ (8:1 version) 1.5 dB typ (16:1 version) 1.5 dB typ (8:1 loop-thru) 2 dB typ (16:1 loop-thru) 2.5 dB typ (32:1 version)
Return Loss:	60 db min (APC version) 55 dB min (other versions)
Polarization Dependent Loss (PDL):	0.05 dB max
Repeatability:	±0.01 dB max
Crosstalk:	-60 dB max
Recommended Input Power:	+20 dBm Above this level a small increase in insertion loss may be experienced, typically less than 0.1 dB at +27 dBm. Damage level, >+30 dBm continuous.
Thermal Stability (-10 to 75°C insertion loss variation):	0.2 dB max
Expected Life:	>>10^9 operations
Maximum Switching Time:	1 ms
Cycle Rate:	500/sec

Multi-Mode Specification

Fiber Switch Type:	MEMS
Available Connector Types:	SC, ST
Wavelength:	700 nm to 1700 nm
Internal Fiber Type:	MM 62.5/125
Insertion Loss:	1 dB typ (8:1 version) 1.5 dB typ (16:1 version) 1.5 dB typ (8:1 loop-thru) 2 dB typ (16:1 loop-thru) 2.5 dB typ (32:1 version)
Return Loss:	55 dB min
Polarization Dependent Loss (PDL):	0.05 dB max

Power Source

Universal AC mains supply, 90-264 VAC, 50-60 Hz	
Power Inlet:	Male IEC connector on rear panel

LAN Interface

Compliant to LXI Standard 1.4, the 60-850/851 has a 1000Base-T Ethernet Interface via a standard RJ-45 connector mounted on the rear panel with a display showing the unit's IP address*.

Note: Legacy units may not have 1000Base-T support or be fitted with an IP address display.

LXI Status Indicators

Front panel mounted LEDs:
- Power
- Ready
- Error
- LAN
- Active

Switch Indicators

LED indicators show the selected MUX channel.

Signal Connectors

Signals via front panel connectors as Product Order Codes.

Connector Protection

Supplied with tethered dust caps for use when not connected to an external fiber connector.

Mechanical Characteristics

Supplied with front panel ears to enable rack mounting on a shelf or other rear support mechanism.

Dimensions: 1U high, full rack width, 340 mm depth

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

Cooling

Fan assisted cooling, side air intakes and rear exhaust.

Scan List Sequencing

Capable of storing 5000 predefined test sequences, loaded from the host Controller to the LXI unit at process initialization, with the ability to be triggered through software or from any of the sixteen software configurable triggers.

For more information on the Pickering Sequence Manager, please go to: pickering-sequence-manager

Triggering

- 16x Software Configurable Bidirectional Open Drain Triggers
- 1x Dedicated Software Reset Line
- 1x Dedicated Software Fault Line
- 1x Dedicated Interlock Line

Sequencing/Triggering port: 25-pin male micro-D connector mounted on the rear panel.

Operating/Storage Conditions

Operating Temperature:	0 °C to +55 °C
Humidity:	Up to 95% non-condensing
Altitude:	5000 m

Storage/Transport Temperature:	-20 °C to +75 °C
Humidity:	Up to 95% non-condensing
Altitude:	15000 m

Safety & CE Compliance

All products 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.

Product Order Codes

Dual 4 Channel Fiber Multiplexer	
SC, Multi-Mode	60-851-209
ST, Multi-Mode	60-851-309
Single 8 Channel Fiber Multiplexer	
FC/APC, Single-Mode	60-850-011
FC/APC, Single-Mode with Loop-Thru	60-850-021
SC, Single-Mode	60-850-211
SC, Single-Mode with Loop-Thru	60-850-221
LC, Single-Mode	60-850-411
LC, Single-Mode with Loop-Thru	60-850-421
SC, Multi-Mode	60-851-211
SC, Multi-Mode with Loop-Thru	60-851-221
Dual 2x2 Channel Fiber Multiplexer	
LC, Multi-Mode	60-851-405
Dual 8 Channel Fiber Multiplexer	
FC/APC, Single-Mode	60-850-012
FC/APC, Single-Mode with Loop-Thru	60-850-022
SC, Single-Mode	60-850-212
SC, Single-Mode with Loop-Thru	60-850-222
LC, Single-Mode	60-850-412
LC, Single-Mode with Loop-Thru	60-850-422
SC, Multi-Mode	60-851-212
SC, Multi-Mode with Loop-Thru	60-851-222
ST, Multi-Mode	60-851-312
Single 16 Channel Fiber Multiplexer	
FC/APC, Single-Mode	60-850-013
FC/APC, Single-Mode with Loop-Thru	60-850-023
SC, Single-Mode	60-850-213
SC, Single-Mode with Loop-Thru	60-850-223
LC, Single-Mode	60-850-413
LC, Single-Mode with Loop-Thru	60-850-423
SC, Multi-Mode	60-851-213
SC, Multi-Mode with Loop-Thru	60-851-223
Single 32 Channel Fiber Multiplexer	
FC/APC, Single-Mode	60-850-014
FC/APC, Single-Mode with Loop-Thru	60-850-024
SC, Single-Mode	60-850-214
SC, Single-Mode with Loop-Thru	60-850-224
LC, Single-Mode	60-850-414
LC, Single-Mode with Loop-Thru	60-850-424
SC, Multi-Mode	60-851-214
SC, Multi-Mode with Loop-Thru	60-851-224

Product Customization

Pickering LXI units 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 switch types
- Mixture of switch types
- Alternative number of switches
- 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.
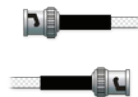
Connectivity Solutions

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
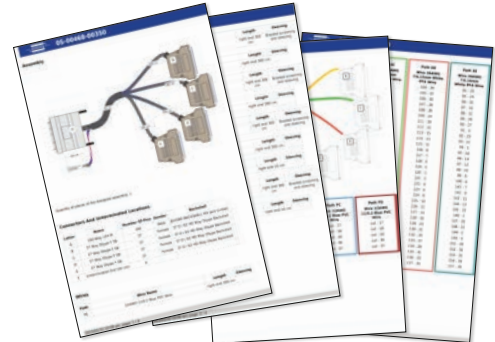
Start designing your custom cabling, go to pickeringtest.com/cdt

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
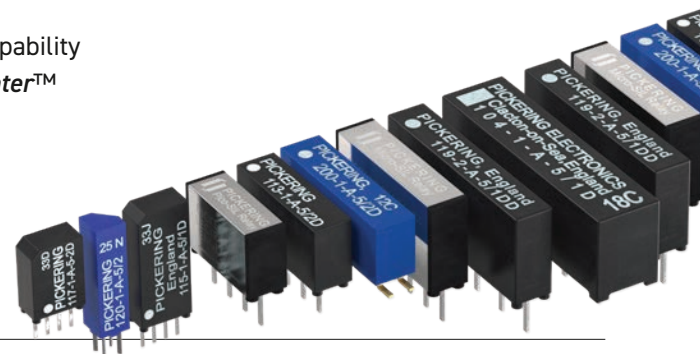
Programming

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
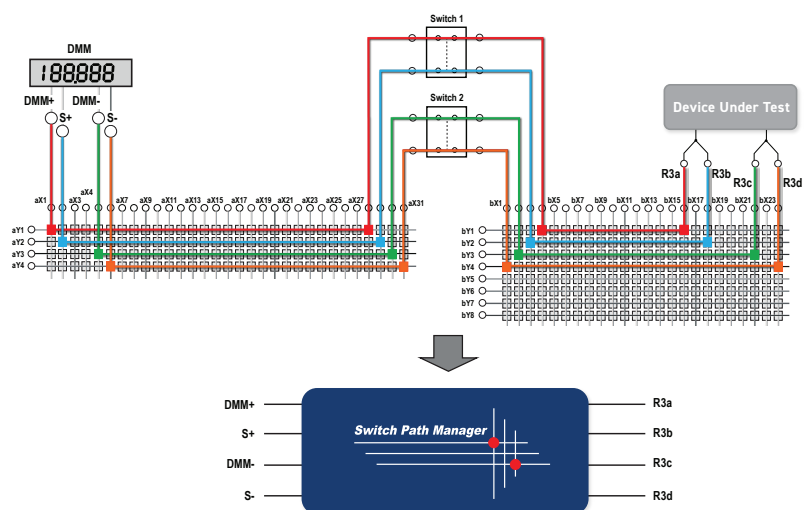
Diagnostic Relay Test Tools

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