



- High Performance Microwave Multiplexers
- 12 Banks of SP4T
- Mixed Bandwidths of 10 GHz & 40 GHz
- Excellent RF & Repeatability Characteristics
- LED Indication
- Compact 2U Form Factor

- LXI Standard 1.5 Compliant
- IVI & Direct I/O Drivers
- 3 Year Warranty

Controlling the Multiplexer

The 60-890-028 is controlled through an Ethernet 1000Base-T LXI interface. This provides a quick and easy method of installing the unit and a simple way of controlling it from a remote location through its API or built in soft front panel. The ability for control at a distance aids the testing of systems without the need for a physical presence.

Easy Repair

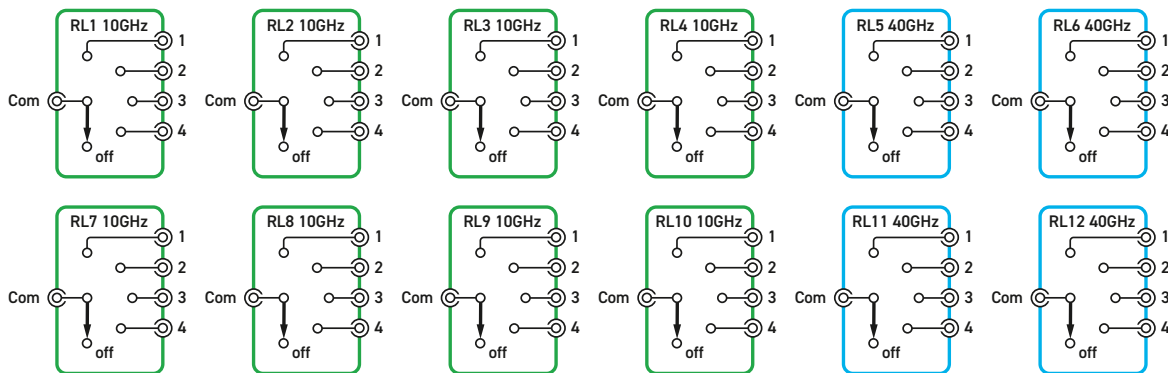
To allow fast in field repair, relays may be individually replaced without removing the covers from the chassis or the chassis from the host rack.

Other Microwave Switching Configurations

We are able to offer other microwave switching solutions, if you have a custom requirement, please contact your local Pickering sales representative.

The 60-890-028 Microwave Multiplexer Unit is configured with 8 banks of SP4T relays with 10 GHz bandwidth and 4 banks of SP4T relays with 40 GHz bandwidth. It is ideal for constructing complex microwave switching systems for many applications. Connection is by front panel mounted SMA or SMA-2.9 connectors.

The multiplexer relays have an extremely high level of performance with low VSWR, very high isolation, low loss and high power handling. They are ideal for switching 50 Ω systems for HF up to microwave frequencies. The unit occupies 2U of rack space, providing a compact switching solution. The multiplexers can be user connected to create customized switching systems which include both multiplexer and matrix arrangements.



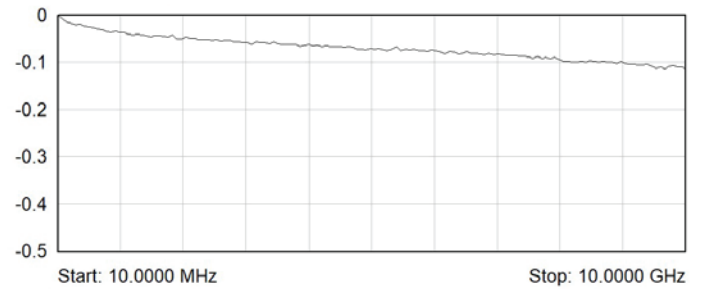
Switching Diagram for the 60-890-028 12-Bank 4-Channel Microwave MUX

General Multiplexer Information

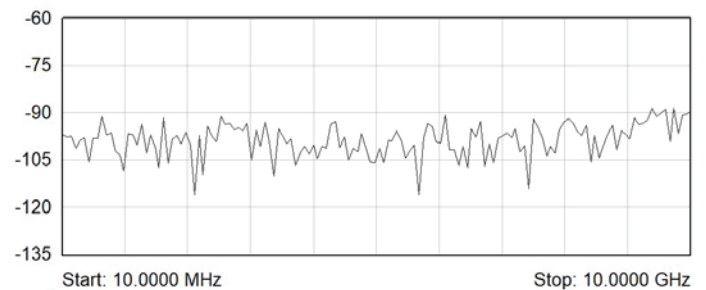
Relay Manufacturer:	Radiall
Configuration:	SP4T Microwave Multiplexer with 12 independent banks.
LED Indicators:	Multiplexer relays have blue LEDs to indicate a closed RF path.
Operate Time:	Typically <10.5 ms
Maximum Cold Switch Voltage:	100 V*
Maximum Carry Current:	1 A

Multiplexer Specification - 10 GHz SP4T Relays

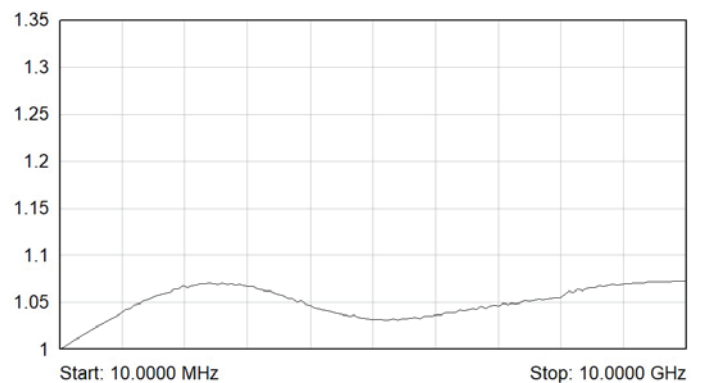
Characteristic Impedance:	50 Ω
Connectors:	SMA
Bandwidth:	DC to 10 GHz
Maximum RF Carry Power:	250 W (0-3 GHz) 150 W (3-8 GHz) 120 W (8-10 GHz)
Isolation:	>80 dB (0-3 GHz) >70 dB (3-8 GHz) >60 dB (8-10 GHz)
Insertion Loss:	<0.2 dB (0-3 GHz) <0.3 dB (3-8 GHz) <0.4 dB (8-10 GHz)
VSWR:	<1:1.2 (0-3 GHz) <1:1.3 (3-8 GHz) <1:1.4 (8-10 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 10 GHz Relays



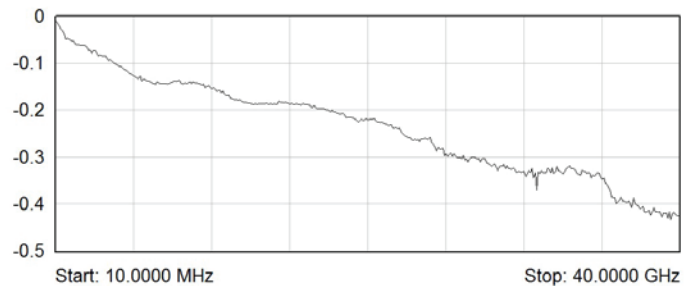
Typical Isolation (dB) Plot for 10 GHz Relays



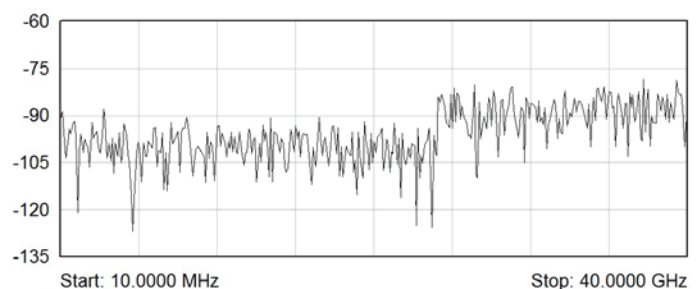
Typical VSWR Plot for 10 GHz Relays

Multiplexer Specification - 40 GHz SP4T Relays

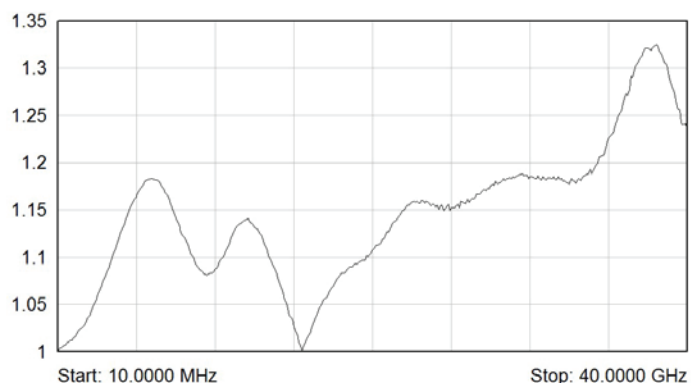
Characteristic Impedance:	50 Ω
Connectors:	SMA-2.9
Bandwidth:	DC to 40 GHz
Maximum RF Carry Power:	60 W (0-3 GHz) 35 W (3-8 GHz) 30 W (8-12.4 GHz) 25 W (12.4-18 GHz) 15 W (18-26.5 GHz) 5 W (26.5-40 GHz)
Isolation:	>80 dB (0-3 GHz) >70 dB (3-8 GHz) >60 dB (8-12.4 GHz) >60 dB (12.4-18 GHz) >55 dB (18-26.5 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 Relays



Typical Isolation (dB) Plot for 40 GHz Relays



Typical VSWR Plot for 40 GHz Relays

Power Source

Universal AC mains supply, 90-120/200-240 V 50-60 Hz	
Power Inlet:	Male IEC connector
Power Rating:	100 VA maximum
Fuse Rating:	5 A, 250 V

LAN Interface

Compliant to LXI Standard 1.5, the 60-890-028 has a 1000Base-T Ethernet Interface via a standard RJ-45 connector mounted on the rear panel with an LCD display showing the unit's IP address.

LXI Status Indicators

Front panel mounted LEDs:

- Power
- Ready
- Error
- LAN
- Active

Mechanical Characteristics

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

Dimensions: Full 19" rack width, 500 mm depth, 2U high.

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

Cooling

Fan assisted cooling, front air intakes and rear exhaust.

Operating/Storage Conditions

Operating Temperature:	0 °C to +55 °C
Humidity:	Up to 90 % non-condensing
Altitude:	5000 m
Storage Temperature:	-20 °C to +75 °C
Humidity:	Up to 90 % non-condensing
Altitude:	15000 m

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.

Product Order Codes

LXI Microwave MUX, 50Ω 12x SP4T, 10 GHz & 40 GHz	60-890-028
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Versions with other bank counts and different frequency ranges can be made to order, please contact sales office.

Additional Switch Order Codes:

SP4T 10 GHz Relay Assembly	91-100-111
SP4T 40 GHz Relay Assembly	91-100-112

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 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

Mating Connectors & Cabling

For connection accessories for the 60-890-028 module 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.

Further LXI RF Switching Solutions from Pickering Interfaces



60-891-001 LXI 36:1 Microwave Multiplexer. Available With SMA Connectors (18 GHz) or BNC Connectors (4 GHz).



60-750/751 LXI Microwave Matrix. Bandwidth up to 20 GHz and is available in sizes from Single 3x3 up to Dual 4x4 with Loop-Thru and termination options.



60-721A LXI 72-Channel High Performance Video Multiplexer with a 1 GHz bandwidth.



60-801/802 LXI Microwave Multiplexer, up to 40 GHz bandwidth and support for up to 16 banks of 6 or 4 way multiplexers.



60-800/803 LXI Microwave Multiplexer. Unterminated versions to 67 GHz with up to 16 banks. Terminated versions to 50 GHz with up to 14 banks. 6 or 4 way multiplexers supported.

Connectivity Solutions

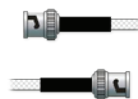
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed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



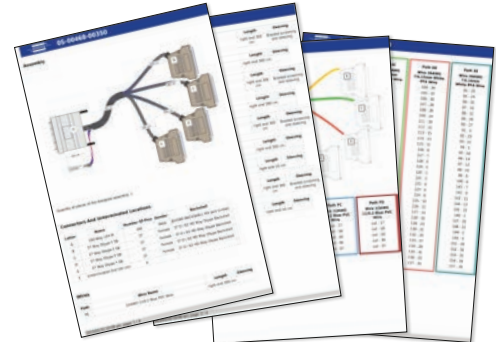
Breakouts



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

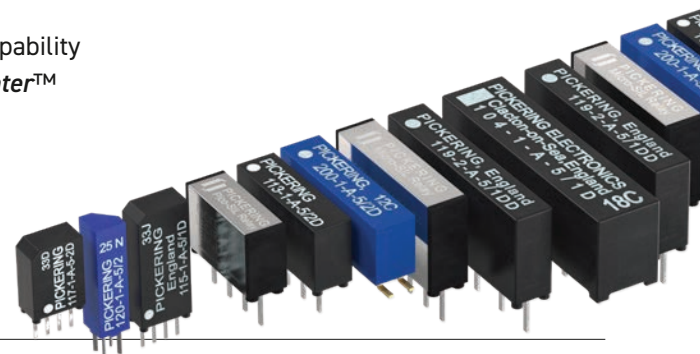
Mass Interconnect

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**

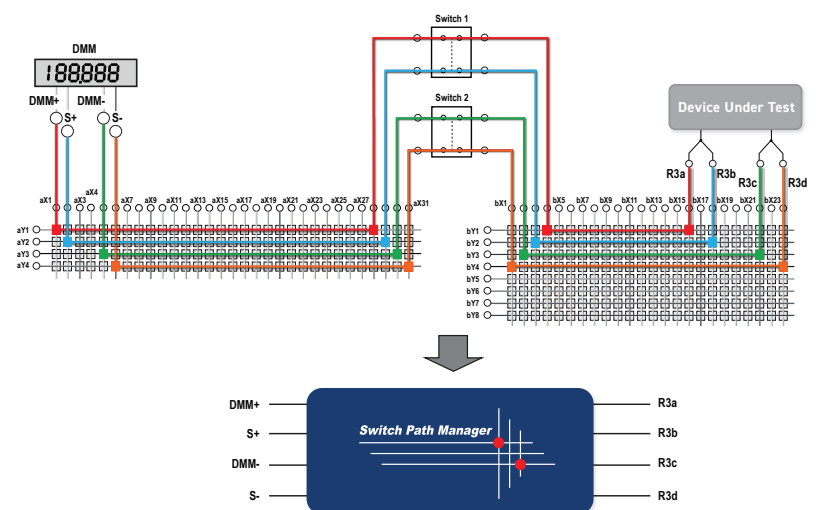
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help 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

