LXI SPDT, SP6T & SP6T-T Microwave Switch 60-890-010

- High Performance Microwave Switches
- SPDT Relays With Bandwidths of 18 GHz & 40 GHz
- SP6T Relays With Bandwidths of 18 GHz & 40 GHz
- SP6T Terminated Relay With Bandwidth of 40 GHz
- Excellent RF & Repeatability Characteristics
- LED Indication
- Compact 2U Form Factor
- LXI Standard 1.4 Compliant
- IVI & Direct I/O Drivers
- 3 Year Warranty

The 60-890-010 Microwave Switching Unit has a mixed configuration of 50 Ω RF relays with bandwidths of 18 GHz and 40 GHz, signal connection is by front panel mounted SMA connectors. The unit's configuration is as follows:

- 5 x SPDT Unterminated 18 GHz Switch
- 1 x SPDT Unterminated 40 GHz Switch
- 7 x SP6T Unterminated 18 GHz Switch
- 3 x SP6T Unterminated 40 GHz Switch
- 1 x SP6T Terminated 40 GHz Switch

The switch has an extremely high level of performance with low VSWR, very high isolation, low loss and high power handling. It is ideal for switching HF to microwave frequencies.

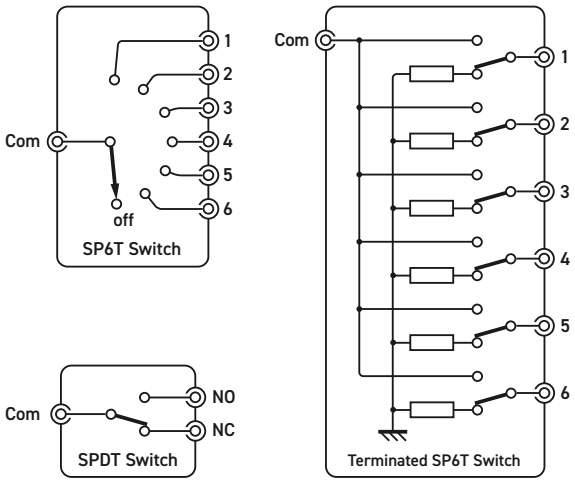
The 60-890-010 occupies 2U of rack space, providing a compact microwave switching solution. The switches can be used individually or interconnected to create a complex switching system.

Controlling the Switch

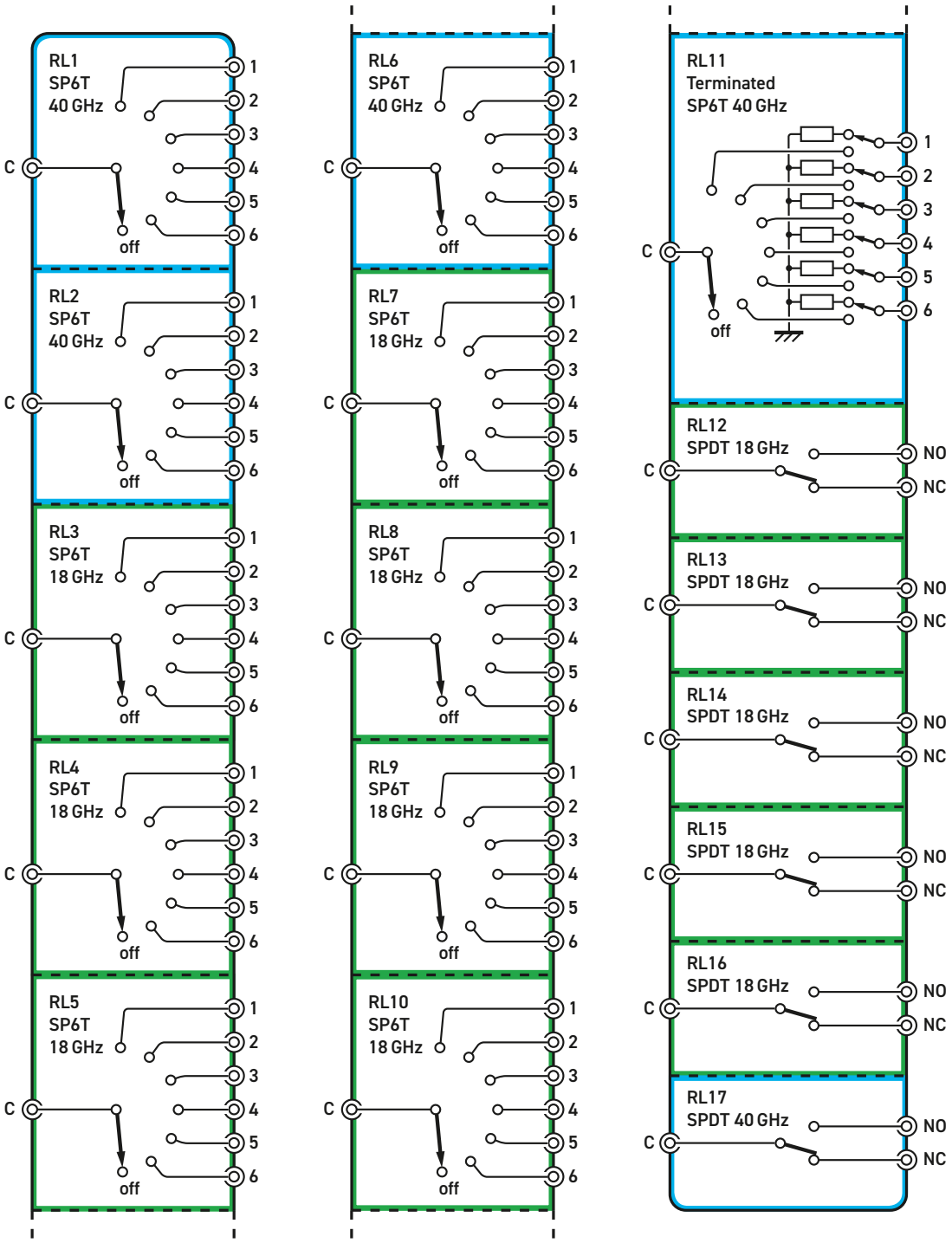
The 60-890-010 is controlled through an LXI interface based on Ethernet 1000Base-T connectivity. The interface provides a quick and easy method of installing the unit in a system and a simple way of controlling the unit at a remote location through its API or built in soft front panel. The ability to control the unit at a distance aids the testing of systems without the need for a physical presence.

Other Microwave Switching Configurations

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



Switching Components of the 60-890-010 Microwave Switch



Switching Diagram for the 60-890-010 SPDT, SP6T & SP6T-T Microwave Switch

Specification - SPDT 18 GHz Unterminated Switch

Relay Manufacturer:	Radiall
Operate Time:	<10 ms
Characteristic Impedance:	50 Ω
Connectors:	SMA
Bandwidth:	DC to 18 GHz
Isolation:	>80 dB (0-3 GHz) >75 dB (3-8 GHz) >65 dB (8-12.4 GHz) >60 dB (12.4-18 GHz)
Insertion Loss:	<0.15 dB (0-3 GHz) <0.20 dB (3-8 GHz) <0.25 dB (8-12.4 GHz) <0.35 dB (12.4-18 GHz)
VSWR:	<1.1:1 (0-3 GHz) <1.2:1 (3-8 GHz) <1.2:1 (8-12.4 GHz) <1.4:1 (12.4-18 GHz)
Average RF Carry Power:	240 W (0-3 GHz) 150 W (3-8 GHz) 120 W (8-12.4 GHz) 100 W (12.4-18 GHz)
Expected Life:	>10 million operations

Specification - SPDT 40 GHz Unterminated Switch

Relay Manufacturer:	Radiall
Operate Time:	<10 ms
Characteristic Impedance:	50 Ω
Connectors:	SMA 2.9
Bandwidth:	DC to 40 GHz
Isolation:	>70 dB (6 GHz) >60 dB (12.4 GHz) >60 dB (18 GHz) >55 dB (26.5 GHz) >50 dB (40 GHz)
Insertion Loss:	<0.3 dB (6 GHz) <0.4 dB (12.4 GHz) <0.5 dB (18 GHz) <0.7 dB (26.5 GHz) <0.8 dB (40 GHz)
VSWR:	<1.3:1 (6 GHz) <1.4:1 (12.4 GHz) <1.5:1 (18 GHz) <1.7:1 (26.5 GHz) <1.9:1 (40 GHz)
Average RF Carry Power:	80 W (6 GHz) 60 W (12.4 GHz) 50 W (18 GHz) 20 W (26.5 GHz) 10 W (40 GHz)
Expected Life:	>10 million operations

Specification - SP6T 18 GHz Unterminated Switch

Relay Manufacturer:	Radiall
Operate Time:	<10.5 ms
Characteristic Impedance:	50 Ω
Connectors:	SMA
Bandwidth:	DC to 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)
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)
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

Specification - SP6T 40 GHz Unterminated Switch

Relay Manufacturer:	Radiall
Operate Time:	<10 ms
Characteristic Impedance:	50 Ω
Connectors:	SMA 2.9
Bandwidth:	DC to 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:	<1.2:1 (0-3 GHz) <1.3:1 (3-8 GHz) <1.4:1 (8-12.4 GHz) <1.5:1 (12.4-18 GHz) <1.7:1 (18-26.5 GHz) <2.2:1 (26.5-40 GHz)
Average 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)
Expected Life:	>2 million operations per position guaranteed (typically >5 million)

RF Specification - SP6T 40 GHz Terminated Switch

Relay Manufacturer:	Radiall
Operate Time:	Typically 15 ms
Characteristic Impedance:	50 Ω
Connectors:	SMA-2.9
Bandwidth	DC to 40 GHz
Isolation:	>70 dB (0-6 GHz) >60 dB (6-12.4 GHz) >60 dB (12.4-18 GHz) >55 dB (18-26.5 GHz) >50 dB (26.5-40 GHz)
Insertion Loss:	<0.2 dB (0-6 GHz) <0.4 dB (6-12.4 GHz) <0.5 dB (12.4-18 GHz) <0.7 dB (18-26.5 GHz) <1.1 dB (26.5-40 GHz)
VSWR:	<1.3:1 (0-6 GHz) <1.4:1 (6-12.4 GHz) <1.5:1 (12.4-18 GHz) <1.7:1(18-26.5 GHz) <2.2:1 (26.5-40 GHz
Maximum RF Carry Power:	40 W (0-6 GHz) 30 W (6-12.4 GHz) 25 W (12.4-18 GHz) 15 W (18-26.5 GHz) 5 W (26.5-40 GHz)
Termination power rating:	1 W per termination, 3 W total per 6 channel multiplexer
Expected Life (Low Power):	>2 million operations per position

Operating/Storage Conditions

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

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 1.4, the 60-890-010 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: 2U high, full 19" rack width, 500 mm depth

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

Connectors

Signals via front panel SMA connectors.

Cooling

Fan assisted cooling, side air intakes and rear exhaust.

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

LXI Microwave Switching Unit, Mixed Configuration: SPDT, SP6T & SP6T-T, 50 Ω, 18 GHz & 40 GHz	60-890-010

Versions with other bank counts and different frequency ranges can be made to order, please contact sales office.

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.

Mating Connectors & Cabling

For connection accessories for the 60-890-010 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 our website.

Further LXI RF Switching Solutions from Pickering Interfaces

60-891 LXI 36:1 Microwave MUX. 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.

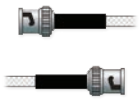
60-801/802 LXI Microwave Multiplexer, up to 40 GHz bandwidth and support for up to 16 banks of 6 or 4 way multiplexers.

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



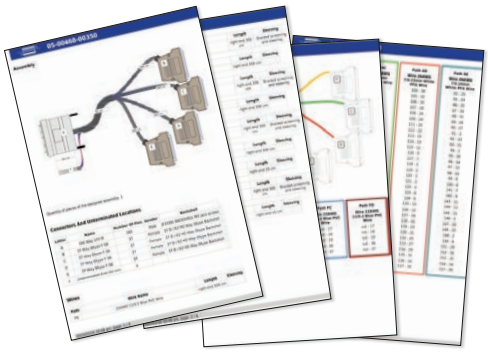
RF Cable Assemblies

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

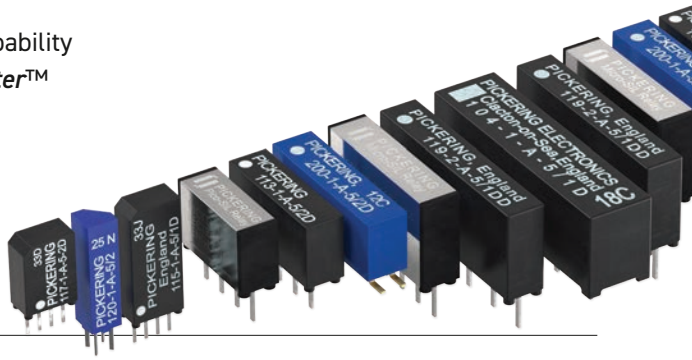
Mass Interconnect

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

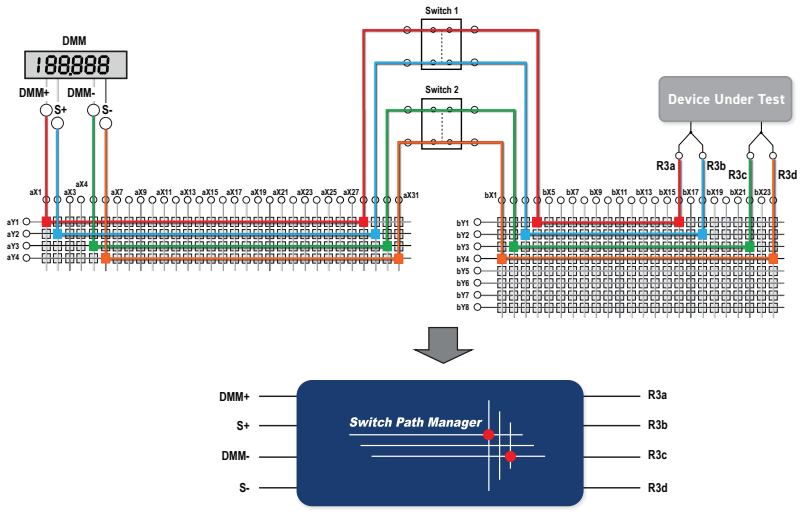
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help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