- Versatile Microwave Matrix Switching Platform
- Versions Available up to Dual 4x4
- Loop-Thru Options For Easy Expansion
- Internally Terminated Versions
- Up to 18 GHz Bandwidth
- Low Loss
- Equal Loss on Each 4x4 Matrix

- 50 Ω Impedance
- Auxiliary Port For External Control of Relays
- Custom Versions Available on Request
- LXI Standard 1.4 Compliant
- 3 Year Warranty

The 60-750/751 is an LXI microwave switching matrix controlled through an LXI compliant Ethernet connection. The matrix is available in a variety of configurations and frequencies up to 18 GHz (60-751).

It is characterized for 50 Ω applications, for 75 Ω versions please consult your local sales representative.

The 60-750/751 is in a 2U full width enclosure, providing a compact solution for rack mounted ATE systems or for use on the bench. The matrix is configured to the specified X-Y size with no extra cabling needed, saving the cost and time required creating matrices from individual components.

The 3x3 or 4x4 matrices are designed to have a matched path loss irrespective of the selected signal route. The matrices are non-blocking, allowing any input to be connected to any unused output. Optional Loop-Thru connections allow matrices to be easily linked to make larger arrays using external cabling.

The 60-750 is a dual or single 10 GHz matrix or can be supplied configured as a single 8x4 matrix with the two 4x4 matrices internally connected. The 60-751 is a single 3x3 or 4x4 18 GHz matrix. Models can be ordered with or without internal terminations for disconnected inputs.

For applications where extra microwave switches are required the 60-750/751 includes an auxiliary output that can be used to supply 12 V power and control for 16 external switches.
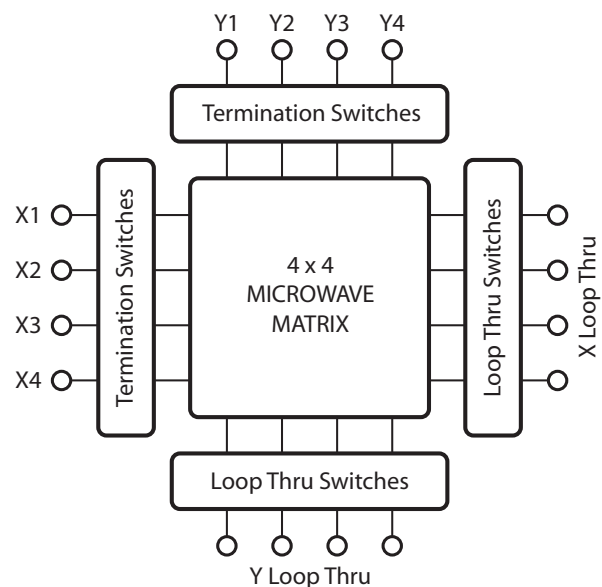
**Single 60-750/751 Non-Blocking 4x4 Matrix
With Optional Loop-Thru and Internal Terminations**

Control of the matrices could not be simpler. Communicate with the 60-750/751 via its Ethernet interface using any W3C compliant browser and run the soft front panel from a PC or a Mac. Alternatively use the programmatic interface based on Pickering Interfaces switch driver to control the 60-750/751 through DLLs or an IVI compliant driver.

The 60-750/751 is ideal for applications where a simple start up process is required and for applications requiring control at large distance.It is the first of a range of commercial and custom microwave switching products with the LXI control interface. For alternative configurations please contact your local sales office.
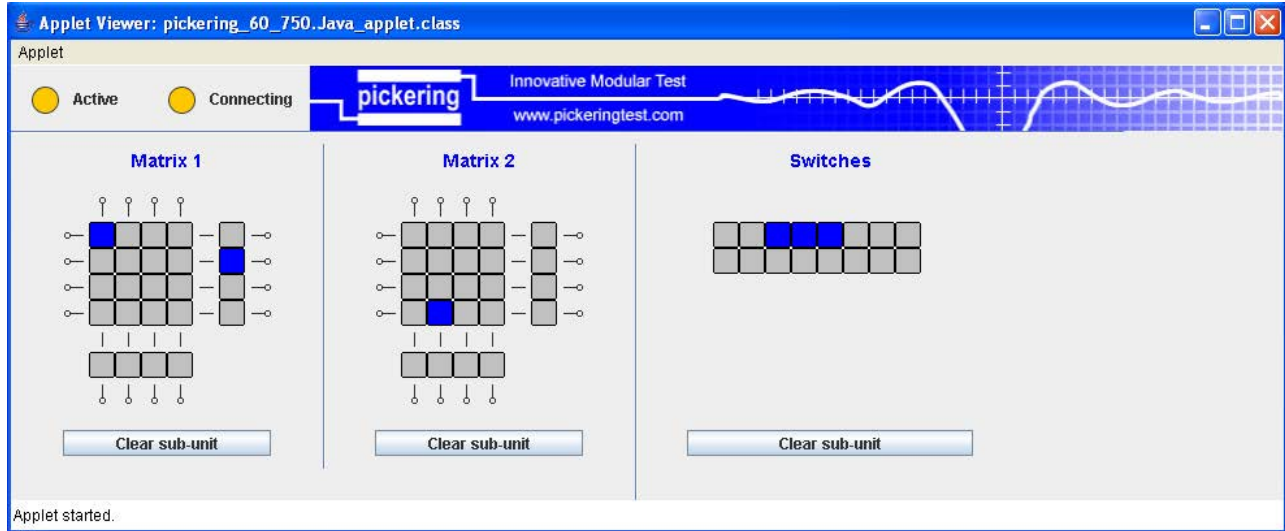
Example Of The Soft Front Panel Supplied With The 60-750/751 Matrix

Rear View Of The 60-750/751 Matrix Showing Power & LAN Connections

8x4 MATRIX

MATRIX 1 (4x4)

X1 — Multi-pole uWave relay ⟶ Multi-pole uWave relay — Y1
X2 — Multi-pole uWave relay ⟶ Multi-pole uWave relay — Y2
X3 — Multi-pole uWave relay ⟶ Multi-pole uWave relay — Y3
X4 — Multi-pole uWave relay ⟶ Multi-pole uWave relay — Y4

Front Panel Connectors

MATRIX 2 (4x4)

X5 — Multi-pole uWave relay ⟶ Multi-pole uWave relay
X6 — Multi-pole uWave relay ⟶ Multi-pole uWave relay
X7 — Multi-pole uWave relay ⟶ Multi-pole uWave relay
X8 — Multi-pole uWave relay ⟶ Multi-pole uWave relay

Front Panel Connectors

= Y1 to X1

= Y1 to X5

**Diagram Illustrating The Two Path Lengths
Used In 8x4 Matrices**

General Matrix Information

Connectors:	Front panel SMA, alternatives available on request.
Operating Time:	<18 ms (limited by switches)
Maximum Voltage:	100 VDC*
Maximum Switch Current:	1A
Path Resistance:	On: <500 mΩ Off: >10^{10} Ω (unterminated)
Expected Life (operations):	Low power: >5 million per position Max power: 0.3 million

* For full voltage rating, signal sources to be switched must be fully isolated from mains supply and safety earth.

Power Source

Universal AC mains supply, 90-120 V to 200-240 V, 50-60 Hz	
Power Inlet on Rear Panel:	Male IEC connector
Fuse Rating:	5 A, 250 V

LAN Interface

Compliant to LXI Standard 1.4, the 60-750/751 has a 1000Base-T Ethernet Interface via a standard RJ-45 connector mounted on the rear panel*.
*Note: Legacy units may not have 1000Base-T support.

LXI Status Indicators

Front panel mounted LEDs:

  · Power   · LAN   · Ready   · Active   · Error

Cooling

Fan assisted cooling, side air intakes and rear exhaust.

Mechanical Characteristics

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

Dimensions: 2U full rack width, 500 mm deep.

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

Matrix Specification

Extensive typical performance information is provided in the operating manual which can be downloaded from the Pickering Interfaces website.

10 GHz Version (60-750)

Characteristic Impedance:	50 Ω
Maximum Power:	100 W to 3 GHz 60 W to 12 GHz Terminated versions limited to 1W on all frequencies.
Typical Isolation:	120 dB
Typical Crosstalk:	-120 dB

10 GHz Single 4x4 & 3x3 and Dual 4x4 & 3x3 Matrix

Insertion Loss:	<1.5 dB to 4 GHz <2.5 dB to 10 GHz
VSWR:	1.5:1 to 4 GHz 1.8:1 to 10 GHz

10 GHz Single 8x4 Matrix

Insertion Loss (Y to X1-4):	<1.5 dB to 4 GHz <2.5 dB to 10 GHz
VSWR (Y to X1-4):	1.5:1 to 4 GHz 1.8:1 to 10 GHz
Insertion Loss (Y to X5-8):	<2.5 dB to 4 GHz <3.9 dB to 10 GHz
VSWR (Y to X5-8):	1.7:1 to 4 GHz 2.1:1 to 10 GHz

18 GHz Version (60-751)

Characteristic Impedance:	50 Ω
Maximum Power:	100 W to 3 GHz 60 W to 10 GHz 30 W to 20 GHz Terminated versions limited to 1W on all frequencies.
Typical Isolation:	120 dB
Typical Crosstalk:	-120 dB

18 GHz Single 4x4 & 3x3 Matrix

Insertion Loss:	<1.5 dB to 6 GHz <2 dB to 10 GHz <3 dB to 18 GHz
VSWR:	1.3:1 to 6 GHz 1.5:1 to 10 GHz 1.9:1 to 18 GHz

Product Order Codes

Single 10 GHz 50 Ω Matrix	
3x3 Matrix	60-750-133
4x4 Matrix	60-750-144
8x4 Matrix	60-750-184
Dual 10 GHz 50 Ω Matrix	
Dual 3x3 Matrix	60-750-233
Dual 4x4 Matrix	60-750-244
Single 18 GHz 50Ω Matrix	
3x3 Matrix	60-751-133
4x4 Matrix	60-751-144

Terminations and Loop-thru Connections:

For versions with Loop-thru, add the suffix **-A**.
For versions with internal terminations, add the suffix **-B**.
For versions with Loop-thru and internal terminations, add **-C**.

For example:

4x4 18 GHz Matrix with Loop Thru &	
internal termination	60-751-144-C

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.

Auxiliary Control

Type:	Interface that can be used to operate 16 external switches, fully floating outputs support common ground or common power configuration. Each output can switch up to 2 A and 100 V, maximum power 10 W.
Power Connection:	12 V protected by resettable fuse with 1.2 A to 2.5 A trip current (operating temperature dependent)
Connector:	37-pin female D-type

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

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.

Mating Connectors & Cabling

For connection accessories for the 60-750/751 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.

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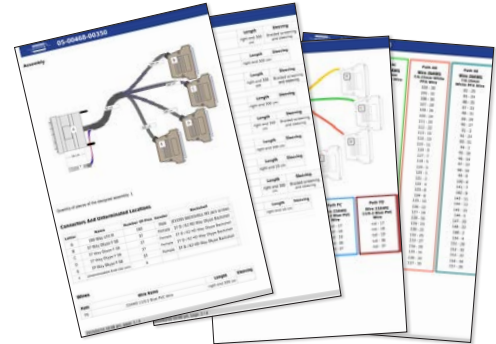
Start designing your custom cabling, go to pickeringtest.com/cdt

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
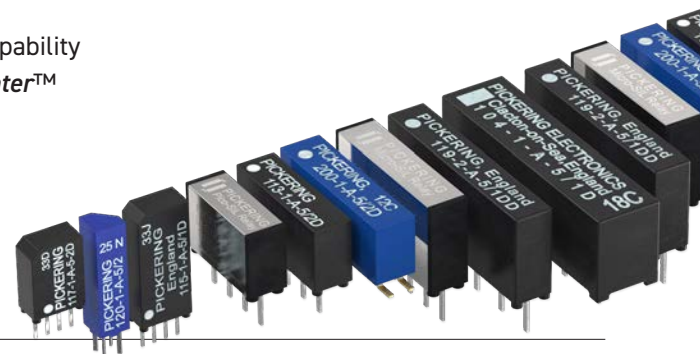
Programming

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
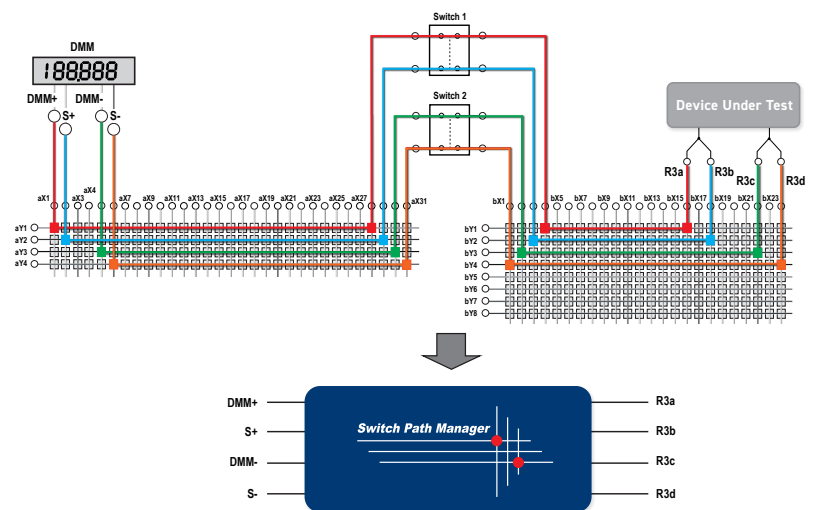
Diagnostic Relay Test Tools

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