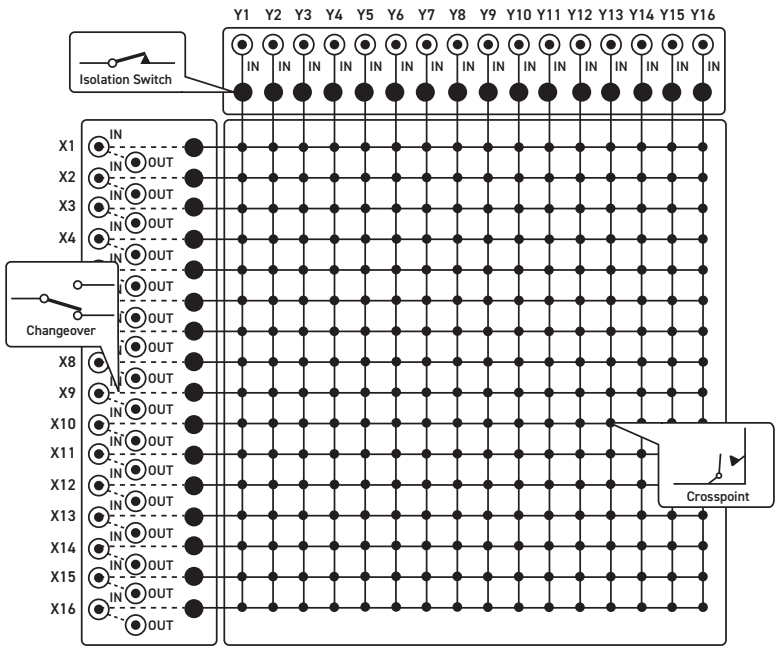
PXI 6 U Expandable 250 MHz 16x16 RF Matrix 45-720A

- 16x16 Coaxial Matrix
- 250 MHz Bandwidth
- High Quality Ruthenium Reed Relays
- Choice of Front Panel Mounted Coaxial Connectors
- Available in 50 Ω and 75 Ω Versions
- Uses High Reliability Reed Relays
- VISA/IVI Drivers Supplied for Windows
- 3 Year Warranty

The 45-720A module is a 6 U 16x16 RF Matrix suitable for switching frequencies beyond 250 MHz. It is available in 50 Ω and 75 Ω versions with a choice of coaxial connectors. It is intended for the easy construction of high performance bi-directional matrix switching systems.

Automatic isolation switches are located on all input and output connections. These are used to disconnect unused signals from the external test fixture to maximize isolation and RF performance.

Typical applications are switching signals to high speed digitizers. The matrix is constructed using high reliability ruthenium electro-plated reed relays, with an operational life of >10^8 to give maximum switching confidence with long service and stable contact resistance.



Switching Diagram for the 45-720A 16x16 Matrix Module

Matrix Operation

The 45-720A is a true 16x16 high density matrix, any combination of cross-points may be selected. Only the signal is switched, all grounds are common. Loop-thru is included on X signals.

Easy Expansion with Automatic Loop-Thru

All unused X input channels are automatically switched to the corresponding "Loop-thru" output connection. This allows for simple expansion (with a little performance loss) and permits the user to place matched terminations on the outputs if required.

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Matrix Expansion

Larger matrices may be constructed by daisy-chaining the X signals from multiple modules, for example, six modules form a 96x16 matrix (1536 crosspoints). Expansion is achieved by interconnecting Xout (Loop-thru) of one matrix to Xin of the next using coaxial cables as shown below. It should be noted that the operating bandwidth will reduce slightly as the number of modules is increased.

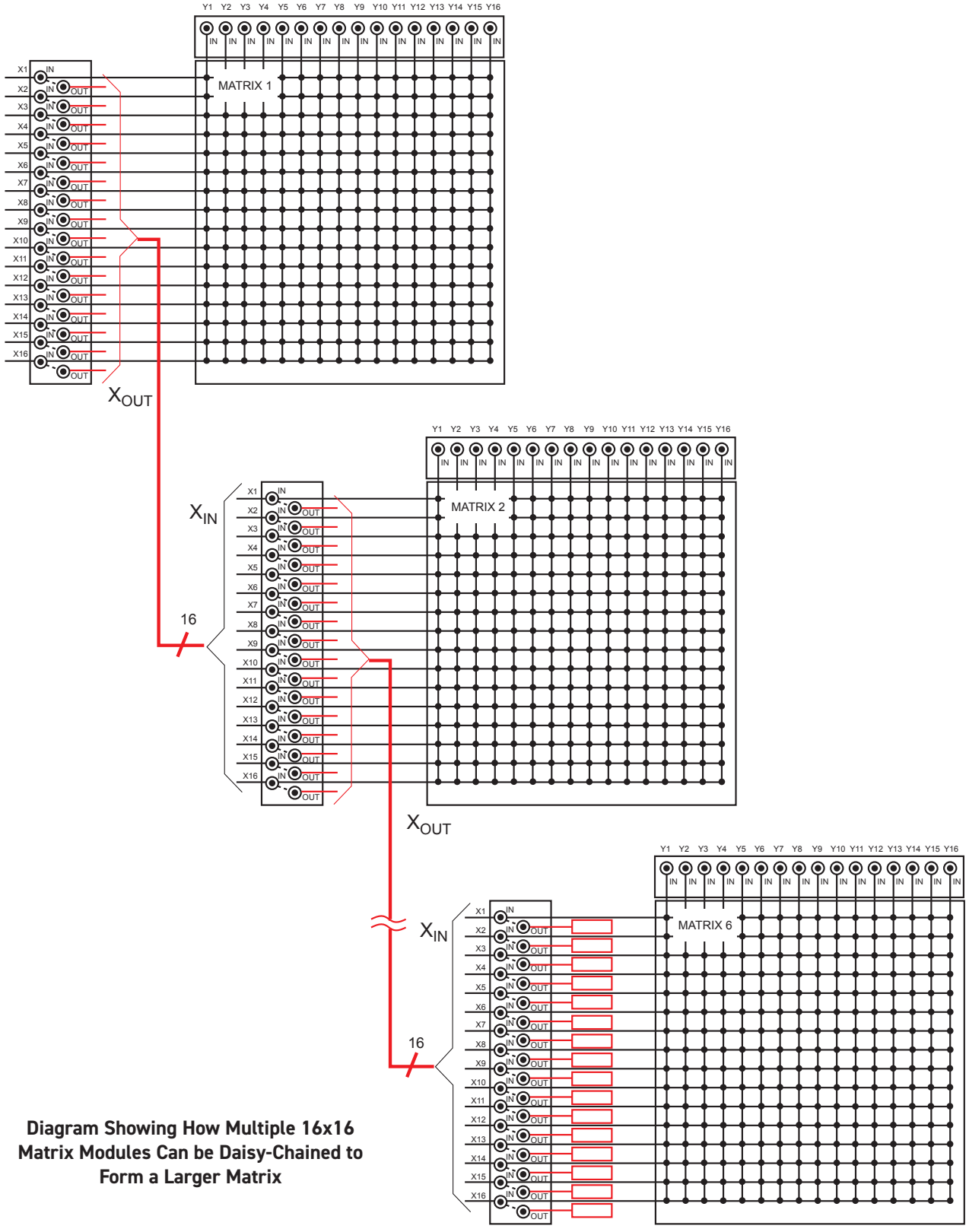
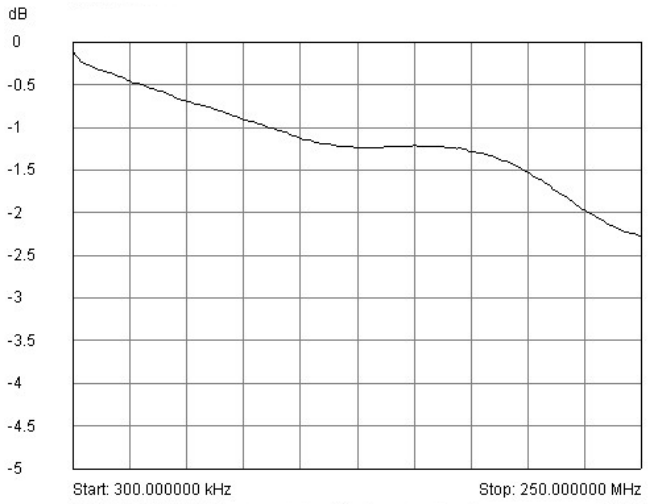
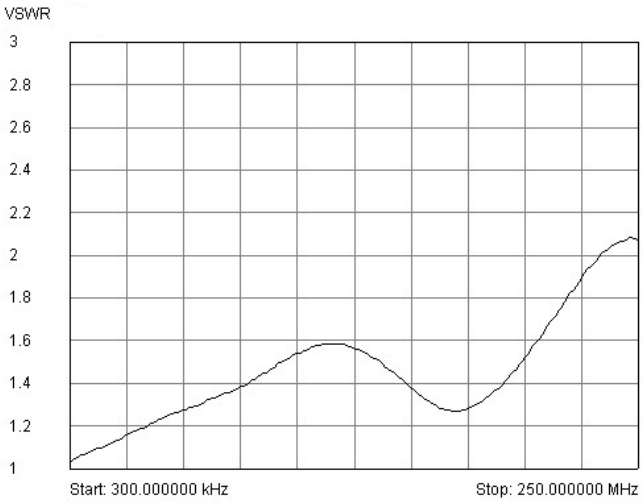


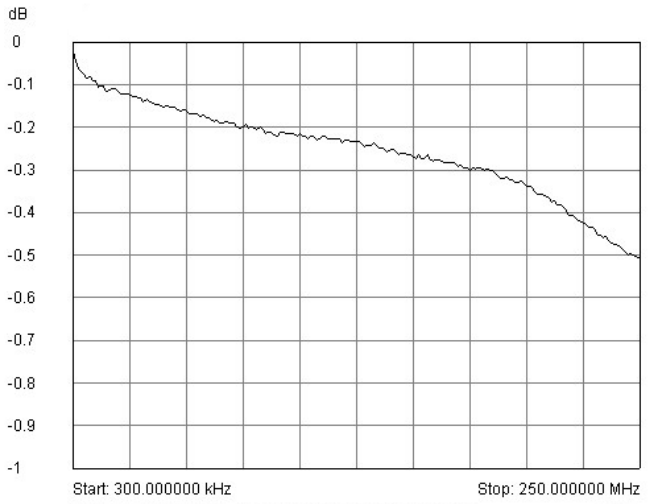
Diagram Showing How Multiple 16x16 Matrix Modules Can be Daisy-Chained to Form a Larger Matrix



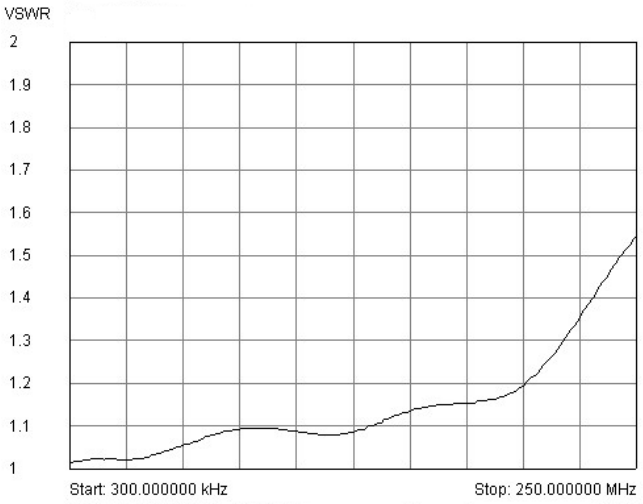
Typical Insertion Loss For One Module



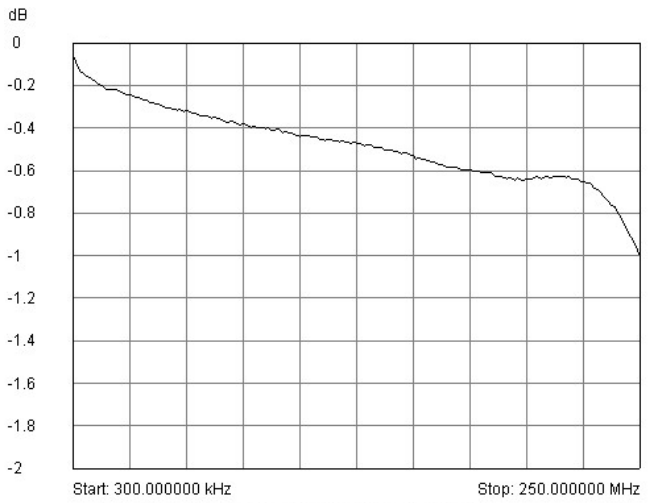
Typical VSWR For One Module



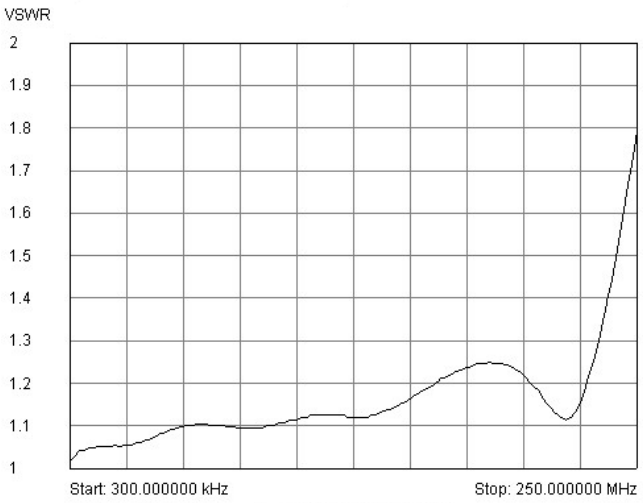
Typical Insertion Loss with Loop-Through For One Module



Typical VSWR with Loop-Through For One Module



Typical Insertion Loss for 2 Daisy-Chained Modules



Typical VSWR for 2 Daisy-Chained Modules

Switching Specification

Switch Type:	Ruthenium Reed
Maximum Voltage:	100 VDC
Maximum Power: Maximum Switch Current: Maximum Carry Current:	10 W 0.5 A 0.5 A
On Path Resistance: Off Path Resistance: DifferentialThermal Offset:	<750 mΩ $>10^8$ Ω <30 µV
Charateristic Impedance:	50 Ω or 75 Ω
Operate Time: Release Time:	<3.0 ms <3.0 ms
Expected Life, low power load: Expected Life, full power load:	$>1x10^8$ operations $>5x10^6$ operations

RF Specification (50 Ω)

Maximum Frequency:	250 MHz
Typical Rise Time:	800 ps †
Insertion Loss (<250 MHz):	<3.5 dB †
VSWR (<250 MHz):	<1:1.9 †
Isolation (<250 MHz):	>70 dB
Crosstalk (<250 MHz):	>60 dB

Loop Through RF Specification (1 Pole)

Insertion Loss (<250 MHz):	<0.5 dB
VSWR (<100 MHz):	<1:1.05

RF Specification (6 modules daisy-chained)

Maximum Frequency:	250 MHz
Typical Rise Time:	800 ps †
Insertion Loss (<250 MHz):	<3.5 dB †
VSWR (<250 MHz):	<1:1.9 †
Isolation (<250 MHz):	>70 dB
Crosstalk (<250 MHz):	>60 dB

† Matrix RF Performance is entirely dependant upon the combination of cross-points currently selected, these figures are for one selected cross-point on any X or Y channel only, refer to graphs.

Power Requirements

+3.3 V	+5 V	+12 V	-12 V
0	1 A (0.6 A typical)	0	0

Mechanical Characteristics

6 U PXI (CompactPCI) module:

- 45-720A-511 - single slot
- 45-720A-541 - dual slot
- 45-720A-711 - dual slot
- 45-720A-741 - single slot
- 45-720A-751 - single slot

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

Chassis Compatibility

Pickering 6 U PXI modules will operate in any 6 U PXI chassis, in addition they will also operate (with 100 % compatibillity) in any 6 U CompactPCI chassis.

Connectors

PXI bus via 32-bit P1/J1 backplane connector.

Front panel signal connectors:

- 45-720A-511 - coaxial 50 Ω SMB
- 45-720A-541 - coaxial 50 Ω Lemo 00
- 45-720A-711 - coaxial 75 Ω BT Type 43/SMZ
- 45-720A-741 - coaxial 75 Ω 1.0/2.3
- 45-720A-751 - coaxial 75 Ω Mini SMB

Operating/Storage Conditions

Operating Conditions

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

Storage and Transport Conditions

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

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 33 MHz 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.

Product Order Codes

PXI 6 U Expandable 16x16 RF Matrix:	
50 Ω SMB, single slot module	**45-720A-511**
50 Ω Lemo 00, dual slot module	**45-720A-541**
75 Ω BT Type 43/SMZ, dual slot module	**45-720A-711**
75 Ω 1.0/2.3, single slot module	**45-720A-741**
75 Ω Mini SMB, single slot module	**45-720A-751**

Product Customization

Pickering 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.

Mating Connectors & Cabling

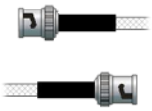
For connection accessories for the 45-720A module range, please refer to the 90-011D RF Cable Assemblies data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

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

Multiway 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 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 Relay Division. These instrument grade reed relays feature ***SoftCenter™*** technology, ensuring long service life and repeatable contact performance.

To learn more, please 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 a list of all supporting operating systems, please see: 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 and OpenTAP
- **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

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

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.

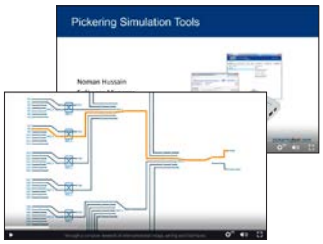
To learn more, please go to: pickeringtest.com/ebirst

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

Available Product Resources

We have a large library of product resources including success stories, product and support videos, articles and white papers as well as application specific product brochures to assist when looking for the switching, simulation and connection solutions you need. We have also published handy reference books on Switching Technology and for the PXI and LXI standards.



To view, download or request any of our product resources, please visit: pickeringtest.com/resources