

- Available as PXI or PXIe Modules
- Easy to Use Loop-thru Option Allows Unlimited X Axis Expansion
- 300 MHz Usable Bandwidth, 150 MHz With Loop-thru
- VISA & IVI Drivers Supplied for Windows
- PXI Version Supported by PXI or LXI Chassis
- Supported by *eBIRST*™
- 3 Year Warranty

The 40-724 (PXI) and 42-724 (PXIe) are RF matrix modules suitable for switching frequencies up to 300 MHz. Having a 50 Ω characteristic impedance and front panel SMB connectors, these modules provide a simple and scalable bidirectional matrix for RF and are intended for the easy construction of high performance switching systems.

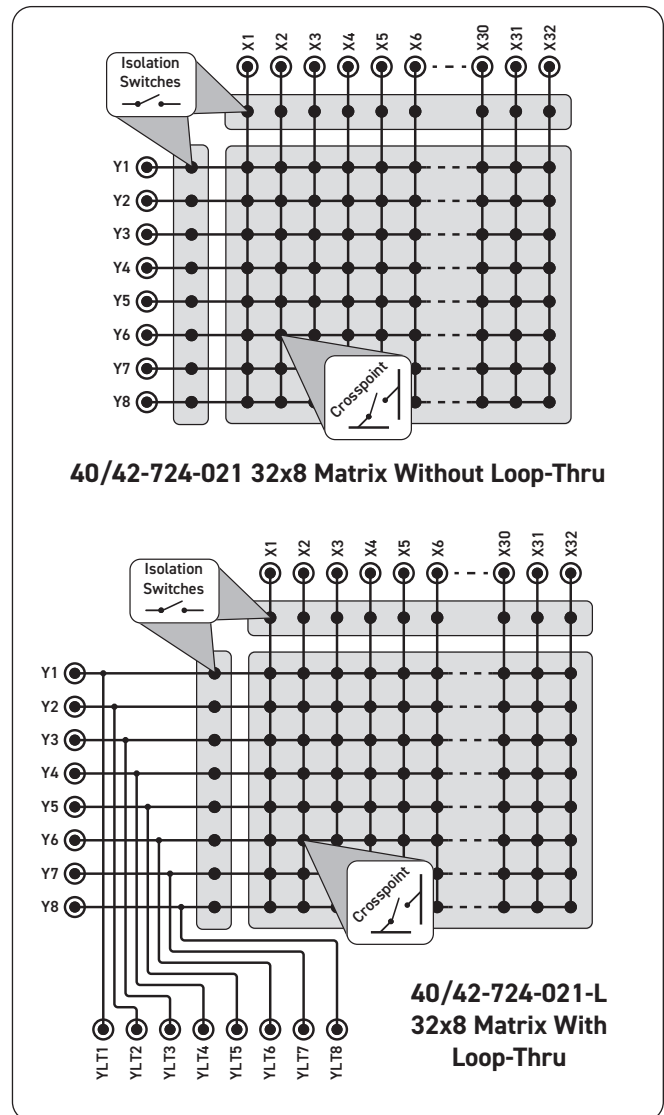
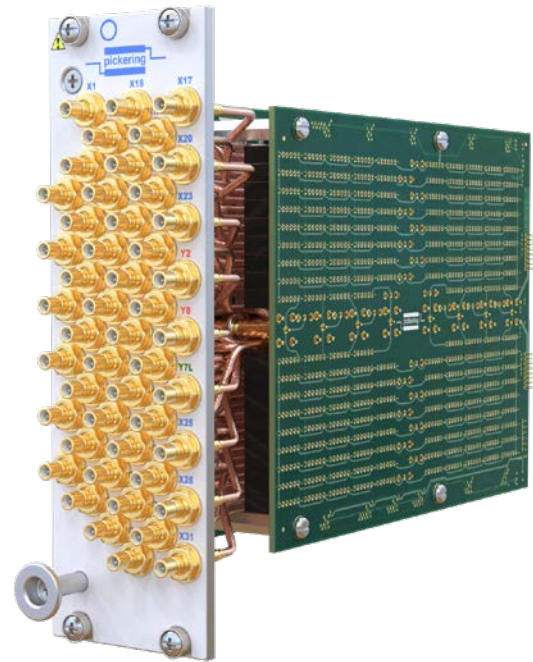
The 40/42-724-021-L version includes Y loop-thru connectors to allow easy matrix expansion between adjacent modules.

All X and Y connections have isolation switches. These can be used to disconnect the matrix from the external test fixture to maximize isolation and RF performance.

Matrix Operation

The 40/42-724 is a high density matrix designed to provide a Y to X connection to maximize bandwidth. It can also support X to X connectivity as shown in the manual. When using loop-thru, X to X connections are possible between modules but this will result in a loss of RF performance.

This module is based on the same construction as the popular 40-725 RF matrix, but has increased capacity and optional Y axis loop thru allowing easy expansion.



Other RF Matrix Modules in Pickering's PXI Range:	
40-725	8x9 500 MHz, 50 Ω/75 Ω
40-726A	12x8 300 MHz, 50 Ω/75 Ω - Optional Y Loop-Thru
40-727	16x4 300 MHz, 50 Ω/75 Ω - Optional Y Loop-Thru
40-728	16x2 300 MHz, 50 Ω/75 Ω - Optional Y Loop-Thru
40-729	8x4 300 MHz, 50 Ω/75 Ω - Optional Y Loop-Thru
40-750	8x2 1.5 GHz, 50 Ω/75 Ω - Y Loop-Thru
40/42-877A	Single/dual 2x2 2.5 GHz, 50 Ω
40/42-837A	Single/dual 2x2 2.5 GHz, 75 Ω
45-720A	6 U, 16x16 250 MHz, 50 Ω/75 Ω - Y Loop-Thru
Alternative LXI Ethernet Controlled RF Matrices:	
60-760	Single/Dual 24x8 25 MHz, 50 Ω
60-711	Single/Dual 24x8 25 MHz, 75 Ω
65-110A	Scalable 24x8 to 104x16 200 MHz, 50 Ω

Supported by *eBIRST*

This module is supported by *eBIRST* test tools. These simplify switching fault-finding by quickly testing the system and graphically identifying the faulty relay.

For more information go to: pickeringtest.com/ebirst

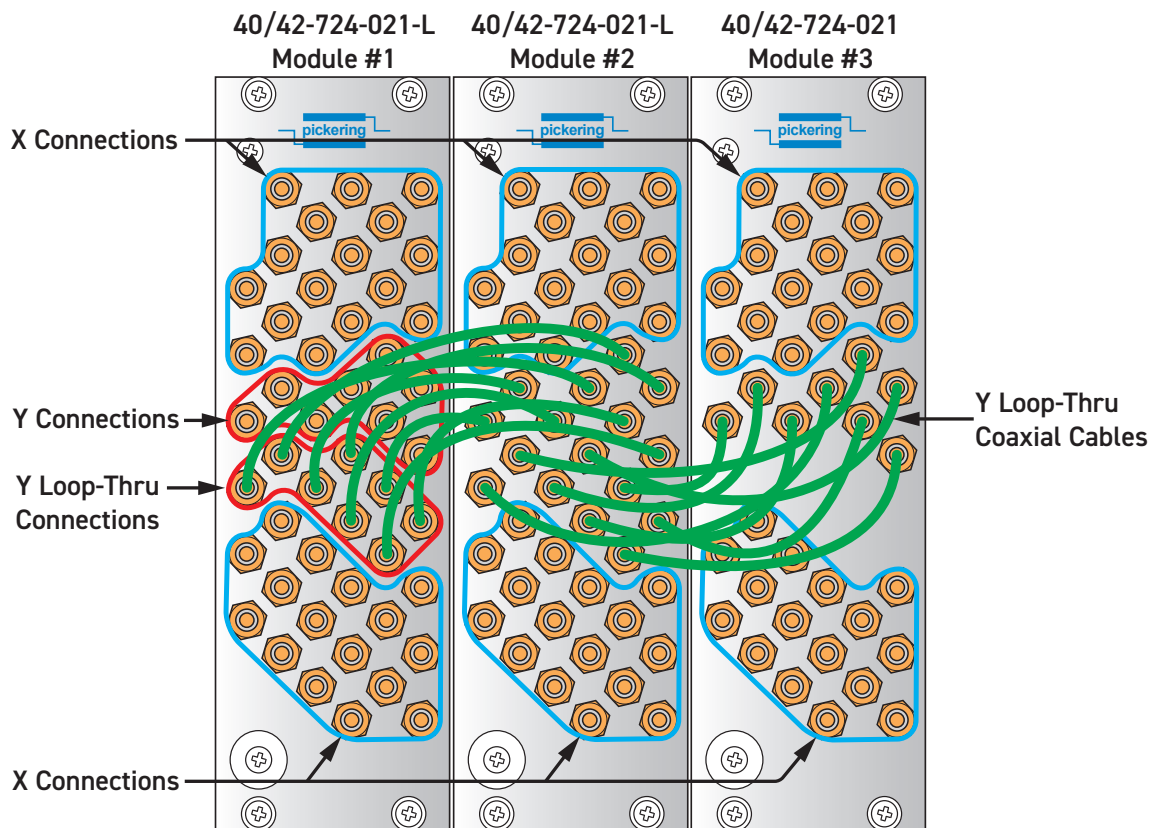
Y Axis Loop-Thru

The easy to use loop-thru option allows 40/42-724 modules to be cascaded to form larger matrices whilst minimizing impact on RF performance.

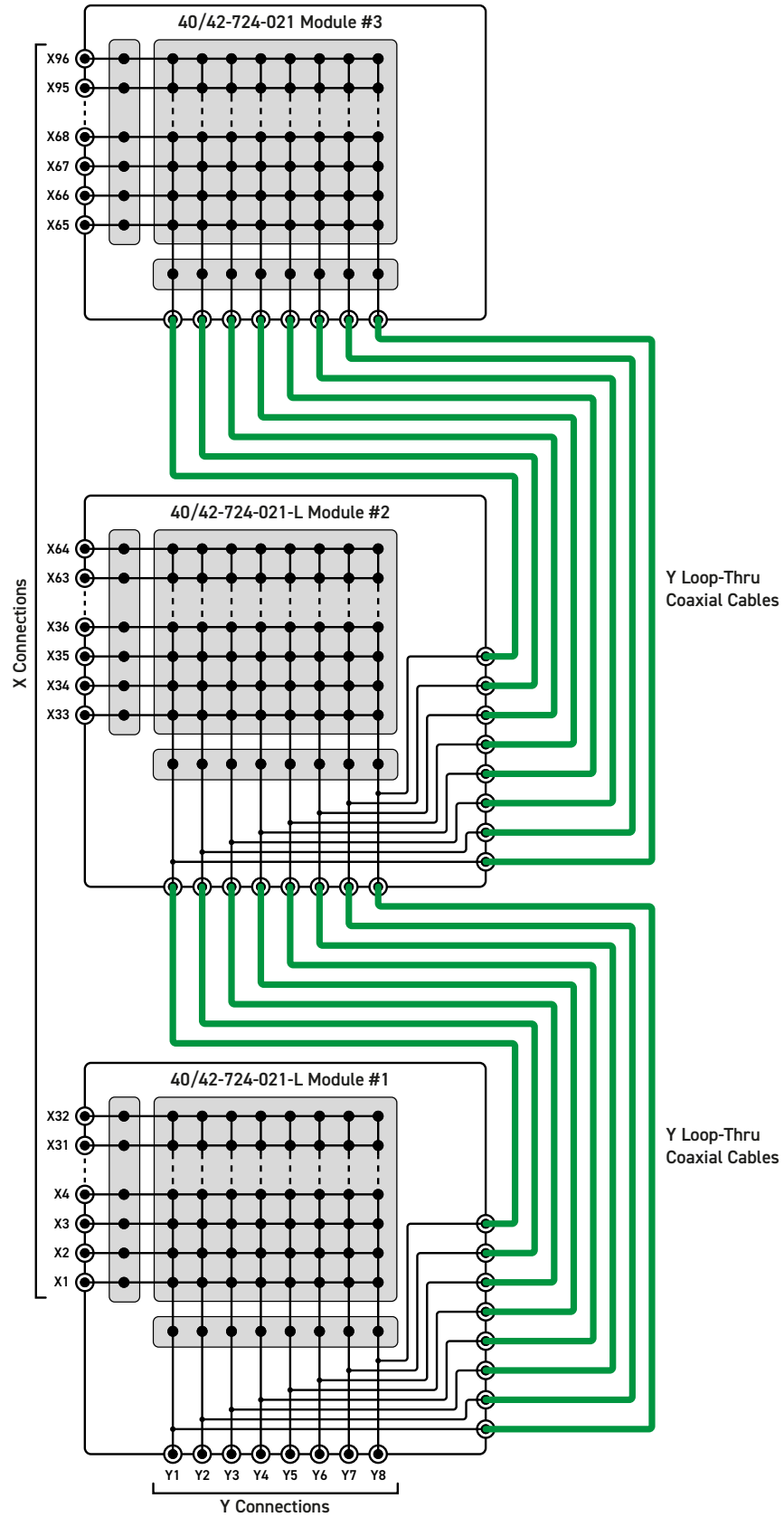
The 40/42-724-021-L version of the module has Y loop-thru connectors on the front panel which are simply plugged into the Y connectors of the adjacent matrix module via SMB to SMB coaxial cables.

The loop thru system is designed to provide an extended connection from Y to X. Connections between X signals on different modules is possible but will result in a reduction in the useable bandwidth.

The inter-module front panel wiring for an example 96x8 matrix is shown below and the switching diagram is show overleaf.

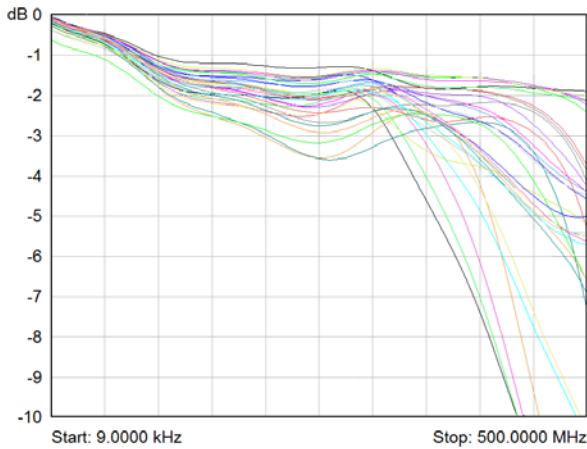


**96x8 RF Matrix Created from 2-off 40/42-724-021-L and 1-off 40/42-724-021
(Loop-thru cables interconnect the Y-buses of each 32x8 matrix module)**

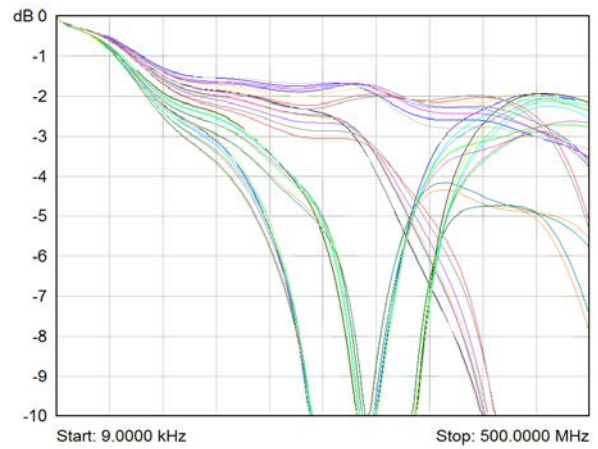


2 off 40-724-021-L and 1 off 40-724-021 32x8 RF Matrix Modules Interconnected as a 96x8 Matrix

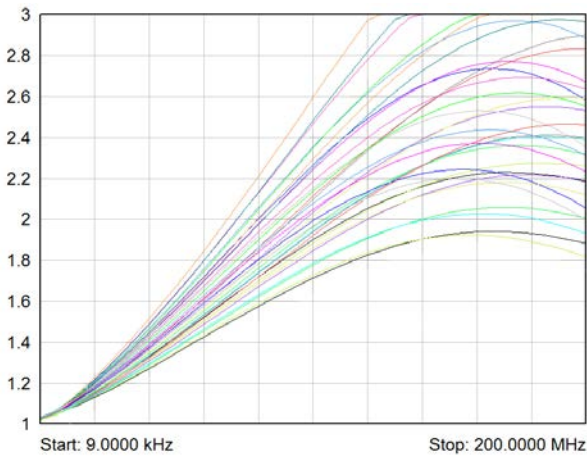
RF Performance Plots for 40/42-724 RF Matrix Module



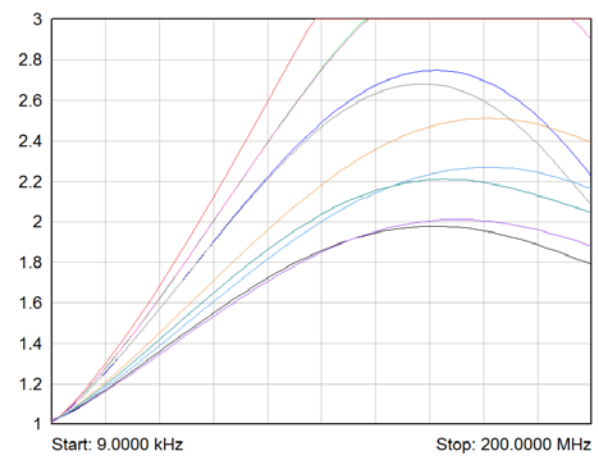
40/42-724-0xx Insertion Loss For X to Y Signal Paths



40/42-724-0xx-L Insertion Loss For X to Y Signal Paths



40/42-724-0xx VSWR For X to Y Signal Paths



40/42-724-0xx-L VSWR For X to Y Signal Paths

Relay Type

The 40/42-724 is fitted with ruthenium sputtered reed relays. A spare reed relay is built onto the daughter board to allow easy maintenance with minimum downtime. All reed relays are manufactured by our Relay Division:

pickeringrelay.com

General Matrix Switching Specification

Maximum Switch Voltage:	100 V
Maximum Switch Current:	0.5 A
Maximum Switch Power:	10 W
Characteristic Impedance:	50 Ω
On Path Resistance:	<1000 mΩ
Off Path Resistance:	>10 ⁸ Ω
Expected Life - Matrix:	1x10 ⁹ operations
Expected Life - Loop-Thru:	1x10 ⁷ operations
Operate Time:	<1 ms, 0.5 ms typical
Release Time:	<1 ms, 0.5 ms typical

RF Specification - 40/42-724-0xx

Maximum Frequency:	Usable to 300 MHz	
Insertion Loss (typical) †:	300 MHz	<3 dB
VSWR (typical) †:	<2.5:1 to 150 MHz	
Crosstalk (typical) †:	10 MHz:	-60 dB
	100 MHz:	-40 dB
	300 MHz:	-30 dB
Isolation (typical):	10 MHz:	100 dB
	100 MHz:	80 dB
	300 MHz:	70 dB

Loop Thru RF Specification - 40/42-724-0xx-L

Maximum Frequency:	Usable to 150 MHz *	
Insertion Loss (typical):	100 MHz:	<3 dB
VSWR (typical):	<2.5:1 to 100 MHz	
Crosstalk (typical):	10 MHz:	-60 dB
	100 MHz:	-40 dB
Isolation (typical):	10 MHz:	100 dB
	100 MHz:	80 dB

† RF performance is entirely dependant upon the combination of crosspoints selected, the figures shown are for one selected crosspoint on any X or Y channel only. For further assistance on getting maximum performance from the 40/42-724 please refer to the operating manual.

* The lower RF performance of the 40/42-724-0xx-L versions is due to the loop-thru connections not having isolation switching.

Power Requirements - 40-724

+3.3 V	+5 V	+12 V	-12 V
65 mA	1.8 A	0	0

Power Requirements - 42-724

+3.3 V	+12 V
65 mA	900 mA

Mechanical Characteristics

40-724 - Dual slot 3U PXI (CompactPCI card).

42-724 - Dual slot 3U PXIe, compatible with PXIe hybrid slot.

Module weight: 580 g (fully populated 32x8 with loop-thru)

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

Connectors

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

Signals via front mounted SMB coaxial panel connectors:

Operating/Storage Conditions

Operating Conditions

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

Storage and Transport Conditions

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

PXI & CompactPCI Compliance - 40-724

The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus & Star Trigger are not implemented. Uses a 33 MHz 32-bit backplane interface.

PXIe Compliance - 42-724

The module is compliant with the PXIe Specification 1.0. Local Bus, Trigger Bus & Star Trigger are not implemented.

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 32x8 RF Coaxial Matrix:		
SMB, 50Ω		40-724-021
SMB, 50Ω with loop-thru on Y axis		40-724-021-L
PXI 32x4 RF Coaxial Matrix:		
SMB, 50Ω		40-724-022
SMB, 50Ω with loop-thru on Y axis		40-724-022-L
PXI 16x8 RF Coaxial Matrix:		
SMB, 50Ω		40-724-011
SMB, 50Ω with loop-thru on Y axis		40-724-011-L
PXI 16x4 RF Coaxial Matrix:		
SMB, 50Ω		40-724-012
SMB, 50Ω with loop-thru on Y axis		40-724-012-L
PXIe 32x8 RF Coaxial Matrix:		
SMB, 50Ω		42-724-021
SMB, 50Ω with loop-thru on Y axis		42-724-021-L
PXIe 32x4 RF Coaxial Matrix:		
SMB, 50Ω		42-724-022
SMB, 50Ω with loop-thru on Y axis		42-724-022-L
PXIe 16x8 RF Coaxial Matrix:		
SMB, 50Ω		42-724-011
SMB, 50Ω with loop-thru on Y axis		42-724-011-L
PXIe 16x4 RF Coaxial Matrix:		
SMB, 50Ω		42-724-012
SMB, 50Ω with loop-thru on Y axis		42-724-012-L

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.

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

eBIRST Switching System Test Tool

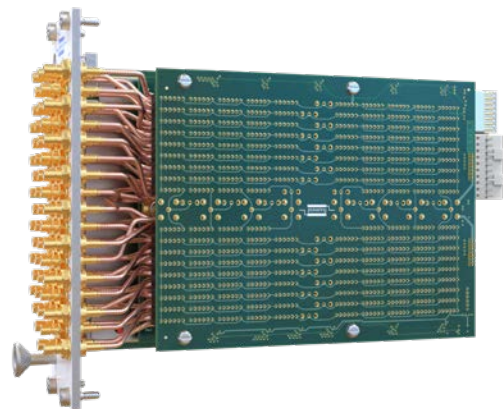
40/42-724 is supported by the eBIRST test tools which simplify the identification of failed relays, the required eBIRST tools are below. For more information go to:

pickeringtest.com/ebirst

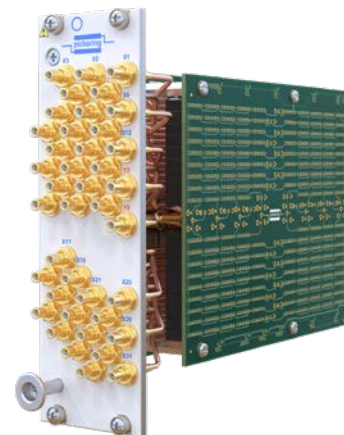
Product	Test Tool	Adaptor
40/42-724-0xx	93-002-001	93-002-202
40/42-724-0xx-L	93-002-001	93-002-202

Mating Connectors & Cabling

For connection accessories for the 40/42-724 modules 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.



42-724-021-L PXIe 32x8 Matrix With Loop-Thru



40/42-724-021 32x8 Matrix Without Loop-Thru

Chassis Compatibility

The PXI versions of this module must be used in a suitable chassis. They are compatible with the following chassis types:

- All chassis conforming to the 3U PXI and 3U Compact PCI (cPCI) specification
- Legacy and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis
- Pickering Interfaces LXI or LXI/USB Modular Chassis

The PXIe versions of this module are compatible with the following chassis types:

- All chassis conforming to the 3U PXIe specification
- PXIe and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis

Chassis Selection Guide

Standard PXI or hybrid PXIe Chassis from any Vendor:

- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization



Pickering LXI or LXI/USB Modular Chassis—only accept our 1000+ PXI Switching & Simulation Modules:

- Ethernet or USB control enables remote operation
- Low-cost control from practically any controller
- LXI provides manual control via Web browsers
- Driverless software support
- Power sequencing immunity
- Ethernet provides chassis/controller voltage isolation
- Independence from Windows operating system



Connectivity Solutions

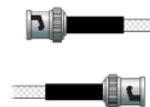
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed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

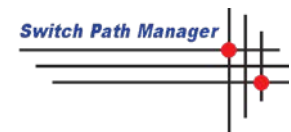
- **Pickering Interfaces Switch Path Manager**
- **National Instruments** products (LabVIEW, LabWindows/CVI, Switch Executive, MAX, TestStand, VeriStand, etc.)
- **Microsoft Visual Studio** products (Visual Basic, Visual C+)
- **Keysight** VEE and OpenTAP
- **Mathworks** Matlab
- **Marvin** ATEasy
- **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