PXI Very High Density Multiplexer 40-615

- Very High Density Multi-Banked Multiplexer
- Choice of 20, 10, 5, 4, 2 or 1 Multiplexers Per Module
- Up to 168 Switch Points Available with 1 or 2-Pole Switching Formats
- Uses High Reliability Pickering Reed Relays
- Fast Operating Speed <500 µs
- Switch up to 150 VDC/100 VAC, 1.0 A with 20 W Max Power
- Versions Available With Automatic Isolation Switches To Reduce Capacitive Loading in Large Systems
- Drivers Supplied for Windows & Linux, Plus Support for Real-time Systems
- Supported by PXI or LXI Chassis
- Supported by *eBIRST*™
- 3 Year Warranty

The 40-615 series of high density multiplexer modules feature a wide range of switching configurations (refer to schematics overleaf). It is especially useful where a large number of small multiplexers are required. Typical applications include signal routing in ATE and data acquisition systems. User connections are made via a front panel 200-pin connector.

The majority of 40-615 models (see order codes) allow multiple channels to be simultaneously selected. Alternatively, product variants can be supplied that operate as a conventional multiplexer with break-before-make action when a new channel is selected.

Note: The multiple channel selection option is not available for the 40-615-022 single pole versions of the multiplexer.

The 40-615-022 single pole high density versions include automatic isolation switching. This connects only the currently active multiplexer bank to the common terminal, keeping capacitive loading and leakage current to a minimum in large multiplexer systems. Larger multiplexers may be constructed by daisy chaining the common signals from multiple modules.

The 40-615 is part of a family of high density PXI multiplexer modules all sharing similar architecture and the same 200-pin connector, other members include the 40-610 and 40-670A High Density Multiplexer series.

Available multiplexer formats
20 Banks, 8 Channels, 1-Pole 20 Banks, 4 Channels, 2-Pole
10 Banks, 16 Channels, 1-Pole 10 Banks, 8 Channels, 2-Pole
5 Banks, 32 Channels, 1-Pole 5 Banks, 16 Channels, 2-Pole
4 Banks, 40 Channels, 1-Pole 4 Banks, 20 Channels, 2-Pole
2 Banks, 80 Channels, 1-Pole 2 Banks, 40 Channels, 2-Pole
1 Bank, 160 Channels, 1-Pole 1 Bank, 80 Channels, 2-Pole
6 Lower Density Versions Custom Sizes (100s of combinations)

Supported by *eBIRST*

These test tools simplify fault-finding by quickly testing the system and graphically identifying the faulty relay.
For more information go to: pickeringtest.com/ebirst

Front Panel Connector

This product is based on the obsolete Molex LFH series connector that has been superseded by a Pickering commissioned form, fit, function equivalent. The new connector series is 100% compatible with the Molex connectors allowing either gender of Pickering connector to mate with the corresponding Molex part without issue.

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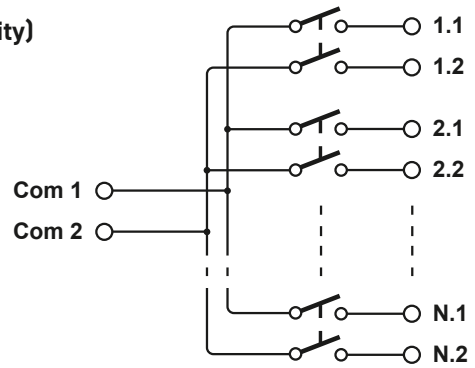
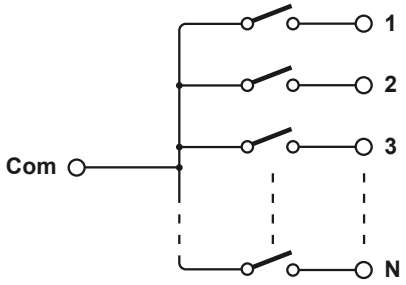
- 20 Banks of 4 Channels
- 10 Banks of 8 Channels
- 5 Banks of 16 Channels
- 4 Bank of 20 Channels
- 2 Banks of 40 Channels
- 1 Bank of 80 Channels
- Custom Configurations

2-Pole MUX Mode (high density) – Available Configurations



- 20 Banks of 4 Channels
- 10 Banks of 8 Channels
- 5 Banks of 16 Channels
- 4 Banks of 20 Channels
- 2 Banks of 40 Channels
- 1 Bank of 80 Channels
- Custom Configurations

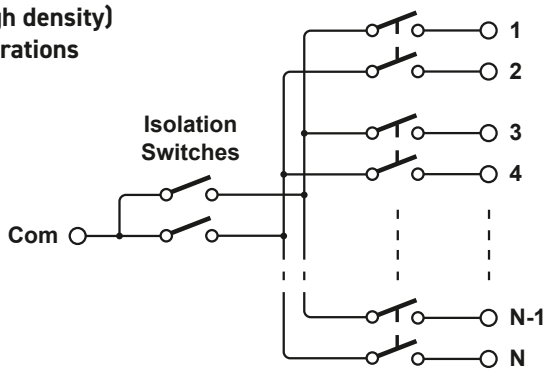
1-Pole MUX Mode (low density) – Available Configurations

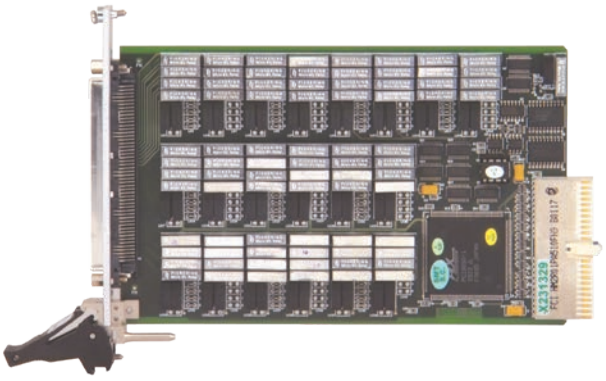


- 20 Banks of 8 Channels
- 10 Banks of 16 Channels
- 5 Banks of 32 Channels
- 4 Banks of 40 Channels
- 2 Banks of 80 Channels
- 1 Bank of 160 Channels
- Custom Configurations

Note: Multi-channel selection not available in this mode

1-Pole MUX Mode (high density) – Available Configurations





PCB Layout for the 40-615 Very High Density Multiplexer Module

Relay Type

The 40-615 is fitted with ruthenium sputtered reed relays, these offer very long life with good low level switching performance and excellent contact resistance stability. Spare reed relays are built onto the circuit board to allow easy maintenance with minimum downtime.

All reed relays are manufactured by our Relay Division: pickeringrelay.com

Switching Specification

Switch Type:	Ruthenium Reed
Max Switch Voltage:	150 VDC/100 VAC*
Max Power:	20 W
Max Switch Current:	1.0 A
Max Carry Current:	1.2 A
Initial On Path Resistance (Single Module):	<1 Ω
Off Path Resistance (Single Module):	>10^9 Ω
Bandwidth (3 dB, 1 module)	>5 MHz †
Operate Time:	1 ms typical, 500 µs for multichannel mode
Expected Life, low power load:	1x10^9 operations
Expected Life, full power load:	>1x10^6 operations

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

† Bandwidth is configuration dependent (please consult sales office for further information).

Power Requirements

+3.3 V	+5 V	+12 V	-12 V
0	1350 mA (typ 280 mA)	0	0

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).
Module weight: 240 g (40-615-022).
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 panel 200-pin female LFH* connector, for pin outs please refer to the operating manual.

* LFH relates to the obsolete Molex connector series and is retained for continuity, products will be fitted with a form, fit, function Pickering equivalent connector that is intermateable with the original Molex parts.

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

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 - High Density MUX Configurations

Channel Selection	Model Variant	Order Code
Multiple	**20 Bank, 4 Channel, 2-Pole**	**40-615-022-20/4/2**
Multiple	**10 Bank, 8 Channel, 2-Pole**	**40-615-022-10/8/2**
Multiple	**4 Bank, 20 Channel, 2-Pole**	**40-615-022-4/20/2**

Note: Contact factory if the above modules are required in single channel selection mode.

Single	**20 Bank, 8 Channel, 1-Pole**	**40-615-022-20/8/1**
Single	**10 Bank, 16 Channel, 1-Pole**	**40-615-022-10/16/1**
Single	**5 Bank, 32 Channel, 1-Pole**	**40-615-022-5/32/1**
Single	**4 Bank, 40 Channel, 1-Pole**	**40-615-022-4/40/1**
Single	**2 Bank, 80 Channel, 1-Pole**	**40-615-022-2/80/1**
Single	**1 Bank, 160 Channel, 1-Pole**	**40-615-022-1/160/1**

Note: The above modules can only select a single channel.

Single	**5 Bank, 16 Channel, 2-Pole**	**40-615-022-5/16/2**
Single	**2 Bank, 40 Channel, 2-Pole**	**40-615-022-2/40/2**
Single	**1 Bank, 80 Channel, 2-Pole**	**40-615-022-1/80/2**

Note: The above modules are available to select a single channel.

Product Order Codes - Low Density MUX Configurations

Channel Selection	Model Variant	Order Code
Multiple	**20 Bank, 4 Channel, 1-Pole**	**40-615-021-20/4/1**
Multiple	**10 Bank, 8 Channel, 1-Pole**	**40-615-021-10/8/1**
Multiple	**5 Bank, 16 Channel, 1-Pole**	**40-615-021-5/16/1**
Multiple	**4 Bank, 20 Channel, 1-Pole**	**40-615-021-4/20/1**
Multiple	**2 Bank, 40 Channel, 1-Pole**	**40-615-021-2/40/1**

Note: Contact factory if the above modules are required in single channel selection mode.

Single	**1 Bank, 80 Channel, 1-Pole**	**40-615-021-1/80/1**

Note: The above module is available to select a single channel.

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 reed relay types
- Mixture of reed 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

eBIRST Switching System Test Tool

This product 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
40-615	**93-002-001**	**Not Required**

Spare Relay Kits

Kits of replacement relays are available for the majority of Pickering's PXI switching products, simplifying servicing and reducing down-time.

Product	Relay Kit
40-615-022	**91-100-008 & 91-100-015**
40-615-021	**91-100-003 & 91-100-015**

For further assistance, please contact your local Pickering sales office.

Mating Connectors & Cabling

For connection accessories for the 40-615 series please refer to the 90-002D 200-pin LFH Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

Pickering can supply mating 200-pin connectors and cable assemblies to enable easy integration of the 40-615 series of multiplexer modules

Chassis Compatibility

This PXI module must be used in a suitable chassis. It is 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

Chassis Selection Guide

Standard PXI or hybrid PXIe Chassis from any Vendor:

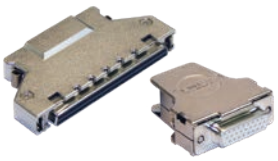
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

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

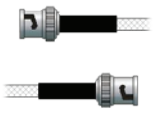
Connectivity Solutions

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

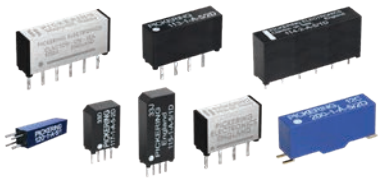
We also offer customized cabling and have a free online **Cable Design Tool** that can be used to create custom cable solutions for many applications. Visit: pickeringtest.com/cdt to start your design.

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

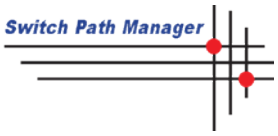
Pickering provide kernel, IVI and VISA (NI & Keysight) drivers which are compatible with all Microsoft supported versions of Windows and popular older versions. For a list of all supporting operating systems, please see: pickeringtest.com/os

The VISA driver 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
- **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

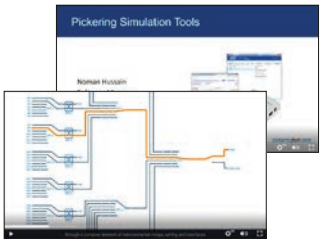
eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
To learn more, please go to: pickeringtest.com/ebirst

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 also have 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