PXI Solid State Versatile Multiplexer 40-682

- Versatile Solid State Multiplexer
- Configurable Architecture
- Functionally Equivalent to 40-612
- 250 mA Hot or Cold Switching
- 40 V Switching
- Fast Switch Operation and Long Service Life
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Supported by ***eBIRST*** ™
- 3 Year Warranty

The 40-682 Very High Density Versatile Multiplexer module features a wide range of selectable switching configurations. It is especially useful where a high density multiplexer is required that can be adapted to different configurations for different test targets, or where a test system may have to be reconfigured in the future. The 40-682 uses high performance solid state switching with a service life of greater than 10 years and fast operation.

MUX Configurations

The module can be set in software to a large number of different multiplexer configurations. Switches allow the multiplexer banks to be set in 1 or 2-pole mode and inter-bank switching enables the channel count to be increased up to a maximum of 128 (refer to schematic diagram overleaf).

Typical Configurations:
8-Banks, 16-Channel, 1-Pole 8-Banks, 8-Channel, 2-Pole
4-Banks, 32-Channel, 1-Pole 4-Banks, 16-Channel, 2-Pole
2-Banks, 64-Channel, 1-Pole 2-Banks, 32-Channel, 2-Pole
1-Bank, 128-Channel, 1-Pole 1-Bank, 64-Channel, 2-Pole

The versatility of the 40-682's architecture allows all multiplexer banks to be inter-linked and common connections used as extra signal inputs.

The 40-682 may be operated as a conventional multiplexer with break-before-make action when a new channel is selected. For 2-pole configurations multiple channels can be simultaneously selected without restriction, for 1-pole configurations the channels that can be simultaneously selected are limited by the use of 2-pole switching.

Pickering's Range of Versatile Multiplexer Modules with the same switching architecture				
Model No.	**Max Voltage**	**Max Current**	**Operate Time**	**Relay Type**
40-612	300 VDC/ 250 VAC	2 A	3 ms	Electro-mechanical
40-681	±60 V	350 mA	200 µs	Solid State
40-682	±40 V	250 mA	80 µs	Solid State
40-683	±100 V	125 mA	500 µs	Solid State

Isolation Switching connects only the currently active multiplexer bank to the analog common, keeping capacitive loading and leakage current in large multiplexer systems to a minimum. Larger multiplexers may be constructed by daisy chaining the common signals from multiple modules.

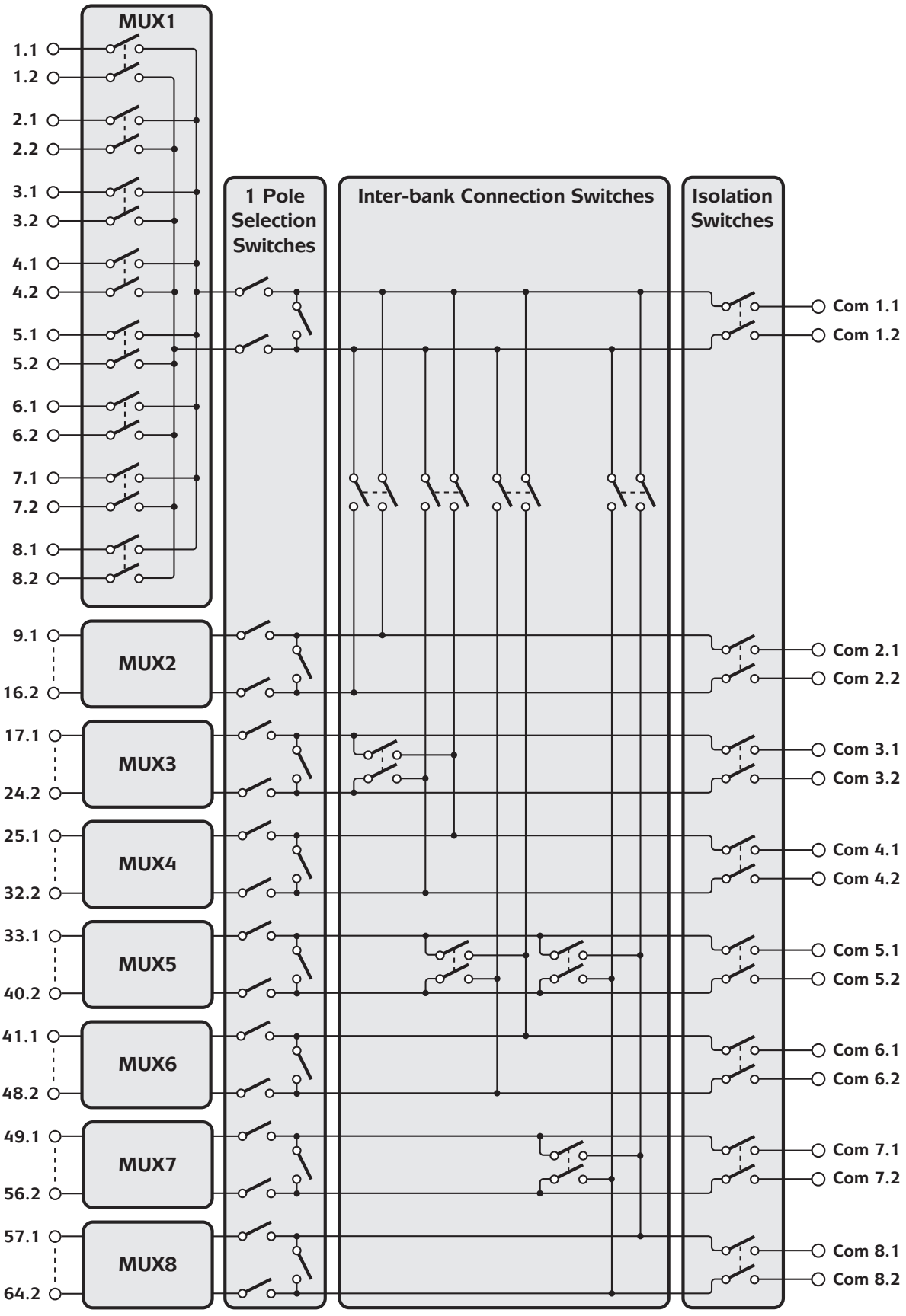
Pickering Interfaces is able to offer PXI solid state switching solutions in a variety of configurations. If you have a different requirement contact your local sales office for a quotation.

Supported by *eBIRST*

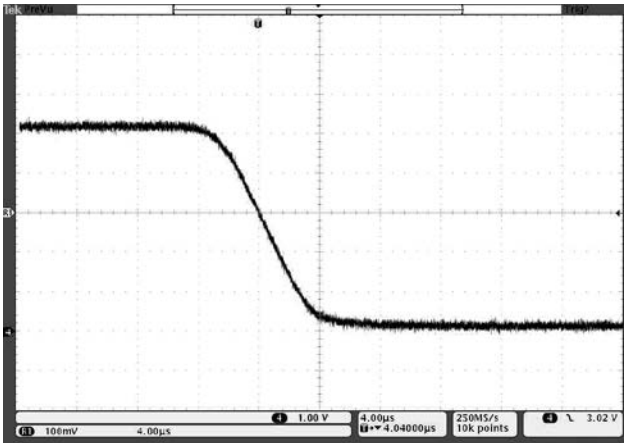
eBIRST test tools simplify fault-finding by quickly testing the system and graphically identifying the faulty relay.

For more information go to: pickeringtest.com/ebirst

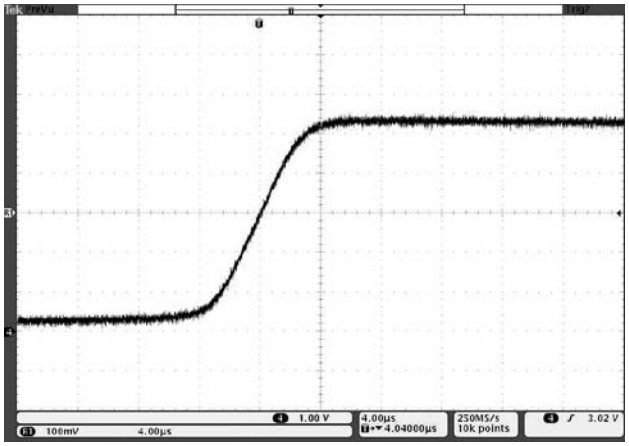
ISSUE 6.1 NOV 2021



Functional Diagram of 40-682 Solid State Versatile Multiplexer

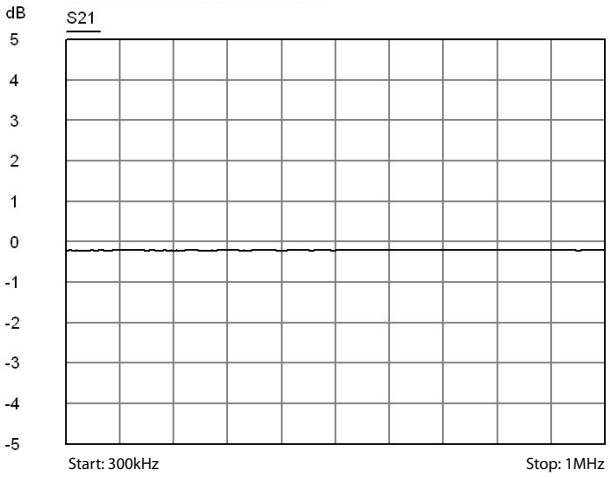


Turn On Characteristics of 40-682
(4µs/division horizontal, 40 µs span)

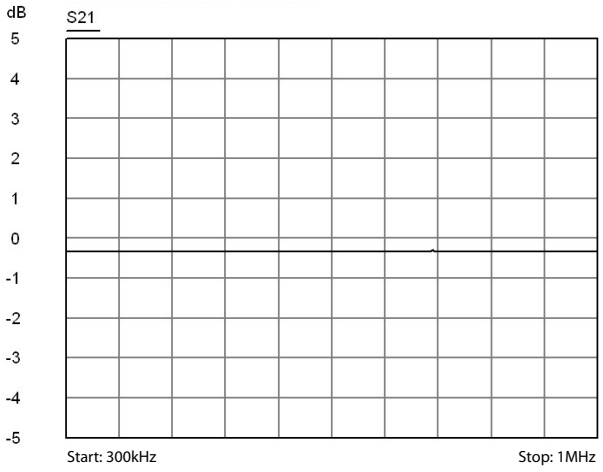


Turn Off Characteristics of 40-682
(4µs/division horizontal, 40 µs span)

Note: Switching measurements were taken by switching a 5.2 V signal to ground via a 51 Ω load resistor, the response shown is measured across the switching element.



Insertion Loss Plot for 40-682 with 3 switches in path
(between C1.1 and 1.1)



Insertion Loss Plot for 40-682 with 5 switches in path
(between 1.1 and 1.2)

Isolation Plot for 40-682 with 3 switches in path
(between C1.1 and 1.1 with one switch open)

Isolation Plot for 40-682 with 5 switches in path
(between 1.1 and 1.2 with one switch open)

Note: Isolation response can be improved further by turning off more than one switch in the signal path.

Relay Type

The 40-682 is fitted with Solid State Switches.

Switching Specification

Switch Type:	Solid State Switch
Max Switch Voltage:	±40 V*†
Max Switch Current:	250 mA continuous 750 mA for 100 ms
Path Resistance - On:	3.2 Ω typical, input to common
Switch Leakage Capacitance:	13 pF typical, input to output voltage at 0 V
Leakage Current (off state):	<10 nA at 40 V
Switching Time:	80 µs typical
Switch Rise/Fall Time:	<20 µs, no bounce
Multiplexer Bandwidth:	1 MHz

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

† Differential voltage between channels must not exceed rated voltage, additional caution should be used when applying AC voltages as multiple asynchronous supplies can create high differential voltages between channels.

Power Requirements

+3.3 V	+5 V	+12 V	-12 V
0	1.06 A (typ 280 mA)	0	0

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).
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 160-pin male DIN 41612 connector, for pin outs please refer to the operating manual.

We recommend that Pickering mating connectors are used with this module which are designed to ensure there are no mechanical interference problems when used in a PXI chassis.

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

Channel Selection	Model Variant	Order Code
Multiple	**Solid State Versatile MUX**	**40-682-002**

Note: The above module is available to select multiple channels.

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.

Support Products

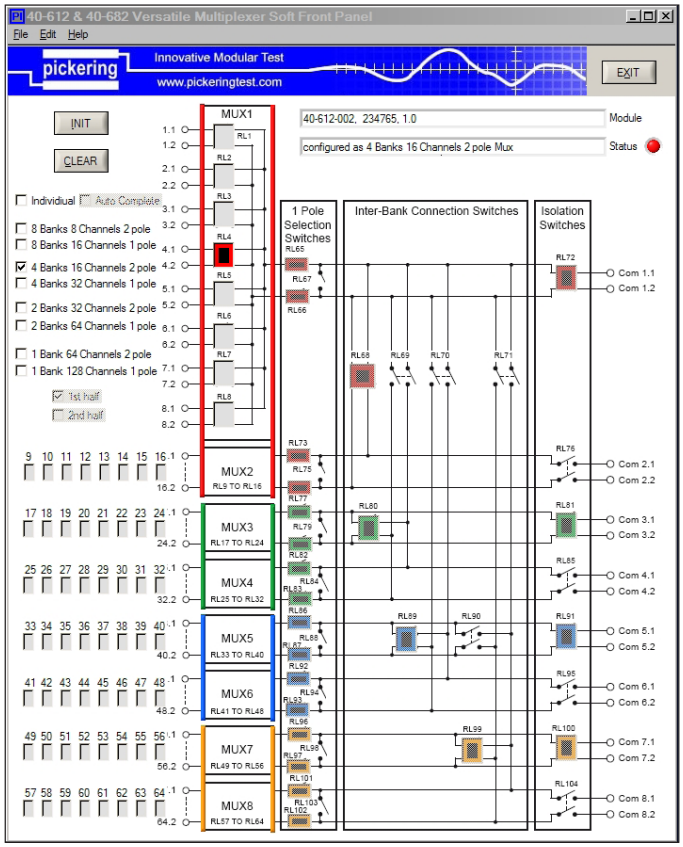
eBIRST Switching System Test Tool

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
40-682	**93-002-001**	**93-002-410**

Mating Connectors & Cabling

For connection accessories for the 40-682 module please refer to the 90-001D 160-pin DIN 41612 Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.



Soft Front Panel for the 40-612, 40-681, 40-682 and 40-683 Very High Density Versatile Multiplexers

Soft Front Panel For The Versatile MUX

The Versatile Multiplexer Soft Front Panel for the 40-612-002, 40-681-001, 40-682-002 and 40-683-001 allows easy setting of various configurations from 8-bank 8-channels 2-pole multiplexers, up to 1-bank 128-channels 1-pole multiplexers as well as individual relay control for custom configurations. The schematic in the background of the SFP simplifies understanding of the selected topology. During configuration setting, all relay control information is logged in a text file which can be re-used in a programming environment.

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:

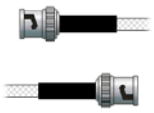
- Ethernet or USB control enables remote operation
- Low-cost control from practically any controller
- LXI provides manual control via Web browsers
- Driverless software support
- Power sequencing immunity
- Ethernet provides chassis/controller voltage isolation
- Independence from Windows operating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

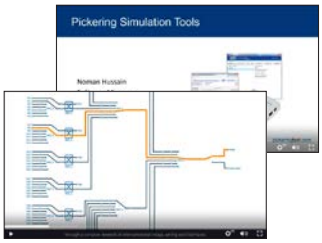
eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
To learn more, please go to: pickeringtest.com/ebirst

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