

- High Density 1-Pole Power Multiplexer in 1-Bank 48-Channel, 2-Bank 24-Channel, 4-Bank 11-Channel & 8-Bank 5-Channel Formats
- 5A Current Rating With 150W/1250VA Maximum Power
- Switch up to 110VDC/250VAC
- High Quality Electro-mechanical Relays
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- 3 Year Warranty



The 40-651 is a high density power multiplexer module suitable for switching inductive/capacitive loads up to 5A at 250VAC. It is available in 1-bank 48-channel, 2-bank 24-channel, 4-bank 11-channel or 8-bank 5-channel 1-pole multiplexer formats. Power multiplexers are suitable for switching heavy AC or DC loads or for slave switching large external relays, contactors and solenoids.

The 40-651 allows 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.

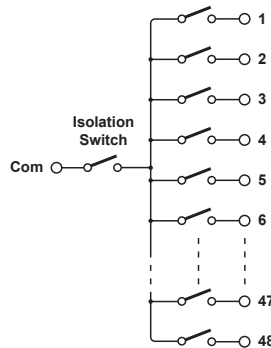
Isolation switching

Models 40-651-001 to 004 and 011 to 014 have automatic isolation switching. Models 40-651-101/102/111/112 have independent isolation switching, improving speed for scanning applications.

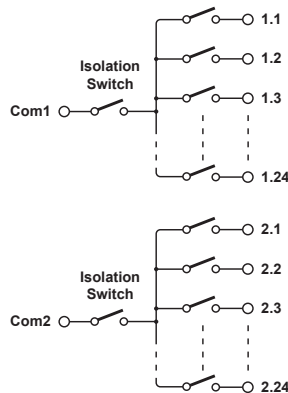
Isolated Common Lines

The 40-651 is available in versions with all the user signals on a single 50-pin D-type connector. Alternatively, dual connector versions are available with common signals on a 9-pin D-type and multiplexer channels on a 50-pin D-type, making it simpler to separate inputs and outputs.

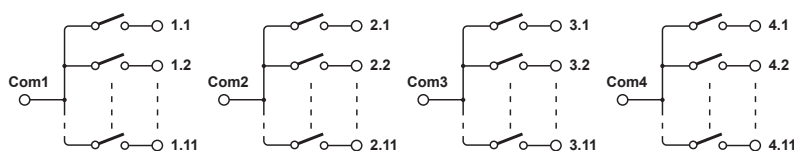
Larger multiplexers can be created by daisy-chaining the common connections from multiple modules. Isolation switching on 48 and 24 channel versions helps minimize capacitive loading and leakage current in large switching systems by switching unused multiplexers out of circuit.



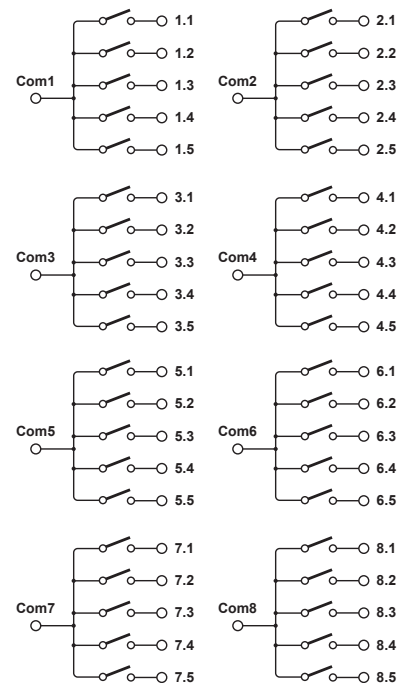
40-651-001/101/011/111 1-Bank, 48-Channel, 1-Pole Power MUX



40-651-002/102/012/112 2-Bank, 24-Channel, 1-Pole Power MUX



40-651-003/013 4-Bank, 11-Channel, 1-Pole Power MUX



40-651-004/014 8-Bank, 5-Channel, 1-Pole Power MUX

Relay Type

The 40-651 is fitted with electro-mechanical power relays with gold clad silver alloy contacts. A spare relay is included with the module to allow easy maintenance with minimum down time.

Switching Specification

Contact Type:	Gold Clad Silver Nickel
Nominal Switching Capacity:	5A @ 30VDC 5A @ 250VAC
Max Switching Power: †	150W, 1250VA*
Max Switching Voltage:	110VDC, 250VAC*
Max Standoff Voltage:	400VDC
Max Continuous Switching Current:	5A
Min Switching Capacity:	10mA, 5VDC
Typical Pulse Capability:	Cold Switch 10A for 100ms under low duty cycle conditions (please contact sales office for further advice).
Maximum Continuous Total Switch Path Loading: ‡	16W (Example allowed condition - 6 Banks at 5A, please contact sales office for further advice).
Initial On Path Resistance:	<200mΩ (100mΩ typical)
Off Path Resistance:	>10 ⁹ Ω
Thermal Offset:	10μV (maximum)
Bandwidth:	>5MHz
Typical Operate Time:	21ms typical, 10.5ms for multichannel mode
Expected Life (operations)	
Low power load:	>2x10 ⁷
Full power load (resistive):	>5x10 ⁴ (5A 30VDC, 5A 250VAC) >1x10 ⁵ (3A 30VDC, 3A 250VAC)

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

† For variation of maximum hot switching capacity of voltage with current refer to plot.

‡ No loading restrictions when using Pickering 40-922/923A PXI & 60-102B/103B LXI chassis' (under initial path resistance conditions), please contact sales office for details.

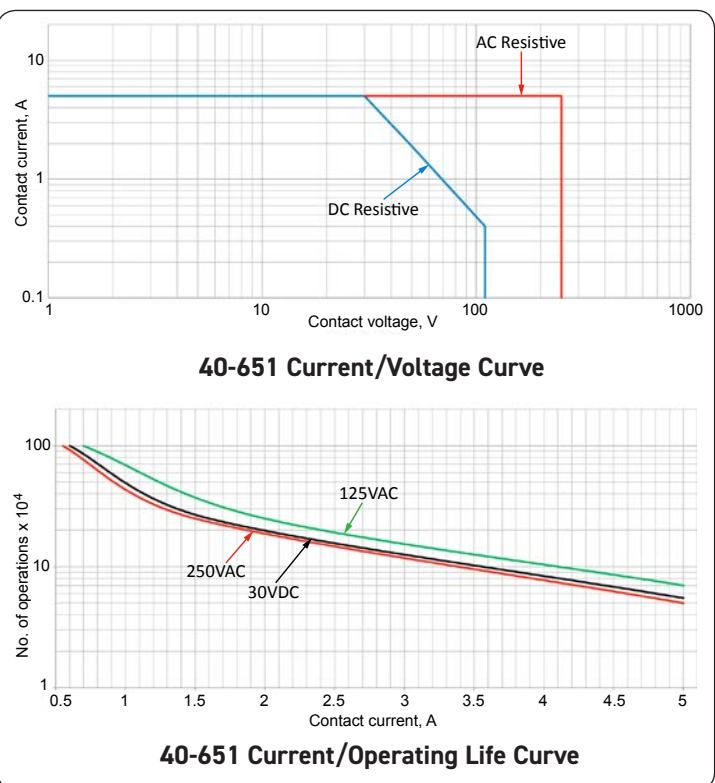
Power Requirements

+3.3V	+5V	+12V	-12V
0	1.17A	0	0

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).

Note: Isolated COM versions are not fitted with a PXI handle.
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 50-pin male D-type connector.

For isolated COM versions, the common connections are via a 9-pin male D-type connector. For pin outs please refer to the operating manual.

Operating/Storage Conditions

Operating Conditions

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

Storage and Transport Conditions

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

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 33MHz 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
5A Power EMR MUX:		
Multiple	1-Bank, 48-Channel, 1-Pole	40-651-001
Multiple	2-Bank, 24-Channel, 1-Pole	40-651-002
Multiple	4-Bank, 11-Channel, 1-Pole	40-651-003
Multiple	8-Bank, 5-Channel, 1-Pole	40-651-004

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

Channel Selection	Model Variant	Order Code
5A Power EMR MUX with independent Isolation Switching (Improving speed for scanning applications):		
Multiple	1-Bank, 48-Channel, 1-Pole	40-651-101
Multiple	2-Bank, 24-Channel, 1-Pole	40-651-102

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

Channel Selection	Model Variant	Order Code
5A Power EMR MUX with Isolated COM Access:		
Multiple	1-Bank, 48-Channel, 1-Pole	40-651-011
Multiple	2-Bank, 24-Channel, 1-Pole	40-651-012
Multiple	4-Bank, 11-Channel, 1-Pole	40-651-013
Multiple	8-Bank, 5-Channel, 1-Pole	40-651-014

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

Channel Selection	Model Variant	Order Code
5A Power EMR MUX with Isolated COM Access & Independent Isolation Switching (Improving speed for scanning applications):		
Multiple	1-Bank, 48-Channel, 1-Pole	40-651-111
Multiple	2-Bank, 24-Channel, 1-Pole	40-651-112

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

Support Products

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
40-651	91-100-020 (Relay Kit 20)

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

Mating Connectors & Cabling

For connection accessories for the 40-651 module please refer to the [90-005D](#) 50-pin D-type and [90-003D](#) 9-pin D-type Connector Accessories data sheets where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

Product Customization

Pickering PXI 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.

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



PXI

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

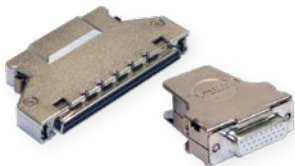
- Ethernet or USB control enables remote operation
- Low-cost control from practically any controller
- LXI provides manual control via Web browsers
- Driverless software support
- Power sequencing immunity
- Ethernet provides chassis/controller voltage isolation
- Independence from Windows operating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

LXI USB



Connectivity Solutions

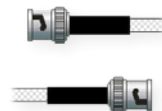
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed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



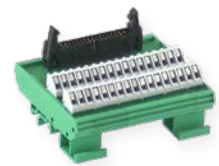
Connectors & Backshells



Multiwire 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.

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 sister company, Pickering Electronics. These instrument grade reed relays feature **SoftCenter®** technology, ensuring long service life and repeatable contact performance



Programming

Pickering provide kernel, IVI and VISA (NI & Keysight) drivers which are compatible with all Microsoft supported versions of Windows and popular older versions.

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**
- **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.

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.



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.



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.

Available Product Resources

We have a large library of product resources including success stories, product and support videos, articles, as well as complete product catalogs and product reference maps to assist when looking for the switching, simulation and cable and connector solutions you need. We have also published handy reference books for the PXI and LXI standards.

