- Versatile Module With Single & Dual Multiplexer Operation
- User Configurable as: 28 Channel, 56 Channel or 112 Channel
- 1, 2 & 4-Pole Switching Formats, User Selectable
- Easy Expansion
- Switch up to 100Volts, 1.2A
- Automatic Isolation Switches Reduce Capacitive Loading in Large Systems
- Single or Multiple Channel Operation
- One Module For All Your Multiplexer Needs!

Not Recommended for New Designs*

*Please contact Pickering for alternative PXI/LXI/USB solutions

The 10-640 Versatile High Density Multiplexer Modules feature high density with a wide range of user selectable switching configurations to suit many requirements. Typical applications include signal routing in ATE and data acquisition systems.

The 10-640 may be set to either single or dual mode operation, switching 1, 2 or 4-poles with up to 112 channels.

Connections are made via two 62-pin D-type connectors. Larger multiplexers may be constructed by cascading modules, with selected signals being routed to the Front panel connectors.

Built in Automatic Isolation Switching (see diagram overleaf) connects only the currently active multiplexer switch bank, thereby keeping capacitive loading and leakage currents in large multiplexer systems to a minimum.

The 10-640 multiplexer may be operated as a conventional multiplexer with break-before-make action enforced when a new channel is selected. In addition, multiple channels may be simultaneously selected, i.e. no break-before-make action (note multiple channel selection not available in 1-pole mode).

The 10-640 uses Ruthenium reed switches which are suitable for very low level signals, these feature extended life with low contact resistance and good contact resistance stability.

A **limiting resistor** can be fitted (see switching schematics), this may be very useful in preventing high current inrushes which may result in permanent damage to the reed switch.
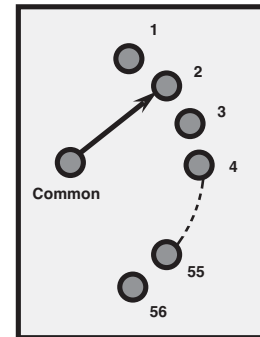
**10-640 Single Multiplexer Mode: 28, 56 or 112 Channels**
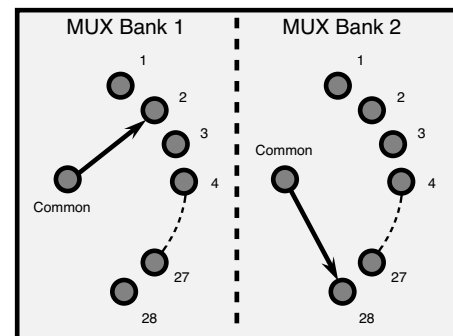
10-640 Dual Multiplexer Mode: 28 or 56 Channels

Overview

10-640 Versatile Multiplexer Configurations:

The 10-640 can be quickly user configured (using internal jumpers) to any of the following multiplexing modes:

Dual	28-Channel	2-Pole (default config.)
Dual	56-Channel	1-Pole
Single	28-Channel	4-Pole
Single	56-Channel	2-Pole
Single	112-Channel	1-Pole

10-640 Dual 56-Channel 1-Pole Multiplexer Mode

10-640 Dual 28-Channel 2-Pole Multiplexer Mode

10-640 Single 112-Channel 1-Pole Multiplexer Mode

10-640 Single 56-Channel 2-Pole Multiplexer Mode

10-640 Single 28-Channel 4-Pole Multiplexer Mode
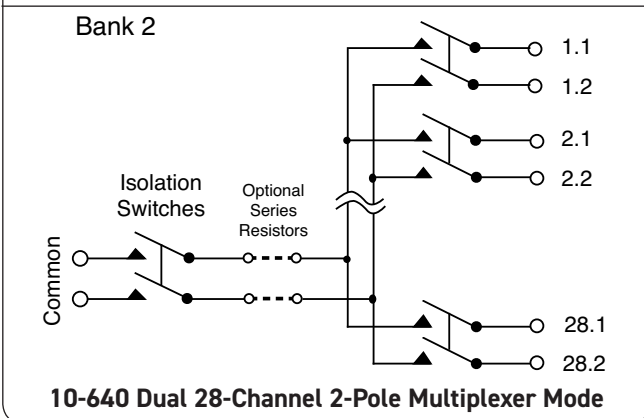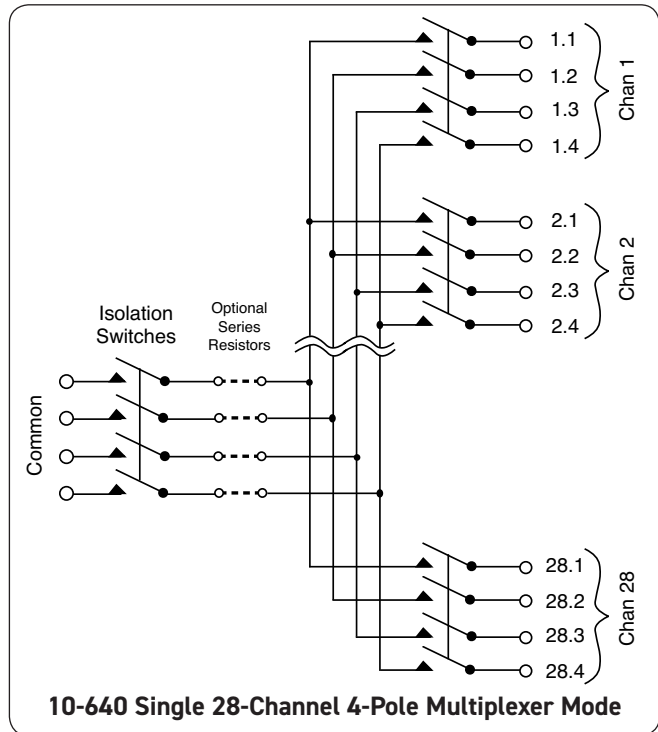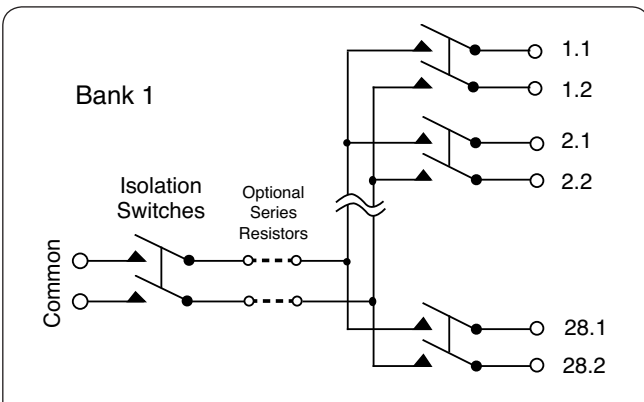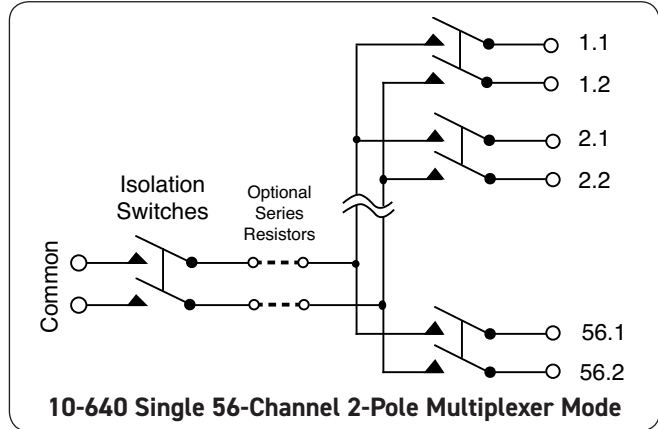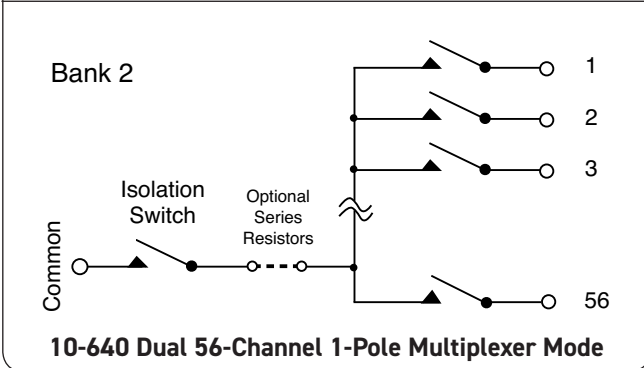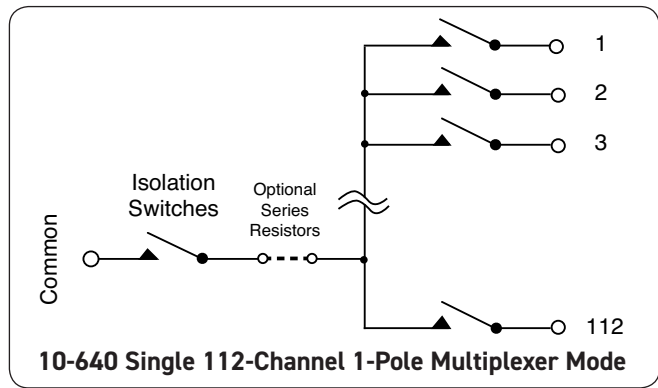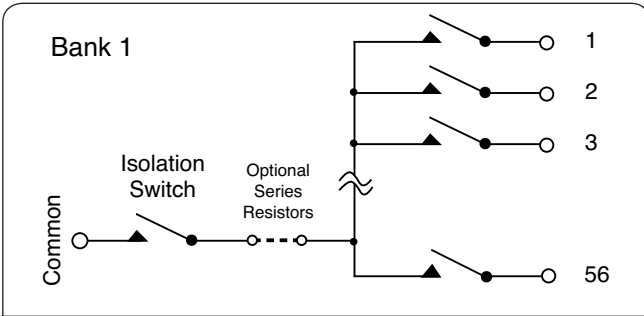
Relay Type

The module uses Ruthenium Reed Switches. **Spare Reed Relays** are built onto the circuit board to facilitate easy maintenance with minimum downtime.

All reed relays are manufactured by our sister company Pickering Electronics: pickeringrelay.com

Switching Specification

Switch Type:	Ruthenium Reed
Max Standoff Voltage:	100V
Max Guard to chassis Voltage:	50V
Max Power:	10W
Max Switch Current:	0.5A
Max Carry Current:	1.2A
Contact Resistance	
On (Single Module):	<300mΩ
On (5 Module System):	<700mΩ
Off (Single Module):	>$10^9\Omega$
Off (5 Module System):	>$10^9\Omega$
Differential Thermal Offset:	<5µV
Capacitance	
Open Channel:	<6pF
Channel to Channel:	<15pF
Channel to Guard:	<25pF
Crosstalk	
(Single Channel On, 50Ω)	
Channel to Channel 10kHz:	>92dB
Channel to Channel 100kHz:	>75dB
Channel to Channel 1MHz:	>54dB
Bank to Bank 100kHz:	>106dB
Bank to Bank 100kHz:	>90dB
Bandwidth (3dB, 1 module):	>25MHz
Noise Level	
(0 to 1MHz in 50Ω system):	<-90dBm
Max Operate Time:	7ms
Max Release Time:	6ms
Expected Life	
Low power load:	>1×10^8
Full power load:	>1×10^6

If there is a problem with any of the modules used to make up a large multiplexer then an error will be detected (use the REPORT? query to discover the cause).

If only one multiplexer module is used then bank address 0 **must** always be used.

Guard Support

The 10-640 multiplexer is constructed using a multilayer pcb, which permits use of extensive shielding/guarding: Both multiplexer banks have separate guards. These guards will minimise crosstalk between channels.

A link on the pcb allows connection of external guards to the Switching System chassis earth.

Programming

The 10-640 multiplexer module is simple to program:

ARESET a	Open all channels on device **a**
DELAY t	Force a minimum delay of **t** milliseconds between two instructions
RESET	Open all switches on all modules
VIEW? a	View status of device **a**
CHAN a,c	Select channel **c** on multiplexer **a**. Automatically clears previous channel (if set) before selecting new channel. When in dual 8 to 1mode the address is prefixed by 1 or 2
CHAN a,c,s	Multi-channel selection argument **s** allows opening/closing of any combination of channels. Also allows selection of all channels except **c** (Not available in 1-Pole Mode)

Common

The common signal(s) are routed (using internal jumpers) to the Front panel connectors. Routing to the front panel allows the user complete flexibility. It also has the additional features of keeping the common signal isolated, improving crosstalk, dc leakage and low thermal emf performance.

Creating Larger Multiplexers

When more than one module is used to make up a multiplexer ie. where five modules are used to make up a 560 channel 1 pole multiplexer – then all multiplexer units must have the same internal address. The location of each module within the multiplexer is given by it's bank address. Bank addresses must start at 0 and should be contiguous.

Mechanical Characteristics

All models conform to the 3U height (128mm) Eurocard standard and are housed in a 160mm deep screened plug-in module. Panel width for all versions is 2.4 Inches.

Connectors

Connections are made via two front panel mounted high density 62-pin D-type plugs (same shell size as standard density 37-pin types).

Please note that these connectors are spaced closely together so care must be taken to use mating connectors that will fit on to the front panel together.

Product Order Codes

Low Density MUX, Ruthenium Switch	10-640-021
High Density MUX, Ruthenium Switch	10-640-022

Note: When ordering you may specify that the 10-640 is configured into any of the Shipping Configuration modes shown below, this saves having to alter internal jumpers yourself upon receipt of the unit.

Shipping Configurations - Low Density Multiplexer

Multiplexer mode	Dual	Single	
Number of Channels	28	28	56
Number of Poles	1	2	1
Configuration	28/1	28/2	56/1

Shipping Configurations - High Density Multiplexer

Multiplexer mode	Dual		Single		
Number of Channels	28	56	28	56	112
Number of Poles	2	1	4	2	1
Configuration	28/2	56/1	28/4	56/2	112/1

Product Customization

Pickering System 10 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.

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.

Mating Connectors & Cabling

62-Pin D-type Socket with Crimp Pins	10-960-062

Operating/Storage Conditions

Operating Conditions

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

Storage and Transport Conditions

Storage Temperature:	-20°C to +75°C
Humidity:	Up to 95% non-condensing
Altitude:	15000m
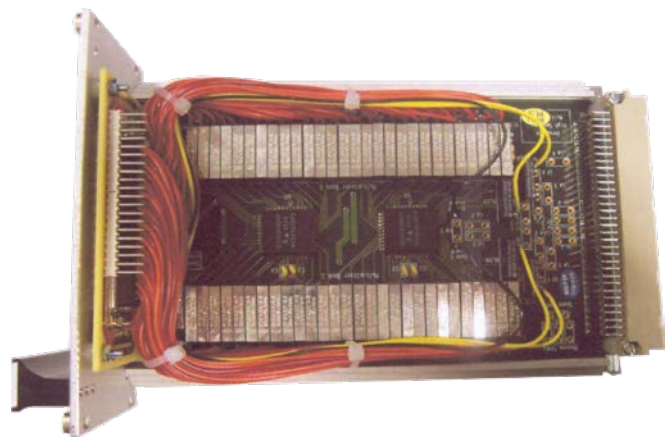
Internal Construction of 10-640 Multiplexer (shields removed)