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40-630/632 User Manual

PXI Single/Dual 16/24/32/48 Channel Versatile Multiplexer Module



Issue 9.1 March 2020

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ISO 9001
Reg No. FM38792

TECHNICAL SUPPORT

For Technical Support please contact Pickering Interfaces either by phone, the website or via e-mail.

WARRANTY

All products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for a period of three years, excluding programmable power supplies, from the date of delivery to the original purchaser. Any product found to be defective within this period will, at the discretion of Pickering Interfaces be repaired or replaced.

Products serviced and repaired outside of the warranty period are warranted for ninety days.

Extended warranty and service are available. Please contact Pickering Interfaces by phone, the website or via e-mail.

ENVIRONMENTAL POLICY

Pickering Interfaces operates under an environmental management system similar to ISO 14001.

Pickering Interfaces strives to fulfil all relevant environmental laws and regulations and reduce wastes and releases to the environment. Pickering Interfaces aims to design and operate products in a way that protects the environment and the health and safety of its employees, customers and the public. Pickering Interfaces endeavours to develop and manufacture products that can be produced, distributed, used and recycled, or disposed of, in a safe and environmentally friendly manner.

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pickeringtest.com

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PRODUCT SAFETY

SAFETY SYMBOLS

The following safety symbols may be used on the product and throughout the product documentation.

MEANING / DESCRIPTION	SYMBOL
PROTECTIVE EARTH (GROUND) To identify any terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault, or the terminal of a protective earth (ground) electrode.	
DANGEROUS VOLTAGE To indicate hazards arising from dangerous voltages.	
WARNING / CAUTION An appropriate safety instruction should be followed or caution to a potential hazard exists. Refer to the relevant instructions detailed within the product manual.	
HEAVY If this product is heavy reference should be made to the safety instructions for provisions of lifting and moving.	
STATIC SENSITIVE To indicate that static sensitive devices are present and handling precautions should be followed.	

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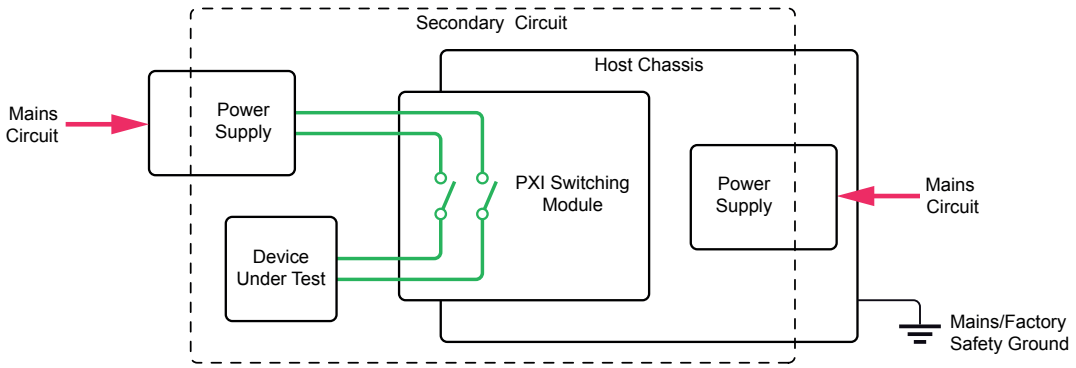
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WARNINGS AND CAUTIONS

WARNING - HAZARDOUS ENVIRONMENTS	SYMBOL
This product is not specifically designed for use in hazardous environments, for example in explosive atmospheres. If the product is to be used in hazardous environments we recommend that the user ensures suitable protective measures are taken.	

WARNING - DANGER OF ELECTRIC SHOCK	SYMBOL
This module may contain hazardous voltages. Before removing the module from the rack remove all supplies and disconnect user I/O signals. Unused slots in the host chassis are populated with blanking plates to prevent access to user I/O signals that may be present. Blanking panels are available to order from Pickering in a variety of slot widths. If the product is not used in this manner for example by using an extender card then additional care must be taken to avoid contact with exposed signals. Not to be used in safety critical circuits, refer to the Pickering Interfaces' terms & conditions of sale. This module must not be used for the switching of Mains Circuits. For the switching of voltages up to the module's full specification, Secondary Circuit power supplies and the Device Under Test must be fully isolated from the Mains Circuit and the safety earth. The host chassis must be correctly installed and be connected to mains or factory safety ground, please refer to your chassis installation manual.  **Diagram Showing Separation Between The Mains Circuit and Secondary Circuit / DUT** For the purposes of this document, a Mains Circuit is an installation classified as Overvoltage Category II up to 300V. Separation between the Secondary Circuit and Mains Circuit is achieved by a transformer in which the primary windings are separated from the secondary windings by reinforced insulation, double insulation, or a screen connected to the protective conductor terminal.	

CAUTION - HANDLING OF ELECTROSTATIC-SENSITIVE DEVICES	SYMBOL
Certain semiconductor devices used in this equipment are liable to damage due to static voltage. Observe the following precautions when handling these devices in their unterminated state, or sub-assemblies containing these devices: 1. Persons removing sub-assemblies from equipment using these devices must be earthed by a wrist strap and a resistor at the point provided on the equipment. 2. Soldering irons used during the repair operations must be low voltage types with earthed tips and isolated from the mains voltage by a double insulated transformer. 3. Outer clothing worn must be unable to generate static charges. 4. Printed Circuit Boards (PCBs) fitted with these devices must be stored and transported in anti-static bags.	

CAUTION - PRODUCT DOCUMENTATION	SYMBOL
Suitably qualified & trained users should ensure that the accompanying documentation is fully read and understood before attempting to install or operate the product.	

SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS
All cleaning and servicing requires the equipment to be isolated and disconnected from the power source and user I/O signals (refer to the Maintenance Section). • Appropriate manual handling procedures should be followed as dictated by the weight of the individual module or the combined weight of the modules & chassis. • Should a fault occur with the module or chassis, immediately isolate and disconnect the incoming power to the chassis and the user I/O signals. • Ensure the equipment is installed, operated and maintained by trained and authorised personnel. • For suitably equipped products in the event of an emergency press the red “emergency stop” button situated on the front of the unit.

SECTION 1 - TECHNICAL SPECIFICATION

- Versatile Multiplexer With Single & Dual Operation
- 40-630 Dual 16-Channel 2-Pole Multiplexer, Available In 4 Other Configurations
- 40-632 Dual 24-Channel 1-Pole Multiplexer, Available In 2 Other Configurations
- 1, 2 & 4-Pole Switching Formats
- Uses High Reliability Pickering Reed Relays
- Fast Operating Speed 500µs Typical per Relay
- Switch up to 150V, 1.2A with 20W Max Power
- Automatic Isolation Switches Reduce Capacitive Loading in Large Systems
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Supported by *eBIRST* ™
- 3 Year Warranty



The 40-630/632 general purpose multiplexer modules feature a wide range of switching configurations. They are based on 1-pole or 2-pole reed relays and typical applications include signal routing in ATE and data acquisition systems. User connections are made via a front panel 68-pin socket.

The majority of 40-630/632 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.

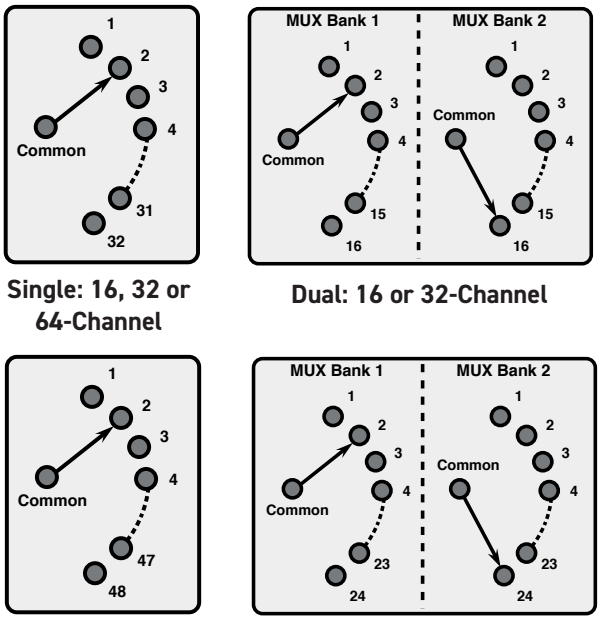
Note: The multiple channel selection option is not available for the 40-630-022-64/1 and 40-630-D/32/1 multiplexers.

Automatic isolation switching (see diagrams overleaf) connects only the currently active multiplexer bank to the common terminal. This minimizes capacitive loading and leakage current in large multiplexer systems. Larger multiplexers may be constructed by daisy chaining the common signals from multiple modules.

Supported by *eBIRST*

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

For more information go to: pickeringtest.com/ebirst



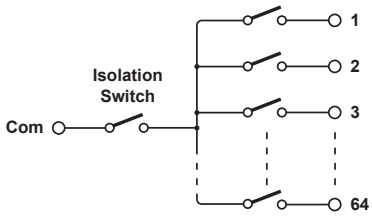
Single: 16, 32 or 64-Channel

Dual: 16 or 32-Channel

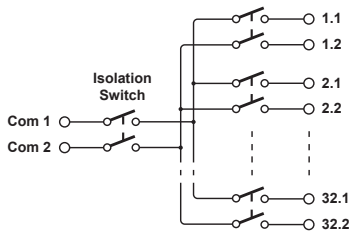
Single: 24 or 48-Channel

Dual: 24-Channel

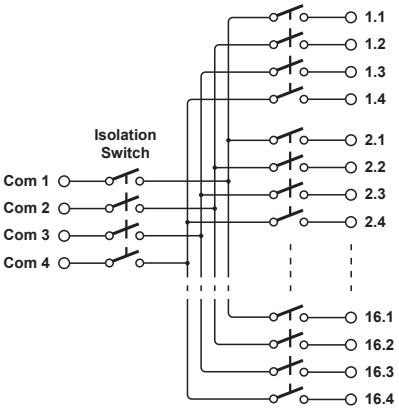
Overview of 40-630/632 Multiplexer Configurations (see overleaf for detailed diagrams)



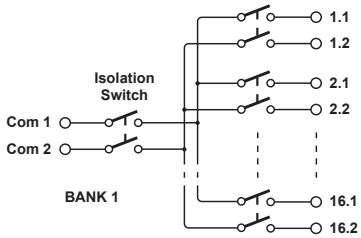
40-630-022-64/1
Single 64-Channel 1-Pole MUX

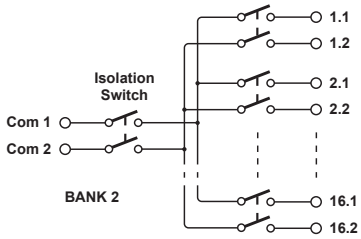


40-630-022-32/2
Single 32-Channel 2-Pole MUX

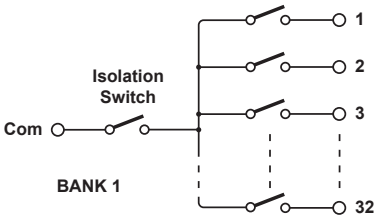


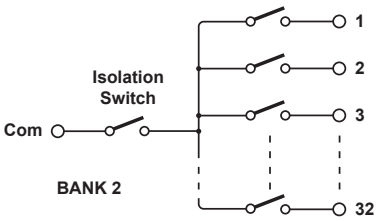
40-630-022-16/4
Single 16-Channel 4-Pole MUX





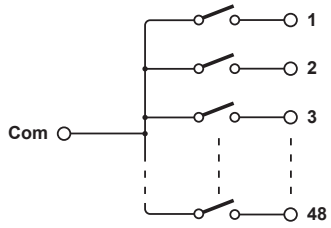
40-630-022-D/16/2
Dual 16-Channel 2-Pole MUX



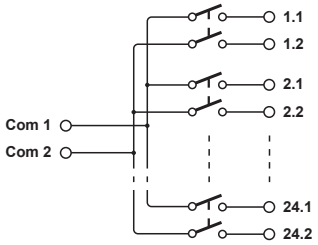


40-630-022-D/32/1
Dual 32-Channel 1-Pole MUX

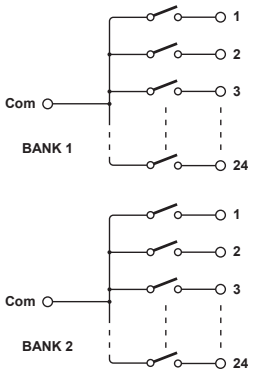
40-630-022 Multiplexer Configuration Schematics



40-632-021-48/1
Single 48-Channel 1-Pole MUX



40-632-021-24/2
Single 24-Channel 2-Pole MUX



40-632-021-D/24/1
Dual 24-Channel 1-Pole MUX

40-632-021 Multiplexer Configuration Schematics

Relay Type

The 40-630 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 sister company Pickering Electronics: pickeringrelay.com

Switching Specification

Switch Type:	Ruthenium Reed
Max Switching Voltage: †	150VDC/100VAC*
Max Power:	20W
Max Switch Current:	1.0A
Max Carry Current:	1.2A
Initial On Path Resistance:	<750mΩ (single module)
Off Path Resistance:	>10^9Ω (single module)
Thermal Offset:	<10µV
Bandwidth (3dB, 1 module)	>10MHz
Operate Time:	1ms typical, 500µs 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.

† Higher switching voltages may be available.

Power Requirements

+3.3V	+5V	+12V	-12V
0	280mA (typ 220mA)	0	0

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).

Module weight: 200g (40-630-022-32/2)
180g (40-630-022-D/32/1)
180g (40-632-021-D/24/1)

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 68-pin female micro-D connector, for pin outs please refer to the operating manual.

Optional Limiting Resistors

Modules may be fitted with limiting resistors, these are fitted in series with the analogue common. These are very useful if over-current signals may be encountered, thus extending the life and reliability of the reed relays.

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

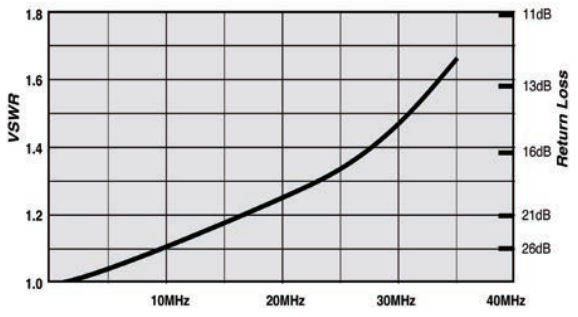
PXI & CompactPCI Compliance

The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus and Star Trigger are not implemented.

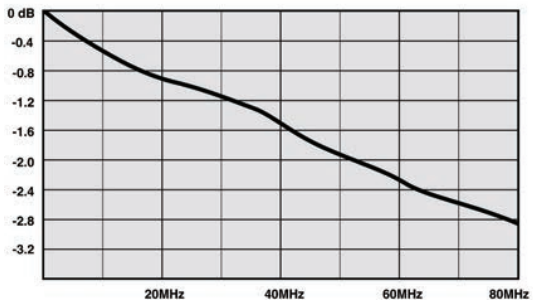
Uses a 33MHz 32-bit backplane interface.

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.



40-630 16-Channel MUX Typical VSWR/Return Loss



40-630 16-Channel MUX Typical Insertion Loss

40-630-022 MUX Shipping Configurations

Multiplexer Mode	Dual		Single		
Number of Channels	16	†32	16	32	†64
Number of Poles	2	1	4	2	1

† Dual 32 channel 1 pole and Single 64 channel 1 pole configurations are NOT capable of switching multiple channels simultaneously.

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

For example, to ship a 40-630-022 multiplexer set up as Single 64 Channel 1 Pole then order: "**40-630-022** Configuration **S/64/1**"

40-632-021 MUX Shipping Configurations

Multiplexer Mode	Dual	Single	
Number of Channels	24	24	48
Number of Poles	1	2	1

Product Order Codes - Multiplexer

Channel Selection	Model Variant	Order Code
Single	**Single 64-Channel 1-Pole**	**40-630-022-64/1**
Single	**Dual 32-Channel 1-Pole**	**40-630-022-D/32/1**

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

Channel Selection	Model Variant	Order Code
Single	**Dual 16-Channel 2-Pole**	**40-630-022-D/16/2-SM**

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

Channel Selection	Model Variant	Order Code
Multiple	**Single 32-Channel 2-Pole**	**40-630-022-32/2**
Multiple	**Single 16-Channel 4-Pole**	**40-630-022-16/4**
Multiple	**Dual 16-Channel 2-Pole**	**40-630-022-D/16/2**
Multiple	**Single 48-Channel 1-Pole**	**40-632-021-48/1**
Multiple	**Single 24-Channel 2-Pole**	**40-632-021-24/2**
Multiple	**Dual 24-Channel 1-Pole**	**40-632-021-D/24/1**

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

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
40-630/632	**93-006-001**	**93-006-401**

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
40-630-022	**91-100-003 & 91-100-005**
40-632-021	**91-100-003**

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

Mating Connectors & Cabling

For connection accessories for the 40-630/632 series please refer to the 90-015D 68-pin micro-D Connector Accessories data sheet 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 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.

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

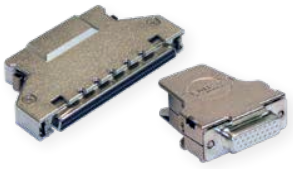
Pickering LXI or LXI/USB Modular Chassis—only accept our 1000+ PXI Switching & Simulation Modules:

- 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

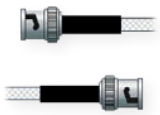
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed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



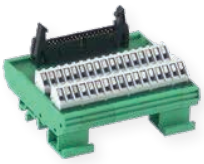
Connectors & Backshells



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.



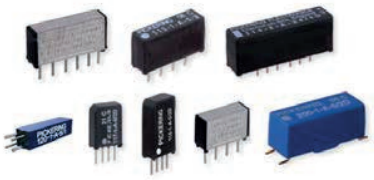
Mass Interconnect

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 sister company, Pickering Electronics. 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

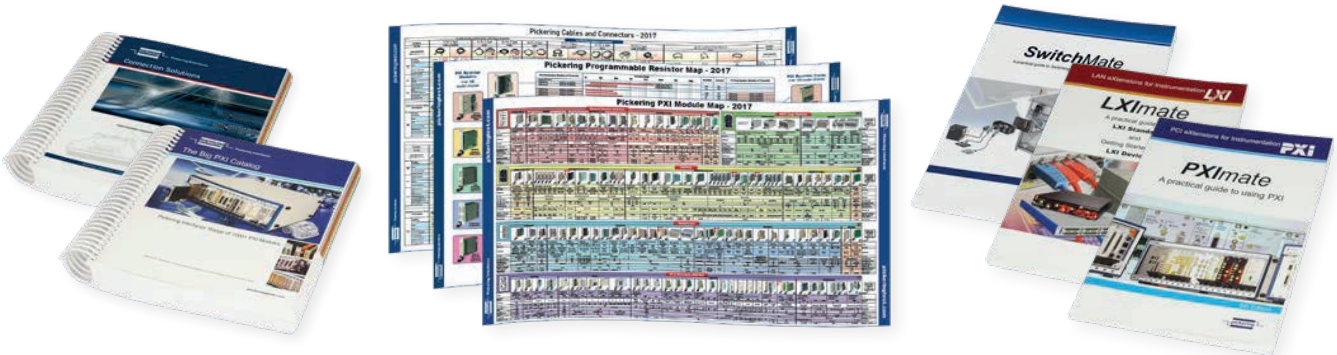
eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
To learn more, please go to: pickeringtest.com/ebirst

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, 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 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

SECTION 2 - TECHNICAL DESCRIPTION

FUNCTIONAL DESCRIPTION

A functional block diagram is provided in Figure 2.1. The Versatile Multiplexer Module 40-630/632 is powered by a +5V input via Compact PCI connector J1. The interface to the user test equipment is via the front panel mounted 68-pin micro-D connector, J2. The module comprises a PCB populated with single pole or two pole relays, or single pole RF relays, depending on the module type. The relays are energised via control signals from relay drivers U8 to U13. The relay drivers are addressed by PCI bridge U1 to output the required signal. Module configuration is determined by hardwired links and data stored in EEPROM U7. PCI Bridge U1 is configured by EEPROM U2.

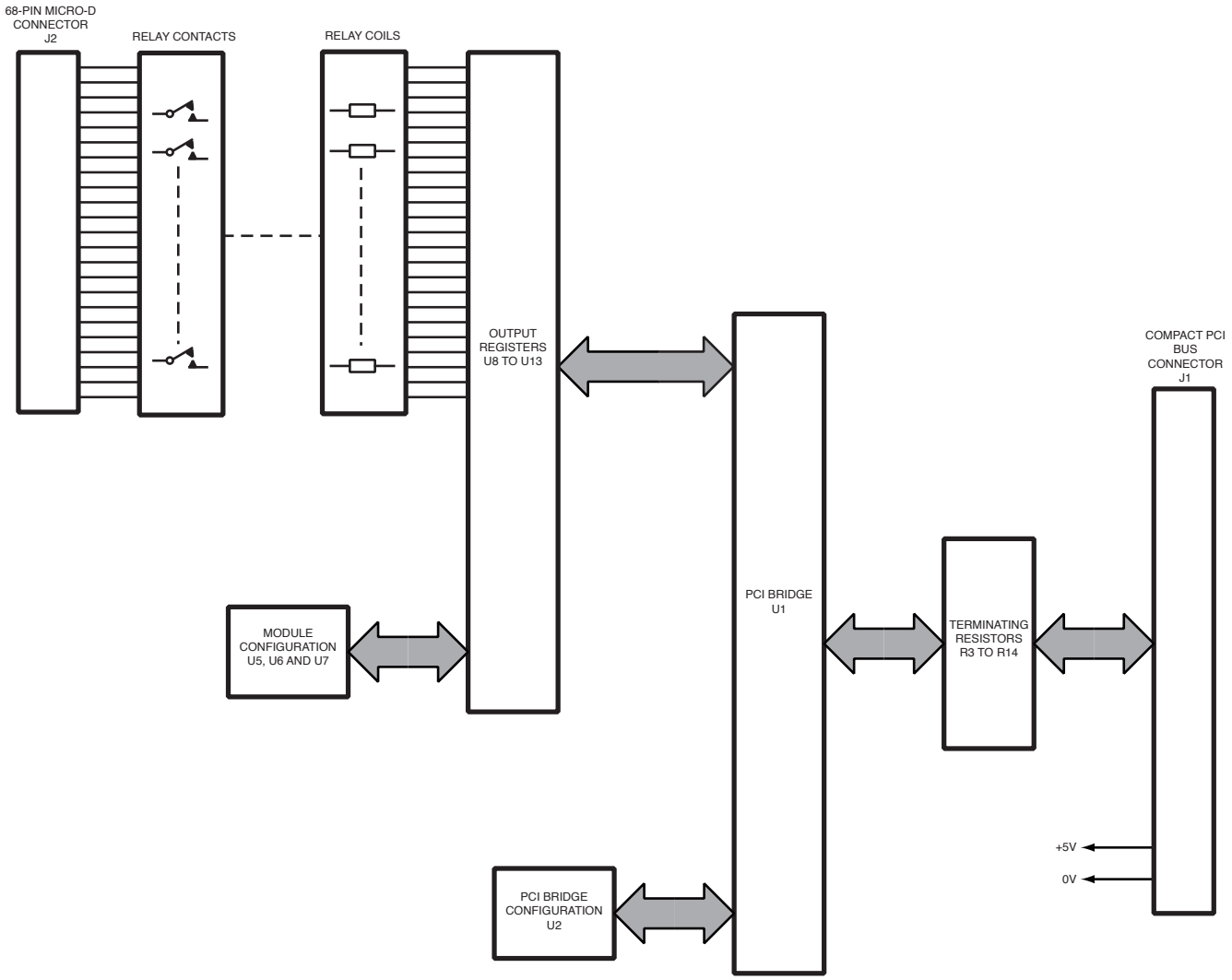


Figure 2.1 - Versatile Multiplexer Module 40-630/632: Functional Block Diagram

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SECTION 3 - INSTALLATION

Refer to the Warnings and Cautions at the front of this manual

Modular products require installation in a suitable PXI/LXI chassis. The module is designed for indoor use only.

PREOPERATION CHECKS (UNPACKING)

1. Check the module for transport damage and report any damage immediately to Pickering Interfaces. Do not attempt to install the product if any damage is evident.
2. Position the chassis relative to any other equipment the module(s) will connect with. Ensure the chassis is not connected to the electrical supply.
3. Ensure that the designated area for the chassis containing the module is of flat and solid construction to withstand and support the combined weight of the module(s) and chassis.

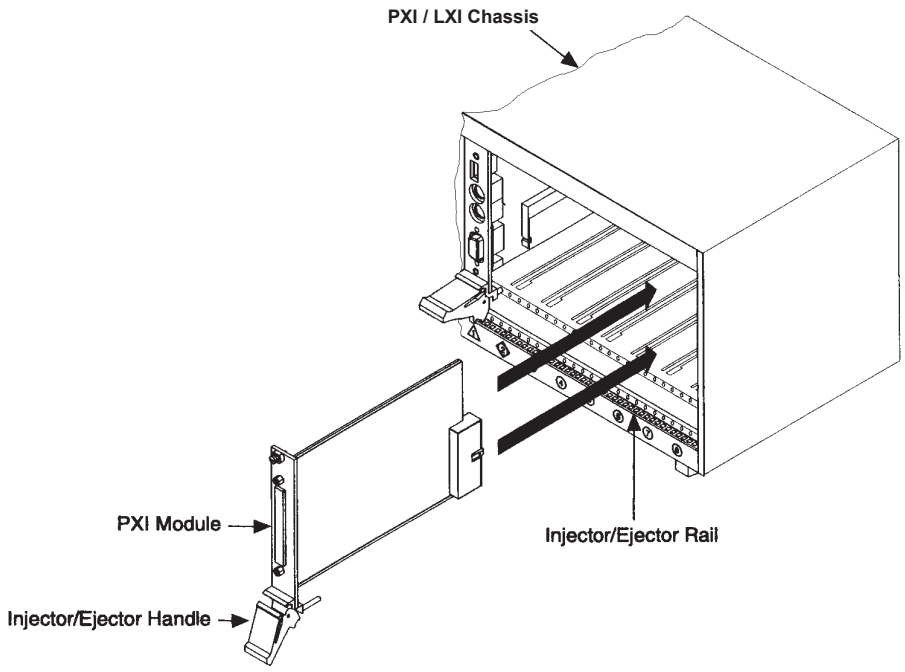


Figure 3.1 - Installing the Module into a PXI/cPCI/LXI Chassis

HARDWARE INSTALLATION
ELECTRICAL CONNECTION (CHASSIS)

1. The chassis must be electrically installed in accordance with local regional electrical codes by a qualified engineer.
2. The chassis must be grounded.

Electrostatic discharge can damage the components on the module. To avoid such damage in handling the board refer to page VII.

Ensure that there is adequate ventilation.

The module should be installed in accordance with the following procedure:

1. Ensure that the system is turned OFF but still connected to mains so that it remains grounded.
2. Choose an appropriate slot in the rack.
3. Remove the blanking plate for the chosen slot.
4. Ensure that the injector/ejector handle is in its downward position. Align the module with the card guides on the top and bottom of the slot.

   Do not raise the injector/ejector handle whilst inserting the module as the module will not insert properly.
5. Hold the handle whilst slowly sliding the module into the card guides until the handle catches on the injector/ejector rail (refer to Figure 3.1).
6. Raise the injector/ejector handle until the module firmly seats into the backplane. The front panel of the module should be flush with the front panel of the chassis.
7. Secure the front panel of the module using both screws to the chassis front panel mounting rails.
8. In a system employing a remote control interface to connect an external controller to a PXI chassis or to link multiple chassis, power-up the system as follows:
   a. For a system comprising an external controller and one chassis, power up the chassis before powering up the external controller.
   b. For a system comprising more than one chassis, turn ON the last chassis in the system followed by the penultimate, etc, and finally turn ON the external controller or chassis containing the system controller.
9. For Pickering Interfaces modular LXI installation there is no requirement to use any particular power up sequence.

SOFTWARE INSTALLATION

First install the appropriate Pickering PXI switch card drivers by running the installer program Setup.exe (provided in a compressed zip file), either from the CD-ROM supplied, or by downloading the latest version from our website **pickeringtest.com** - the recommended method. Setup is accompanied by a ReadMe file containing additional installation information. A single installation covers all cards in the System 40, System 45 and System 50 ranges.

When installation completes, the installed drivers' ReadMe file is offered for display. It can also be displayed later using a shortcut on the Programs>>Pickering menu.

If you are not a LabVIEW user you should choose the "full" version, and once that has been installed run the LabVIEW Runtime Engine installer via the shortcut on the Programs>>Pickering menu. In the absence of LabVIEW the Runtime Engine is required to support the Pickering Test Panels application.

TESTING OPERATION

After installation of the hardware and Pickering PXI Driver software package start the General Soft Front Panel (GSFP) using the desktop icon or via the Start menu (***Start Menu-> Pickering Interfaces Ltd -> General Soft Front Panel***).



Figure 3.2 - General Soft Front Panel Icon

A selector panel will appear, listing all installed Pickering PCI, PXI or LXI switch cards and resistor cards. Click on the card you wish to control, and a graphical control panel is presented allowing operation of the card. Panels can be opened simultaneously for all the installed cards.

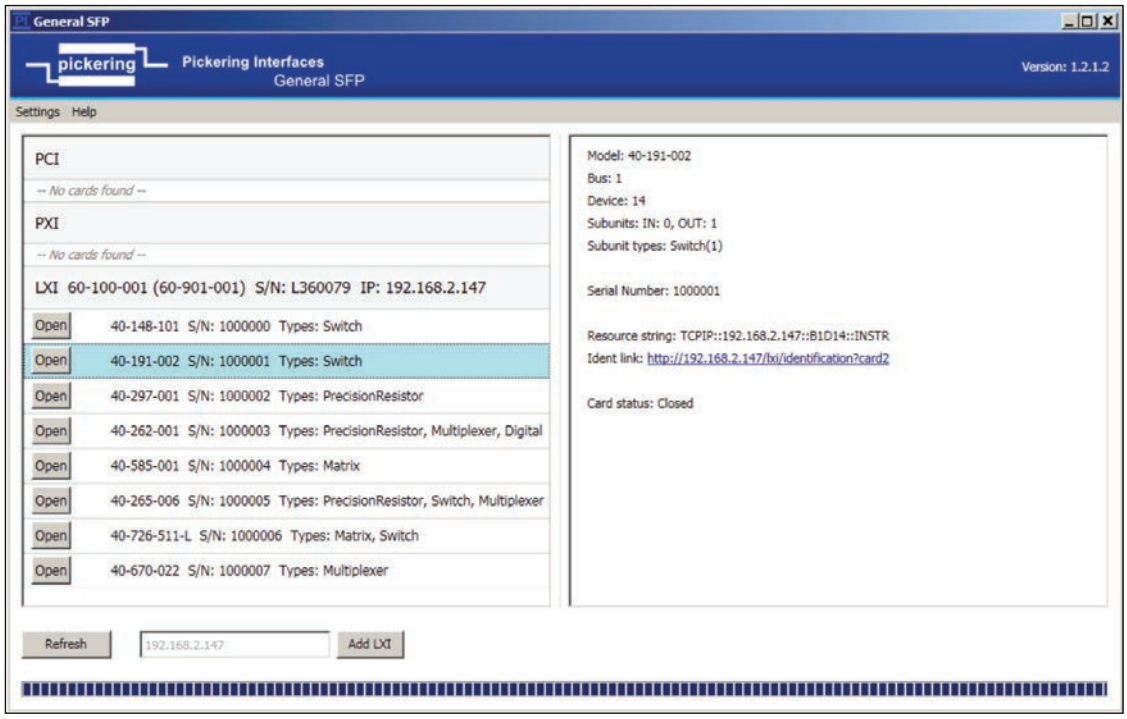


Figure 3.3 - General Soft Front Panel Selector

More details how to use the GSFP can be found in the manual, via menu ***Help\Manual***

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SECTION 4 - PROGRAMMING GUIDE

PROGRAMMING OPTIONS FOR PICKERING INTERFACES PXI MODULES

For information on the installation and use of drivers and the programming of Pickering's products in various software environments, please refer to the Software User Manual.

This is available as a download from:
https://www.pickeringtest.com/support/software-drivers-and-downloads

Also, it can be accessed from the DVD supplied with the product:
<DVD_DRIVE>\downloads\Documentation\Software-Manual.pdf

MODULE ARCHITECTURE

The 40-630/632 is an array of 32, 36 or 48 SPST/DPST relays depending on the model number. In the default state all relays are open circuit. Energising a particular relay creates a signal path between the common terminal(s) and the corresponding channel terminal(s). The relay module's switching architectures are shown in their default state in Section 1.

The sub-units used to control the module's relays are as shown below and correspond to the number of multiplexers in the configuration. Isolation switching is automatic. Enabling a particular bit within the sub-unit operates the corresponding relay.

40-630-022-64/1
Single 64 Channel Mux - 1 Pole

SU	Bit	Signal	RL	SU	Bit	Signal	RL
1	1	Com to Ch1	2	1	41	Com to Ch41	34
	2	Com to Ch2			42	Com to Ch42	
	3	Com to Ch3	4		43	Com to Ch43	36
	4	Com to Ch4			44	Com to Ch44	
	5	Com to Ch5	6		45	Com to Ch45	38
	6	Com to Ch6			46	Com to Ch46	
	7	Com to Ch7	8		47	Com to Ch47	40
	8	Com to Ch8			48	Com to Ch48	
	9	Com to Ch9	10		49	Com to Ch49	42
	10	Com to Ch10			50	Com to Ch50	
	11	Com to Ch11	12		51	Com to Ch51	44
	12	Com to Ch12			52	Com to Ch52	
	13	Com to Ch13	14		53	Com to Ch53	46
	14	Com to Ch14			54	Com to Ch54	
	15	Com to Ch15	16		55	Com to Ch55	48
	16	Com to Ch16			56	Com to Ch56	
	17	Com to Ch17	18		57	Com to Ch57	41
	18	Com to Ch18			58	Com to Ch58	
	19	Com to Ch19	20		59	Com to Ch59	43
	20	Com to Ch20			60	Com to Ch60	
	21	Com to Ch21	22		61	Com to Ch61	45
	22	Com to Ch22			62	Com to Ch62	
	23	Com to Ch23	24		63	Com to Ch63	47
	24	Com to Ch24			64	Com to Ch64	
	25	Com to Ch25	1		-	ISOLATION	21
	26	Com to Ch26			-	ISOLATION	23
	27	Com to Ch27	3		-	ISOLATION	25
	28	Com to Ch28			-	ISOLATION	27
	29	Com to Ch29	5		-	Not Fitted	9
	30	Com to Ch30			-	Not Fitted	11
	31	Com to Ch31	7		-	Not Fitted	13
	32	Com to Ch32			-	Not Fitted	15
	33	Com to Ch33	26		-	Not Fitted	17
	34	Com to Ch34			-	Not Fitted	19
	35	Com to Ch35	28		-	Not Fitted	29
	36	Com to Ch36			-	Not Fitted	31
	37	Com to Ch37	30		-	Not Fitted	33
	38	Com to Ch38			-	Not Fitted	35
	39	Com to Ch39	32		-	Not Fitted	37
	40	Com to Ch40			-	Not Fitted	39

40-630-022-32/2
Single 32 Channel Mux - 2 Pole

SU	Bit	Signal	RL	SU	Bit	Signal	RL
1	1	Com1 to Ch1.1	2	1	21	Com1 to Ch21.1	34
		Com2 to Ch1.2				Com2 to Ch21.2	
	2	Com1 to Ch2.1	4		22	Com1 to Ch22.1	36
		Com2 to Ch2.2				Com2 to Ch22.2	
	3	Com1 to Ch3.1	6		23	Com1 to Ch23.1	38
		Com2 to Ch3.2				Com2 to Ch23.2	
	4	Com1 to Ch4.1	8		24	Com1 to Ch24.1	40
		Com2 to Ch4.2				Com2 to Ch24.2	
	5	Com1 to Ch5.1	10		25	Com1 to Ch25.1	42
		Com2 to Ch5.2				Com2 to Ch25.2	
	6	Com1 to Ch6.1	12		26	Com1 to Ch26.1	44
		Com2 to Ch6.2				Com2 to Ch26.2	
	7	Com1 to Ch7.1	14		27	Com1 to Ch27.1	46
		Com2 to Ch7.2				Com2 to Ch27.2	
	8	Com1 to Ch8.1	16		28	Com1 to Ch28.1	48
		Com2 to Ch8.2				Com2 to Ch28.2	
	9	Com1 to Ch9.1	18		29	Com1 to Ch29.1	41
		Com2 to Ch9.2				Com2 to Ch29.2	
	10	Com1 to Ch10.1	20		30	Com1 to Ch30.1	43
		Com2 to Ch10.2				Com2 to Ch30.2	
	11	Com1 to Ch11.1	22		31	Com1 to Ch31.1	45
		Com2 to Ch11.2				Com2 to Ch31.2	
	12	Com1 to Ch12.1	24		32	Com1 to Ch32.1	47
		Com2 to Ch12.2				Com2 to Ch32.2	
	13	Com1 to Ch13.1	1		-	ISOLATION	21
		Com2 to Ch13.2			-	ISOLATION	23
	14	Com1 to Ch14.1	3		-	ISOLATION	25
		Com2 to Ch14.2			-	ISOLATION	27
	15	Com1 to Ch15.1	5		-	Not Fitted	9
		Com2 to Ch15.2			-	Not Fitted	11
	16	Com1 to Ch16.1	7		-	Not Fitted	13
		Com2 to Ch16.2			-	Not Fitted	15
	17	Com1 to Ch17.1	26		-	Not Fitted	17
		Com2 to Ch17.2			-	Not Fitted	19
	18	Com1 to Ch18.1	28		-	Not Fitted	29
		Com2 to Ch18.2			-	Not Fitted	31
	19	Com1 to Ch19.1	30		-	Not Fitted	33
		Com2 to Ch19.2			-	Not Fitted	35
	20	Com1 to Ch20.1	32		-	Not Fitted	37
		Com2 to Ch20.2			-	Not Fitted	39

40-630-022-16/4
Single 16 Channel Mux - 4 Pole

SU	Bit	Signal	RL
1	1	Com1 to Ch1.1	2
		Com2 to Ch1.2	
		Com3 to Ch1.3	26
		Com4 to Ch1.4	
	2	Com1 to Ch2.1	4
		Com2 to Ch2.2	
		Com3 to Ch2.3	28
		Com4 to Ch2.4	
	3	Com1 to Ch3.1	6
		Com2 to Ch3.2	
		Com3 to Ch3.3	30
		Com4 to Ch3.4	
	4	Com1 to Ch4.1	8
		Com2 to Ch4.2	
		Com3 to Ch4.3	32
		Com4 to Ch4.4	
	5	Com1 to Ch5.1	10
		Com2 to Ch5.2	
		Com3 to Ch5.3	34
		Com4 to Ch5.4	
	6	Com1 to Ch6.1	12
		Com2 to Ch6.2	
		Com3 to Ch6.3	36
		Com4 to Ch6.4	
	7	Com1 to Ch7.1	14
		Com2 to Ch7.2	
		Com3 to Ch7.3	38
		Com4 to Ch7.4	
	8	Com1 to Ch8.1	16
		Com2 to Ch8.2	
		Com3 to Ch8.3	40
		Com4 to Ch8.4	
	9	Com1 to Ch9.1	18
		Com2 to Ch9.2	
		Com3 to Ch9.3	42
		Com4 to Ch9.4	
	10	Com1 to Ch10.1	20
		Com2 to Ch10.2	
		Com3 to Ch10.3	44
		Com4 to Ch10.4	
1	11	Com1 to Ch11.1	22
		Com2 to Ch11.2	
		Com3 to Ch11.3	46
		Com4 to Ch11.4	
	12	Com1 to Ch12.1	24
		Com2 to Ch12.2	
		Com3 to Ch12.3	48
		Com4 to Ch12.4	
	13	Com1 to Ch13.1	1
		Com2 to Ch13.2	
		Com3 to Ch13.3	41
		Com4 to Ch13.4	
	14	Com1 to Ch14.1	3
		Com2 to Ch14.2	
		Com3 to Ch14.3	43
		Com4 to Ch14.4	
	15	Com1 to Ch15.1	5
		Com2 to Ch15.2	
		Com3 to Ch15.3	45
		Com4 to Ch15.4	
	16	Com1 to Ch16.1	7
		Com2 to Ch16.2	
		Com3 to Ch16.3	47
		Com4 to Ch16.4	
	-	ISOLATION	21
	-	ISOLATION	23
	-	ISOLATION	25
	-	ISOLATION	27
	-	Not Fitted	9
	-	Not Fitted	11
	-	Not Fitted	13
	-	Not Fitted	15
	-	Not Fitted	17
	-	Not Fitted	19
	-	Not Fitted	29
	-	Not Fitted	31
	-	Not Fitted	33
	-	Not Fitted	35
	-	Not Fitted	37
	-	Not Fitted	39

40-630-022-D/32/1
Dual 32 Channel Mux - 1 Pole

SU	Bit	Signal	RL
1	1	Com to Ch1	2
	2	Com to Ch2	
	3	Com to Ch3	4
	4	Com to Ch4	
	5	Com to Ch5	6
	6	Com to Ch6	
	7	Com to Ch7	8
	8	Com to Ch8	
	9	Com to Ch9	10
	10	Com to Ch10	
	11	Com to Ch11	12
	12	Com to Ch12	
	13	Com to Ch13	14
	14	Com to Ch14	
	15	Com to Ch15	16
	16	Com to Ch16	
	17	Com to Ch17	18
	18	Com to Ch18	
	19	Com to Ch19	20
	20	Com to Ch20	
	21	Com to Ch21	22
	22	Com to Ch22	
	23	Com to Ch23	24
	24	Com to Ch24	
	25	Com to Ch25	1
	26	Com to Ch26	
	27	Com to Ch27	3
	28	Com to Ch28	
	29	Com to Ch29	5
	30	Com to Ch30	
	31	Com to Ch31	7
	32	Com to Ch32	
2	1	Com to Ch1	26
	2	Com to Ch2	
	3	Com to Ch3	28
	4	Com to Ch4	
	5	Com to Ch5	30
	6	Com to Ch6	
	7	Com to Ch7	32
	8	Com to Ch8	
2	9	Com to Ch9	34
	10	Com to Ch10	
	11	Com to Ch11	36
	12	Com to Ch12	
	13	Com to Ch13	38
	14	Com to Ch14	
	15	Com to Ch15	40
	16	Com to Ch16	
	17	Com to Ch17	42
	18	Com to Ch18	
	19	Com to Ch19	44
	20	Com to Ch20	
	21	Com to Ch21	46
	22	Com to Ch22	
	23	Com to Ch23	48
	24	Com to Ch24	
	25	Com to Ch25	41
	26	Com to Ch26	
	27	Com to Ch27	43
	28	Com to Ch28	
	29	Com to Ch29	45
	30	Com to Ch30	
	31	Com to Ch31	47
	32	Com to Ch32	
	-	ISOLATION	21
	-	ISOLATION	23
	-	ISOLATION	25
	-	ISOLATION	27
	-	Not Fitted	9
	-	Not Fitted	11
	-	Not Fitted	13
	-	Not Fitted	15
	-	Not Fitted	17
	-	Not Fitted	19
	-	Not Fitted	29
	-	Not Fitted	31
	-	Not Fitted	33
	-	Not Fitted	35
	-	Not Fitted	37
	-	Not Fitted	39

40-630-022-D/16/2
Dual 16 Channel Mux - 2 Pole

SU	Bit	Signal	RL	SU	Bit	Signal	RL
1	1	Com1 to Ch1.1	2	2	5	Com1 to Ch5.1	34
		Com2 to Ch1.2				Com2 to Ch5.2	
	2	Com1 to Ch2.1	4		6	Com1 to Ch6.1	36
		Com2 to Ch2.2				Com2 to Ch6.2	
	3	Com1 to Ch3.1	6		7	Com1 to Ch7.1	38
		Com2 to Ch3.2				Com2 to Ch7.2	
	4	Com1 to Ch4.1	8		8	Com1 to Ch8.1	40
		Com2 to Ch4.2				Com2 to Ch8.2	
	5	Com1 to Ch5.1	10		9	Com1 to Ch9.1	42
		Com2 to Ch5.2				Com2 to Ch9.2	
	6	Com1 to Ch6.1	12		10	Com1 to Ch10.1	44
		Com2 to Ch6.2				Com2 to Ch10.2	
	7	Com1 to Ch7.1	14		11	Com1 to Ch11.1	46
		Com2 to Ch7.2				Com2 to Ch11.2	
	8	Com1 to Ch8.1	16		12	Com1 to Ch12.1	48
		Com2 to Ch8.2				Com2 to Ch12.2	
	9	Com1 to Ch9.1	18		13	Com1 to Ch13.1	41
		Com2 to Ch9.2				Com2 to Ch13.2	
	10	Com1 to Ch10.1	20		14	Com1 to Ch14.1	43
		Com2 to Ch10.2				Com2 to Ch14.2	
	11	Com1 to Ch11.1	22		15	Com1 to Ch15.1	45
		Com2 to Ch11.2				Com2 to Ch15.2	
	12	Com1 to Ch12.1	24		16	Com1 to Ch16.1	47
		Com2 to Ch12.2				Com2 to Ch16.2	
	13	Com1 to Ch13.1	1		-	ISOLATION	21
		Com2 to Ch13.2			-	ISOLATION	23
	14	Com1 to Ch14.1	3		-	ISOLATION	25
		Com2 to Ch14.2			-	ISOLATION	27
	15	Com1 to Ch15.1	5		-	Not Fitted	9
		Com2 to Ch15.2			-	Not Fitted	11
	16	Com1 to Ch16.1	7		-	Not Fitted	13
		Com2 to Ch16.2			-	Not Fitted	15
2	1	Com1 to Ch1.1	26		-	Not Fitted	17
		Com2 to Ch1.2			-	Not Fitted	19
	2	Com1 to Ch2.1	28		-	Not Fitted	29
		Com2 to Ch2.2			-	Not Fitted	31
	3	Com1 to Ch3.1	30		-	Not Fitted	33
		Com2 to Ch3.2			-	Not Fitted	35
	4	Com1 to Ch4.1	32		-	Not Fitted	37
		Com2 to Ch4.2			-	Not Fitted	39

PROGRAMMING THE MODULE

Here are examples of using the drivers with the 40-630-022-64/1 (64 Channel 1 Pole) Multiplexer module. Other modules in the range operate in a similar way but the sub-units / bits may vary.

Using PILPXI

To operate a relay the user could use the simple OpBit command or the WriteSub commands

OpBit

```
DWORD sub_unit = 1;
PIL_OpBit( card_num, sub_unit, 1, 1);    // Connects channel 1 to common
PIL_OpBit( card_num, sub_unit, 1, 0);    // Disconnects channel 1 from common
PIL_OpBit( card_num, sub_unit, 6, 1);    // Connects channel 6 to common
```

WriteSub

```
// Sub-unit is 64 bits wide, so 2 DWORD is needed to hold the pattern
DWORD data[2];
data[0] = 1;             // Sets lowest bit to 1, channel 1 to common
PIL_WriteSub( card_num, sub_unit, data);
data[0] = 0x20;          // Sets 6th bit, channel 6 to common
                         // All other relays are set to off
PIL_WriteSub( card_num, sub_unit, data);
```

Using PIPX40

setChannelState

```
ViUInt12 sub_unit = 1;
pipx40_setChannelState(vi, sub_unit, 1, VI_ON);     // Connects channel 1 to common
pipx40_setChannelState(vi, sub_unit, 1, VI_OFF);    // Disconnects channel 1 from common
pipx40_setChannelState(vi, sub_unit, 6, VI_ON);     // Connects channel 6 to common
```

setChannelPattern

```
// Sub-unit is 64 bits wide, so 2 ViUInt32 value is needed to hold the entire pattern
ViUInt32 data[2];
data[0] = 1;             // Sets lowest bit to 1, channel 1 to common
pipx40_setChannelPattern( vi, sub_unit, data);
data[0] = 0x20;          // Sets 6th bit, channel 6 to common
                         // All other relays are set to off
pipx40_setChannelPattern( vi, sub_unit, data);
```

Using pi40iv

The IVI driver has no special labelling for this card and treats the array of switches as a simple array, labelling the channels using the normal com/ch and comA/chA (etc) labelling tags.

```
pi40iv_Connect(vi, com, ch1);        // Connects channel 1 to common
pi40iv_Disconnect(vi, com, ch1);     // Disconnects channel 1 from common
pi40iv_Connect(vi, com, ch6);        // Connects channel 6 to common
```

The IVI Swtch driver specification contains no bulk setting capabilities.

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SECTION 5 - CONNECTOR INFORMATION

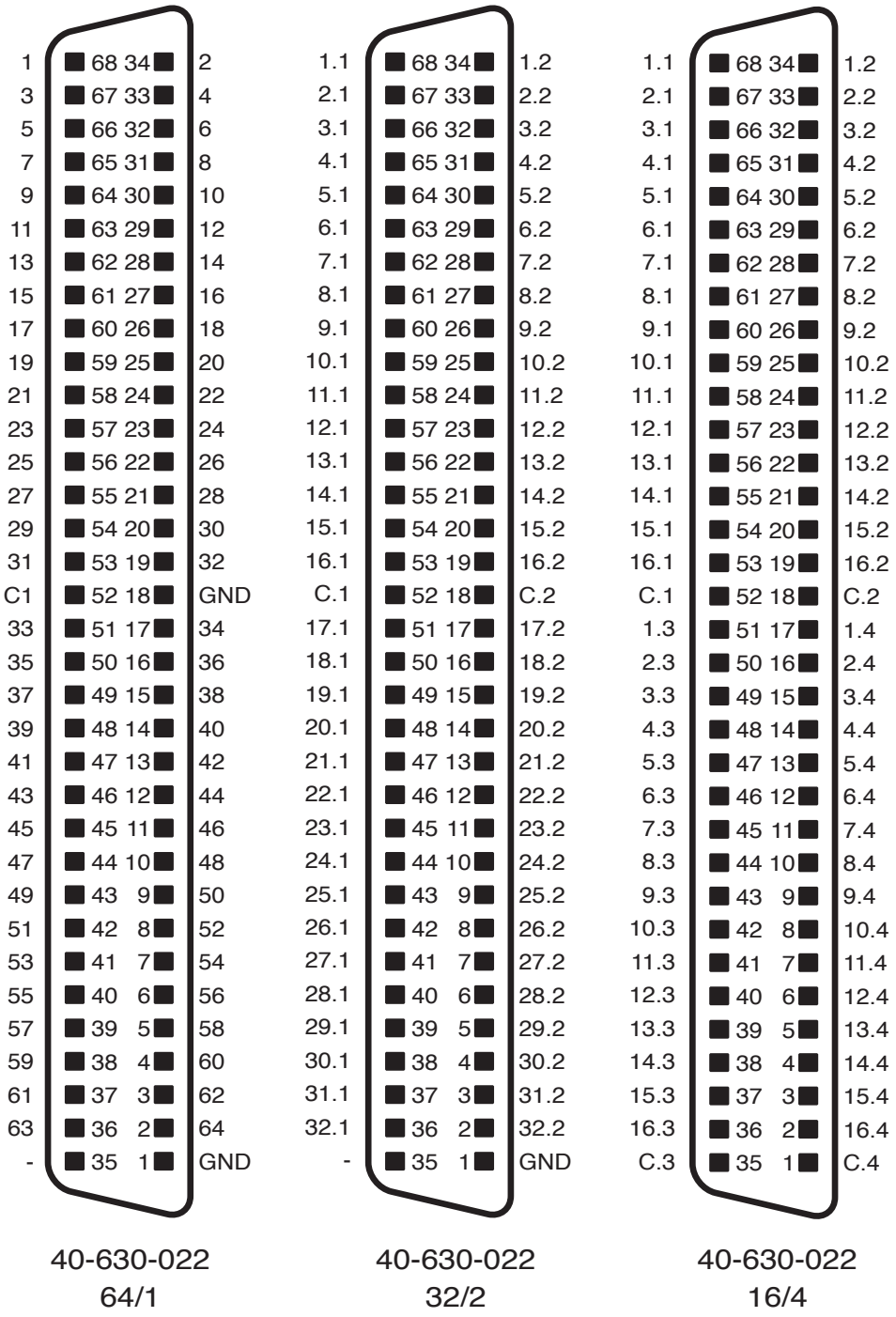


Figure 5.1 - Versatile Multiplexer Module 40-630-022: Pinouts (68-pin micro-D female connector viewed from front of module)

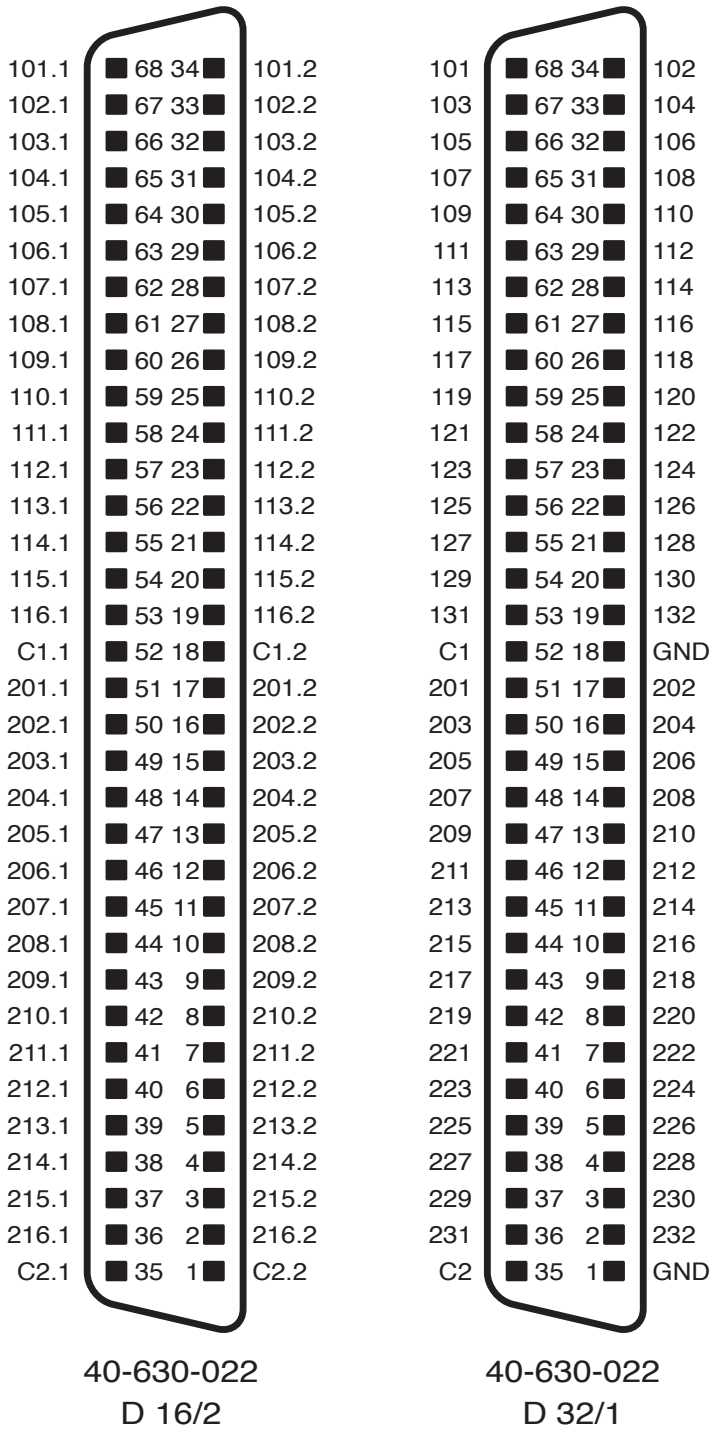


Figure 5.2 - Versatile Multiplexer Module 40-630-022: Pinouts (continued)
(68-pin micro-D female connector viewed from front of module)

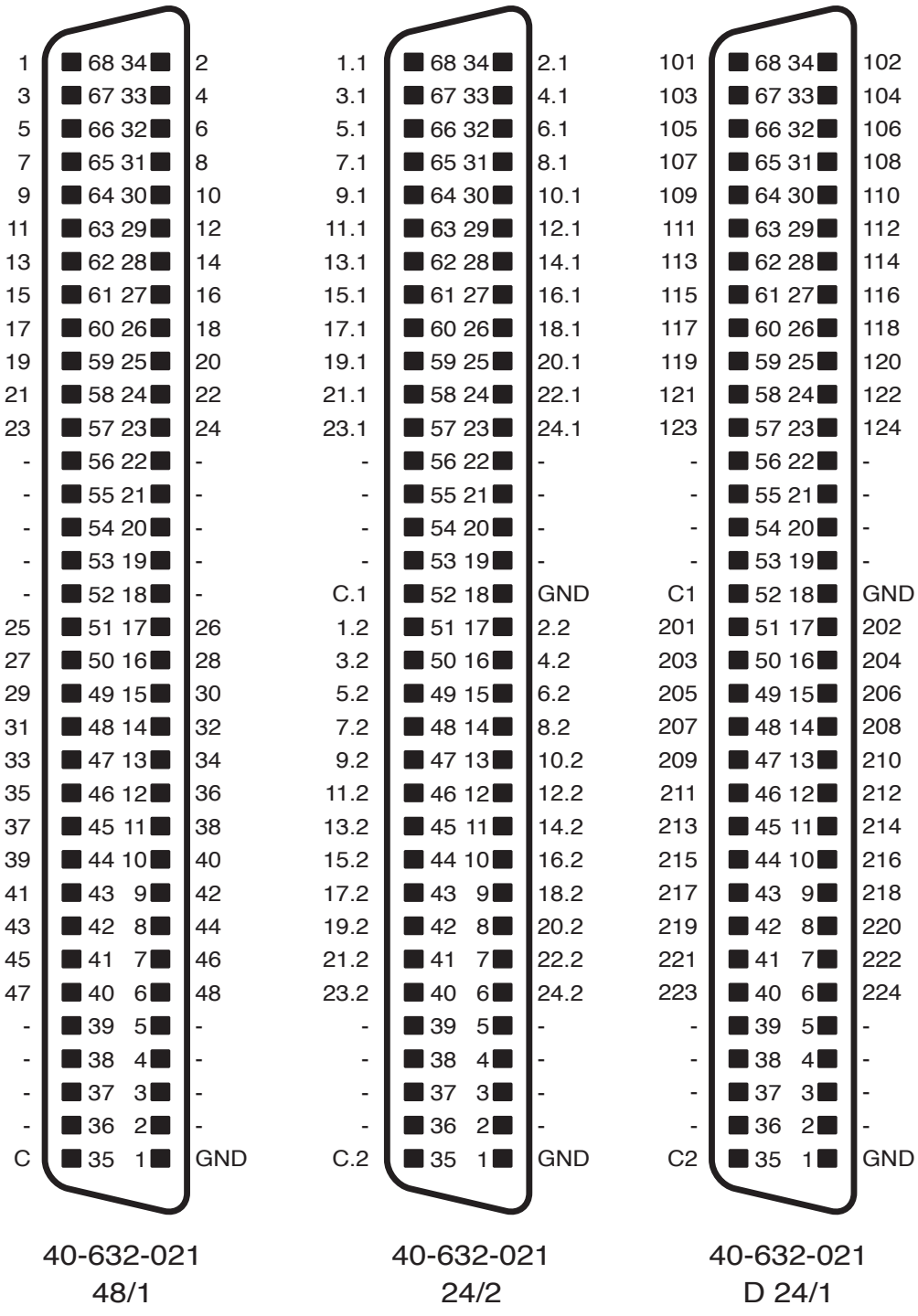


Figure 5.3 - Versatile Multiplexer Module 40-632-021/022: Pinouts (68-pin micro-D female connector viewed from front of module)

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SECTION 6 - TROUBLE SHOOTING

Refer to the Warnings and Cautions at the front of this manual 

INSTALLATION PROBLEMS

The Plug & Play functionality of Pickering switch cards generally ensures trouble-free installation.

If you do experience any installation problems you should first ensure that all cards are properly seated in their slots. Improperly mated cards may go undetected by the operating system, or may be detected as a card of an unknown type. They can also cause the computer to freeze at various stages in the boot sequence.

If your system employs a remote control interface you should check the integrity of all remote control interface links. When the system is powered up, and during Windows start-up, you should expect to see periodic activity on the remote control interface RX/TX (yellow) indicators, clearing to leave only the PWR/LNK (green) LEDs illuminated. The RX/TX indicators should show activity when you attempt to access a card.

DIAGNOSTIC UTILITY

The Pickering Diagnostic Utility (accessible through the Programs>>Pickering>>PXI Utilities menu) generates a diagnostic report of the system's PCI configuration, highlighting any potential configuration problems. Specific details of all installed Pickering switch cards are included. All the installed Pickering switch cards should be listed in the "Pilpxi information" section - if one or more cards is missing it may be possible to determine the reason by referring to the PCI configuration dump contained in the report, but interpretation of this information is far from straightforward, and the best course is to contact Pickering support: support@pickeringtest.com, if possible including a copy of the diagnostic report.

In the "VISA information" section, if VISA is not installed its absence will be reported. This does not affect operation using the Direct I/O driver, and is not a problem unless you wish to use VISA. VISA is a component of National Instruments LabWindows/CVI and LabVIEW, or is available as a standalone environment.

If VISA is present and is of a sufficiently recent version, the section "Pipx40 information" should present a listing similar to "Pilpxi information".

Please note that the Diagnostic Utility cannot access cards if they are currently opened by some other application, such as the Test Panels or Terminal Monitor.

SWITCHING SYSTEM TEST TOOLS

Please refer to Section 7 - Maintenance Information.

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SECTION 7 - MAINTENANCE INFORMATION

Refer to the Warnings and Cautions at the front of this manual

PERIODIC MAINTENANCE

This product and its corresponding chassis do not require any periodic maintenance.

GENERAL CLEANING

- Isolate the electrical power from the chassis and ensure that no user I/O signals are being applied.
- Wipe the product & chassis surfaces with a clean dry anti-static cloth only.

SOFTWARE UPDATE

For PXI modules operating in a PXI chassis, no module software updates are required. For the latest version of the driver please refer to our web site **pickeringtest.com** where links to our Software Download page will provide the latest version of the driver software for the various programming environments encountered.

For PXI modules which are supported in one of Pickering Interfaces' Modular LXI Chassis (such as the 60-102B and 60-103B) no module software update is required. If the module was introduced after the LXI chassis was manufactured the module may not be recognized, in this case the chassis firmware may need upgrading. This is a simple process which is described in the manual for the Modular LXI Chassis.

SWITCHING SYSTEM TEST TOOLS

We recommend the use of ***eBIRST*** to provide a check of the correct operation of relays and to identify the location of any faulty relay. For more information on ***eBIRST*** click here.

RELAY LOOK-UP TABLES

The following pages provide a cross reference between the signal paths of the product and the physical relays on the PCB. The tables can be used in the fault finding process and should be used in conjunction with the corresponding PCB layout diagrams to identify the position of faulty relays. Users of ***eBIRST*** switching system test tools do not need to use this information to locate faulty relays.

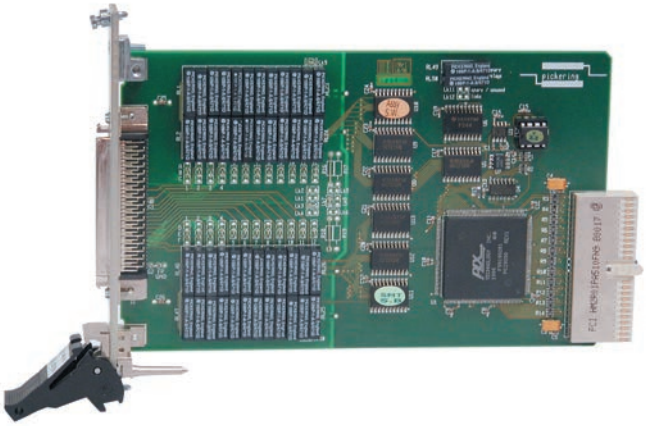


Figure 7.1 - Versatile Multiplexer Module 40-632

Table 7.1 - Versatile Multiplexer Module: Relay Numbering

40-630-022-64/1 Single 64 Channel Mux - 1 Pole

Signal Path with relay energised

Signal	RL	Signal	RL
Com to Ch25 Com to Ch26	1	ISOLATION	25
Com to Ch1 Com to Ch2	2	Com to Ch33 Com to Ch34	26
Com to Ch27 Com to Ch28	3	ISOLATION	27
Com to Ch3 Com to Ch4	4	Com to Ch35 Com to Ch36	28
Com to Ch29 Com to Ch30	5	NF	29
Com to Ch5 Com to Ch6	6	Com to Ch37 Com to Ch38	30
Com to Ch31 Com to Ch32	7	NF	31
Com to Ch7 Com to Ch8	8	Com to Ch39 Com to Ch40	32
NF	9	NF	33
Com to Ch9 Com to Ch10	10	Com to Ch41 Com to Ch42	34
NF	11	NF	35
Com to Ch11 Com to Ch12	12	Com to Ch43 Com to Ch44	36
NF	13	NF	37
Com to Ch13 Com to Ch14	14	Com to Ch45 Com to Ch46	38
NF	15	NF	39
Com to Ch15 Com to Ch16	16	Com to Ch47 Com to Ch48	40
NF	17	Com to Ch57 Com to Ch58	41
Com to Ch17 Com to Ch18	18	Com to Ch49 Com to Ch50	42
NF	19	Com to Ch59 Com to Ch60	43
Com to Ch19 Com to Ch20	20	Com to Ch51 Com to Ch52	44
ISOLATION	21	Com to Ch61 Com to Ch62	45
Com to Ch21 Com to Ch22	22	Com to Ch53 Com to Ch54	46
ISOLATION	23	Com to Ch63 Com to Ch64	47
Com to Ch23 Com to Ch24	24	Com to Ch55 Com to Ch56	48

40-630-022-32/2 Single 32 Channel Mux - 2 Pole

Signal Path with relay energised

Signal	RL	Signal	RL
Com1 to Ch13.1 Com2 to Ch13.2	1	ISOLATION	25
Com1 to Ch1.1 Com2 to Ch1.2	2	Com1 to Ch17.1 Com2 to Ch17.2	26
Com1 to Ch14.1 Com2 to Ch14.2	3	ISOLATION	27
Com1 to Ch2.1 Com2 to Ch2.2	4	Com1 to Ch18.1 Com2 to Ch18.2	28
Com1 to Ch15.1 Com2 to Ch15.2	5	NF	29
Com1 to Ch3.1 Com2 to Ch3.2	6	Com1 to Ch19.1 Com2 to Ch19.2	30
Com1 to Ch16.1 Com2 to Ch16.2	7	NF	31
Com1 to Ch4.1 Com2 to Ch4.2	8	Com1 to Ch20.1 Com2 to Ch20.2	32
NF	9	NF	33
Com1 to Ch5.1 Com2 to Ch5.2	10	Com1 to Ch21.1 Com2 to Ch21.2	34
NF	11	NF	35
Com1 to Ch6.1 Com2 to Ch6.2	12	Com1 to Ch22.1 Com2 to Ch22.2	36
NF	13	NF	37
Com1 to Ch7.1 Com2 to Ch7.2	14	Com1 to Ch23.1 Com2 to Ch23.2	38
NF	15	NF	39
Com1 to Ch8.1 Com2 to Ch8.2	16	Com1 to Ch24.1 Com2 to Ch24.2	40
NF	17	Com1 to Ch29.1 Com2 to Ch29.2	41
Com1 to Ch9.1 Com2 to Ch9.2	18	Com1 to Ch25.1 Com2 to Ch25.2	42
NF	19	Com1 to Ch30.1 Com2 to Ch30.2	43
Com1 to Ch10.1 Com2 to Ch10.2	20	Com1 to Ch26.1 Com2 to Ch26.2	44
ISOLATION	21	Com1 to Ch31.1 Com2 to Ch31.2	45
Com1 to Ch11.1 Com2 to Ch11.2	22	Com1 to Ch27.1 Com2 to Ch27.2	46
ISOLATION	23	Com1 to Ch32.1 Com2 to Ch32.2	47
Com1 to Ch12.1 Com2 to Ch12.2	24	Com1 to Ch28.1 Com2 to Ch28.2	48

40-630-022-16/4 Single 16 Channel Mux - 4 Pole

Signal Path with relay energised

Signal	RL	Signal	RL
Com1 to Ch13.1 Com2 to Ch13.2	1	ISOLATION	25
Com1 to Ch1.1 Com2 to Ch1.2	2	Com3 to Ch1.3 Com4 to Ch1.4	26
Com1 to Ch14.1 Com2 to Ch14.2	3	ISOLATION	27
Com1 to Ch2.1 Com2 to Ch2.2	4	Com3 to Ch2.3 Com4 to Ch2.4	28
Com1 to Ch15.1 Com2 to Ch15.2	5	NF	29
Com1 to Ch3.1 Com2 to Ch3.2	6	Com3 to Ch3.3 Com4 to Ch3.4	30
Com1 to Ch16.1 Com2 to Ch16.2	7	NF	31
Com1 to Ch4.1 Com2 to Ch4.2	8	Com3 to Ch4.3 Com4 to Ch4.4	32
NF	9	NF	33
Com1 to Ch5.1 Com2 to Ch5.2	10	Com3 to Ch5.3 Com4 to Ch5.4	34
NF	11	NF	35
Com1 to Ch6.1 Com2 to Ch6.2	12	Com3 to Ch6.3 Com4 to Ch6.4	36
NF	13	NF	37
Com1 to Ch7.1 Com2 to Ch7.2	14	Com3 to Ch7.3 Com4 to Ch7.4	38
NF	15	NF	39
Com1 to Ch8.1 Com2 to Ch8.2	16	Com3 to Ch8.3 Com4 to Ch8.4	40
NF	17	Com3 to Ch13.3 Com4 to Ch13.4	41
Com1 to Ch9.1 Com2 to Ch9.2	18	Com3 to Ch9.3 Com4 to Ch9.4	42
NF	19	Com3 to Ch14.3 Com4 to Ch14.4	43
Com1 to Ch10.1 Com2 to Ch10.2	20	Com3 to Ch10.3 Com4 to Ch10.4	44
ISOLATION	21	Com3 to Ch15.3 Com4 to Ch15.4	45
Com1 to Ch11.1 Com2 to Ch11.2	22	Com3 to Ch11.3 Com4 to Ch11.4	46
ISOLATION	23	Com3 to Ch16.3 Com4 to Ch16.4	47
Com1 to Ch12.1 Com2 to Ch12.2	24	Com3 to Ch12.3 Com4 to Ch12.4	48

Table 7.1 - Versatile Multiplexer Module: Relay Numbering (continued)

40-630-022-D/32/1
Dual 32 Channel Mux - 1 Pole
Signal Path with relay energised

Bank	Signal	RL	Bank	Signal	RL
1	Com to Ch25 Com to Ch26	1	2	ISOLATION Com	25
	Com to Ch1 Com to Ch2	2		Com to Ch1 Com to Ch2	26
	Com to Ch27 Com to Ch28	3		ISOLATION Com	27
	Com to Ch3 Com to Ch4	4		Com to Ch3 Com to Ch4	28
	Com to Ch29 Com to Ch30	5		NF	29
	Com to Ch5 Com to Ch6	6		Com to Ch5 Com to Ch6	30
	Com to Ch31 Com to Ch32	7		NF	31
	Com to Ch7 Com to Ch8	8		Com to Ch7 Com to Ch8	32
	NF	9		NF	33
	Com to Ch9 Com to Ch10	10		Com to Ch9 Com to Ch10	34
	NF	11		NF	35
	Com to Ch11 Com to Ch12	12		Com to Ch11 Com to Ch12	36
	NF	13		NF	37
	Com to Ch13 Com to Ch14	14		Com to Ch13 Com to Ch14	38
	NF	15		NF	39
	Com to Ch15 Com to Ch16	16		Com to Ch15 Com to Ch16	40
	NF	17		Com to Ch25 Com to Ch26	41
	Com to Ch17 Com to Ch18	18		Com to Ch17 Com to Ch18	42
	NF	19		Com to Ch27 Com to Ch28	43
	Com to Ch19 Com to Ch20	20		Com to Ch19 Com to Ch20	44
	ISOLATION Com	21		Com to Ch29 Com to Ch30	45
	Com to Ch21 Com to Ch22	22		Com to Ch21 Com to Ch22	46
	ISOLATION Com	23		Com to Ch31 Com to Ch32	47
	Com to Ch23 Com to Ch24	24		Com to Ch23 Com to Ch24	48

40-630-022-D/16/2
Dual 16 Channel Mux - 2 Pole
Signal Path with relay energised

Bank	Signal	RL	Bank	Signal	RL
1	Com1 to Ch13.1 Com2 to Ch13.2	1	2	ISOLATION Com1	25
	Com1 to Ch1.1 Com2 to Ch1.2	2		Com1 to Ch1.1 Com2 to Ch1.2	26
	Com1 to Ch14.1 Com2 to Ch14.2	3		ISOLATION Com2	27
	Com1 to Ch2.1 Com2 to Ch2.2	4		Com1 to Ch2.1 Com2 to Ch2.2	28
	Com1 to Ch15.1 Com2 to Ch15.2	5		NF	29
	Com1 to Ch3.1 Com2 to Ch3.2	6		Com1 to Ch3.1 Com2 to Ch3.2	30
	Com1 to Ch16.1 Com2 to Ch16.2	7		NF	31
	Com1 to Ch4.1 Com2 to Ch4.2	8		Com1 to Ch4.1 Com2 to Ch4.2	32
	NF	9		NF	33
	Com1 to Ch5.1 Com2 to Ch5.2	10		Com1 to Ch5.1 Com2 to Ch5.2	34
	NF	11		NF	35
	Com1 to Ch6.1 Com2 to Ch6.2	12		Com1 to Ch6.1 Com2 to Ch6.2	36
	NF	13		NF	37
	Com1 to Ch7.1 Com2 to Ch7.2	14		Com1 to Ch7.1 Com2 to Ch7.2	38
	NF	15		NF	39
	Com1 to Ch8.1 Com2 to Ch8.2	16		Com1 to Ch8.1 Com2 to Ch8.2	40
	NF	17		Com1 to Ch13.1 Com2 to Ch13.2	41
	Com1 to Ch9.1 Com2 to Ch9.2	18		Com1 to Ch9.1 Com2 to Ch9.2	42
	NF	19		Com1 to Ch14.1 Com2 to Ch14.2	43
	Com1 to Ch10.1 Com2 to Ch10.2	20		Com1 to Ch10.1 Com2 to Ch10.2	44
	ISOLATION Com2	21		Com1 to Ch15.1 Com2 to Ch15.2	45
	Com1 to Ch11.1 Com2 to Ch11.2	22		Com1 to Ch11.1 Com2 to Ch11.2	46
	ISOLATION Com1	23		Com1 to Ch16.1 Com2 to Ch16.2	47
	Com1 to Ch12.1 Com2 to Ch12.2	24		Com1 to Ch12.1 Com2 to Ch12.2	48

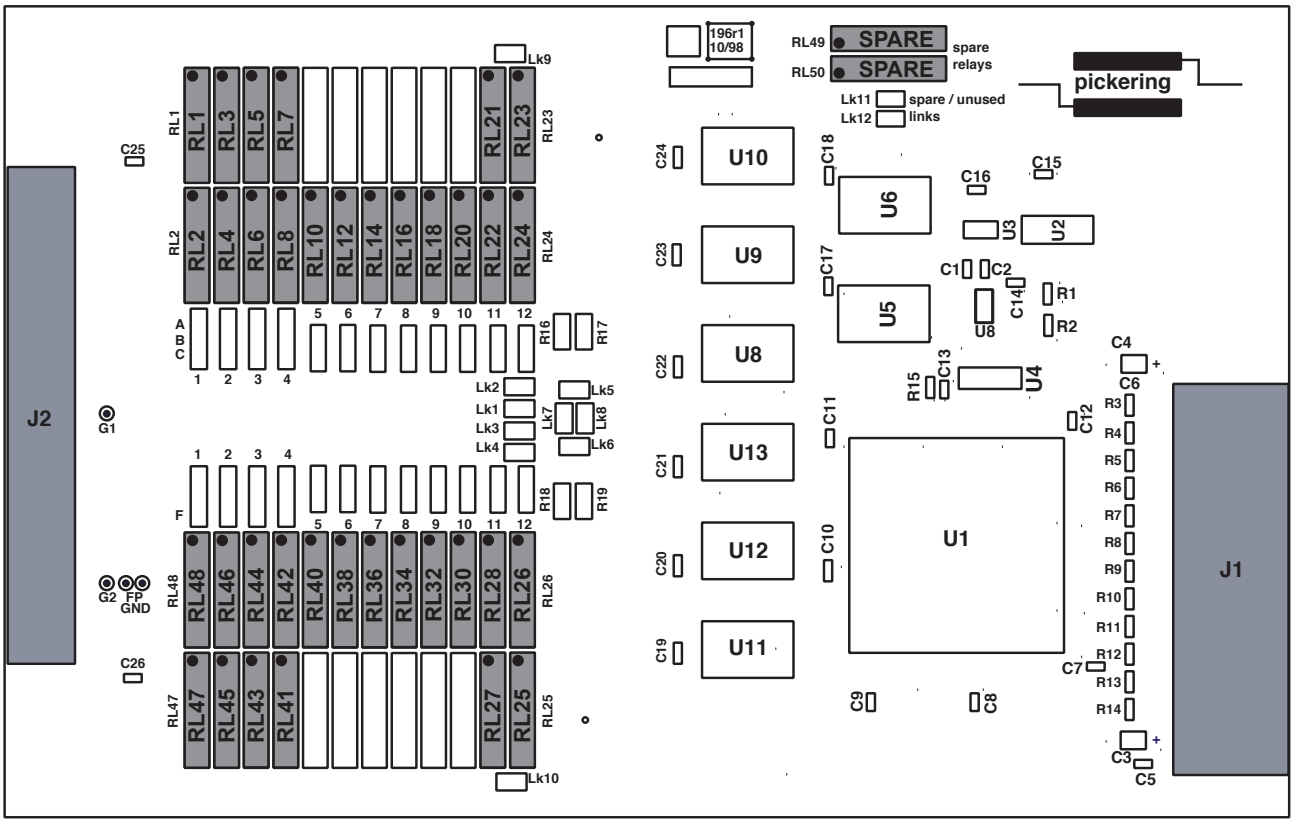


Figure 7.2 - Versatile Multiplexer Module 40-630-022: Component Layout

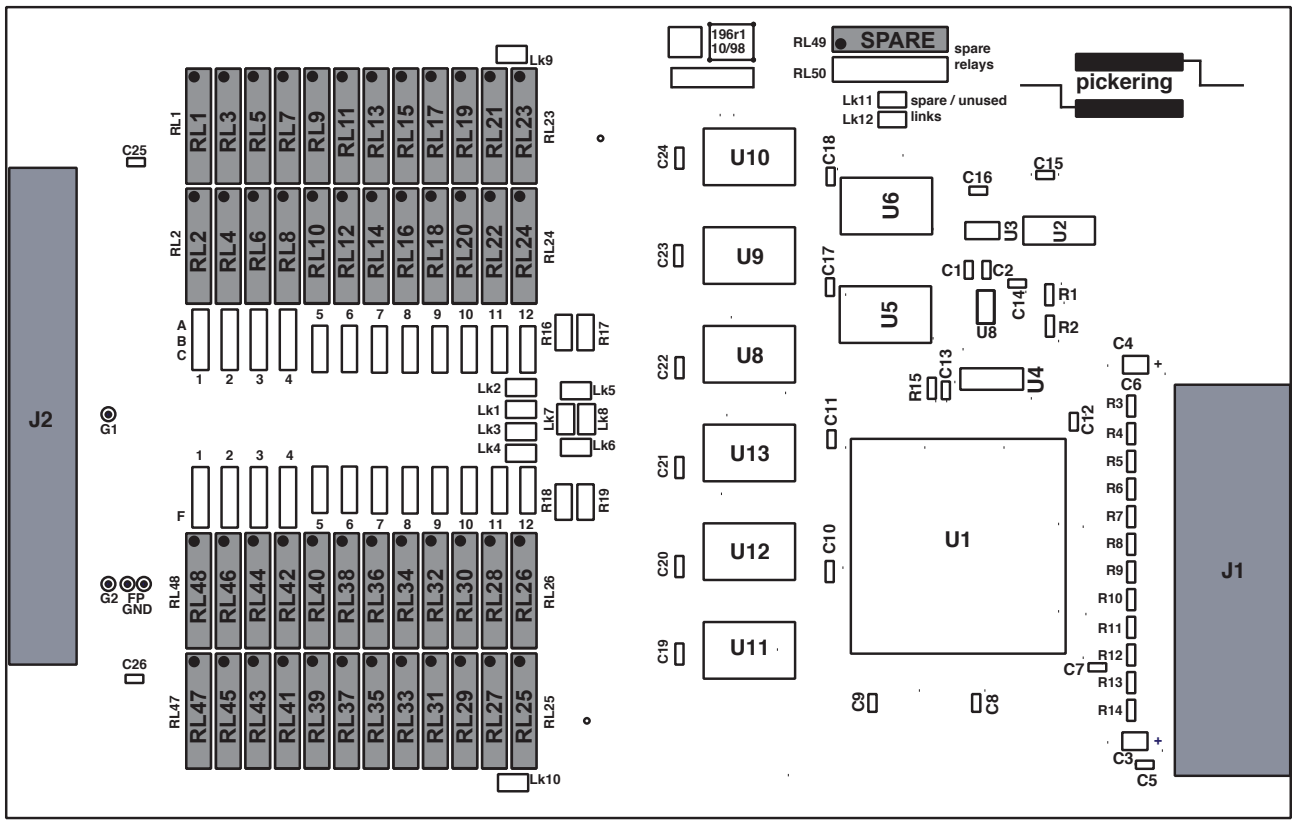


Figure 7.3 - Versatile Multiplexer Module 40-632-021: Component Layout

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