PXI 10A Fault Insertion Switch 40-192

- 6 Fault Insertion Channels
- Simulation of Various Types of Electrical Fault, Enabling Rigorous Fault Testing
- 2 Fault Insertion Buses
- High Inrush Current Rating
- Switch ±200V Signals (AC or DC)
- 10 Amp Continuous Current
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Supported by *eBIRST* ™
- 3 Year Warranty

The 40-192 is a 6 Channel Fault Insertion switch designed for the simulation of fault conditions in automotive systems.

It is designed to be able to insert 3 different fault conditions between the test fixture and the equipment under test:

- Open-Circuit
- Short-Circuit between UUT connections
- Short-Circuit to external signals

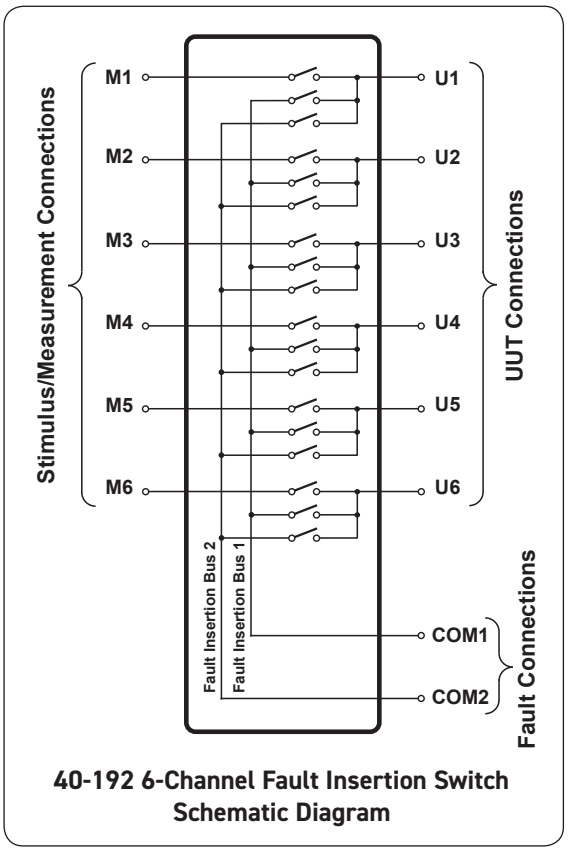
Through relays on each channel enable signals to the UUT to be set open-circuit. There are two fault insertion buses that can be used for shorting channels together or connecting a channel to an external signal such as Power, Ignition or Ground to simulate fault conditions.

The 40-192 uses solid state switching capable of withstanding inrush current of greater than 50 Amps and a peak voltage of 200V. With an indefinite number of switching operations the 40-192 can hot switch AC or DC with no life degradation.

Supported by *eBIRST*

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

Pickering's Range of PXI Fault Insertion Switches					
Model No.	**Signal Channels**	**Fault Buses**	**Fault Inputs**	**Max Voltage**	**Max Current or Bus Type**
40-190B	74, 64 or 32	1 or 2	4 or 8	165V	2A
40-191	6	2	2	40V	30A
40-192	6	2	2	200V	10A
40-193	7	1 or 2	1 or 2	16V	20A, 1A min
40-194	7	1 or 2	1 or 2	16V	20A, no min
40-195	22 or 11 pairs	—	8 or 4	150V	1A
40-196	10 or 5 pairs	—	10 or 5	110V	5A
40-197A	34 or 16	4	8	300V	2A
40-198	20	1 or 2	3 or 6	250V	5A
40-199	10	1 or 2	2	250V	10A
40-200	4 or 8 differential	4	8	100V	CAN, FlexRay
40-201	4 or 8 differential	2	4	100V	Ethernet/AFDX /BroadR-Reach
40-202	22 or 11 pairs	—	22 or 11	150V	1A



40-192 6-Channel Fault Insertion Switch Schematic Diagram

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Relay Type

The 40-192 is fitted with solid state MOSFET switches.

Switching Specification

Switch Type	Solid State MOSFET
Max Switch Voltage:	±200V (DC or AC peak)*
Continuous Switch Current:	10A
Peak Current:	50A for 200µs
Max Total Module Current:	6 channels each carrying 10A on thru path †
Max Fault Bus Current:	40A, each bus
Initial On Path Resistance:	60mΩ at 25˚C typical
Rise/Fall Time:	20µs typical
Operate Time:	70µs on, 120µs off
Recommended Maximum Cycle Rate (on, then off):	150 operations/sec
Expected Life (operations):	Indefinite when used within ratings

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

† The capacity of the module to carry 10A on all channels is chassis dependent and dependent on the number of high power modules fitted to the chassis. Specification reflects test conditions in a Pickering PXI chassis. Refer to supplier for chassis cooling capacity, restrict average RMS current over 5 minute period to 7A per channel for chassis meeting the minimum PXI recommendations.

Power Requirements

+3.3V	+5V	+12V	-12V
100mA	1A	0	0

Mechanical Characteristics

Double 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 2 front panel 8-pin male power D-Type connectors, 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.

Ordering Information

Product Order Codes

6-Channel 10A Fault Insertion Switch, Two Fault Buses	**40-192-012**

Note: The 40-192-012 supersedes the 40-192-002 which is functionally the same.

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.

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.

Product	Test Tool	Adaptor	Termination
40-192	93-005-001	93-005-236	93-012-103

Mating Connectors & Cabling

For connection accessories for the 40-192 please refer to the 90-012D 8-pin power D-Type Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

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:

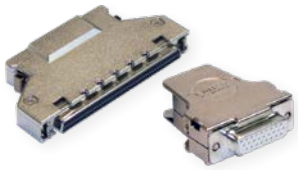
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

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

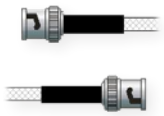
Connectivity Solutions

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.

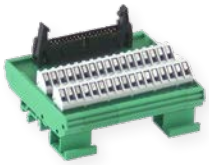


Connectors & Backshells

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.

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.