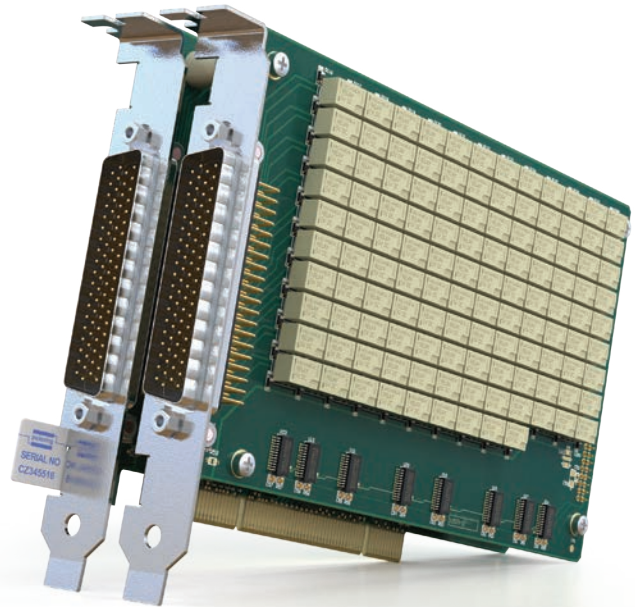


- 75, 64 or 36 Fault Insertion Channels
- Suitable for Automotive/Avionics ECU Burn-in/Endurance Test Applications
- High Density Low Cost Solution
- Simulation of Various Types of Electrical Faults, Enabling Rigorous Fault Testing
- High Relay Closure Count
- Choice of 1 or 2 Fault Insertion Buses
- Fault MUX For Selecting External Fault Conditions
- 2A Hot or Cold Switching Per Channel*
- Switch up to 165 VDC/115 VAC with 60W Max Power
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by *eBIRST*™
- 3 Year Warranty



High Density 75-Channel Version
Occupying 2 PCI Slots

The 50-190 is a Fault Insertion switch available with 75, 64 or 36 channels. It is primarily designed for simulating fault conditions in automotive & avionics applications involving the reliability testing of safety critical controllers. The Stimulus/Measurement to UUT path is suitable for CAN or Flexray.

It can be used to insert 3 different types of fault condition between the test fixture and the equipment under test:

- Open-Circuit
- Short-Circuit between UUT connections
- Short-Circuit to other signals such as Power, Ignition and Ground via Fault Insertion Bus

Channel thru relays allow the simulation of an open circuit between the stimulus/measurement connection and the UUT. Fault Insertion Buses allow any channel to be shorted to any other channel or to be connected to an external fault condition. The card is available with either 1 or 2 fault buses. A 3 channel multiplexer on each bus allows an external signal level such as Power, Ignition or Ground to be selected as the fault condition.

The default or non-powered state is with all through relays closed and all fault insertion relays open, giving an uninterrupted path between the test fixture and the equipment under test.

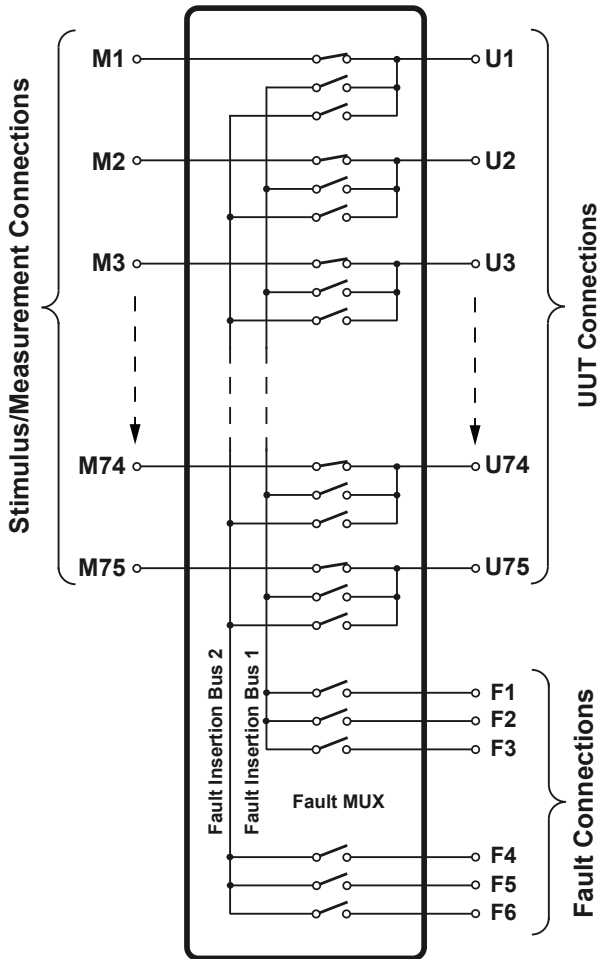
High Relay Closure Count

For flexibility, there are no limits on the number of simultaneously energized relays providing the card's ratings are not exceeded.

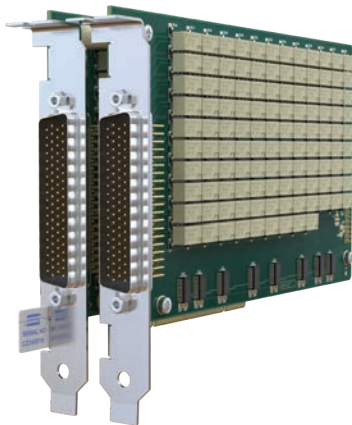
* Maximum current capability for multiple channels depends on card configuration and installation cooling - contact Pickering for more information.

Supported by *eBIRST*

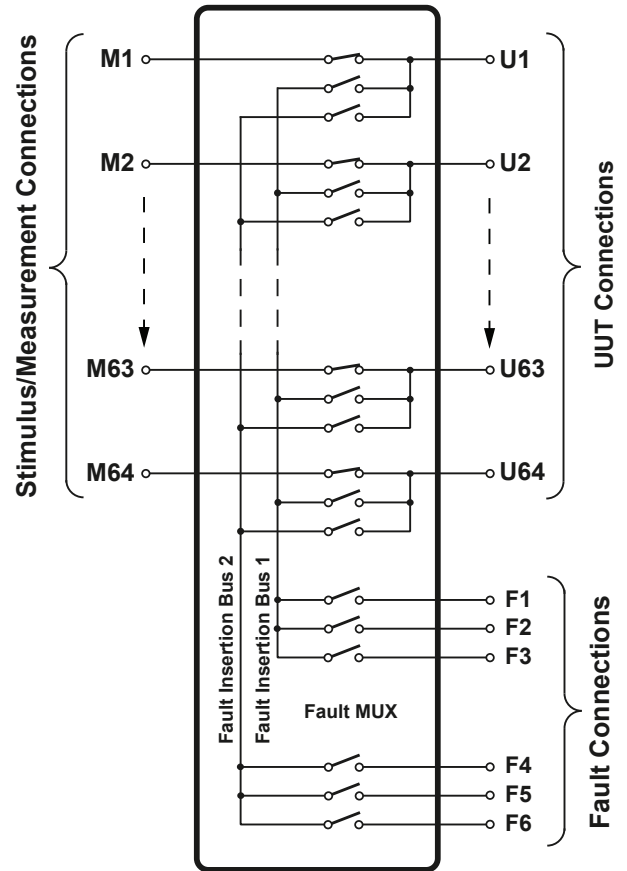
eBIRST test tools simplify switching fault-finding by quickly testing the system and graphically identifying the faulty relay. For more information go to: pickeringtest.com/ebirst



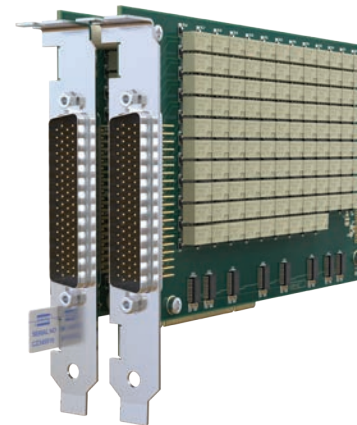
50-190-002 Dual Bus, 75-Channel Fault Insertion Switch Schematic
(50-190-001 has 1 Fault Bus)



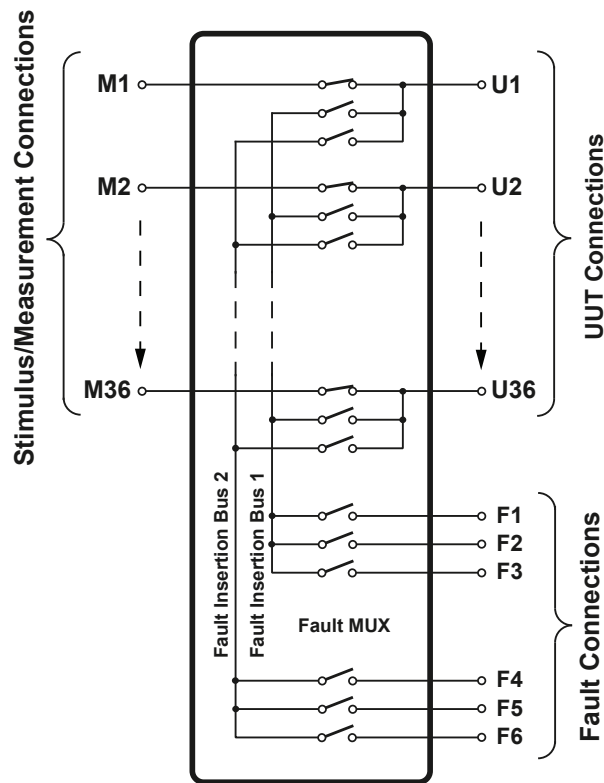
75-Channel Version Occupying 2 PCI Slots



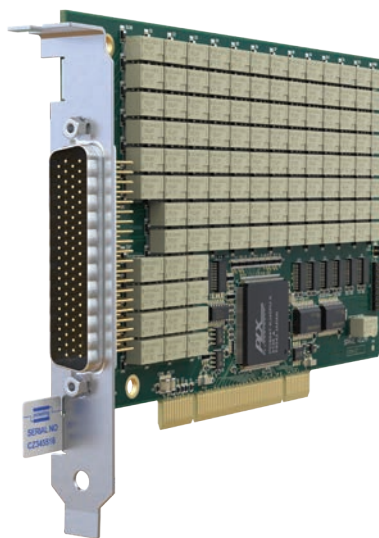
50-190-102 Dual Bus, 64-Channel Fault Insertion Switch Schematic
(50-190-101 has 1 Fault Bus)



64-Channel Version Occupying 2 PCI Slots



50-190-202 Dual Bus, 36-Channel Fault Insertion Switch Schematic (50-190-201 has 1 Fault Bus)



36-Channel Version Occupying 1 PCI Slot

Relay Type

The 50-190 is fitted with high quality electro-mechanical relays, palladium-ruthenium gold covered contacts. A spare relay is built onto the circuit board to allow easy maintenance with minimum downtime.

Switching Specification

Switch Type:	Electro-mechanical
Contact Type:	Palladium-Ruthenium, Gold Covered Bifurcated
Max Switch Voltage:	165 VDC/115 VAC*
Max Power:	60 W
Max Switch Current:	2 A
Max Continuous Carry Current:	2 A
Max Pulsed Carry Current (for a single switch path):	6 A for 100 ms (up to 10% duty cycle)
Max Total Card Switch Current:	152 A ² for 2 slot cards 76 A ² for single slot cards
Max number of simultaneously operated relays:	No Limit
Initial Path Resistance - On:	<0.5 Ω max, 0.3 Ω typical
Path Resistance - Off:	>10 ⁹ Ω
Thermal Offset:	<8 μV per relay
Typical Operate Time:	3 ms
Expected Life (operations)	
Very low power signal load:	>1x10 ⁸
Low power load (2 W):	>1.5x10 ⁷ (0.1 A 20 VDC)
Medium power load (30 W):	>5x10 ⁶ (1 A 30 VDC)
Full power load (60 W):	>1x10 ⁵ (2 A 30 VDC)

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

Bandwidth Specification

M to U path:	>35 MHz typical at 50 Ω impedance
Fault path:	>7 MHz typical at 50 Ω impedance

Power Requirements

+3.3 V	+5 V	+12 V	-12 V
0.22 A typical	<2.4 A typically 0.5 A	0	0

Mechanical Characteristics

- 36-channel versions: Single slot short PCI format
 - 64 & 75-channel versions: Dual slot short PCI format
- 3D models for all versions in a variety of popular file formats are available on request.

Connectors

Signal connectors:

- 36-channel versions: Single 78-pin male D-type
- 64 & 75-channel versions: Dual 78-pin male D-type

For pin outs please refer to the operating manual.

Operating/Storage Conditions

Operating Temperature:	0 °C to +55 °C
Humidity:	Up to 90 % non-condensing
Altitude:	5000 m
Storage Temperature:	-20 °C to +75 °C
Humidity:	Up to 90 % non-condensing
Altitude:	15000 m

PCI Compliance

The 50-190 complies with the PCI Specification 2.0 (issued Feb 2004).

Signalling Environment: 33 MHz, 32-bit Universal (+3.3 V or +5 V).

Safety & CE Compliance

All cards 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: PCI Fault Insertion Switch

Single Bus 75-Channel, 2 A	50-190-001
Dual Bus 75-Channel, 2 A	50-190-002
Single Bus 64-Channel, 2 A	50-190-101
Dual Bus 64-Channel, 2 A	50-190-102
Single Bus 36-Channel, 2 A	50-190-201
Dual Bus 36-Channel, 2 A	50-190-202

Product Customization

Pickering PCI cards 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. This product requires master slave testing and two sets of tools are required together with the master slave cable **93-970-301** for the 64 and 75-channel configurations. The 36-channel version requires a single tool. For more information go to: pickeringtest.com/ebirst

Product	Test Tool	Adaptor
50-190	93-006-001	Not Required

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
50-190	91-100-001

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

Mating Connectors & Cabling

For connection accessories for the 50-190 series please refer to the [90-006D](#) 78-pin D-type Connector Accessories data sheet where a complete list and documentation can be found for accessories.



Pickering can supply mating 78-pin connectors and cable assemblies to enable easy integration of the 50-190 series of relay cards

Connectivity Solutions

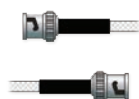
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed to mechanically and electrically mate to our modules. These accessories are detailed in Connector Accessories data sheets, where a complete list and documentation can be found for each accessory.



Connectors & Backshells



Multi-way Cable Assemblies



RF Cable Assemblies



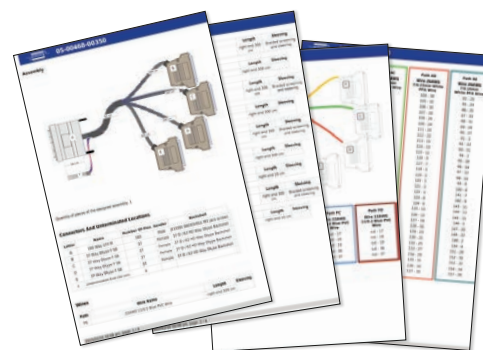
Breakouts



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.

- Fully supported on modern browsers and tablet operating systems.
- Built-in tutorials and videos allow you to get quickly up to speed.
- Store cable assemblies in the Cloud and develop over time.
- Each cable design has a downloadable PDF documentation file detailing all specifications



Start designing your custom cabling, go to pickeringtest.com/cdt

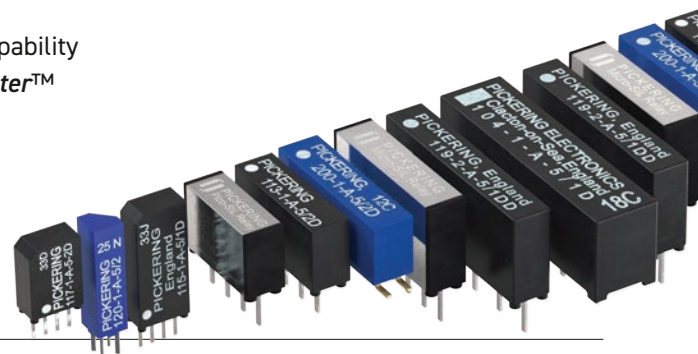
Mass Interconnect

We recommend the use of a mass interconnect solution when an Interchangeable Test Adapter (ITA) is required for PXI/LXI based test systems. Our modules are fully supported by 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 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 more information go to pickeringtest.com/os

The VISA driver support is provided for LabVIEW Real Time Operating Systems (Pharlap and Linux-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++)
- **Programming Languages** C, C++, C#, Python
- **Keysight VEE and OpenTAP**
- **Mathworks MATLAB, Simulink**
- **Marvin ATEasy**
- **MTQ Testsolutions Tecap Test & Measurement Suite**

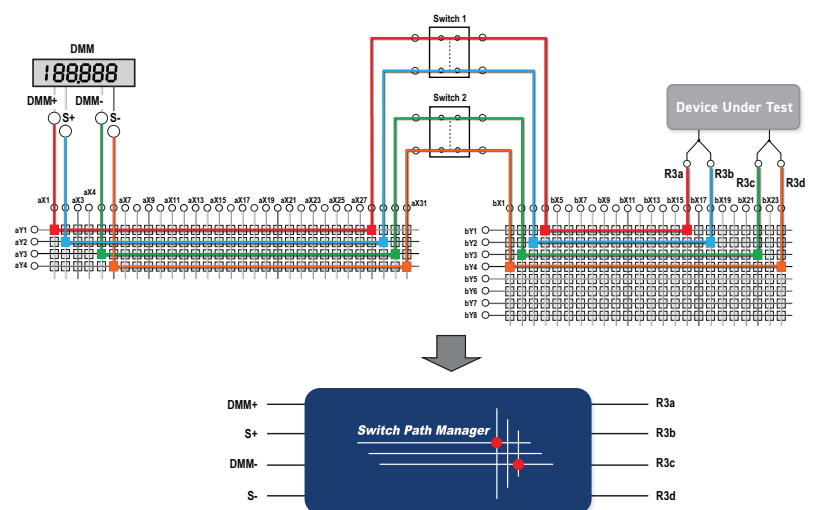
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help you develop test routines with ease.

To learn more about software drivers and development environments 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 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 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 three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available with various levels for 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 go to pickeringtest.com/support

Available Product Resources

We have a library of resources including success stories, product and support videos, articles and white papers as well as application-specific brochures to assist you. We have also published reference books on switching technology and the PXI and LXI standards.

To view, download or request any of our product resources go to pickeringtest.com/resources

