

Fault Insertion Units for PXI and PXI Express

NI PXI-2510, NI 2512, NI 2514 **NEW!**

- Simulate open, pin-to-pin, short-to-battery, and short-to-ground faults
- Control from LabVIEW Real-Time for deterministic operation

NI PXI-2510

- 68 lines with 2 fault buses
- Up to 4 faults per bus
- 150 V, 2 A switching

NI 2512, NI 2514

- 7 lines with 2 fault buses
- Up to 48 V and 10 A on the NI 2512
- Up to 28 V and 40 A on the NI 2514
- Overcurrent protection

Operating Systems

- Windows Vista/XP/2000

Recommended Software

- LabVIEW
- LabVIEW Real-Time
- LabWindows™/CVI
- Measurement Studio
- NI VeriStand

Other Compatible Software

- Microsoft Visual Basic
- C/C++

Driver Software (included)

- NI-SWITCH
- NI-DAQmx



Overview

NI PXI-2510, PXI-2512, PXIe-2512, PXI-2514, and PXIe-2514 are fault insertion units (FIUs) designed for use in hardware-in-the-loop (HIL) applications. Each module has a set of feedthrough channels that you can open or short to one or more fault buses. You can use this architecture to simulate open or interrupted connections as well as shorts between pins, shorts to battery voltages, and shorts to ground on a per-channel basis. When controlled with the NI LabVIEW Real-Time Module, these FIUs are ideal for validating the integrity of control systems including engine control units (ECUs) and full authority digital engine controls (FADECs).

Triggering and Synchronization

Each FIU module can send and receive triggers through the PXI backplane. Input triggers can advance the switch to the next fault location in a predefined list loaded onto the FIU hardware. You can use output triggers to initiate measurements on other instruments in the PXI system.

In addition, you can send triggers from real-time simulations to sequence through fault conditions for automated test coverage. For applications requiring more complex sequencing and dynamic fault control, you can use a PXI field-programmable gate array (FPGA) module to send and receive triggers to one or more FIUs via the PXI backplane.

Software for Control

In the Windows environment, you can interactively configure and test PXI switches with the NI-SWITCH Soft Front Panel. For automated control, the included NI-SWITCH hardware driver provides programmatic access to the full functionality of each module. Using the NI-SWITCH hardware driver, you can control connections individually or download a scan list to the FIU hardware to initiate hardware-timed sequences of connections. This functionality can be useful for increasing the speed of scanning through multiple test points or for simulating a loose or intermittent connection by rapidly opening and closing a single test point.

For real-time test applications, you can easily control NI PXI FIUs with NI VeriStand software, which means you can manage them in the same environment that you use to configure real-time I/O, stimulus profiles, data logging, and alarming; implement control algorithms or system simulations; build test system interfaces for a run-time editable user interface; and more.

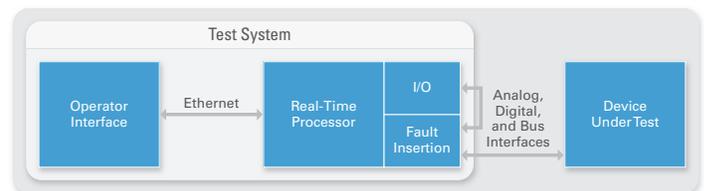


Figure 1. Typical hardware-in-the-loop (HIL) test system showing a fault insertion unit placed between test system I/O and a device under test to simulate fault conditions.

Vertrieb durch



AMC – Analytik & Messtechnik GmbH Chemnitz

Heinrich-Lorenz-Str. 55 Tel.: +49/371/38388-0
09120 Chemnitz Fax: +49/371/38388-99
E-Mail: info@amc-systeme.de Web: www.amc-systeme.de

Fault Insertion Units for PXI and PXI Express

Safety and Reliability

Because high voltages and currents are often associated with fault insertion, NI takes the utmost care with its FIUs when it comes to safety. Specifically, all NI FIUs are compliant with IEC 61010-1 international standards, and have had their designs verified through third-party agencies such as UL. Each unit is also tested prior to shipping to validate both functionality and safety.

In addition, reliability is a key concern for the integrity of long-term tests. Because they are based on FET relay technology, the NI 2512 and NI 2514 have an unlimited electrical lifetime under normal operating conditions. Additionally, the NI 2512 and NI 2514 FIUs feature integrated overcurrent and over-temperature detection to protect both the device under test (DUT) and the test system in the case of excessive loading. The higher-density PXI-2510 employs electromechanical relays which, although rated for millions of cycles, have a finite and relatively predictable lifetime under normal loading conditions. To allow for increased long-term reliability, the PXI-2510 incorporates onboard relay count tracking, which you can use to view the number of cycles each relay has undergone, thus helping you determine your maintenance and replacement needs. The PXI-2510 features a user-replaceable relay kit in the event of normal relay failure at the end of its specified lifetime.

Connectivity

Cabling and connectivity are major concerns for fault insertion applications due to the potentially large number of high voltage and high current channels that are typically involved. Each FIU offers both cabled connector options and bare-wire cable options that are specifically designed to guarantee safety, reliability, and shielding all the way to the signal terminals, thus providing a full connectivity solution. The result is improved noise and cross-talk in addition to reduced system emissions.

Ordering Information

NI PXI-2510	778572-10
Cable for NI PXI-2510 (to three 50-pin D-Sub).....	781090-01
Cable for NI PXI-2510 (to 160-pin DIN).....	781090-02
Cable for NI PXI-2510 (to bare wire).....	781090-03
IMO2PNS replacement relays (qty. 10).....	781089-10
NI PXI-2512	778572-12
NI PXIe-2512	778587-12
NI PXI-2514	778572-14
NI PXIe-2514	780587-14
Cable for NI 2512/2514 (to 8-pin D-Sub).....	781092-01
Cable for NI 2512/2514 (to bare wire).....	781092-02

BUY NOW

For complete product specifications, pricing, and accessory information, call 800 813 3693 (U.S.) or go to ni.com/switches.

Vertrieb durch



AMC – Analytik & Messtechnik GmbH Chemnitz

Heinrich-Lorenz-Str. 55 Tel.: +49/371/38388-0
09120 Chemnitz Fax: +49/371/38388-99
E-Mail: info@amc-systeme.de Web: www.amc-systeme.de

Fault Insertion Units for PXI and PXI Express

PXI-2510 Specifications

Topology

The PXI-2510 features 68 feedthrough channels and two fault buses, each of which you can open or close on a per-channel basis. Additionally, there are two fault lines, each of which has four selectable fault bus inputs. See Figure 2.

Electrical Characteristics

Maximum switching voltage.....	150 V
Maximum current.....	2 A
Maximum channel switching power.....	60 W
Maximum DC path resistance	
Initial.....	150 mΩ (typical)
End-of-life	>1 Ω
Minimum switch load	1 mA
Typical bandwidth ¹	>6.5 MHz

¹Compatible with communications signals including 1 MHz CAN and FlexRay.

Dynamic Characteristics

Relay operate time	
Typical.....	1 ms
Maximum.....	3 ms
Typical relay life	
Mechanical	1 x 10 ⁸ cycles
Electrical (resistive)	
30 V, 1 A	5 x 10 ⁵ cycles
30 V, 2 A	1 x 10 ⁵ cycles

Trigger Characteristics

Input trigger	
Sources	PXI trigger lines 0–7
Minimum pulse width.....	150 ns
Output trigger	
Destinations.....	PXI trigger lines 0–7
Pulse width.....	Programmable (1 to 62 μs)

Physical Characteristics

Relay type.....	Electromechanical, nonlatching
Contact material.....	Palladium-ruthenium, gold-covered
Front panel connector	160 DIN 41612, 160 positions, male
PXI power requirement	0.48 W at 3.3 V, typical; 6.6 W at 5 V, typical
Dimensions (L by W by H)	3U, one slot, PXI/CompactPCI module 21.6 by 2.0 by 13.0 cm (8.5 by 0.8 by 5.1 in.)

Environment

Operating temperature.....	0 to 55 °C
Storage temperature.....	-20 to 70 °C
Relative humidity	5 to 85%, noncondensing
Pollution degree	2
Maximum altitude.....	2,000 m
Indoor use only.	

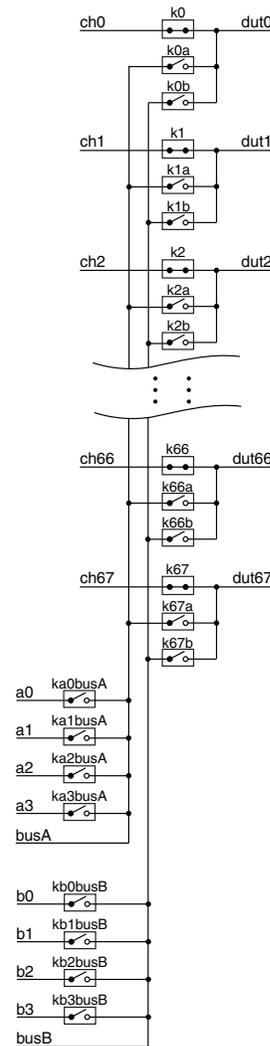


Figure 2. PXI-2510 Topology

Vertrieb durch



AMC – Analytik & Messtechnik GmbH Chemnitz

Heinrich-Lorenz-Str. 55 Tel.: +49/371/38388-0
09120 Chemnitz Fax: +49/371/38388-99
E-Mail: info@amc-systeme.de Web: www.amc-systeme.de

Fault Insertion Units for PXI and PXI Express

NI 2512, NI 2514 Specifications

Topology

NI 2512 and NI 2514 modules feature seven feedthrough channels and two fault buses, each of which you can open or close on a per-channel basis. See Figure 3.

Electrical Characteristics

	NI 2512	NI 2514
Maximum switching voltage	50 VDC	28 VDC
Maximum continuous current	10 A	40 A
Maximum pulsed current	50 A (600 μ s max)	200 A (1100 μ s max)
Overcurrent detection limit	10.5 A typical	41 A typical
Maximum channel switching power	500 W	1120 W
Maximum DC path resistance	35 m Ω	10 m Ω
Typical bandwidth ¹	>800 kHz	>800 kHz

¹Compatible with communications signals including 1 MHz CAN.

Dynamic Characteristics

Relay operate time

Typical..... 13 μ s
 Maximum..... 35 μ s

Typical relay life..... unlimited, when operated within specified limits

Trigger Characteristics

Input trigger

Sources..... PXI trigger lines 0–7
 Minimum pulse width..... 150 ns

Note: The NI 2512/14 can recognize trigger pulse widths that are less than 150 ns by disabling digital filtering. For information about disabling digital filtering, refer to the NI Switches Help.

Output trigger

Destinations..... PXI trigger lines 0–7
 Pulse width..... Programmable (1 to 62 μ s)

Physical Characteristics

Relay type..... FET
 Front panel connector..... Two D-Sub, 8 positions, male
 PXI power requirement
 PXI..... 1.0 W at 3.3 V; 13.0 W at 5 V
 PXI Express..... 1.4 W at 3.3 V; 14.7 W at +12 V
 Dimensions (L by W by H)..... 3U, two slot, PXI/CompactPCI module
 21.6 by 4.0 by 13.0 cm
 (8.5 by 1.6 by 5.1 in.)

Environment

Operating temperature..... 0 to 50 °C
 Storage temperature..... -20 to 70 °C
 Relative humidity..... 5 to 85%, noncondensing
 Pollution degree..... 2
 Maximum altitude..... 2,000 m
 Indoor use only.

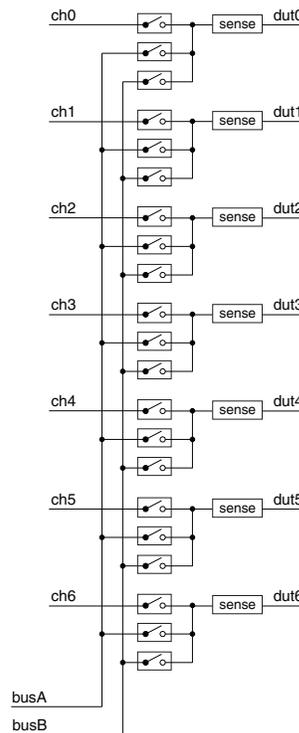


Figure 3. NI 2512/14 Topology

Vertrieb durch



AMC – Analytik & Messtechnik GmbH Chemnitz

Heinrich-Lorenz-Str. 55 Tel.: +49/371/38388-0
 09120 Chemnitz Fax: +49/371/38388-99
 E-Mail: info@amc-systeme.de Web: www.amc-systeme.de