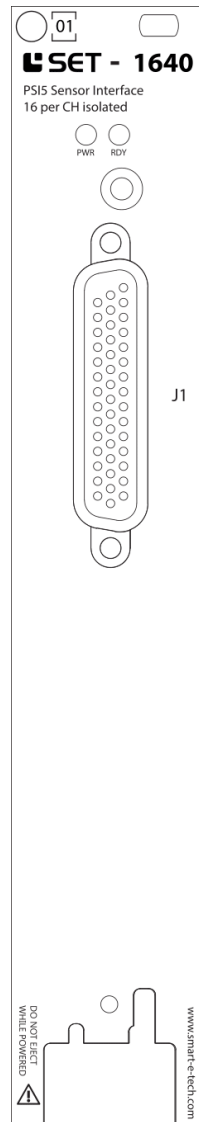




TECHNICAL DESCRIPTION

SET-1640

16 differential /32 single-ended channel fault insertion card



This document 9040TDD0250 is a technical description of the SET-1640.

-  **Note** Before you begin, complete the Software and Hardware installation procedures applicable to your application.
-  **Note** The guidelines in this document are specific to the SET-1640. The other components in the system might not meet the same safety ratings. Refer to the documentation of each component in the system to determine the safety and EMC ratings for the entire system.

MORE INFORMATION ON OUR WEBSITE:

www.smart-e-tech.de/slsc

Safety Guidelines



Caution Do not operate the SET-1640 in a manner not specified in this document. Product misuse can result in a hazard. You can compromise the safety protection built into the product if the product is damaged in any way. If the product is damaged, return it for repair.

Electromagnetic Compatibility Guidelines

This product was tested and complies with the regulatory requirements and limits for electromagnetic compatibility (EMC). These requirements and limits provide reasonable protection against harmful interference when the product is operated in the intended operational electromagnetic environment.

This product is intended for use in industrial locations. However, harmful interference may occur in some installations, when the product is connected to a peripheral device or test object, or if the product is used in residential or commercial areas. To minimize interference with radio and television reception and prevent unacceptable performance degradation, install, and use this product in strict accordance with the instructions in the product documentation.

Furthermore, any changes or modifications to the product not expressly approved by SET GmbH could void your authority to operate it under your local regulatory rules.



Caution To ensure the specified EMC performance, operate this product only with shielded cables and accessories.



Caution To ensure the specified EMC performance, the length of any cable attached to connectors J1 and J2 must be no longer than 3 m (10 ft).



Description

The SET-1640 device is a physical layer of Peripheral Sensor Interface (PSI5) for NI-SLSC. This card provides 16 isolated PSI5 slave inputs that designed to work according to PSI5 Technical Specification V2.2 Base Standard. The SET-1640 send slave's data to a PSI5 master Device Under Test (DUT) and receive data from the DUT.

PSI5 logic high and logic low current levels are adjustable from min 0.015 mA up to max 145 mA, this exceeds PSI5 specification limits and gives the possibility extended test. Current levels are controlled via the SLSC Interface; power-up current levels are set as following:

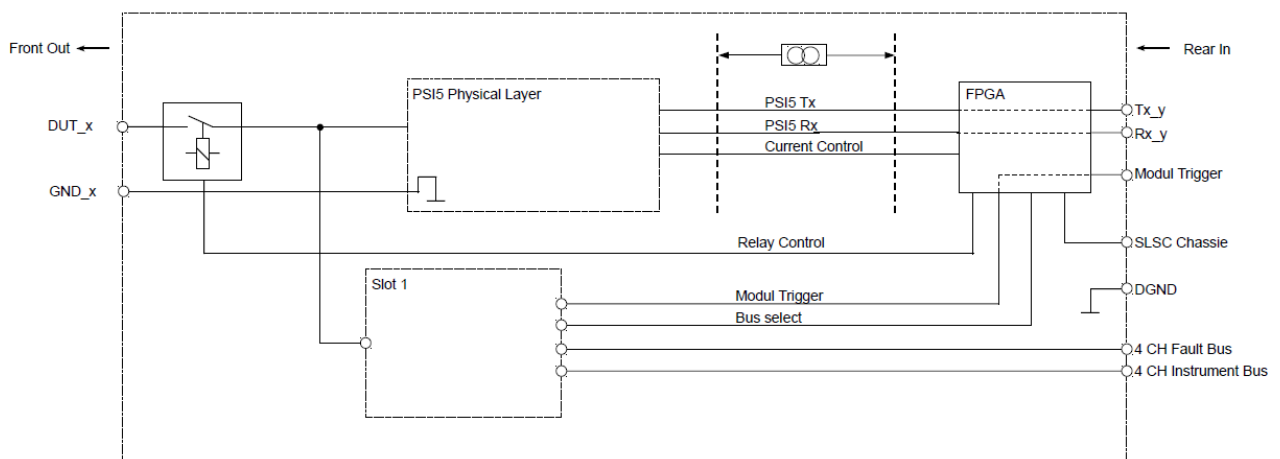
- Low level = 9.4 mA
- High level = 36.8 mA

A relay allows galvanic disconnect in each slave physically from the DUT.

The Data I/O are controlled by a logic-level digital source, like NI R-Series FPGA or NI C-Series digital output modules through the RTI. The RTI-side I/O are LVCMOS, LVTTTL and TTL compatible buffered interfaces with low leakage current.

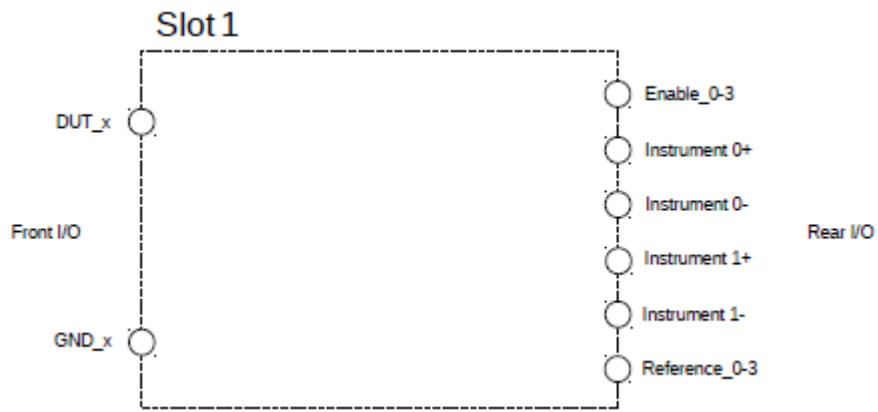
The SET-1640 can be equipped if an ADD—on card for Fault insertion or Instrument connect.

Circuitry

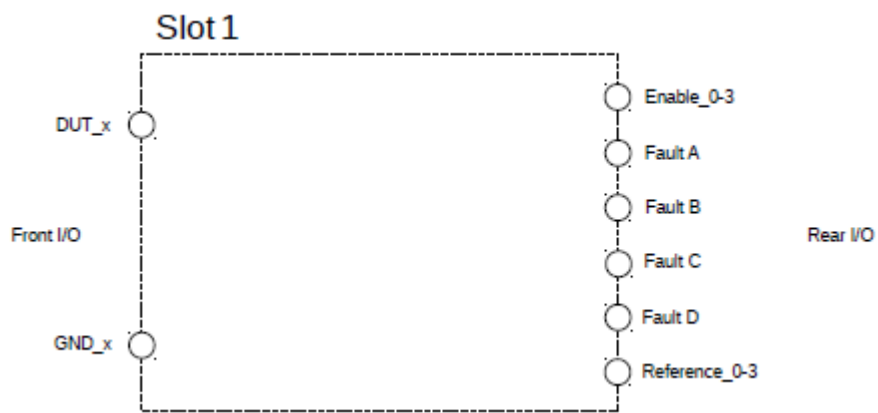


Note Diagram only shows one channel.

All voltages are relative to GND unless otherwise noted.



Reference routing to the instrument bus.



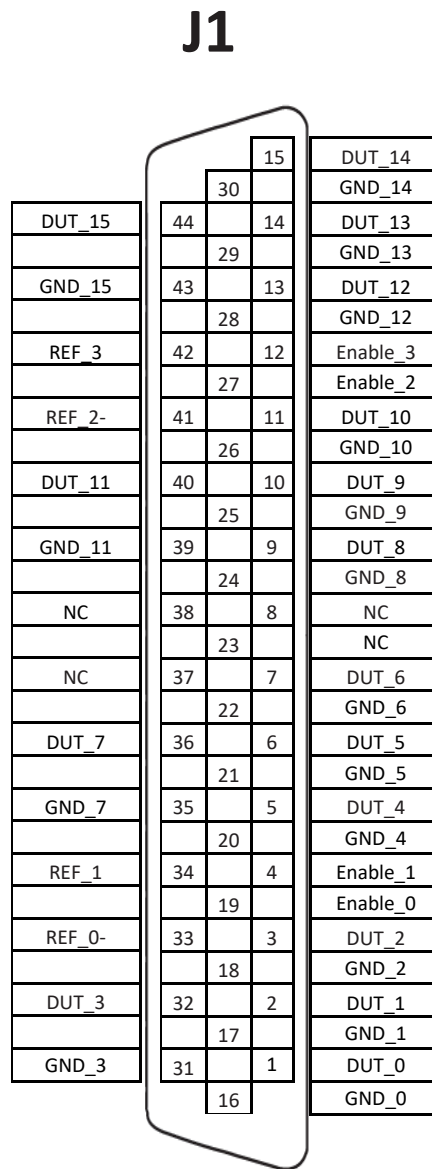
Reference routing to the fault bus.



Note At startup, Enable_0 is activated. If Enable_0 is switched, all Enable will be switched on Slot 1.

All voltages are relative to GND unless otherwise noted.

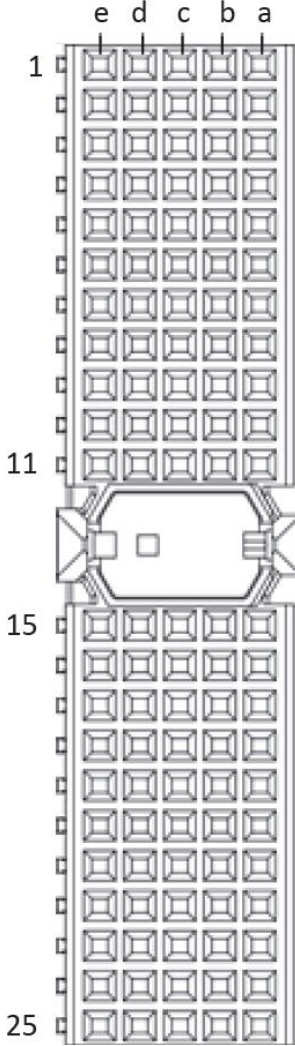
J1 Pinout (Front)



Signal	Description
DUT_x	Device Under Test x
GND	Ground connection
NC	No connection
Enable_x	Enable x

J1 Connector Pin Assignments

XJ2 Connector Pinout (Rear)



XJ2 Connector Pinout (Rear)

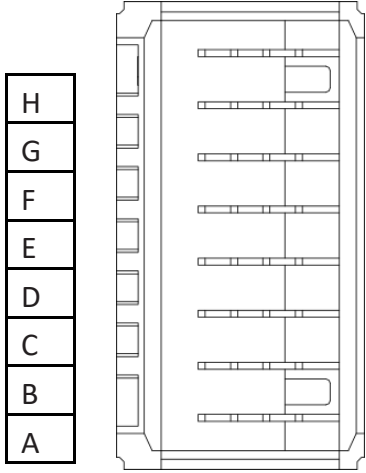
Row	e	d	c	b	a
1	TX_1	RX_1	Trigger_0	TX_0	RX_0
2	TX_3	RX_3	NC	TX_2	RX_2
3	DGND	DGND	DGND	DGND	DGND
4	TX_5	RX_5	Trigger_1	TX_4	RX_4
5	TX_7	RX_7	NC	TX_6	RX_6
6	DGND	DGND	DGND	DGND	DGND
7	TX_9	RX_9	Trigger_2	TX_8	RX_8
8	TX_11	RX_11	NC	TX_10	RX_10
9	DGND	DGND	DGND	DGND	DGND
10	TX_13	RX_13	Trigger_3	TX_12	RX_12
11	TX_16	RX_16	NC	TX_15	RX_15
12	NC	NC	NC	NC	NC
13	NC	NC	NC	NC	NC
14	NC	NC	NC	NC	NC
15	NC	NC	NC	NC	NC
16	NC	NC	NC	NC	NC
17	DGND	DGND	DGND	DGND	DGND
18	NC	NC	NC	NC	NC
19	NC	NC	NC	NC	NC
20	DGND	DGND	DGND	DGND	DGND
21	NC	NC	NC	NC	NC
22	NC	NC	NC	NC	NC
23	DGND	DGND	DGND	DGND	DGND
24	NC	NC	NC	NC	NC
25	NC	NC	NC	NC	NC

XJ2 Connector Pin Assignments

Signal	Description
DI	Digital Input signal connection
GND	Ground connection
NC	No connection

XJ2 Connector Signal Descriptions

XJ3 Connector Pinout (Rear)



Pins	Signal	Slot1/Slot2
H	V1+	Instrument 0+
G	V1-	Instrument 0-
F	V2+	Instrument 1+
E	V2-	Instrument 1-
D	V3+	Fault_A
C	V3-	Fault_B
B	V4+	Fault_C
A	V4-	Fault_D

XJ3 Connector Pin Assignments



LED Behavior

LED Name	LED Behavior	Definition of Behavior
PWR	Off	No power present on the board
	Solid green	Power good state
RDY	Off	Module card is unpowered or reset active
	Solid green	Card is recognized by chassis and ready to communicate
	Amber	Chassis is communicating
	Blinking amber	Chassis is communicating with the module card

Error Handling

LED Name	LED Behavior	Actions
PWR	Off	<ul style="list-style-type: none"> - Check power supply of chassis - Check external power supply if used
	Blinking Red	<ul style="list-style-type: none"> - Check plugin module on board - Check fuse on board
RDY	Off	<ul style="list-style-type: none"> - Check power supply of chassis - Check external power supply if used
	Solid amber	<ul style="list-style-type: none"> - Wait until boot process is finished
	Blinking amber	<ul style="list-style-type: none"> - Waiting until communication is finished - If communication does not finish, shut down all operations and reboot chassis

Hardware Specifications

Absolute Maximum Ratings			
Property	Condition	Value	Comment
Max. Channel Voltage	Measured between Ch Data & Ch GND	30 V	
Max. Channel Reverse Voltage	Measured between Ch Data & Ch GND	30 V	

Technical Data			
Property	Condition	Value	Comment
Max. Input Channel Voltage	Relative to GND	6.5 V	
Max. Input Channel Reverse Voltage	Relative to GND	-0.4 V	
Max. Input Leakage Current		-5 μ A, +5 μ A	
Max. Low-level Input Voltage		0.8 V	
Max. High-level Input Voltage		2.0 V	
Max. Channel Current		200 mA	
Max. Input Frequency		Max. 500 kHz	PSI5: 189 kbps
Min. Sync Pulse Slew Rate	$V_{bus,low} = 5 V$ $V_{bus,high} = 10 V$	0.250 V/ μ s	
Max. Sync Pulse Slew Rate	$V_{bus,low} = 5 V$ $V_{bus,high} = 10 V$	5 V/ μ s	
Data transmission speed			
Output Capacitance		10 nF (RLC Measurement device) 6 nF (Charge calculation)	
Min PSI5 Output Current Level	$V_{bus} = 5 V$	0.015 mA	
Max PSI5 Output Current Level	$V_{bus} = 16.6 V$	145 mA	
Current Level Step Width	$V_{bus} = 5 V$	37 μ a	

Physicals Characteristics			
Property	Condition	Value	Comment
Module Dimensions	Excluding ejector	144.32 mm x 30.48 mm x 302 mm (H x W x D)	Standard SLSC card size
Front Panel Connector		2x female DB -44 high-density D-Sub with 4-40 UNC screw lock	For mating connectors and cables, see below
RTI Connector		2mm hard metric per IEC 61076-101	Any RTI marked

Hardware Specifications

Environmental			
Property	Condition	Value	Comment
Operating Humidity	Relative, non-condensing	10%-90%	
Storage Humidity	Relative, non-condensing	5%-95%	
Operating Temperature	Forced-air cooling from chassis	0°C-40°C	
Storage Temperature		-40°C-85°C	
Maximum Altitude		2000 m	

