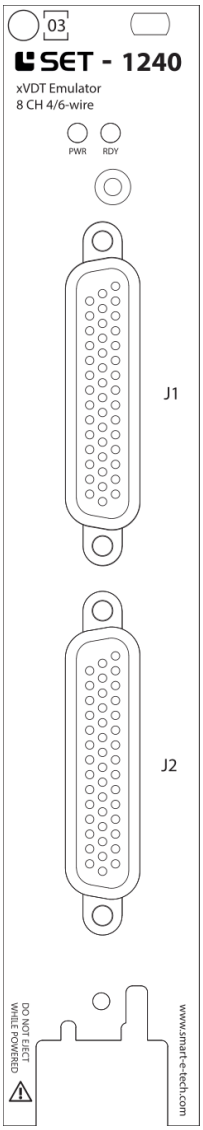
TECHNICAL DESCRIPTION

SET-1240

8 Channel 4/6-wire xVDT Emulator



This document 9040TDD1100 is a technical description of the SET-1240 xVDT Emulator card.

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-1240. 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-1240 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-1240 xVDT Emulator Card provides 8 independent xVDT emulator channels, with galvanic isolated I/O. By this the applied excitation voltage and frequency can vary from channel to channel. Each channel can be configured individually as 6-wire or 4/5-wire xVDT emulation.

The SET-1240 xVDT Emulator Card works with a wide excitation frequency range of 400 Hz to 10 kHz.

The emulated A and B signals can be controlled separately. This allows the SET-1240 xVDT Emulator Card to emulate resolvers. In 5 and 6 wire configuration this also makes the simulation of over and undervoltage faults of the A + B current sum signal possible.

The SET-1240 xVDT Emulator Card has several self-test features. One of them allows the use an excitation signal injected by the instrumentation bus of the RTI, instead of the excitation signals from the front I/O: The RTI excitation can be used for both, self-test, and normal operation.

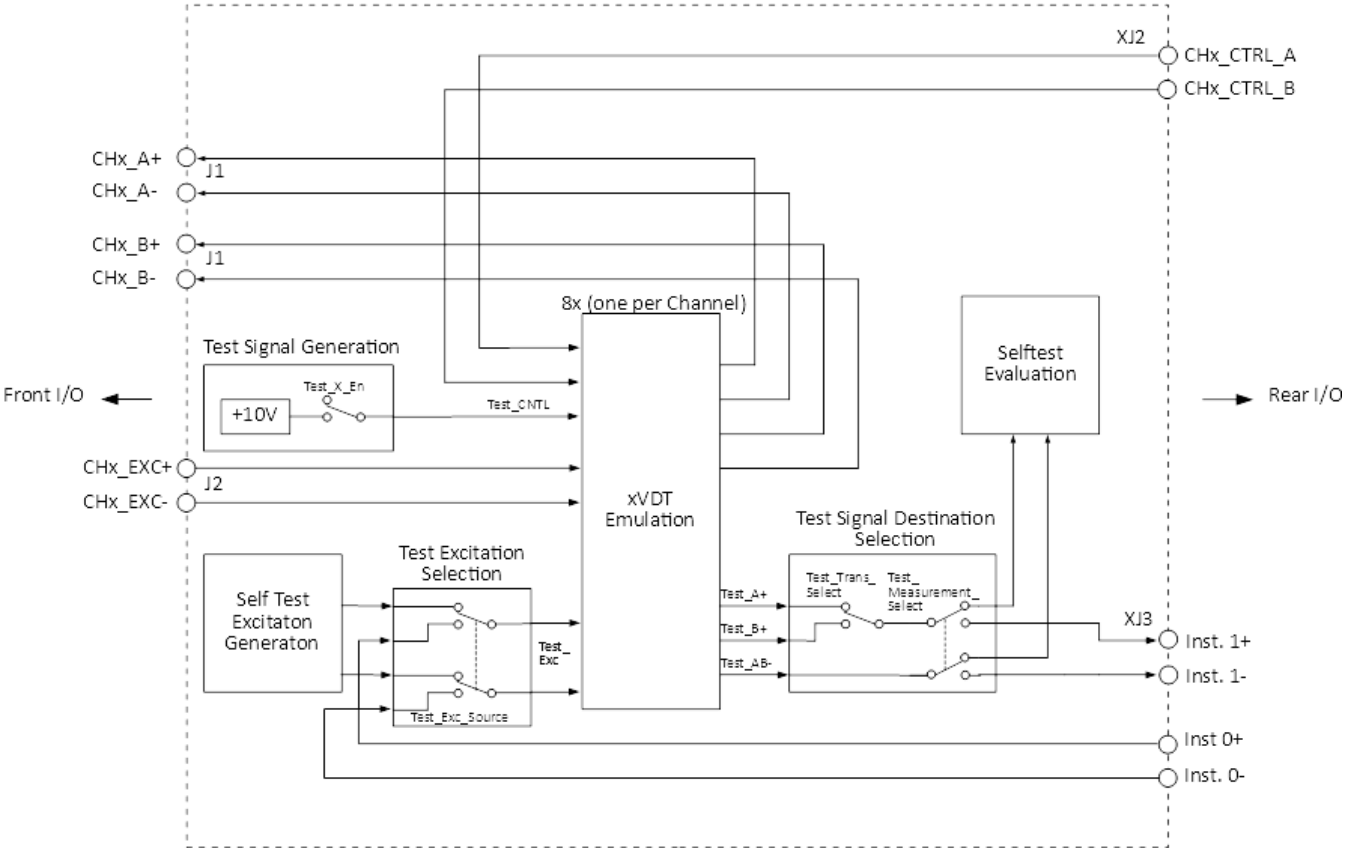
The self-test excitation generation circuit of the SET-1240 xVDT Emulator Card can generate a 400 Hz, 1 kHz, and 10 kHz excitation signal. Either this signal or the RTI excitation can be selected as test excitation.

As test CNTL signal 0 V and ±10 V ±2% can be selected, which represents a gain of 0 and 1 ±2%.

Instead of passing the A and B signals to the Front I/O, they can be switched to the internal test bus (Test_A+, Test_B+ and Test_AB-). The internal test bus can be forwarded either to the Self-test Evaluation circuit or to the instrumentation bus of the RTI. This includes the selection of either Test_A+ or Test_B+ as Test_AB+ signal.

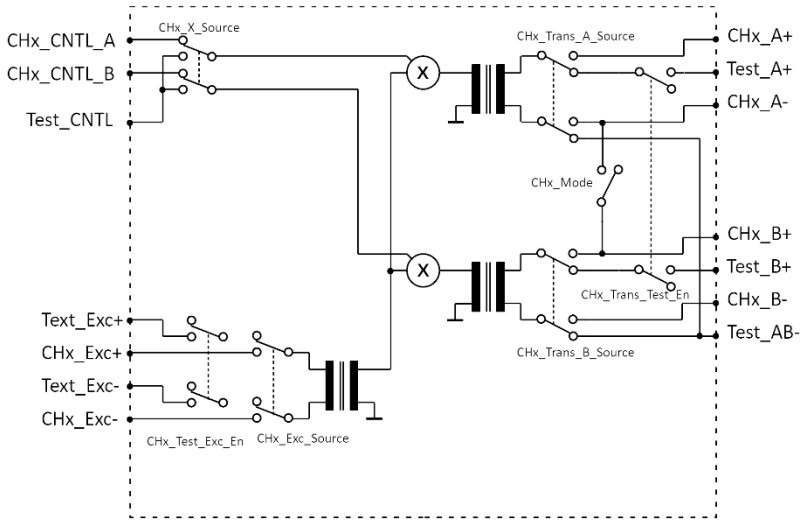
The transformers used for the galvanic isolation are mounted on an internal sub-card and can be easily replaced. Please contact the SET sales department if you require a customized transformer module.

Circuitry



Functional Block Overview

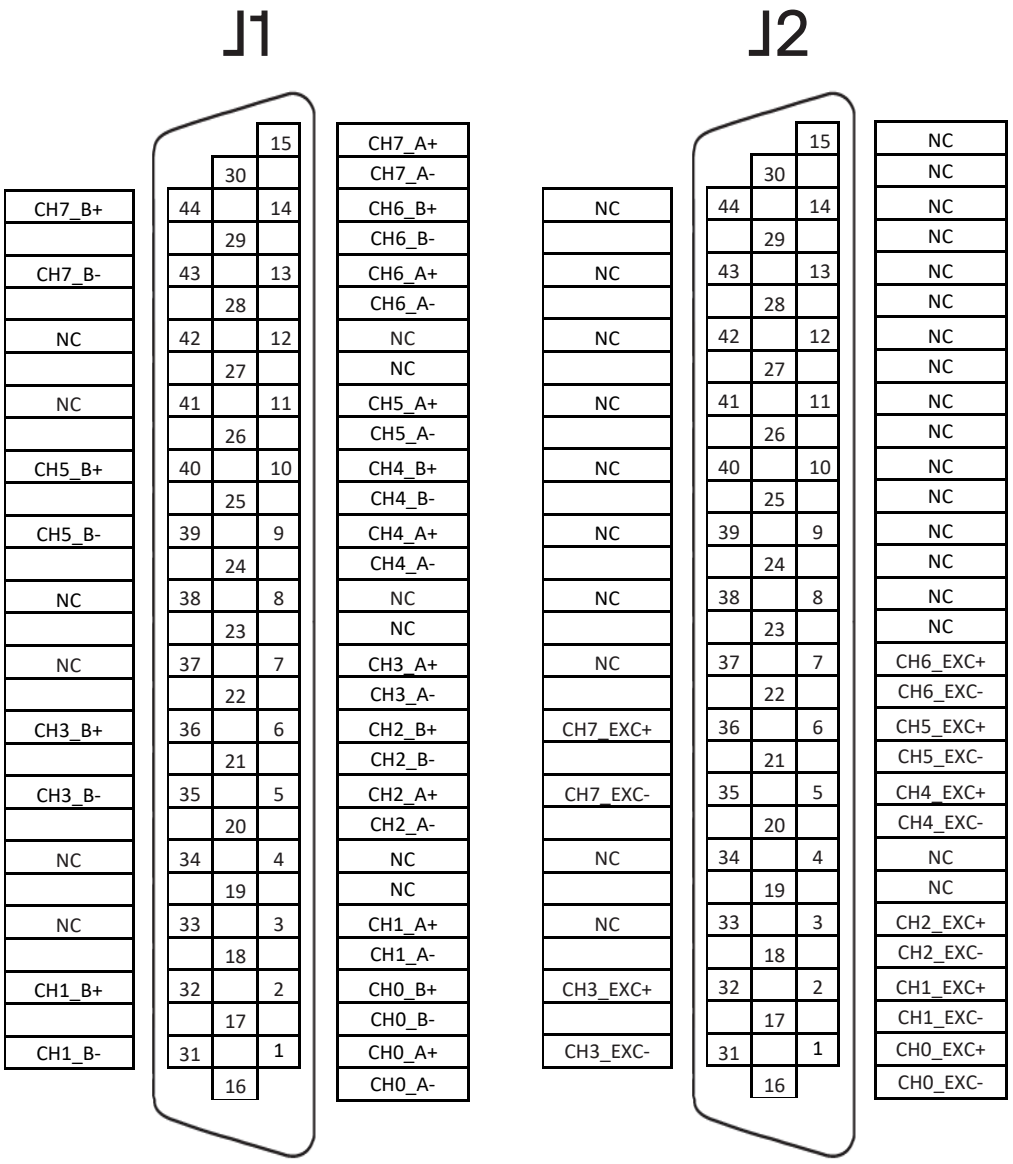
Note Diagram shows the channel specific signals for only one channel.



xVDT Emulator Block Details

Note Every channel has a separate xVDT Emulation Block.

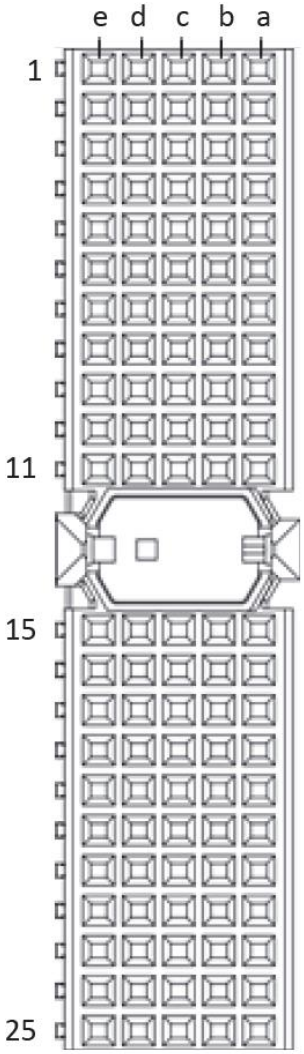
J1, J2 Pinout (Front)



Signal	Description
CHx_A+/-	6-wire mode: Emulated A signal output. 4/5-wire mode: CHx_A+ to be used as signal output (in 5-wire applications either CHx_A- or CHx_B+ can be used for common/GND line).
CHx_B+/-	6-wire mode: Emulated A signal output. 4/5-wire mode: CHx_B- to be used as signal output (in 5-wire applications either CHx_A- or CHx_B+ can be used for common/GND line).
CHx_EXC+/-	Excitation input
NC	No connection

J1, J2 Connector Pin Assignments

XJ2 Connector Pinout (Rear)



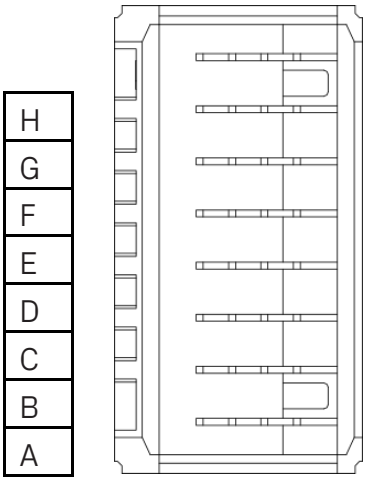
Row	e	d	c	b	a
1	CH1_CTRL_B	CH1_CTRL_A	NC	CH0_CTRL_B	CH0_CTRL_A
2	CH3_CTRL_B	CH3_CTRL_A	NC	CH2_CTRL_B	CH2_CTRL_A
3	GND	GND	GND	GND	GND
4	CH5_CTRL_B	CH5_CTRL_A	NC	CH4_CTRL_B	CH4_CTRL_A
5	CH7_CTRL_B	CH7_CTRL_A	NC	CH6_CTRL_B	CH6_CTRL_A
6	GND	GND	GND	GND	GND
7	NC	NC	NC	NC	NC
8	NC	NC	NC	NC	NC
9	GND	GND	GND	GND	GND
10	NC	NC	NC	NC	NC
11	NC	NC	NC	NC	NC
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	GND	GND	GND	GND	GND
18	NC	NC	NC	NC	NC
19	NC	NC	NC	NC	NC
20	GND	GND	GND	GND	GND
21	NC	NC	NC	NC	NC
22	NC	NC	NC	NC	NC
23	GND	GND	GND	GND	GND
24	NC	NC	NC	NC	NC
25	NC	NC	NC	NC	NC

XJ2 Connector Pin Assignments

Signal	Description
CHx_CNTL_A	Controls the A signal generation
CHx_CNTL_B	Controls the B signal generation
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+	NC
C	V3-	NC
B	V4+	NC
A	V4-	NC

XJ3 Connector Pin Assignments

Signal	Description
Instrument 0+	Input: RTI Excitation +
Instrument 0-	Input: RTI Excitation -
Instrument 1+	Output: Test Signal AB+
Instrument 1-	Output: Test Signal AB-
NC	No connection

XJ3 Connector Signal Descriptions

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

Error Handling

LED Name	LED Behavior	Actions
PWR	Off	- Check power supply of chassis - Check external power supply if used
PWR	Blinking Red	- Check plugin module on board - Check fuse on board

Hardware Specifications

Absolute Maximum Ratings			
Property	**Condition**	**Value**	**Comment**
Max. Excitation Voltage	Recommended Operation Range	400 Hz ≤ f_{Exc} ≤ 1 kHz: 3 V_{RMS}	2% F.S.
		1 kHz < f_{Exc} ≤ 7 kHz: 7 V_{RMS}	
	Operation without damage	10 V_{RMS}	
Max. Common mode Excitation Voltage		45 VDC	
Min. Common mode Excitation Voltage		-45 VDC	
Max. RTI CNTL Voltage		+10 V	
Min. RTI CNTL Voltage		-10 V	
Excitation Frequency	Recommended Operation Range	400 Hz – 10 kHz	

Technical Data			
Property	Condition	Value	Comment
Update Time		10 ms	SLSC Commit CMD duration
Expected Electrical Relay Lifetime	1 A, 30 V_{DC} resistive	10^5 operations	
DC Resistance of Transformers		115 Ω ±15%	

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		2 mm hard metric per IEC 61076-101	Any RTI marked

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		2000m	