Tracks Accessory Datasheet   *SA13816*

General Description

Tracks or Reed Tracks is the flexible interface layer between Stacks and your DUT (Device Under Test). It allows the connection of any line to any other line through a large relay multiplexer. When connected to the Core through the accessory bus, Tracks is a seamless expansion of the Core's functionality. Just like the Core, it can be controlled using Python.

Tracks is a matrix of solid-state relays that can be configured with any number of relays enabled. The relays may control high voltage, low current signals, as all relays are rated for 400V and 40mA. All inputs are galvanically isolated from the control circuitry. There are eight banks of four relays each. Among the four relay channels, a common line connects all the relays. This allows for easy signal multiplexing, yet allows for flexibility for more obscure applications.

Tracks is enclosed in a black anodized aluminum shell with LED indication of relay status on the top. Tracks mounts via 0.1" pitch pins as a component on a PCB, or alternately attaches to a breakout board. Electrically, Tracks I/O are designed with industry-standard protection, and all relays are galvanically isolated from the control circuitry.

Applications

- Automated Test Systems
- Design Verification Setups
- Muxing Networks

Features

- Stacks Accessory Bus Interface
- 400V Channel Isolation
- Bounce-less switching
- Addressable to control multiple units
- Rugged Aluminum Enclosure
- Ease of PCB Layout

Related Products

Description	Part Number
Tracks Breakout Board	SA13761
Reed Tracks Accessory	SA13732

Block Diagram

Figure 1: Block Diagram

Table of Contents

Pin Functionality Table

Please refer to Figure 1.
Tracks Accessory pin-out detail:

Pin #	Function Name	Functionality
1	+3.3V_OUT	Direct connection to the internal +3.3V bias supply. This may be used to bias external circuits. Exceeding the rated current can cause unexpected operation. Do not drive this pin.
2,10,13,15	GND	Ground for signals and power.
3	$\overline{ADDR\_0}$	LSB of the address selection pins. Connect to ground to set active, otherwise float the pin. This pin is read on power-up.
4	$\overline{ADDR\_1}$	Bit 1 of the address selection lines. Connect to ground to set active, otherwise float the pin. This pin is read on power-up.
5	$\overline{ADDR\_2}$	Bit 2 of the address selection lines. Connect to ground to set active, otherwise float the pin. This pin is read on power-up.
6	$\overline{ADDR\_3}$	Bit 3 of the address selection lines. Connect to ground to set active, otherwise float the pin. This pin is read on power-up.
7	$\overline{ADDR\_4}$	MSB of the address selection lines. Connect to ground to set active, otherwise float the pin. This pin is read on power-up.
8	$\overline{RESET}$	Connect to ground to reset the device, otherwise float the pin or pull up to +3.3V.
9	+5V	+5V device power. Typically connected to the Stacks Core's 5V DUT Power.
11	+RS485	RS485 communication line. Idle high, active low line. Typically connected to the Stacks Core.
12	-RS485	RS485 communication line. Idle low, active high line. Typically connected to the Stacks Core.
14	RX	The console RX line with respect to the Reed Tracks device. Reserved for future use and can be left unconnected.
16	TX	The console TX line with respect to the Reed Tracks device. Reserved for future use and can be left unconnected.
17,18,19,20	CH_A_0-3	Bank A reed relay output contact channels. These are normally open and can be independently controlled.
21,22,23,24	CH_B_0-3	Bank B reed relay output contact channels. These are normally open and can be independently controlled.
25,26,27,28	CH_C_0-3	Bank C reed relay output contact channels. These are normally open and can be independently controlled.
29,30,31,32	CH_D_0-3	Bank D reed relay output contact channels. These are normally open and can be independently controlled.
33,34,35,36	CH_E_0-3	Bank E reed relay output contact channels. These are normally open and can be independently controlled.
37,38,39,40	CH_F_0-3	Bank F reed relay output contact channels. These are normally open and can be independently controlled.
41,42,43,44	CH_G_0-3	Bank G reed relay output contact channels. These are normally open and can be independently controlled.

Pin #	Function Name	Functionality
45,46,47,48	CH_H_0-3	Bank H reed relay output contact channels. These are normally open and can be independently controlled.
49	CH_A_COM	The common pole for bank A reed relay contacts.
55	CH_B_COM	The common pole for bank B reed relay contacts.
60	CH_C_COM	The common pole for bank C reed relay contacts.
64	CH_D_COM	The common pole for bank D reed relay contacts.
53	CH_E_COM	The common pole for bank E reed relay contacts.
57	CH_F_COM	The common pole for bank F reed relay contacts.
62	CH_G_COM	The common pole for bank G reed relay contacts.
68	CH_H_COM	The common pole for bank H reed relay contacts.
50,51,52,54, 56,58,59,61, 63,65,66,67	NC	These are not connected inside the device to allow for sufficient voltage standoff clearance between adjacent common pins.

Electrical Specifications

Absolute Maximum Ratings[1]

T_A = 25C, unless otherwise specified.

+5V to GND ....-0.3V to 6.35V

+3.3V_OUT to GND ....-0.3V to 3.6V

RX to GND...-7.0V to 7.0V

TX to GND..-7.0V to 7.0V

$\overline{RESET}$ to GND......................................-7.0V to 7.0V

+RS485 to GND ....-27.0V to 27.0V

-RS485 to GND ....-27.0V to 27.0V

$\overline{ADDR\_0 - 4}$ to GND..............................-7.0V to 7.0V

Channel to Channel .... 400VDC/peak AC

Channel to Common .... 400VDC/peak AC

Channel to GND .... 400VDC/peak AC

Storage Temp Range ....0°C to +85°C

Operation Temp Range...........................0°C to +70°C

(1) Stresses beyond those listed may cause permanent device damage. Functional operation range of the device is defined in Recommended Operating Ratings or Electrical Characteristics. Exposure to absolute max ratings for extended periods may reduce device reliability.

Recommended Operating Ratings

T_A = 25C, unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Unit
+5V, V_{SUPPLY}	Continuous	4.5	-	5.35	V
+3.3V_{OUT} Current	Continuous	-	-	25	mA
Channel to Channel Voltage[1]	Continuous	-350	-	350	V_{DC}/AC_{PEAK}

(1) Any combination of channel to channel or common within the same bank of 4 relays.

Electrical Characteristics[1]

T_A = 25C, V_{SUPPLY} = 5V, unless otherwise specified.

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
OUTPUT						
+3.3V Output	+3.3V_{OUT}	$I_{OUT = 0}$	3.1	3.35	3.5	V
CHANNEL OUTPUTS						
Switch Voltage	V_{SW}	Max DC/peak AC (resistive)	-	-	400	V
		0°C to +70°C	-	-	350	V
Switching Current	I_{SW}	Max DC/peak AC (resistive)	-	-	40	mA
Carry Current	I_{HOLD}	Current applied only when the switch is closed	-	-	40	mA
Switch Resistance	R_{SW}	I = 10mA	-	65	100	Ω
Channel to Channel Leakage Current	$I_{O(OFF)}$	350V	-	0.3	10	nA
Channel to Channel Capacitance	$C_{(OFF)}$		-	10	15	pF
Switch Time	T_{SW}	Once the switch command is received from the accessory bus	-	1	-	ms
RS485 DRIVER						
Steady-state Differential Output Voltage	$|V_{O(SS)}|$	No load	3.3	4.2	5.3	V
		R_{TERM} = 60Ω	1.8	2.5	-	

(1) As designed and characterized, not fully tested in production unless otherwise specified.

Pinout Specifications

TOP VIEW

Figure 2: Pinout Diagram

Recommended Samtec SSQ series female headers for socket mounting:
8-pin connectors: SSQ-108-01-L-S
10-pin connectors: SSQ-105-01-L-D
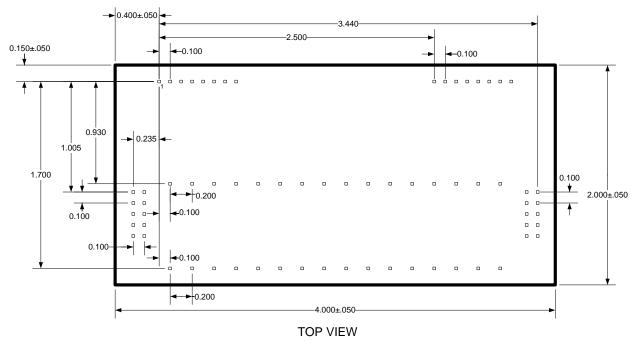16-pin connectors: SSQ-131-01-L-S

Mechanical Specifications

TOP VIEW

Figure 3: Mechanical Diagram