PXI-2503 User Manual

2025-03-26

Contents

PXI-2503 User Manual

The PXI-2503 User Manual provides detailed descriptions of the product functionality and the step by step processes for use.

Looking for Something Else?

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Related information:

- PXI-2503 Specifications
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- NI-SWTICH User Manual
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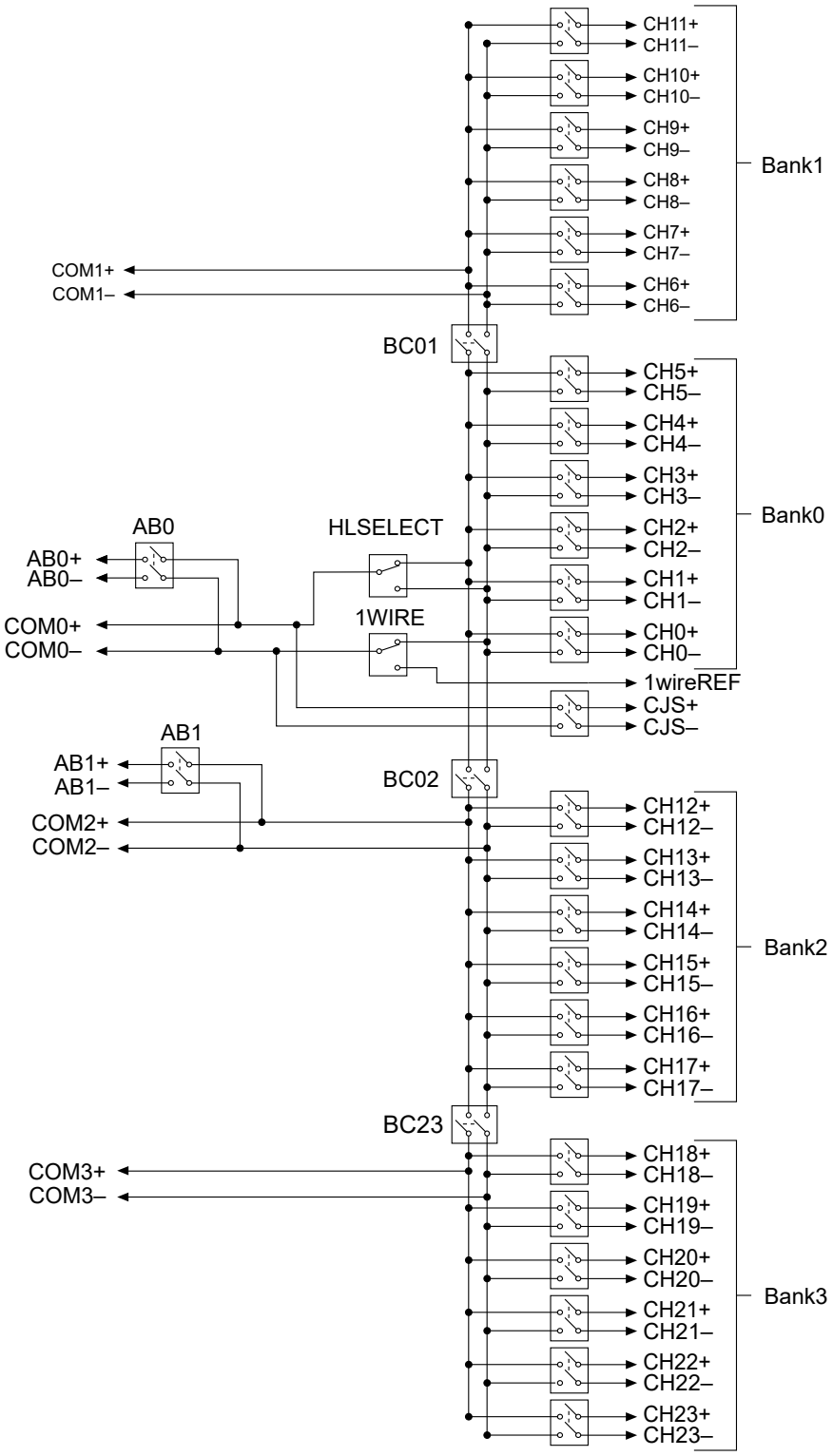
PXI-2503 Overview

Figure 1. PXI-2503 Hardware Diagram



PXI-2503 Topologies and Pinouts

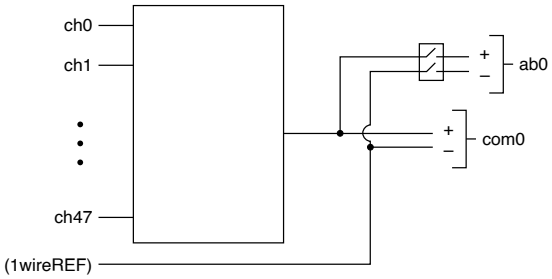
The following table lists the topologies supported by the module. Each topology supports immediate and scanning mode.

Topology	Software Name
1-wire 48x1 Multiplexer	2501/1-Wire 48x1 Mux (NISWITCH_TOPOLOGY_2501_1_WIRE_48X1_MUX)
2-wire 24x1 Amplified Multiplexer	2501/2-Wire 24x1 Mux (NISWITCH_TOPOLOGY_2501_2_WIRE_24X1_MUX)
2-wire Dual 12x1 Multiplexer	2501/2-Wire Dual 12x1 Mux (NISWITCH_TOPOLOGY_2501_2_WIRE_DUAL_MUX)
2-wire Quad 6x1 Multiplexer	2501/2-Wire Quad 6x1 Mux (NISWITCH_TOPOLOGY_2501_2_WIRE_QUAD_6X1_MUX)
4-wire 12x1 Multiplexer	2501/4-Wire 12x1 Mux (NISWITCH_TOPOLOGY_2501_4_WIRE_12X1_MUX)
2-wire 4x6 Matrix	2501/2-Wire 4x6 Matrix (NISWITCH_TOPOLOGY_2501_2_WIRE_4X6_MATRIX)

1-Wire 48 × 1 Multiplexer Topology

Connect your signals using the NI TB-2605 terminal block.

Figure 2. 1-Wire 48 × 1 Multiplexer



1-Wire 48 × 1 Multiplexer Pinout

Figure 3. 1-Wire 48 × 1 Multiplexer Pinout

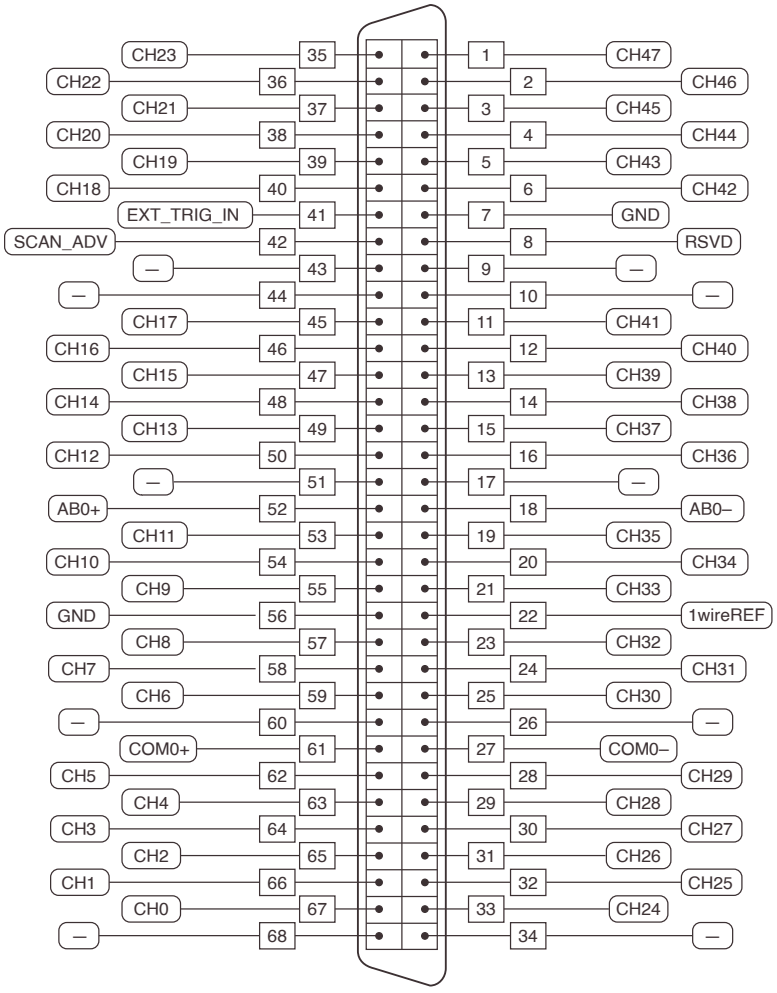


Table 1. 1-Wire 48 × 1 Multiplexer Signal Descriptions

Signal	Description
1wireREF	Signal connection reference
AB0+	Positive analog bus connection
AB0-	Negative analog bus connection
CHx	Signal connection
COM0+	Routing destination for all channels
COM0-	Routing destination for all 1wireREF connections
EXT_TRIG_IN	External trigger input connection
GND	Ground connection

Signal	Description
RSVD	Reserved, do not connect
SCAN_ADV	Scan advanced output connection
—	No connection

Table 2. 1-Wire 48 × 1 Multiplexer Terminal Block Connections

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch0	N/A	67	CH0
ch24	N/A	33	CH24
ch1	N/A	66	CH1
ch25	N/A	32	CH25
ch2	N/A	65	CH2
ch26	N/A	31	CH26
ch3	N/A	64	CH3
ch27	N/A	30	CH27
ch4	N/A	63	CH4
ch28	N/A	29	CH28
ch5	N/A	62	CH5
ch29	N/A	28	CH29
ch6	N/A	59	CH6
ch30	N/A	25	CH30
ch7	N/A	58	CH7
ch31	N/A	24	CH31
ch8	N/A	57	CH8
ch32	N/A	23	CH32
ch9	N/A	55	CH9
ch33	N/A	21	CH33

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch10	N/A	54	CH10
ch34	N/A	20	CH34
ch11	N/A	53	CH11
ch35	N/A	19	CH35
ch12	N/A	50	CH12
ch36	N/A	16	CH36
ch13	N/A	49	CH13
ch37	N/A	15	CH37
ch14	N/A	48	CH14
ch38	N/A	14	CH38
ch15	N/A	47	CH15
ch39	N/A	13	CH39
ch16	N/A	46	CH16
ch40	N/A	12	CH40
ch17	N/A	45	CH17
ch41	N/A	11	CH41
ch18	N/A	40	CH18
ch42	N/A	6	CH42
ch19	N/A	39	CH19
ch43	N/A	5	CH43
ch20	N/A	38	CH20
ch44	N/A	4	CH44
ch21	N/A	37	CH21
ch45	N/A	3	CH45
ch22	N/A	36	CH22

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch46	N/A	2	CH46
ch23	N/A	35	CH23
ch47	N/A	1	CH47
com0	+	61	COM0+
com0 (Connects to 1wireREF per diagram)	–	27	COM0–
ab0	+	52	AB0+
ab0 (relay selection to connect to 1wireREF per diagram)	–	18	AB0–
No Connect*	N/A	60	COM1+
No Connect*	N/A	26	COM1–
No Connect*	N/A	44	COM2+
No Connect*	N/A	10	COM2–
No Connect*	N/A	43	COM3+
No Connect*	N/A	9	COM3–
No Connect*	N/A	51	AB1+
No Connect*	N/A	17	AB1–
*Not used in this topology			

Making a Connection for 1-Wire 48x1 Mux Topology

In 1-wire mode, all channels can connect to COM0+. COM0– is always connected to 1_WIRE_LO_REF and can optionally be used to route the second wire of a different signal (for example, the LO terminal of a DMM) through the switch.

During scanning, an example scan list entry is ch2->com0;. This entry routes the signal connected to ch2 to COM0+.

During immediate operations when calling the niSwitch Connect Channels VI or the

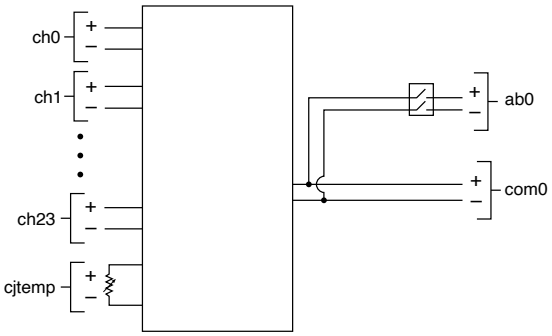
`niSwitch_Connect` function with `ch2` and `com0`, the signal connected to ch2 is routed to COM0+. To route the signals to AB0, use the niSwitch Connect Channels VI or the niSwitch_Connect function with com0 and ab0.

2-Wire 24 × 1 Multiplexer Topology

Connect your signals using the NI TB-2605 terminal block.

You can connect to a cold-junction sensor channel for cold-junction compensation.

Figure 4. 2-Wire 24 × 1 Multiplexer



2-Wire 24 × 1 Multiplexer Pinout

Figure 5. 2-Wire 24 × 1 Multiplexer Pinout

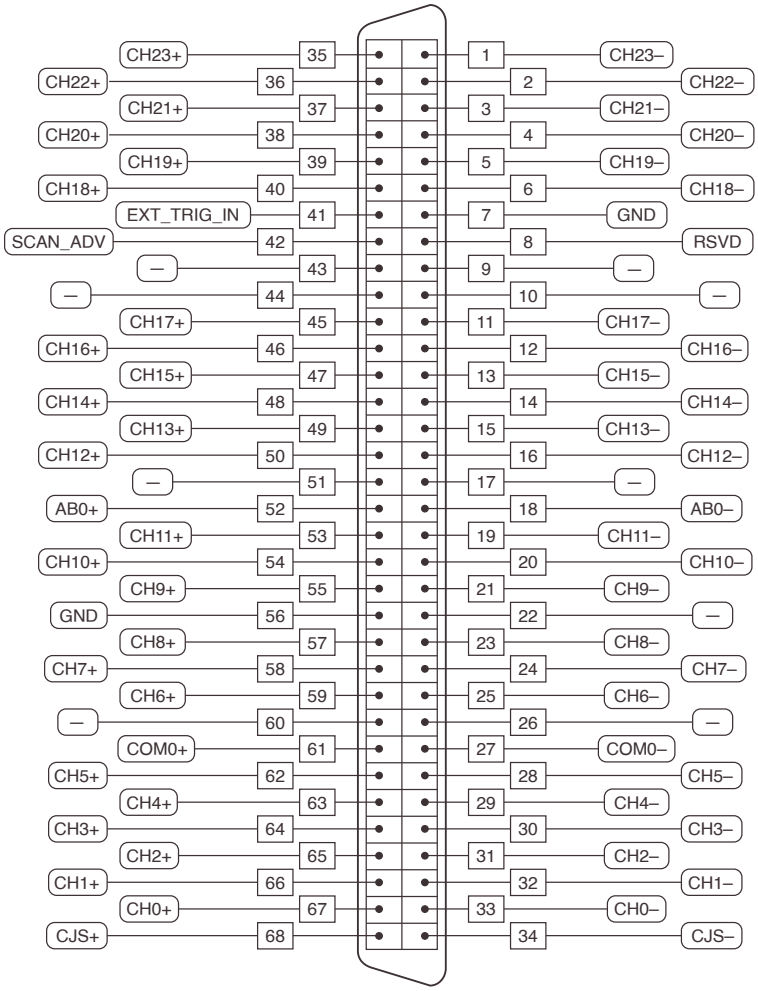


Table 3. 2-Wire 24 × 1 Multiplexer Signal Descriptions

Signal	Description
AB0+	Positive analog bus connection
AB0-	Negative analog bus connection
CHx+	Positive signal connection
CHx-	Negative signal connection
CJS+	CJC positive connection
CJS-	CJC negative connection
COM0+	Routing destination for all positive channels
COM0-	Routing destination for all negative channels

Signal	Description
EXT_TRIG_IN	External trigger input connection
GND	Ground connection
RSVD	Reserved, no connection
SCAN_ADV	Scan advanced output connection
—	No connection

Table 4. 2-Wire 24 × 1 Multiplexer Terminal Block Connections

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch0	+	67	CH0+
	–	33	CH0–
ch1	+	66	CH1+
	–	32	CH1–
ch2	+	65	CH2+
	–	31	CH2–
ch3	+	64	CH3+
	–	30	CH3–
ch4	+	63	CH4+
	–	29	CH4–
ch5	+	62	CH5+
	–	28	CH5–
ch6	+	59	CH6+
	–	25	CH6–
ch7	+	58	CH7+
	–	24	CH7–
ch8	+	57	CH8+
	–	23	CH8–

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch9	+	55	CH9+
	–	21	CH9–
ch10	+	54	CH10+
	–	20	CH10–
ch11	+	53	CH11+
	–	19	CH11–
ch12	+	50	CH12+
	–	16	CH12–
ch13	+	49	CH13+
	–	15	CH13–
ch14	+	48	CH14+
	–	14	CH14–
ch15	+	47	CH15+
	–	13	CH15–
ch16	+	46	CH16+
	–	12	CH16–
ch17	+	45	CH17+
	–	11	CH17–
ch18	+	40	CH18+
	–	6	CH18–
ch19	+	39	CH19+
	–	5	CH19–
ch20	+	38	CH20+
	–	4	CH20–
ch21	+	37	CH21+
	–	3	CH21–

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch22	+	36	CH22+
	–	2	CH22–
ch23	+	35	CH23+
	–	1	CH23–
com0	+	61	COM0+
	–	27	COM0–
ab0	+	52	AB0+
	–	18	AB0–
No Connect*	+	60	COM1+
	–	26	COM1–
No Connect*	+	44	COM2+
	–	10	COM2–
No Connect*	+	43	COM3+
	–	9	COM3–
No Connect*	+	51	AB1+
	–	17	AB1–
*Not used in this topology			

Making a Connection for 2-Wire 24 × 1 Multiplexer Topology

The module in this topology contains 24 2-wire input channels connected to a common 2-wire channel. In software, these input channels are referred to as ch<0..23> and the common channel is referred to as com0. All positive leads (CH0+ through CH23+) can connect to COM0+, and all negative leads (CH0– through CH23–) can connect to COM0–.

For example, to connect a 2-wire signal to ch5, wire the HI side to CH5+ and the LO side to CH5–. For com0, connect to COM0+ and COM0– for the HI and LO of the signal, respectively.

You can also route cjtemp to com0, which routes com0 to a temperature sensor on the NI TB-2605 terminal block. Refer to ***PXI-2503 Cold-Junction Temperature Sensor Channel*** for more information.

During scanning, an example scan list entry is CH2->com0;. This entry routes the signal connected to CH2+ to COM0+ and the signal connected to CH2– to COM0–.

During immediate operations when calling the niSwitch Connect Channels VI or the `niSwitch_Connect` function with `ch2` and `com0`, the signal connected to CH2+ is routed to COM0+ and the signal connected to CH2– is routed to COM0–. To route the signals to AB0, use the niSwitch Connect Channels VI or the niSwitch_Connect function with com0 and ab0.

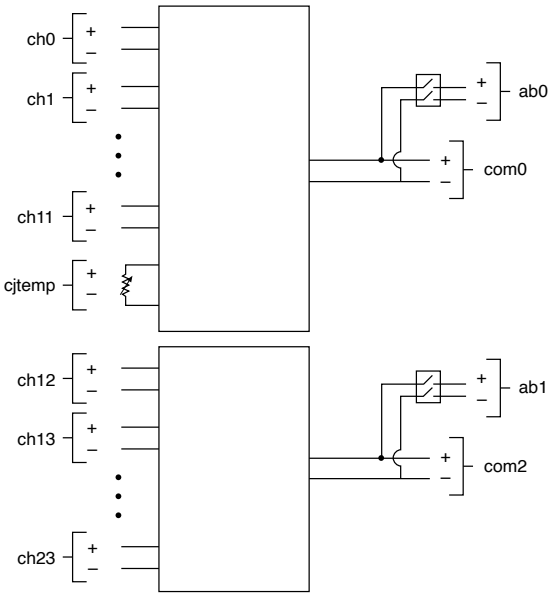
Related reference:

- PXI-2503 Cold-Junction Temperature Sensor Channel

2-Wire Dual 12 × 1 Multiplexer Topology

Connect your signals using the NI TB-2605 terminal block.

Figure 6. 2-Wire Dual 12 × 1 Multiplexer



2-Wire Dual 12 × 1 Multiplexer Pinout

Figure 7. 2-Wire Dual 12 × 1 Multiplexer Pinout

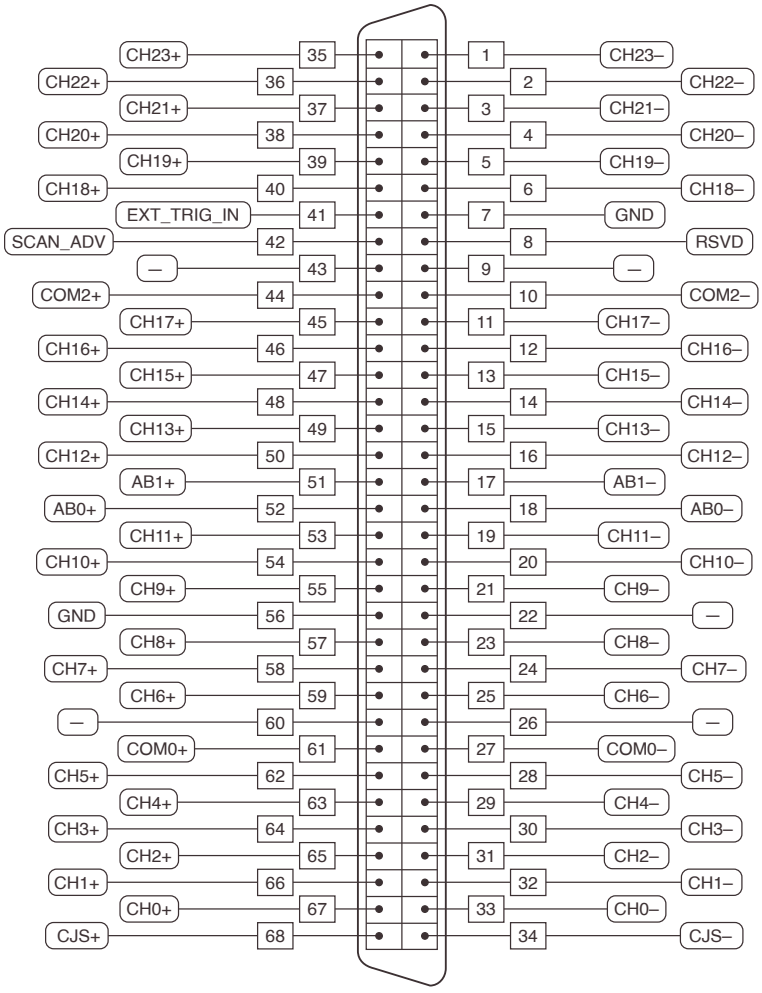


Table 5. 2-Wire Dual 12 × 1 Multiplexer Signal Descriptions

Signal	Description
ABx+	Positive analog bus connection
ABx-	Negative analog bus connection
CHx+	Positive signal connection
CHx-	Negative signal connection
CJS+	CJC positive connection
CJS-	CJC negative connection
COMx+	Routing destination for corresponding positive signal connections
COMx-	Routing destination for corresponding negative signal connections

Signal	Description
EXT_TRIG_IN	External trigger input connection
GND	Ground connection
RSVD	Reserved, no connection
SCAN_ADV	Scan advanced output connection
—	No connection

Table 6. 2-Wire Dual 12 × 1 Multiplexer Terminal Block Connections

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch0	+	67	CH0+
	–	33	CH0–
ch1	+	66	CH1+
	–	32	CH1–
ch2	+	65	CH2+
	–	31	CH2–
ch3	+	64	CH3+
	–	30	CH3–
ch4	+	63	CH4+
	–	29	CH4–
ch5	+	62	CH5+
	–	28	CH5–
ch6	+	59	CH6+
	–	25	CH6–
ch7	+	58	CH7+
	–	24	CH7–
ch8	+	57	CH8+
	–	23	CH8–

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch9	+	55	CH9+
	–	21	CH9–
ch10	+	54	CH10+
	–	20	CH10–
ch11	+	53	CH11+
	–	19	CH11–
ch12	+	50	CH12+
	–	16	CH12–
ch13	+	49	CH13+
	–	15	CH13–
ch14	+	48	CH14+
	–	14	CH14–
ch15	+	47	CH15+
	–	13	CH15–
ch16	+	46	CH16+
	–	12	CH16–
ch17	+	45	CH17+
	–	11	CH17–
ch18	+	40	CH18+
	–	6	CH18–
ch19	+	39	CH19+
	–	5	CH19–
ch20	+	38	CH20+
	–	4	CH20–
ch21	+	37	CH21+
	–	3	CH21–

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch22	+	36	CH22+
	–	2	CH22–
ch23	+	35	CH23+
	–	1	CH23–
com0	+	61	COM0+
	–	27	COM0–
com2	+	44	COM2+
	–	10	COM2–
ab0	+	52	AB0+
	–	18	AB0–
ab1	+	51	AB1+
	–	17	AB1–
No Connect*	+	60	COM1+
	–	26	COM1–
No Connect*	+	43	COM3+
	–	9	COM3–
*Not used in this topology			

Making a Connection for 2-Wire Dual 12 × 1 Multiplexer Topology

The module in this topology contains two banks of 12 2-wire input channels connected to a common 2-wire channel. These input channels are referred to as ch<0..23> and the two common channels are referred to as com0 and com2. You can only connect to the common channel that is in the same bank. The banks are organized as follows:

Input Channels	Common Channel
ch0, ch1, ch2, ch3, ch4, ch5, ch6, ch7, ch8, ch9, ch10, ch11, cjtemp	com0
ch12, ch13, ch14, ch15, ch16, ch17, ch18, ch19, ch20, ch21, ch22, ch23	com2

For example, you can connect ch5 to com0; however, you cannot connect ch5 to com2 in this topology. When connecting signals for ch5, you would connect them to CH5+ and CH5– for HI and LO of the signal, respectively. For com0, connect to COM0+ and COM0– for HI and LO of the signal, respectively. Notice that in the first bank you can connect cjtemp to com0. This connects com0 to a temperature sensor on the NI TB-2605 terminal block. Refer to ***PXI-2503 Cold-Junction Temperature Sensor Channel*** for more information.

During scanning, an example scan list entry is `ch2->com0;`. This entry routes the signal connected to CH2+ to COM0+ and the signal from CH2– to COM0–.

During immediate operations when calling the niSwitch Connect Channels VI or the `niSwitch_Connect` function with `ch2+` and `com0`, the signal connected to CH2+ is routed to COM0+ and the signal connected to CH2– is routed to COM0–. To route the signals to AB0, use the niSwitch Connect Channels VI or the niSwitch_Connect function with com0 and ab0.

Related reference:

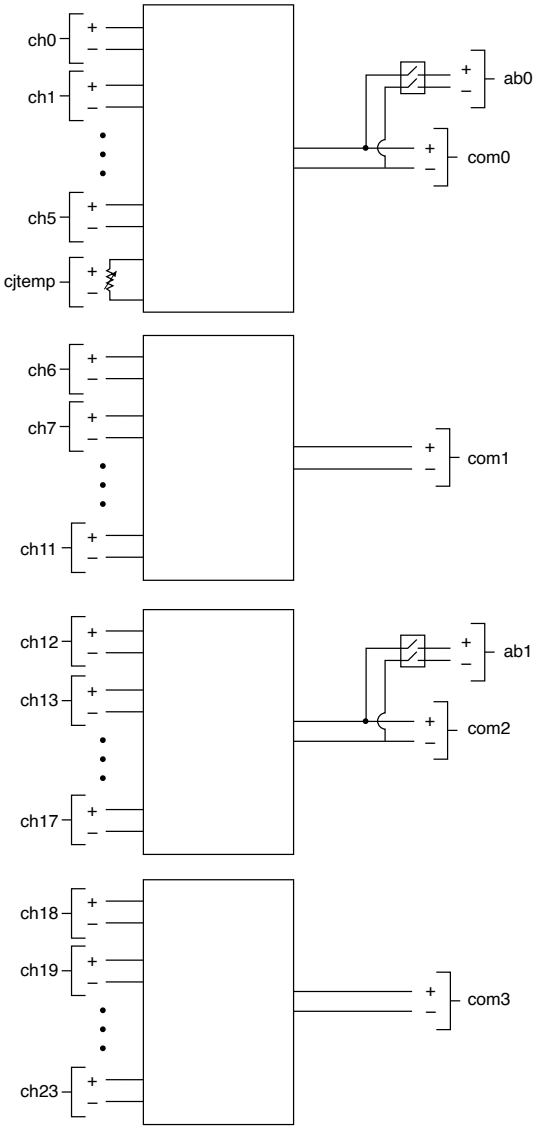
- PXI-2503 Cold-Junction Temperature Sensor Channel

2-Wire Quad 6×1 Multiplexer Topology

Connect your signals using the NI TB-2605 terminal block.

You can connect to a cold-junction sensor channel for cold-junction compensation.

Figure 8. 2-Wire Quad 6 × 1 Multiplexer



2-Wire Quad 6 × 1 Multiplexer Pinout

Figure 9. 2-Wire Quad 6 × 1 Multiplexer Pinout

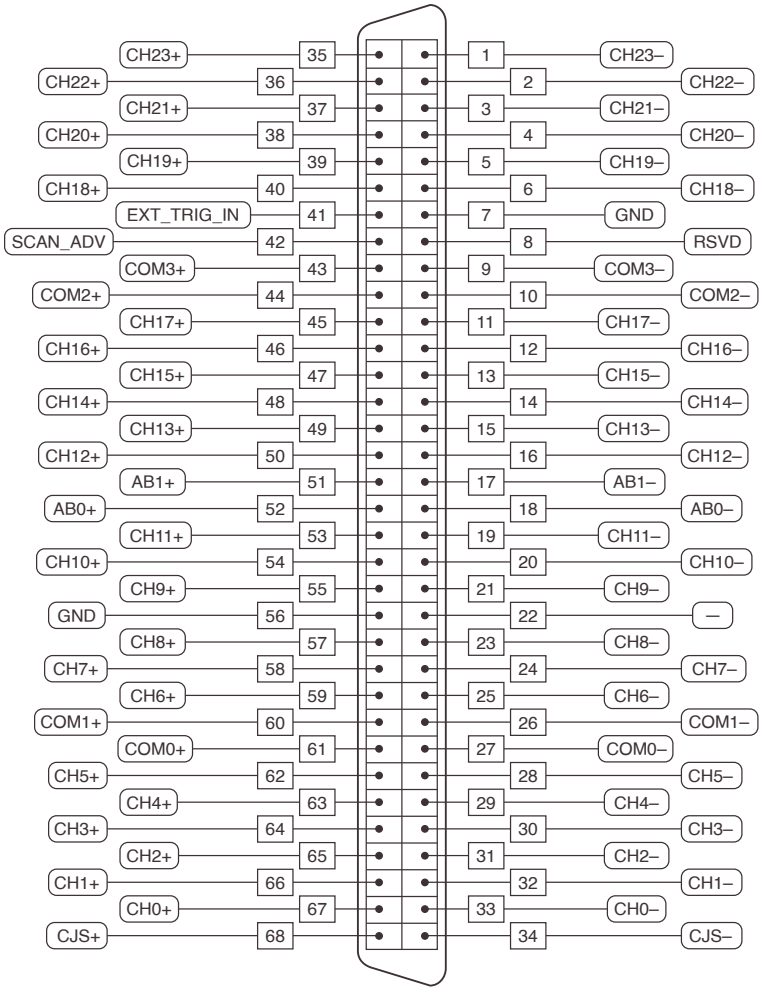


Table 7. 2-Wire Quad 6 × 1 Multiplexer Signal Descriptions

Signal	Description
ABx+	Positive analog bus connection
ABx-	Negative analog bus connection
CHx+	Positive signal connection
CHx-	Negative signal connection
CJS+	CJC positive connection
CJS-	CJC negative connection
COMx+	Routing destination for corresponding positive signal connections

Signal	Description
COMx-	Routing destination for corresponding negative signal connections
EXT_TRIG_IN	External trigger input connection
GND	Ground connection
RSVD	Reserved, no connection
SCAN_ADV	Scan advanced output connection
—	No connection

Table 8. 2-Wire Quad 6 × 1 Multiplexer Terminal Block Connections

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch0	+	67	CH0+
	–	33	CH0–
ch1	+	66	CH1+
	–	32	CH1–
ch2	+	65	CH2+
	–	31	CH2–
ch3	+	64	CH3+
	–	30	CH3–
ch4	+	63	CH4+
	–	29	CH4–
ch5	+	62	CH5+
	–	28	CH5–
ch6	+	59	CH6+
	–	25	CH6–
ch7	+	58	CH7+
	–	24	CH7–

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch8	+	57	CH8+
	–	23	CH8–
ch9	+	55	CH9+
	–	21	CH9–
ch10	+	54	CH10+
	–	20	CH10–
ch11	+	53	CH11+
	–	19	CH11–
ch12	+	50	CH12+
	–	16	CH12–
ch13	+	49	CH13+
	–	15	CH13–
ch14	+	48	CH14+
	–	14	CH14–
ch15	+	47	CH15+
	–	13	CH15–
ch16	+	46	CH16+
	–	12	CH16–
ch17	+	45	CH17+
	–	11	CH17–
ch18	+	40	CH18+
	–	6	CH18–
ch19	+	39	CH19+
	–	5	CH19–
ch20	+	38	CH20+

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
	–	4	CH20–
ch21	+	37	CH21+
	–	3	CH21–
ch22	+	36	CH22+
	–	2	CH22–
ch23	+	35	CH23+
	–	1	CH23–
com0	+	61	COM0+
	–	27	COM0–
com1	+	60	COM1+
	–	26	COM1–
com2	+	44	COM2+
	–	10	COM2–
com3	+	43	COM2+
	–	9	COM2–
ab0	+	52	AB0+
	–	18	AB0–
ab (Not used in this topology)	+	51	AB1+
	–	17	AB1–

Making a Connection for 2-Wire Quad 6 × 1 Multiplexer Topology

The module in this topology contains four banks of six 2-wire input channels connected to a common 2-wire channel. These input channels are referred to as ch<0..23>, and the four common channels are referred to as com<0..3>. You can only connect to the common channel that is in the same bank. The banks are organized as

shown in the following table.

Input Channels	Common Channel
ch0, ch1, ch2, ch3, ch4, ch5, cjtemp	com0
ch6, ch7, ch8, ch9, ch10, ch11	com1
ch12, ch13, ch14, ch15, ch16, ch17	com2
ch18, ch19, ch20, ch21, ch22, ch23	com3

For example, you can connect ch5 to com0; however, you cannot connect ch5 to com1 in this topology. When connecting signals for ch5, you would connect them to CH5+ and CH5– for HI and LO of the signal, respectively. For com0, connect to COM0+ and COM0– for HI and LO of the signal, respectively.

Notice that in the first bank you can connect cjtemp to com0. This connects com0 to a temperature sensor on the NI TB-2605 terminal block. Refer to ***PXI-2503 Cold-Junction Temperature Sensor Channel*** for more information.

During scanning, an example scan list entry is `ch2->com0`; This entry routes the signal connected to CH2+ to COM0+ and the signal connected to CH2– is routed to COM0–.

During immediate operations when calling the niSwitch Connect Channels VI or the `niSwitch_Connect` function with `ch2+` and `com0`, the signal connected to CH2+ is routed to COM0+. To route the signals to ABO, use the niSwitch Connect Channels VI or the niSwitch_Connect function with com0 and ab0 and the signal connected to CH2– is routed to COM0–.

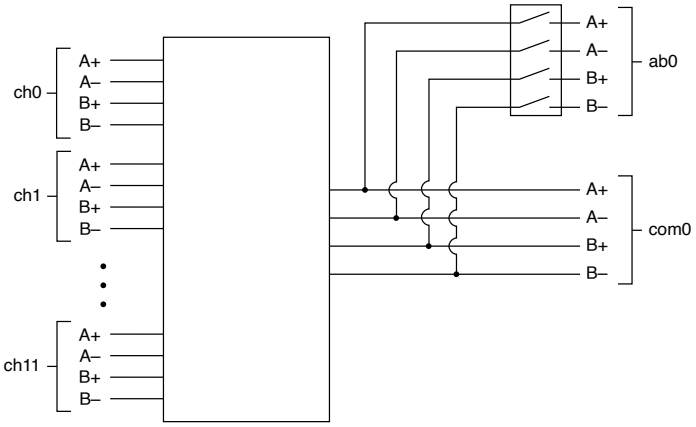
Related reference:

- PXI-2503 Cold-Junction Temperature Sensor Channel

4-Wire 12 × 1 Multiplexer Topology

Connect your signals using the NI TB-2605 terminal block.

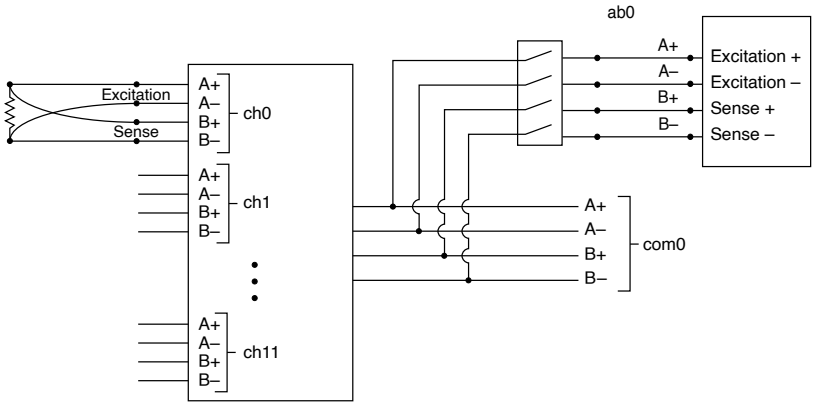
Figure 10. 4-Wire 12 × 1 Multiplexer



4-Wire Resistance Measurements

4-wire mode is usually used in 4-wire resistance measurements. One pair of wires supplies the excitation while the other pair makes the voltage measurement. In 4-wire mode, connect your excitation or source leads to CHxA+ and CHxA-, and connect your measurement or sensing leads to CHxB+ and CHxB-, as shown in the following figure.

Figure 11. 4-Wire Resistance Measurements



Note The previous figure shows the DMM connected to the analog bus (AB) of the switch module. Instead of routing signals to the AB, you can connect COM0A+ and COM0A- to the excitation terminals and COM0B+ and COM0B- to the sense terminals of the DMM.

4-Wire 12 × 1 Multiplexer Pinout

Figure 12. 4-Wire 12 × 1 Multiplexer Pinout

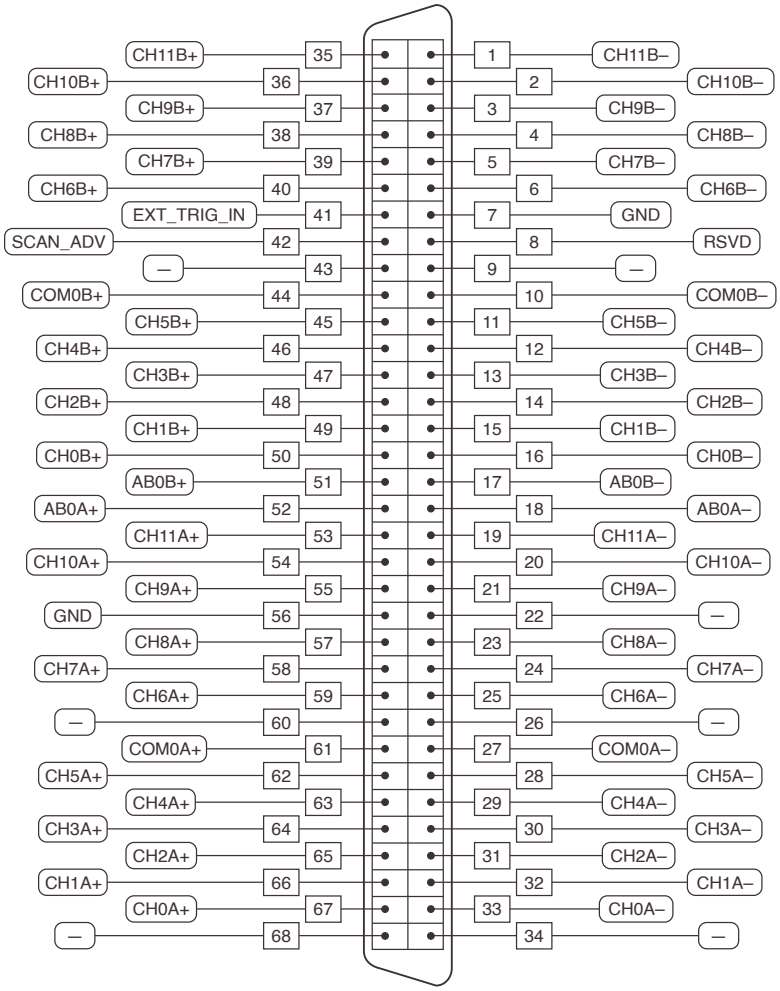


Table 9. 4-Wire 12 × 1 Multiplexer Signal Descriptions

Signal	Description
ABx+	Positive analog bus connection
ABx-	Negative analog bus connection
CHxA+	Positive excitation connection
CHxA-	Negative excitation connection
CHxB+	Positive sense connection
CHxB-	Negative sense connection
COM0x+	Routing destination for positive channels on the corresponding bank

Signal	Description
COM0x-	Routing destination for negative channels on the corresponding bank
EXT_TRIG_IN	External trigger input connection
GND	Ground connection
RSVD	Reserved, no connection
SCAN_ADV	Scan advanced output connection
—	No connection

Table 10. 4-Wire 12 × 1 Multiplexer Terminal Block Connections

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch0	+	67	CH0A+
	-	33	CH0A-
	+	50	CH0B+
	-	16	CH0B-
ch1	+	66	CH1A+
	-	32	CH1A-
	+	49	CH1B+
	-	15	CH1B-
ch2	+	65	CH2A+
	-	31	CH2A-
	+	48	CH2B+
	-	14	CH2B-
ch3	+	64	CH3A+
	-	30	CH3A-
	+	47	CH3B+
	-	13	CH3B-

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
ch4	+	63	CH4A+
	-	29	CH4A-
	+	46	CH4B+
	-	12	CH4B-
ch5	+	62	CH5A+
	-	28	CH5A-
	+	45	CH5B+
	-	11	CH5B-
ch6	+	59	CH6A+
	-	25	CH6A-
	+	40	CH6B+
	-	6	CH6B-
ch7	+	58	CH7A+
	-	24	CH7A-
	+	39	CH7B+
	-	5	CH7B-
ch8	+	57	CH8A+
	-	23	CH8A-
	+	38	CH8B+
	-	4	CH8B-
ch9	+	55	CH9A+
	-	21	CH9A-
	+	37	CH9B+
	-	3	CH9B-
ch10	+	54	CH10A+

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2605 Terminal Name
	-	20	CH10A-
	+	36	CH10B+
	-	2	CH10B-
ch11	+	53	CH11A+
	-	19	CH11A-
	+	35	CH11B+
	-	1	CH11B-
com0	+	61	COM0A+
	-	27	COM0A-
	+	44	COM0B+
	-	10	COM0B-
No Connect (Not used in this topology)	+	60	COM1A+
	-	26	COM1A-
	+	43	COM1B+
	-	9	COM1B-
ab0	+	52	AB0A+
	-	18	AB0A-
	+	51	AB0B+
	-	17	AB0B-

Making a Connection for 4-Wire 12 × 1 Multiplexer

Both the scanning command, `ch2->com0;`, and the immediate operation, niSwitch Connect Channels VI or the `niSwitch_Connect` function with parameters ch2 and com0, result in the following connections:

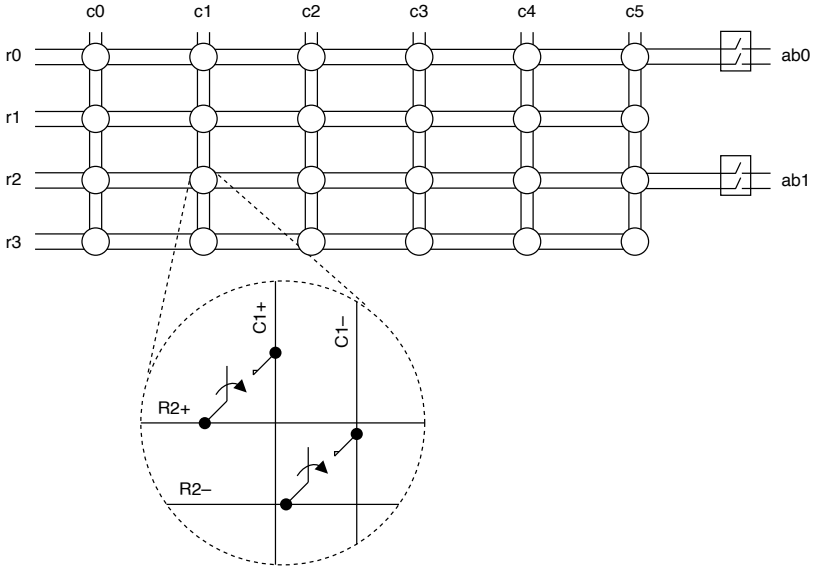
- signal connected to CH2A+ is routed to COM0A+

- signal connected to CH2A– is routed to COM0A–
- signal connected to CH2B+ is routed to COM0B+
- signal connected to CH2B– is routed to COM0B–

2-Wire 4 × 6 Matrix Topology

Connect your signals using the NI TB-2606 terminal block.

Figure 13. 2-Wire 4 × 6 Matrix



2-Wire 4 × 6 Matrix Pinout

Figure 14. 2-Wire 4 × 6 Matrix Pinout

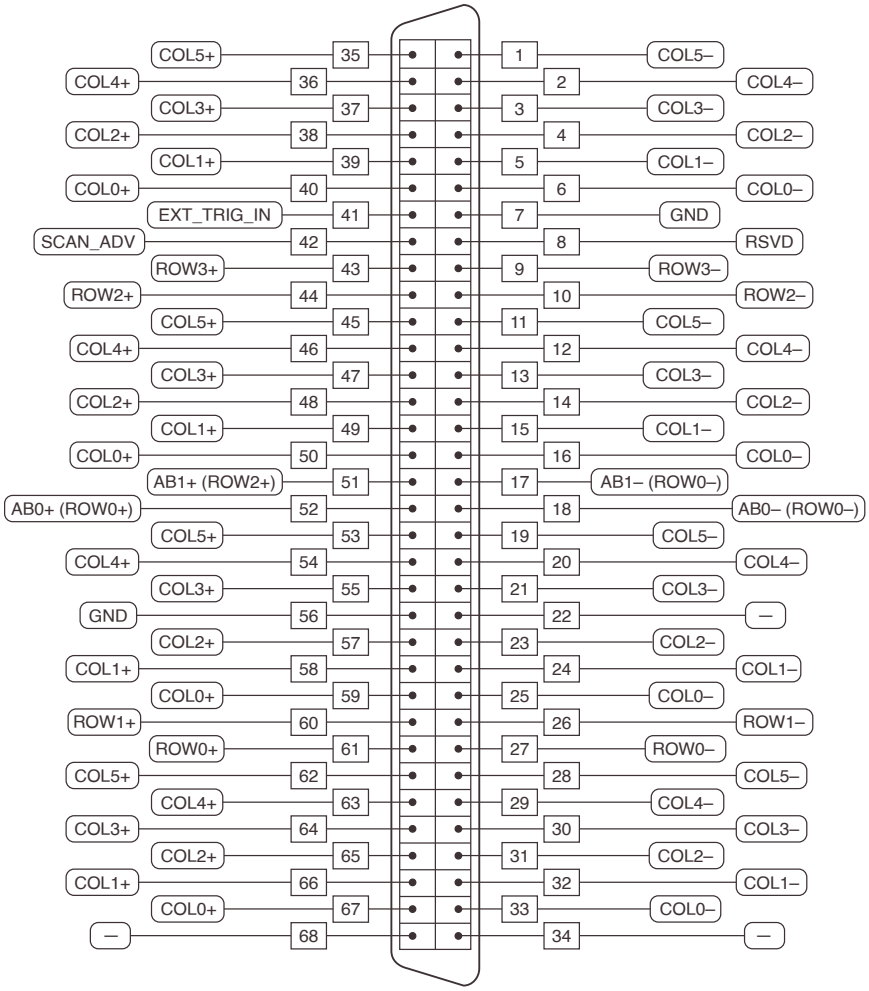


Table 11. 2-Wire 4 × 6 Matrix Signal Descriptions

Signal	Description
ABx+	Positive analog bus connection
ABx-	Negative analog bus connection
COLx+	Positive column connection
COLx-	Negative column connection
EXT_TRIG_IN	External trigger input connection
GND	Ground connection
RSVD	Reserved, no connection
ROWx+	Positive row connection

Signal	Description
ROWx-	Negative row connection
SCAN_ADV	Scan advanced output connection
—	No connection

Table 12. 2-Wire 4 × 6 Matrix Terminal Block Connections

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2606 Terminal Name
c0	+	67, 59, 50, 40	C0+
	-	33, 25, 16, 6	C0-
c1	+	66, 58, 49, 39	C1+
	-	32, 24, 15, 5	C1-
c2	+	65, 57, 48, 38	C2+
	-	31, 23, 14, 4	C2-
c3	+	64, 55, 47, 37	C3+
	-	30, 21, 13, 3	C3-
c4	+	63, 54, 46, 36	C4+
	-	29, 20, 12, 2	C4-
c5	+	62, 53, 45, 35	C5+
	-	28, 19, 11, 1	C5-
r0	+	61	R0+
	-	27	R0-
r1	+	60	R1+
	-	26	R1-
r2	+	44	R2+
	-	10	R2-
r3	+	43	R3+
	-	9	R3-

Software Name	Polarity	Hardware Name	
		Module Connector Pin Number	NI TB-2606 Terminal Name
ab0	+	52	AB0+
	-	18	AB0-
ab1	+	51	AB1+
	-	17	AB1-

Making a Connection for 2-Wire 4 × 6 Matrix Topology

In this topology, connect your positive and negative leads to Cx± or Rx± inside the NI TB-2606 terminal block.

During scanning, an example scan list entry is `r2->c1;`. This entry routes the signal connected to R2+ to C1+ and connects R2– to C1–.

During immediate operations when calling the niSwitch Connect Channels VI or the `niSwitch_Connect` function with r2 and c1, the signal connected to R2+ is routed to C1+ and the signal connected to R2– is routed to C1–. To route the signals to AB0, use the niSwitch Connect Channels VI or the `niSwitch_Connect`function with `com0` and `ab0`.

PXI-2503 Cold-Junction Temperature Sensor Channel

The module has a dedicated temperature sensor channel useful for cold-junction compensation when switching thermocouples.

The NI TB-2605 and TBX-68S terminal blocks both have onboard temperature sensors that connect to the dedicated cold-junction sensor channel.

You can access the cold-junction sensor channel by connecting to channel cjtemp in the following topologies:

- 2-wire 24×1 multiplexer
- 2-wire dual 12×1 multiplexer
- 2-wire quad 6×1 multiplexer

Related reference:

- Making a Connection for 2-Wire 24 × 1 Multiplexer Topology
- Making a Connection for 2-Wire Dual 12 × 1 Multiplexer Topology
- Making a Connection for 2-Wire Quad 6 × 1 Multiplexer Topology

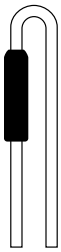
PXI-2503 Current-Loop Receivers

The module has sockets for transforming individual channels to current-to-voltage converters. NI offers a process-current pack of four 249 Ω, 0.1%, 5 ppm, 0.25 W resistors. The reference designator format for the current-loop resistors is such that for input channel x, the resistor is RCLx. For example, the resistor for channel 14 is RCL14.

Note Before installing the resistors in your module, make sure that no signals are connected to your module front connector.

Before installing your module in the NI PXI chassis, you must install the resistors by performing the following steps:

1. Ground yourself using a grounding strap or a ground connected to your PXI chassis. Properly grounding yourself prevents damage to your PXI module from electrostatic discharge.
2. Bend and trim the resistor lead as shown in the following figure. Be sure that the resistor does not extend more than 0.5 in. (1.3 cm) above the surface of the circuit board.



3. Insert the resistor into the appropriate socket, labeled RCLx.

PXI-2503 Matrix and Multiplexer Expansion

Matrix Expansion

To expand the matrix of a module, directly connect wire from one terminal block to the other using the NI TB-2606 terminal block. Each module can operate as a 4×6 matrix. To form a 4×12 matrix, use two modules and connect all the rows from both TB-2606 terminal blocks.

To form a 12×6 matrix, you need three modules with three TB-2606 terminal blocks. Connect all the columns from all three terminal blocks.

Note The analog bus connectors cannot be used to expand a matrix.

Multiplexer Expansion

If you need to multiplex through more channels than the number present on your module, you can expand the size of the multiplexer. The NI TB-2605 terminal block has two analog bus connectors that allow analog bus sharing between two other modules. Each NI TB-2605 comes with a plug to share this analog bus between modules.

Refer to the module hardware diagram to see the analog bus relay that connects the multiplexer COM lines to an analog bus. This analog bus relay must be closed for multiplexer expansion. When this analog bus is shared between modules, a single larger multiplexer is formed. For example, connecting two modules using their analog bus in 2-wire 24×1 multiplexer topology, creates a 2-wire 48×1 multiplexer.

You can also use the LV6-BAN4 cable to connect a DMM directly to the analog bus that acts as the COM of the expanded multiplexer.

PXI-2503 Relay Replacement

The module uses electromechanical armature relays.

Replacement Relay	Part Number
NEC-TOKIN	EF2-4.5NUX-L6
M3 Distribution (10 relays)	197488A-01

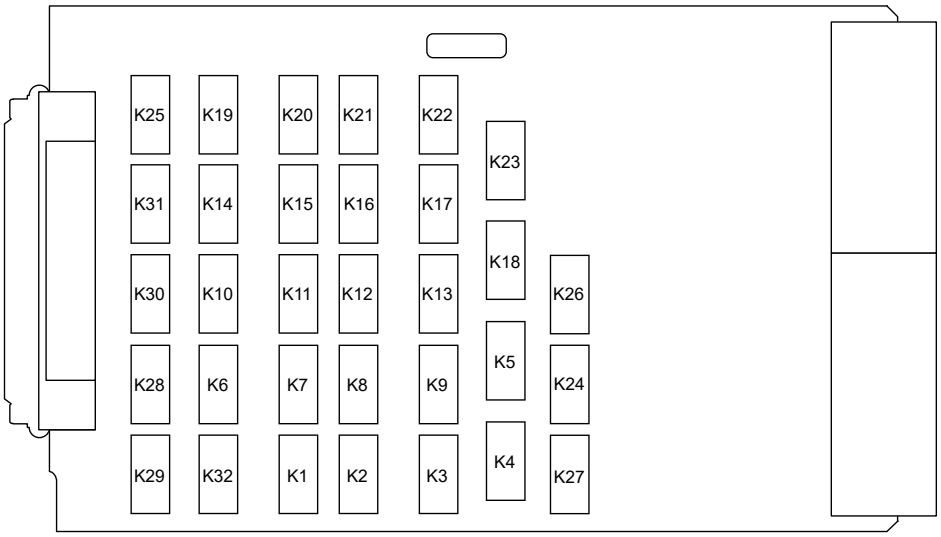
Complete the following steps to replace a failed relay.

Locate the Relay

1. Ground yourself using a grounding strap or a ground connected to your PXI chassis.

   Note Properly grounding yourself prevents damage to your module from electrostatic discharge.

2. Locate the relay you want to replace. Refer to the hardware diagram in ***PXI-2503 Overview*** and the following figure and table for relay locations.



Relay Name	Reference Designator
CH0	K32
CH1	K1
CH2	K2
CH3	K3
CH4	K4
CH5	K5
CH6	K6
CH7	K7
CH8	K8
CH9	K9
CH10	K10
CH11	K11
CH12	K12
k13	K12
CH13	K13
CH14	K14
CH15	K15
CH16	K16
CH17	K17
CH18	K18
CH19	K19
CH20	K20
CH21	K21
CH22	K22
CH23	K23
BC01	K24
BC23	K25

Relay Name	Reference Designator
BC02	K26
CJTEMP	K27
1WIRE	K28
HLSEL	K29
AB0	K30
AB2	K31

3. Locate the assembly and serial number labels on the board with the relay you want to replace. White labels indicate the board was assembled using lead solder (Sn 63 Pb 37). Green labels indicate the board was assembled using lead-free solder (Sn 96.5 Ag 3.0 Cu 0.5). Lead-free assemblies have assembly numbers ending in L.

Related reference:

- PXI-2503 Overview

Replace the Relay

Note NI recommends using lead-free solder for relay replacement on lead-free assemblies, and lead solder for relay replacement on lead assemblies.

Note Do not rework lead assemblies using a lead-free work station. Lead solder from the unit could contaminate the station.

Note If a lead-free assembly is reworked with lead solder, label the assembly to indicate this condition. This rework can prevent the same unit from being reworked later on a lead-free solder station, because it could contaminate the station.

Make sure that you have the following items:

- Temperature-regulated soldering iron set to 316 °C (600 °F) for lead solder rework

or 371 °C (700 °F) for lead-free solder rework
- 63/37 Tin/Lead solder (flux core) for lead solder rework
- 96.5/3.0/0.5 Tin/Silver/Copper solder (flux core) for lead-free solder rework
- Solder wick
- Fine pick
- Isopropyl alcohol
- Cotton swabs

Replace the relay as you would any other through-hole part.

Note You can use the Switch Soft Front Panel to reset the relay count after you have replaced a failed relay.