KEITHLEY
A Tektronix Company

Model 3732 Quad 4×28 Reed Relay Card

Instructions

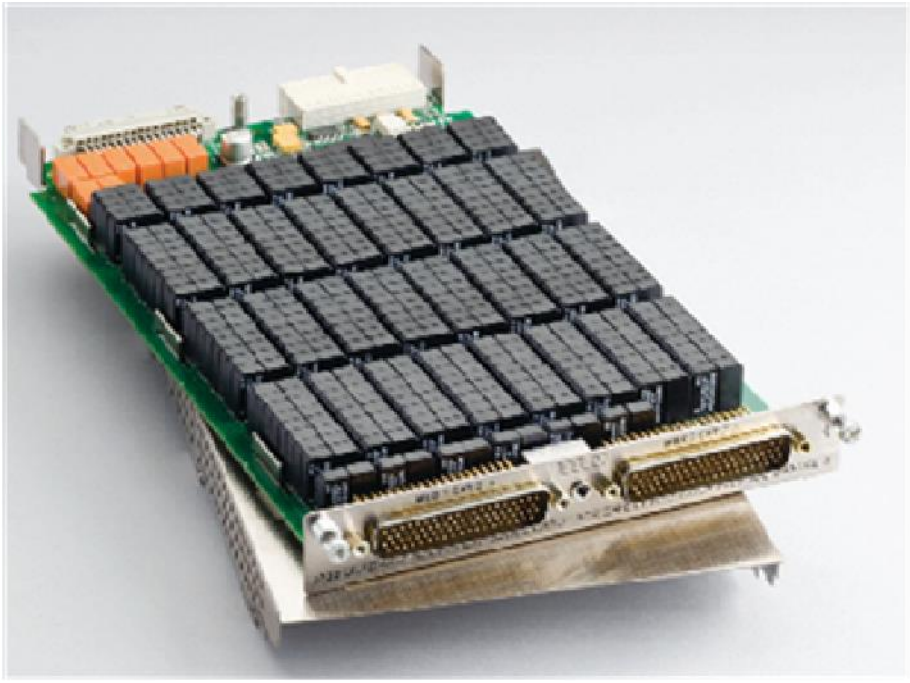
Keithley Instruments
28775 Aurora Road
Cleveland, Ohio 44139
1-800-833-9200
tek.com/keithley

Introduction

The ultra-high density 3732 matrix card is comprised of four banks, each with 4 rows by 28 columns of reed relays. This provides 448 single-pole crosspoints for maximum connection versatility in high channel count applications. For even greater flexibility, bank configuration relays are mounted on the card. They offer an automated method of connecting banks to enable two additional matrix configurations: Single 4×112 and dual 4×56. This feature allows the matrix size to be easily adapted to existing or future applications. For differential (2-wire) measurements, you can select two-pole mode, which enables automatic pairing of crosspoints to create a dual 4×28 or single 4×56 configuration. For larger matrix sizes, analog backplane relays are provided that enable rows to connect to the Series 3700A mainframe backplane. This allows, for example, a matrix of up to 4 rows by 672 columns within a single 3706A mainframe using six 3732 cards.

The 3732 card is shown in the following figure.

Figure 1: Model 3732 Quad 4x28 Reed Relay Matrix Card



Item shipped may vary from model pictured here.

The 3732 card uses optimized reed relays that offer both low contact potential and low current offset to minimize the switching errors that often accompany this relay technology. Additionally, these relays provide greater signal voltage (200 V) and current (1.2 A carry) dynamic range while supporting the long life and fast actuation times necessary in many automated test applications.

The 3732 uses two 78-pin D-sub plugs for signal and configuration connections. For screw-terminal connections, you can use one of the following detachable accessories:

- For 16×28 or dual 8×28 matrix configurations, use the 3732-ST-R.
- For the 4×112, dual 4×56, or base quad 4×28 matrix configurations, use the 3732-ST-C.
- For direct connections, use the 3732-ST-C.

These additional features differentiate the 3732 card from other Series 3700A switching cards:

- Bank configuration relays mounted on the 3732 card allow you to automate bank connections.
- Two-pole mode enables automatic channel pairing for differential (2-wire) measurements.
- You can use analog backplane relays to connect rows to the Series 3700A mainframe backplane for larger matrix configurations that use multiple 3732 cards.

For more information regarding available cards and accessories, refer to the *Series 3700A System Switch/Multimeter and Plug-in Cards* datasheet, available at tek.com/keithley.

This document describes how to install the plug-in card and make connections to it. For information on scanning, and on reading, writing, and controlling channels, refer to the *Series 3700A System Switch/Multimeter Reference Manual*, available at tek.com/keithley.

Safety precautions for connections

WARNING

Shock hazard. To prevent electric shock that could result in serious injury or death, comply with these safety precautions.

Connection information for plug-in cards is intended for qualified service personnel. Do not attempt to connect devices under test (DUTs) or external circuitry to a plug-in card unless you are qualified.

As described in the International Electrotechnical Commission (IEC) Standard IEC 60664, the Series 3700A is Installation Category O and signal lines must not be directly connected to AC mains.

Before making or breaking any connections to the plug-in card, make sure the Series 3700A instrument power is turned off and power is removed from all external circuitry.

Do not connect signals that will exceed the maximum specifications of any installed plug-in card. If the rear analog backplane connector of the instrument and the plug-in card terminals are connected at the same time, the test lead insulation must be rated to the highest voltage that is connected. For example, if 300 V is connected to the analog backplane connector, the test lead insulation for the plug-in card must also be rated for 300 V.

Dangerous arcs of an explosive nature in a high-energy circuit can cause severe personal injury or death if contacted. If the multimeter is connected to a high-energy circuit when set to a current range, low-resistance range, or any other low-impedance range, the circuit is virtually shorted. Dangerous arcing can result, even when the multimeter is set to a voltage range, if the minimum voltage spacing is reduced in the external connections.

Use test leads that are fully insulated. Use only test leads that can be connected to the circuit (for example, alligator clips and spade lugs) for hands-off measurements. Do not use test leads that decrease voltage spacing. These diminish arc protection and create a hazardous condition.

Card installation

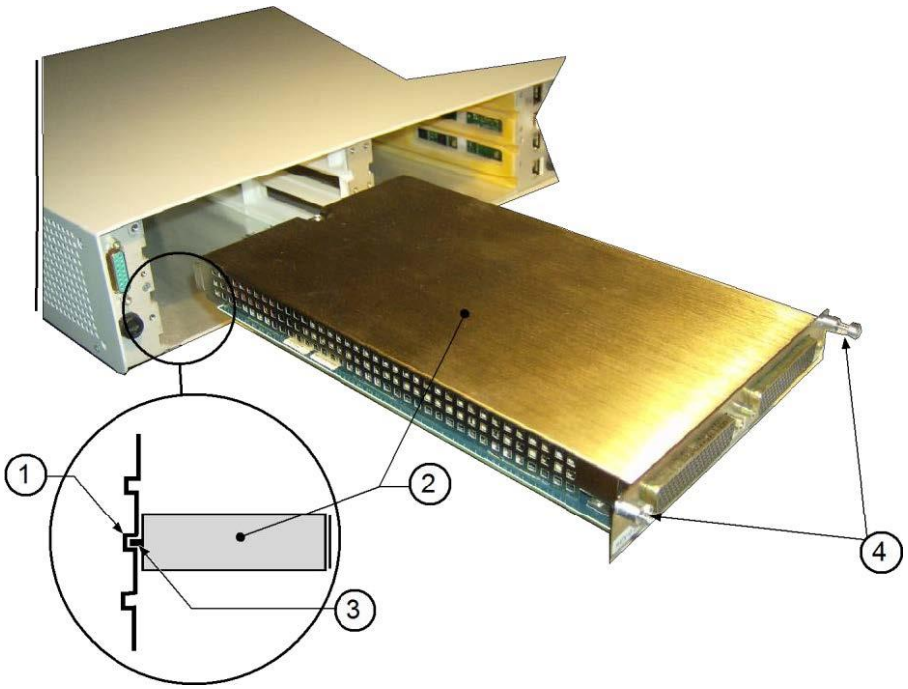
WARNING

Slot covers must be installed on unused slots to prevent personal contact with high-voltage circuits. Failure to recognize and observe standard safety precautions could result in personal injury or death due to electric shock.

To install a switching card into the instrument mainframe:

1. Turn the instrument off.
2. Position the instrument so that you are facing the rear panel.
3. Disconnect the power line cord and any other cables connected to the rear panel.
4. Remove the slot cover plate from the mainframe slot. Retain the plate and screws for future use.
5. With the top cover of the switching card facing up, align the card edge into the card guide of the slot, as shown in the following figure.
6. Slide in the card. For approximately the last ¼ inch, press in firmly to seat the card connector to the mainframe connector.
7. On each side of the card, there is a mounting screw. Use a flat-bladed screwdriver to tighten the two mounting screws to secure the card to the mainframe. Do not overtighten.
8. Reconnect the power line cable and any other cables to the rear panel.
9. Turn the instrument on.

Figure 2: Module installation



Item shipped may vary from model pictured here.

Item	Description
1	Card guide (part of mainframe)
2	Card
3	Card edge (part of card)
4	Mounting screw (part of card)

Verify card installation

To verify that the card was properly installed:

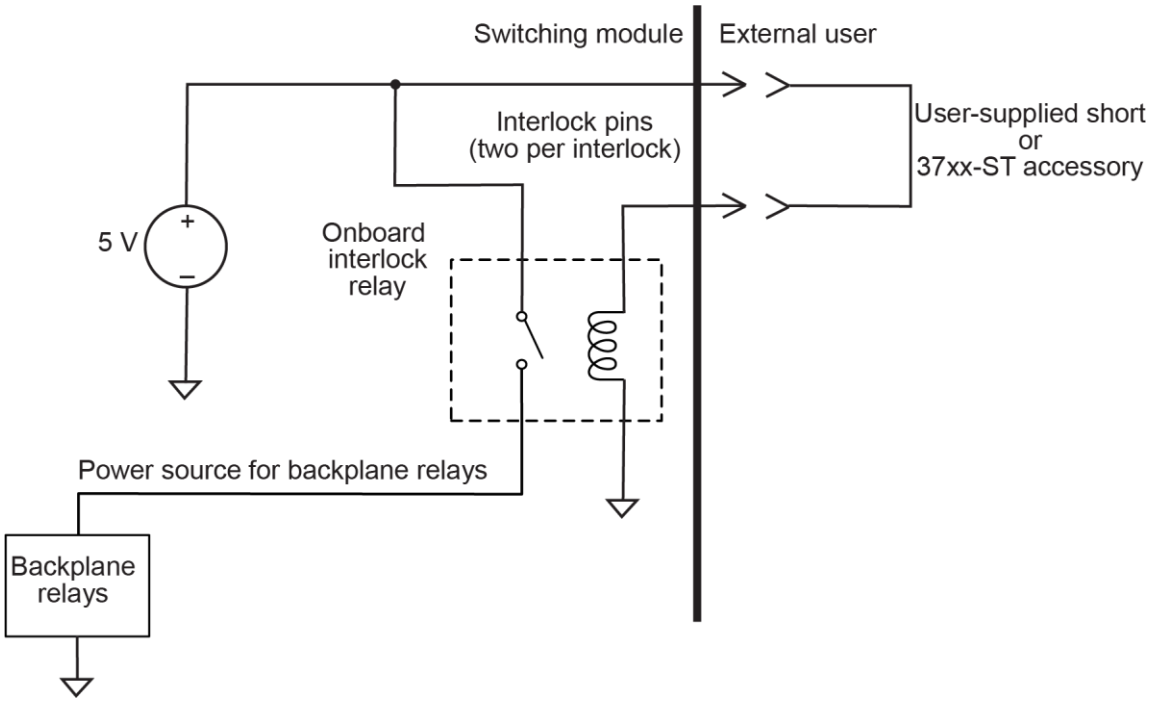
1. If the 3700A is controlled remotely (REM is displayed), press **EXIT** to switch control to local.
2. On the 3700A front panel, press **SLOT**. The name and firmware version of the instrument is displayed.
3. Press **SLOT** again. The name and firmware version of the card in slot 1 is displayed.
4. If you have more than one card installed, continue to press **SLOT** until the slot you installed is displayed.
5. Confirm the name and firmware version.
6. Press **EXIT** to return to the operating display.

Hardware interlocks

This plug-in card can switch high-voltage signals. To prevent exposure to hazardous voltages, the plug-in card includes a hardware interlock. The hardware interlocks are present on the plug-in card and are designed to keep the plug-in card disconnected from the 3700A backplane. When the interlock circuit is disengaged, no measurements can be made through a plug-in card, but channel relays can continue to operate.

The following figure is a simplified schematic of the interlock circuit on the plug-in card.

Figure 3: Simplified interlock circuit



Interlock pin numbers

The interlock circuit of the 3732 is on banks 1, 2, 3, and 4 using interlock pins J3-76 and J3-78. The affected backplane relays are s0911 through s0918.

CAUTION

To prevent instrument damage or loss of functionality, make sure high-voltage analog signals are not wired to the interlock pins.

Engage hardware interlocks

To engage the hardware interlocks, you must provide a low-resistance path between the two applicable interlock pins, as shown in the figure in Hardware interlocks (on page 5). This path routes a 5 V power source to an onboard interlock relay, which in turn enables power to the backplane relays. If a 37xxA-ST screw-terminal accessory is used, a low-resistance path is provided to automatically engage the interlock circuit.

WARNING

The supplied 5 V power source is not designed for use with external circuits. Only use this power source to energize the interlock relay.

For reliable operation, be sure to provide a low-resistance path between the interlock pins. Significant resistance can cause the interlock circuit to fail to engage.

Check interlock status

You can check the status of the interlocks using the TSP command `slot[slot].interlock.state`, where *slot* is `1` to `6`. When the interlock status is returned as engaged, you can energize the associated backplane relays. When interlock status is disengaged, you cannot energize the associated backplane relays.

Refer to the *Series 3700A System Switch/Multimeter Reference Manual* for more information on interlock commands. This manual is available at tek.com/keithley.

Configuration and connection choices overview

Before configuring your card, you need to decide which base matrix configuration to use and how to wire the connections. The options are shown in the following table.

Configuration type	Mode	Matrix configurations	Wiring method	Accessory
Column expansion	1-pole	Quad 4×28 Dual 4×56 Single 4×112	Modular screw-terminal accessory	3732-ST-C
	2-pole	Dual 4×28 Single 4×56		
Row expansion	1-pole	Dual 8×28 Single 16×28	Modular screw-terminal accessory	3732-ST-R
	2-pole	Single 8×28		
Custom configuration	Any	User-defined	Direct wiring with prefabricated cable blocks	3732-MTC-3

Screw-terminal accessories

You can use screw-terminal accessories to create matrix configurations without any direct wiring. The screw-terminal accessories available for use with the 3732 card are the 3732-ST-C and 3732-ST-R.

The 3732-ST-C provides terminal block access for the following matrix configurations:

- Quad 4×28 (1-pole)
- Dual 4×28 (2-pole)
- Dual 4×56 (1-pole)
- Single 4×56 (2-pole)
- Single 4×112 (1-pole)

The 3732-ST-R provides terminal block access and column jumper blocks for extended row configurations, including:

- Dual 8×28 (1-pole)
- Single 8×28 (2-pole)
- Single 16×28 (1-pole)

CAUTION

You cannot remove and replace cards in the Series 3700A while power is on (also known as hot swapping).

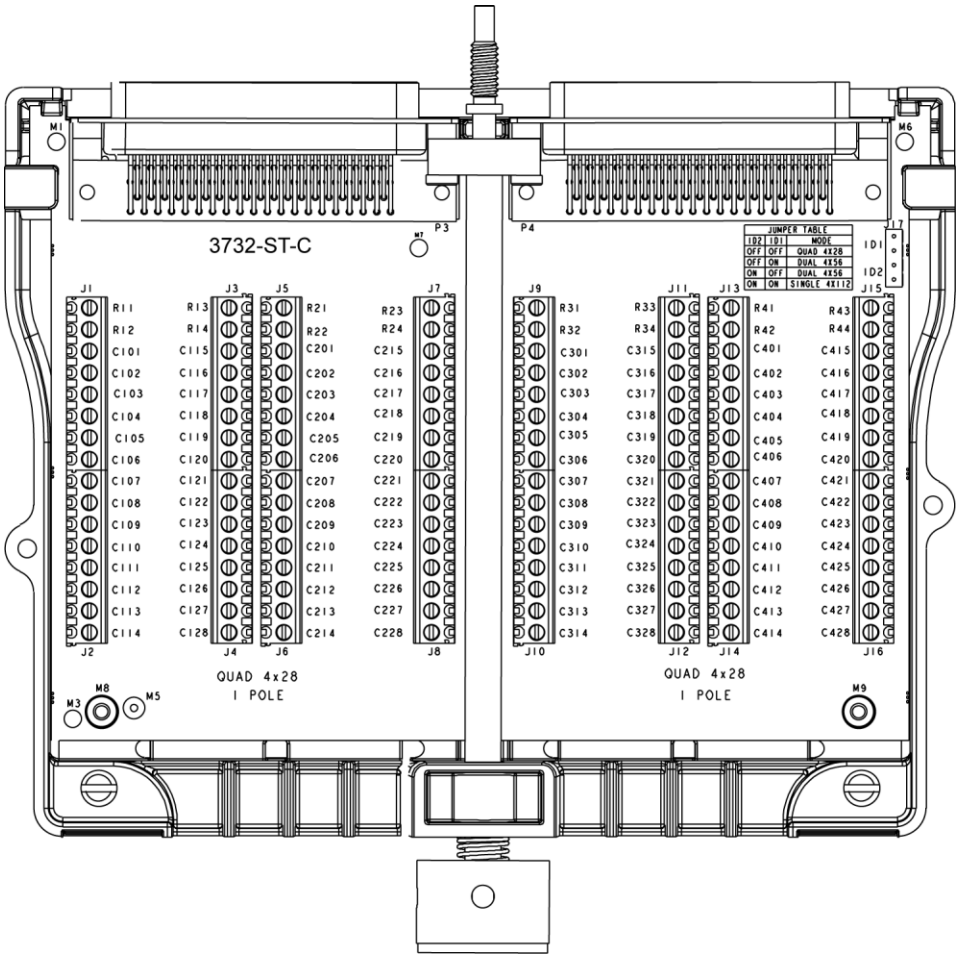
CAUTION

Removing a screw-terminal accessory while the instrument is powered off leaves the 3732 card in the configuration that it was in when last powered on. To ensure that configuration changes are applied, the interlock must be activated after turning on Series 3700A instrument power. This forces the Series 3700A to read the 3732 identification bits that define the card configuration and apply that configuration. If the interlock is not activated, the card configuration remains in the state it was in the last time power was turned on and the interlock was activated. To preserve the configuration of a card through power off, ensure the interlock has been activated before removing instrument power.

Model 3732-ST-C screw-terminal accessory

The 3732-ST-C screw-terminal accessory is shown in the following figure. The 3732-ST-C is labeled to show the correct connections for the quad 4×28 configuration. For other configurations, overlays are provided with the screw-terminal accessory that you can insert to show the correct wiring for the dual 4×56, single 4×112, dual 4×28 (2-pole), and single 4×56 (2-pole) configurations.

Figure 4: Model 3732-ST-C Screw-Terminal Accessory



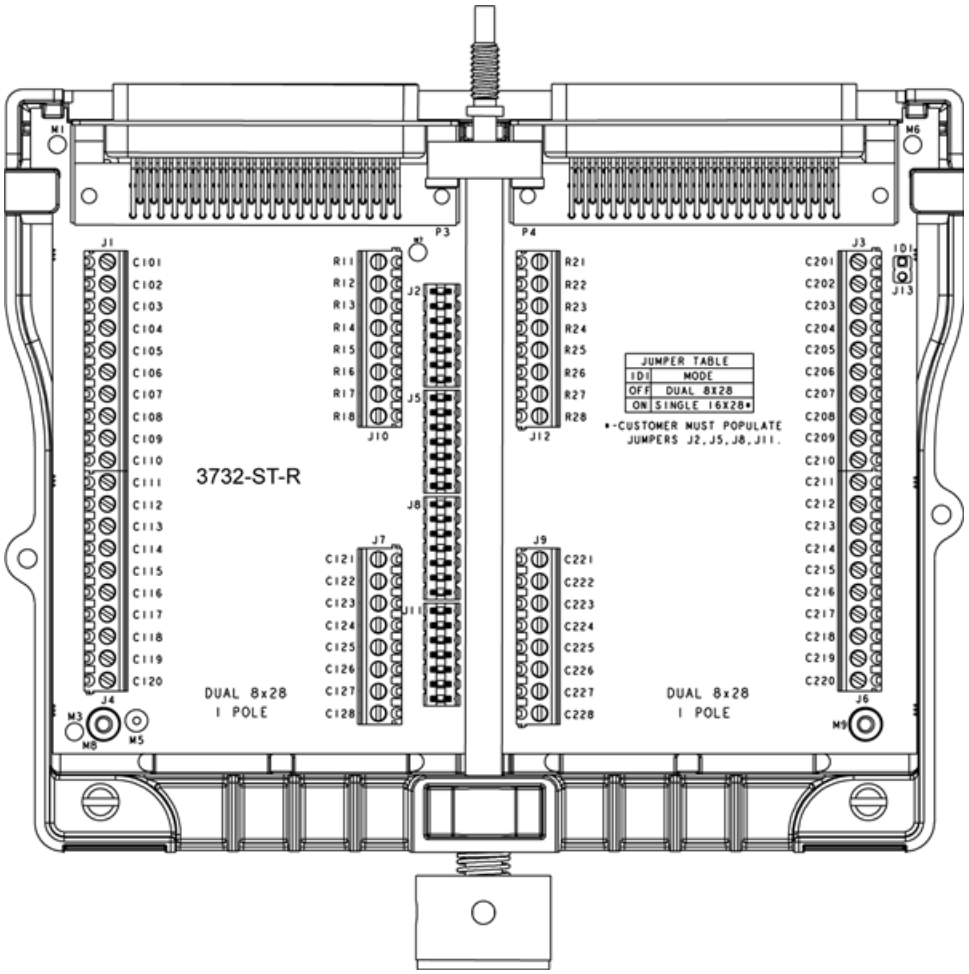
You must also set the J17 jumper, on the upper right of the 3732-ST-C, for the configuration. The settings are shown in the following table. You can set the dual 4×56 configuration in one of two ways.

ID2	ID1	Configuration
OFF	OFF	Quad 4×28
OFF	ON	Dual 4×56
ON	OFF	Dual 4×56
ON	ON	Single 4×112

Model 3732-ST-R screw-terminal accessory

The 3732-ST-R screw-terminal accessory is shown in the following figure. The 3732-ST-R is labeled to show the correct connections for the dual 8×28 configuration. You can insert overlays (provided with the screw-terminal accessory) that show the correct wiring for the single 16×28 and single 8×28 (2-pole) configurations.

Figure 5: Model 3732-ST-R Screw-Terminal Accessory



You must also set the J13 jumper, on the upper right of the 3732-ST-R, for the configuration. The settings are shown in the following table.

ID1	Configuration
OFF	Dual 8×28
ON	Single 16×28

Wire the screw-terminal accessory

These instructions describe how to connect wiring to a Series 3700A screw-terminal accessory.

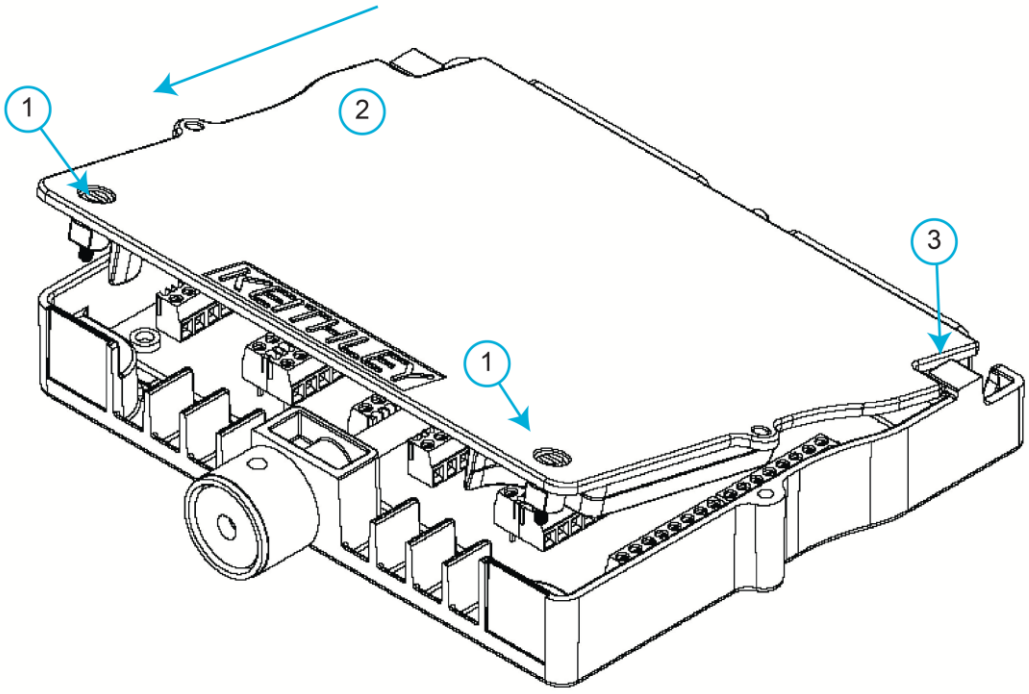
CAUTION

It is not necessary to remove a circuit board from its enclosure to wire the screw-terminal accessory. Avoid handling circuit board surfaces and terminal blocks. Contaminants from hands may degrade screw-terminal accessory performance.

To wire the screw-terminal accessory:

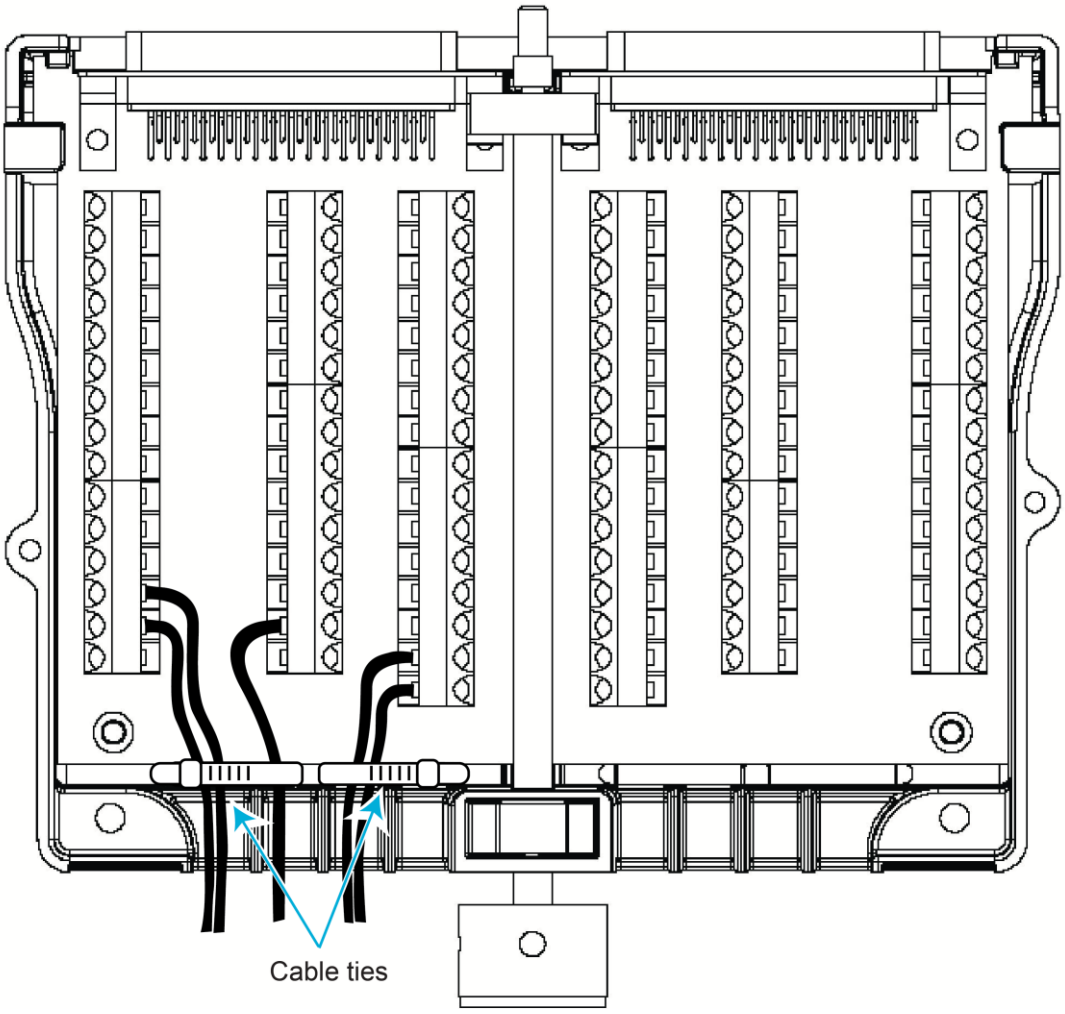
1. Loosen the slotted captive screws (1) on the top cover.
2. Slide the top cover (2) away from the retaining tab (3), as shown in the following figure.

Figure 6: Remove the top cover of the screw-terminal accessory



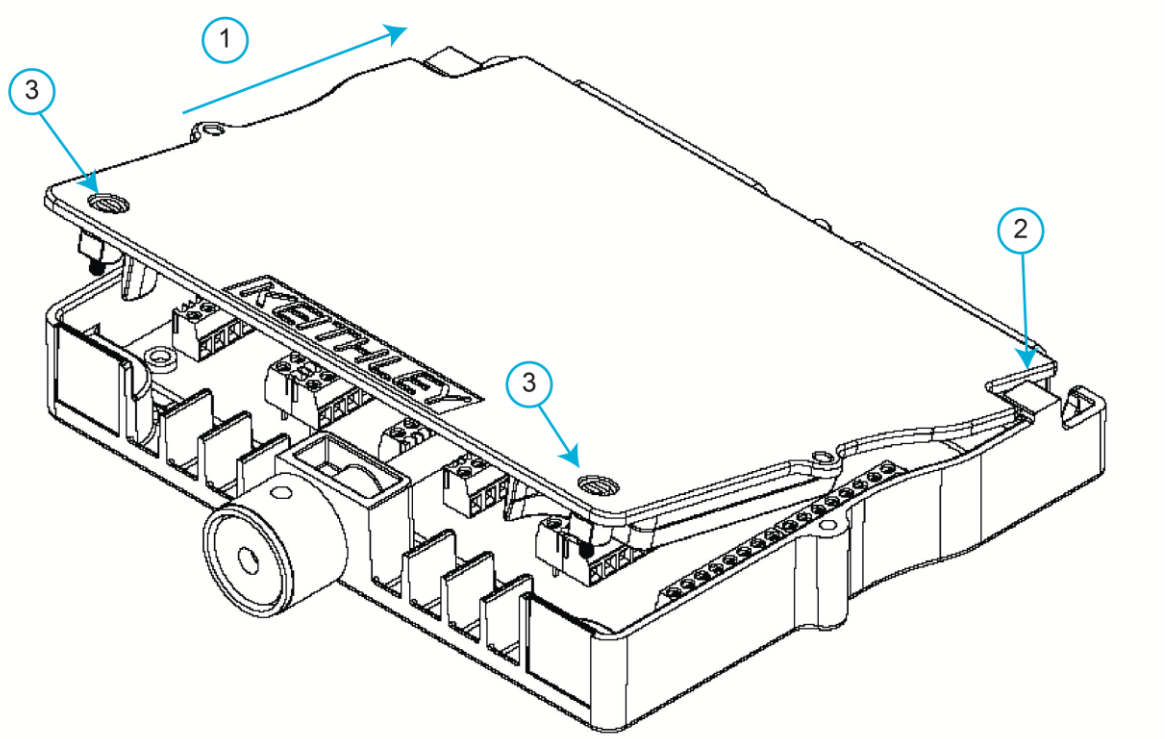
3. Select the correct overlay and press it into place inside the screw-terminal accessory.
4. As shown in the following figure, route your wiring through the slots at the rear of the screw-terminal accessory and connect it to the wiring terminals as needed for your configuration.

Figure 7: Routing and securing cables with ties



5. When all wires have been connected, use small cable ties to secure the wires and provide strain relief, as shown in the previous figure. Pass the cable tie in and out of the small holes in the base of the screw-terminal assembly and around your wiring before pulling the cable tie tight.
6. Align the top cover with the circuit board.
7. Slide the cover forward (1) and beneath the retaining tab (2), as shown in the following figure.
8. Fasten the two slotted captive screws (3).

Figure 8: Install the screw-terminal assembly top cover



Install the screw-terminal accessory

WARNING

Before using a screw-terminal assembly with an installed plug-in card, verify that the card is properly installed in the 3700A instrument and that the mounting screws are tightly fastened. If the mounting screws are not properly connected, an electrical shock hazard may be present.

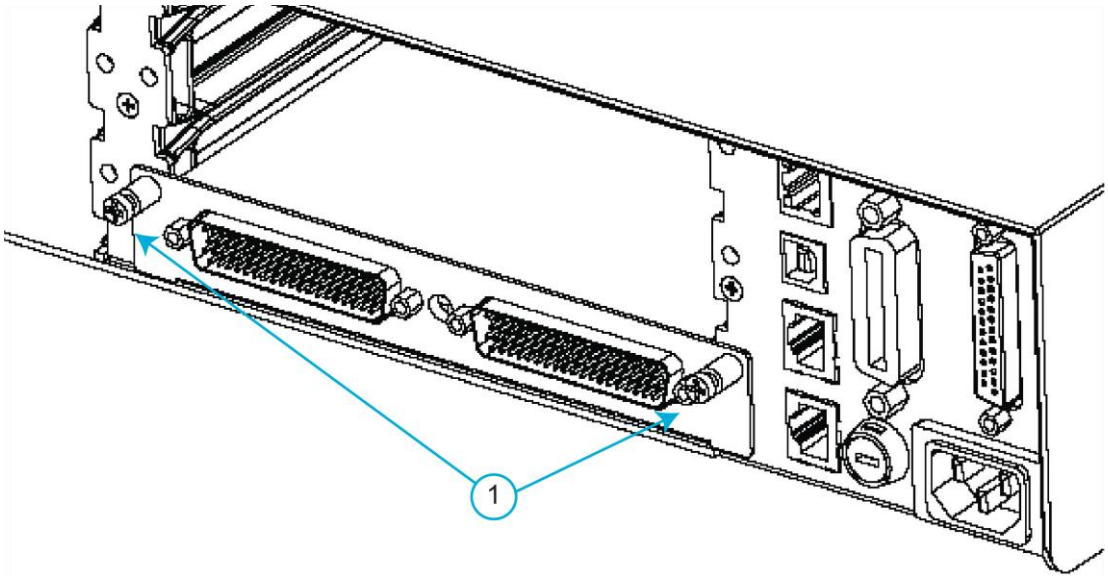
NOTE

To use more than two 3700A screw-terminal accessories in a rack-mount installation, use the terminal support bracket included in the Model 4288-10 Rear Support Mount Kit. For more information about the rack-mount kit, refer to Keithley document *Model 4288-10 Rear Support Rack-Mount Kit Assembly and Mounting Instructions*, available on tek.com/keithley.

To install the screw-terminal accessory on the 3700A plug-in card:

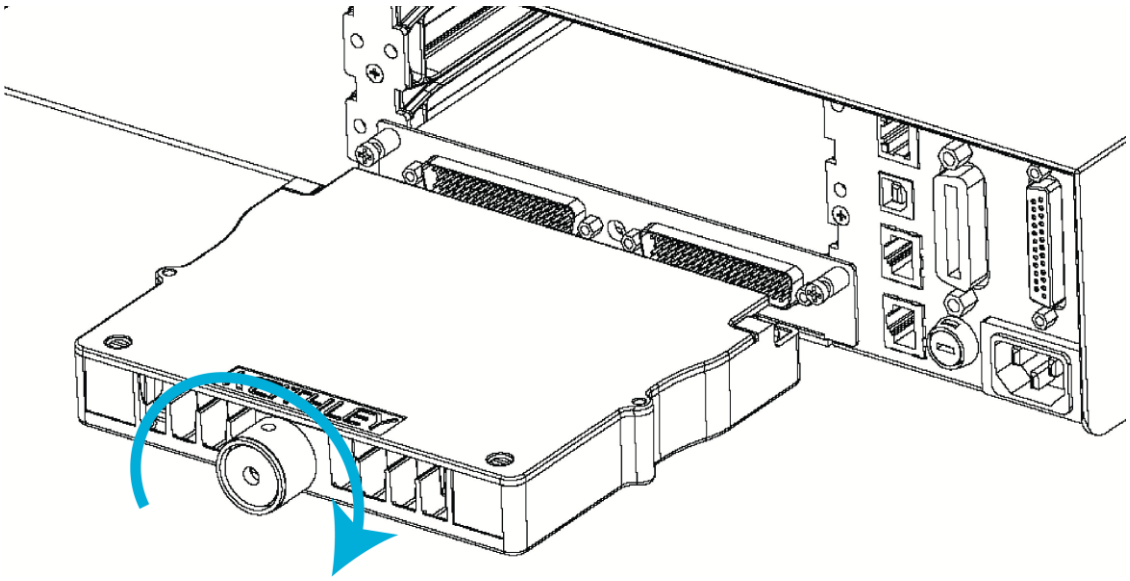
1. Remove all power from the 3700A instrument.
2. Make sure that the mounting screws (1 in the following figure) on the installed plug-in card are secure.

Figure 9: Check 3700A card mounting screws



3. Align the screw-terminal assembly D-sub connectors with the connectors on the installed plug-in card, as shown in the following figure.
4. Press to seat the D-sub connectors.

Figure 10: Connect the screw-terminal accessory



5. Turn the knob on the screw-terminal assembly clockwise by hand, as shown in the previous figure, until it is firmly engaged. You may need to use a slotted screwdriver to tighten the knob.

CAUTION

To prevent damage to the card, do not overtighten the knob.

Remove the screw-terminal accessory

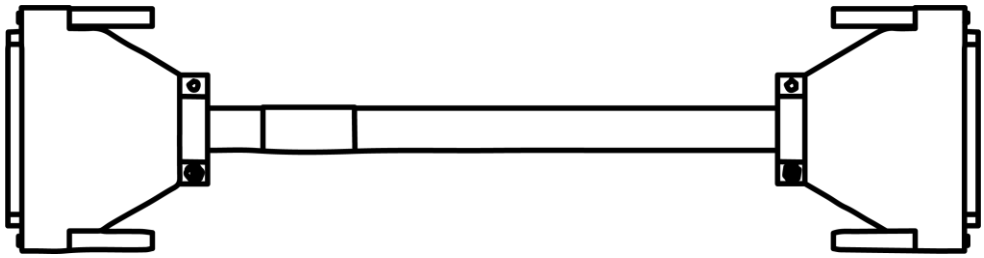
To remove a screw-terminal accessory from an installed plug-in card:

1. Remove all power from the 3700A instrument.
2. Turn the knob on the screw-terminal accessory counter-clockwise until it is completely disengaged. You may need to use a slotted screwdriver to loosen the knob.
3. Pull the screw-terminal accessory away from the plug-in card D-sub connectors.

Model 3732-MTC-3 cable

The Model 3732-MTC-3 cable is a 78-pin cable assembly that is 3.0 m (10 ft) long and terminated with a D-sub plug on one end and a D-sub jack on the other end.

Figure 11: Model 3723-MTC-3 cable



WARNING

To prevent electrical shock, observe the following safety precautions:

- **Connect both ends of the cable before applying any power to the system.**
- **Remove all power in the system before connecting the cable to a switching module or external circuitry.**
- **Connect both D-sub connector shells of this cable to a safety earth ground. A shock hazard exists when voltage levels greater than 30 V_{RMS}, 42.4 V_{PEAK}, or 60 V DC are present.**

3732-MTC-3 characteristics

Cable maximum signal levels: 300 V DC or 300 V_{RMS}.

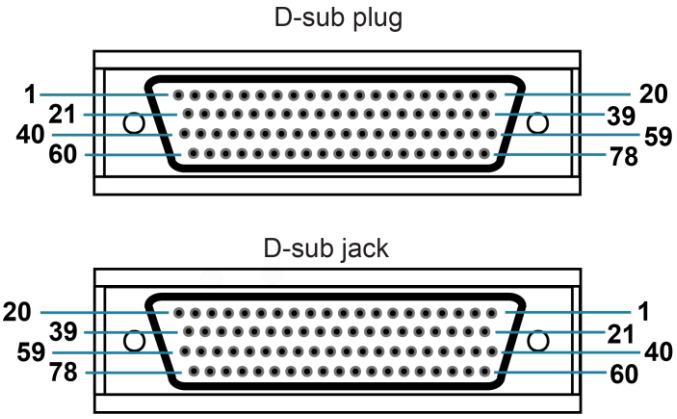
Cable maximum current rating:

- **Single conductor:** 4.4 A
- **Multiple conductors:** 2.2 A per wire
- **Conductor gauge:** 22 AWG

Pin number identification

Pin number identification for the Model 3732-MTC-3 cable is shown in the following figure and table.

Figure 12: Model 3732-MTC-3 D-sub connectors



NOTE

Connect the drain wire to shield at both ends.

Model 3732-MTC-3 pin number identification

CONN 1 Pin	Color	CONN 2 Pin
1	Black	1
2	Brown	2
3	Red	3
4	Orange	4
5	Yellow	5
6	Green	6
7	Blue	7
8	Violet	8
9	Gray	9
10	White	10
11	White/black	11
12	White/brown	12
13	White/red	13
14	White/orange	14
15	White/yellow	15
16	White/green	16
17	White/blue	17
18	White/violet	18
19	White/gray	19
20	White/black/brown	20
21	White/black/red	21

CONN 1 Pin	Color	CONN 2 Pin
40	White/red/gray	40
41	White/orange/yellow	41
42	White/orange/green	42
43	White/orange/blue	43
44	White/orange/violet	44
45	White/orange/gray	45
46	White/yellow/green	46
47	White/yellow/blue	47
48	White/yellow/violet	48
49	White/yellow/gray	49
50	Not connected	50
51	Not connected	51
52	Not connected	52
53	White/green/blue	53
54	White/green/violet	54
55	White/blue/orange/yellow	55
56	Not connected	56
57	Not connected	57
58	Not connected	58
59	Not connected	59
60	White/black/orange/green	60

CONN 1 Pin	Color	CONN 2 Pin
22	White/black/orange	22
23	White/black/yellow	23
24	White/black/green	24
25	White/black/blue	25
26	White/black/violet	26
27	White/black/gray	27
28	White/brown/red	28
29	White/brown/orange	29
30	White/brown/yellow	30
31	White/brown/green	31
32	White/brown/blue	32
33	White/brown/violet	33
34	White/brown/gray	34
35	White/red/orange	35
36	White/red/yellow	36
37	White/red/green	37
38	White/red/blue	38
39	White/red/violet (spare)	39

CONN 1 Pin	Color	CONN 2 Pin
61	White/black/orange/blue	61
62	White/green/gray	62
63	White/blue/violet	63
64	White/blue/gray	64
65	White/violet/gray	65
66	White/black/brown/red	66
67	White/black/brown/orange	67
68	White/black/brown/yellow	68
69	White/black/brown/green	69
70	White/black/brown/blue	70
71	White/black/brown/violet (spare)	71
72	White/black/red/green	72
73	White/black/brown/gray	73
74	White/black/red/yellow	74
75	Not connected	75
76	White/black/red/blue	76
77	White/black/red/violet	77
78	White/black/red/gray	78

Channel specifiers

The Series 3700A supports different card types. The functional elements on these cards are switches, relays, digital-analog converters (DACs), and digital I/O, referred to as channels. Channels are specified by a four-digit or five-digit alphanumeric sequence. This sequence is used to specify which channels are closed, opened, scanned, or assigned channel patterns. The first digit is always the slot number of the card in the mainframe. The remaining digits vary depending on the type of card.

NOTE

For complete information about Series 3700A channel types and specifiers, refer to the *Series 3700A System Switch/Multimeter Reference Manual* (part number 3700AS-901-01), available at tek.com/keithley.

Matrix card channel specifiers

The channels on the matrix cards are referred to by their slot, bank, row, and column numbers:

- **Slot number**: The number of the slot in which the card is installed.
- **Bank number**: The bank number, if used by your card. See your card documentation.
- **Row number**: The row number is either 1 to 8 or A to Z. See your card documentation.
- **Column number**: Always two digits. For columns greater than 99, use A, B, C and so on to represent 10, 11, 12, …; the resulting sequence is: 98, 99, A0, A1, …, A8, A9, B0, B1, …

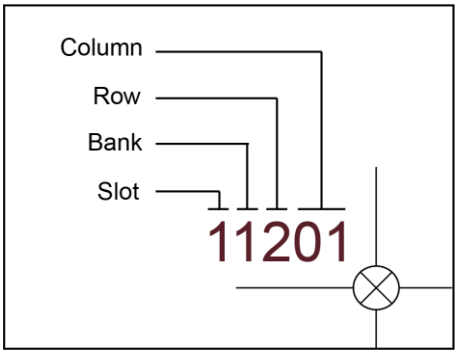
Matrix card channel examples

Specifier	Slot number	Bank number	Row number	Column number
1A05	1	N/A	1	05
3C12	3	N/A	3	12
1104	1	N/A	1	04
11104	1	1	1	04
1203	1	N/A	2	03
213A4	2	1	3	104
3112	3	N/A	1	12
62101	6	2	1	01

Channel numbering example

In the crosspoint schematics that are provided for each 3732 configuration, the numbers listed at each crosspoint indicate the slot, bank, row, and column, as shown in the following figure.

Figure 13: Channel numbering in matrix crosspoint schematics



Card configurations

You can use one of the following configurations in 1-pole mode:

- Quad 4×28 1-pole configuration (on page 18)
- Dual 4×56 1-pole configuration (on page 27)
- Single 4×112 1-pole configuration (on page 35)
- Dual 8×28 1-pole configuration (on page 45)
- Single 16×28 1-pole configuration (on page 53)

You can use one of the following configurations in 2-pole mode:

- Dual 4×28 2-pole configuration (on page 59)
- Single 4×56 2-pole configuration (on page 68)
- Single 8×28 2-pole configuration (on page 76)

The 3732 uses single-pole relays and operates in single-pole mode by default.

In 2-pole operation, one relay bank is used for the high signals and the adjacent relay bank is used for the low signals. When the 3732 is configured for 2-pole operation, channels are paired: Closing a channel on the first (high) bank causes the automatic closure of the corresponding channel on the second (low) bank.

To set up the 3732 card for 2-pole operation, you configure the hardware of the card for the appropriate 1-pole operation, and then enable 2-pole operation using Series 3700A software. The following table shows the base hardware configuration (1-pole) for each 2-pole configuration.

Base 1-pole hardware settings for 2-pole configurations

3732 1-pole configuration	3732 2-pole configuration
Quad 4×28	Dual 4×28 (2-pole)
Dual 8×28	Single 8×28 (2-pole)
Dual 4×56	Single 4×56 (2-pole)

Configure the 3732 hardware for the appropriate 1-pole operation by setting the ID jumpers on the screw-terminal accessory or direct wiring the ID bit connections (if you are not using a screw-terminal accessory).

Once the hardware is configured, use Series 3700A software to select 2-pole operation using the `channel.setpole` command. For more information, refer to the *Series 3700A System Switch/Multimeter Reference Manual*, available at tek.com/keithley and the “Close/Open Overview” section.

NOTE

You can specify 2-pole operation on some channels and not others, but it is more common to operate the entire card in 2-pole mode. The 2-pole schematics, connection diagrams, and connection logs in the following sections assume the entire card is set to 2-pole operation.

The following sections provides details for each configuration, including the D-sub connections, pin assignments and signal naming, crosspoint relay schematics, and connection logs.

Quad 4×28 1-pole configuration

The quad 4×28 1-pole configuration, which is the default configuration for the 3732 card, allows you to connect four separate banks of 28 crosspoints using jumpers, relays, or the 3732-ST-C screw-terminal accessory.

If you are using the 3732-ST-C, set jumper J17 on the upper right corner of the 3732-ST-C card to ID1 OFF and ID2 OFF.

NOTE

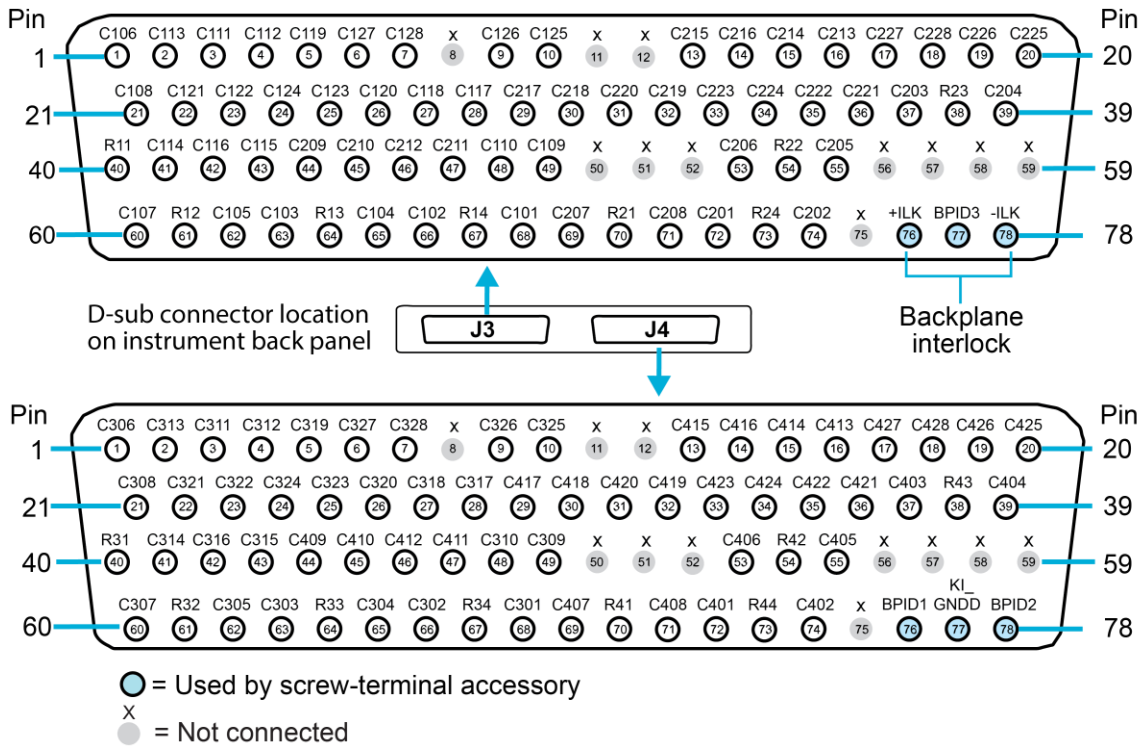
Jumper J17 is only read when the instrument is turned on and the interlock is activated.

D-sub connections: Quad 4×28 configuration

The following figure shows the J3 and J4 D-sub pin connections for the 3732 quad 4×28 configuration.

To actuate the backplane, connect +ILK and −ILK.

Figure 14: Quad 4×28 D-sub pin connections



Pin assignments and signal naming: Quad 4×28 configuration

The 3732 is set to the quad 4×28 configuration by default. The following tables show the pin signal name for each pin on each of the D-sub connectors and list the location of the connection in the switch matrix.

In the following tables, X indicates pins that are not connected.

You can use direct wiring for connections to the 3732 card using the 3732-MTC-3 cables. To use direct wiring with a quad 4×28 configuration, install jumpers as shown in the following table.

Signal	Connector and pin location	Configuration
BPID1	J4, Pin 76	Open (no connection)
BPID2	J4, Pin 78	Open (no connection)
BPID3	J3, Pin 77	Open (no connection)
+ILK	J3, Pin 76	J3, Pin 78
−ILK	J3, Pin 78	J3, Pin 76

NOTE

Refer to the Screw-terminal accessories (on page 7) for more information about jumper settings.

3732 J3 D-sub connector pin assignments for the quad 4×28 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106	1	1	6	C124	24	1	24	C109	49	1	9	R23	38	2	3
C113	2	1	13	C123	25	1	23	X	50	X	X	R11	40	1	1
C111	3	1	11	C120	26	1	20	X	51	X	X	R22	54	2	2
C112	4	1	12	C118	27	1	18	X	52	X	X	R12	61	1	2
C119	5	1	19	C117	28	1	17	C206	53	2	6	R13	64	1	3
C127	6	1	27	C217	29	2	17	C205	55	2	5	R14	67	1	4
C128	7	1	28	C218	30	2	18	X	56	X	X	R21	70	2	1
X	8	X	X	C220	31	2	20	X	57	X	X	R24	73	2	4
C126	9	1	26	C219	32	2	19	X	58	X	X				
C125	10	1	25	C223	33	2	23	X	59	X	X				
X	11	X	X	C224	34	2	24	C107	60	1	7				
X	12	X	X	C222	35	2	22	C105	62	1	5				
C215	13	2	15	C221	36	2	21	C103	63	1	3				
C216	14	2	16	C203	37	2	3	C104	65	1	4				
C214	15	2	14	C204	39	2	4	C102	66	1	2				
C213	16	2	13	C114	41	1	14	C101	68	1	1				
C227	17	2	27	C116	42	1	16	C207	69	2	7				
C228	18	2	28	C115	43	1	15	C208	71	2	8				
C226	19	2	26	C209	44	2	9	C201	72	2	1				
C225	20	2	25	C210	45	2	10	C202	74	2	2				
C108	21	1	8	C212	46	2	12	X	75	X	X				
C121	22	1	21	C211	47	2	11								
C122	23	1	22	C110	48	1	10								

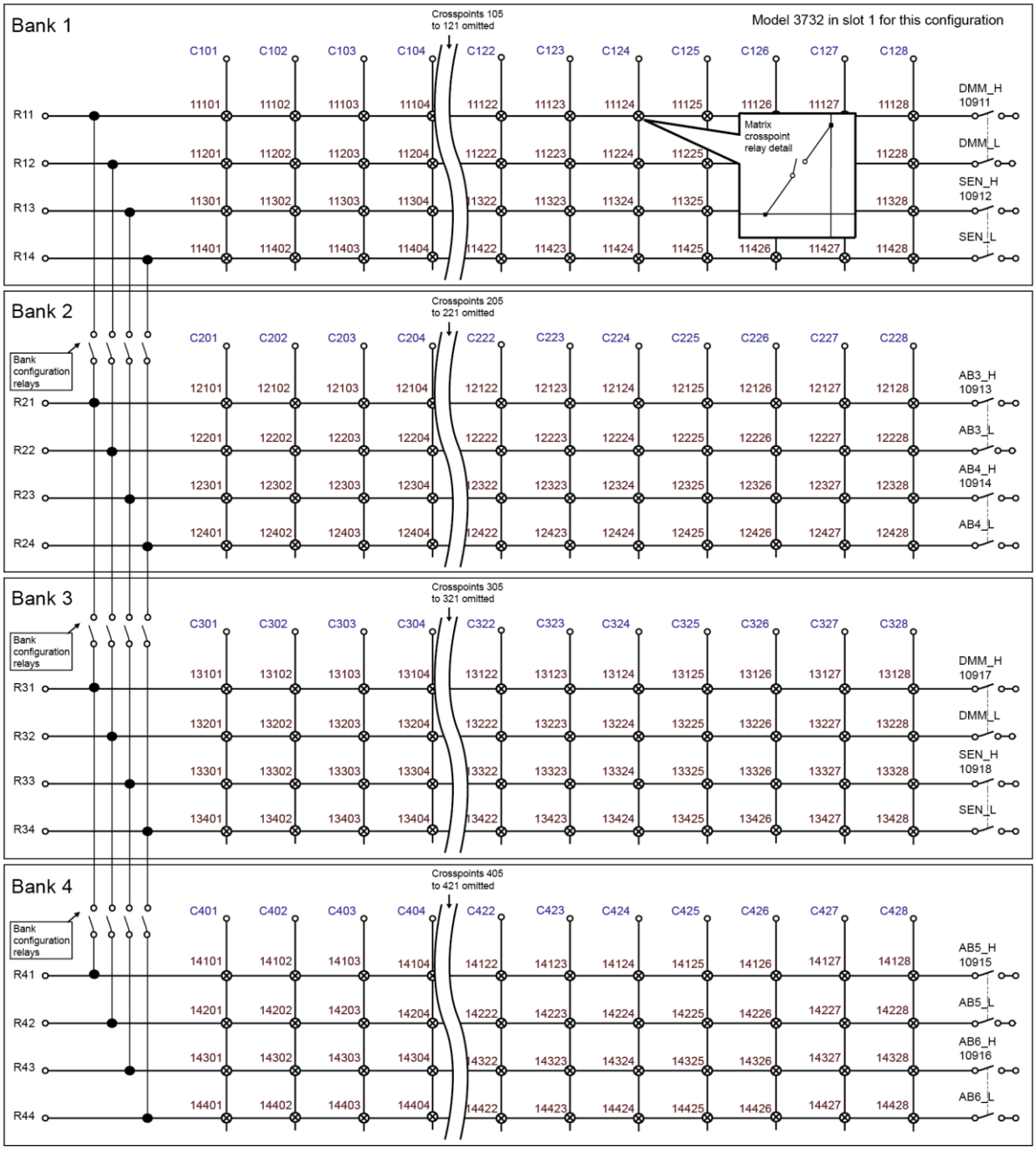
3732 J4 D-sub connector pin assignments for the quad 4×28 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C306	1	3	6	C322	23	1	22	C411	47	4	11	R43	38	2	3
C313	2	3	13	C324	24	1	24	C310	48	3	10	R31	40	1	1
C311	3	3	11	C323	25	1	23	C309	49	3	9	R42	54	2	2
C312	4	3	12	C320	26	1	20	X	50	X	X	R32	61	1	2
C319	5	3	19	C318	27	1	18	X	51	X	X	R33	64	1	3
C327	6	3	27	C317	28	1	17	X	52	X	X	R34	67	1	4
C328	7	3	28	C417	29	2	17	C406	53	4	6	R41	70	2	1
X	8	X	X	C418	30	2	18	C405	55	4	5	R44	73	2	4
C326	9	3	26	C420	31	2	20	X	56	X	X				
C325	10	3	25	C419	32	2	19	X	57	X	X				
X	11	X	X	C423	33	2	23	X	58	X	X				
X	12	X	X	C424	34	2	24	X	59	X	X				
C415	13	4	15	C422	35	2	22	C307	60	3	7				
C416	14	4	16	C421	36	2	21	C305	62	3	5				
C414	15	4	14	C403	37	2	3	C303	63	3	3				
C413	16	4	13	C404	39	2	4	C304	65	3	4				
C427	17	4	27	C314	41	1	14	C302	66	3	2				
C428	18	4	28	C316	42	1	16	C301	68	3	1				
C426	19	4	26	C315	43	1	15	C407	69	4	7				
C425	20	4	25	C409	44	2	9	C408	71	4	8				
C308	21	3	8	C410	45	2	10	C402	74	4	2				
C321	22	3	21	C412	46	2	12	X	75	X	X				

Matrix crosspoint schematic: Quad 4×28 configuration

The following figure is a simplified crosspoint schematic of the quad 4×28 matrix configuration.

Figure 15: 4×28 crosspoint matrix



Quad 4×28 configuration connection logs

Use this table to record your 3732 connection information in the quad 4×28 configuration (1 of 4).

Bank	Connection	Pin signal name	Color	Description
1	Row 1	R11		
1	Row 2	R12		
1	Row 3	R13		
1	Row 4	R14		
1	Column 1	C101		
1	Column 2	C102		
1	Column 3	C103		
1	Column 4	C104		
1	Column 5	C105		
1	Column 6	C106		
1	Column 7	C107		
1	Column 8	C108		
1	Column 9	C109		
1	Column 10	C110		
1	Column 11	C111		
1	Column 12	C112		
1	Column 13	C113		
1	Column 14	C114		
1	Column 15	C115		
1	Column 16	C116		
1	Column 17	C117		
1	Column 18	C118		
1	Column 19	C119		
1	Column 20	C120		
1	Column 21	C121		
1	Column 22	C122		
1	Column 23	C123		
1	Column 24	C124		
1	Column 25	C125		
1	Column 26	C126		
1	Column 27	C127		
1	Column 28	C128		

Model 3732 connection log for the quad 4×28 configuration (2 of 4).

Bank	Connection	Pin signal name	Color	Description
2	Row 1	R21		
2	Row 2	R22		
2	Row 3	R23		
2	Row 4	R24		
2	Column 1	C201		
2	Column 2	C202		
2	Column 3	C203		
2	Column 4	C204		
2	Column 5	C205		
2	Column 6	C206		
2	Column 7	C207		
2	Column 8	C208		
2	Column 9	C209		
2	Column 10	C210		
2	Column 11	C211		
2	Column 12	C212		
2	Column 13	C213		
2	Column 14	C214		
2	Column 15	C215		
2	Column 16	C216		
2	Column 17	C217		
2	Column 18	C218		
2	Column 19	C219		
2	Column 20	C220		
2	Column 21	C221		
2	Column 22	C222		
2	Column 23	C223		
2	Column 24	C224		
2	Column 25	C225		
2	Column 26	C226		
2	Column 27	C227		
2	Column 28	C228		

Model 3732 connection log for the quad 4×28 configuration (3 of 4).

Bank	Connection	Pin signal name	Color	Description
3	Row 1	R31		
3	Row 2	R32		
3	Row 3	R33		
3	Row 4	R34		
3	Column 1	C301		
3	Column 2	C302		
3	Column 3	C303		
3	Column 4	C304		
3	Column 5	C305		
3	Column 6	C306		
3	Column 7	C307		
3	Column 8	C308		
3	Column 9	C309		
3	Column 10	C310		
3	Column 11	C311		
3	Column 12	C312		
3	Column 13	C313		
3	Column 14	C314		
3	Column 15	C315		
3	Column 16	C316		
3	Column 17	C317		
3	Column 18	C318		
3	Column 19	C319		
3	Column 20	C320		
3	Column 21	C321		
3	Column 22	C322		
3	Column 23	C323		
3	Column 24	C324		
3	Column 25	C325		
3	Column 26	C326		
3	Column 27	C327		
3	Column 28	C328		

Model 3732 connection log for the quad 4×28 configuration (4 of 4).

Bank	Connection	Pin signal name	Color	Description
4	Row 1	R41		
4	Row 2	R42		
4	Row 3	R43		
4	Row 4	R44		
4	Column 1	C401		
4	Column 2	C402		
4	Column 3	C403		
4	Column 4	C404		
4	Column 5	C405		
4	Column 6	C406		
4	Column 7	C407		
4	Column 8	C408		
4	Column 9	C409		
4	Column 10	C410		
4	Column 11	C411		
4	Column 12	C412		
4	Column 13	C413		
4	Column 14	C414		
4	Column 15	C415		
4	Column 16	C416		
4	Column 17	C417		
4	Column 18	C418		
4	Column 19	C419		
4	Column 20	C420		
4	Column 21	C421		
4	Column 22	C422		
4	Column 23	C423		
4	Column 24	C424		
4	Column 25	C425		
4	Column 26	C426		
4	Column 27	C427		
4	Column 28	C428		

Dual 4×56 1-pole configuration

The dual 4×56 1-pole configuration allows you to create two banks of 224 crosspoints using bank configuration relays mounted on the 3732 card. The columns of these two banks can then be connected using jumpers, relays, or the 3732-ST-C screw-terminal accessory.

If you are using the 3732-ST-C, set jumper J17 on the upper right corner of the 3732-ST-C card to ID1 ON and ID2 OFF. You can also set ID1 to OFF and ID2 to ON.

NOTE

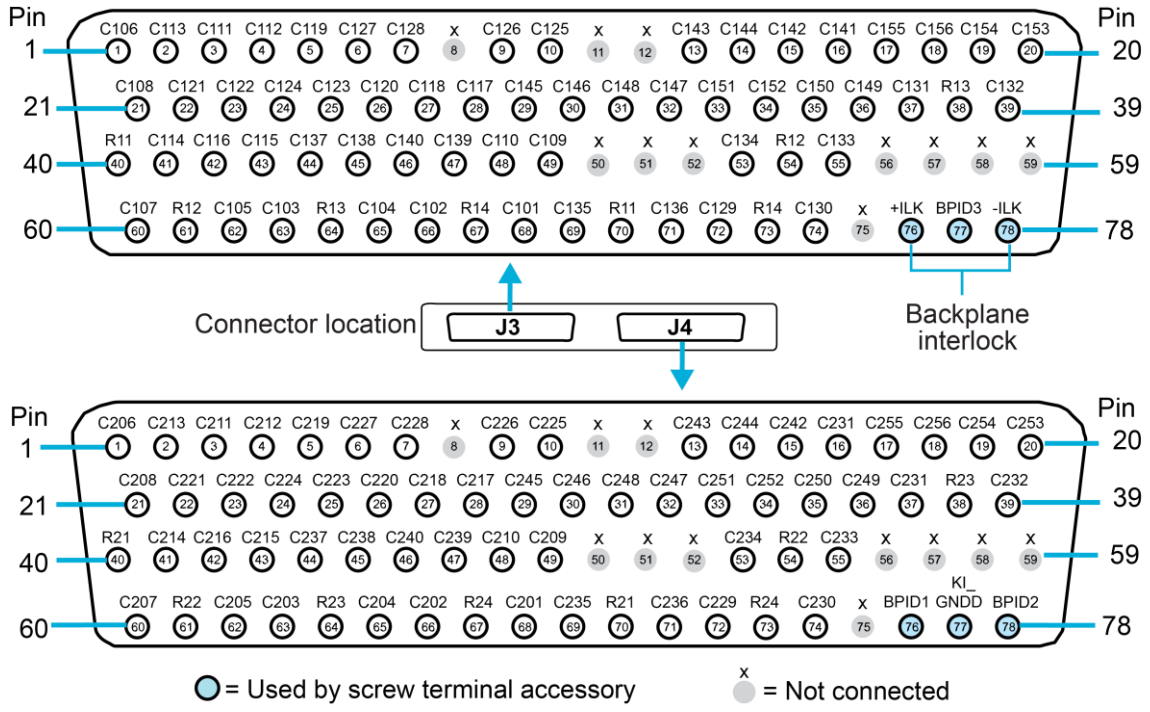
Jumper J17 is only read when the instrument is turned on and the interlock is activated.

D-sub connections: Dual 4×56 configuration

The following figure shows the J3 and J4 D-sub pin connections for the 3732 dual 4×56 configuration.

The backplane interlock is actuated by connecting +ILK and −ILK.

Figure 16: Dual 4×56 D-sub pin connections



Pin assignments and signal naming: Dual 4×56 configuration

The following tables show the pin signal name for each pin on each of the D-sub connectors and list the location of the connection in the switch matrix.

In the following tables, X indicates pins that are not connected.

You can use direct wiring for connections to the 3732 card using the 3732-MTC-3 cables. To use direct wiring with a dual 4×56 configuration, install jumpers as shown in the following table. Both configuration options produce the same results.

Signal	Connector and pin location	Configuration option 1	Configuration option 2
BPID1	J4, Pin 76	Open (no connection)	J4, Pin 77
BPID2	J4, Pin 78	J4, Pin 77	Open (no connection)
BPID3	J3, Pin 77	Open (no connection)	Open (no connection)
+ILK	J3, Pin 76	J3, Pin 78	J3, Pin 78
−ILK	J3, Pin 78	J3, Pin 76	J3, Pin 76

3732 J3 D-sub connector pin assignments for the dual 4×56 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106	1	1	6	C124	24	1	24	C109	49	1	9	R13	38	1	3
C113	2	1	13	C123	25	1	23	X	50	X	X	R11	40	1	1
C111	3	1	11	C120	26	1	20	X	51	X	X	R12	54	1	2
C112	4	1	12	C118	27	1	18	X	52	X	X	R12	61	1	2
C119	5	1	19	C117	28	1	17	C134	53	1	34	R13	64	1	3
C127	6	1	27	C145	29	1	45	C133	55	1	33	R14	67	1	4
C128	7	1	28	C146	30	1	46	X	56	X	X	R11	70	1	1
X	8	X	X	C148	31	1	48	X	57	X	X	R14	73	1	4
C126	9	1	26	C147	32	1	47	X	58	X	X				
C125	10	1	25	C151	33	1	51	X	59	X	X				
X	11	X	X	C152	34	1	52	C107	60	1	7				
X	12	X	X	C150	35	1	50	C105	62	1	5				
C143	13	1	43	C149	36	1	49	C103	63	1	3				
C144	14	1	44	C131	37	1	31	C104	65	1	4				
C142	15	1	42	C132	39	1	32	C102	66	1	2				
C141	16	1	41	C114	41	1	14	C101	68	1	1				
C155	17	1	55	C116	42	1	16	C135	69	1	35				
C156	18	1	56	C115	43	1	15	C136	71	1	36				
C154	19	1	54	C137	44	1	37	C129	72	1	29				
C153	20	1	53	C138	45	1	38	C130	74	1	30				
C108	21	1	8	C140	46	1	40	X	75	X	X				
C121	22	1	21	C139	47	1	39								
C122	23	1	22	C110	48	1	10								

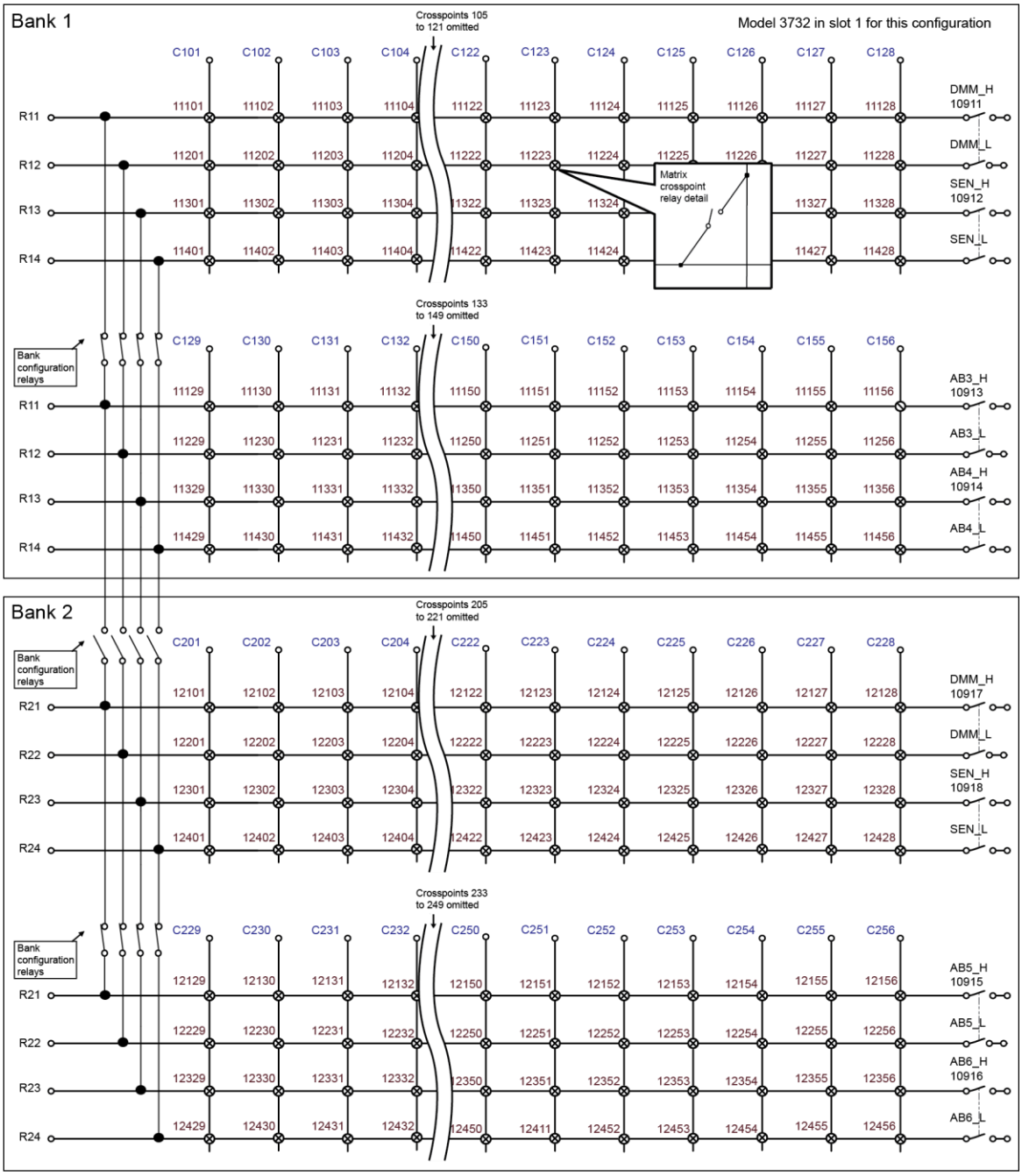
3732 J4 D-sub connector pin assignments for the dual 4× 56 configuration

Columns												Rows			
		Matrix location				Matrix location				Matrix location				Matrix location	
Pin signal name	Pin #	Bank #	Column #	Pin signal name	Pin #	Bank #	Column #	Pin signal name	Pin #	Bank #	Column #	Pin signal name	Pin #	Bank #	Row #
C206	1	2	6	C224	24	2	24	C209	49	2	9	R23	38	2	3
C213	2	2	13	C223	25	2	23	X	50	X	X	R21	40	2	1
C211	3	2	11	C220	26	2	20	X	51	X	X	R22	54	2	2
C212	4	2	12	C218	27	2	18	X	52	X	X	R22	61	2	2
C219	5	2	19	C217	28	2	17	C234	53	2	34	R23	64	2	3
C227	6	2	27	C245	29	2	45	C233	55	2	33	R24	67	2	4
C228	7	2	28	C246	30	2	46	X	56	X	X	R21	70	2	1
X	8	X	X	C248	31	2	48	X	57	X	X	R24	73	2	4
C226	9	2	26	C247	32	2	47	X	58	X	X				
C225	10	2	25	C251	33	2	51	X	59	X	X				
X	11	X	X	C252	34	2	52	C207	60	2	7				
X	12	X	X	C250	35	2	50	C205	62	2	5				
C243	13	2	43	C249	36	2	49	C203	63	2	3				
C244	14	2	44	C231	37	2	31	C204	65	2	4				
C242	15	2	42	C232	39	2	32	C202	66	2	2				
C231	16	2	31	C214	41	2	14	C201	68	2	1				
C255	17	2	55	C216	42	2	16	C235	69	2	35				
C256	18	2	56	C215	43	2	15	C236	71	2	36				
C254	19	2	54	C237	44	2	37	C229	72	2	29				
C253	20	2	53	C238	45	2	38	C230	74	2	30				
C208	21	2	8	C240	46	2	40	X	75	X	X				
C221	22	2	21	C239	47	2	39								
C222	23	2	22	C210	48	2	10								

Schematic: Dual 4×56 configuration

The following figure is a simplified crosspoint schematic of the dual 4×56 matrix configuration.

Figure 17: Dual 4×56 simplified crosspoint schematic



Dual 4×56 configuration connection logs

Use this table to record your 3732 connection information for the dual 4×56 configuration (1 of 4).

Model 3732 connection log for the dual 4×56 configuration: Bank 1

Bank	Connection	Pin signal name	Color	Description
1	Row 1	R11		
1	Row 2	R12		
1	Row 3	R13		
1	Row 4	R14		
1	Column 1	C101		
1	Column 2	C102		
1	Column 3	C103		
1	Column 4	C104		
1	Column 5	C105		
1	Column 6	C106		
1	Column 7	C107		
1	Column 8	C108		
1	Column 9	C109		
1	Column 10	C110		
1	Column 11	C111		
1	Column 12	C112		
1	Column 13	C113		
1	Column 14	C114		
1	Column 15	C115		
1	Column 16	C116		
1	Column 17	C117		
1	Column 18	C118		
1	Column 19	C119		
1	Column 20	C120		
1	Column 21	C121		
1	Column 22	C122		
1	Column 23	C123		
1	Column 24	C124		
1	Column 25	C125		

Model 3732 connection log for the dual 4×56 configuration: Bank 1

Bank	Connection	Pin signal name	Color	Description
1	Column 26	C126		
1	Column 27	C127		
1	Column 28	C128		
1	Column 29	C129		
1	Column 30	C130		
1	Column 31	C131		
1	Column 32	C132		
1	Column 33	C133		
1	Column 34	C134		
1	Column 35	C135		
1	Column 36	C136		
1	Column 37	C137		
1	Column 38	C138		
1	Column 39	C139		
1	Column 40	C140		
1	Column 41	C141		
1	Column 42	C142		
1	Column 43	C143		
1	Column 44	C144		
1	Column 45	C145		
1	Column 46	C146		
1	Column 47	C147		
1	Column 48	C148		
1	Column 49	C149		
1	Column 50	C150		
1	Column 51	C151		
1	Column 52	C152		
1	Column 53	C153		
1	Column 54	C154		
1	Column 55	C155		
1	Column 56	C156		

Model 3732 connection log for the dual 4×56 configuration: Bank 2

Bank	Connection	Pin signal name	Color	Description
2	Row 1	R21		
2	Row 2	R22		
2	Row 3	R23		
2	Row 4	R24		
2	Column 1	C201		
2	Column 2	C202		
2	Column 3	C203		
2	Column 4	C204		
2	Column 5	C205		
2	Column 6	C206		
2	Column 7	C207		
2	Column 8	C208		
2	Column 9	C209		
2	Column 10	C210		
2	Column 11	C211		
2	Column 12	C212		
2	Column 13	C213		
2	Column 14	C214		
2	Column 15	C215		
2	Column 16	C216		
2	Column 17	C217		
2	Column 18	C218		
2	Column 19	C219		
2	Column 20	C220		
2	Column 21	C221		
2	Column 22	C222		
2	Column 23	C223		
2	Column 24	C224		
2	Column 25	C225		
2	Column 26	C226		

Model 3732 connection log for the dual 4×56 configuration: Bank 2

Bank	Connection	Pin signal name	Color	Description
2	Column 27	C227		
2	Column 28	C228		
2	Column 29	C229		
2	Column 30	C230		
2	Column 31	C231		
2	Column 32	C232		
2	Column 33	C233		
2	Column 34	C234		
2	Column 35	C235		
2	Column 36	C236		
2	Column 37	C237		
2	Column 38	C238		
2	Column 39	C239		
2	Column 40	C240		
2	Column 41	C241		
2	Column 42	C242		
2	Column 43	C243		
2	Column 44	C244		
2	Column 45	C245		
2	Column 46	C246		
2	Column 47	C247		
2	Column 48	C248		
2	Column 49	C249		
2	Column 50	C250		
2	Column 51	C251		
2	Column 52	C252		
2	Column 53	C253		
2	Column 54	C254		
2	Column 55	C255		
2	Column 56	C256		

Single 4×112 1-pole configuration

The single 4×112 1-pole configuration allows you to connect four banks of 112 crosspoints into a single matrix of 448 crosspoints using bank configuration relays mounted on the 3732 card. The columns of these four banks can then be connected using jumpers, relays, or the 3732-ST-C screw-terminal accessory.

If you are using the 3732-ST-C, set jumper J17 on the upper right corner of the 3732-ST-C card to ID1 ON and ID2 to ON.

NOTE

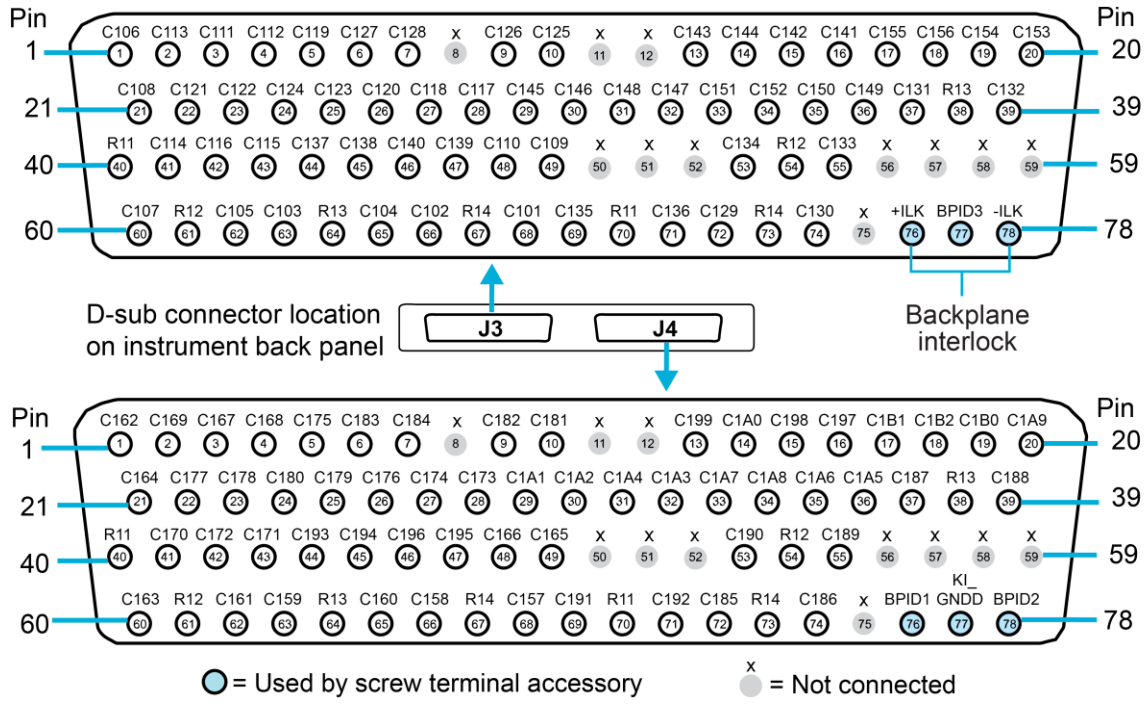
Jumper J17 is only read when the instrument is turned on and the interlock is activated.

D-sub connections: Single 4×112 configuration

The following figure shows the J3 and J4 D-sub pin assignments for the single 4×112 configuration.

To actuate the backplane interlock, connect +ILK and −ILK.

Figure 18: Single 4×112 D-sub pin connections



Pin assignments and signal naming: Single 4×112 configuration

The following tables show the pin signal name for each pin on each of the D-sub connectors and list the location of the connection in the switch matrix.

In the following tables, X indicates pins that are not connected.

You can use direct wiring for connections to the 3732 card using the 3732-MTC-3 cables. To use direct wiring with a single 4×112 configuration, install jumpers as shown in the following table.

Signal	Connector and pin location	Configuration
BPID1	J4, Pin 76	J4, Pin 77
BPID2	J4, Pin 78	J4, Pin 77
BPID3	J3, Pin 77	Open (no connection)
+ILK	J3, Pin 76	J3, Pin 78
−ILK	J3, Pin 78	J3, Pin 76

NOTE

Refer to the Screw-terminal accessories (on page 7) for more information about jumper settings.

3732 J3 D-sub connector pin assignments for the single 4×112 configuration

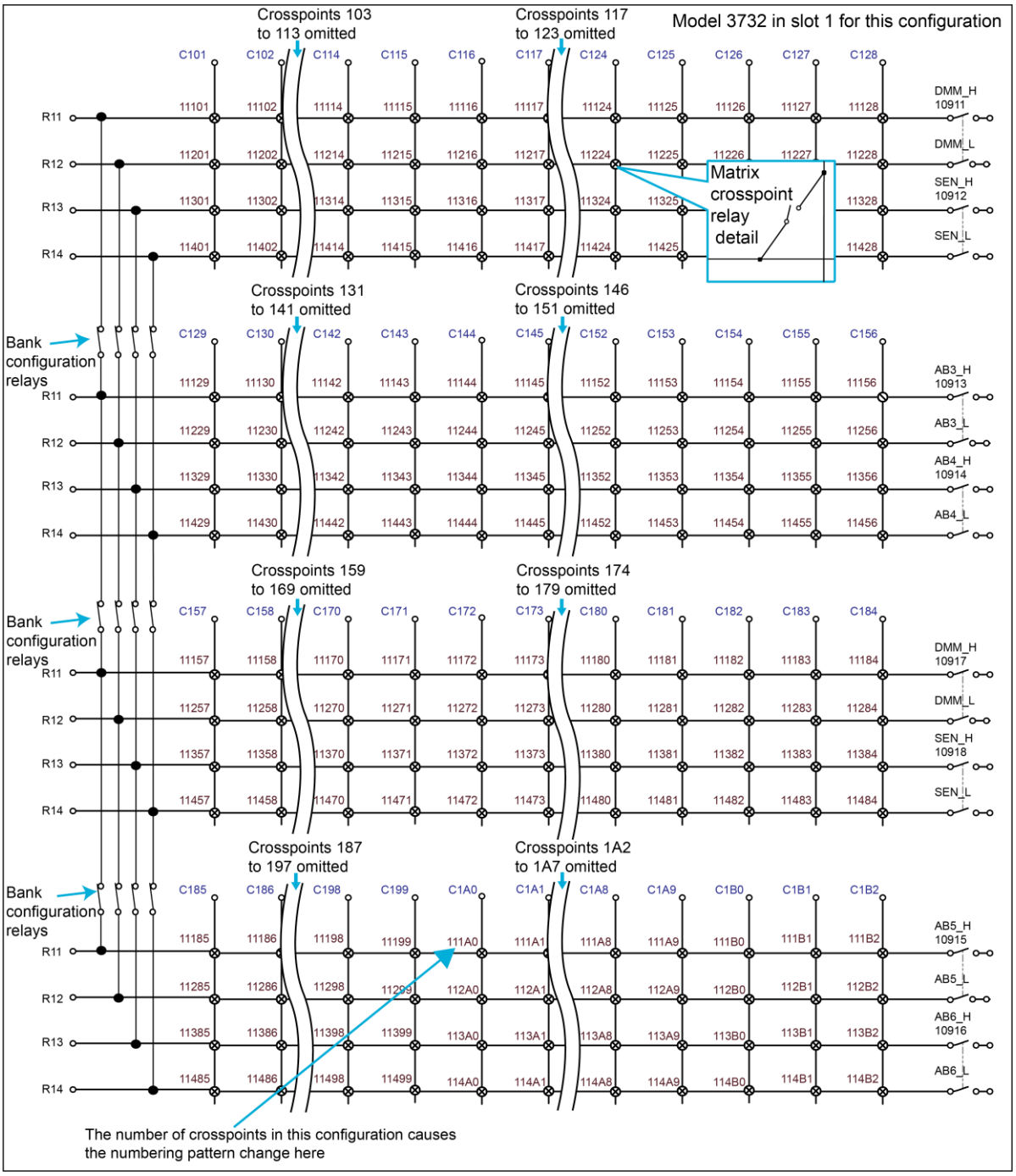
Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106	1	1	6	C124	24	1	24	C109	49	1	9	R13	38	1	3
C113	2	1	13	C123	25	1	23	X	50	X	X	R11	40	1	1
C111	3	1	11	C120	26	1	20	X	51	X	X	R12	54	1	2
C112	4	1	12	C118	27	1	18	X	52	X	X	R12	61	1	2
C119	5	1	19	C117	28	1	17	C134	53	1	34	R13	64	1	3
C127	6	1	27	C145	29	1	45	C133	55	1	33	R14	67	1	4
C128	7	1	28	C146	30	1	46	X	56	X	X	R11	70	1	1
X	8	X	X	C148	31	1	48	X	57	X	X	R14	73	1	4
C126	9	1	26	C147	32	1	47	X	58	X	X				
C125	10	1	25	C151	33	1	51	X	59	X	X				
X	11	X	X	C152	34	1	52	C107	60	1	7				
X	12	X	X	C150	35	1	50	C105	62	1	5				
C143	13	1	43	C149	36	1	49	C103	63	1	3				
C144	14	1	44	C131	37	1	31	C104	65	1	4				
C142	15	1	42	C132	39	1	32	C102	66	1	2				
C141	16	1	41	C114	41	1	14	C101	68	1	1				
C155	17	1	55	C116	42	1	16	C135	69	1	35				
C156	18	1	56	C115	43	1	15	C136	71	1	36				
C154	19	1	54	C137	44	1	37	C129	72	1	29				
C153	20	1	53	C138	45	1	38	C130	74	1	30				
C108	21	1	8	C140	46	1	40	X	75	X	X				
C121	22	1	21	C139	47	1	39								
C122	23	1	22	C110	48	1	10								

3732 J4 D-sub connector pin assignments for the single 4×112 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C162	1	1	62	C180	24	1	80	C165	49	1	65	R13	38	1	3
C169	2	1	69	C179	25	1	79	X	50	X	X	R11	40	1	1
C167	3	1	67	C176	26	1	76	X	51	X	X	R12	54	1	2
C168	4	1	68	C174	27	1	74	X	52	X	X	R12	61	1	2
C175	5	1	75	C173	28	1	73	C190	53	1	90	R13	64	1	3
C183	6	1	83	C1A1	29	1	A1	C189	55	1	89	R14	67	1	4
C184	7	1	84	C1A2	30	1	A2	X	56	X	X	R11	70	1	1
X	8	X	X	C1A4	31	1	A4	X	57	X	X	R14	73	1	4
C182	9	1	82	C1A3	32	1	A3	X	58	X	X				
C181	10	1	81	C1A7	33	1	A7	X	59	X	X				
X	11	X	X	C1A8	34	1	A8	C163	60	1	63				
X	12	X	X	C1A6	35	1	A6	C161	62	1	61				
C199	13	1	99	C1A5	36	1	A5	C159	63	1	59				
C1A0	14	1	A0	C187	37	1	87	C160	65	1	60				
C198	15	1	98	C188	39	1	88	C158	66	1	58				
C197	16	1	97	C170	41	1	70	C157	68	1	57				
C1B1	17	1	B1	C172	42	1	72	C191	69	1	91				
C1B2	18	1	B2	C171	43	1	71	C192	71	1	92				
C1B0	19	1	B0	C193	44	1	93	C185	72	1	85				
C1A9	20	1	A9	C194	45	1	94	C186	74	1	86				
C164	21	1	64	C196	46	1	96	X	75	X	X				
C177	22	1	77	C195	47	1	95								
C178	23	1	78	C166	48	1	66								

Schematic: Single 4×112 configuration

The following figure is a simplified crosspoint schematic of the single 4×112 matrix configuration.



Single 4×112 configuration connection logs

Use this table to record your 3732 connection information for the single 4×112 configuration.

Model 3732 connection log for the single 4×112 configuration

Bank	Connection	Pin signal name	Color	Description
1	Row 1	R11		
1	Row 2	R12		
1	Row 3	R13		
1	Row 4	R14		
1	Column 1	C101		
1	Column 2	C102		
1	Column 3	C103		
1	Column 4	C104		
1	Column 5	C105		
1	Column 6	C106		
1	Column 7	C107		
1	Column 8	C108		
1	Column 9	C109		
1	Column 10	C110		
1	Column 11	C111		
1	Column 12	C112		
1	Column 13	C113		
1	Column 14	C114		
1	Column 15	C115		
1	Column 16	C116		
1	Column 17	C117		
1	Column 18	C118		
1	Column 19	C119		
1	Column 20	C120		

Model 3732 connection log for the single 4×112 configuration

Bank	Connection	Pin signal name	Color	Description
1	Column 21	C121		
1	Column 22	C122		
1	Column 23	C123		
1	Column 24	C124		
1	Column 25	C125		
1	Column 26	C126		
1	Column 27	C127		
1	Column 28	C128		
1	Column 29	C129		
1	Column 30	C130		
1	Column 31	C131		
1	Column 32	C132		
1	Column 33	C133		
1	Column 34	C134		
1	Column 35	C135		
1	Column 36	C136		
1	Column 37	C137		
1	Column 38	C138		
1	Column 39	C139		
1	Column 40	C140		
1	Column 41	C141		
1	Column 42	C142		
1	Column 43	C143		
1	Column 44	C144		
1	Column 45	C145		
1	Column 46	C146		

Model 3732 connection log for the single 4×112 configuration

Bank	Connection	Pin signal name	Color	Description
1	Column 47	C147		
1	Column 48	C148		
1	Column 49	C149		
1	Column 50	C150		
1	Column 51	C151		
1	Column 52	C152		
1	Column 53	C153		
1	Column 54	C154		
1	Column 55	C155		
1	Column 56	C156		
1	Column 57	C157		
1	Column 58	C158		
1	Column 59	C159		
1	Column 60	C160		
1	Column 61	C161		
1	Column 62	C162		
1	Column 63	C163		
1	Column 64	C164		
1	Column 65	C165		
1	Column 66	C166		
1	Column 67	C167		
1	Column 68	C168		
1	Column 69	C169		
1	Column 70	C170		
1	Column 71	C171		
1	Column 72	C172		

Model 3732 connection log for the single 4×112 configuration

Bank	Connection	Pin signal name	Color	Description
1	Column 73	C173		
1	Column 74	C174		
1	Column 75	C175		
1	Column 76	C176		
1	Column 77	C177		
1	Column 78	C178		
1	Column 79	C179		
1	Column 80	C180		
1	Column 81	C181		
1	Column 82	C182		
1	Column 83	C183		
1	Column 84	C184		
1	Column 85	C185		
1	Column 86	C186		
1	Column 87	C187		
1	Column 88	C188		
1	Column 89	C189		
1	Column 90	C190		
1	Column 91	C191		
1	Column 92	C192		
1	Column 93	C193		
1	Column 94	C194		
1	Column 95	C195		
1	Column 96	C196		
1	Column 97	C197		
1	Column 98	C198		

Model 3732 connection log for the single 4×112 configuration

Bank	Connection	Pin signal name	Color	Description
1	Column 99	C199		
1	Column 100	C1A0		
1	Column 101	C1A1		
1	Column 102	C1A2		
1	Column 103	C1A3		
1	Column 104	C1A4		
1	Column 105	C1A5		
1	Column 106	C1A6		
1	Column 107	C1A7		
1	Column 108	C1A8		
1	Column 109	C1A9		
1	Column 110	C1B0		
1	Column 111	C1B1		
1	Column 112	C1B2		

Dual 8×28 1-pole configuration

The dual 8×28 1-pole configuration allows you to use row expansion to create two banks of 224 crosspoints using jumpers, relays, or the 3732-ST-R screw-terminal accessory. Each bank consists of 8 rows and 28 columns.

If you are using the 3732-ST-R, set jumper J13 on the upper right corner of the 3732-ST-R card to ID1 OFF.

NOTE

Jumper J13 is only read when the instrument is turned on and the interlock is activated.

D-sub connections: Dual 8×28 configuration

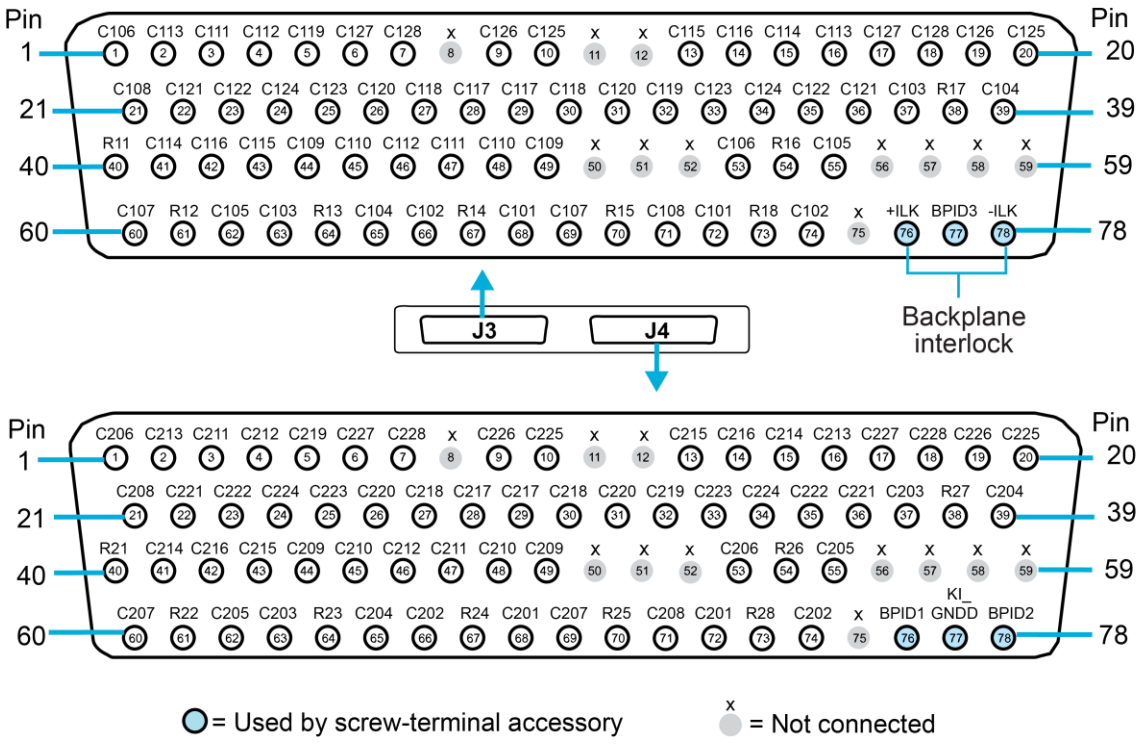
The following figure shows the J3 and J4 D-sub pin assignments for the dual 8×28 configuration.

To actuate the backplane interlock, connect +ILK and −ILK.

NOTE

The pinouts in the following figure represent the pin connections that are made when the 3732-ST-R screw-terminal accessory is attached to the 3732 J3 and J4 connectors. If the 3732-ST-R is not attached, you must connect the pins with the same names together externally; they are not connected on the 3732 card for this configuration.

Figure 19: Dual 8×28 D-sub pin connections



Pin assignments and signal naming: Dual 8×28 configuration

The following tables show the pin signal name for each pin on each of the D-sub connectors and list the location of the connection in the switch matrix.

You can use direct wiring for connections to the 3732 card using the 3732-MTC-3 cables. To use direct wiring with a dual 8×28 configuration, install jumpers as shown in the following table.

Signal	Connector and pin location	Configuration
BPID1	J4, Pin 76	Open (no connection)
BPID2	J4, Pin 78	Open (no connection)
BPID3	J3, Pin 77	J4, Pin 77
+IILK	J3, Pin 76	J3, Pin 78
−ILK	J3, Pin 78	J3, Pin 76

NOTE

Refer to the Screw-terminal accessories (on page 7) for more information about jumper settings.

3732 J3 D-sub connector pin assignments for the dual 8×28 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106	1	1	6	C124	24	1	24	C109	49	1	9	R17	38	1	7
C113	2	1	13	C123	25	1	23	X	50	X	X	R11	40	1	1
C111	3	1	11	C120	26	1	20	X	51	X	X	R16	54	1	6
C112	4	1	12	C118	27	1	18	X	52	X	X	R12	61	1	2
C119	5	1	19	C117	28	1	17	C106	53	1	6	R13	64	1	3
C127	6	1	27	C117	29	1	17	C105	55	1	5	R14	67	1	4
C128	7	1	28	C118	30	1	18	X	56	X	X	R15	70	1	5
X	8	X	X	C120	31	1	20	X	57	X	X	R18	73	1	8
C126	9	1	26	C119	32	1	19	X	58	X	X				
C125	10	1	25	C123	33	1	23	X	59	X	X				
X	11	X	X	C124	34	1	24	C107	60	1	7				
X	12	X	X	C122	35	1	22	C105	62	1	5				
C115	13	1	15	C121	36	1	21	C103	63	1	3				
C116	14	1	16	C103	37	1	3	C104	65	1	4				
C114	15	1	14	C104	39	1	4	C102	66	1	2				
C113	16	1	13	C114	41	1	14	C101	68	1	1				
C127	17	1	27	C116	42	1	16	C107	69	1	7				
C128	18	1	28	C115	43	1	15	C108	71	1	8				
C126	19	1	26	C109	44	1	9	C101	72	1	1				
C125	20	1	25	C110	45	1	10	C102	74	1	2				
C108	21	1	8	C112	46	1	12	X	75	X	X				
C121	22	1	21	C111	47	1	11								
C122	23	1	22	C110	48	1	10								

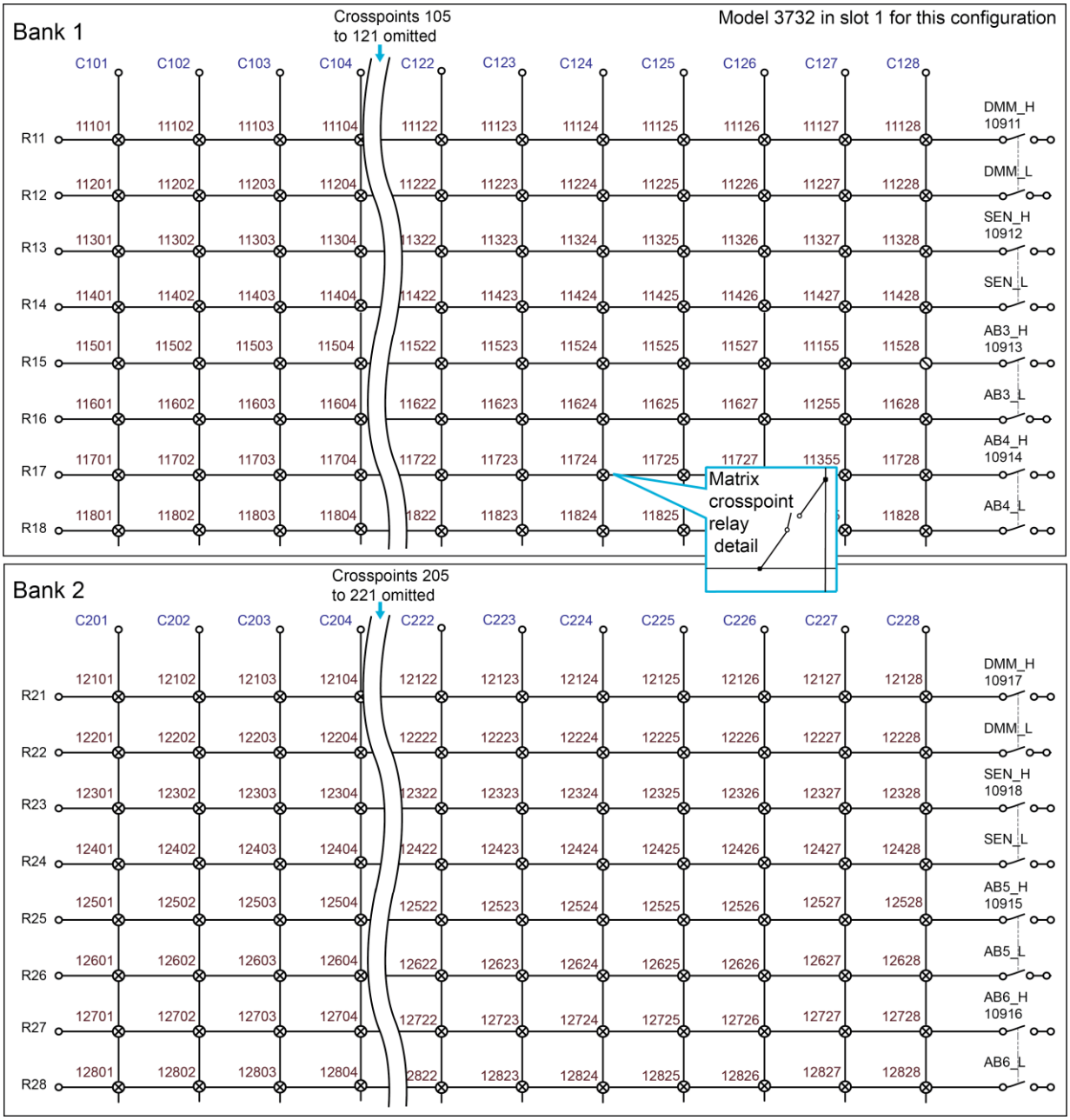
3732 J4 D-sub connector pin assignments for the dual 8×28 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C206	1	2	6	C224	24	2	24	C209	49	2	9	R27	38	2	7
C213	2	2	13	C223	25	2	23	X	50	X	X	R21	40	2	1
C211	3	2	11	C220	26	2	20	X	51	X	X	R26	54	2	6
C212	4	2	12	C218	27	2	18	X	52	X	X	R22	61	2	2
C219	5	2	19	C217	28	2	17	C206	53	2	6	R23	64	2	3
C227	6	2	27	C217	29	2	17	C205	55	2	5	R24	67	2	4
C228	7	2	28	C218	30	2	18	X	56	X	X	R25	70	2	5
X	8	X	X	C220	31	2	20	X	57	X	X	R28	73	2	8
C226	9	2	26	C219	32	2	19	X	58	X	X				
C225	10	2	25	C223	33	2	23	X	59	X	X				
X	11	X	X	C224	34	2	24	C207	60	2	7				
X	12	X	X	C222	35	2	22	C205	62	2	5				
C215	13	2	15	C221	36	2	21	C203	63	2	3				
C216	14	2	16	C203	37	2	3	C204	65	2	4				
C214	15	2	14	C204	39	2	4	C202	66	2	2				
C213	16	2	13	C214	41	2	14	C201	68	2	1				
C227	17	2	27	C216	42	2	16	C207	69	2	7				
C228	18	2	28	C215	43	2	15	C208	71	2	8				
C226	19	2	26	C209	44	2	9	C201	72	2	1				
C225	20	2	25	C210	45	2	10	C202	74	2	2				
C208	21	2	8	C212	46	2	12	X	75	X	X				
C221	22	2	21	C211	47	2	11								
C222	23	2	22	C210	48	2	10								

Schematic: Dual 8×28 configuration

The following figure is a simplified crosspoint schematic of the dual 8×28 matrix configuration.

Figure 20: Dual 8×28 simplified crosspoint schematic



Dual 8×28 configuration connection logs

Use this table to record your 3732 connection information for the dual 8×28 configuration.

Model 3732 connection log for the dual 8×28 configuration: Bank 1

Bank	Connection	Pin signal name	Color	Description
1	Row 1	R11		
1	Row 2	R12		
1	Row 3	R13		
1	Row 4	R14		
1	Row 5	R15		
1	Row 6	R16		
1	Row 7	R17		
1	Row 8	R18		
1	Column 1	C101		
1	Column 2	C102		
1	Column 3	C103		
1	Column 4	C104		
1	Column 5	C105		
1	Column 6	C106		
1	Column 7	C107		
1	Column 8	C108		
1	Column 9	C109		
1	Column 10	C110		
1	Column 11	C111		
1	Column 12	C112		
1	Column 13	C113		
1	Column 14	C114		
1	Column 15	C115		
1	Column 16	C116		
1	Column 17	C117		
1	Column 18	C118		
1	Column 19	C119		
1	Column 20	C120		
1	Column 21	C121		

Model 3732 connection log for the dual 8×28 configuration: Bank 1

Bank	Connection	Pin signal name	Color	Description
1	Column 22	C122		
1	Column 23	C123		
1	Column 24	C124		
1	Column 25	C125		
1	Column 26	C126		
1	Column 27	C127		
1	Column 28	C128		

Model 3732 connection log for the dual 8×28 configuration: Bank 2

Bank	Connection	Pin signal name	Color	Description
2	Row 1	R21		
2	Row 2	R22		
2	Row 3	R23		
2	Row 4	R24		
2	Row 5	R25		
2	Row 6	R26		
2	Row 7	R27		
2	Row 8	R28		
2	Column 1	C201		
2	Column 2	C202		
2	Column 3	C203		
2	Column 4	C204		
2	Column 5	C205		
2	Column 6	C206		
2	Column 7	C207		
2	Column 8	C208		
2	Column 9	C209		
2	Column 10	C210		
2	Column 11	C211		

Model 3732 connection log for the dual 8×28 configuration: Bank 2

Bank	Connection	Pin signal name	Color	Description
2	Column 12	C212		
2	Column 13	C213		
2	Column 14	C214		
2	Column 15	C215		
2	Column 16	C216		
2	Column 17	C217		
2	Column 18	C218		
2	Column 19	C219		
2	Column 20	C220		
2	Column 21	C221		
2	Column 22	C222		
2	Column 23	C223		
2	Column 24	C224		
2	Column 25	C225		
2	Column 26	C226		
2	Column 27	C227		
2	Column 28	C228		

Single 16×28 1-pole configuration

The single 16×28 configuration allows you to use row expansion to create a single bank consisting of 16 rows and 28 columns using jumpers, relays, or the 3732-ST-R screw-terminal accessory.

If you are using the 3732-ST-R, set jumper J13 on the upper right corner of the 3732-ST-R card to ID1 ON.

NOTE

Jumper J13 is only read when the instrument is turned on and the interlock is activated.

D-sub connections: Single 16×28 configuration

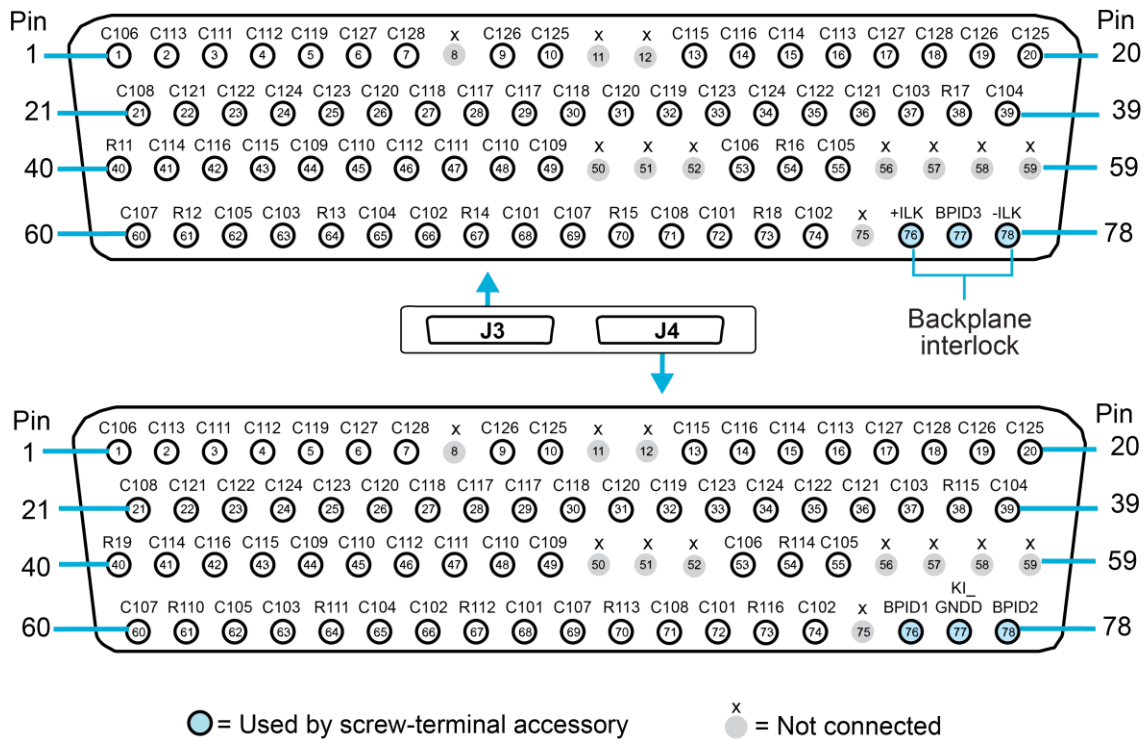
The following figure shows the J3 and J4 D-sub pin assignments for the single 16×28 configuration.

The backplane interlock is actuated by connecting +ILK and −ILK.

NOTE

The pinouts in the following figure represent the pin connections that are made when the 3732-ST-R screw-terminal accessory is attached to the 3732 J3 and J4 connectors. If the 3732-ST-R is not attached, you must connect the pins with the same names together externally; they are not connected on the 3732 card for this configuration.

Figure 21: Single 16×28 D-sub pin connections



Pin assignments and signal naming: Single 16×28 configuration

The following tables show the pin signal name for each pin on each of the D-sub connectors and list the location of the connection in the switch matrix.

You can use direct wiring for connections to the 3732 card using the 3732-MTC-3 cables. To use direct wiring with a single 16×28 configuration, install jumpers as shown in the following table.

Signal	Connector and pin location	Configuration
BPID1	J4, Pin 76	J4, Pin 77
BPID2	J4, Pin 78	Open (no connection)
BPID3	J3, Pin 77	J4, Pin 77
+IILK	J3, Pin 76	J3, Pin 78
−ILK	J3, Pin 78	J3, Pin 76

NOTE

Refer to the Screw-terminal accessories (on page 7) for more information about jumper settings.

3732 J3 D-sub connector pin assignments for the single 16×28 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106	1	1	6	C124	24	1	24	C109	49	1	9	R17	38	1	7
C113	2	1	13	C123	25	1	23	X	50	X	X	R11	40	1	1
C111	3	1	11	C120	26	1	20	X	51	X	X	R16	54	1	6
C112	4	1	12	C118	27	1	18	X	52	X	X	R12	61	1	2
C119	5	1	19	C117	28	1	17	C106	53	1	6	R13	64	1	3
C127	6	1	27	C117	29	1	17	C105	55	1	5	R14	67	1	4
C128	7	1	28	C118	30	1	18	X	56	X	X	R15	70	1	5
X	8	X	X	C120	31	1	20	X	57	X	X	R18	73	1	8
C126	9	1	26	C119	32	1	19	X	58	X	X				
C125	10	1	25	C123	33	1	23	X	59	X	X				
X	11	X	X	C124	34	1	24	C107	60	1	7				
X	12	X	X	C122	35	1	22	C105	62	1	5				
C115	13	1	15	C121	36	1	21	C103	63	1	3				
C116	14	1	16	C103	37	1	3	C104	65	1	4				
C114	15	1	14	C104	39	1	4	C102	66	1	2				
C113	16	1	13	C114	41	1	14	C101	68	1	1				
C127	17	1	27	C116	42	1	16	C107	69	1	7				
C128	18	1	28	C115	43	1	15	C108	71	1	8				
C126	19	1	26	C109	44	1	9	C101	72	1	1				
C125	20	1	25	C110	45	1	10	C102	74	1	2				
C108	21	1	8	C112	46	1	12	X	75	X	X				
C121	22	1	21	C111	47	1	11								
C122	23	1	22	C110	48	1	10								

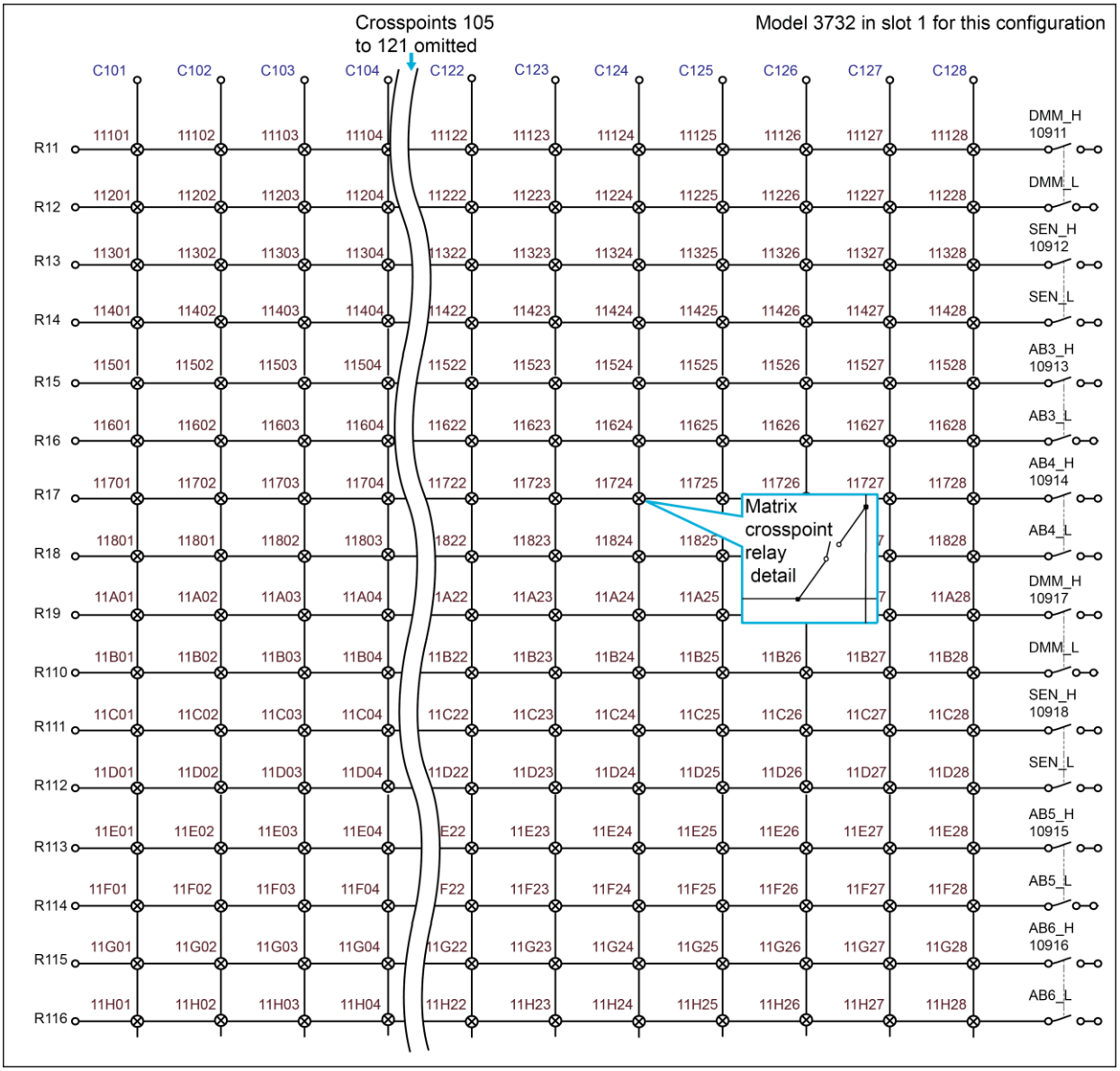
3732 J4 D-sub connector pin assignments for the single 16×28 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106	1	1	6	C124	24	1	24	C109	49	1	9	R115	38	1	15
C113	2	1	13	C123	25	1	23	X	50	X	X	R19	40	1	9
C111	3	1	11	C120	26	1	20	X	51	X	X	R114	54	1	14
C112	4	1	12	C118	27	1	18	X	52	X	X	R110	61	1	10
C119	5	1	19	C117	28	1	17	C106	53	1	6	R111	64	1	11
C127	6	1	27	C117	29	1	17	C105	55	1	5	R112	67	1	12
C128	7	1	28	C118	30	1	18	X	56	X	X	R113	70	1	13
X	8	X	X	C120	31	1	20	X	57	X	X	R116	73	1	16
C126	9	1	26	C119	32	1	19	X	58	X	X				
C125	10	1	25	C123	33	1	23	X	59	X	X				
X	11	X	X	C124	34	1	24	C107	60	1	7				
X	12	X	X	C122	35	1	22	C105	62	1	5				
C115	13	1	15	C121	36	1	21	C103	63	1	3				
C116	14	1	16	C103	37	1	3	C104	65	1	4				
C114	15	1	14	C104	39	1	4	C102	66	1	2				
C113	16	1	13	C114	41	1	14	C101	68	1	1				
C127	17	1	27	C116	42	1	16	C107	69	1	7				
C128	18	1	28	C115	43	1	15	C108	71	1	8				
C126	19	1	26	C109	44	1	9	C101	72	1	1				
C125	20	1	25	C110	45	1	10	C103	74	1	3				
C108	21	1	8	C112	46	1	12	X	75	X	X				
C121	22	1	21	C111	47	1	11								
C122	23	1	22	C110	48	1	10								

Schematic: Single 16×28 configuration

The following figure is a simplified crosspoint schematic of the single 16×28 matrix configuration.

Figure 22: Single 16×28 simplified crosspoint schematic



Single 16×28 configuration connection logs

Use this table to record your 3732 connection information for the single 16×28 configuration.

Bank	Connection	Pin signal name	Color	Description
1	Row 1	R11		
1	Row 2	R12		
1	Row 3	R13		
1	Row 4	R14		
1	Row 5	R15		
1	Row 6	R16		
1	Row 7	R17		
1	Row 8	R18		
1	Row 9	R19		
1	Row 10	R110		
1	Row 11	R111		
1	Row 12	R112		
1	Row 13	R113		
1	Row 14	R114		
1	Row 15	R115		
1	Row 16	R116		
1	Column 1	C101		
1	Column 2	C102		
1	Column 3	C103		
1	Column 4	C104		
1	Column 5	C105		
1	Column 6	C106		
1	Column 7	C107		
1	Column 8	C108		
1	Column 9	C109		
1	Column 10	C110		
1	Column 11	C111		
1	Column 12	C112		
1	Column 13	C113		
1	Column 14	C114		
1	Column 15	C115		
1	Column 16	C116		
1	Column 17	C117		
1	Column 18	C118		
1	Column 19	C119		
1	Column 20	C120		
1	Column 21	C121		
1	Column 22	C122		
1	Column 23	C123		
1	Column 24	C124		
1	Column 25	C125		
1	Column 26	C126		
1	Column 27	C127		
1	Column 28	C128		

Dual 4×28 2-pole configuration

The dual 4×28 2-pole configuration allows you to automatically link four contact sets to function as two pairs. Using the internal relays, you can create a matrix consisting of two banks of paired crosspoints, each with four rows and up to 28 columns. Use of the 3732-ST-C screw-terminal accessory is optional in this configuration.

To set up the 3732 card if you are using the 3732-STC-C accessory, on J17, set ID1 and ID2 to OFF.

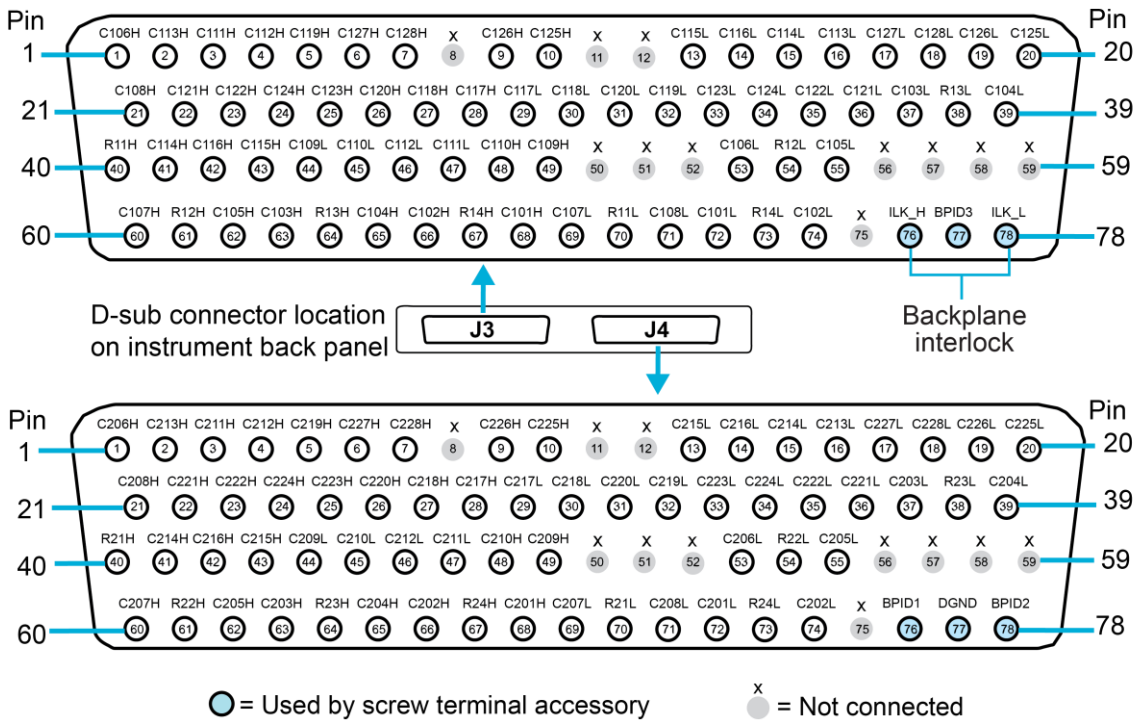
After setting up the hardware, use Series 3700A software to select 2-pole operation using the `channel.setpole` command. For more information, refer to the *Series 3700A System Switch/Multimeter Reference Manual*, available at tek.com/keithley.

D-sub connections: Dual 4×28 2-pole configuration

The following figure shows the J3 and J4 D-sub pin assignments for the dual 4×28 2-pole configuration.

The backplane interlock is actuated by connecting ILK_H and ILK_L.

Figure 23: Dual 4×28 2-pole D-sub pin connections



Pin assignments and signal naming: Dual 4×28 2-pole configuration

The following tables show the pin signal name for each pin on each of the D-sub connectors and list the location of the connection in the switch matrix.

If you are directly wiring the card, wire the pins as shown in the following table.

Signal	Connector and pin location	Configuration
BPID1	J4, Pin 76	Open (no connection)
BPID2	J4, Pin 78	Open
BPID3	J3, Pin 77	Open
+IILK	J3, Pin 76	J3, Pin 78
−ILK	J3, Pin 78	J3, Pin 76

NOTE

Refer to the Screw-terminal accessories (on page 7) for more information about jumper settings.

3732 J3 D-sub connector pin assignments for the dual 4×28 2-pole configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106H	1	1	6H	C124H	24	1	24H	C109H	49	1	9H	R13L	38	1	3L
C113H	2	1	13H	C123H	25	1	23H	X	50	X	X	R11H	40	1	1H
C111H	3	1	11H	C120H	26	1	20H	X	51	X	X	R12L	54	1	2L
C112H	4	1	12H	C118H	27	1	18H	X	52	X	X	R12H	61	1	2H
C119H	5	1	19H	C117H	28	1	17H	C106L	53	1	6L	R13H	64	1	3H
C127H	6	1	27H	C117L	29	1	17L	C105L	55	1	5L	R14H	67	1	4H
C128H	7	1	28H	C118L	30	1	18L	X	56	X	X	R11L	70	1	1L
X	8	X	X	C120L	31	1	20L	X	57	X	X	R14L	73	1	4L
C126H	9	1	26H	C119L	32	1	19L	X	58	X	X				
C125H	10	1	25H	C123L	33	1	23L	X	59	X	X				
X	11	X	X	C124L	34	1	24L	C107H	60	1	7H				
X	12	X	X	C122L	35	1	22L	C105H	62	1	5H				
C115L	13	1	15L	C121L	36	1	21L	C103H	63	1	3H				
C116L	14	1	16L	C103L	37	1	3L	C104H	65	1	4H				
C114L	15	1	14L	C104L	39	1	4L	C102H	66	1	2H				
C113L	16	1	13L	C114H	41	1	14H	C101H	68	1	1H				
C127L	17	1	27L	C116H	42	1	16H	C107L	69	1	7L				
C128L	18	1	28L	C115H	43	1	15H	C108L	71	1	8L				
C126L	19	1	26L	C109L	44	1	9L	C101L	72	1	1L				
C125L	20	1	25L	C110L	45	1	10L	C102L	74	1	2L				
C108H	21	1	8H	C112L	46	1	12L	X	75	X	X				
C121H	22	1	21H	C111L	47	1	11L								
C122H	23	1	22H	C110H	48	1	10H								

3732 J4 D-sub connector pin assignments for the dual 4×28 2-pole configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106H	1	2	6H	C122H	23	2	22H	C111L	47	2	11L	R13L	38	2	3L
C113H	2	2	13H	C124H	24	2	24H	C110H	48	2	10H	R11H	40	2	1H
C111H	3	2	11H	C123H	25	2	23H	C109H	49	2	9H	R12L	54	2	2L
C112H	4	2	12H	C120H	26	2	20H	X	50	X	X	R12H	61	2	2H
C119H	5	2	19H	C118H	27	2	18H	X	51	X	X	R13H	64	2	3H
C127H	6	2	27H	C117H	28	2	17H	X	52	X	X	R14H	67	2	4H
C128H	7	2	28H	C117L	29	2	17L	C106L	53	2	6L	R11L	70	2	1L
X	8	X	X	C118L	30	2	18L	C105L	55	2	5L	R14L	73	2	4L
C126H	9	2	26H	C120L	31	2	20L	X	56	X	X				
C125H	10	2	25H	C119L	32	2	19L	X	57	X	X				
X	11	X	X	C123L	33	2	23L	X	58	X	X				
X	12	X	X	C124L	34	2	24L	X	59	X	X				
C115L	13	2	15L	C122L	35	2	22L	C107H	60	2	7H				
C116L	14	2	16L	C121L	36	2	21L	C105H	62	2	5H				
C114L	15	2	14L	C103L	37	2	3L	C103H	63	2	3H				
C113L	16	2	13L	C104L	39	2	4L	C104H	65	2	4H				
C127L	17	2	27L	C114H	41	2	14H	C102H	66	2	2H				
C128L	18	2	28L	C116H	42	2	16H	C101H	68	2	1H				
C126L	19	2	26L	C115H	43	2	15H	C107L	69	2	7L				
C125L	20	2	25L	C109L	44	2	9L	C108L	71	2	8L				
C108H	21	2	8L	C110L	45	2	10L	C101L	72	2	1L				
C121H	22	2	21H	C112L	46	2	12L	C102L	74	2	2L				
								X	75	X	X				

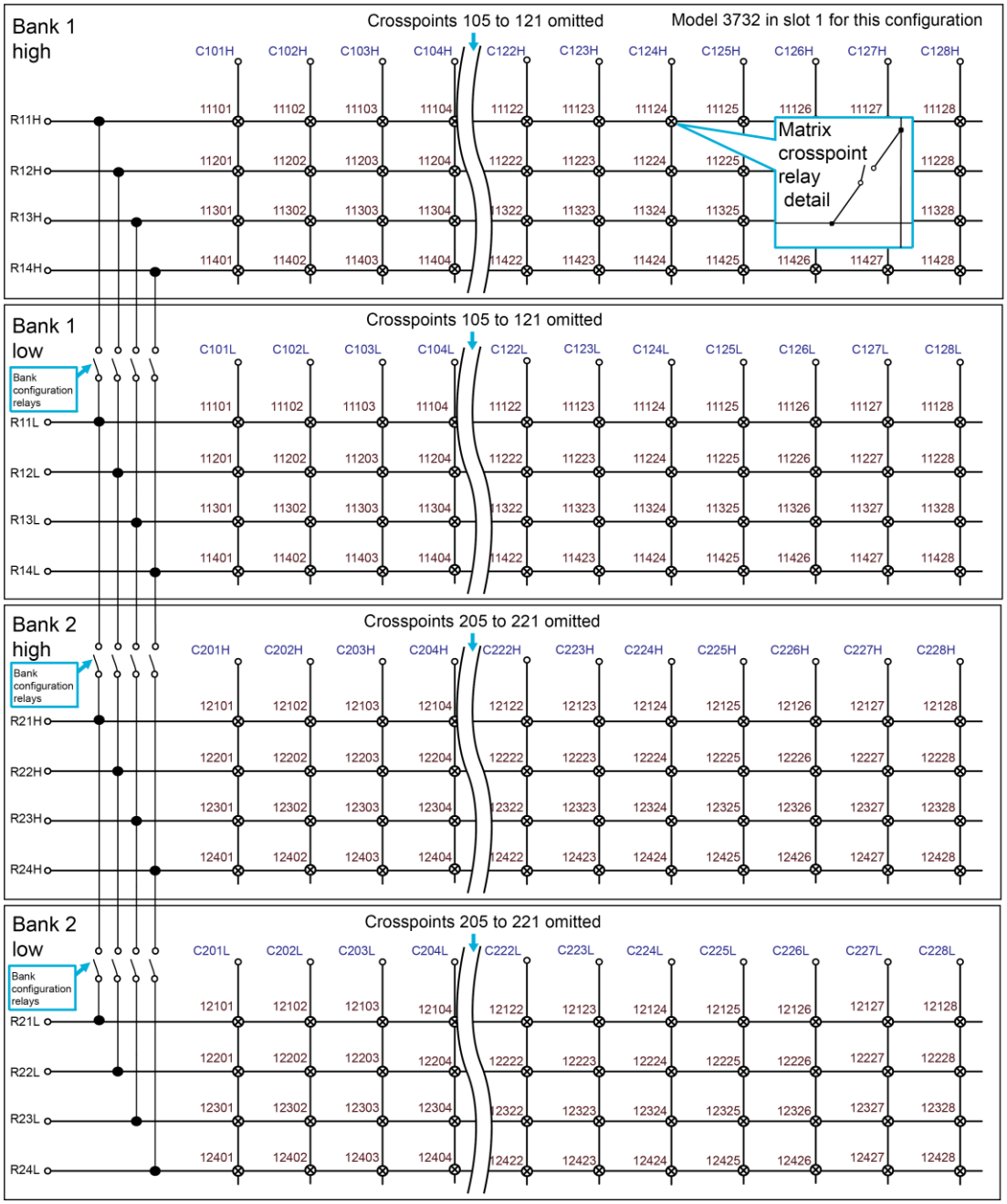
Schematic: Dual 4×28 2-pole configuration

The following table is a simplified crosspoint schematic of the dual 4×28 2-pole matrix configuration.

NOTE

The low channels are paired with the high channels.

Figure 24: Dual 4×28 2-pole simplified crosspoint schematic



Dual 4×28 2-pole configuration connection logs

Use this table to record your 3732 connection information for the dual 4×28 2-pole configuration.

Model 3732 connection log for the dual 4×28 2-pole configuration: Bank 1

Bank	Connection	Pin signal name	Color	Description
1	Row 1 High	R11H		
1	Row 1 Low	R11L		
1	Row 2 High	R12H		
1	Row 2 Low	R12L		
1	Row 3 High	R13H		
1	Row 3 Low	R13L		
1	Row 4 High	R14H		
1	Row 4 Low	R14L		
1	Column 1 High	C101H		
1	Column 1 Low	C101L		
1	Column 2 High	C102H		
1	Column 2 Low	C102L		
1	Column 3 High	C103H		
1	Column 3 Low	C103L		
1	Column 4 High	C104H		
1	Column 4 Low	C104L		
1	Column 5 High	C105H		
1	Column 5 Low	C105L		
1	Column 6 High	C106H		
1	Column 6 Low	C106L		
1	Column 7 High	C107H		
1	Column 7 Low	C107L		
1	Column 8 High	C108H		
1	Column 8 Low	C108L		
1	Column 9 High	C109H		
1	Column 9 Low	C109L		
1	Column 10 High	C110H		
1	Column 10 Low	C110L		
1	Column 11 High	C111H		
1	Column 11 Low	C111L		
1	Column 12 High	C112H		

Model 3732 connection log for the dual 4×28 2-pole configuration: Bank 1

Bank	Connection	Pin signal name	Color	Description
1	Column 12 Low	C112L		
1	Column 13 High	C113H		
1	Column 13 Low	C113L		
1	Column 14 High	C114H		
1	Column 14 Low	C114L		
1	Column 15 High	C115H		
1	Column 15 Low	C115L		
1	Column 16 High	C116H		
1	Column 16 Low	C116L		
1	Column 17 High	C117H		
1	Column 17 Low	C117L		
1	Column 18 High	C118H		
1	Column 18 Low	C118L		
1	Column 19 High	C119H		
1	Column 19 Low	C119L		
1	Column 20 High	C120H		
1	Column 20 Low	C120L		
1	Column 21 High	C121H		
1	Column 21 Low	C121L		
1	Column 22 High	C122H		
1	Column 22 Low	C122L		
1	Column 23 High	C123H		
1	Column 23 Low	C123L		
1	Column 24 High	C124H		
1	Column 24 Low	C124L		
1	Column 25 High	C125H		
1	Column 25 Low	C125L		
1	Column 26 High	C126H		
1	Column 26 Low	C126L		
1	Column 27 High	C127H		
1	Column 27 Low	C127L		
1	Column 28 High	C128H		
1	Column 28 Low	C128L		

Model 3732 connection log for the dual 4×28 2-pole configuration: Bank 2

Bank	Connection	Pin signal name	Color	Description
2	Row 1 High	R21H		
2	Row 1 Low	R21L		
2	Row 2 High	R22H		
2	Row 2 Low	R22L		
2	Row 3 High	R23H		
2	Row 3 Low	R23L		
2	Row 4 High	R24H		
2	Row 4 Low	R24L		
2	Column 1 High	C201H		
2	Column 1 Low	C201L		
2	Column 2 High	C202H		
2	Column 2 Low	C202L		
2	Column 3 High	C203H		
2	Column 3 Low	C203L		
2	Column 4 High	C204H		
2	Column 4 Low	C204L		
2	Column 5 High	C205H		
2	Column 5 Low	C205L		
2	Column 6 High	C206H		
2	Column 6 Low	C206L		
2	Column 7 High	C207H		
2	Column 7 Low	C207L		
2	Column 8 High	C208H		
2	Column 8 Low	C208L		
2	Column 9 High	C209H		
2	Column 9 Low	C209L		
2	Column 10 High	C210H		
2	Column 10 Low	C210L		
2	Column 11 High	C211H		
2	Column 11 Low	C211L		
2	Column 12 High	C212H		
2	Column 12 Low	C212L		
2	Column 13 High	C213H		

Model 3732 connection log for the dual 4×28 2-pole configuration: Bank 2

Bank	Connection	Pin signal name	Color	Description
2	Row 1 High	R21H		
2	Column 13 Low	C213L		
2	Column 14 High	C214H		
2	Column 14 Low	C214L		
2	Column 15 High	C215H		
2	Column 15 Low	C215L		
2	Column 16 High	C216H		
2	Column 16 Low	C216L		
2	Column 17 High	C217H		
2	Column 17 Low	C217L		
2	Column 18 High	C218H		
2	Column 18 Low	C218L		
2	Column 19 High	C219H		
2	Column 19 Low	C219L		
2	Column 20 High	C220H		
2	Column 20 Low	C220L		
2	Column 21 High	C221H		
2	Column 21 Low	C221L		
2	Column 22 High	C222H		
2	Column 22 Low	C222L		
2	Column 23 High	C223H		
2	Column 23 Low	C223L		
2	Column 24 High	C224H		
2	Column 24 Low	C224L		
2	Column 25 High	C225H		
2	Column 25 Low	C225L		
2	Column 26 High	C226H		
2	Column 26 Low	C226L		
2	Column 27 High	C227H		
2	Column 27 Low	C227L		
2	Column 28 High	C228H		
2	Column 28 Low	C228L		

Single 4×56 2-pole configuration

The single 4×56 2-pole configuration allows you to automatically link two contact sets to function as one pair. Using either direct cabling or the 3732-ST-C screw-terminal accessory, you can create a matrix consisting of one bank of paired crosspoints with four rows and up to 56 columns.

To set up the 3732 card if you are using the 3732-STC-C accessory, on J17, set ID1 to ON and ID2 to OFF.

After setting up the hardware, use Series 3700A software to select 2-pole operation using the `channel.setpole` command. For more information, refer to the *Series 3700A System Switch/Multimeter Reference Manual*, available at tek.com/keithley.

NOTE

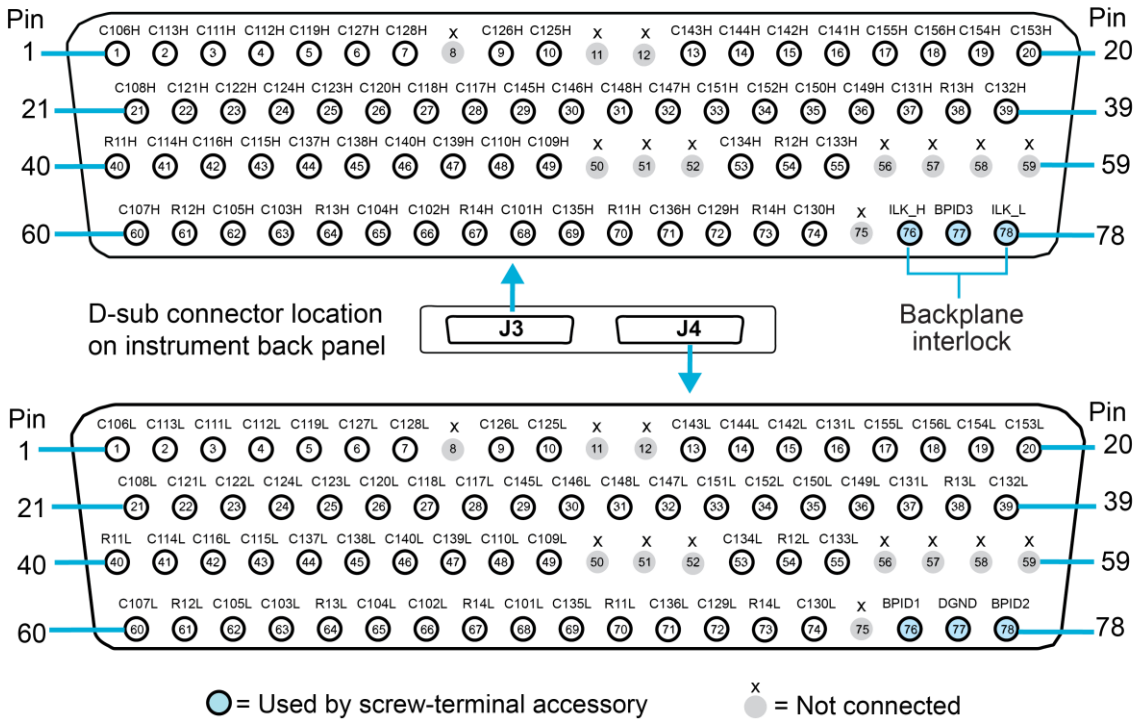
Refer to the Screw-terminal accessories (on page 7) topic for more information about jumper settings.

D-sub connections: Single 4×56 2-pole configuration

The following figure shows the J3 and J4 D-sub pin assignments for the single 4×56 2-pole configuration.

To actuate the backplane interlock, connect ILK_H and ILK_L.

Figure 25: Single 4x56 2-pole D-sub pin connections



Pin assignments and signal naming: Single 4×56 2-pole configuration

The following tables show the pin signal name for each pin on each of the D-sub connectors and list the location of the connection in the switch matrix.

If you are directly wiring the card, wire the pins as shown in the following table.

Signal	Connector and pin location	Configuration
BPID1	J4, Pin 76	J4, Pin 77
BPID2	J4, Pin 78	Open (no connection)
BPID3	J3, Pin 77	Open (no connection)
+IILK	J3, Pin 76	J3, Pin 78
−ILK	J3, Pin 78	J3, Pin 76

You can also wire BPID1 to J4, Pin 77, and leave BPID2 open.

3732 J3 D-sub connector pin assignments for the single 4×56 2-pole configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106H	1	1	6H	C124H	24	1	24H	C109H	49	1	9H	R13H	38	1	3H
C113H	2	1	13H	C123H	25	1	23H	X	50	X	X	R11H	40	1	1H
C111H	3	1	11H	C120H	26	1	20H	X	51	X	X	R12H	54	1	2H
C112H	4	1	12H	C118H	27	1	18H	X	52	X	X	R12H	61	1	2H
C119H	5	1	19H	C117H	28	1	17H	C134H	53	1	34H	R13H	64	1	3H
C127H	6	1	27H	C145H	29	1	45H	C133H	55	1	33H	R14H	67	1	4H
C128H	7	1	28H	C146H	30	1	46H	X	56	X	X	R11H	70	1	1H
X	8	X	X	C148H	31	1	48H	X	57	X	X	R14H	73	1	4H
C126H	9	1	26H	C147H	32	1	47H	X	58	X	X				
C125H	10	1	25H	C151H	33	1	51H	X	59	X	X				
X	11	X	X	C152H	34	1	52H	C107H	60	1	7H				
X	12	X	X	C150H	35	1	50H	C105H	62	1	5H				
C143H	13	1	43H	C149H	36	1	49H	C103H	63	1	3H				
C144H	14	1	44H	C131H	37	1	31H	C104H	65	1	4H				
C142H	15	1	42H	C132H	39	1	32H	C102H	66	1	2H				
C141H	16	1	41H	C114H	41	1	14H	C101H	68	1	1H				
C155H	17	1	55H	C116H	42	1	16H	C135H	69	1	35H				
C156H	18	1	56H	C115H	43	1	15H	C136H	71	1	36H				
C154H	19	1	54H	C137H	44	1	37H	C129H	72	1	29H				
C153H	20	1	53H	C138H	45	1	38H	C130H	74	1	30H				
C108H	21	1	8H	C140H	46	1	40H	X	75	X	X				
C121H	22	1	21H	C139H	47	1	39H								
C122H	23	1	22H	C110H	48	1	10H								

3732 J4 D-sub connector pin assignments for the single 4×56 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106L	1	2	6L	C124L	24	2	24L	C109L	49	2	9L	R13L	38	2	3L
C113L	2	2	13L	C123L	25	2	23L	X	50	X	X	R11L	40	2	1L
C111L	3	2	11L	C120L	26	2	20L	X	51	X	X	R12L	54	2	2L
C112L	4	2	12L	C118L	27	2	18L	X	52	X	X	R12L	61	2	2L
C119L	5	2	19L	C117L	28	2	17L	C134L	53	2	34L	R13L	64	2	3L
C127L	6	2	27L	C145L	29	2	45L	C133L	55	2	33L	R14L	67	2	4L
C128L	7	2	28L	C146L	30	2	46L	X	56	X	X	R11L	70	2	1L
X	8	X	X	C148L	31	2	48L	X	57	X	X	R14L	73	2	4L
C126L	9	2	26L	C147L	32	2	47L	X	58	X	X				
C125L	10	2	25L	C151L	33	2	51L	X	59	X	X				
X	11	X	X	C152L	34	2	52L	C107L	60	2	7L				
X	12	X	X	C150L	35	2	50L	C105L	62	2	5L				
C143L	13	2	43L	C149L	36	2	49L	C103L	63	2	3L				
C144L	14	2	44L	C131L	37	2	31L	C104L	65	2	4L				
C142L	15	2	42L	C132L	39	2	32L	C102L	66	2	2L				
C131L	16	2	31L	C114L	41	2	14L	C101L	68	2	1L				
C155L	17	2	55L	C116L	42	2	16L	C135L	69	2	35L				
C156L	18	2	56L	C115L	43	2	15L	C136L	71	2	36L				
C154L	19	2	54L	C137L	44	2	37L	C129L	72	2	29L				
C153L	20	2	53L	C138L	45	2	38L	C130L	74	2	30L				
C108L	21	2	8L	C140L	46	2	40L	X	75	X	X				
C121L	22	2	21L	C139L	47	2	39L								
C122L	23	2	22L	C110L	48	2	10L								

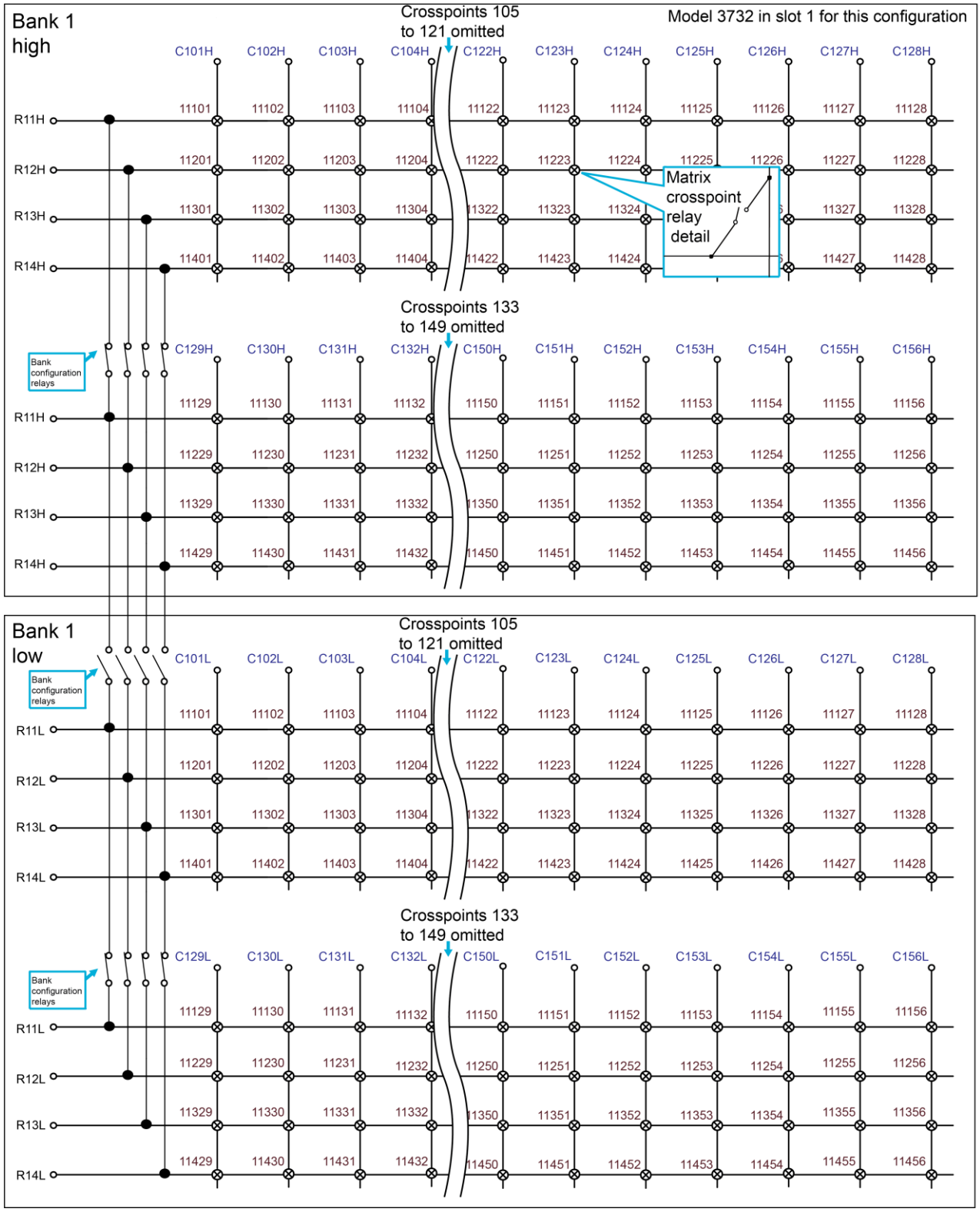
Schematic: Single 4×56 2-pole configuration

The following figure is a simplified crosspoint schematic of the single 4×56 2-pole matrix configuration.

NOTE

The low channels are paired with the high channels.

Figure 26: Single 4×56 simplified crosspoint schematic



Single 4×56 2-pole configuration connection logs

Use this table to record your 3732 connection information for the single 4×56 2-pole configuration (1 of 4).

Model 3732 connection log for the single 4×56 2-pole configuration

Bank	Connection	Pin signal name	Color	Description
1	Row 1 High	R11H		
1	Row 1 Low	R11L		
1	Row 2 High	R12H		
1	Row 2 Low	R12L		
1	Row 3 High	R13H		
1	Row 3 Low	R13L		
1	Row 4 High	R14H		
1	Row 4 Low	R14L		
1	Column 1 High	C101H		
1	Column 1 Low	C101L		
1	Column 2 High	C102H		
1	Column 2 Low	C102L		
1	Column 3 High	C103H		
1	Column 3 Low	C103L		
1	Column 4 High	C104H		
1	Column 4 Low	C104L		
1	Column 5 High	C105H		
1	Column 5 Low	C105L		
1	Column 6 High	C106H		
1	Column 6 Low	C106L		
1	Column 7 High	C107H		
1	Column 7 Low	C107L		
1	Column 8 High	C108H		
1	Column 8 Low	C108L		
1	Column 9 High	C109H		
1	Column 9 Low	C109L		
1	Column 10 High	C110H		
1	Column 10 Low	C110L		
1	Column 11 High	C111H		
1	Column 11 Low	C111L		

Model 3732 connection log for the single 4×56 2-pole configuration

Bank	Connection	Pin signal name	Color	Description
1	Column 12 High	C112H		
1	Column 12 Low	C112L		
1	Column 13 High	C113H		
1	Column 13 Low	C113L		
1	Column 14 High	C114H		
1	Column 14 Low	C114L		
1	Column 15 High	C115H		
1	Column 15 Low	C115L		
1	Column 16 High	C116H		
1	Column 16 Low	C116L		
1	Column 17 High	C117H		
1	Column 17 Low	C117L		
1	Column 18 High	C118H		
1	Column 18 Low	C118L		
1	Column 19 High	C119H		
1	Column 19 Low	C119L		
1	Column 20 High	C120H		
1	Column 20 Low	C120L		
1	Column 21 High	C121H		
1	Column 21 Low	C121L		
1	Column 22 High	C122H		
1	Column 22 Low	C122L		
1	Column 23 High	C123H		
1	Column 23 Low	C123L		
1	Column 24 High	C124H		
1	Column 24 Low	C124L		
1	Column 25 High	C125H		
1	Column 25 Low	C125L		
1	Column 26 High	C126H		
1	Column 26 Low	C126L		
1	Column 27 High	C127H		
1	Column 27 Low	C127L		
1	Column 28 High	C128H		

Model 3732 connection log for the single 4×56 2-pole configuration

Bank	Connection	Pin signal name	Color	Description
1	Column 28 Low	C128L		
1	Column 29 High	C129H		
1	Column 29 Low	C129L		
1	Column 30 High	C130H		
1	Column 30 Low	C130L		
1	Column 31 High	C131H		
1	Column 31 Low	C131L		
1	Column 32 High	C132H		
1	Column 32 Low	C132L		
1	Column 33 High	C133H		
1	Column 33 Low	C133L		
1	Column 34 High	C134H		
1	Column 34 Low	C134L		
1	Column 35 High	C135H		
1	Column 35 Low	C135L		
1	Column 36 High	C136H		
1	Column 36 Low	C136L		
1	Column 37 High	C137H		
1	Column 37 Low	C137L		
1	Column 38 High	C138H		
1	Column 38 Low	C138L		
1	Column 39 High	C139H		
1	Column 39 Low	C139L		
1	Column 40 High	C140H		
1	Column 40 Low	C140L		
1	Column 41 High	C141H		
1	Column 41 Low	C141L		
1	Column 42 High	C142H		
1	Column 42 Low	C142L		
1	Column 43 High	C143H		
1	Column 43 Low	C143L		
1	Column 44 High	C144H		
1	Column 44 Low	C144L		

Model 3732 connection log for the single 4×56 2-pole configuration

Bank	Connection	Pin signal name	Color	Description
1	Column 45 High	C145H		
1	Column 45 Low	C145L		
1	Column 46 High	C146H		
1	Column 46 Low	C146L		
1	Column 47 High	C147H		
1	Column 47 Low	C147L		
1	Column 48 High	C148H		
1	Column 48 Low	C148L		
1	Column 49 High	C149H		
1	Column 49 Low	C149L		
1	Column 50 High	C150H		
1	Column 50 Low	C150L		
1	Column 51 High	C151H		
1	Column 51 Low	C151L		
1	Column 52 High	C152H		
1	Column 52 Low	C152L		
1	Column 53 High	C153H		
1	Column 53 Low	C153L		
1	Column 54 High	C154H		
1	Column 54 Low	C154L		
1	Column 55 High	C155H		
1	Column 55 Low	C155L		
1	Column 56 High	C156H		
1	Column 56 Low	C156L		

Single 8×28 2-pole configuration

The single 8×28 2-pole configuration allows you to automatically link two contact sets to function as one pair. Using the 3732-ST-R screw-terminal accessory, you can create a matrix consisting of one bank of paired crosspoints with eight rows and up to 28 columns.

NOTE

To create this configuration, you must use the 3732-ST-R screw-terminal accessory.

On the 3732-STC-R accessory, set the jumper to OFF.

After setting up the hardware, use Series 3700A software to select 2-pole operation using the `channel.setpole` command. For more information, refer to the *Series 3700A System Switch/Multimeter Reference Manual*, available at tek.com/keithley.

NOTE

Refer to the Screw-terminal accessory (on page 7) for more information about jumper settings.

D-sub connections: Single 8×28 2-pole configuration

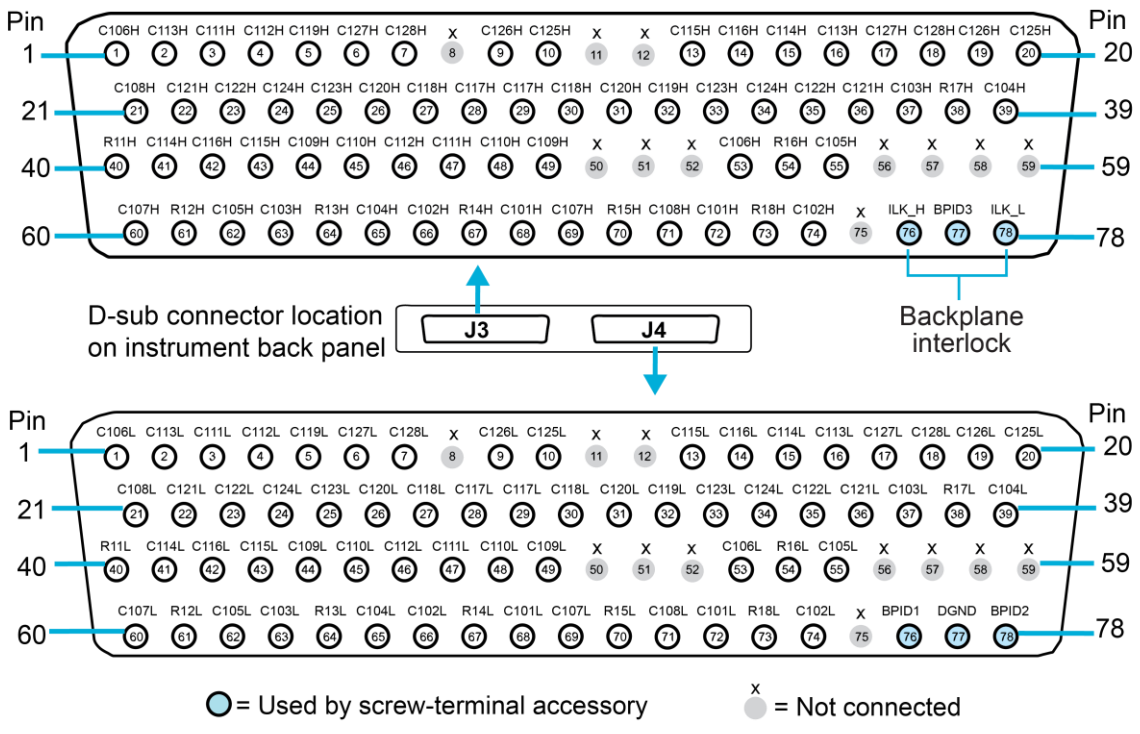
The following figure shows the J3 and J4 D-sub pin assignments for the single 8×28 2-pole configuration.

To actuate the backplane interlock, connect ILK_H and ILK_L

NOTE

The pinouts in the following figure represent the pin connections that are made when the 3732-ST-R screw-terminal accessory is attached to the 3732 J3 and J4 connectors. If the 3732-ST-R is not attached, you must connect the pins with the same names together externally; they are not connected on the 3732 card for this configuration.

Figure 27: Single 8×28 D-sub conn (2-pole)



Pin assignments and signal naming: Single 8×28 2-pole configuration

The following tables show the pin signal name for each pin on each of the D-sub connectors and list the location of the connection in the switch matrix.

3732 J3 D-sub connector pin assignments for the single 8×28 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106H	1	1	6H	C124H	24	1	24H	C109H	49	1	9H	R17H	38	1	7H
C113H	2	1	13H	C123H	25	1	23H	X	50	X	X	R11H	40	1	1H
C111H	3	1	11H	C120H	26	1	20H	X	51	X	X	R16H	54	1	6H
C112H	4	1	12H	C118H	27	1	18H	X	52	X	X	R12H	61	1	2H
C119H	5	1	19H	C117H	28	1	17H	C106H	53	1	6H	R13H	64	1	3H
C127H	6	1	27H	C117H	29	1	17H	C105H	55	1	5H	R14H	67	1	4H
C128H	7	1	28H	C118H	30	1	18H	X	56	X	X	R15H	70	1	5H
X	8	X	X	C120H	31	1	20H	X	57	X	X	R18H	73	1	8H
C126H	9	1	26H	C119H	32	1	19H	X	58	X	X				
C125H	10	1	25H	C123H	33	1	23H	X	59	X	X				
X	11	X	X	C124H	34	1	24H	C107H	60	1	7H				
X	12	X	X	C122H	35	1	22H	C105H	62	1	5H				
C115H	13	1	15H	C121H	36	1	21H	C103H	63	1	3H				
C116H	14	1	16H	C103H	37	1	3H	C104H	65	1	4H				
C114H	15	1	14H	C104H	39	1	4H	C102H	66	1	2H				
C113H	16	1	13H	C114H	41	1	14H	C101H	68	1	1H				
C127H	17	1	27H	C116H	42	1	16H	C107H	69	1	7H				
C128H	18	1	28H	C115H	43	1	15H	C108H	71	1	8H				
C126H	19	1	26H	C109H	44	1	9H	C101H	72	1	1H				
C125H	20	1	25H	C110H	45	1	10H	C102H	74	1	2H				
C108H	21	1	8H	C112H	46	1	12H	X	75	X	X				
C121H	22	1	21H	C111H	47	1	11H								
C122H	23	1	22H	C110H	48	1	10H								

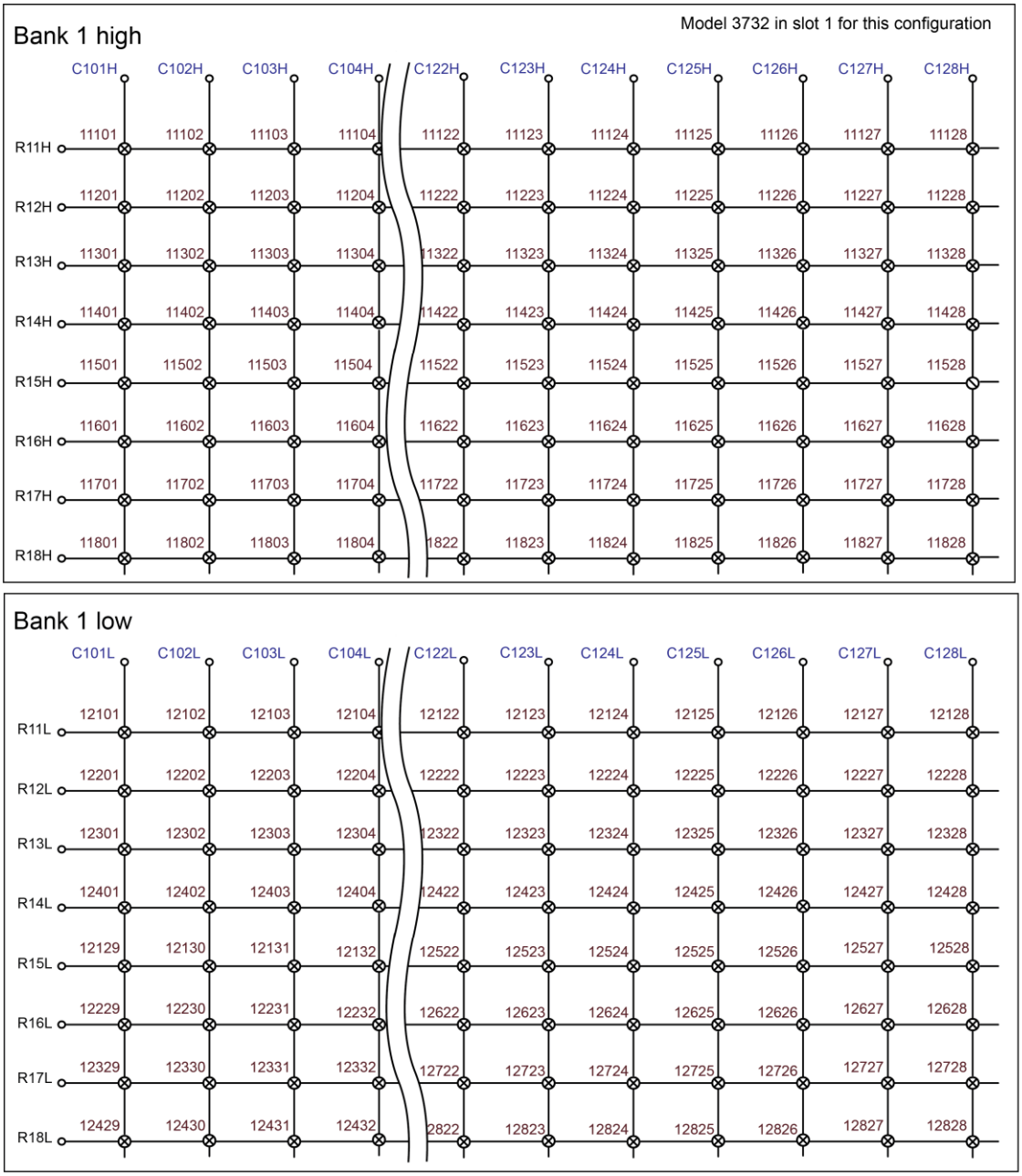
3732 J4 D-sub connector pin assignments for the single 8×28 configuration

Columns												Rows			
Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location		Pin signal name	Pin #	Matrix location	
		Bank #	Column #			Bank #	Column #			Bank #	Column #			Bank #	Row #
C106L	1	1	6L	C124L	24	1	24	C109L	49	1	9L	R17L	38	1	7L
C113L	2	1	13L	C123L	25	1	23L	X	50	X	X	R11L	40	1	1L
C111L	3	1	11L	C120L	26	1	20L	X	51	X	X	R16L	54	1	6L
C112L	4	1	12L	C118L	27	1	18L	X	52	X	X	R12L	61	1	2L
C119L	5	1	19L	C117L	28	1	17L	C106L	53	1	6L	R13L	64	1	3L
C127L	6	1	27L	C117L	29	1	17L	C105L	55	1	5L	R14L	67	1	4L
C128L	7	1	28L	C118L	30	1	18L	X	56	X	X	R15L	70	1	5L
X	8	X	X	C120L	31	1	20L	X	57	X	X	R18L	73	1	8L
C126L	9	1	26L	C119L	32	1	19L	X	58	X	X				
C125L	10	1	25L	C123L	33	1	23L	X	59	X	X				
X	11	X	X	C124L	34	1	24L	C107L	60	1	7L				
X	12	X	X	C122L	35	1	22L	C105L	62	1	5L				
C115L	13	1	15L	C121L	36	1	21L	C103L	63	1	3L				
C116L	14	1	16L	C103L	37	1	3L	C104L	65	1	4L				
C114L	15	1	14L	C104L	39	1	4L	C102L	66	1	2L				
C113L	16	1	13L	C114L	41	1	14L	C101L	68	1	1L				
C127L	17	1	27L	C116L	42	1	16L	C107L	69	1	7L				
C128L	18	1	28L	C115L	43	1	15L	C108L	71	1	8L				
C126L	19	1	26L	C109L	44	1	9L	C101L	72	1	1L				
C125L	20	1	25L	C110L	45	1	10L	C102L	74	1	2L				
C108L	21	1	8L	C112L	46	1	12L	X	75	X	X				
C121L	22	1	21L	C111L	47	1	11L								
C122L	23	1	22L	C110L	48	1	10L								

Schematic: Single 8×28 2-pole configuration

The following figure shows a simplified crosspoint schematic of the single 8×28 2-pole matrix configuration.

Figure 28: Single 8×28 simplified crosspoint schematic



Single 8×28 2-pole configuration connection logs

Use this table to record your 3732 connection information for the single 8×28 2-pole configuration.

Model 3732 connection log for the single 8×28 2-pole configuration

Bank	Connection	Pin signal name	Color	Description
1	Row 1 High	R11H		
1	Row 1 Low	R11L		
1	Row 2 High	R12H		
1	Row 2 Low	R12L		
1	Row 3 High	R13H		
1	Row 3 Low	R13L		
1	Row 4 High	R14H		
1	Row 4 Low	R14L		
1	Row 5 High	R15H		
1	Row 5 Low	R15L		
1	Row 6 High	R16H		
1	Row 6 Low	R16L		
1	Row 7 High	R17H		
1	Row 7 Low	R17L		
1	Row 8 High	R18H		
1	Row 8 Low	R18L		
1	Column 1 High	C101H		
1	Column 1 Low	C101L		
1	Column 2 High	C102H		
1	Column 2 Low	C102L		
1	Column 3 High	C103H		
1	Column 3 Low	C103L		
1	Column 4 High	C104H		
1	Column 4 Low	C104L		
1	Column 5 High	C105H		
1	Column 5 Low	C105L		
1	Column 6 High	C106H		
1	Column 6 Low	C106L		
1	Column 7 High	C107H		
1	Column 7 Low	C107L		
1	Column 8 High	C108H		
1	Column 8 Low	C108L		
1	Column 9 High	C109H		
1	Column 9 Low	C109L		
1	Column 10 High	C110H		
1	Column 10 Low	C110L		

Model 3732 connection log for the single 8×28 2-pole configuration

Bank	Connection	Pin signal name	Color	Description
1	Column 11 High	C111H		
1	Column 11 Low	C111L		
1	Column 12 High	C112H		
1	Column 12 Low	C112L		
1	Column 13 High	C113H		
1	Column 13 Low	C113L		
1	Column 14 High	C114H		
1	Column 14 Low	C114L		
1	Column 15 High	C115H		
1	Column 15 Low	C115L		
1	Column 16 High	C116H		
1	Column 16 Low	C116L		
1	Column 17 High	C117H		
1	Column 17 Low	C117L		
1	Column 18 High	C118H		
1	Column 18 Low	C118L		
1	Column 19 High	C119H		
1	Column 19 Low	C119L		
1	Column 20 High	C120H		
1	Column 20 Low	C120L		
1	Column 21 High	C121H		
1	Column 21 Low	C121L		
1	Column 22 High	C122H		
1	Column 22 Low	C122L		
1	Column 23 High	C123H		
1	Column 23 Low	C123L		
1	Column 24 High	C124H		
1	Column 24 Low	C124L		
1	Column 25 High	C125H		
1	Column 25 Low	C125L		
1	Column 26 High	C126H		
1	Column 26 Low	C126L		
1	Column 27 High	C127H		
1	Column 27 Low	C127L		
1	Column 28 High	C128H		
1	Column 28 Low	C128L		

Cross-card expansion

You can use the Series 3700A analog backplane to expand the number of columns in a system beyond the capacity of a single 3732 card. The signal paths on the backplane can be used to interconnect the rows on up to six 3732 cards by closing the appropriate backplane relays on all the cards.

Because the Series 3700A backplane has six dual paths (12 signal paths), cross-card column expansion is limited to 12 rows. If you need to expand the columns by more than 12 rows, use external wiring to make the necessary row interconnections for the remaining rows.

NOTE

When the Series 3700A backplane is used for column expansion, it cannot be used by other cards to connect to the DMM exclusively. It can be used to route the expanded card signals to the DMM if the proper rows are used.

The following table shows the possible column expansion configurations using two 3732 cards.

Column expansion configuration	Mode
4×224	1-pole
8×112	1-pole
12×56	1-pole
4×112	2-pole

Cross-card expansion examples

The following examples describe cross-card expansion using the Series 3700A with two 3732 cards installed in slots 1 and 2.

Example 1: Configure an expanded 4×224 1-pole matrix

- Configure both 3732 cards as single 4×112 matrices.
- Close backplane relays 10911, 10912, 20911, and 20912 to interconnect the rows on the two cards.

Example 2: Configure an expanded 12×56 1-pole matrix

- Configure both 3732 cards as single 16×28 matrices.
- Close backplane relays 10911, 10912, 10913, 10914, 10915, 10916, 20911, 20912, 20913, 20914, 20915, and 20916.

NOTE

Because the backplane has 12 signal paths in this configuration, relay bank 3 is not used on either 3732 card. Because relay bank 3 shares the same backplane connections as relay bank 1, relay bank 3 cannot be used in this configuration. With all backplane relays closed, relay bank 1 is in parallel with relay bank 3, requiring all relays in bank 3 to remain open in this configuration.

Example 3: Configure an expanded 4×112 2-pole matrix

- Configure both 3732 cards as single 4×56 2-pole matrices.
- Close backplane relays 10913, 10914, 10915, 10916, 20913, 20914, 20915, and 20916.

Using the Model 3732 with the 3700A digital multimeter

The connection options for using the 3732 with the Series 3700A digital multimeter (DMM) are:

- Use external wiring to connect 3732 rows to the Series 3700A DMM terminals in the 15-pin rear panel analog backplane connector. This is the preferred method.
- Connect to the Series 3700A DMM through the Series 3700A backplane by programmatically closing the appropriate backplane relays.
- Install jumpers on the Series 3700A 15-pin analog backplane connector to route DMM connections from their default location to one or more of the other backplane signal paths.

External wiring connection method

This method makes connections between the rows of the 3732 and the 15-pin analog backplane connector on the Series 3700A rear panel. This allows you to make most efficient use of all crosspoints on the 3732 and allows automatic channel pairing on the Series 3700A for 2-pole mode.

For example, assume that a 3732 card is in installed in slot 1 of the Series 3700A mainframe and has been configured using the jumpers on the ID pins to be a quad 4×28 matrix. The 3732 card is then configured by software to be a dual 4×28 matrix in 2-pole mode on all channels. In this configuration:

- Closing channel 11101 automatically closes channel 12101
- Closing channel 13102 automatically closes channel 14102

Programmatic connection method

You can make DMM connections using the backplane relays on the 3732 card. This method eliminates the requirement to make external connections to the analog backplane connector. There are two disadvantages to this connection method:

- 3732 crosspoints are used less efficiently because of how the backplane signals are connected to the matrix rows.
- You cannot use two-pole mode in this configuration because the DMM-to-backplane connection mapping is not compatible with two-pole mode.

To establish accurate connections when using the backplane relays to connect from 3732 rows to the Series 3700A, use 1-pole mode for all channels and use channel patterns to close both the channel relays and appropriate backplane relays.

Install jumpers

A jumper connection method may be appropriate in some situations. You can install jumpers on the Series 3700A 15-pin analog backplane connector to route DMM connections from their default locations to one or more of the other backplane signal paths.

To put DMM HI on bank 2, row 1, and DMM LO on bank 4, row 1, connect the Series 3700A analog backplane connector as follows:

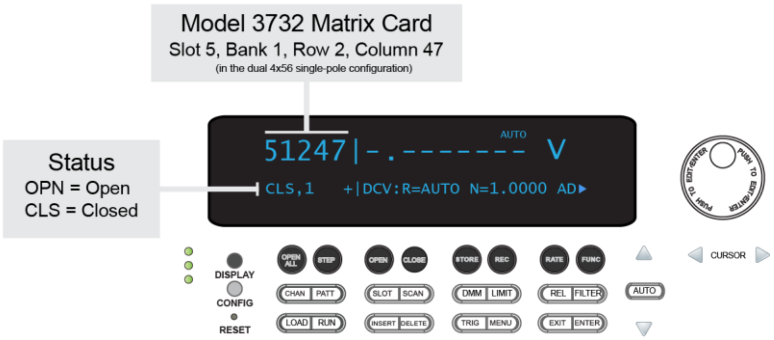
- From DMM HI to analog backplane 3 HI
- From DMM LO to analog backplane 5 HI
- Close analog backplanes 3 and 5 to complete the path.

Using this technique allows you to make jumper connections to all the 3732 cards in the Series 3700A chassis.

Using the front panel of the 3700A with the 3732 card

The 3732 card includes an extra digit in the channel specifiers compared to the other 3700A cards. On the front panel, this extra digit is displayed, as shown in the following figure.

Figure 29: Matrix card display example



When editing the channel, press the navigation wheel to sequence through editing the slot, bank, row, and column numbers. Rotating the navigation wheel moves through the valid selections.

Pseudocards

You can perform open, close, and scan operations and configure your system without having a switch card installed in your instrument. If you are connected to a remote interface, you can assign a pseudocard to an empty switch card slot.

You cannot set up a pseudocard from the front panel. However, once pseudocard configuration is complete, you can take the instrument out of remote mode and use the front panel to control the pseudocard. Press the **EXIT** key to take the instrument out of remote mode. The model number of a pseudocard is the same as the model number of an actual card (except for 3732 cards).

When the instrument is turned off, the pseudocard settings are lost and the pseudocard is no longer assigned to the slot. To preserve the pseudocard setting through a power cycle, use a saved setup or a configuration script. The setup or script retains the model number of the card installed in each slot, including pseudocards.

For additional information on pseudocards, refer to the *Series 3700A System Switch/Multimeter Reference Manual* at tek.com/keithley.

Set up a 3732 pseudocard

You can install a pseudocard in any empty slot. With a 3732 pseudocard installed, the instrument operates as if a 3732 card is installed in the slot. This allows you to configure a scan and exercise its operation before the plug-in card is installed in the 3700A instrument.

For the 3732, the number for the pseudocard includes the type of matrix you want to emulate. The parameters for the available matrices are:

- **Quad 4×28 matrix:** `37320` or `3732A`
- **Dual 4×56 matrix:** `37321`
- **Single 4×112 matrix:** `37322`
- **Dual 8×28 matrix:** `37323`
- **Single 16×28 matrix:** `37324`

In the following code examples, replace *`slot`* with the slot number (`1` to `6`).

To set a slot to use a 3732 pseudocard set up as a dual** 4×56 matrix**, send:

```
slot[slot].pseudocard = 37321
```

To query the pseudocard, send:

```
print(slot[slot].pseudocard)
```

To set a slot to stop using a pseudocard, send:

```
slot[slot].pseudocard = slot.PSEUDO_NONE
```

NOTE

The revision level of a pseudocard is always returned as 00.00 a.

You can query the slot attributes to determine the capabilities of the installed switching modules. For example, send the following query to determine if slot 1 supports 4-wire commonside ohms channels:

```
print(slot[1].commonsideohms)
```

Refer to the *Series 3700A System Switch/Multimeter Reference Manual* for more information about using queries at tek.com/keithley.

Maximum power usage with 3700A cards

The 3700A plug-in cards can switch many relays at once, which can take a substantial amount of system power. The maximum power available in the 3700A is limited on a per-slot and per-bank basis, as shown in the following table.

Bank 1	Bank 2
Slot 1	Slot 4
Slot 2	Slot 5
Slot 3	Slot 6
12,300 mW (maximum)	12,300 mW (maximum)

The maximum slot power limit is 10,500 mW.

If the power levels are exceeded, the system performs as many of the operations as possible until the power limits are reached. When the power limits are reached, an error message is generated and the remaining operations are not performed.

Power budgeting and calculation

Individual relay power consumption generally depends on the type of relay. Latching relays consume power briefly to open or close and are not a concern when budgeting power. Nonlatching relays continuously consume power to maintain their state, so they must be considered when budgeting for power consumption.

Each switch card also uses system power to operate. This continuous power draw is known as quiescent power. Quiescent power takes away power that is available to operate relays, so it must also be considered when budgeting for power consumption.

The following table shows the power consumption of channel and backplane relays for the 3700A switch cards. The quiescent power is also shown.

Model	Quiescent power (P_Q) (milliwatts)	Channel relay power (P_{CR}) consumption each (milliwatts)	Backplane relay power (P_{BR}) consumption each (milliwatts)
3720	975	Not applicable	100
3721	1350	Not applicable	100
3722	475	Not applicable	100
3723	700	100 (2-pole)	100
		50 (1-pole)	100
3724	1150	20	100
3730	780	Not applicable	100
3731	780	67	100
3732	780	17	100
3740	1000	Not applicable (independent)	100
		200 (high current)	100

To determine how many relay operations can be performed, use the previous table to calculate the total power required by applying the following equation:

$P_{TS} = P_Q + (N_{CC} \times P_{CR}) + (N_{BC} \times P_{BR})$

Where:

- P_{TS} is the total slot power
- P_Q is the quiescent power
- N_{CC} is the number of closed channels
- P_{CR} is the power per channel relay
- N_{BC} is the number of closed backplane channels
- P_{BR} is the power per backplane relay

To calculate the total slot power, you must calculate the power for each bank of slots:

Bank 1 Power = Slot 1 P_{TS} + Slot 2 P_{TS} + Slot 3 P_{TS}

Bank 2 Power = Slot 4 P_{TS} + Slot 5 P_{TS} + Slot 6 P_{TS}

The results are called bank powers and should be compared with the maximum limits. Example calculations are shown in the following topics.

Power budgeting example for six 3732 cards

This example is for a fully loaded 3706A-S with all 3732 switch cards.

Slot	Card	Channel relays closed	Backplane relays closed
1	3732	20	2
2	3732	20	2
3	3732	20	2
4	3732	20	2
5	3732	20	2
6	3732	20	2

This produces the power consumption shown in the following table.

	P_Q		$N_{CC} \times P_{CR}$		$N_{BC} \times P_{BR}$		P_{TS}
Slot 1 power consumed =	780	+	0	+	2 × 100	=	1175
Slot 2 power consumed =	780	+	0	+	2 × 100	=	1175
Slot 3 power consumed =	780	+	0	+	2 × 100	=	1175
Slot 4 power consumed =	780	+	0	+	2 × 100	=	1175
Slot 5 power consumed =	780	+	0	+	2 × 100	=	1175
Slot 6 power consumed =	780	+	0	+	2 × 100	=	1175

Totals for each bank are calculated as shown in the following table.

	Slot 1		Slot 2		Slot 3		Total
Bank 1 power consumed =	1175	+	1175	+	1175	=	3525

	Slot 4		Slot 5		Slot 6		Total
Bank 2 power consumed =	1175	+	1175	+	1175	=	3525

Since each bank did not exceed the maximum power, the power budget is within the limits.

Power budgeting example with multiple cards

This example is for a fully loaded 3706A-S with a mix of switch cards.

Slot	Card	Channel relays closed	Backplane relays closed
1	3720	20	2
2	3721	20	2
3	3722	15 (2-pole)	4
4	3724	30	2
5	3731	16	6
6	3732	2	4

This produces the following power consumption:

	P_Q		$N_{CC} \times P_{CR}$		$N_{BC} \times P_{BR}$		P_{TS}
Slot 1 power consumed =	975	+	0	+	2 × 100	=	1175
Slot 2 power consumed =	1350	+	0	+	2 × 100	=	1550
Slot 3 power consumed =	475	+	0	+	4 × 100	=	875
Slot 4 power consumed =	1150	+	30 × 20	+	2 × 100	=	1950
Slot 5 power consumed =	780	+	16 × 67	+	6 × 100	=	2452
Slot 6 power consumed =	780	+	2 × 17	+	4 × 100	=	1214

Totals for each bank are calculated:

	Slot 1		Slot 2		Slot 3		Total
Bank 1 power consumed =	1175	+	1550	+	875	=	3600

	Slot 4		Slot 5		Slot 6		Total
Bank 2 power consumed =	1950	+	2452	+	1214	=	5616

Since each bank did not exceed the maximum power, the power budget is within the limits.

Safety precautions

The following safety precautions should be observed before using this product and any associated instrumentation. Although some instruments and accessories would normally be used with nonhazardous voltages, there are situations where hazardous conditions may be present.

This product is intended for use by personnel who recognize shock hazards and are familiar with the safety precautions required to avoid possible injury. Read and follow all installation, operation, and maintenance information carefully before using the product. Refer to the user documentation for complete product specifications.

If the product is used in a manner not specified, the protection provided by the product warranty may be impaired.

The types of product users are:

Responsible body is the individual or group responsible for the use and maintenance of equipment, for ensuring that the equipment is operated within its specifications and operating limits, and for ensuring that operators are adequately trained.

Operators use the product for its intended function. They must be trained in electrical safety procedures and proper use of the instrument. They must be protected from electric shock and contact with hazardous live circuits.

Maintenance personnel perform routine procedures on the product to keep it operating properly, for example, setting the line voltage or replacing consumable materials. Maintenance procedures are described in the user documentation. The procedures explicitly state if the operator may perform them. Otherwise, they should be performed only by service personnel.

Service personnel are trained to work on live circuits, perform safe installations, and repair products. Only properly trained service personnel may perform installation and service procedures.

Keithley products are designed for use with electrical signals that are measurement, control, and data I/O connections, with low transient overvoltages, and must not be directly connected to mains voltage or to voltage sources with high transient overvoltages. Measurement Category II (as referenced in IEC 60664) connections require protection for high transient overvoltages often associated with local AC mains connections. Certain Keithley measuring instruments may be connected to mains. These instruments will be marked as category II or higher.

Unless explicitly allowed in the specifications, operating manual, and instrument labels, do not connect any instrument to mains.

Exercise extreme caution when a shock hazard is present. Lethal voltage may be present on cable connector jacks or test fixtures. The American National Standards Institute (ANSI) states that a shock hazard exists when voltage levels greater than 30 V RMS, 42.4 V peak, or 60 VDC are present. A good safety practice is to expect that hazardous voltage is present in any unknown circuit before measuring.

Operators of this product must be protected from electric shock at all times. The responsible body must ensure that operators are prevented access and/or insulated from every connection point. In some cases, connections must be exposed to potential human contact. Product operators in these circumstances must be trained to protect themselves from the risk of electric shock. If the circuit is capable of operating at or above 1000 V, no conductive part of the circuit may be exposed.

Do not connect switching cards directly to unlimited power circuits. They are intended to be used with impedance-limited sources. NEVER connect switching cards directly to AC mains. When connecting sources to switching cards, install protective devices to limit fault current and voltage to the card.

Before operating an instrument, ensure that the line cord is connected to a properly-grounded power receptacle. Inspect the connecting cables, test leads, and jumpers for possible wear, cracks, or breaks before each use.

When installing equipment where access to the main power cord is restricted, such as rack mounting, a separate main input power disconnect device must be provided in close proximity to the equipment and within easy reach of the operator.

For maximum safety, do not touch the product, test cables, or any other instruments while power is applied to the circuit under test. ALWAYS remove power from the entire test system and discharge any capacitors before connecting or disconnecting cables or jumpers, installing or removing switching cards, or making internal changes, such as installing or removing jumpers.

Do not touch any object that could provide a current path to the common side of the circuit under test or power line (earth) ground. Always make measurements with dry hands while standing on a dry, insulated surface capable of withstanding the voltage being measured.

For safety, instruments and accessories must be used in accordance with the operating instructions. If the instruments or accessories are used in a manner not specified in the operating instructions, the protection provided by the equipment may be impaired.

Do not exceed the maximum signal levels of the instruments and accessories. Maximum signal levels are defined in the specifications and operating information and shown on the instrument panels, test fixture panels, and switching cards.

When fuses are used in a product, replace with the same type and rating for continued protection against fire hazard.

Chassis connections must only be used as shield connections for measuring circuits, NOT as protective earth (safety ground) connections.

If you are using a test fixture, keep the lid closed while power is applied to the device under test. Safe operation requires the use of a lid interlock.

If a  screw is present, connect it to protective earth (safety ground) using the wire recommended in the user documentation.

The  symbol on an instrument means caution, risk of hazard. The user must refer to the operating instructions located in the user documentation in all cases where the symbol is marked on the instrument.

The  symbol on an instrument means warning, risk of electric shock. Use standard safety precautions to avoid personal contact with these voltages.

The  symbol on an instrument shows that the surface may be hot. Avoid personal contact to prevent burns.

The  symbol indicates a connection terminal to the equipment frame.

If this  symbol is on a product, it indicates that mercury is present in the display lamp. Please note that the lamp must be properly disposed of according to federal, state, and local laws.

The **WARNING** heading in the user documentation explains hazards that might result in personal injury or death. Always read the associated information very carefully before performing the indicated procedure.

The **CAUTION** heading in the user documentation explains hazards that could damage the instrument. Such damage may invalidate the warranty.

The **CAUTION** heading with the  symbol in the user documentation explains hazards that could result in moderate or minor injury or damage the instrument. Always read the associated information very carefully before performing the indicated procedure. Damage to the instrument may invalidate the warranty.

Instrumentation and accessories shall not be connected to humans.

Before performing any maintenance, disconnect the line cord and all test cables.

To maintain protection from electric shock and fire, replacement components in mains circuits — including the power transformer, test leads, and input jacks — must be purchased from Keithley. Standard fuses with applicable national safety approvals may be used if the rating and type are the same. The detachable mains power cord provided with the instrument may only be replaced with a similarly rated power cord. Other components that are not safety-related may be purchased from other suppliers as long as they are equivalent to the original component (note that selected parts should be purchased only through Keithley to maintain accuracy and functionality of the product). If you are unsure about the applicability of a replacement component, call a Keithley office for information.

Unless otherwise noted in product-specific literature, Keithley instruments are designed to operate indoors only, in the following environment: Altitude at or below 2,000 m (6,562 ft); temperature 0 °C to 50 °C (32 °F to 122 °F); and pollution degree 1 or 2.

To clean an instrument, use a cloth dampened with deionized water or mild, water-based cleaner. Clean the exterior of the instrument only. Do not apply cleaner directly to the instrument or allow liquids to enter or spill on the instrument. Products that consist of a circuit board with no case or chassis (e.g., a data acquisition board for installation into a computer) should never require cleaning if handled according to instructions. If the board becomes contaminated and operation is affected, the board should be returned to the factory for proper cleaning/servicing.

Safety precaution revision as of June 2018.