# Quad 4x28 Reed Relay Matrix Card Specifications

**Keithley Instruments, Inc.**
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## MATRIX CONFIGURATION

Four banks, each with 4 rows by 28 columns of reed relays. Bank configuration and analog backplane relays are included for additional matrix configurations. Banks can be connected together using relays, creating dual 4x56 matrices or a single 4x112 matrix. Row and column expansion is available using optional screw terminal accessories.

## CONTACT CONFIGURATION

Single-pole form A

## CONNECTOR TYPE

Two 78-pin male D-shell connectors

## MODEL 3732-ST-R SCREW TERMINAL OPTION

Provides terminal block access and column jumper blocks for extended row configurations, including dual 8x28 (1-pole), single 8x28 (2-pole), and single 16x28 (1-pole).

**Typical wire size:** #22 AWG with .062 in. outside diameter; 88 conductors per card maximum

**Maximum wire size:** #16 AWG with .092 in. outside diameter; 44 conductors per card maximum

## MODEL 3732-ST-C SCREW TERMINAL OPTION

Provides terminal block access for quad 4x28 (1 W), dual 4X28 (2 W), dual 4X56 (1 W), single 4X56 (2 W), and single 4X112 (1 W) matrix configurations.

**Typical wire size:** #22 AWG with .062 in. outside diameter; 88 conductors per card maximum

**Maximum wire size:** #16 AWG with .092 in. outside diameter; 44 conductors per card maximum

## MAXIMUM SIGNAL LEVEL

200 V DC or peak AC, 0.75 A switched (1.2 A carry), 15 W / 15 VA maximum switch power

## COMMON MODE VOLTAGE

200 V DC or peak AC between any signal path to a signal path or ground

## VOLT-HERTZ LIMIT

$8x10^7$ V · Hz

## CONTACT LIFE

**REED:** $>10^9$ operations no load; $>8x10^6$ operations at 100 V, 10 mA

**EMR (backplane):** $>10^8$ operations at 5 V, 10 mA and $10^5$ operations at maximum signal level

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## MODEL 3732 PARAMETERS

| Parameter | Quad 4x28 [1,2] | Dual 4x56 [1,2] | Single 4x112[1,2] | Dual 8x28 [3,2] | Single 16x28[3,2] |
|---|---|---|---|---|---|
| Channel resistance (end of life) | <1.5 Ω | <2.0 Ω | <2.5 Ω | <1.6 Ω | <2.0 Ω |
| Contact potential (differential) | <± 10 µV | <± 20 µV | n/a | <± 15 µV | n/a |
| Contact potential (single-ended) | <± 20 µV | <± 40 µV | <± 65 µV | <± 20 µV | <± 20 µV |
| Offset current | <± 0.5 nA | <± 1.0 nA | <± 2.0 nA | <± 1.0 nA | <± 2.0 nA |
| **Isolation** | | | | | |
| CH-CH | $3x10^9$ Ω / 150 pF | $1.5x10^9$ Ω / 300 pF | $7.5x10^8$ Ω / 600 pF | $2x10^9$ Ω / 200 pF | $1.5x10^9$ Ω / 300 pF |
| Common mode | $1.5x10^9$ Ω/300 pF | $1.5x10^9$ Ω / 300 pF | $7.5x10^8$ Ω / 600 pF | $2x10^9$ Ω / 200 pF | $1.5x10^9$ Ω / 300 pF |
| **Crosstalk Ch-Ch** | | | | | |
| 300 KHz | <-37 dB | <-37 dB | <-37dB | <-37 dB | <-37 dB |
| 1 MHz | <-26 dB | <-26 dB | <-26 dB | <-26 dB | <-26 dB |
| 15 MHz | <-7 dB | <-7 dB | <-7 dB | <-7 dB | <-7 dB |
| Bandwidth | 15 MHz | 15 MHz | 10 MHz | 15 MHz | 15 MHz |

### ACTUATION TIME

0.6 ms

### RELAY TYPE

Reed (signal relays); EMR (backplane relays)

### RELAY DRIVE SCHEME

Direct drive

### REED RELAY DRIVE CURRENT

3.2 mA

### INTERLOCK

Backplane relays are disabled when the terminal assembly interlock signal is removed.

### OPERATING ENVIRONMENT

Specified for 0º C to 50º C

Specified to 70 percent relative humidity up to 35º C

### STORAGE ENVIRONMENT

-25º C to 65º C

### WEIGHT

3.40 lb (1.54 kg)

[1] Connections made using the Model 3732-ST-C screw terminal assembly.
[2] Model 3706 mainframe with all digital multimeter (DMM) backplane relays disconnected.
[3] Connections made using the Model 3732-ST-R screw terminal assembly.
Specifications are subject to change without notice.

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### FIRMWARE

Requires Series 3700 firmware version 1.40 or later (applies to all Series 3700 mainframes)

### SYSTEM SPECIFICATIONS

Refer to the Keithley Instruments Model 3700 System Switch/Multimeter Specifications Rev. D or later, available on www.keithley.com.

### SAFETY

Compliant with European Union Low Voltage Directive

### EMC

Compliant with European Union EMC Directive

## GENERAL SPECIFICATIONS

### POWER BUDGET INFORMATION

#### QUIESCENT POWER USAGE

| Mode | Quiescent power |
|---|---|
| Quad 4x28 | 780 mW |
| Dual 4x56 | 916 mW |
| Single 4x112 | 984 mW |
| Dual 8x28 | 780 mW |
| Single 16x28 | 780 mW |

Channel relay power consumption (milliwatts) each: 17

Backplane relay power consumption (milliwatts) each: 100

For additional power-budgeting information, refer to the Series 3700 Module Schematics and Connections section in the Series 3700 User's Manual (part number 3700S-900-01).

### AVAILABLE ACCESSORIES

| Model number | Description |
|---|---|
| Model 3720-MTC-1.5 | 78-pin D-sub female-to-male cable, 5 ft (1.5 m) |
| Model 3720-MTC-3 | 78-pin D-sub female-to-male cable, 10 ft (3 m) |
| Model 3732-ST-C | Screw terminal assembly for quad 4x28, dual 5x56, and single 4x112 matrix configurations |
| Model 3732-ST-R | Screw terminal assembly for single 16x28 or dual 8x28 matrix configurations |
| Model 3791-CIT | Contact insertion and extraction tool |
| Model 3791-KIT78-R | 78-pin, female D-sub connector kit; contains two female D-sub connectors and 156 solder-cup contacts |

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# Quad 4x28 Reed Relay Matrix Card Specifications

## Figure 1: Quad 4x28 simplified crosspoint relay detail