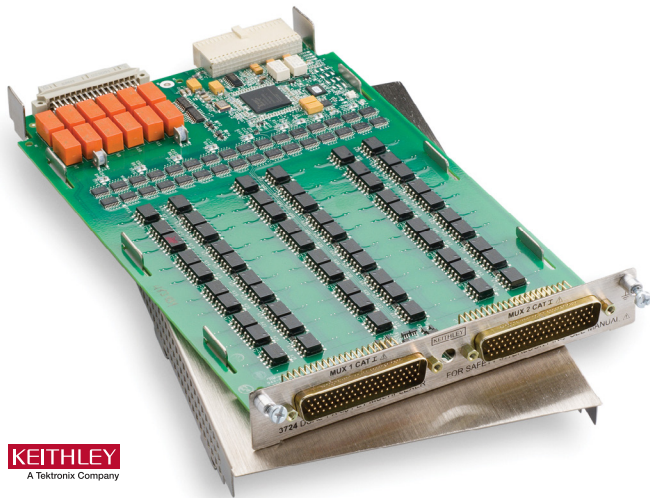


# 3724 Dual 1x30 FET Multiplexer Card

## 60 differential channels, automatic CJC with 3724-ST accessory

### Datasheet



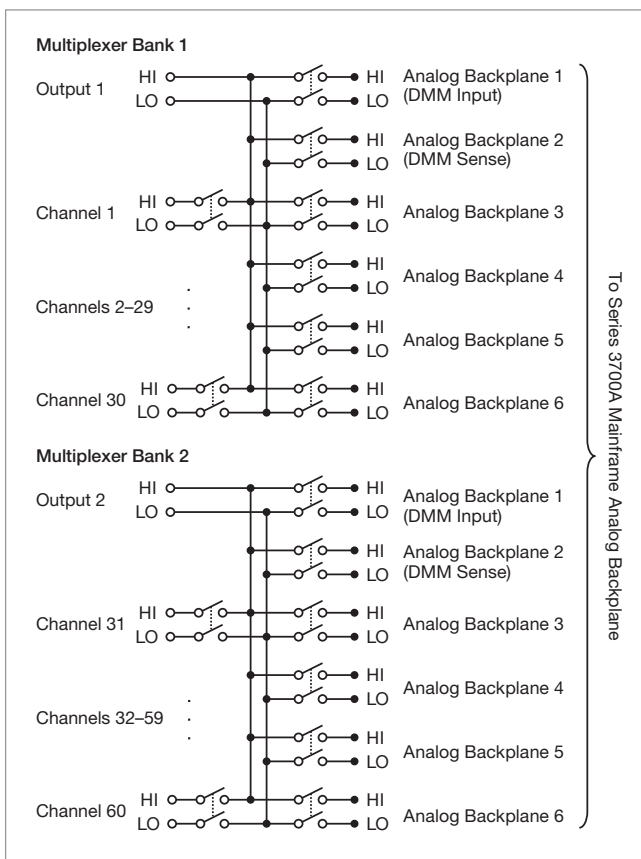
The 3724 provides two independent banks of solid-state relays arranged as 1x30 two-pole multiplexers that are ideal for high reliability, high speed multipoint measurement applications including temperature. The two banks can automatically be connected to the Series 3700A mainframe backplane and optional DMM through the analog backplane connection relays. This connection allows the mainframe to reconfigure the card to a single 1x60 two-pole multiplexer or to enable card-to-card expansion for even larger configurations.

#### Key Features

- 60 two-pole or 30 four-pole solid-state channels
- Scanning speeds greater than 1250 channels/second (switch only)
- Optically isolated, solid-state FET relays provide unlimited contact life
- 200 V, 0.1 A switch/carry signal capacity; 800mW
- Automatic CJC for temperature measurements when used with 3724-ST accessory
- Analog backplane connection relays provide easy bank and card interconnections
- Screw terminal connections provided with removable 3724-ST accessory
- Ideal for maintenance-free, long-life thermocouple temperature measurements
- Perfect for EV battery cell voltage monitoring

The solid-state FET relay technology supports fast switching times with scanning rates of greater than 1250 channels/second and provides unlimited contact life. In addition, the 3724 supports thermocouple temperature measurements when used with the 3724-ST (screw terminal) accessory providing automatic cold junction compensation (CJC).

The 3724 uses two 78-pin male D-sub connectors for signal connections. For screw terminal or automatic CJC, use the detachable 3724-ST accessory.



### 3724 Specifications

|                               |                                                                                                                                                                                                                        |
|-------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Multiplexer Configuration     | Two independent 1×30, 2-pole multiplexers. Banks can be connected together via relay creating a single 1×60 multiplexer. Banks can be isolated from the backplane by relays. Card can be configured for 2- and 4-wire. |
| Contact Configuration         | 2-pole form A.                                                                                                                                                                                                         |
| Connector type                | Two 78-pin male D-shells.                                                                                                                                                                                              |
| 3724-ST Screw Terminal Option | #22AWG typical wire size with 0.062 inch O.D. 124 conductors maximum. 16 AWG maximum wire size with 0.092 inch O.D. 36 conductor per card maximum.                                                                     |
| Maximum Signal Level          | 200 V DC or 141 V RMS between any terminal, 0.1 A switched (0.1 A carry), 800 mW.                                                                                                                                      |
| Common Mode Voltage           | 300V DC or RMS between any terminal and chassis.                                                                                                                                                                       |
| Volt-Hertz Limit              | 10 <sup>7</sup> .                                                                                                                                                                                                      |
| Contact Life                  | <b>Solid State:</b> > unlimited.<br><b>EMR (Backplane):</b> >1×10 <sup>8</sup> operations @ 5 V, 10 mA. 1×10 <sup>5</sup> operations @ max. signal level.                                                              |

|                                  |              | Dual 1×30 <sup>1</sup>               | Single 1×60 <sup>1, 2</sup>          |
|----------------------------------|--------------|--------------------------------------|--------------------------------------|
| Channel Resistance               |              | <62 Ω (54 Ω @ 23°C)                  | <64 Ω (58 Ω @ 23°C)                  |
| Contact Potential (differential) |              | <±2 μV                               | <±2.5 μV                             |
| Offset Current                   |              | <10 nA<br>(<±100 pA @ 23°C/60% R.H.) | <10 nA<br>(<±100 pA @ 23°C/60% R.H.) |
| Isolation                        | Differential | 10 <sup>9</sup> Ω, 500 pF            | 10 <sup>9</sup> Ω, 1100 pF           |
|                                  | Bank-Bank    | 10 <sup>9</sup> Ω, 100 pF            | —                                    |
|                                  | CH-CH        | 10 <sup>9</sup> Ω, 125 pF            | 10 <sup>9</sup> Ω, 125 pF            |
|                                  | Common Mode  | 10 <sup>9</sup> Ω, 150 pF            | 10 <sup>9</sup> Ω, 700 pF            |
| Crosstalk CH-CH                  | 300 kHz      | –40 dB                               | –40 dB                               |
|                                  | 1 MHz        | –30 dB                               | –30 dB                               |
| Bandwidth                        |              | 2 MHz                                | 1 MHz                                |

Notes

- 1. Connections made using 3724-ST.
- 2. 3706A mainframe with all DMM backplane relays disconnected. Maximum two card backplane relays closed.

## 3724 Card/3706A Multimeter Condensed Specifications

### Temperature

Displayed in °C, °F, or K. Exclusive of probe errors.

Displayed in °C, °F, or K. Exclusive of probe errors.

### Thermocouples (accuracy based on ITS-90)

| Type | Range            | Resolution | 90 Day/1 Year, 23°C ± 5° |
|------|------------------|------------|--------------------------|
| J    | –150 to +760°C   | 0.001°C    | 1.0°C                    |
| K    | –150 to +1372°C  | 0.001°C    | 1.0°C                    |
| N    | –100 to +1300°C  | 0.001°C    | 1.0°C                    |
| T    | –100 to +400°C   | 0.001°C    | 1.0°C                    |
| E    | –150 to +1000°C  | 0.001°C    | 1.0°C                    |
| R    | +400 to +1768°C  | 0.1°C      | 1.8°C                    |
| S    | +400 to +1768°C  | 0.1°C      | 1.8°C                    |
| B    | +1100 to +1820°C | 0.1°C      | 1.8°C                    |

### DC Specifications

### 3724 Card/3706A Multimeter Uncertainty Specifications

| Function                          | Range                                       | Notes                                                                                              |
|-----------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------|
| Voltage                           | All                                         | Add 4.5 $\mu$ V to PPM “of range”                                                                  |
| Resistance                        | 100 k $\Omega$                              | Add 8 PPM to “of reading”                                                                          |
| Resistance                        | 1 M $\Omega$                                | Add 80 PPM to “of reading”                                                                         |
| Resistance                        | 10 M $\Omega$                               | Add 250 PPM to “of reading”                                                                        |
| Resistance                        | 100 M $\Omega$                              | Add 5000 PPM to “of reading”                                                                       |
| Resistance 2-wire                 | 1 k $\Omega$ through 100 M $\Omega$         | Add 1.2 $\Omega$ (with REL) to PPM “of range” Add 64 $\Omega$ (without REL) to PPM “of range”      |
| Resistance 4-wire and Dry Circuit | 1 $\Omega$ , 10 $\Omega$ , and 100 $\Omega$ | Ranges Not Available (maximum lead resistance exceeded, see manual for measurement considerations) |

**Conditions** 1 PLC or 5 PLC.

**Accuracy**  $\pm$ (ppm of reading + ppm of range) (ppm = parts per million; e.g., 10 ppm = 0.001%).

General

|                                                                     |                                                                            |             |
|---------------------------------------------------------------------|----------------------------------------------------------------------------|-------------|
| ACTUATION TIME                                                      | <0.2 ms.                                                                   |             |
| Temperature Accuracy Using Automatic CJC with 3724-ST Accessory     | 1°C for J, K, T, and E type (see mainframe specification for details).     |             |
| Relay Type                                                          | Optically isolated FET.                                                    |             |
| Relay Drive Scheme                                                  | Direct.                                                                    |             |
| Interlock                                                           | Backplane relays disabled when interlock connection removed.               |             |
| Relay Drive Current                                                 | 4 mA.                                                                      |             |
| Operating Environment                                               | Specified for 0°C to 50°C. Specified to 70% R.H. at 35°C.                  |             |
| Storage Environment                                                 | –25°C to 65°C.                                                             |             |
| Weight                                                              | 1.13 kg (2.5 lbs.).                                                        |             |
| Safety                                                              | Conforms to European Union Directive 73/23/EEC, EN61010-1.                 |             |
| EMC                                                                 | Conforms to European Union Directive 2004/108/EC, EN61326-1.               |             |
| Typical Scanning Speeds, Switch Only <sup>1</sup>                   | Sequential scanning, single channel, immediate trigger advance >1250 ch/s. |             |
| Typical Scanning Speeds, With Measurements Into Memory <sup>2</sup> |                                                                            |             |
|                                                                     | DCV (10 V range) or 2WΩ (1 kΩ range)                                       | >1000 ch/s. |
|                                                                     | Thermocouple                                                               | >1000 ch/s. |
|                                                                     | 3- or 4-Wire RTD                                                           | >450 ch/s.  |
|                                                                     | 4-Wire Ω (1 kΩ range)                                                      | >450 ch/s.  |
|                                                                     | ACV (10 V, 400 Hz range)                                                   | >1000 ch/s. |
| Power Budget Information                                            | Quiescent Power (mW)                                                       | 1150.       |
|                                                                     | Channel Relay Power (mW) Each                                              | 20.         |
|                                                                     | Backplane Relay Power Consumption (mW) Each                                | 100.        |

See Chapter 8 of the Series 3700A user's manual for more detailed information.

Notes

1. Scanning script local to mainframe, within same bank, break before make.
2. 3706A mainframe with autorange off, limits off, dmm.autodelay=0, dmm.autozero=0, 4½ digits (NPLC=.006), for ACV dmm.detectorbandwidth=300, for OHMs dmm.offsetcompensation=off, dmm.opendetector=off. Scanning script local to mainframe, sequential scan within same bank (2-pole) or card (4-pole), and break before make switching.

Ordering Information

|      |                                |
|------|--------------------------------|
| 3724 | Dual 1×30 FET Multiplexer Card |
|------|--------------------------------|

Available Accessories

|            |                                                                        |
|------------|------------------------------------------------------------------------|
| 3720-MTC-3 | 78-pin female-to-male D-sub Cable Assembly, 3 m (9.8 ft)               |
| 3724-ST    | Screw Terminal Block (required for auto CJC thermocouple measurements) |

Available Services

|                |                                                                   |
|----------------|-------------------------------------------------------------------|
| 3724-3Y-EW-STD | 1-year factory warranty extended to 3 years from date of shipment |
| 3724-5Y-EW-STD | 1-year factory warranty extended to 5 years from date of shipment |
| C/3724-3Y-DATA | 3 (Z540-1 compliant) calibrations within 3 years of purchase*     |

\*Not available in all countries

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