

# 7700 20-channel, Differential Multiplexer Module with Automatic CJC, Screw Terminals, and up to 50MHz Bandwidth

## Datasheet

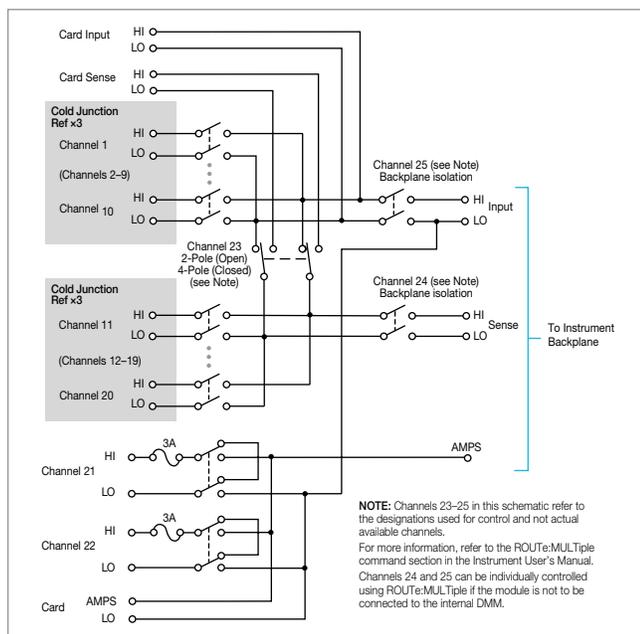


**KEITHLEY**  
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The 7700 plug-in module offers 20 channels of 2-pole or 10 channels of 4-pole multiplexer switching that can be configured as two independent banks of multiplexers. There are two additional protected channels for current measurements. Automatic CJC is provided so that no other accessories are required to make thermocouple temperature measurements. In addition, the 7700 contains latching electromechanical relays that enable signal bandwidths of up to 50 MHz. The 7700 is ideal for RTD, thermistor, and thermocouple temperature applications.

### Key Features

- 20 channels for generalpurpose measurements, plus two channels to measure current
- Oversize screw terminal connection blocks are standard for easier connections
- 50 MHz bandwidth
- 300 V, 1 A capacity for voltage channels; 60 W, 125 VA
- 3 A capacity for current channels
- Low insertion loss of up to 50 MHz
- Relay closures stored in onboard memory



### Specifications

#### Capabilities

<b>Channels 1–20</b>	Multiplex one of twenty 2-pole or one of ten 4-pole signals into DMM.
<b>Channels 21–22</b>	Multiplex one of two 2-pole current signals into DMM.

#### Inputs

##### Maximum Signal Level

**Channels (1–20)** 300 V DC or 300 V rms (425 V peak) for AC waveforms, 1 A switched, 60 W, 125 VA maximum.

**Channels (21–22)** 60 V DC or 30 V rms, 3 A switched, 60 W, 125 VA maximum.

**Contact Life (typ.)** >10<sup>5</sup> operations at max. signal level. >10<sup>8</sup> operations no load<sup>1</sup>.

1. Open thermocouple detector on during thermocouple measurements. Minimum signal level 10 mV, 10 μA.

**Contact Resistance** <1 Ω at end of contact life.

**Contact Potential** <±500 nV typical per contact, 1 μV max. <±500 nV typical per contact pair, 1 μV max.

**Offset Current** <100 pA.

**Connector Type** Screw terminal, #20 AWG wire size.

**Isolation Between Any Two Terminals:** >10<sup>10</sup> Ω, <100 pF.

**Isolation Between Any Terminal and Earth:** >10<sup>9</sup> Ω, <200 pF.

**Insertion Loss (50 Ω Source, 50 Ω Load)**

	w/Internal DMM	w/o Internal DMM*
<0.1 dB	1 MHz	1 MHz
<3 dB	2 MHz	50 MHz

**Crosstalk (50 Ω Load):**

	w/Internal DMM	w/o Internal DMM*
10 MHz	<-40 dB	<-40 dB
25 MHz	**	<-25 dB

**Common Mode Voltage**

300 V or 300 V rms (425 V peak) for AC waveforms between any terminal and chassis.

\* Channels 24 and 25 are open. Refer to ROUTe:MULTiple command in 27XX User Manual.

\*\* Not valid.

### General

**20 Channels** 20 channels of 2-pole relay input. All channels configurable to 4-pole.

**2 Channels** 2 channels of current only input.

**Relay Type** Latching electromechanical.

**Actuation Time** <3 ms.

**Environmental** **Operating Environment:** Specified for 0° to 50°C. Specified to 80% R.H. at 35°C.

**Storage Environment:** -25° to 65°C.

**EMC:** Conforms to European Union EMC Directive.

**Safety:** Conforms to European Union Low Voltage Directive

**RoHS:** Conforms to European Union RoHS Directive

**Warranty:** 1 year

**Weight** 0.45 kg (1 lb).

### Supplied Accessories

**CC-92-1** Set of 20 Cable Ties

**TL-23** Screwdriver

### Available Services

**7700-3Y-EW** 1-year factory warranty extended to 3 years from date of shipment

### Ordering Information

**7700** 20-channel, Differential Multiplexer Module with Automatic CJC and Screw Terminals

# 7701 32-channel Differential Multiplexer Module

## Datasheet

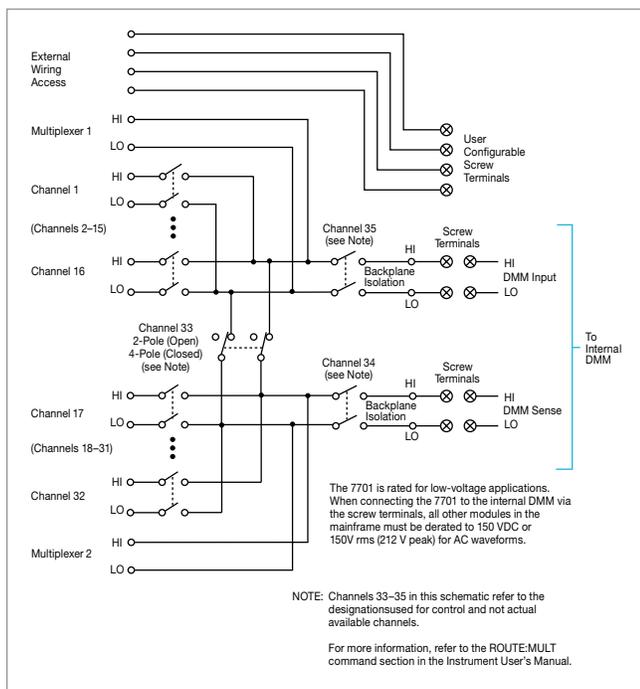


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The 7701 plug-in module offers 32 channels of 2-pole or 16 channels of 4-pole multiplexer switching. Its 32 channels can be configured for common-side 4-wire ohms. They can also be configured as two independent banks of multiplexers. It is ideal for RTD or thermistor temperature applications.

### Key Features

- Configurable for 32 channels of differential measurements, with up to 16 channels of 4-pole measurements
- Two female D-shell connectors are standard for secure hook-up and quick teardown
- 150 V, 1 A capacity for voltage channels; 60 W, 125 VA
- Relay closures stored in onboard memory
- Screw terminal jumpers allow user-configurable DMM connections



### Specifications

#### Capabilities

**Channels 1-32** Multiplex one of 32 2-pole or one of 16 4-pole signals into DMM. Configuration supports dual 1x16 independent multiplexers.

#### Inputs

##### Maximum Signal Level

Any channel to Any Channel (1-32): 150 V DC or 150 Vrms (212 V peak) for AC waveforms, 1 A switched, 60 W, 125 VA maximum.

**Contact Life (typ):** >10<sup>5</sup> operations at max. signal level.

>10<sup>8</sup> operations no load<sup>1</sup>.

1. Minimum signal level 10 mV, 10 μA.

**Contact Resistance** <1 Ω any path and additional 1 Ω at end of contact life.

**Contact Potential** <6 μV per contact pair.

**Offset Current** <100 pA.

**Connector Type** 50-pin female D-shell, Channels 1-24.  
25-pin female D-shell, Channels 25-32.  
Supplied with male IDC ribbon cable connectors.

##### Isolation Between Any Two Terminals

>10<sup>9</sup> Ω, <200 pF.

##### Isolation Between Any Terminal and Earth

>10<sup>9</sup> Ω, <400 pF.

##### Cross Talk (1 MHz, 50 Ω Load)

<-35 dB.

##### Insertion Loss (50 Ω Source, 50 Ω Load)

<0.35 dB below 1 MHz. <3 dB below 2 MHz.

##### Common Mode Voltage

300 VDC or 300 Vrms (425 V peak) for AC waveforms between any terminal and chassis.

### General

**32 Channels** 32 channels of 2-pole relay input. All channels configurable to 4-pole.

**Relay Type** Latching electromechanical.

**Actuation Time** <3 ms.

**DMM Connections** Screw terminals provide internal DMM connections to channels 34 and 35 and connections to external wiring access.

#### Environmental

**Operating Environment:** Specified for 0° to 50°C. Specified to 80% R.H. at 35°C.

**Storage Environment:** -25° to 65°C.

**EMC:** Conforms to European Union EMC Directive.

**Safety:** Conforms to European Union Low Voltage Directive

**RoHS:** Conforms to European Union RoHS Directive

**Warranty:** 1 year

#### Weight

<0.52 kg (1.16 lb).

### Supplied Accessories

**7709-306A** 50-pin D-Sub Male IDC Connector Kit

**7709-307A** 25-pin D-Sub Male IDC Connector Kit

**J-15** Jumper Wires, quantity 4

### Available Accessories

**7789** 50-pin male, 25-pin male D-shell solder cup connectors

**7790** 50-pin male, 50-pin female, 25-pin male D-shell IDC connectors

### Available Services

**7701-3Y-EW** 1-year factory warranty extended to 3 years from date of shipment

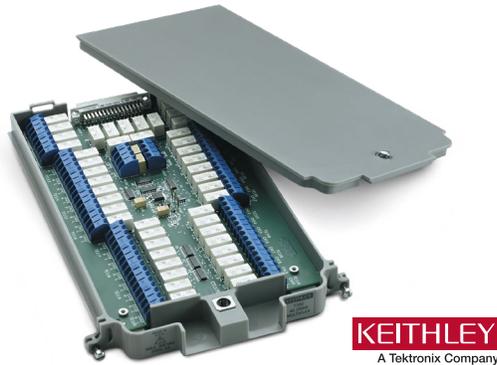
### Ordering Information

**7701** 32-channel, Differential Multiplexer Module

# 7702 40-channel, Differential Multiplexer Module

with Screw Terminals

## Datasheet

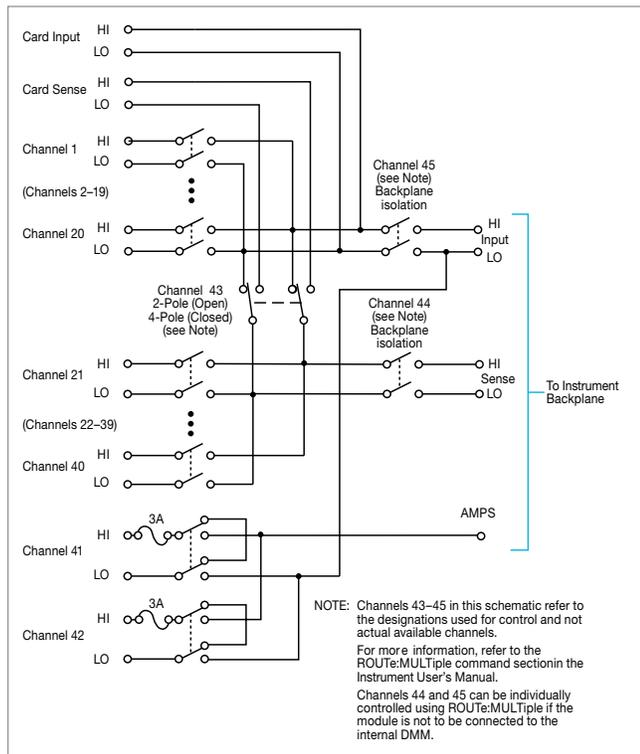


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The 7702 plug-in module offers 40 channels of 2-pole or 20 channels of 4-pole multiplexer switching that can be configured as two independent banks of multiplexers. The 7702 provides two additional protected channels for current measurements. It is ideal for RTD, thermistor, and thermocouple temperature applications.

### Key Features

- 40 channels for generalpurpose measurements, plus 2 channels to measure current
- Two- or four-wire measurement
- Oversize screw terminal connection blocks are standard for easier connection
- 300 V, 1 A capacity for voltage channels; 60 W, 125 VA
- 3 A capacity for current channels
- Relay closures stored in onboard memory



### Specifications

#### Capabilities

<b>Channels 1-40</b>	Multiplex one of 40 2-pole or one of 20 4-pole signals into DMM.
<b>Channels 41-42</b>	Multiplex one of 2 2-pole current signals into DMM.

#### Inputs

##### Maximum Signal Level

<b>Channels (1-40)</b>	300 V DC or rms, 1 A switched, 60 W, 125 VA maximum.
<b>Channels (41-42)</b>	60 V DC or 30 V rms, 3 A switched, 60 W, 125 VA maximum.

<b>Contact Life (typ.)</b>	>10 <sup>5</sup> operations at max. signal level. >10 <sup>8</sup> operations no load <sup>1</sup> .
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1. Minimum signal level 10 mV, 10  $\mu$ A.

<b>Contact Resistance</b>	<1 $\Omega$ at end of contact life.
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<b>Contact Potential</b>	< $\pm$ 500 nV typical per contact, 1 $\mu$ V max. < $\pm$ 500 nV typical per contact pair, 1 $\mu$ V max.
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<b>Offset Current</b>	<100pA.
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<b>Connector Type</b>	Screw terminal, #20 AWG wire size.
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<b>Isolation Between Any Two Terminals</b>	>10 <sup>10</sup> $\Omega$ , <100 pF.
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<b>Isolation Between Any Terminal and Earth</b>	>10 <sup>9</sup> $\Omega$ , <200 pF.
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<b>Cross Talk (10 MHz, 50 <math>\Omega</math> Load)</b>	<-40 dB.
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<b>Insertion Loss (50 <math>\Omega</math> Source, 50 <math>\Omega</math> Load)</b>	<0.1 dB below 1 MHz. <3 dB below 2 MHz.
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<b>Common Mode Voltage</b>	300V between any terminal and chassis.
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### General

<b>40 Channels</b>	40 channels of 2-pole relay input. All channels configurable to 4-pole.
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<b>2 Channels</b>	2 channels of current only input.
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<b>Relay Type</b>	Latching electromechanical.
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<b>Actuation Time</b>	<3 ms.
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<b>Environmental</b>	<b>Operating Environment:</b> Specified for 0° to 50°C. Specified to 80% R.H. at 35°C.
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**Storage Environment:** -25° to 65°C.

**EMC:** Conforms to European Union EMC Directive.

**Safety:** Conforms to European Union Low Voltage Directive

**RoHS:** Conforms to European Union RoHS Directive

**Warranty:** 1 year

<b>Weight</b>	0.5 kg (1.1 lb).
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### Supplied Accessories

<b>CC-92-1</b>	Set of 20 Cable Ties
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<b>TL-23</b>	Screwdriver
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### Available Services

<b>7702-3Y-EW</b>	1-year factory warranty extended to 3 years from date of shipment
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### Ordering Information

<b>7702</b>	40-channel Differential Multiplexer Module with Screw Terminals
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# 7703 32-channel, High Speed, Differential Multiplexer Module

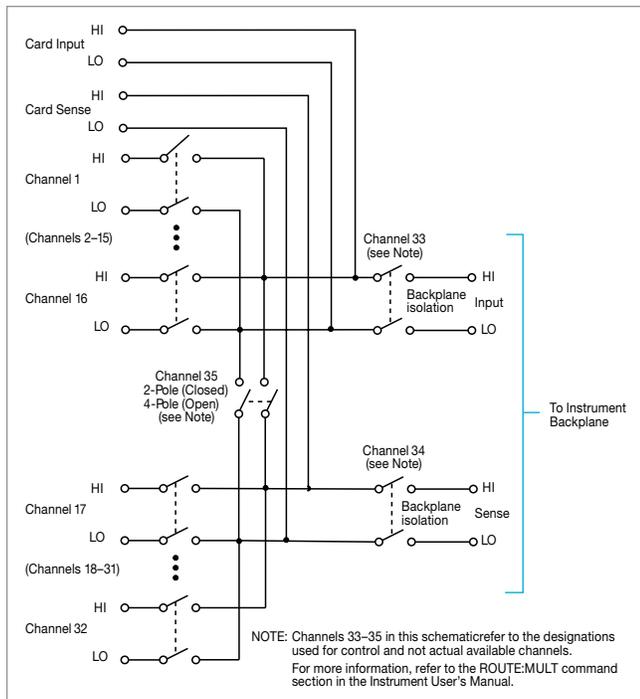
## Datasheet



The 7703 plug-in module offers 32 channels of 2-pole or 16 channels of 4-pole multiplexer switching that can be configured as two independent banks of multiplexers. The non-latching reed relays provide high speeds and are designed for 300 volt, 500 mA; 10 VA. The relay closures are stored in onboard memory. The 7703 is ideal for RTD and thermistor temperature applications.

### Key Features

- 32 channels for general purpose measurements
- Relay actuation time of less than 1ms for high-speed scanning
- Two- or four-wire measurement
- Two 50-pin female D-sub connectors are standard for secure hook-up and quick teardown Specifications



### Specifications

#### Capabilities

**Channels 1-32** Multiplex one of 32 2-pole or one of 16 4-pole signals into DMM.

#### Inputs

##### Maximum Signal Level

**Channels (1-32)** 300 V DC or rms, 0.5 A switched, 10 W maximum.

**Contact Life (typ.)** >5×10<sup>4</sup> operations at max. signal level.  
>10<sup>8</sup> operations cold switching.

**Contact Resistance** <1 Ω at end of contact life.

**Contact Potential** <±3 μV typical per contact, 6 μV max.  
<±3 μV typical per contact pair, 6 μV max.

**Offset Current** <100 pA.

**Connector Type** 50 pin D-sub ×2.

**Relay Drive Current** 20 mA per channel.

##### Isolation Between Any Two Terminals

>10<sup>9</sup> Ω, <200 pF.

##### Isolation Between Any Terminal and Earth

>10<sup>9</sup> Ω, <400 pF.

##### Cross Talk (1 MHz, 50 Ω Load)

<-40 dB.

##### Insertion Loss (50 Ω Source, 50 Ω Load)

<0.35 dB below 1 MHz. <3 dB below 2 MHz.

##### Common Mode Voltage

300 V between any terminal and chassis.

### General

**32 Channels** 32 channels of 2-pole relay input. All channels configurable to 4-pole.

**Relay Type** Reed.

**Actuation Time** <1 ms.

**Environmental** **Operating Environment:** Specified for 0° to 50°C. Specified to 40% R.H. at 35°C.

**Storage Environment:** -25° to 65°C.

**EMC:** Conforms to European Union EMC Directive.

**Safety:** Conforms to European Union Low Voltage Directive

**RoHS:** Conforms to European Union RoHS Directive

**Warranty:** 1 year

**Weight** 0.8 kg (1.75 lbs).

### Supplied Accessories

**7703-306A** 50-pin D-Sub Male Shell Connector Kit, quantity 2

### Available Accessories

**7705-MTC-2** 50 Pin Male to Female D-sub Cable, 2 m (6.6 ft).

**7788** 50-pin D-Sub male connector kit, quantity 2

**7790** 50-pin male, 50-pin female, 25-pin male D-shell IDC connectors

### Available Services

**7703-3Y-EW** 1-year factory warranty extended to 3 years from date of shipment

### Ordering Information

**7703** 32-channel, High Speed, Differential Multiplexer Module

# 7705 40-channel, Single-pole Control Module

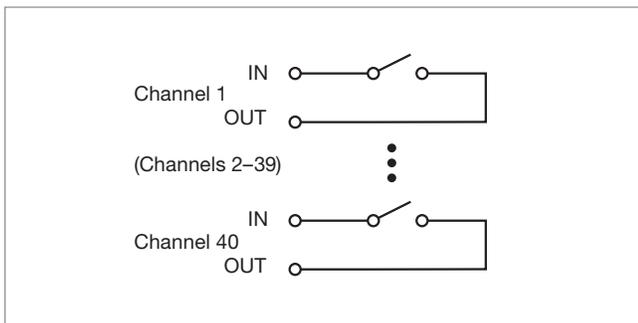
## Datasheet



The 7705 plug-in module offers 40 channels of independent switching. These channels are designed to control power to the DUT and switching loads. They can also directly control light indicators, relays, etc.

### Key Features

- 300 V, 2 A capacity
- Two 50-pin female D-sub connectors are standard for secure hook-up and quick teardown
- Relay closures stored in onboard memory



### Specifications

#### Inputs

<b>Maximum Signal Level</b>	300 VDC or rms, 2 A switched, 60 W (DC, resistive), 125 VA (AC, resistive).
<b>Contact Life</b>	<b>No Load<sup>1</sup>:</b> 10 <sup>8</sup> closures. <b>At Maximum Signal Levels:</b> 10 <sup>5</sup> closures. 1. Minimum signal level 10 mV, 10 $\mu$ A.
<b>Channel Resistance (per conductor)</b>	<1 $\Omega$ .
<b>Contact Potential</b>	$\leq$ 4 $\mu$ V per contact.
<b>Offset Current</b>	<100 pA.
<b>Actuation Time</b>	3 ms.
<b>Isolation</b>	Channel to Channel: >10 <sup>9</sup> $\Omega$ , <50 pF. Common Mode: >10 <sup>9</sup> $\Omega$ , <100 pF.
<b>Crosstalk (1 MHz, 50 <math>\Omega</math> load)</b>	<-35 dB.
<b>Insertion Loss (50 <math>\Omega</math> source, 50 <math>\Omega</math> load)</b>	<0.3 dB below 1 MHz, <3 dB below 10 MHz.
<b>Common Mode Voltage</b>	300 V between any terminal and chassis.

#### General

<b>Relay Switch Configuration</b>	40 independent channels of 1-pole switching. Isolated from internal DMM.
<b>Contact Configuration</b>	1 pole Form A.
<b>Relay Type</b>	Latching electromechanical.
<b>Connector Type</b>	Two 50-pin female D-sub connectors.
<b>Environmental</b>	<b>Operating Environment:</b> Specified for 0° to 50°C. Specified to 80% R.H. at 35°C. <b>Storage Environment:</b> -25° to 65°C. <b>EMC:</b> Conforms to European Union EMC Directive. <b>Safety:</b> Conforms to European Union Low Voltage Directive <b>RoHS:</b> Conforms to European Union RoHS Directive <b>Warranty:</b> 1 year
<b>Weight</b>	0.45 kg (1 lb).

#### Supplied Accessories

7703-306A	50-pin D-Sub Male Shell Connector Kit, quantity 2
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#### Available Accessories

7705-MTC-2	50 Pin Male to Female D-sub Cable, 2 m (6.6 ft).
7788	50-pin D-Sub male connector kit, quantity 2
7790	50-pin male, 50-pin female, 25-pin male D-shell IDC connectors

#### Available Services

7705-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
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#### Ordering Information

7705	40-channel, Single-pole Control Module
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# 7706 All-in-One I/O Module

20-channel Differential Multiplexer w/Automatic CJC, 16 Digital Outputs, 2 Analog Outputs, a Counter/Totalizer, and Screw Terminals

## Datasheet

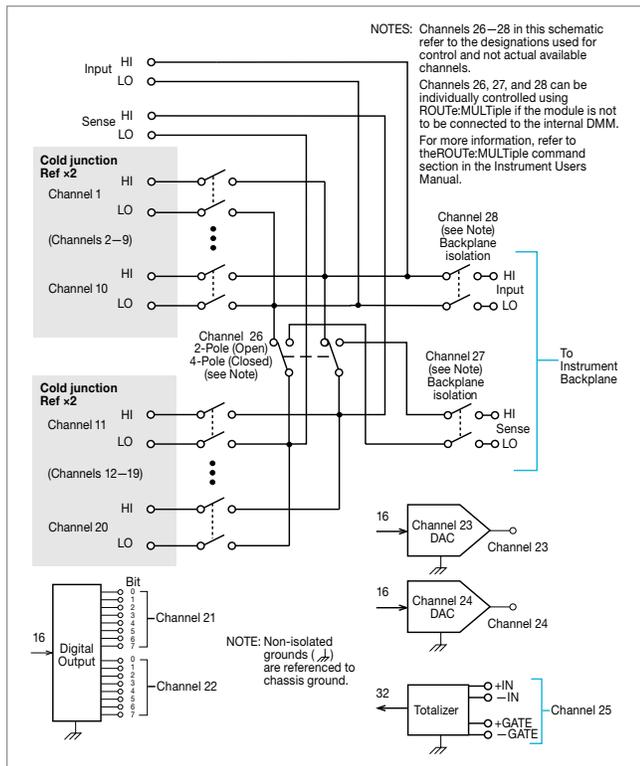


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The 7706 plug-in module offers 20 channels of 2-pole or 10 channels of 4-pole multiplexer switching with automatic CJC, as well as two analog output channels, 16 digital outputs, and one event counter/totalizer. The event counter/totalizer can be used to monitor and control system components, such as fixtures, limit switches, pass/fail indicators, external voltage sources, loads, door closures, revolutions, etc., while performing mixed signal measurements. The 7706 is ideal for RTD, thermistor, and thermocouple temperature applications.

### Key Features

- 20 channels of analog input (w/automatic CJC) for general-purpose measurements
- 16 channels of digital output
- 2 analog outputs ( $\pm 12$  V, 5 mA)
- 300 V, 1 A capacity; 60 W, 125 VA maximum
- Configurable as two independent banks of multiplexers
- Relay closures stored in onboard memory



### Specifications

#### Capabilities

<b>Channels 1–20</b>	Multiplex one of 20 2-pole or one of 10 4-pole signals into DMM.
<b>Channels 21–22</b>	16 Digital Outputs.
<b>Channels 23–24</b>	Analog Voltage Output (2).
<b>Channels 25</b>	Totalize Input.

Channels 21–25 are referenced to chassis ground.

#### Inputs (Channels 1–20)

**Maximum Signal Level (Channels 1–20):** 300 V DC or rms, 1 A switched, 60 W, 125 VA maximum.

**Safety Category** CAT 1

**Contact Life (typ.)**  $>10^8$  operations at max. signal level;  
 $>10^8$  operations no load<sup>1</sup>.

<sup>1</sup> Minimum signal level 10 mV, 10  $\mu$ A.

**Contact Resistance**  $<1 \Omega$  at end of contact life.

**Contact Potential**  $<\pm 2 \mu$ V typical per contact, 3  $\mu$ V max.

**Offset Current**  $<100$  pA.

**Connector Type** Screw terminal, #22 AWG wire size.

**Isolation Between Any Two Terminals:**  $>10^9 \Omega$ ,  $<100$  pF.

**Isolation Between Any Terminal and Earth:**  $>10^9 \Omega$ ,  $<200$  pF.

**Cross Talk (10MHz, 50  $\Omega$  Load):**  $<-35$  dB.

**Insertion Loss (50  $\Omega$  Source, 50  $\Omega$  Load)**  
 $<0.1$  dB below 1 MHz.  $<3$  dB below 2 MHz.

**Common Mode Voltage:** 300 V between any terminal and chassis.

#### Digital Output (Channels 21 and 22)

**$V_{out}(L)$**   $<0.8$  V @  $I_{out} = 400$  mA.

**$V_{out}(H)$**   $>2.4$  V @  $I_{out} = 1$  mA.

**$V_{out}(H)Max.$**   $<42$  V with external open drain pull-up.

**Write Speed** 50/s.

#### Analog Voltage Output (Channels 23 and 24)

**DAC 1, 2**  $\pm 12$  V @ 1 mA max, non-isolated,  $\pm 10$  V @ 5 mA max.

**Resolution** 1 mV.

**$I_{out}$**  5 mA max.

**Settling Time** 1 ms to 0.01% of output.

**Accuracy  $\pm$ (% of output + mV)** 1 year  $\pm 5^\circ C$ : 0.15% + 19 mV;  
90 day  $\pm 5^\circ C$ : 0.1% + 19 mV;  
24 hour  $\pm 1^\circ C$ : 0.04% + 19 mV.

**Temperature Coefficient:**  $\pm(0.015\% + 1 \text{ mV})/^\circ C$ .

**Write Speed** 50/s.

#### Totalize Input (Channel 25)

**Maximum Count** 232–1.

**Totalize Input** 100 kHz (max), rising or falling edge, programmable.

**Signal Level** 1 Vp-p (min), 42 Vpk (max).

**Threshold** 0 V or TTL, jumper selectable.

**Gate Input** TTL-Hi, TTL-Lo, or none.

**Count Reset** Manual or Read+Reset.

**Read Speed** 50/s.

### General

**20 Channels** 20 channels of 2-pole relay input. All channels configurable to 4-pole.

**Relay Type** Latching electromechanical.

**Actuation Time**  $<3$  ms.

**Environmental** **Operating Environment:** Specified for  $0^\circ$  to  $50^\circ C$ . Specified to 80% R.H. at  $35^\circ C$ .

**Storage Environment:**  $-25^\circ$  to  $65^\circ C$ .

**EMC:** Conforms to European Union EMC Directive.

**Safety:** Conforms to European Union Low Voltage Directive

**RoHS:** Conforms to European Union RoHS Directive

**Warranty:** 1 year

**Weight** 0.5 kg (1.1 lbs).

### Supplied Accessories

**CC-92-1** Set of 20 Cable Ties

**TL-23** Screwdriver

### Available Services

**7706-3Y-EW** 1-year factory warranty extended to 3 years from date of shipment

### Ordering Information

**7706** All-in-One I/O Module

# 7707 32-channel Digital I/O Module

## with 10-channel Differential Multiplexer

### Datasheet



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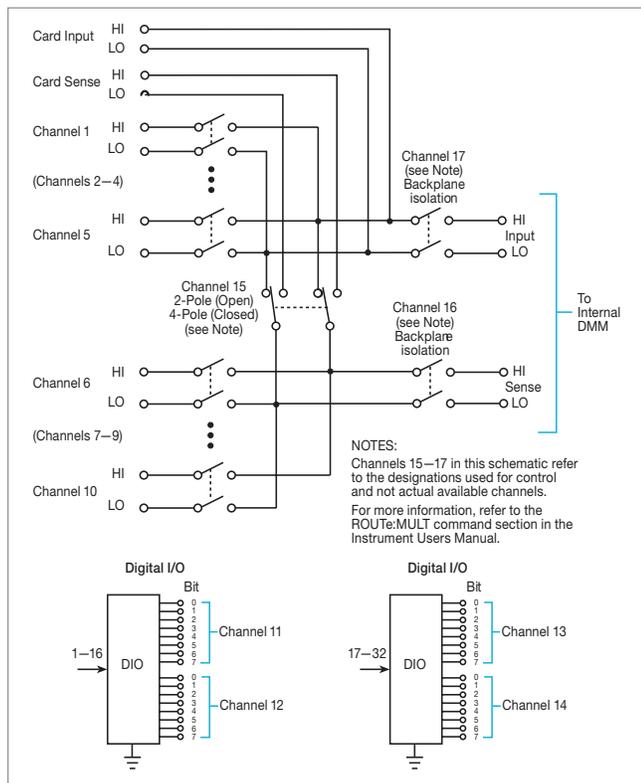
The 7707 plug-in module offers 10 channels of 2-pole or 5 channels of 4-pole multiplexer switching that can be configured as two independent banks of multiplexers. The 7707 also provides 32 digital input/output channels (four 8-bit ports) for I/O control. Connect the 7707 to industry standard solid-state relays to switch up to 980 VA.

#### Key Features

- 300 V, 1 A capacity; 60 W, 125 VA maximum (analog)
- 33 V, 100 mA capacity (digital)
- Digital outputs are short circuit protected
- Relay closures stored in onboard memory

#### Ordering Information

7707 32-channel Digital I/O Module with 10-channel Differential Multiplexer



#### Specifications

##### Capabilities

**Channels 1–10** Multiplex one of 10 2-pole or one of 5 4-pole signals into DMM.

**Channels 11–14** 32 Digital Inputs/Outputs referenced to chassis ground.

**Thermal Protection** Channels 11–14 are thermally protected to 1 A up to 25 V.

##### Inputs (Channels 1–10)

**Maximum Signal Level: Any Channel to Any Channel (1–10):** 300 VDC or 300 Vrms (425 V peak) for AC waveforms, 1 A switched, 60 W, 125 VA maximum.

**Contact Life (typ.)** >10<sup>5</sup> operations at max. signal level  
>10<sup>8</sup> operations no load<sup>1</sup>.

1. Minimum signal level 10 mV, 10  $\mu$ A.

**Contact Resistance** <1  $\Omega$  any path and additional 1  $\Omega$  at end of contact life.

**Contact Potential** <6  $\mu$ V typical per contact pair and additional 5  $\mu$ V with Channels 11–14 at rate  $V_{out}(L)$ .

**Offset Current** <100 pA.

**Connector Type:** 50-pin male D-shell, Channels 11–14. 25-pin female D-shell, Channels 1–10. Supplied with female and male IDC ribbon cable connectors.

##### Isolation Between Any Two Terminals

>10<sup>9</sup>  $\Omega$ , <100 pF with isolation channels 16 and 17 open.

**Isolation Between Any Terminal and Earth:** >10<sup>9</sup>  $\Omega$ , <200 pF.

**Cross Talk (1 MHz, 50  $\Omega$  Load):** <-35 dB.

**Insertion Loss (50  $\Omega$  Source, 50  $\Omega$  Load)**

<0.1 dB below 1 MHz. <3 dB below 2 MHz.

**Common Mode Voltage:** 300 VDC or 300 Vrms (425 V peak) for AC waveforms between any terminal and chassis.

##### Digital Input/Output (Channels 11–14)

$V_{in}(L)$ : <0.8 V (TTL).  $V_{in}(H)$ : >2 V (TTL).

$V_{out}(L)$ : <1.0 V @  $I_{out} = 100$  mA.  $V_{out}(H)$ : >2.4 V @  $I_{out} = 1$  mA.

$V_{out}(H)MAX.$ : <40 V with external open drain pull-up.

**Read/Write Speed** 50/s.

#### General

**10 Channels** 10 channels of 2-pole relay input. All channels configurable to 4-pole.

**Relay Type** Latching electromechanical.

**Actuation Time** <3 ms.

**Capacity** **2700:** (1) 7707 and (1) 77XX, except 7706.  
**2701:** Any combination of 77XX modules.  
**2750:** (4) 7707 and (1) 77XX, except 7706. A 7706 module may be substituted for a 7707 module.

**Environmental** **Operating Environment:** Specified for 0° to 50°C. Specified to 80% R.H. at 35°C.

**Storage Environment:** -25° to 65°C.

**EMC:** Conforms to European Union EMC Directive.

**Safety:** Conforms to European Union Low Voltage Directive

**RoHS:** Conforms to European Union RoHS Directive

**Warranty:** 1 year

**Weight** <0.5 kg (1.16 lb).

#### Supplied Accessories

**7707-306A** 50-pin D-Sub Female IDC Connector Kit

**7709-307A** 25-pin D-Sub Male IDC Connector Kits

#### Available Accessories

**7790** 50-pin Male, 50-pin Female, 25-pin Male D-shell IDC Connectors

**7705-MTC-2** 50 Pin Male to Female D-sub Cable, 2 m (6.6 ft).

**7707-MTC-2** 25 Pin Male to Female D-sub Cable, 2 m (6.6 ft)..

#### Available Services

**7707-3Y-EW** 1-year factory warranty extended to 3 years from date of shipment

# 7708 40-channel, Differential Multiplexer Module

with Automatic CJC and Screw Terminals

## Datasheet

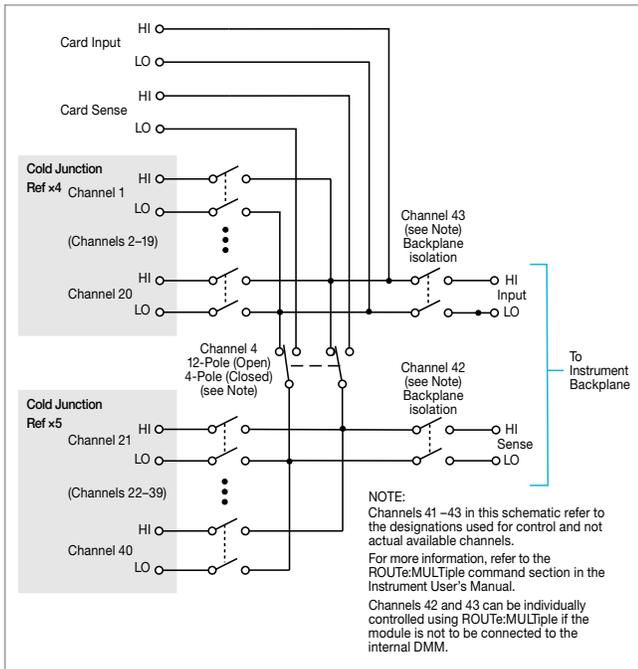


**KEITHLEY**  
A Tektronix Company

The 7708 plug-in module offers 40 channels of 2-pole or 20 channels of 4-pole multiplexer switching that can be configured as two independent banks of multiplexers. The built-in CJC sensors automatically linearize thermocouples, making the 7708 ideal for RTD, thermistor, and thermocouple temperature applications. It is also well suited for mixed-signal measurement applications that require multi-point monitoring, such as environmental stress screening.

### Key Features

- 40 differential channels for general-purpose measurements
- Two- or four-wire measurements
- 300 V, 1 A capacity for voltage channels; 60 W, 125 VA
- Oversize screw terminal connection blocks are standard for easier connection
- Relay closures stored in onboard memory



### Specifications

#### Capabilities

**Channels 1–40** Multiplex one of 40 2-pole or one of 20 4-pole signals into DMM.

#### Inputs

##### Maximum Signal Level

**Channels (1–40)** 300 V DC or rms, 1 A switched, 60 W, 125 VA maximum.

**Contact Life (typ.)** >10<sup>5</sup> operations at max. signal level.  
>10<sup>8</sup> operations no load<sup>1</sup>.

1. Open thermocouple detector on during thermocouple measurements. Minimum signal level 10 mV, 10 μA.

**Contact Resistance** <2 Ω at end of contact life.

**Contact Potential** <±500 nV typical per contact, 1 μV max.  
<±500 nV typical per contact pair, 1 μV max.

**Offset Current** <100 pA.

**Connector Type** Screw terminal, #20 AWG wire size.

##### Isolation Between Any Two Terminals

>10<sup>9</sup> Ω, <200 pF.

##### Isolation Between Any Terminal and Earth

>10<sup>9</sup> Ω, <400 pF.

##### Cross Talk (1 MHz, 50 Ω Load)

<-40 dB.

##### Insertion Loss (50 Ω Source, 50 Ω Load)

<0.1 dB below 1 MHz. <3 dB below 2 MHz.

##### Common Mode Voltage

300 V between any terminal and chassis.

### General

**40 Channels** 40 channels of 2-pole relay input. All channels configurable to 4-pole.

**Relay Type** Latching electromechanical.

**Actuation Time** <3 ms.

**Environmental** **Operating Environment:** Specified for 0° to 50°C. Specified to 80% R.H. at 35°C.

**Storage Environment:** -25° to 65°C.

**EMC:** Conforms to European Union EMC Directive.

**Safety:** Conforms to European Union Low Voltage Directive

**RoHS:** Conforms to European Union RoHS Directive

**Warranty:** 1 year

**Weight** 0.52 kg (1.16 lb).

### Supplied Accessories

**CC-92-1** Set of 20 Cable Ties

**TL-23** Screwdriver

### Available Accessories

**7708-3Y-EW** 1-year factory warranty extended to 3 years from date of shipment

### Ordering Information

**7708** 40-channel Differential Multiplexer Module with Automatic CJC and Screw Terminals

# 7709 6x8 Matrix Module

## Datasheet



**KEITHLEY**  
A Tektronix Company

The 7709 plug-in module is a two-pole, 6x8 matrix module. It can connect any combination of six differential channels of instrumentation to any combination of eight differential device-under-test channels. The instrumentation can be AC and DC sources, internal or external meters, oscilloscopes, etc. This matrix configuration allows wide flexibility for complex test systems.

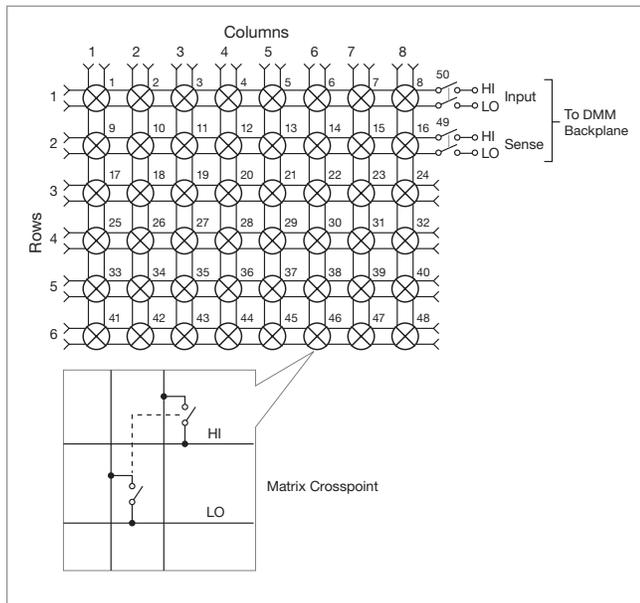
### Key Features

- Automatic two- or four-wire connection to DMM
- 6 row x 8 column matrix
- Expandable to larger switch configurations by daisy-chaining or cascading multiple modules
- Two female D-sub connectors are standard for secure hook-up and quick teardown
- 300 V, 1 A capacity
- Relay closures stored in onboard memory

### Ordering Information

7709

6x8 Matrix Module



### Specifications

#### Capabilities

##### DMM Connection

**2-Wire Functions** Row 1, channels 1–8, through channel 50.

**4-Wire Functions** Row 1, channels 1–4 (Source to Input) through channel 50 and Row 2, channels 13–16 (Sense), through channel 49.

##### Close Channel

CLOSE command connects channels 1–8 to DMM. For 4-wire, channels 1–4 are automatically paired with channels 13–16. ROUTe:MULTiple allows any combination of rows and columns to be connected at the same time.

#### Inputs

##### Maximum Signal Level

**Any Channel to Any Channel (1–48):** 300 VDC or 300 Vrms (425 V peak) for AC waveforms, 1 A switched, 60 W, 125 VA maximum.

**Contact Life (typ.)** >10<sup>9</sup> operations at max. signal level.  
>10<sup>8</sup> operations no load<sup>1</sup>.

1. Minimum signal level 10 mV, 10 μA.

**Contact Resistance** <1 Ω any path and additional 1 Ω at end of contact life.

**Contact Potential** <3 μV per contact pair.

**Offset Current** <100 pA.

##### Connector Type

50-pin female D-shell for rows and columns.  
25-pin female D-shell for "daisy-chain" rows.  
Supplied with male IDC ribbon cable connectors.

##### Isolation Between Any Two Terminals

>10<sup>9</sup> Ω, <200 F.

##### Isolation Between Any Terminal and Earth

>10<sup>9</sup> Ω, <400 pF.

##### Cross Talk (1 MHz, 50 Ω Load)

<-35 dB.

##### Insertion Loss (50 Ω Source, 50 Ω Load)

<0.35 dB below 1 MHz. <3 dB below 2 MHz.

##### Common Mode Voltage

300 VDC or 300 Vrms (425 V peak) for AC waveforms between any terminal and chassis.

### General

**Matrix Configuration** 6 rows x 8 columns.

**Contact Configuration** 2 pole Form A.

##### Relay Type

Latching electromechanical.

##### Actuation Time

<3 ms.

##### Environmental

**Operating Environment:** Specified for 0° to 50°C. Specified to 80% R.H. at 35°C.

**Storage Environment:** -25° to 65°C.

**EMC:** Conforms to European Union EMC Directive.

**Safety:** Conforms to European Union Low Voltage Directive

**RoHS:** Conforms to European Union RoHS Directive

**Warranty:** 1 year

##### Weight

0.52 kg (1.16 lb).

### Supplied Accessories

**7709-306A** 50-pin D-Sub Male IDC Connector Kit

**7709-307A** 25-pin D-Sub Male IDC Connector Kit

### Available Accessories

**7789** 50/25 Pin Male D-Shell Solder Cup Connectors

**7790** 50/50/25 Pin Female/Male D-Shell IDC Connectors

**7705-MTC-2** 50 Pin Male to Female D-sub Cable, 2m (6.6 ft).

**7707-MTC-2** 25 Pin Male to Female D-sub Cable, 2m (6.6 ft).

### Available Services

**7709-3Y-EW** 1-year factory warranty extended to 3 years from date of shipment

# 7710 20-channel Solid-state Differential Multiplexer

with Automatic CJC

## Datasheet

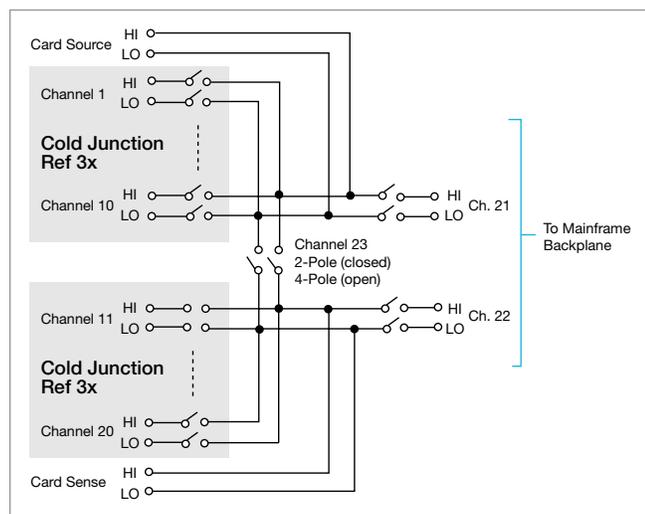


**KEITHLEY**  
A Tektronix Company

The 7710 plug-in module offers 20 channels of 2-pole or 10 channels of 4-pole relay input that can be configured as two independent banks of multiplexers. The relays are solid state, providing long life and low maintenance. Solid-state relays usually have 100 times longer life than mechanical relays. It is ideal for long-term data logging applications as well as for demanding high-speed applications.

### Key Features

- 20 channels for general purpose measurements with scanning speeds up to 800 channels/s
- High speed production or ATE testing up to 500 channels/s
- Long lifetime solid state relay
- Removable screw terminals



### Specifications

#### Capabilities

<b>Maximum Signal Level</b>	Any channel to any channel (1–20) 60 VDC or 42 V rms, 100 mA switched, 6 W, 4.2 VA maximum.
<b>Common Mode Voltage</b>	300 VDC or 300 Vrms (425 V peak) maximum between any terminal and chassis.
<b>Contact Life</b>	>10 <sup>10</sup> operations at cold switching or max signal level (guaranteed by design).
<b>Relay Drive Current</b>	6 mA per channel continuous, 25 mA during initial pulse.
<b>Contact Resistance</b>	<10 Ω per channel or <5 Ω per conductor. Refer to the 7710 User's Guide for measurement considerations when used on the instrument 1 Ω or 10 Ω ranges.
<b>Contact Potential</b>	<3 μV per pair.
<b>Offset Current</b>	<3 nA @ 23°C (per channel); additional 0.13 nA/°C >23°C.
<b>Connector Type</b>	3.5 mm removable screw terminals, #20 AWG wire size.
<b>Isolation Between Any Two Terminals:</b>	>10 <sup>10</sup> Ω @ 23°C, > 8×10 <sup>9</sup> Ω @ 50°C, <100 pF.
<b>Isolation Between Any Terminal and Earth:</b>	>10 <sup>10</sup> Ω, <100 pF.
<b>Crosstalk (CH-CH, 500 kHz, 50 Ω Load):</b>	<–40 dB.
<b>Insertion Loss (50 Ω Source, 50 Ω Load)</b>	<1 dB below 500 kHz.

#### Scanning Speeds (see mainframe specifications for details)

<b>Multiple Channels, Into Memory</b>	7710 Scanning DCV: >800. 7710 Scanning DCV alternating 2WΩ: >400.
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### General

<b>Channels</b>	20 channels of 2-pole relay input. All channels configurable to 4-pole.
<b>Relay Type</b>	Solid state opto-coupled FET.
<b>Actuation Time</b>	<0.5 ms (100 mA load).
<b>Environmental</b>	<b>Operating Environment:</b> Specified for 0° to 50°C. Specified to 80% R.H. at 35°C. <b>Storage Environment:</b> –25° to 65°C. <b>EMC:</b> Conforms to European Union EMC Directive. <b>Safety:</b> Conforms to European Union Low Voltage Directive <b>RoHS:</b> Conforms to European Union RoHS Directive <b>Warranty:</b> 1 year
<b>Weight</b>	0.45 kg (1 lb).

### Supplied Accessories

<b>CC-92-1</b>	Set of 20 Cable Ties
<b>TL-23</b>	Screwdriver

### Available Services

<b>7710-3Y-EW</b>	1-year factory warranty extended to 3 years from date of shipment
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### Ordering Information

<b>7710</b>	20-channel Solid-state Differential Multiplexer Module
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# 7711 2 GHz 50 Ω RF Module

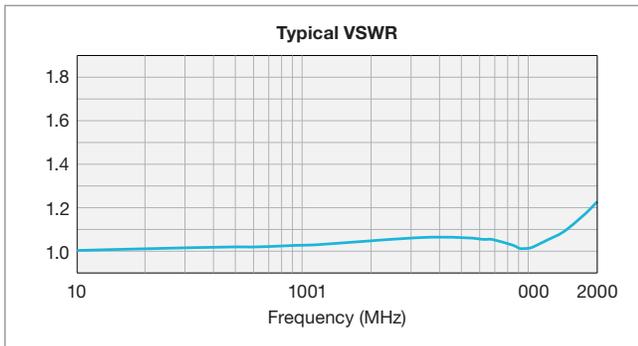
## Datasheet



The 7711 plug-in module provides an economical, wideband signal routing solution that complements the DC/low frequency switching and measurement capability of the Integra Series systems. The 7711 offers dual 1×4 configurations and can interface with a wide range of external AC instruments, including oscilloscopes, pulse generators, and signal analysis tools. One channel in each multiplex bank is always closed to the corresponding OUT connector. All connections are easily accessible from the rear panel.

### Key Features

- Signal routing performance to 2 GHz
- Switches up to 60 VDC
- Rear panel SMA connections
- Onboard switch closure counter
- Onboard S parameter storage



### Specifications

#### Inputs (Channels 1–8)

Maximum Signal Level	<b>Any channel to any channel or chassis (1–8):</b> 30 Vrms (42 V peak for AC waveforms) or 60 VDC, 0.5 A.
Maximum Power	20 W per module, 10 W per channel (refer to 7711/7712 Manual PA-818 for measurement considerations).
Isolation	<b>Multiplexer to Multiplexer:</b> >1 GΩ. <b>Center to Shield:</b> >1 GΩ, <25 pF. <b>Channel to Channel:</b> >100 MΩ.
Contact Life	1×10 <sup>6</sup> no load, 1×10 <sup>5</sup> rated load (resistive load).
Contact Potential	<6 μV.
Contact Resistance	<0.5 Ω (initial), <1 Ω (end of life).
Rise Time	<300 ps (guaranteed by design).
Signal Delay	<3 ns.

#### General

Relay Type	High frequency electromechanical.
Contact Configuration	Dual 1×4 multiplexer, single pole four throw, Channels 1 and 5 are normally closed. <b>Note:</b> One channel in each multiplex bank is always closed to the corresponding OUT connector.
Close Channel	ROUTE:CLOSE allows a single channel in a multiplex bank to be closed. ROUTE:MULTiple:CLOSE allows two channels (one in each bank) to be closed at one time.
Open Channel	ROUTE:OPEN:ALL closes CH1 and CH5 to OUT A and OUT B respectively.
Actuation Time	<10 ms.
Connector Type	Ten external rear panel SMA connectors.
Mating Torque	0.9 N·m (8 in-lb).
Environmental	<b>Operating Environment:</b> Specified for 0° to 50°C. Specified to 80% R.H. at 35°C. <b>Storage Environment:</b> -25° to 65°C. <b>EMC:</b> Conforms to European Union EMC Directive. <b>Safety:</b> Conforms to European Union Low Voltage Directive <b>RoHS:</b> Conforms to European Union RoHS Directive <b>Warranty:</b> 1 year
Weight	0.5 kg (1.1 lb).

#### Available Accessories

7051-2	BNC Cable, male to male, 0.6 m (2 ft.)
7051-5	BNC Cable, male to male, 1.5 m (5 ft.)
7051-10	BNC Cable, male to male, 3.0 m (10 ft.)
7711-BNC-SMA	Male SMA to female BNC Cables (5), 0.15 m (0.5 ft)
7712-SMA-1	SMA Cable, male to male, 1 m (3.3 ft)
7712-SMA-N	Female SMA to Male N-Type Adapter
S46-SMA-0.5	SMA Cable, male to male, 0.15 m (0.5 ft.)
S46-SMA-1	SMA Cable, male to male, 0.3 m (1 ft.)
S46-SMA-1.7	SMA Cable, Male to Male, 0.58 m (1.7 ft)

#### Available Services

7711-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
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#### Ordering Information

7711	2 GHz 50 Ω RF Module
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# 7712 3.5 GHz 50 Ω RF Module

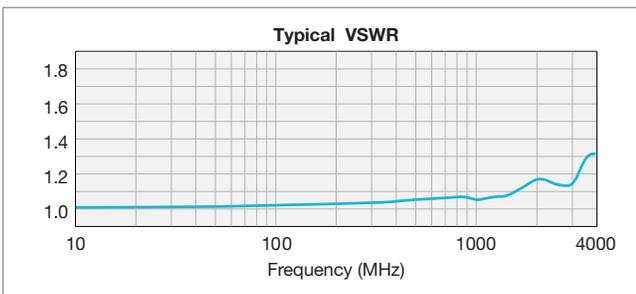
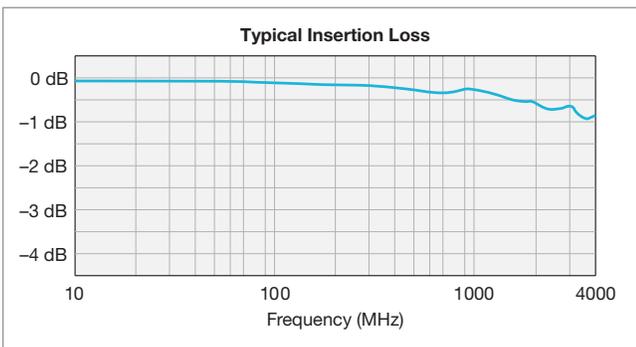
## Datasheet



The 7712 plug-in module offers a 50W dual 1×4 multiplexer configuration with rear panel SMA 14 connectors. Multiple multiplexers can be cascaded to build scalable matrix and multiplexer systems for a large number of devices under test and RF source/measurement instruments. One channel in each multiplex bank is always closed to the corresponding OUT connector. The 3.5 GHz RF switching capability of the 7712 makes it ideal for testing wireless modules operating in the 2.4 GHz and lower industrial, scientific, and medical (ISM) radio bands.

### Key Features

- 3.5 GHz bandwidth
- Dual 1×4 configuration
- Onboard switch closure counter
- Onboard S parameter storage



### Specifications

#### Inputs (Channels 1–8)

Maximum Signal Level	<b>Any channel to any channel or chassis (1–8):</b> 30 Vrms (42 V peak for AC waveforms) or 42 VDC, 0.5A.
Maximum Power	20 W per module, 10 W per channel (refer to 7711/7712 Manual PA-818 for measurement considerations).
Contact Life	5×10 <sup>6</sup> no load, 1×10 <sup>5</sup> rated load (resistive load).
Contact Potential	<12 μV.
Contact Resistance	<0.5 Ω (initial), <1 Ω (end of life).
Rise Time	<200 ps (guaranteed by design).
Signal Delay	<1.5 ns.

### General

Relay Type	High frequency electromechanical.
Contact Configuration	Dual 1×4 multiplexer, single pole four throw, Channels 1 and 5 are normally closed. <b>Note:</b> One channel in each multiplex bank is always closed to the corresponding OUT connector.
Close Channel	ROUTE:CLOSE allows a single channel in a multiplex bank to be closed. ROUTE:MULTIPLE:CLOSE allows two channels (one in each bank) to be closed at one time.
Open Channel	ROUTE:OPEN:ALL closes CH1 and CH5 to OUT A and OUT B respectively.
Actuation Time	<10 ms.
Connector Type	Ten external rear panel SMA connectors.
Mating Torque	0.9 N·m (8 in-lb).
Isolation	<b>Multiplexer to Multiplexer:</b> >1 GΩ. <b>Center to Shield:</b> >1 GΩ, <20 pF. <b>Channel to Channel:</b> >100 MΩ.
Environmental	<b>Operating Environment:</b> Specified for 0° to 50°C. Specified to 80% R.H. at 35°C. <b>Storage Environment:</b> -25° to 65°C. <b>EMC:</b> Conforms to European Union EMC Directive. <b>Safety:</b> Conforms to European Union Low Voltage Directive <b>RoHS:</b> Conforms to European Union RoHS Directive <b>Warranty:</b> 1 year
Weight	0.5 kg (1.1 lb).

### Available Accessories

7712-SMA-1	SMA Cable, male to male, 1 m (3.3 ft)
7712-SMA-N	Female SMA to Male N-Type Adapter
S46-SMA-0.5	SMA Cable, male to male, 0.15 m (0.5 ft.)
S46-SMA-1	SMA Cable, male to male, 0.3 m (1 ft.)
S46-SMA-1.7	SMA Cable, Male to Male, 0.58 m (1.7 ft.)

### Available Services

7712-3Y-EW	1-year factory warranty extended to 3 years from date of shipment
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### Ordering Information

7712	3.5 GHz 50 Ω RF Module
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**Contact Information:**

- Australia\*** 1 800 709 465
- Austria** 00800 2255 4835
- Balkans, Israel, South Africa and other ISE Countries** +41 52 675 3777
- Belgium\*** 00800 2255 4835
- Brazil** +55 (11) 3759 7627
- Canada** 1 800 833 9200
- Central East Europe / Baltics** +41 52 675 3777
- Central Europe / Greece** +41 52 675 3777
- Denmark** +45 80 88 1401
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- Hong Kong** 400 820 5835
- India** 000 800 650 1835
- Indonesia** 007 803 601 5249
- Italy** 00800 2255 4835
- Japan** 81 (3) 6714 3010
- Luxembourg** +41 52 675 3777
- Malaysia** 1 800 22 55835
- Mexico, Central/South America and Caribbean** 52 (55) 56 04 50 90
- Middle East, Asia, and North Africa** +41 52 675 3777
- The Netherlands\*** 00800 2255 4835
- New Zealand** 0800 800 238
- Norway** 800 16098
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- Taiwan** 886 (2) 2656 6688
- Thailand** 1 800 011 931
- United Kingdom / Ireland\*** 00800 2255 4835
- USA** 1 800 833 9200
- Vietnam** 12060128

\* European toll-free number. If not accessible, call: +41 52 675 3777



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