40-785B Microwave Multiplexer Module

- Single or Dual 6 Channel Panel Mounted Multiplexer
- Up To 3 Remote Multiplexers From Single Slot Version
- 18GHz, 26.5GHz and 40GHz Versions
- 50 Ohm Terminated and Unterminated Versions
- 75Ω Version With 2.5GHz Bandwidth
- LED Indication
- VISA, IVI & Kernel Drivers Supplied for Windows XP/Vista/7/8
- Supported by PXI or LXI Chassis
- 3 Year Warranty

Pickering Interfaces PXI Microwave multiplexer modules are suitable for switching 50Ω signals up to 40GHz. The 40-785B is available as a single or dual 6 channel multiplexer, with relays mounted on the front panel. The single slot version can support up to three supplied remotely mounted multiplexers.

The single slot remote multiplexer versions occupy less PXI panel space and allow the microwave relays to be placed closer to the UUT and other RF test equipment. In some applications it can shorten the length of RF cable runs and improve system performance. The remote multiplexers are supplied complete with a 1.5m interface cable.

A 50Ω terminated version with panel mounted multiplexers is also available that occupies 4 or 6 (for the dual version) slots.

A 75Ω version is now available with a bandwidth of 2.5GHz, using the Siemens 1.6/5.6 style 75Ω connector.

The 40-785B is suitable for constructing complex microwave switching networks and provides a range of switching configurations to suit most applications. Connection is by high performance SMA and SMA-2.9 connectors for 50 Ohm versions.

These modules offer high RF & Microwave performance with applications mainly in the Microwave region, however there are many uses in the RF spectrum where extremely low insertion loss and ultra-high isolation are critical.
**Specification**

**General Multiplexer Information**

Relay Manufacturer: Radiall  
Configuration: SP6T Microwave Multiplexer with 1, 2 or 3 independent banks.  
LED Indicators: Multiplexers have blue LEDs to indicate a closed RF path.  
Operate Time: Typically 15ms  
Maximum Cold Switch Voltage: 100V  
Maximum Carry Current: 1A  

**Multiplexer Specification - 18GHz Versions**

| Characteristic Impedance: | 50Ω  
| Connectors: | SMA  
| Bandwidth | DC to 18GHz  
| Rise Time: | <3ps  
| Isolation: | 80dB (0-3GHz)  
| | 70dB (3-8GHz)  
| | 60dB (8-12.4GHz)  
| | 60dB (12.4-18GHz)  
| Insertion Loss: | 0.2dB (0-3GHz)  
| | 0.3dB (3-8GHz)  
| | 0.4dB (8-12.4GHz)  
| | 0.5dB (12.4-18GHz)  
| VSWR: | 1.2:1 (0-3GHz)  
| | 1.3:1 (3-8GHz)  
| | 1.4:1 (8-12.4GHz)  
| | 1.5:1 (12.4-18GHz)  
| Maximum RF Carry Power: | 240W (0-3GHz)  
| | 150W (3-8GHz)  
| | 120W (8-12.4GHz)  
| | 100W (12.4-18GHz)  
| Termination Power Rating: | 1W per termination, 3W total per 6 channel multiplexer.  
| Expected Life (Low Power): | 18GHz option >5 million operations  
| | 18GHz terminated option >2 million operations  

**Typical Insertion Loss (dB) Plot for 18GHz Versions**

**Typical Isolation (dB) Plot for 18GHz Versions**

**Typical VSWR Plot for 18GHz Versions**

**Typical Isolation (dB) Plot for Terminated 18GHz Versions**

**Typical VSWR Plot for Terminated 18GHz Versions**
Multiplexer Specification - 26.5GHz Terminated Versions

- Characteristic Impedance: 50Ω
- Connectors: SMA
- Bandwidth: DC to 26.5GHz
- Rise Time: <3ps
- Isolation:
  - 80dB (0-3GHz)
  - 70dB (3-8GHz)
  - 60dB (8-12.4GHz)
  - 60dB (12.4-18GHz)
  - 55dB (18-26.5GHz)
- Insertion Loss:
  - 0.2dB (0-3GHz)
  - 0.3dB (3-6GHz)
  - 0.4dB (6-12.4GHz)
  - 0.5dB (12.4-18GHz)
  - 0.7dB (18-26.5GHz)
- VSWR:
  - 1.2:1 (0-3GHz)
  - 1.3:1 (3-6GHz)
  - 1.4:1 (6-12.4GHz)
  - 1.5:1 (12.4-18GHz)
  - 1.7:1 (18-26.5GHz)
- Maximum RF Carry Power:
  - 240W (0-3GHz)
  - 150W (3-6GHz)
  - 120W (6-12.4GHz)
  - 100W (12.4-18GHz)
  - 40W (18-26.5GHz)
- Termination power rating:
  - 1W per termination,
  - 3W total per 6 channel multiplexer
- Expected Life (low power): >2 million ops per position

Multiplexer Specification - 26.5GHz Unterminated Versions

- Characteristic Impedance: 50Ω
- Connectors: SMA-2.9
- Bandwidth: DC to 26.5GHz
- Rise Time: <3ps
- Isolation:
  - 70dB (0-6GHz)
  - 60dB (6-12.4GHz)
  - 60dB (12.4-18GHz)
  - 55dB (18-26.5GHz)
- Insertion Loss:
  - 0.2dB (0-6GHz)
  - 0.4dB (6-12.4GHz)
  - 0.5dB (12.4-18GHz)
  - 0.7dB (18-26.5GHz)
- VSWR:
  - 1.2:1 (0-6GHz)
  - 1.4:1 (6-12.4GHz)
  - 1.5:1 (12.4-18GHz)
  - 1.7:1 (18-26.5GHz)
- Maximum RF Carry Power:
  - 40W (0-6GHz)
  - 30W (6-12.4GHz)
  - 25W (12.4-18GHz)
  - 15W (18-26.5GHz)
- Expected Life (low power): >2 million ops per position

Typical Isolation (dB) Plot for 26.5GHz Versions

Typical Insertion Loss (dB) Plot for 26.5GHz Versions

Typical VSWR Plot for 26.5GHz Versions
**Multiplexer Specification - 40GHz Versions**

- **Characteristic Impedance:** 50Ω
- **Connectors:** SMA-2.9
- **Bandwidth:** DC to 40GHz
- **Rise Time:** <3ps
- **Isolation:**
  - 70dB (0-6GHz)
  - 60dB (6-12.4GHz)
  - 60dB (12.4-18GHz)
  - 55dB (18-26.5GHz)
  - 50dB (26.5-40GHz)
- **Insertion Loss:**
  - 0.2dB (0-6GHz)
  - 0.4dB (6-12.4GHz)
  - 0.5dB (12.4-18GHz)
  - 0.7dB (18-26.5GHz)
  - 1.1dB (26.5-40GHz)
- **VSWR:**
  - 1.3:1 (0-6GHz)
  - 1.4:1 (6-12.4GHz)
  - 1.5:1 (12.4-18GHz)
  - 1.7:1 (18-26.5GHz)
  - 2.2:1 (26.5-40GHz)
- **Maximum RF Carry Power:**
  - 40W (0-6GHz)
  - 30W (6-12.4GHz)
  - 25W (12.4-18GHz)
  - 15W (18-26.5GHz)
  - 5W (26.5-40GHz)
- **Termination power rating:** 1W per termination, 3W total per 6 channel multiplexer
- **Expected Life (Low Power):** >2 million operations per position

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**Typical VSWR Plot for 40GHz Versions**

**Typical Isolation (dB) Plot for 40GHz Terminated Versions**

**Typical Insertion (dB) Loss Plot for 40GHz Terminated Versions**

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**pickering**

**pickeringtest.com**
**Mux Specification - 2.5GHz 75 Ohms unterminated version**

- **Characteristic Impedance:** 75Ω
- **Connectors:** 1.6/5.6
- **Bandwidth:** DC to 2.5GHz
- **Rise Time:** <3ps
- **Isolation:**
  - 80dB (0-1GHz)
  - 70dB (1-2.5GHz)
- **Insertion Loss:**
  - 0.2dB (0-1GHz)
  - 0.3dB (1-2.5GHz)
- **VSWR:**
  - 1.2:1 (0-1GHz)
  - 1.3:1 (1-2.5GHz)
- **Maximum RF Carry Power:**
  - 400W (0-1GHz)
  - 240W (1-2.5GHz)
- **Expected Life (Low Power):** >2 million operations per position

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**Remotely Mounted Microwave Multiplexers**

**Power Requirements**

Power consumption from the backplane supply is as follows:

<table>
<thead>
<tr>
<th>Voltage</th>
<th>+3.3V</th>
<th>+5V</th>
<th>+12V</th>
<th>-12V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>0.2A</td>
<td>0.75A</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

**Mechanical Characteristics**

Front panel mounted versions occupy 3 slots, terminated front panel mounted versions occupy 4 (single) or 6 (dual versions) slots.

Remote multiplexer versions occupy one slot and are supplied with a 1.5m interface cable for each of the supplied microwave relays.

3D models for all versions in a variety of popular file formats are available on request.

**Connectors**

PXI bus via 32-bit P1/J1 backplane connector.

Connectors on microwave switches are coaxial as follows:

- 18GHz versions - SMA
- 26.5GHz versions - SMA or SMA-2.9
- 40GHz versions - SMA-2.9
- 75Ω versions - Siemens 1.6/5.6 75Ω connectors
## Product Order Codes

### 18GHz Multiplexer Versions - 50Ω

<table>
<thead>
<tr>
<th>Model Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>† Single 6 Chan, Panel mount, 50Ω SMA</td>
<td>40-785B-521</td>
</tr>
<tr>
<td>† Dual 6 Chan, Panel mount, 50Ω SMA</td>
<td>40-785B-522</td>
</tr>
<tr>
<td>Single 6 Chan, Panel mt, 50Ω SMA, Term</td>
<td>40-785B-521-T</td>
</tr>
<tr>
<td>Dual 6 Chan, Panel mt, 50Ω SMA, Term</td>
<td>40-785B-522-T</td>
</tr>
<tr>
<td>Single 6 Chan, Remote mount, 50Ω SMA</td>
<td>40-785B-521-E</td>
</tr>
<tr>
<td>Dual 6 Chan, Remote mount, 50Ω SMA</td>
<td>40-785B-522-E</td>
</tr>
<tr>
<td>Triple 6 Chan, Remote mount, 50Ω SMA</td>
<td>40-785B-523-E</td>
</tr>
<tr>
<td>Single 6 Chan, Remote, 50Ω SMA, Term</td>
<td>40-785B-521-TE</td>
</tr>
<tr>
<td>Dual 6 Chan, Remote, 50Ω SMA, Term</td>
<td>40-785B-522-TE</td>
</tr>
<tr>
<td>Triple 6 Chan, Remote, 50Ω SMA, Term</td>
<td>40-785B-523-TE</td>
</tr>
</tbody>
</table>

### 26.5GHz Multiplexer Versions - 50Ω

<table>
<thead>
<tr>
<th>Model Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>† Single 6 Chan, Panel mount, 50Ω SMA-2.9</td>
<td>40-785B-531</td>
</tr>
<tr>
<td>† Dual 6 Chan, Panel mount, 50Ω SMA-2.9</td>
<td>40-785B-532</td>
</tr>
<tr>
<td>Single 6 Chan, Panel mt, 50Ω SMA-2.9, Term</td>
<td>40-785B-531-T</td>
</tr>
<tr>
<td>Dual 6 Chan, Panel mt, 50Ω SMA-2.9, Term</td>
<td>40-785B-532-T</td>
</tr>
<tr>
<td>Single 6 Chan, Remote mount, 50Ω SMA-2.9</td>
<td>40-785B-531-E</td>
</tr>
<tr>
<td>Dual 6 Chan, Remote mount, 50Ω SMA-2.9</td>
<td>40-785B-532-E</td>
</tr>
<tr>
<td>Triple 6 Chan, Remote mount, 50Ω SMA-2.9</td>
<td>40-785B-533-E</td>
</tr>
<tr>
<td>Single 6 Chan, Remote, 50Ω SMA-2.9, Term</td>
<td>40-785B-531-TE</td>
</tr>
<tr>
<td>Dual 6 Chan, Remote, 50Ω SMA-2.9, Term</td>
<td>40-785B-532-TE</td>
</tr>
<tr>
<td>Triple 6 Chan, Remote, 50Ω SMA-2.9, Term</td>
<td>40-785B-533-TE</td>
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</tbody>
</table>

### 40GHz Multiplexer Versions - 50Ω

<table>
<thead>
<tr>
<th>Model Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>† Single 6 Chan, Panel mount, 50Ω SMA-2.9</td>
<td>40-785B-541</td>
</tr>
<tr>
<td>† Dual 6 Chan, Panel mount, 50Ω SMA-2.9</td>
<td>40-785B-542</td>
</tr>
<tr>
<td>Single 6 Chan, Panel mt, 50Ω SMA-2.9, Term</td>
<td>40-785B-541-T</td>
</tr>
<tr>
<td>Dual 6 Chan, Panel mt, 50Ω SMA-2.9, Term</td>
<td>40-785B-542-T</td>
</tr>
<tr>
<td>Single 6 Chan, Remote mount, 50Ω SMA-2.9</td>
<td>40-785B-541-E</td>
</tr>
<tr>
<td>Dual 6 Chan, Remote mount, 50Ω SMA-2.9</td>
<td>40-785B-542-E</td>
</tr>
<tr>
<td>Triple 6 Chan, Remote mount, 50Ω SMA-2.9</td>
<td>40-785B-543-E</td>
</tr>
<tr>
<td>Single 6 Chan, Remote, 50Ω SMA-2.9, Term</td>
<td>40-785B-541-TE</td>
</tr>
<tr>
<td>Dual 6 Chan, Remote, 50Ω SMA-2.9, Term</td>
<td>40-785B-542-TE</td>
</tr>
<tr>
<td>Triple 6 Chan, Remote, 50Ω SMA-2.9, Term</td>
<td>40-785B-543-TE</td>
</tr>
</tbody>
</table>

### 2.5GHz Multiplexer Versions - 75Ω

<table>
<thead>
<tr>
<th>Model Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single 6 Chan, Panel mount, 75Ω 1.6/5.6</td>
<td>40-785B-751</td>
</tr>
<tr>
<td>Dual 6 Chan, Panel mount, 75Ω 1.6/5.6</td>
<td>40-785B-752</td>
</tr>
<tr>
<td>Single 6 Chan, Remote mount, 75Ω 1.6/5.6</td>
<td>40-785B-751-E</td>
</tr>
<tr>
<td>Dual 6 Chan, Remote mount, 75Ω 1.6/5.6</td>
<td>40-785B-752-E</td>
</tr>
<tr>
<td>Triple 6 Chan, Remote mount, 75Ω 1.6/5.6</td>
<td>40-785B-753-E</td>
</tr>
</tbody>
</table>

### Accessories:

- Microwave relay bracket for remote mounting
- Contact Pickering Interfaces for information.

† These models have equivalents in the 40-784A range that occupy only two PXI slots.
‡ These models have been superceded with more competitive options from model 40-784A, however remain available for legacy requirements.

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**Mating Connectors & Cabling**

For connection accessories for the 40-785B range please refer to the [90-011D RF Cable Assemblies data sheets](#) where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.
Programming
Pickering provide kernel, IVI and VISA (NI and Agilent) drivers which are compatible with 32/64-bit versions of Windows including XP, Vista, 7 and 8 operating systems. The VISA driver is also compatible with Real-Time Operating Systems such as LabVIEW RT. For other RTOS support contact Pickering. These drivers may be used with a variety of programming environments and applications including:

- **National Instruments** products (LabVIEW, LabWindows/CVI, Switch Executive, MAX, TestStand, etc.)
- **Microsoft Visual Studio** products (Visual Basic, Visual C+)
- **Agilent VEE**
- **Marvin ATE Easy**
- **Mathworks Matlab**
- **MTQ Testsolutions Tecap**

Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquires.

Operating/Storage Conditions

**Operating Conditions**
- Operating Temperature: 0°C to +55°C
- Humidity: Up to 90% non-condensing
- Altitude: 5000m

**Storage and Transport Conditions**
- Storage Temperature: -20°C to +75°C
- Humidity: Up to 90% non-condensing
- Altitude: 15000m

PXI & CompactPCI Compliance
The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus and Star Trigger are not implemented. Uses 33MHz 32-bit backplane interface.

Safety & CE Compliance

PXI & LXI Chassis Compatibility
Compatible with all chassis conforming to the 3U PXI and 3U cPCI specification. Compatible with Legacy and Hybrid peripheral slots in a 3U PXI Express chassis.

Drivers for popular RTOS support contact Pickering. For information on driving your switching solution in an LXI environment refer to the LXI Product Catalog.

Latest Details
Please refer to our Web Site for Latest Product Details.

www.pickeringtest.com