

PXI/PXIe 50 Ω 4-Channel RF MEMS Multiplexers 4x-878

- Available as PXI or PXIe Modules
- 4 GHz RF Multiplexer
- Maximum RF Power to 25 W
- Single, Dual and Quad Versions
- SMB or MCX Connector Versions
- Very Low Insertion Loss
- Long Operational Life
- Fast Operating Time
- Relay Cycle Counting Included
- Drivers Supplied for Windows and Linux, Plus Support for Real-time Systems
- PXI Versions Supported by PXI or LXI Chassis
- Based on Menlo Micro Ideal Switch[®] MEMS Devices
- 3 Year Warranty

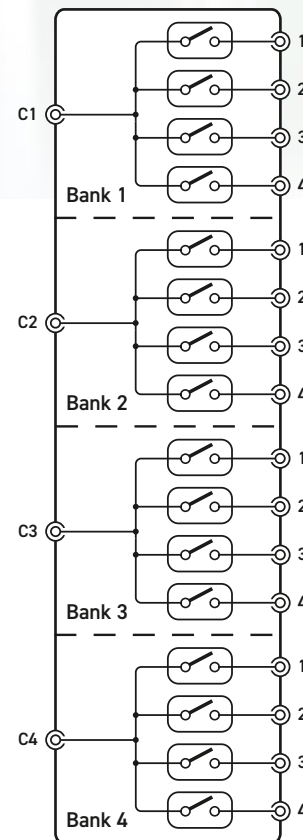


The 40-878 (PXI) and 42-878 (PXIe) are 50 Ω 4 to 1 RF Multiplexers available with 1, 2 or 4 banks in a single PXI or PXIe slot.

The module is based on the latest micro-electromechanical system (MEMS) switching technology from Menlo Micro and has low insertion loss and VSWR. In addition, MEMS devices have a long operational life of >3 billion operations and benefit from an operating time of 50 μ s allowing greater test system throughput. The multiplexers have excellent and repeatable RF characteristics beyond 4 GHz with each path having a nominally equal insertion loss. The 4x-878 minimizes the injection of noise and unwanted signals into the signal path by careful attention to the mechanical and electrical design.

Versions with MCX or SMB connectors are available, allowing users to simplify cabling issues by matching them to other connectors in their test system.

The 4x-878 is supplied with drivers that allow support in all popular software environments. It can also be supported in all Pickering's LXI Modular Switching chassis, allowing the use of a PXI or LAN controlled switching solution with the same high levels of performance.



Quad 4 to 1 RF MUX (Part No. 4x-878-24x)
- Default Switch State Shown

Relay Cycle Counting

To aid with module "health" monitoring all versions are provided with a relay cycle counting cycle feature. The number of operations per contact are stored on the module and can be used to determine if a relay is approaching EOL. This information could allow system connections to be revised so that signals applied to heavily used contacts are swapped with lightly used contacts to prolong the working life of the relay(s).

RF Specification

| | |
|------------------------|--|
| RF Frequency Range: | DC to 4 GHz, usable to 5 GHz |
| Insertion Loss: | Typically <0.7 dB to 1 GHz Typically <1.4 dB to 4 GHz |
| VSWR: | Typically <1.25:1 to 1 GHz Typically <1.5:1 to 4 GHz |
| Isolation: | Typically >40 dB to 1 GHz Typically >30 dB to 4 GHz |
| Crosstalk: | Typically <-60 dB to 1 GHz Typically <-40 dB to 4 GHz |
| Maximum RF Power (CW): | 2 W to 1 MHz 10 W to 10 MHz 25 W to 4 GHz |

Other Switching Specifications

| | |
|---------------------|--------------------------------|
| Maximum DC Voltage: | 35 V * |
| Maximum DC Current: | 0.5 A |
| Operating Time: | 50 μ s typical |
| Life Expectancy: | 3 x 10 ⁹ operations |

* MEMS devices are intended for cold-switch applications only.

Power Requirements - 40-878

| | | | |
|--------|--------|-------|-------|
| +3.3 V | +5 V | +12 V | -12 V |
| 200 mA | 100 mA | 0 | 0 |

Power Requirements - 42-878

| | |
|--------|-------|
| +3.3 V | +12 V |
| 200 mA | 50 mA |

Mechanical Characteristics

40-878 - Single slot 3U PXI (CompactPCI card).

42-878 - Single slot 3U PXIe, compatible with PXIe hybrid slot.

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

Module weight: 206 g (40-878-242)

Connectors

40-878 - PXI bus via 32-bit P1/J1 backplane connector.

42-878 - PXIe bus via XJ3 and XJ4 backplane connectors.

Signals via front panel SMB or MCX connectors.

PXI & CompactPCI Compliance - 40-878

The module is compliant with the PXI Specification 2.2.

Local Bus, Trigger Bus & Star Trigger are not implemented.

Uses a 33 MHz 32-bit backplane interface.

PXIe Compliance - 42-878

The module is compliant with the PXIe Specification 1.0.

Local Bus, Trigger Bus & Star Trigger are not implemented.

Safety & CE Compliance

All modules are fully CE compliant and meet applicable EU directives:

Low-voltage safety EN61010-1:2010,

EMC Immunity EN61326-1:2013,

Emissions EN55011:2009+A1:2010.

Operating/Storage Conditions

Operating Temperature: 0 °C to +55 °C

Humidity: Up to 90% non-condensing

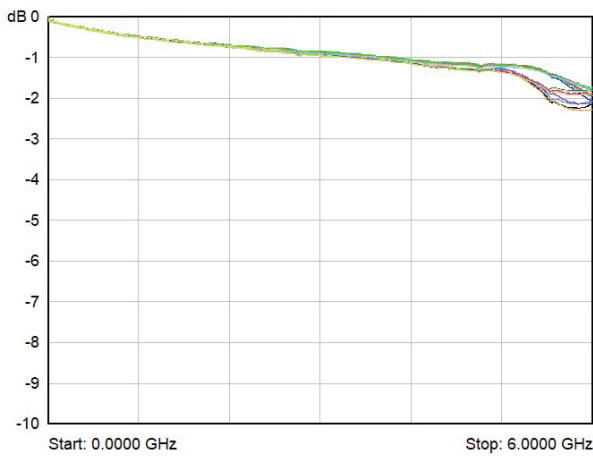
Altitude: 5000 m

Storage Temperature: -20 °C to +75 °C

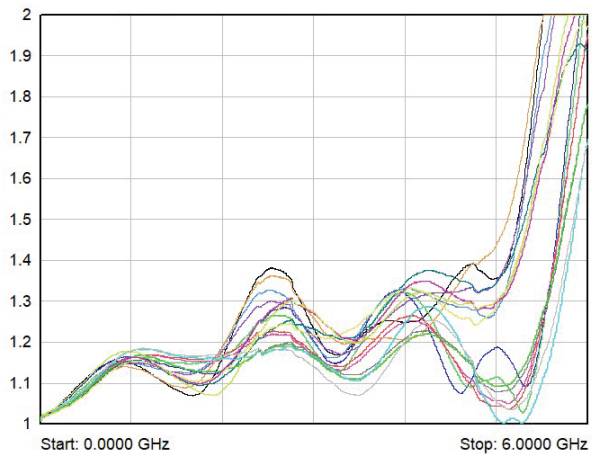
Humidity: Up to 90% non-condensing

Altitude: 15000 m

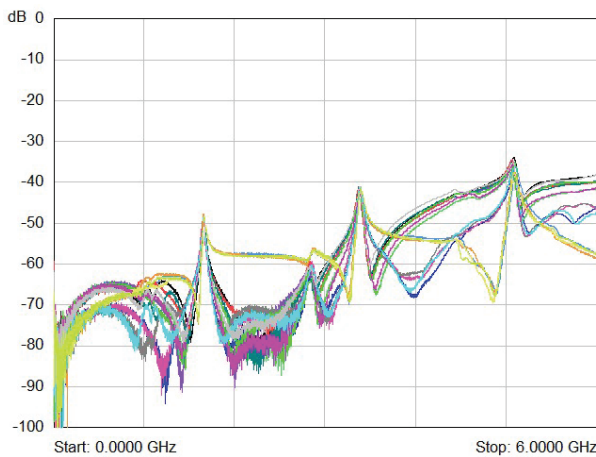
4x-878 RF Performance Plots (Plots taken from typical sample showing all connecting paths for parameter)



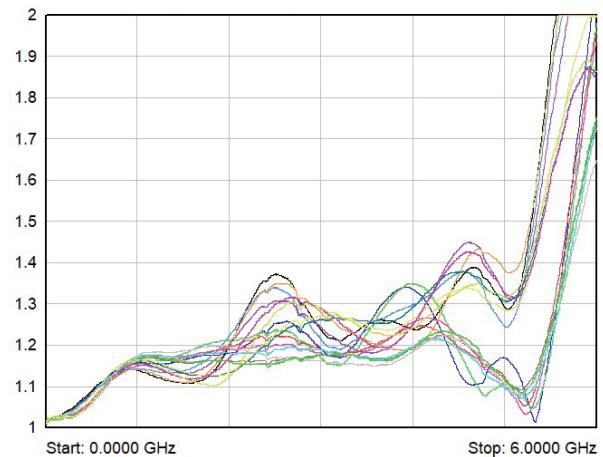
Typical Insertion Loss Plot For Each Signal Path



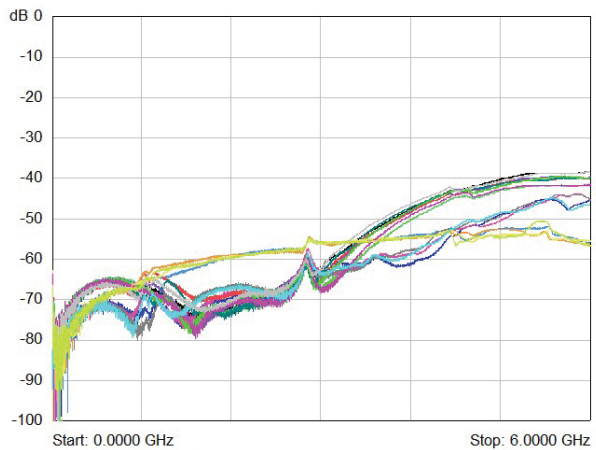
Typical VSWR Plot For Each Signal Path (Load on COM)



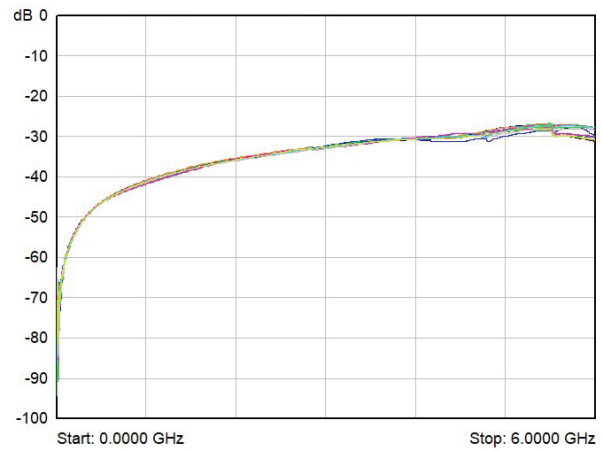
Typical Crosstalk Plot Between Signal Paths (Unloaded)



Typical VSWR Plot For Each Signal Path (Load on Channel)



Typical Crosstalk Plot Between Signal Paths
(Unswitched, Load on COM)



Typical Isolation Plots for Each Channel

PXI/PXIe 50 Ω 4-Channel RF MEMS Multiplexers 4x-878

The 4x-878 is part of a range of 3 GHz multiplexers using electro-mechanical relays and 4 GHz multiplexers using MEMS switching technology:

| Pickering's Range of PXI/PXIe 3 & 4 GHz Multiplexers | | | |
|--|-----------|----------|--|
| Model No. | Frequency | Channels | Bank Versions Available |
| 4x-872A | 3 GHz | 4 | Single, Dual or Quad |
| 4x-873A | | | Single or Dual (terminated channels) |
| 4x-874A | | 8 | Single or Dual |
| 4x-875A | | 16 | Single |
| 4x-876A | | 4 | Single, Dual or Quad (terminated common) |
| 4x-878 | 4 GHz | 4 | Single, Dual or Quad (MEMS switching) |



Product Order Codes

| | |
|---|------------|
| Single MEMS 50 Ω 4:1 RF MUX, SMB | 4x-878-211 |
| Dual MEMS 50 Ω 4:1 RF MUX, SMB | 4x-878-221 |
| Quad MEMS 50 Ω 4:1 RF MUX, SMB | 4x-878-241 |
| Single MEMS 50 Ω 4:1 RF MUX, MCX | 4x-878-212 |
| Dual MEMS 50 Ω 4:1 RF MUX, MCX | 4x-878-222 |
| Quad MEMS 50 Ω 4:1 RF MUX, MCX | 4x-878-242 |

Where **4x** specifies PXI or PXIe, for example:

40-878-211 Single MEMS 50 Ω 4:1 RF Multiplexer, SMB connectors in PXI format

42-878-211 Single MEMS 50 Ω 4:1 RF Multiplexer, SMB connectors in PXIe format

Product Customization

Pickering modules are designed and manufactured on our own flexible manufacturing lines, giving complete product control and enabling simple customization to meet very specific requirements.

All customized products are given a unique part number, fully documented and may be ordered at any time in the future. Please contact your local sales office to discuss.

Connection Accessories

For a complete list of connection accessories and documentation for the 4x-878 module, please refer to our [RF connectors datasheet \(90-011D\)](#).



42-878-241 PXIe Quad 50 Ω 4:1 RF Multiplexer

Chassis Compatibility

The PXI versions of this module are compatible with the following chassis types:

- All chassis conforming to the 3U PXI and 3U Compact PCI (cPCI) specification
- Legacy and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis
- Pickering Interfaces LXI or LXI/USB Modular Chassis

The PXIe versions of this module are compatible with the following chassis types:

- All chassis conforming to the 3U PXIe specification
- PXIe and Hybrid Peripheral slots in a 3U PXI Express (PXIe) chassis

Chassis Selection Guide

PXI and PXIe (with PXIe and/or Hybrid slots) Chassis from any Vendor:

- Mix our 1000+ PXI/PXIe switching & simulation modules with any vendor's PXI/PXIe instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization



Pickering LXI or LXI/USB Modular Chassis Only accept our PXI Switching & Simulation Modules:

- Choose from 1000+ Pickering PXI Modules
- Ethernet or USB control enables remote operation
- Low-cost control from practically any controller
- LXI provides manual control via Web browsers
- Driverless software support
- Power sequencing immunity
- Ethernet provides chassis/controller voltage isolation
- Independence from Windows operating system



Programming

Pickering provide kernel, IVI and VISA (NI & Keysight) drivers which are compatible with all Microsoft supported versions of Windows and popular older versions.

For more information go to pickeringtest.com/os

The VISA driver support is provided for LabVIEW Real Time Operating Systems (Pharlap and Linux-RT). For other RTOS support contact Pickering. These drivers may be used with a variety of programming environments and applications including:

- **Pickering Interfaces Switch Path Manager**
- **National Instruments products** (LabVIEW, LabWindows/CVI, Switch Executive, MAX, TestStand, VeriStand, etc.)
- **Microsoft Visual Studio products** (Visual Basic, Visual C++)
- **Programming Languages** C, C++, C#, Python
- **Keysight VEE and OpenTAP**
- **Mathworks MATLAB, Simulink**
- **Marvin ATEasy**
- **MTQ Testsolutions Tecap Test & Measurement Suite**

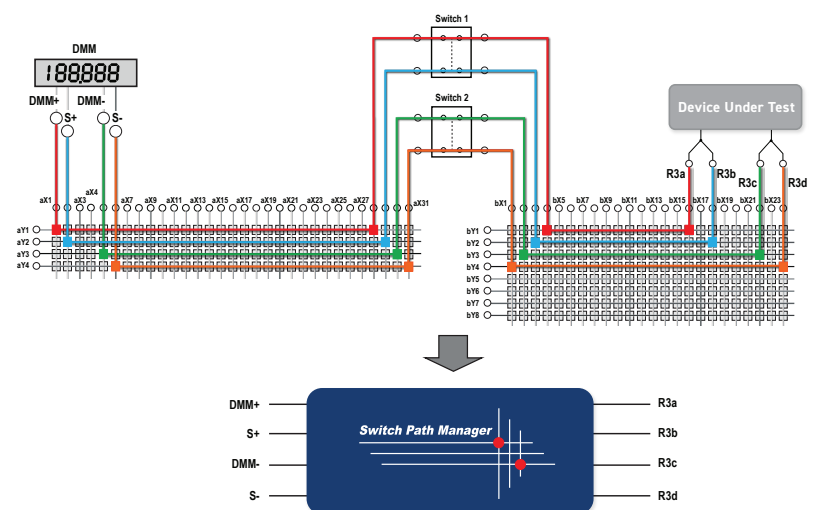
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help you develop test routines with ease.

To learn more about software drivers and development environments go to pickeringtest.com/software

Signal Routing Software

Our signal routing software, Switch Path Manager, automatically selects and energizes switch paths through Pickering switching systems. Signal routing is performed by simply defining test system endpoints to be connected together, greatly accelerating Test System software development.

To learn more go to pickeringtest.com/spm



Diagnostic Relay Test Tools

eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.

To learn more go to pickeringtest.com/ebirst



Three Year Warranty & Guaranteed Long-Term Support

All standard products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available with various levels for your requirements. Although we offer a 3-year warranty as standard, we also include guaranteed long-term support—with a history of supporting our products for typically 15-20 years.

To learn more go to pickeringtest.com/support

Available Product Resources

We have a library of resources including success stories, product and support videos, articles and white papers as well as application-specific brochures to assist you. We have also published reference books on switching technology and the PXI and LXI standards.

To view, download or request any of our product resources go to pickeringtest.com/resources

