GPIB Low Thermal Multiplexer Module 10-670

- 16 Double Pole Channels per Module
- Differential Thermal Offset < 500nV, Typically < 300nV
- Easy Expansion
- Switch up to 100Volts, 1A with 10W Max Power

*Please contact Pickering for alternative PXI/LXI/USB solutions

Model 10-670 is a 16-channel 2-pole multiplexer module suitable for switching very low level signals where thermoelectric EMFs in the switching system are a consideration. Identical in operation to the
10-620 and 10-630 general purpose multiplexers, however thermal EMFs are reduced by a factor of 10 to typically 300nV.

Typical applications include selecting thermocouple inputs, switching amplifier gain circuits and high accuracy DC microvolt measurements.

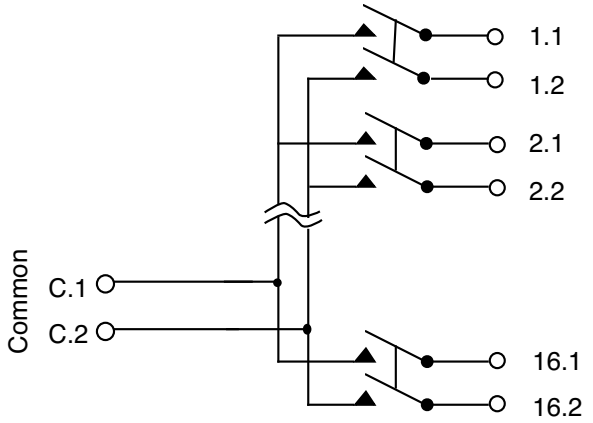
Ruthenium reed switches are used because of their good low level switching capability, i.e. very long life with good contact resistance stability, minimal wetting current and low thermal offset.

Connections are made via a 50-pin D-type connector. Larger multiplexers may be constructed by cascading modules, up to 300 channels.

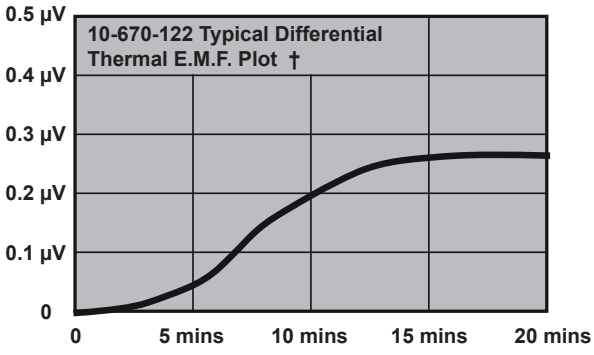
The 10-670 multiplexer may be operated as a conventional multiplexer with break-before-make action enforced when a new channel is selected. In addition multiple channels may be simultaneously selected (i.e. no break-before-make).

Low Thermal Pickering Reed Relays

The very low thermal e.m.f. generated by the 10-670 module is due mainly to the special Low Thermal Pickering Reed Relays used. These are type 100-2-A-5/2D as shown here, for further information on Pickering Reed Relays please visit pickeringrelay.com



16 Channel 2-Pole Low Thermal Multiplexer



† Differential measurement taken with short circuit across multiplexer input (Model tested 10-670-122). Equipment allowed to reach thermal equilibrium for > 1 hour.

Measuring instrument: Datron 1271 DMM.

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Relay Type

The module uses Ruthenium Reed Switches. **Spare Reed Relays** are built onto the circuit board to facilitate easy maintenance with minimum downtime.

All reed relays are manufactured by our sister company Pickering Electronics: pickeringrelay.com

Switching Specification

Switch Type:	Ruthenium Reed
Max Standoff Voltage:	100V †
Max Power:	10W
Max Switch Current:	0.5A
Max Carry Current:	1.0A
Contact Resistance	
On:	130mΩ
Off:	$>10^9\Omega$
Differential Thermal Offset:	<500nV
Capacitance	
Open Channel:	<6pF
Channel to Channel:	<20pF
Bandwidth (-3dB in 50Ω system):	10MHz
Crosstalk (50Ω System):	60dB at 1MHz
	40dB at 10MHz
Max Operate Time:	7ms
Max Release Time:	6ms
Expected Life	
Low power load:	$>1x10^8$
Full power load:	$>1x10^6$

† Higher voltage standoffs are available.

Programming

The 10-640 multiplexer module is simple to program:

ARESET a	Open all channels on device **a**
DELAY t	Force a minimum delay of **t** milliseconds between two instructions
RESET	Open all switches on all modules
VIEW? a	View status of device **a**
CHAN a,c	Select channel **c** on multiplexer **a**. Automatically clears previous channel (if set) before selecting new channel.
CHAN a,c,s	Multi-channel selection argument **s** allows opening/closing of any combination of channels.

Analogue Common

The analogue common is brought out on the input connector. This has the advantage of keeping the analogue signal totally isolated from the backplane, improving crosstalk and dc leakage. **This method will prevent any further thermal e.m.f 's due to additional junction potentials etc.**

Creating Larger Multiplexers

When more than one module is used to make up a multiplexer, where five modules are used to make up a 80 channel multiplexer – then all multiplexer units must have the same internal address, the location of each module within the multiplexer is given by its own bank address. Bank addresses must start at 0 and should be contiguous.

If there is a problem with any of the modules used to make up a large multiplexer then an error will be detected (use the REPORT? query to discover the cause).

Note: Degradation of the low thermal emf properties can occur due to multiplexer linking.

Mechanical Characteristics

All models conform to the 3U height (128mm) Eurocard standard and are housed in a 160mm deep screened plug-in module. Panel width for all versions is 2.4 Inches.

Connectors

Connections are made via a front panel mounted 50-pin D-type plug.

Further Information

For further applications information on using the 10-670 Low Thermal Multiplexer please see the Pickering 10-670 Manual.

Operating/Storage Conditions

Operating Conditions

Operating Temperature:	0°C to +55°C
Humidity:	Up to 95% non-condensing
Altitude:	5000m

Storage and Transport Conditions

Storage Temperature:	-20°C to +75°C
Humidity:	Up to 95% non-condensing
Altitude:	15000m

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.

Product Order Codes

16-Channel 2-Pole Low Thermal Multiplexer	
Common Brought onto Front Panel Connector	**10-670-122**

Product Customization

Pickering System 10 modules are designed and manufactured on our own flexible manufacturing lines, giving complete product control and enabling simple customization to meet very specific requirements.

Customization can include:

- Alternative relay types
- Mixture of relay types
- Alternative number of relays
- Different performance specifications

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.

Mating Connectors & Cabling

50-Pin D-type Socket with Crimp Pins	**10-960-050**

For other 50-pin connection accessories for the 10-670 module please refer to the 90-005D 50-pin D-type Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.