GPIB High Voltage Multiplexer Module 20-340/341

- High Density HV Multiplexer With Choice of 16 or 24 Channel Versions
- Switch up to 1.5kV with 2kV Standoff Voltage
- Automatic Isolation Switches Minimise Capacitive Loading and Leakage Current in Large Systems
- Very Low Leakage Currents When Using Driven Guard
- High Quality Reed Switch Contacts for Reliable Switching With Long Life
- Insulation Resistance >100TΩ (10^{14}Ω)

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

Model 20-340/341 High Voltage Guarded Multiplexer module will switch up to 1500 Volts with an Insulation Resistance of over 100TΩ. Available in 16 or 24 channel versions, automatic isolation switching minimizes leakage in large multiplexer systems.

The 20-340/341 is designed to operate with high performance Insulation Resistance Meters such as the Sefelec M1500P. Programmable as a conventional break-before-make multiplexer or in multi-channel mode where any combination of charge or measure channels may be selected simultaneously.

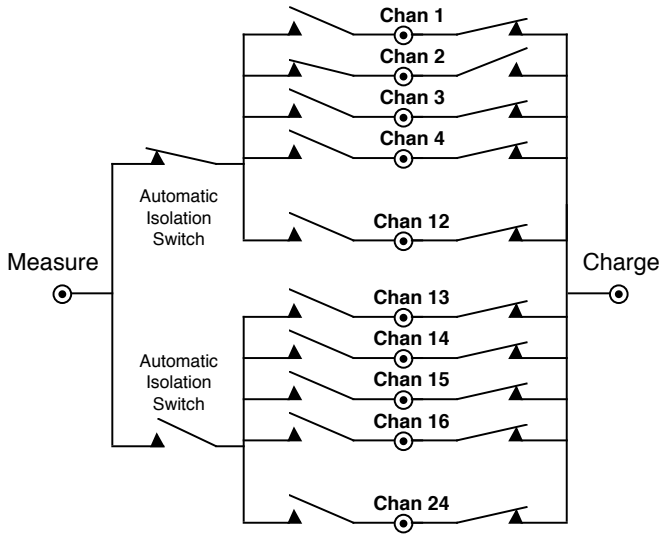
These units are designed for both "hot" switching (close switch after load applied) and "cold" switching (close switch before EHT load applied) high voltage applications, giving very reliable switching with no disruption to internal logic. For large multiplexer systems automatic isolation switching connects only those multiplexer banks which contain active channels (see diagram).

RFI Suppression

20-340 modules have extensive built-in RFI suppression, this will greatly increase switching life and eliminate potential problems due to high voltage transients upsetting either System 10/20 or more importantly your IEEE-488 Bus network. Please note, if possible keep high voltage switching modules away from more sensitive switching units to minimise any crosstalk. **To maximise system reliability and performance it is always preferable to "Cold Switch" high voltage signals.**

Safety – Interlock Facility

An **interlock** facility, which can be used with external circuitry to disable all high voltage relays is built into the module. A voltage > 4V DC is required to enable relay operation, if this voltage is removed then **all relays will open**, this is provided on a 6 Pin Mini DIN Connector. A protected 5V source is provided to ease interlock implementation.



Channel 2 is Selected (to Measure). All Other Channels are Routed to Charge

Switching Diagram for the 20-340 High Voltage Multiplexer

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Very High Voltage Switching Specification

Max Standoff Voltage:	2000V DC (2000V ACpk)
Max Switching Voltage:	1500V DC (1500V ACpk)
Max Power:	10W
Max Switch Current:	<5mA (at max voltage)
Max Current:	1A
Contact Resistance, On: †	<220Ω
Insulation Resistance, Off:	$>10^{14}$Ω (25°C 65%RH)
	$>10^{13}$Ω (40°C 95%RH)
Crosstalk:	
Channel to Channel at 10kHz	>100dB
Channel to Channel at 100kHz	>90dB
Capacitance:	
Selected Channel to Ground	<30pF
Bandwidth:	250kHz
Max Switch Operate Time:	10ms
Max Switch Release Time:	9ms
Expected Life Low power load:	$>1x10^8$ operations
Expected Life Full power load:	$>1x10^6$ operations
Max Guard to Chassis Voltage	42 VDC (42V ACpk)

† The 20-340 can be fitted with a choice of protection devices:

- A 100Ω resistor is in series with all internal relays, this maximizes relay life. 20-340 modules can be manufactured to special order without limiting resistors, reducing the path resistance to <2Ω, please contact factory for further information.
- An RF choke with 4.7Ω impedance gives greater protection but cannot be used with signals having a frequency > 250kHz.
- A 0Ω option is available to special order, please note that this module will then not meet it's hot switching specification.

High Voltage Connections

High voltage connections are made via front panel mounted high voltage BNC Co-Ax sockets.

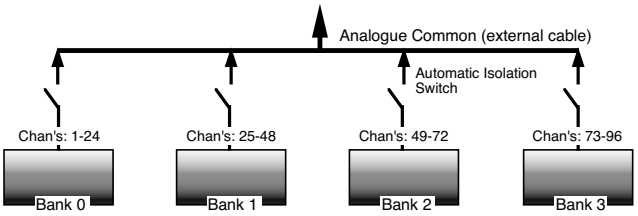
Please note that the guard is exposed on the Co-Ax BNC, therefore for safety reasons the guard may only be raised to 42V above chassis ground. High Voltage BNC manufacturers include Radiall and DDK. Mating BNC plugs are also available.

Mechanical Characteristics

Modules conform to the 6U height (262mm) Eurocard standard and are 160mm deep, front panel width is 2.4 Inches for the 16-channel version and 3.6 Inches for the 24-channel version. Up to six of the 16 channel 20-340 modules will fit in a standard case, four of the 24-channels versions, larger systems may be constructed using expansion cases.

Creating Larger Multiplexers

When more than one module is used to make up a multiplexer – see diagram, where four 24 channel modules are used to make up a 96 channel 1 pole 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).

If only one multiplexer module is used then bank address 0 must always be used.

The analogue common must be externally wired between modules (the built-in analogue buses are only suitable for signals < 100V, also they have no support for a driven guard).

Programming

The 20-340/341 may be used in one of two configurations:

1. **Single** 16 (or 24) channel multiplexer (default setting), only one channel may be connected to measure with all other channels automatically connected to charge. This mode features break-before-make operation and is very simple to program.
2. **Dual** 16 (or 24) channel multiplexer mode allows all channels to be independently operated, therefore any number of channels may be connected to both measure (bank 1) and charge (bank 2). There is no break-before-make operation, greater care must be taken with this mode.

The commands available to program the module are:

`ARESET a`	Open all switches on module **`a`**.
`CLOSE 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 charge or measure channels.
`DELAY t`	Force a minimum delay of **`t`** milliseconds between two instructions.
`RESET`	Open all switches on all modules.
`VIEW? a`	View status of module **`a`**.

Product Order Codes

Fitted with High Voltage Co-Ax BNC Connectors	
Single 24-Channel HV MUX	20-340-101
Single 16-Channel HV MUX	20-341-101

Further Information on High Voltage Switching

If you require more detailed information, please contact the Sales office for a free copy of the 20-340 Operating Manual. **High voltage switching can be a difficult area to work in, each application is different. If you require any further assistance please contact Pickering to discuss your requirement**.

Product Customization

Pickering System 20 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

High Voltage Co-Ax BNC Plug	10-968-001

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.