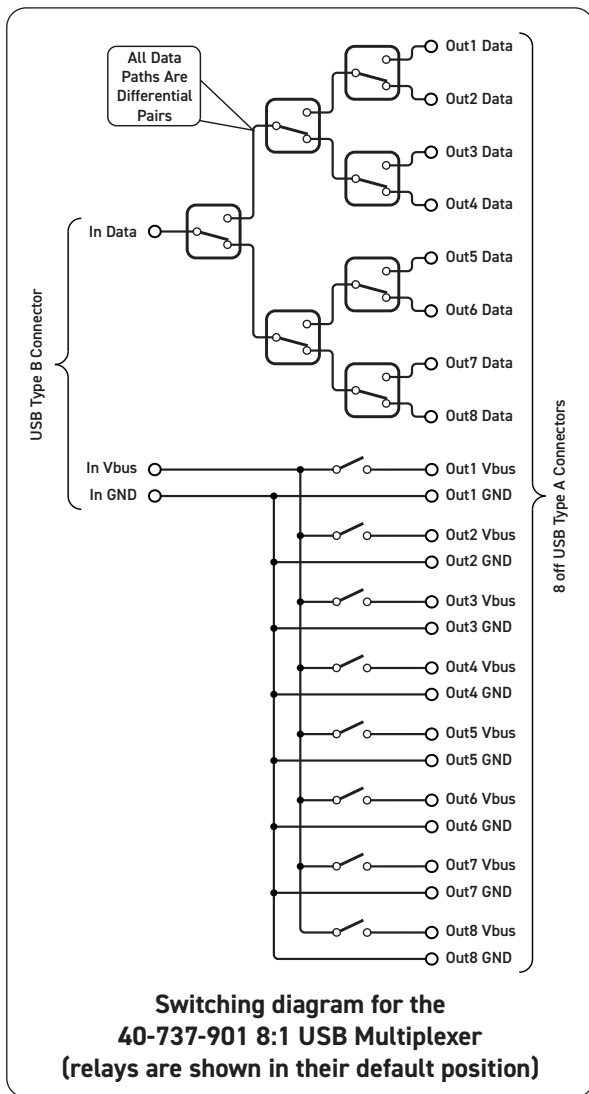


- Multiplexer Designed For Switching USB Signals
- Configured As An 8:1 or a 16:1 Multiplexer
- Wide Differential Bandwidth
- Controlled Differential Impedance
- Suitable For USB1 and USB2 Switching Applications
- 8:1 Version Uses Standard USB Type A and B Signal Connectors
- Interface Board Available For 16:1 Version Allowing Use of Standard USB Cables
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Selected Builds Supported by **eBIRST™**
- 3 Year Warranty



Pickering's Range of Data Comms Multiplexers		
Model No.	Configuration	Application
40-735	Single 36 channel or Dual 18 channel, differential pair	USB, RS232
40-736	Single 32, Dual 16, Quad 8 channel, differential pair	1Gb Ethernet, AFDX, BroadR-Reach, LVDS, USB, RS232
40-737	Single 8:1 or 16:1 differential pair and power	USB1, USB2

The 40-737 is an 8:1 or 16:1 multiplexer for switching data signals and is specifically designed for routing USB. The data paths are 2-pole differential pairs as defined by the USB standard. The multiplexer signal pairs have a controlled differential impedance and the USB power paths have a common negative and a switched positive. All paths are designed for minimum loss.

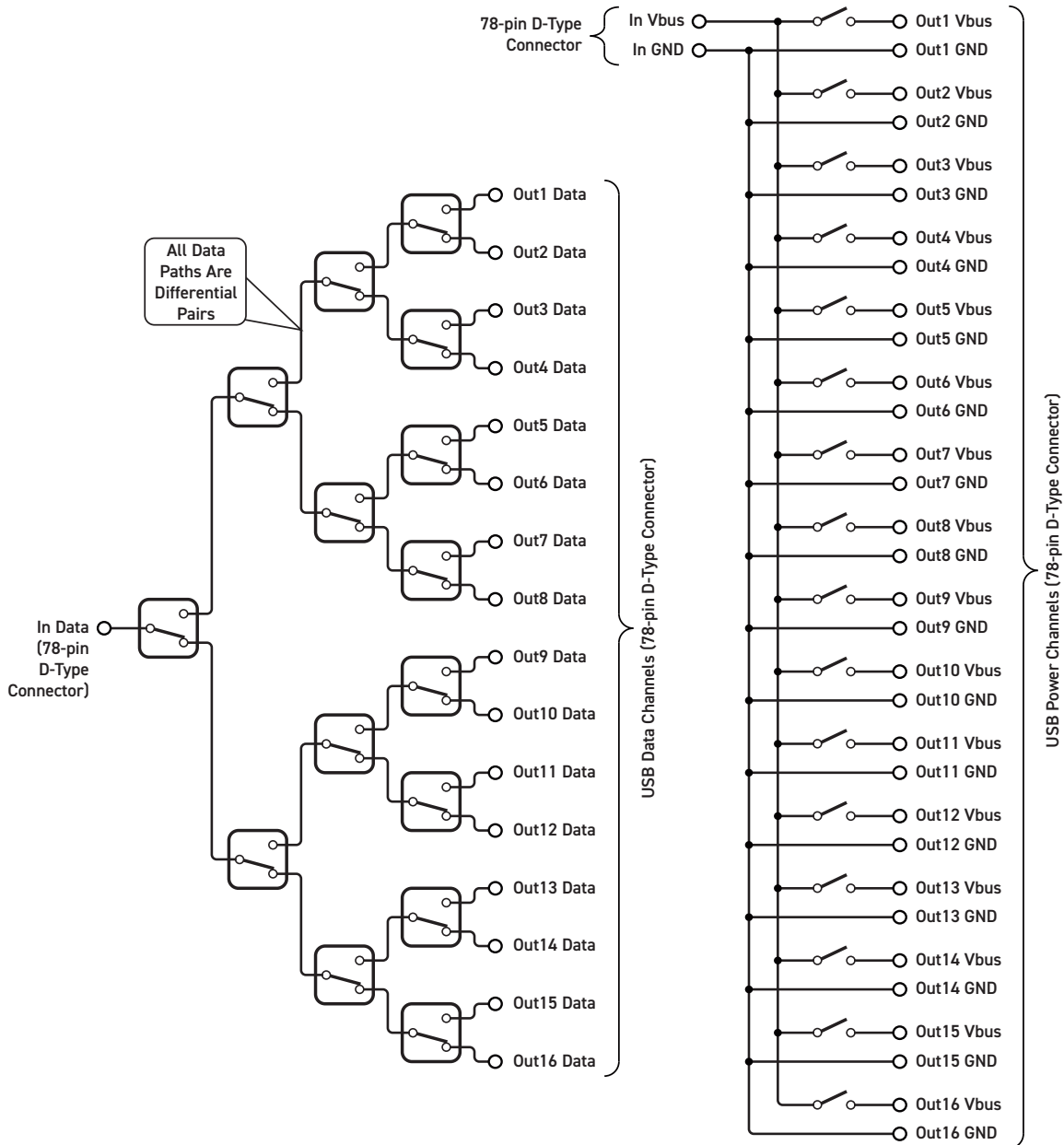
The common of the 8:1 multiplexer is via a front panel mounted USB type B socket, and the eight channels are via USB type A sockets. The 16:1 multiplexer has a male 78-pin D-type connector for all signals and, using an interface board (40-965-909), standard USB cables can be connected. Both multiplexer versions are capable of switching USB1 or USB2.

The module is ideal for testing multiple USB devices, allowing one target device to be selected from many. The design is bi-directional allowing use as a multiplexer or de-multiplexer with no impact on performance. Long life electro-mechanical relays characterized for telephony are used.

**Selected Builds Supported by eBIRST**

40-737 versions with a 78-pin D-type connector are supported by eBIRST switching system test tools. These simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.

For more information go to: [pickeringtest.com/ebirst](http://pickeringtest.com/ebirst)



Switching diagram for the 40-737-001 16:1 USB Multiplexer, relays are shown in their default position.

## Relay Type

The 40-736 is fitted with electro-mechanical relays, these have long life with good switching performance. A spare relay is built onto the circuit board to allow easy maintenance with minimum downtime.

## Specification

Switching Configuration (40-737-901):	8-way, 2-pole tree MUX for USB differential data pairs. 8 way single pole conventional MUX for USB power with common ground connection.
Switching Configuration (40-737-001):	16-way, 2-pole tree MUX for USB differential data pairs. 16 way single pole conventional MUX for USB power with common ground connection.
Differential Transmission Line Impedance:	90 Ω ±10 Ω (data pairs)
Voltage Rating:	100 V between wires in same pair, 100 V pair to pair*
Current Rating:	0.5 A (data paths) 2 A (power paths)
Maximum Power:	60 W
Minimum Switching Voltage:	100 μV
Contact Type:	Palladium Ruthenium, gold covered
Operate Time:	3 ms
Expected Life	
Mechanical Endurance:	>10 <sup>8</sup> operations
Full Power Load:	>10 <sup>5</sup> operations
Path Resistance:	<0.6 Ω (data path) <0.2 Ω (power path)
Typical Bandwidth:	450 MHz differential

\* For full voltage rating, signal sources to be switched must be fully isolated from mains supply and safety earth.

## Power Requirements

+3.3V	+5V	+12V	-12V
0.05A	0.5A	0	0

## Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).  
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.

Signals via front panel connectors:

- 40-737-901 MUX common is USB type B, 8 channels are USB type A
- 40-737-001 Connections are via a 78-pin male D-type connector.

For pin outs please refer to the operating manual.

## Operating/Storage Conditions

### Operating Conditions

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

### Storage and Transport Conditions

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

## PXI & CompactPCI Compliance

The module is compliant with the PXI Specification 2.2. Local Bus, Trigger Bus and Star Trigger are not implemented.

Uses a 33 MHz 32-bit backplane interface.

## 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

8:1 USB Data Comms Multiplexer	40-737-901
16:1 USB Data Comms Multiplexer (78-pin D-type connector)	40-737-001

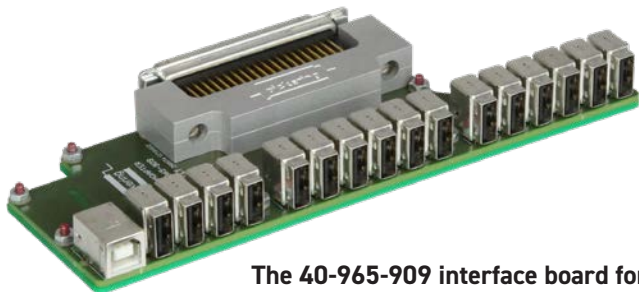
### Accessories:

16:1 Interface Board 78-pin D-type to USB connectors for 40-737-001	40-965-909
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## 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.



The 40-965-909 interface board for 16:1 USB switching applications

40-965-909 allows conversion of a 16:1 USB MUX from a 78-pin D-type to 16 off USB A and 1 off USB B



## Support Products

### eBIRST Switching System Test Tool

78-pin D-type builds of this product are supported by the eBIRST test tools which simplify the identification of failed relays, the required eBIRST tools are below. For more information go to: [pickeringtest.com/ebirst](http://pickeringtest.com/ebirst)

Product	Test Tool	Adaptor
40-737-001	93-006-001	Not Required
40-737-901	Not Supported	

### Spare Relay Kits

Kits of replacement relays are available for the majority of Pickering's PXI switching products, simplifying servicing and reducing down-time.

Product	Relay Kit
40-737	91-100-001

For further assistance, please contact your local Pickering sales office.

## Mating Connectors & Cabling

**Note:** Maintenance of the USB capability requires cabling solutions specifically designed to support USB signalling. Pickering Interfaces is able to offer suitable custom cabling solutions, contact your local sales representative with your requirement. For USB applications we strongly recommend use of an interface board as listed under Accessories.

For general purpose (non-differential) connection accessories for the 40-737 module please refer to the [90-006D](#) 78-pin D-type connector data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

## Chassis Compatibility

This PXI module must be used in a suitable chassis. It is 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

## Chassis Selection Guide

### Standard PXI or hybrid PXIe Chassis from any Vendor:

- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI 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 1000+ PXI Switching & Simulation 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



## Connectivity Solutions

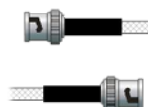
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed to mechanically and electrically mate to our modules.



Connectors & Backshells



Multiwire Cable Assemblies



RF Cable Assemblies



Connector Blocks

We also offer customized cabling and have a free online **Cable Design Tool** that can be used to create custom cable solutions for many applications. Visit: [pickeringtest.com/cdt](http://pickeringtest.com/cdt) to start your design.

## Mass Interconnect

We recommend the use of a mass interconnect solution when an Interchangeable Test Adapter (ITA) is required for a PXI or LXI based test system. Our modules are fully supported by both Virginia Panel and MacPanel.



## Pickering Reed Relays

We are the only switch provider with in-house reed relay manufacturing capability via our Relay Division. These instrument grade reed relays feature **SoftCenter™** technology, ensuring long service life and repeatable contact performance. To learn more, please go to: [pickeringrelay.com](http://pickeringrelay.com)



## 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 a list of all supporting operating systems, please see: [pickeringtest.com/os](http://pickeringtest.com/os)

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:

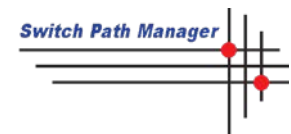
- **Pickering Interfaces Switch Path Manager**
- **National Instruments** products (LabVIEW, LabWindows/CVI, Switch Executive, MAX, TestStand, VeriStand, etc.)
- **Microsoft Visual Studio** products (Visual Basic, Visual C+)
- **Keysight** VEE and OpenTAP
- **Mathworks** Matlab
- **Marvin** ATEasy
- **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, please go to: [pickeringtest.com/software](http://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, please go to: [pickeringtest.com/spm](http://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, please go to: [pickeringtest.com/ebirst](http://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 a period of three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available for all our modules and systems with various levels to suit 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, please go to: [pickeringtest.com/support](http://pickeringtest.com/support)

## Available Product Resources

We have a large library of product resources including success stories, product and support videos, articles and white papers as well as application specific product brochures to assist when looking for the switching, simulation and connection solutions you need. We have also published handy reference books on Switching Technology and for the PXI and LXI standards.



To view, download or request any of our product resources, please visit: [pickeringtest.com/resources](http://pickeringtest.com/resources)