- Digital I/O Module With Opto Isolation
- High Side Output Switches For Controlling Common Negative Loads
- 32 Bits Out + 16 Bits In
- Suitable For Industrial Automation Applications, e.g. Operating Pneumatic Valves, Power Relays, etc.
- Operating Speed <10ms
- All I/O Ports Are Protected Against Damage
- VISA & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- 3 Year Warranty

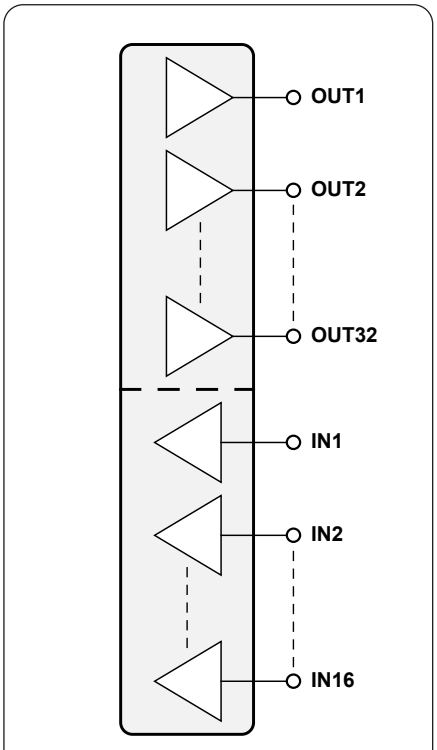
The 40-490/491 module is designed for applications requiring optically isolated digital I/O, typically in industrial automation. The module features 32 digital outputs and 16 digital inputs that can be programmed by word or individual bit.

The 40-490's input ports have a nominal logical threshold of 6V while the 40-491's thresholds are TTL compatible. Versions of each module are offered with either an internal +5V supply (DC to DC converter) for the isolated side or requiring an external +5V isolated supply.

The 40-490/491 digital I/O module has many applications in process control, sensing inputs, volt free contacts, product testing, noise free inputs or for driving relays and solenoids.

40-490 Opto-Isolated Digital I/O Module Details

The 40-490 is intended for moderate speed input-output in potentially noisy environments. All inputs and outputs share a common negative ground, which is isolated to 500VDC from the PXI chassis ground.



The 40-490 Opto Isolated Digital I/O Module

ISSUE 8.0 APR 2018

Specification

Inputs	
Type:	Inputs are low pass filtered and clamped to reject transients. The electrical time constant at the inputs is approximately 3.5ms. Inputs are pulled low, and present a load of greater than 3.3KΩ to the source.
Input Threshold:	6V (40-490) or TTL (40-491).
Max Voltage*:	The input connections can withstand the application of voltages to 40V.
Read Time:	1ms typical excluding input filter settling time.
Outputs	
Switch Type:	High side FET switch
Protection:	Switch protected against overcurrent, overvoltage, overtemperature and inductive loading. Clamp diode limits voltage excursion below negative voltage.
Switch Ratings	
Voltage*: Current:	+40V relative to negative output. 400mA for single output, 1A for any group of 8 outputs sharing power and return pins.
Write Time:	2ms typical excluding any external filtering.
Internal Isolated 5VDC supply (DC to DC Converter)	
Type:	Fully regulated, short-circuit protected.
Rating:	5VDC +/-2%. A maximum of 350mA may be drawn externally.
External DC Voltage Versions	
Requirement:	5VDC +/-5% at 50mA, isolated.

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

Custom options

Alternate values may be substituted in the input filter circuits to obtain different filter or threshold characteristics.

Additional resistors may be fitted to pull inputs up to a user-supplied positive voltage.

Power Requirements

Power consumption from the 5V backplane supply is as follows:

+3.3V	+5V	+12V	-12V
0	0.36A	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 68-pin female micro-D 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:	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 a 33MHz 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

Opto Isolated Digital I/O Module	
With DC to DC Converter	**40-490-001**
No DC to DC Converter	**40-490-002**
Opto Isolated Digital I/O Module, TTL Input	
With DC to DC Converter	**40-491-001**
No DC to DC Converter	**40-491-002**

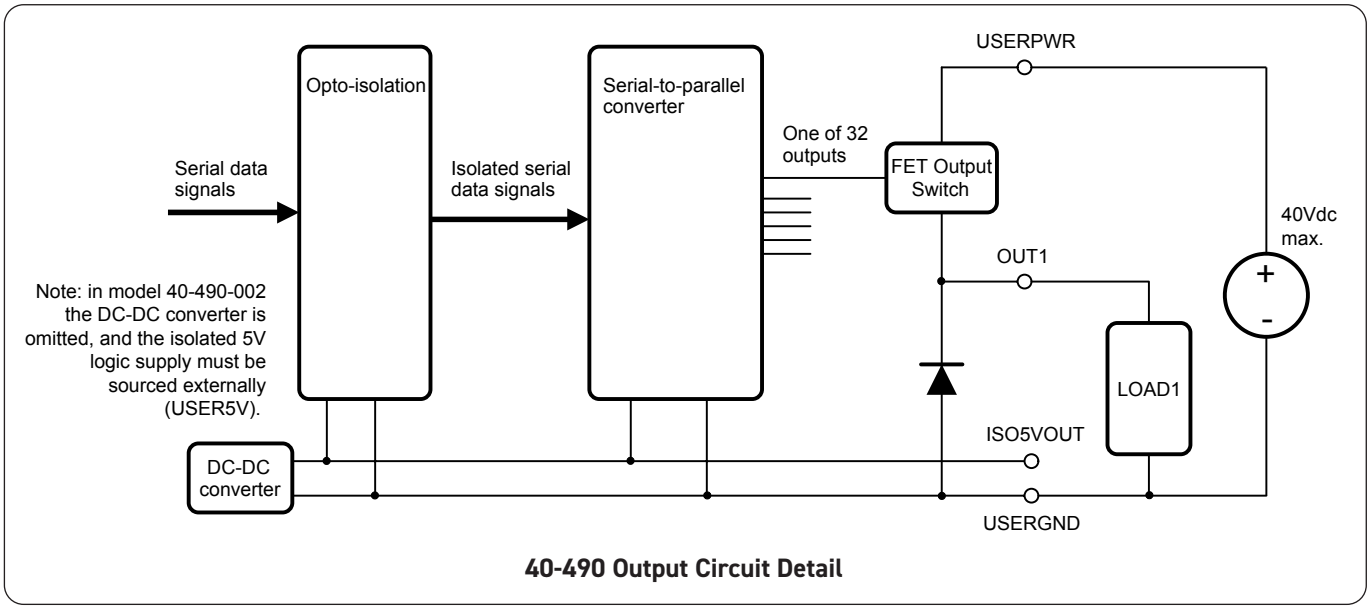
Product Customization

Pickering PXI 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.

Mating Connectors & Cabling

For connection accessories for the 40-490/491 please refer to the 90-015D 68-pin micro-D Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.



40-490 Output Circuit Detail

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:

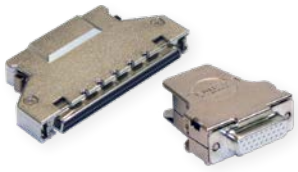
- Mix our 1000+ PXI switching & simulation modules with any vendor's PXI instrumentation
- Embedded or remote Windows PC control
- Real-time Operating System Support
- High data bandwidths, especially with PXI Express
- Integrated module timing and synchronization

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

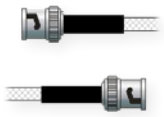
Connectivity Solutions

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.

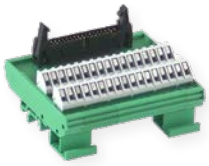


Connectors & Backshells

Multiway 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 to start your design.

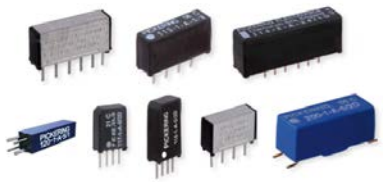
Mass Interconnect

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 sister company, Pickering Electronics. These instrument grade reed relays feature ***SoftCenter***® technology, ensuring long service life and repeatable contact performance.

To learn more, please go to: 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

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

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

Diagnostic Relay Test Tools

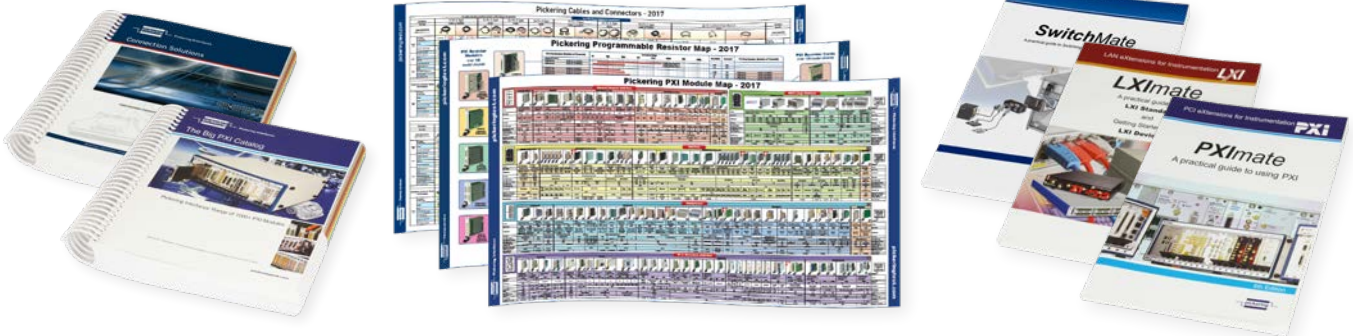
eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.
To learn more, please go to: pickeringtest.com/ebirst

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

Available Product Resources

We have a large library of product resources including success stories, product and support videos, articles, as well as complete product catalogs and product reference maps to assist when looking for the switching, simulation and cable and connector 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