

- Versatile PXI Breadboard With Prototype Area
- Built-In Digital I/O, 32-Bits Out, 32-Bits In
- TTL Outputs Suitable for Driving External Logic
- Open Collector Outputs For High Current Drive
- Switched +12V, +5V, +3.3V and -12V Power Supply Outputs
- DC-DC Converter Option For Additional Power Supply Output
- VISA, IVI & Kernel Drivers Supplied for Windows
- 3 Year Warranty

The 40-228 provides 32 channels of digital input and 32 channels of digital output, together with switched +12V, +5V, +3.3V and -12V supply outputs derived from the PXI backplane. The module is available fitted with a DC-DC converter (40-228-001) which provides an additional -5V supply output. Alternatively the module can be supplied with an industry standard footprint for a DC-DC converter (40-228-002) allowing the user to fit one of their own specification if required.

The 40-228 includes a breadboard area that allows users to add their own circuitry to the module.

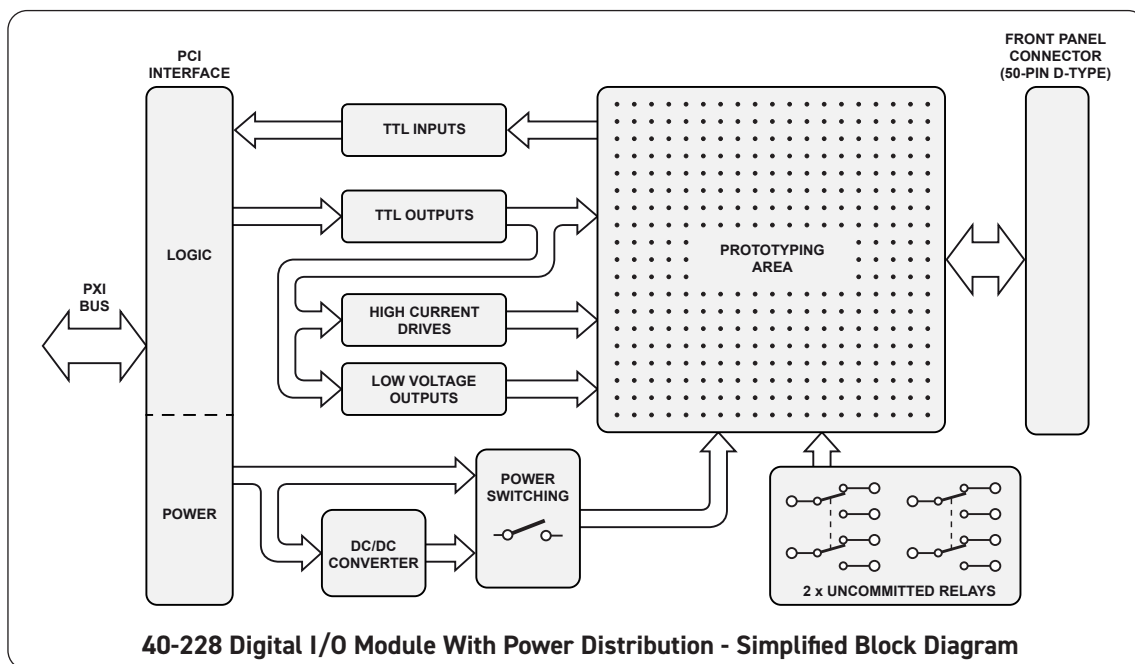
Writing and reading can be done at bit, byte or word level to simplify programming effort. Applications include generating control signals, stimulus and sensing status from digital devices.

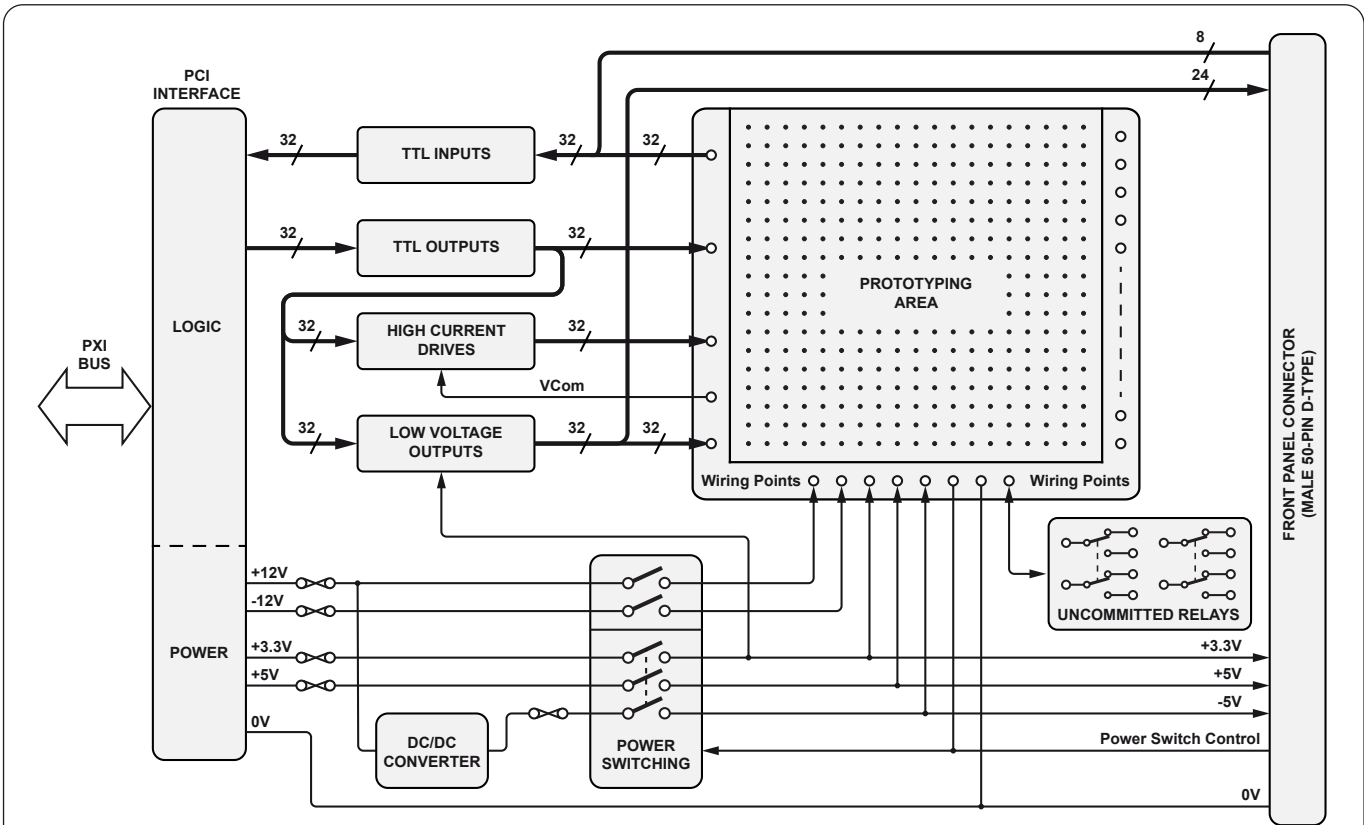
The switched power supply outputs on the 40-228-001 are controlled using a single externally applied signal to the front panel connector, providing a simple means of controlling the supplies, while also providing a safety interlock - if the front panel connection is removed the supplies shut down.



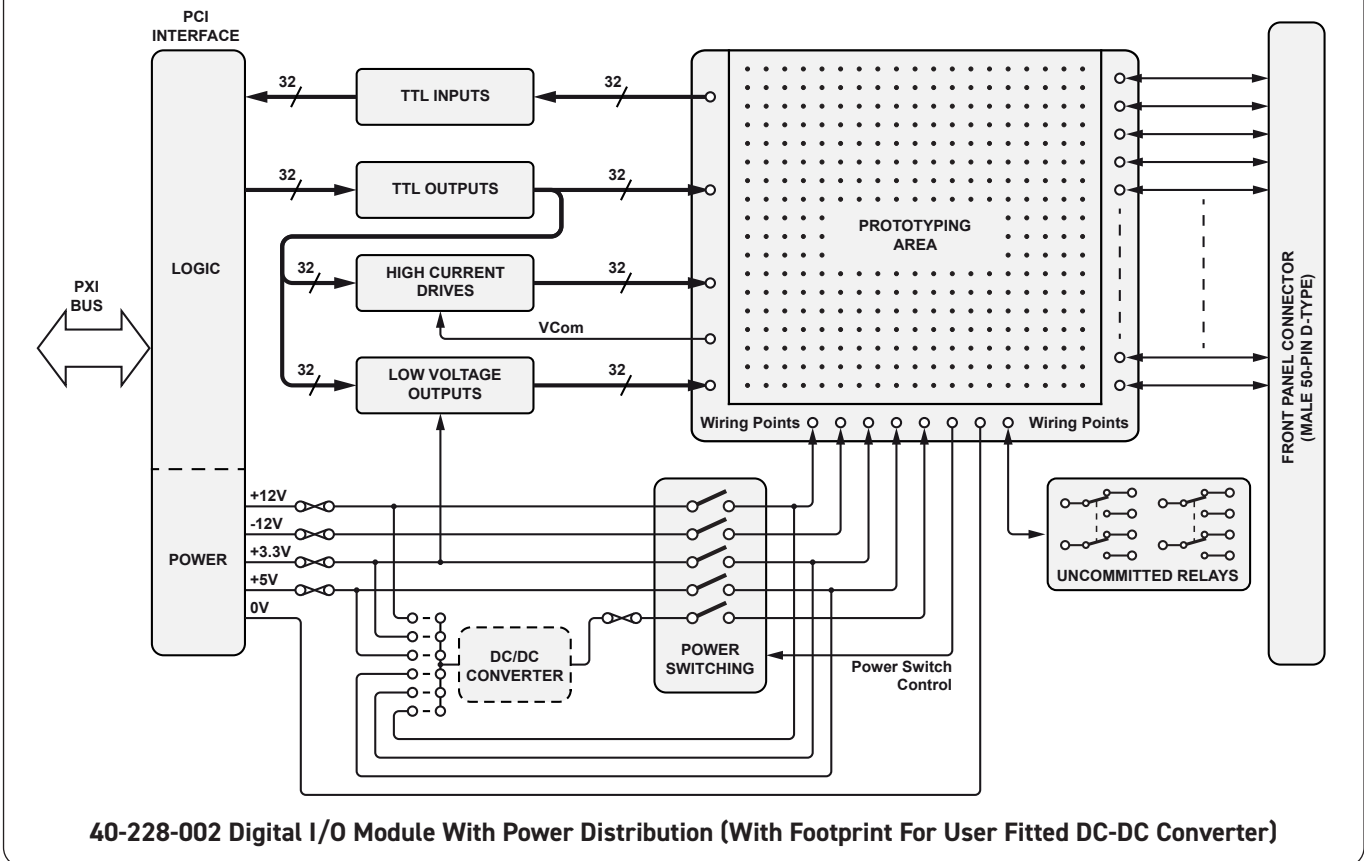
### Typical Applications

- Construction of Special One-Off Circuits
- Programmable Amplifiers
- Programmable Attenuators
- Filters
- Special Circuits to Drive External Relays
- Mounting Special Relay Types
- Dummy Multiplexer Channels for Calibration Purposes





40-228-001 Digital I/O Module With Power Distribution (DC-DC Converter Fitted)



40-228-002 Digital I/O Module With Power Distribution (With Footprint For User Fitted DC-DC Converter)

## General Specification

Digital Outputs	
Output Voltage:	5V*
Sink Current:	24mA
Source Current:	24mA

Digital Outputs, Low Voltage	
Output Voltage:	3.3V*
Sink Current:	24mA
Source Current:	24mA

Digital Outputs, Open Collector	
Output Voltage:	50V*
Load Current:	500mA†
Power Dissipation, per output:	1W
Power Dissipation, per 8 output device:	2.5W

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

† Outputs may be paralleled to increase current capability.

Digital Inputs	
Maximum Standoff Volts:	7V*
Nominal True Voltage:	>2.0V
Maximum Power per byte:	<0.8W
Data is strobed when the read operation executes	

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

**Note:** Care must be taken when interfacing the module with external circuits which may produce high voltage spikes or RF interference. Additional noise protection may be required, please contact Pickering if you wish to discuss your requirement.

## Power Outputs

Choice of switched output voltages: +12V, +5V, +3.3V, -12V and -5V supplied from DC-DC converter (40-228-001).

Up to 4A for +3.3V and +5V, 1A for -5V and ±12V.

Output signals are controlled using an externally supplied 3.3V, 50mA, control line (40-228-001) or onboard output (40-228-002).

## Power Requirements

+3.3V	+5V	+12V	-12V
20mA	200mA	30mA	0

## Breadboard Supply Rails

All four PXI system voltages are available: +3.3V, +5V and ±12V.

Up to 5A for +3.3V and +5V, and 1A for ±12V (within the overall limit of the power supply).

The power supplies are protected by on-board fuses, 5A for +3.3V, 5A for +5V, and 1A for ±12V.

## General Breadboard Details

Square pad and DIP construction areas. Approximately 65 <sup>2</sup> cm (10 sq inches) of prototype area. 0.1" grid spacing.	
Maximum Component Height:	13mm
	1.52mm (defined by PXI)
Maximum Lead Length Below PCB:	0.7mm
Maximum Lead Diameter:	300V
Maximum Voltage:	
Uncommitted Power Rails / Bus Lines:	
Maximum Lead Diameter:	0.7mm
Maximum Current:	4A
Maximum Voltage:	300V

## 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 50-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:	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

Digital I/O Module With Power Distribution With DC-DC Converter	40-228-001
Digital I/O Module With Power Distribution Without DC-DC Converter	40-228-002

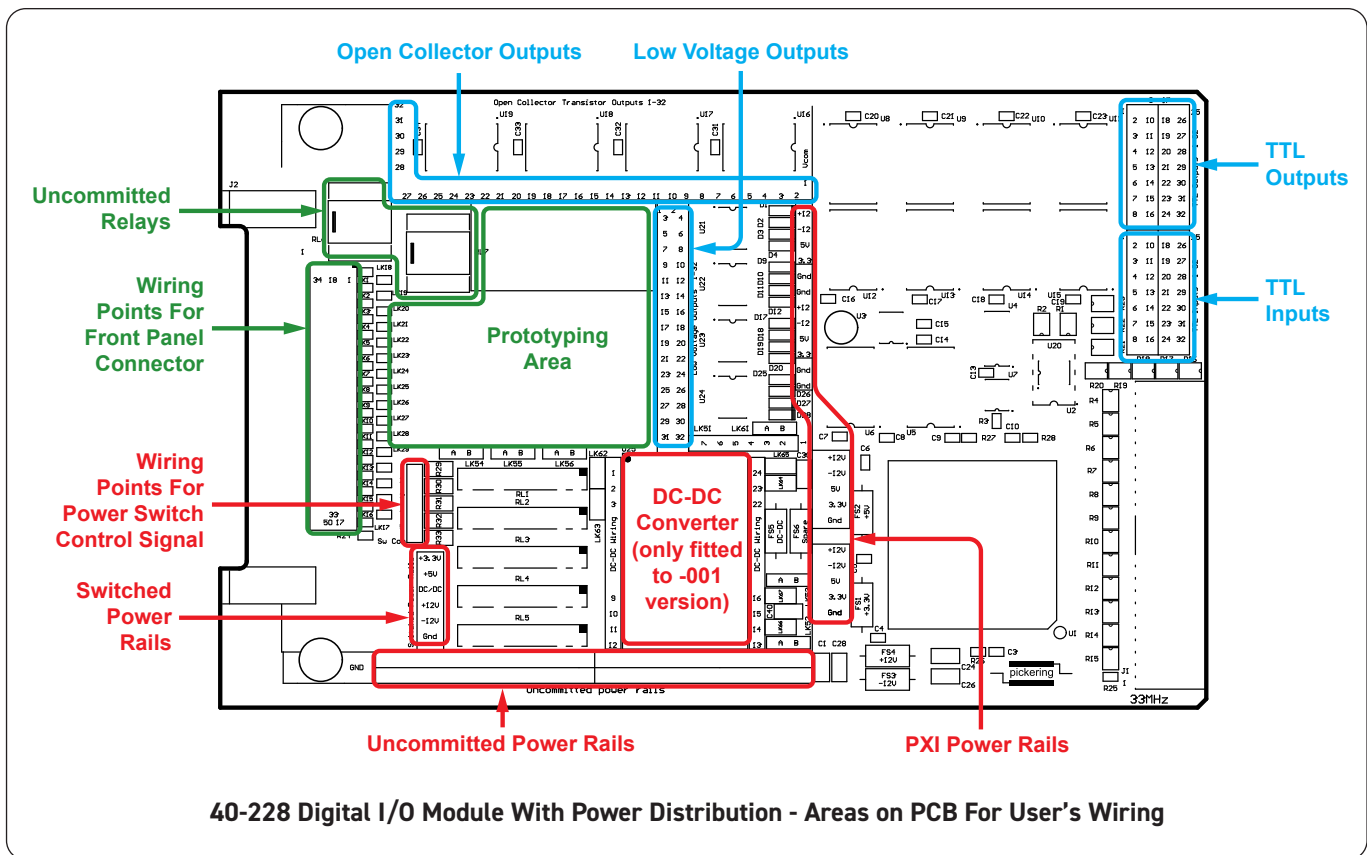
## Product Customization

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 40-228 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.



## 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

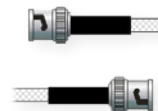
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed 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 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](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 Testolutions** Tecap Test & Measurement Suite

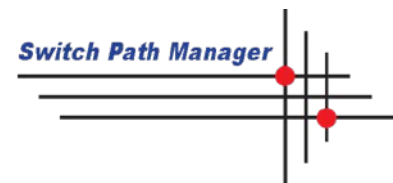
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help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

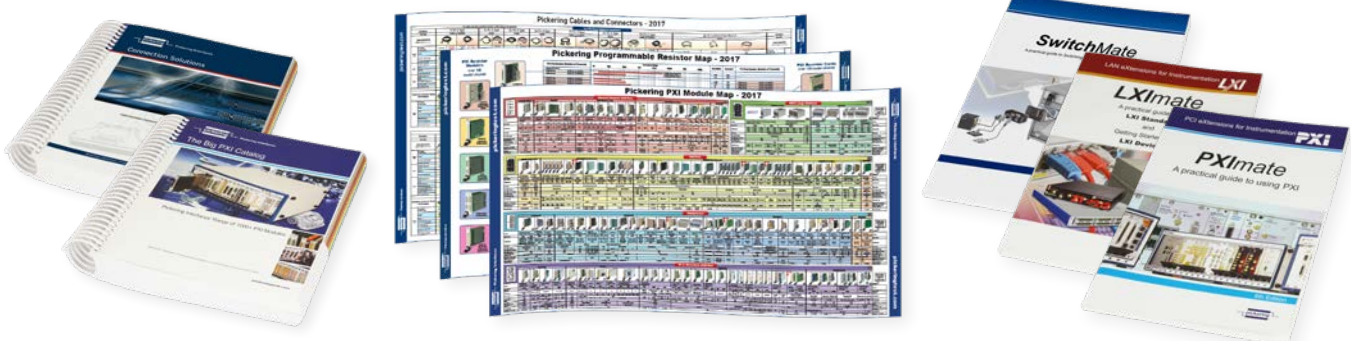


## Three Year Warranty & Guaranteed Long-Term Support

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, 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](http://pickeringtest.com/resources)