# 40-518A/519A
# 2 Amp 2 Pole Matrix Module
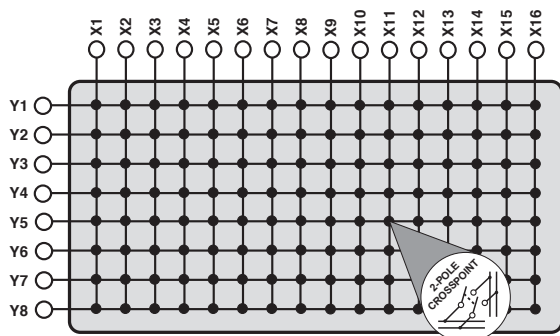
- ● **High Density Single-Slot 3U PXI 2A Matrices With 128 Crosspoints**
- ● **2-Pole 32x4 and 16x8 Options**
- ● **Maximum Current 2A Hot or Cold Switching**
- ● **Switch up to 300VDC/250VAC and up to 60W Max Power**
- ● **Uses Gold-Plated Contact Electro-mechanical 2-Pole Relays**
- ● **VISA/IVI Drivers Supplied for Windows XP/Vista/7/8**
- ● **Supported by PXI or LXI Chassis**
- ● **Built-In Diagnostics - _BiRST_™**
- ● **3 Year Warranty**

The 40-518A and 40-519A 2 Amp, 2-Pole Matrix Modules form part of the System 40 PXI Programmable Switching system. Each module consists of a matrix of 128 2-pole electro-mechanical relays under the control of a PXI/PCI interface. The matrix configuration is dependant upon the model number, this is as follows:
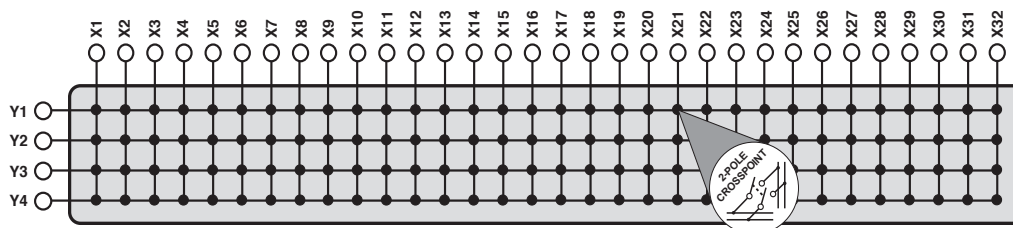
| | |
|---|---|
| **40-518A-002** | 16x8 2-Pole Matrix |
| **40-519A-002** | 32x4 2-Pole Matrix |

These modules are designed for switching medium voltage/power signals in test applications where reed relays do not have sufficient rating. They are also suitable for telecoms applications where send and return signals need to be switched simultaneously.

Both modules use 2-pole electro-mechanical relays with palladium-ruthenium, gold-plated, bifurcated contacts for maximum reliability and long operational life. Each contact has a maximum carry and switching current of 2 Amps. The maximum voltage is 300VDC/250VAC with a maximum power rating of 60W/62.5VA.

## Built-In-Relay-Self-Test _BiRST_™

The BIRST facility provides a quick and simple way of finding relay failures within the module. No supporting test equipment is required to run a BIRST test, simply disconnect the UUT from the module's user connector, launch the supplied BIRST application software and the tool will run a diagnostic test that will find all relays with contacts welded closed or with high (open) contact resistance. It makes it simple for systems integrators to diagnose the cause of switching failures in a system.

The BIRST tool compliments any self test diagnostic test tools built into the system since a switch path failure can be caused by switch or by cabling failures. If a system self test identifies a system failure and the BIRST indicates there are no relay failures, chances are the user needs to look for a cabling or programming errors.

If a relay failure is detected by BIRST the user can quickly identify the failed relay, locate the cause of the failure and replace the failed device. More information on the use of the BIRST tool is contained within the module's operating manual.



**40-518A Matrix 16x8 2-Pole**
**(each line is a 2 wire connection)**

The 40-518A/519A are part of Pickering's family of High Density, 128 crosspoint, BIRST enabled EMR PXI matrices, the range is as follows:

- **40-527-001** - 64x2 1-Pole, 2 Amp Matrix
- **40-528-001** - 32x4 1-Pole, 2 Amp Matrix
- **40-529-001** - 16x8 1-Pole, 2 Amp Matrix

Also available from Pickering is a range of Very High Density, 256 crosspoint EMR PXI matrices, also fitted with BIRST:

- **40-582-001** - 16x16 2-Pole, 2 Amp Matrix
- **40-584-001** - 128x2 1-Pole, 2 Amp Matrix
- **40-585-001** - 64x4 1-Pole, 2 Amp Matrix
- **40-586-001** - 32x8 1-Pole, 2 Amp Matrix
- **40-587-001** - 16x16 1-Pole, 2 Amp Matrix



**40-519A Matrix 32x4 2-Pole (each line is a 2 wire connection)**

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## Switching Specification

| Switch Type: | Electro-mechanical |
|---|---|
| Contact Type: | Palladium-Ruthenium, Gold plated, bifurcated |
| Max Switch Voltage: | 300VDC/250VAC |
| Max Power: | 62.5VA, 60W from 30V to 220VDC, 30W to 300VDC (resistive load) |
| Max Switch Current: | 2A |
| Max Continuous Carry Current: | 2A |
| Max Pulsed Carry Current Example (for a single switch path): | 6A for 100ms (up to 10% duty cycle) |
| Initial On Path Resistance: Initial Off Path Resistance: Minimum Voltage Differential Thermal Offset: | <500mΩ >$10^9$Ω 100µV <10µV |
| Operate Time: | <3ms |
| Expected Life (Operations) Very low power load: Low power load: Medium power load: Full power load (60W): | >$1x10^8$ >$1.5x10^7$ (0.1A 20VDC) >$5x10^6$ (1A 30VDC) >$1x10^5$ (2A 30VDC) >$1x10^5$ (0.1A 300VDC) |

## Bandwidth

| Bandwidth | >10MHz |
|---|---|

## Power Requirements

| +3.3V | +5V | +12V | -12V |
|---|---|---|---|
| 100mA (typical) | 400mA (typical) | 50mA (typical) | 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:              32-bit P1/J1 backplane connector
Front panel connector:   78-way male D-type

**NOTE:** The pinout for the 40-518A differs from the 40-518, see the user manual for details (the 40-519A and 40-519 have the same pinout).

## Product Order Codes

| 16x8 Matrix Module, 2-pole with BIRST | **40-518A-002** |
|---|---|
| 32x4 Matrix Module, 2-pole with BIRST | **40-519A-002** |

## Support Products

### Spare Relay Kits

Kits of replacement relays are available for the majority of Pickering's PXI switching modules, simplifying servicing and reducing down-time. The relay kits for the 40-518A/519A modules are as follows:

91-100-001 kit for 40-518A-002
91-100-001 kit for 40-519A-002

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

## Mating Connectors & Cabling

For connection accessories for the 40-518A/519A please refer to the **90-006D** 78-way D-type Connector Accessories data sheet where a complete list and documentation can be found for accessories, or refer to the Connection Solutions catalog.

## Programming

Pickering provide kernel, IVI and VISA (NI and Agilent) drivers which are compatible with 32/64-bit versions of Windows including XP, Vista, 7 and 8 operating systems. 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:

- **National Instruments** products (LabVIEW, LabWindows/ CVI, Switch Executive, MAX, TestStand, etc.)
- **Microsoft Visual Studio** products (Visual Basic, Visual C+)
- **Agilent** VEE
- **Mathworks** Matlab
- **Geotest** ATE Easy
- **MTQ Testsolutions** Tecap

Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries.

## 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 33MHz 32-bit backplane interface.

## Safety & CE Compliance

All modules are fully CE compliant and meet applicable EU directives: Low-voltage safety EN61010-1:2001, EMC Immunity EN61000-6-1:2001, Emissions EN55011:1998.

## PXI & LXI Chassis Compatibility

Compatible with all chassis conforming to the 3U PXI and 3U cPCI specification. Compatible with Legacy and Hybrid peripheral slots in a 3U PXI Express chassis.

Compatible with Pickering Interfaces LXI Modular Switching chassis. For information on driving your switching solution in an LXI environment refer to the LXI Product Guide.



## Latest Details

Please refer to our Web Site for Latest Product Details.

www.pickeringtest.com



Please refer to the Pickering Interfaces "**Connection Solutions**" catalog for the full list of connector/cabling options, including drawings, photos and specifications. This is available in either print or as a download. Alternatively our web site has dynamically linked connector/ cabling options, including pricing, for all Pickering PXI modules.



"**The Big PXI Catalog**" gives full details of Pickering's entire range of PXI switch modules, instrument modules and support products.
At over 500 pages, the Big PXI Catalog is available on request or can be downloaded from the Pickering website.
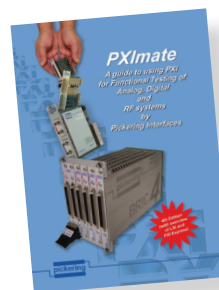


Ever wondered what PXI is all about?

Pickering Interfaces' "**PXImate**" explains the basics of PXI and provides useful data for engineers working on switch based test systems.

The PXImate is available free on request from the Pickering website.
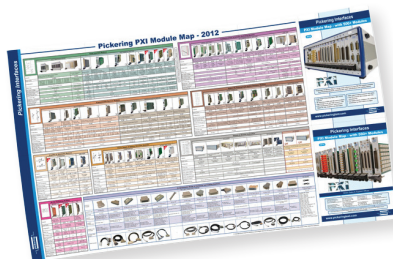


The "**PXI Module Map**" – a simple fold-out selection guide to all Pickering's 600+ PXI Modules.

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# Pickering Built-In Relay Self Test: BIRST™

Relays have specific voltage and current ratings and can be damaged if these parameters are exceeded – this can happen accidentally during test development and debug. The damaged relays can exhibit a variety of failures including:

- Permanent or intermittent open/short circuits
- Variable path resistance.

These are often very difficult to diagnose as they can erroneously connect signals together causing unpredictable UUT behaviour.

Historically, complex switching systems on platforms such as VXI and Pickering's System 10/20 GPIB products have included a degree of self test for the relays. But in PXI, the industry has not included self test on switching because of the compromises introduced on density and cost when implementing previous self test architectures. As an alternative, some PXI switching solutions include relay operation counters to attempt to predict when a relay will fail. Although it may be helpful to know how intensively a relay might be being used it is not on its own a good indicator. The disadvantages are:

- Load conditions alone can impact the relay operating life by more than three orders of magnitude.
- Using the measure as a predictive maintenance tool (replacing relays when they have operated a number of times) can easily degrade the reliability of a switching system because of the disturbance that relay replacement causes to adjacent devices (not just relays), the risk of introducing a relay with "infant mortality" and even the potential for damaging the PCB when the change is made, especially if the relays are surface mount devices.

Pickering has greatly improved the test methodology to the extent it is now possible to include full self test in PXI switch modules with minimal impact on cost and switching density, welcome news for users who are used to having such features in their solutions. BIRST will identify any relay failures in the switch module and is also capable of detecting relays with deteriorating contacts which may indicate they are in the process of failing, as shown below.
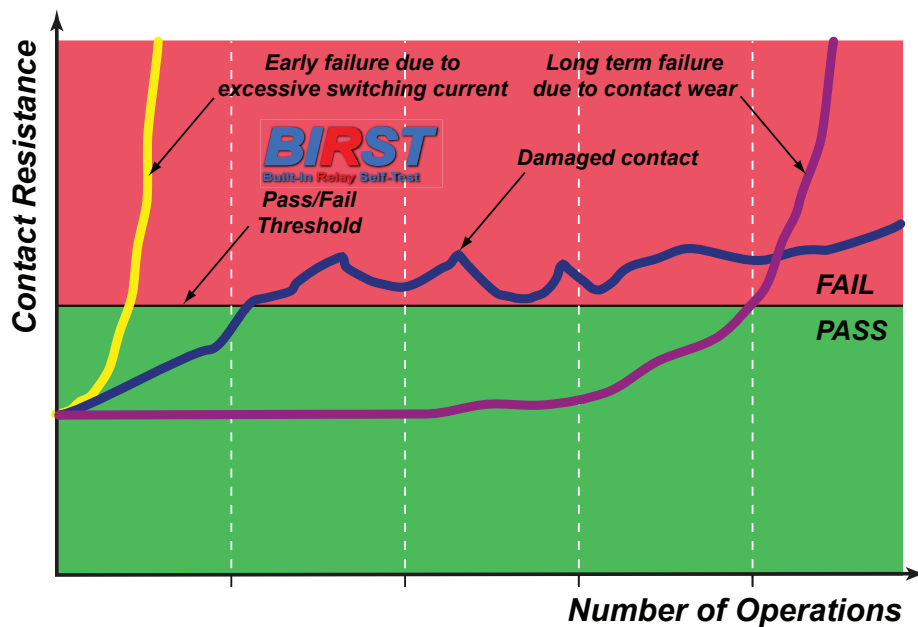


To conduct a test the user simply disconnects the switching module from the UUT and test instrumentation and runs the supplied application program. No supporting test equipment is needed; the test runs automatically and identifies any defective or suspect relays within the module. If the switch module is connected directly to a Mass Interconnect receiver then BIRST may be executed without removing these connections. The BIRST tool is not intended to entirely displace user-developed self test applications that are built into some ATE systems. This system level test typically uses an external DMM and loop back mechanisms to check for switching and cable harness faults. BIRST conducts its test when the UUT and instrumentation are disconnected from the switching system, if BIRST finds no switching faults and a system level tool does find faults, the problem is with the cabling system. The user does not have to design software to diagnose switching faults, considerably simplifying the design task for system self test.

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