# PXI 2-Pole 2 A BRIC™ Multi-Slot Matrix 40-566B

- Integrated PXI 2 A Matrix Module With Built In High Performance Screened Analog Bus
- Fully Scalable Matrix Solution
- High Density Configurations With 4-Slot to 165x4 (2-Pole) & 8-Slot to 385x4 (2-Pole)
- Flexible Matrix Architecture Through Isolation Switching Enabling Multiple Independent Matrices (Up To 7 Per BRIC8)
- Partially Populated Versions Available
- Maximum Current 2 A Hot or Cold Switching
- 2-Pole Switching up to 300VDC/250VAC and up to 60W Max Power
- Drivers Supplied for Windows & Linux, Plus Support for Real-time Systems
- Supported by PXI or LXI Chassis
- Supported by ***BIRST*** ™ and ***eBIRST*** ™ Test Tools
- 3 Year Warranty

## BRIC™ 2nd Generation PXI 2 A Switch Matrix

The 40-566B BRIC provides a range of high density matrix configurations able to switch up to 2 A or 300 VDC/250 VAC. The modules are available in 4 or 8-slot PXI sizes and are constructed using high quality electro-mechanical relays.

Typical applications include signal routing for functional ATE systems. With this high level of switching density, the 40-566B allows a complete functional ATE switching system to be housed in a single 3U PXI chassis. BRIC Modules allow the use of a much lower cost 8 slot PXI chassis.

- **BRIC4** - 4-slot PXI Module, this can hold up to 3 matrix daughtercards, 660 crosspoints (up to 165x4, 2-pole).
- **BRIC8** - 8-slot PXI Module, this can hold up to 7 matrix daughtercards, 1824 crosspoints (up to 385x4, 2-pole).

Pickering 2 A BRIC matrices are higher signal power versions of our established range of PXI BRIC modules. Comprising high quality electro-mechanical relays they feature higher voltage, current and power handling than ultra high density reed relay based BRICs.


The 40-566B is an ideal choice for simultaneously busing up to four higher power signal pairs, where improved robustness is required (please refer to our 40-573 for busing up to eight higher power signal pairs simultaneously).

For lower level switching requirements, please consider our 40-560B/561A/562B range of ruthenium reed relay solutions that exhibit superior operating speed & life performance.

## High Reliability and Easy of Use

The 40-566B PXI BRIC is designed to minimise the cost and complexity of cable assemblies to the device under test and instrumentation. Analog busing is housed within the module using a high performance screened analog backplane. Pickering can construct custom cable assemblies for all of our PXI modules, please contact sales office for further assistance.

## Built-In Relay Self-Test - *BIRST*

This provides a quick and simple way of finding relay failures. No test equipment is required, simply disconnect the UUT, launch the BIRST application and the tool will run a diagnostic test that will find all relays with faulty contacts.
For more information go to: pickeringtest.com/birst

## Supported by *eBIRST*

eBIRST test tools simplify switching fault-finding by quickly testing the system and graphically identifying the faulty relay.
For more information go to: pickeringtest.com/ebirst

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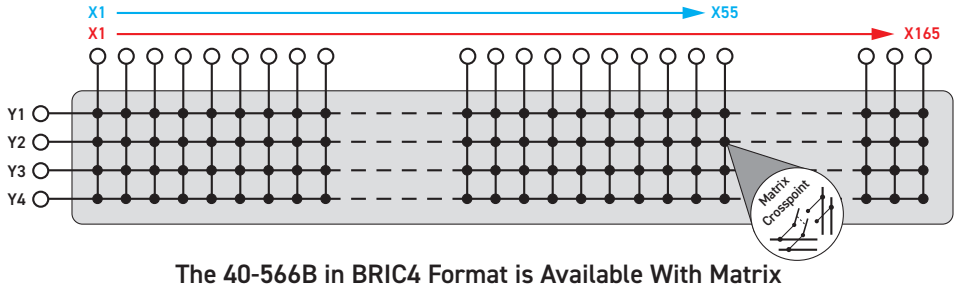
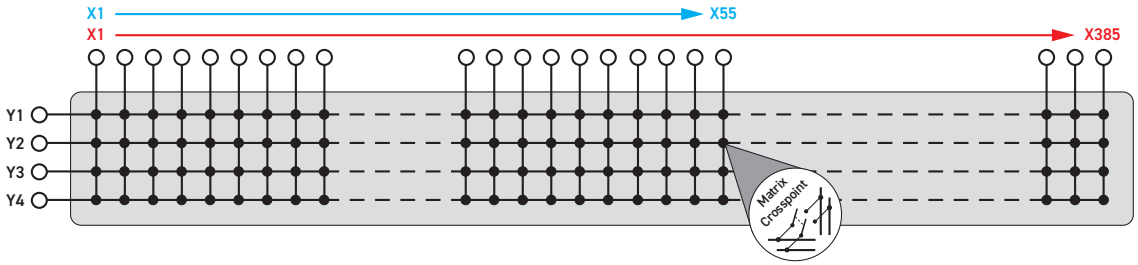



The 40-566B in BRIC4 Format is Available With Matrix Configurations Between 55x4 and 165x4 (2-Pole)



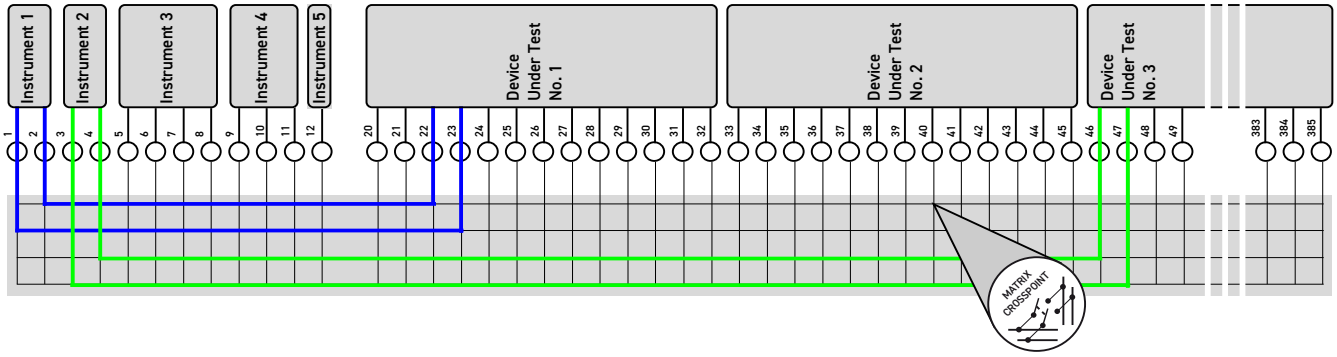

The 40-566B in BRIC8 Format is Available With Matrix Configurations Between 55x4 and 385x4 (2-Pole)

| Pickering's Range of 2 A BRIC Matrix Modules | | | | |
|---|---|---|---|---|
| Model No. | Poles | Y-Bus Size | Min. Matrix Size | Max. Matrix Size |
| **40-568A** | 1 | 4 | 75x4 | 600x4 |
| **40-596A** | 1 | 6 | 58x6 | 464x6 |
| **40-567A** | 1 | 8 | 44x8 | 352x8 |
| **40-597** | 1 | 12 | 32x12 | 256x12 |
| **40-598** | 1 | 16 | 24x16 | 192x16 |
| **40-566B** | 2 | 4 | 55x4 | 385x4 |
| **40-574** | 2 | 4 (dual analog bus) | 57x4 | 456x4 |
| **40-565A** | 2 | 8 | 24x8 | 192x8 |
| **40-573** | 2 | 8 | 29x8 | 232x8 |

## 40-566B BRIC Key Advantages

- Complete PXI Switching Solution in one PXI Module.
- Simplified cabling, easy to connect to the DUT thus minimizing costs.
- Internal Shielded Analog Bus giving maximum signal integrity with easy expansion at minimal cost with maximum bandwidth and isolation.
- Program as one whole matrix, therefore very easy to achieve fast operate time.
- Targeted at high performance matrix switching with minimized cost.
- Build just the matrix configuration you need. Modular architecture allows users to buy just as much matrix capacity as they require, extra cards can be added later to expand the matrix.
- BRICs allow use of much lower cost 8 slot PXI chassis (40-908).
- Simpler and faster programming with Direct I/O, VISA and IVI Drivers + LabVIEW Soft Front Panels. Fully compatible with NI Switch Executive.
- Custom versions built to order.
- Built-In Relay Self Test (BIRST & eBIRST).

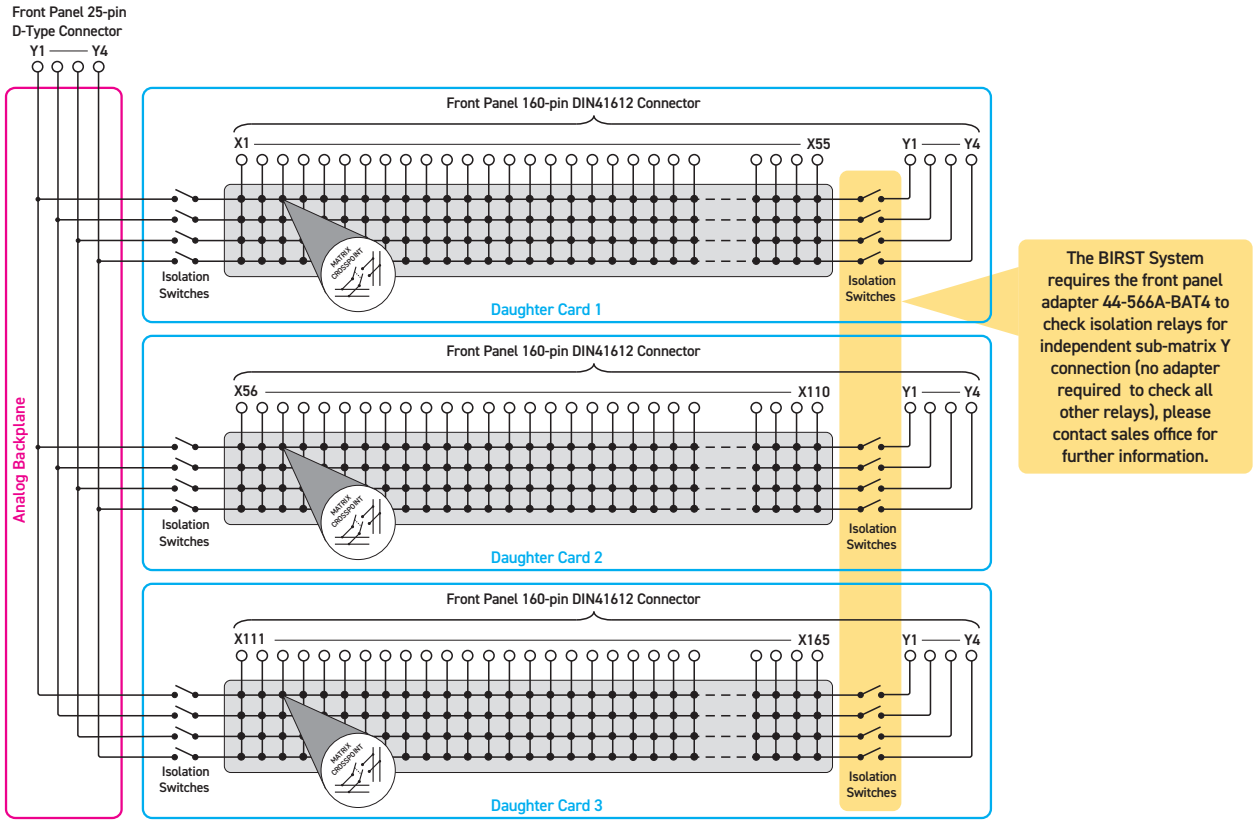
## Example Configurations of the 40-566B 2 A BRIC Matrix (All connections via X-axis for maximum efficiency)



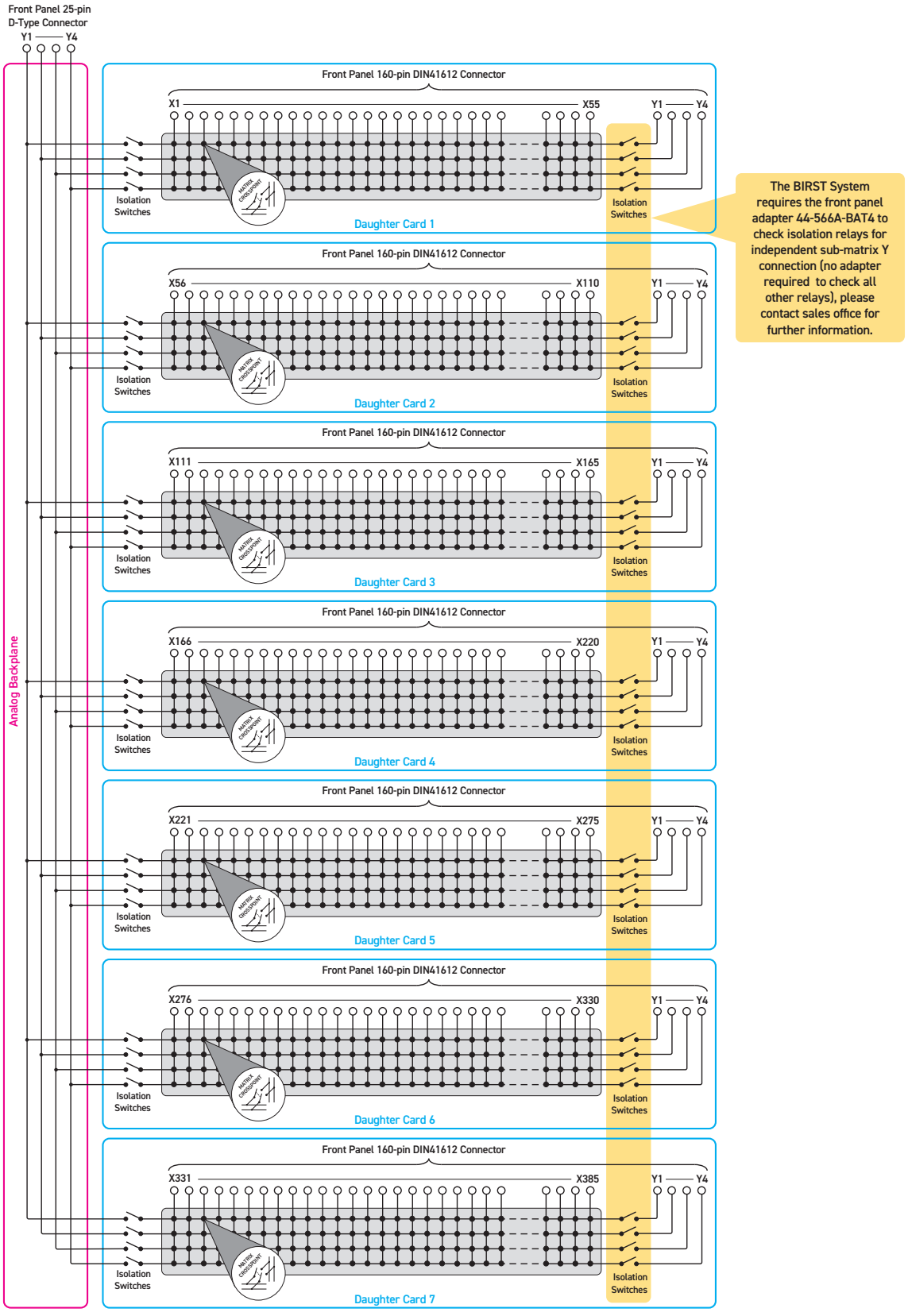

Schematic diagram showing a 385x4 BRIC Matrix being used to parallel test multiple DUTs.
The BRIC Matrix allows tremendous test system flexibility.

## Flexible Matrix Architecture

Isolation Switching within the 40-566B enables the configuration of multiple independent matrices (up to 7 per BRIC8). These switches allow the removal of redundant rows/columns within a system, maintaining signal integrity through maximized bandwidth as well as keeping interconnection capacitance, leakage and crosstalk to a minimum.




Switching Architecture of a 165x4 Matrix in BRIC4 Format (40-566B-004) Note: All Connections are 2-Pole




Switching Architecture of a 385x4 Matrix in BRIC8 Format (40-566B-108) Note: All Connections are 2-Pole

## Built-In Relay Self-Test (*BIRST*) - Overview

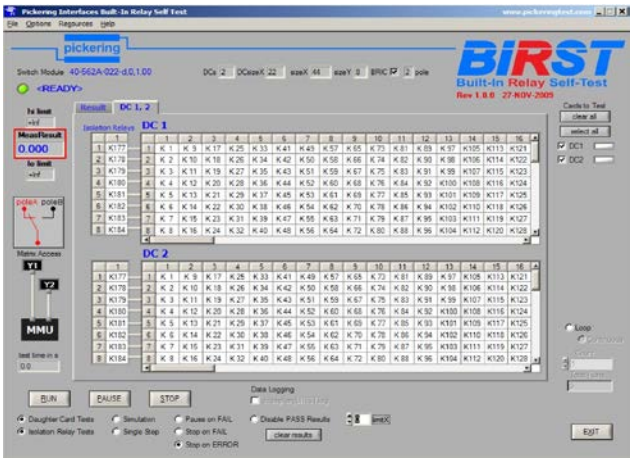
It can be hard to confirm or identify faulty relays on complex switching matrices. The user may be aware that the test system is not behaving as expected but may be unsure if it is a cabling fault, a software problem or a faulty matrix. Discovering the source of the problem takes time and effort users may not have when working to tight schedules.

To ensure low cost of ownership, Pickering Interfaces has now incorporated a test tool, BIRST, into the BRIC.

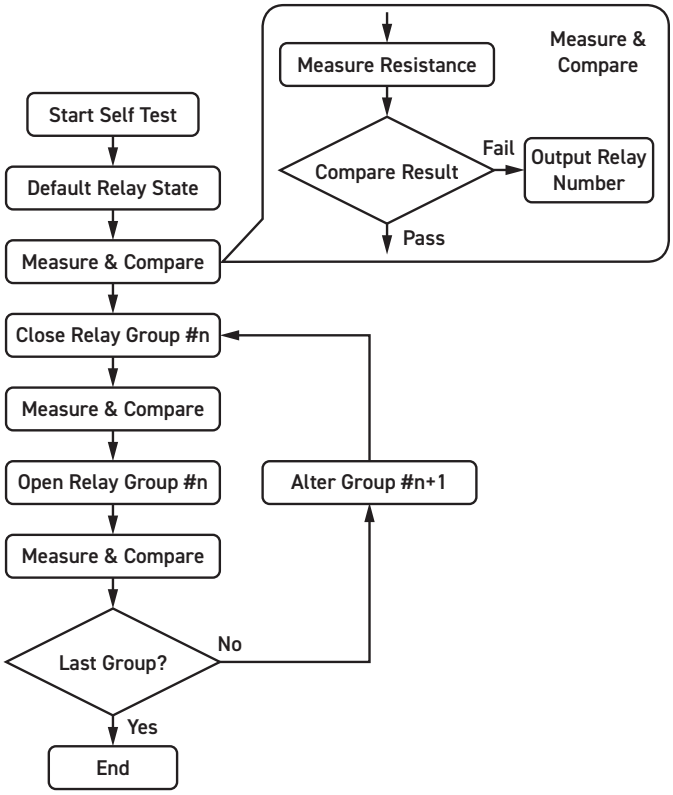
## *BIRST*

The BIRST is a sophisticated diagnostic tool, which allows a complete relay self test of a BRIC module. The BIRST is an easy to use, tool that is especially useful in remote production sites where local technical support may be limited. It provides the following features and capabilities:

- Complete BRIC, Matrix self-test capability
- High fault coverage, self-test tool
- Tests for all relay fault types (bad open or bad close)
- Identifies faults to individual component relay level
- Test sequencer allows detailed control of testing
- Test results shown on screen or sent to log file
- Runs single or repeat tests for maximum confidence




**Test Sequencer Front Panel for BIRST™. This allows any combination of tests to be run in either single or multiple sequences. All test data is displayed in the results window and can be written to a data file.**




**BIRST™ Flow Chart**

## Designed for Reliability and Serviceability

The BIRST provides a quick and cost effective way of identifying the fault or simply providing reassurance that the matrix is working correctly.

The design of Pickering Interfaces' products ensures that relay replacement is with a minimum of investment in tools. The use of leaded relays in preference to surface mount ensures that the replacement of one device will not stress others through the use of re-flow techniques. Individual relay failures can be corrected with little impact on the others in the matrix. This maximizes the service life of the matrix even after a failure has occurred and been repaired.

The repairer's skills required are good understanding of the extraction and replacement of leaded components. Spare relays are included with many of Pickering's lower density matrix modules. Alternatively replacement parts are readily available from Pickering Interfaces representatives. The ability to replace failures locally ensures that system downtime is minimized and transportation costs are avoided.

## Switching Specification

| | |
|---|---|
| Switch Type: | Electro-mechanical |
| Contact Type: | Palladium-Ruthenium, Gold Covered Bifurcated |
| Max Switch Voltage: | 300 VDC/250 VAC* |
| Max Power: | 62.5 VA, 60 W |
| Max Switch Current: | 2 A |
| Max Continuous Carry Current: | 2 A |
| Max Pulsed Carry Current Example (for a single switch path): | 6 A for 100 ms (up to 10 % duty cycle) |
| Initial Path Resistance On (Single Module): | <850 mΩ (X to X) <750 mΩ (X to Y) |
| Off (Single Module): | $>10^9$ Ω |
| Differential Thermal Offset: | 5 µV (typical) |
| Operate Time: | <3 ms |
| Max Number of Simultaneously Closed Crosspoints: | BRIC4: 50 BRIC8: 100 |
| Expected Life (operations) | |
| Very low power signal load: | $>1x10^8$ |
| Low power load (2 W): | $>1.5x10^7$ (0.1 A 20 VDC) |
| Medium power load (30 W): | $>5x10^6$ (1 A 30 VDC) |
| Full power load (60 W): | $>1x10^5$ (2 A 30 VDC) |

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

## RF Specification - In a 50 Ω System

| | | |
|---|---|---|
| Bandwidth (-3 dB): | 10 MHz | |
| Crosstalk (typical): | 10 kHz: | -65 dB |
| | 100 kHz: | -60 dB |
| | 1 MHz: | -35 dB |
| | 10 MHz: | -15 dB |
| Isolation (typical): | 10 kHz: | 65 dB |
| | 100 kHz: | 60 dB |
| | 1 MHz: | 45 dB |
| | 10 MHz: | 30 dB |

## Power Requirements

| +3.3 V | +5 V | +12 V | -12 V |
|---|---|---|---|
| 310 mA (typical) | 4 A max (fully loaded BRIC8, 100 crosspoints energised), typically <2A | 40 mA | 0 |

## Width and Dimensions

Four or eight slot 3U PXI module (CompactPCI).
3D models for these modules in a variety of popular file formats are available on request.

## Module Weight

| | Empty BRIC | Fully Loaded BRIC |
|---|---|---|
| BRIC4 | 0.9Kg | 2.1Kg |
| BRIC8 | 1.6Kg | 4.0Kg |
| BRIC daughter card | 0.32Kg | |

## Connectors

PXI bus via 32-bit P1/J1 backplane connector.

X connections are made via multiple front panel 160-pin male DIN 41612 connectors (Up to 3 per 4-slot module or up to 7 per 8 slot module).
Y connections are made via a single front panel 25-pin male D-type connector.

**Note:** We recommend that Pickering mating connectors are used with this module which are designed to ensure there are no mechanical interference problems when used in a PXI chassis.

## Operating/Storage Conditions

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

| | |
|---|---|
| BRIC4 - 4-Slot High Density Matrix | |
| 2 A, 2-Pole, 55x4 Matrix | 40-566B-001 |
| 2 A, 2-Pole, 110x4 Matrix | 40-566B-002 |
| 2 A, 2-Pole, 165x4Matrix | 40-566B-003 |
| BRIC8 - 8-Slot High Density Matrix | |
| 2 A, 2-Pole, 55x4 Matrix | 40-566B-101 |
| 2 A, 2-Pole, 110x4 Matrix | 40-566B-102 |
| 2 A, 2-Pole, 165x4 Matrix | 40-566B-103 |
| 2 A, 2-Pole, 220x4 Matrix | 40-566B-104 |
| 2 A, 2-Pole, 275x4 Matrix | 40-566B-105 |
| 2 A, 2-Pole, 330x4 Matrix | 40-566B-106 |
| 2 A, 2-Pole, 385x4 Matrix | 40-566B-107 |

For the expansion of an existing BRIC matrix or replacement of faulty BRIC daughter cards please contact your local sales office.

## 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.

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.

## Special Versions

BRIC modules can be built in special versions, for example where an exact matrix size is required then partly populated daughtercards may be ordered.

## Upgrading With Daughtercards

BRIC modules can be upgraded to a larger matrix size using daughtercards, please consult your local sales office for further information.

## Support Products

### *BIRST* Adapter

For the BIRST tool to achieve full relay coverage the supplied **44-566A-BAT4** adapter is required to allow the front panel Y isolation switches to be tested. The adapter consists of a pre-wired 160-pin DIN41612 socket with back-shell, and is fitted to the front panel connector during testing.

### *eBIRST* Switching System Test Tool

This product is supported by the *eBIRST* test tools which simplify the identification of failed relays, the required *eBIRST* tools are below. This product requires master slave testing and two sets of tools are required together with the master slave cable: **93-970-301**. For more information go to: pickeringtest.com/ebirst

| Connector | Test Tool | Adaptor |
|---|---|---|
| 160-pin DIN41612 | 93-002-001 | 93-002-410 |
| 25-pin D-type | 93-005-001 | 93-005-414 |

### 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 |
|---|---|
| 40-566B-xxx | 91-100-001 |

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

### Mating Connectors & Cabling

For connection accessories for the 40-566B module please refer to the 90-001D 160-pin DIN 41612 and 90-008D 25-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 PXI Switching & Simulation Modules:

- Choose from 1000+ Pickering PXI 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. These accessories are detailed in Connector Accessories data sheets, where a complete list and documentation can be found for each accessory.

Connectors & Backshells

Multi-way Cable Assemblies

RF Cable Assemblies

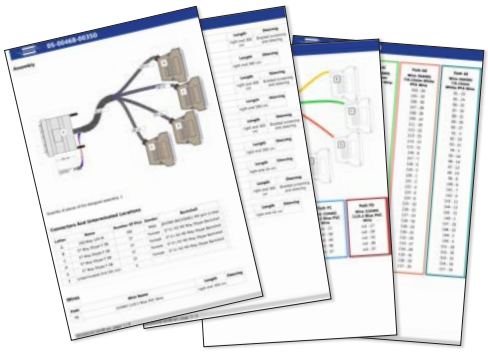
Breakouts

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.

- Fully supported on modern browsers and tablet operating systems.
- Built-in tutorials and videos allow you to get quickly up to speed.
- Store cable assemblies in the Cloud and develop over time.
- Each cable design has a downloadable PDF documentation file detailing all specifications

Start designing your custom cabling, go to pickeringtest.com/cdt



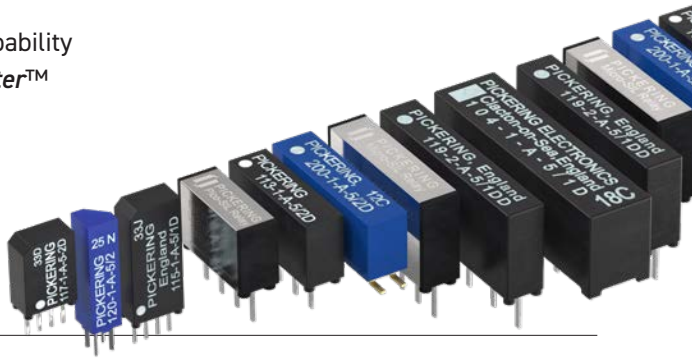
## Mass Interconnect

We recommend the use of a mass interconnect solution when an Interchangeable Test Adapter (ITA) is required for PXI/LXI based test systems. Our modules are fully supported by 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 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 more information go to pickeringtest.com/os

The VISA driver support is provided for LabVIEW Real Time Operating Systems (Pharlap and Linux-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++)
- **Programming Languages** C, C++, C#, Python
- **Keysight** VEE and OpenTAP
- **Mathworks MATLAB, Simulink**
- **Marvin** ATEasy
- **MTQ Testsolutions** Tecap Test & Measurement Suite

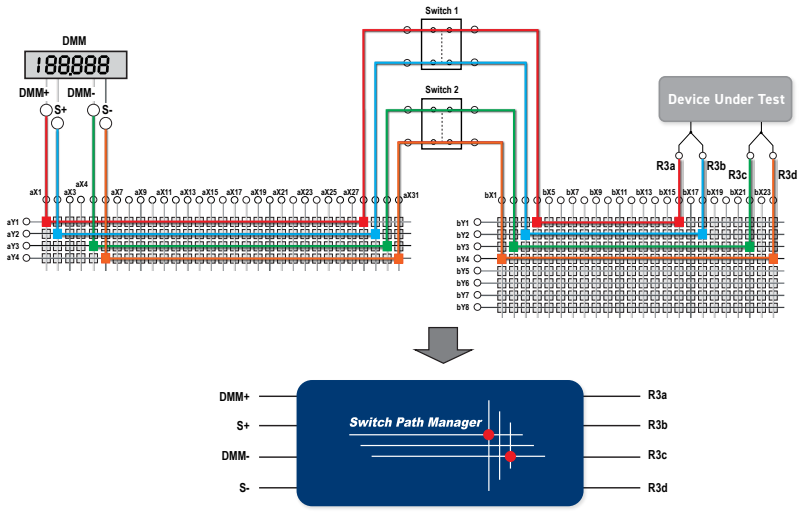
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help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

To learn more about software drivers and development environments 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 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 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 three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available with various levels for 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 go to pickeringtest.com/support

## Available Product Resources

We have a library of resources including success stories, product and support videos, articles and white papers as well as application-specific brochures to assist you. We have also published reference books on switching technology and the PXI and LXI standards.

To view, download or request any of our product resources go to pickeringtest.com/resources