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# PCI Matrix Card

# 50-510A/511A/512A/513A

- High Density Reed Relay Matrix Card
- 1 Standard Slot PCI
- 22x4, Dual 20x4, 22x8 or 44x4
- 1-Pole or 2-Pole Versions
- Large Matrices Built Using Multiple Cards
- Uses High Reliability Pickering Reed Relays For Maximum Performance
- Fast Operating Speed <500 µs
- Switch up to 100 V, 1.2 A with 20 W Max Power
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by ***eBIRST*** ™
- 3 Year Warranty

The 50-510A series of matrix cards feature a wide range of switching configurations (22x4, dual 20x4, 22x8 and 44x4).

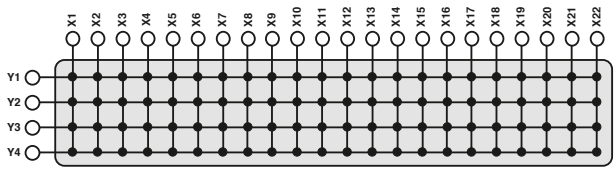
Larger matrices may be constructed by daisy chaining the common signals from multiple cards. For example four 44x4 cards will form a 176x4 Matrix, a total of 1704 crosspoints.

Typical applications include signal routing in functional ATE and data acquisition systems. These PCI matrix cards are constructed using high reliability ruthenium electro-plated reed relays, offering >$10^8$ operations to give maximum switching confidence with long life and stable contact resistance. Available switching architectures are 1-pole and 2-pole.

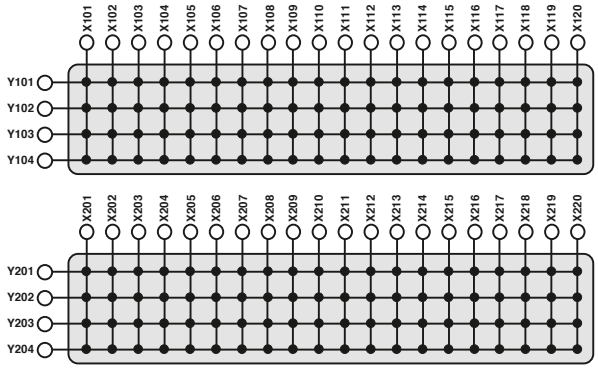
## Supported by *eBIRST*

*eBIRST* switching system test tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.

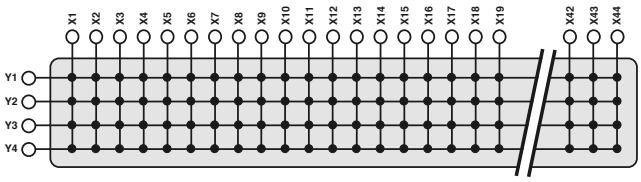
For more information go to: pickeringtest.com/ebirst



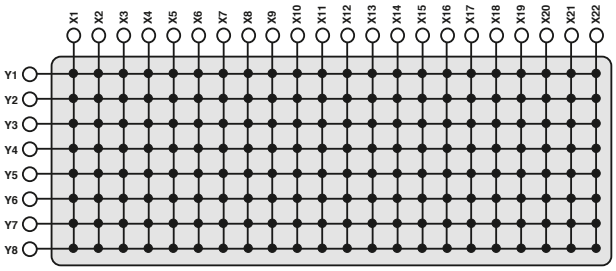

**50-510A 22x4 Matrix**
**(Available as 1-Pole or 2-Pole)**




**50-511A Dual 20x4 Matrix**
**(Available as 1-Pole or 2-Pole)**




**50-513A Single 44x4 Matrix**
**(Available as 1-Pole or 2-Pole)**



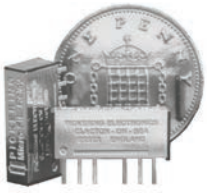

**50-512A 22x8 2-Pole Matrix**
**(Available as 1-Pole or 2-Pole)**

Issue 1.4 Dec 2023

## Relay Type

The 50-510A matrix cards are fitted with Series 109 ruthenium electroplated reed relays manufactured by our Relay Division. These offer very long life with good low level switching performance and excellent contact resistance stability.

Series 109 reed relays are the smallest double pole reed relays currently available (the picture shows two 109-2-A-12/2D reed relays together with a British 1 pence coin, shown actual size).



Spare reed relays are built onto the circuit board to allow easy maintenance with minimum downtime.

For more information please visit: pickeringrelay.com

## Switching Specification

| | |
|---|---|
| Switch Type: | Ruthenium Reed |
| Max Switching Voltage: | 100 V* |
| Max Power: | 20 W |
| Max Switch Current: | 0.5 A |
| Max Carry Current: | 1.2 A |
| On Path Resistance: | <1500 mΩ |
| Off Path Resistance: | >$10^9$ Ω |
| Thermal Offset: | <35 µV |
| Bandwidth: | 25 MHz (50-510A & 50-511A)<br>10 MHz (50-512A & 50-513A) |
| Operate Time: | <1 ms, 0.5 ms typical |
| Release Time: | <1 ms, 0.5 ms typical |
| Expected Life | |
| Low power load: | >1x$10^8$ operations |
| Full power load: | >5x$10^6$ operations |

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

## Power Requirements

| +3.3 V | +5 V | +12 V | -12 V |
|---|---|---|---|
| 220 mA | 1.5 A Max | 0 | 0 |

## Mechanical Characteristics

Single slot standard (>175mm) PCI format.
3D models for all versions in a variety of popular file formats are available on request.

## Connectors

Signals via a 96-pin male micro-D connector, for pin outs please refer to the operating manual.

## PCI Compliance

The 50-510A series comply with the PCI Specification 2.0 (issued Feb 2004).

Signalling Environment: 33 MHz, 32-bit Universal (+3.3 V & +5 V).

## Safety & CE Compliance

All cards 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.

## 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 |

## Product Order Codes

| | |
|---|---|
| Single 22x4 Matrix, 1-Pole | 50-510A-021 |
| Single 22x4 Matrix, 2-Pole | 50-510A-022 |
| Dual 20x4 Matrix, 1-Pole | 50-511A-021 |
| Dual 20x4 Matrix, 2-Pole | 50-511A-022 |
| Single 22x8 Matrix, 1-Pole | 50-512A-021 |
| Single 22x8 Matrix, 2-Pole | 50-512A-022 |
| Single 44x4 Matrix, 1-Pole | 50-513A-021 |
| Single 44x4 Matrix, 2-Pole | 50-513A-022 |
| Expansion Cables: | |
| 50-512A Expansion to 44x8 | 50-976-020-0.1M |
| 50-512A Expansion to 22x16 | 50-976-050-0.1M |
| 50-513A Expansion to 88x4 | 50-976-020-0.1M |
| 50-513A Expansion to 44x8 | 50-976-050-0.1M |

## Product Customization

Pickering PCI cards 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 reed relay types
- Mixture of reed 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.

## Support Products

### *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. For more information go to: pickeringtest.com/ebirst

| Product | Test Tool | Adaptor | Termination |
|---|---|---|---|
| 50-510A/511A /512A/513A | 93-002-001 | 93-002-226 | 93-016-103 |

### 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 |
|---|---|
| 50-510A-021 | 91-100-003 |
| 50-510A-022 | 91-100-008 |
| 50-511A-021 | 91-100-003 |
| 50-511A-022 | 91-100-008 |
| 50-512A-021 | 91-100-003 |
| 50-512A-022 | 91-100-008 |
| 50-513A-021 | 91-100-003 |
| 50-513A-022 | 91-100-008 |

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

### Mating Connectors & Cabling

For connection accessories for the 50-510A series please refer to the 90-016D 96-pin micro-D Connector Accessories data sheet where a complete list and documentation can be found for accessories.

**Pickering can supply mating connectors and cable assemblies to enable easy integration of this series of PCI cards**

## 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

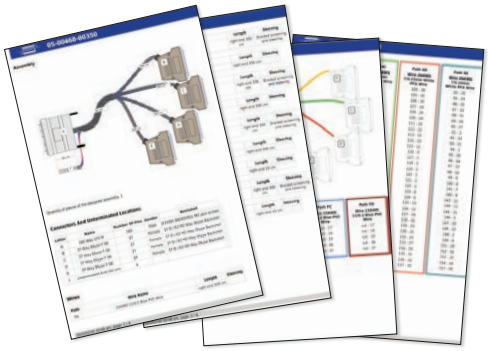
RF Cable Assemblies

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

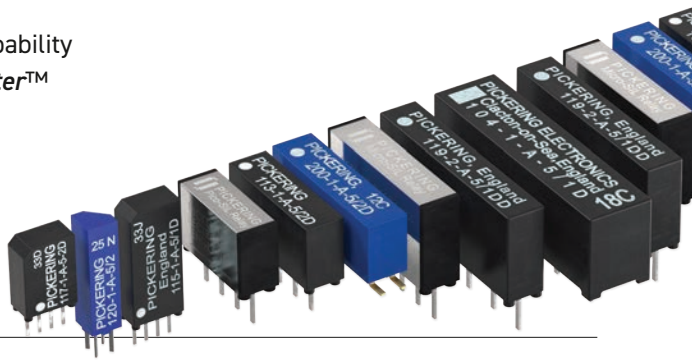
## Mass Interconnect

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

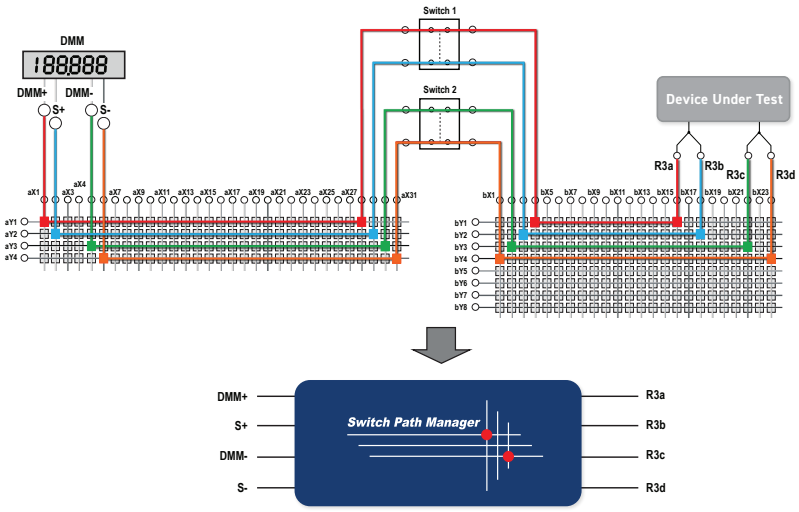
Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help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

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