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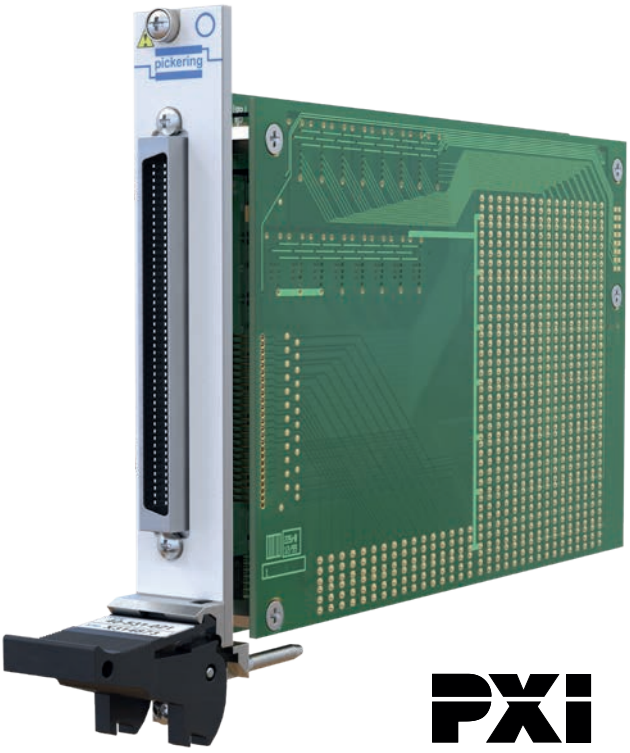
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40-531/532 User Manual

PXI Ultra High Density Matrix Module



PXI

Issue 3.4 February 2020

pickeringtest.com

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ISO 9001
Reg No. FM38792

TECHNICAL SUPPORT

For Technical Support please contact Pickering Interfaces either by phone, the website or via e-mail.

WARRANTY

All products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for a period of three years, excluding programmable power supplies, from the date of delivery to the original purchaser. Any product found to be defective within this period will, at the discretion of Pickering Interfaces be repaired or replaced.

Products serviced and repaired outside of the warranty period are warranted for ninety days.

Extended warranty and service are available. Please contact Pickering Interfaces by phone, the website or via e-mail.

ENVIRONMENTAL POLICY

Pickering Interfaces operates under an environmental management system similar to ISO 14001.

Pickering Interfaces strives to fulfil all relevant environmental laws and regulations and reduce wastes and releases to the environment. Pickering Interfaces aims to design and operate products in a way that protects the environment and the health and safety of its employees, customers and the public. Pickering Interfaces endeavours to develop and manufacture products that can be produced, distributed, used and recycled, or disposed of, in a safe and environmentally friendly manner.

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PRODUCT SAFETY

SAFETY SYMBOLS

The following safety symbols may be used on the product and throughout the product documentation.

MEANING / DESCRIPTION	SYMBOL
PROTECTIVE EARTH (GROUND) To identify any terminal which is intended for connection to an external conductor for protection against electric shock in case of a fault, or the terminal of a protective earth (ground) electrode.	
DANGEROUS VOLTAGE To indicate hazards arising from dangerous voltages.	
WARNING / CAUTION An appropriate safety instruction should be followed or caution to a potential hazard exists. Refer to the relevant instructions detailed within the product manual.	
HEAVY If this product is heavy reference should be made to the safety instructions for provisions of lifting and moving.	
STATIC SENSITIVE To indicate that static sensitive devices are present and handling precautions should be followed.	

CONTENTS

Copyright Statement II

Technical Support and Warranty III

Product Safety IV

Contents (this page) V

Warnings and Cautions VII

Section 1
Technical Specification 1.1

Section 2
Technical Description 2.1
Functional Description 2.1

Section 3
Installation 3.1
Pre Operation Checks 3.1
Hardware Installation 3.2
Software Installation 3.2
Testing Operation 3.3

Section 4
Programming Guide 4.1
Programming Options For Pickering PXI Modules 4.1
Module Architecture 4.2
Programming The Module 4.3

Section 5
Connector Information 5.1

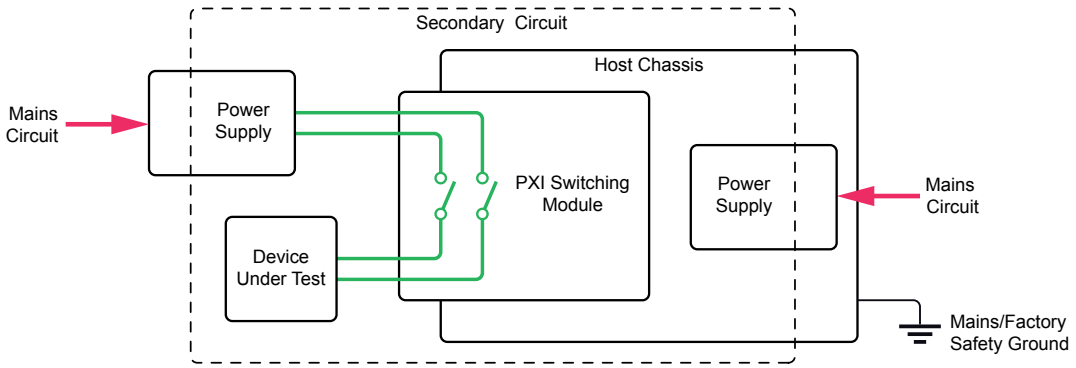
Section 6
Trouble Shooting 6.1

Section 7
Maintenance Information 7.1
Switching System Test Tools 7.1
Relay Lookup Tables 7.1

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WARNINGS AND CAUTIONS

WARNING - HAZARDOUS ENVIRONMENTS	SYMBOL
This product is not specifically designed for use in hazardous environments, for example in explosive atmospheres. If the product is to be used in hazardous environments we recommend that the user ensures suitable protective measures are taken.	

WARNING - DANGER OF ELECTRIC SHOCK	SYMBOL
This module may contain hazardous voltages. Before removing the module from the rack remove all supplies and disconnect user I/O signals. Unused slots in the host chassis are populated with blanking plates to prevent access to user I/O signals that may be present. Blanking panels are available to order from Pickering in a variety of slot widths. If the product is not used in this manner for example by using an extender card then additional care must be taken to avoid contact with exposed signals. Not to be used in safety critical circuits, refer to the Pickering Interfaces' terms & conditions of sale. This module must not be used for the switching of Mains Circuits. For the switching of voltages up to the module's full specification, Secondary Circuit power supplies and the Device Under Test must be fully isolated from the Mains Circuit and the safety earth. The host chassis must be correctly installed and be connected to mains or factory safety ground, please refer to your chassis installation manual.  **Diagram Showing Separation Between The Mains Circuit and Secondary Circuit / DUT** For the purposes of this document, a Mains Circuit is an installation classified as Overvoltage Category II up to 300V. Separation between the Secondary Circuit and Mains Circuit is achieved by a transformer in which the primary windings are separated from the secondary windings by reinforced insulation, double insulation, or a screen connected to the protective conductor terminal.	

CAUTION - HANDLING OF ELECTROSTATIC-SENSITIVE DEVICES	SYMBOL
Certain semiconductor devices used in this equipment are liable to damage due to static voltage. Observe the following precautions when handling these devices in their unterminated state, or sub-assemblies containing these devices: 1. Persons removing sub-assemblies from equipment using these devices must be earthed by a wrist strap and a resistor at the point provided on the equipment. 2. Soldering irons used during the repair operations must be low voltage types with earthed tips and isolated from the mains voltage by a double insulated transformer. 3. Outer clothing worn must be unable to generate static charges. 4. Printed Circuit Boards (PCBs) fitted with these devices must be stored and transported in anti-static bags.	

CAUTION - PRODUCT DOCUMENTATION	SYMBOL
Suitably qualified & trained users should ensure that the accompanying documentation is fully read and understood before attempting to install or operate the product.	

SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS
All cleaning and servicing requires the equipment to be isolated and disconnected from the power source and user I/O signals (refer to the Maintenance Section). • Appropriate manual handling procedures should be followed as dictated by the weight of the individual module or the combined weight of the modules & chassis. • Should a fault occur with the module or chassis, immediately isolate and disconnect the incoming power to the chassis and the user I/O signals. • Ensure the equipment is installed, operated and maintained by trained and authorised personnel. • For suitably equipped products in the event of an emergency press the red “emergency stop” button situated on the front of the unit.

SECTION 1 - TECHNICAL SPECIFICATION

- Ultra High Density Reed Relay Matrix With 256 Crosspoints
- Available as a Single 32x8 or Dual 16x8 Matrix
- 1-Pole, 2-Pole or Screened Versions
- Large Matrices Built Using Multiple Module
- Screened 50Ω Option with 50MHz Bandwidth
- Uses High Reliability Pickering Ruthenium Reed Relays For Maximum Performance
- Fast Operating Speed <1000µs
- Switch up to 150 Volts with 10W Max Power
- Max Switch Current 0.5A Cold or 0.5A Hot
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Supported by *eBIRST* ™
- 3 Year Warranty



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

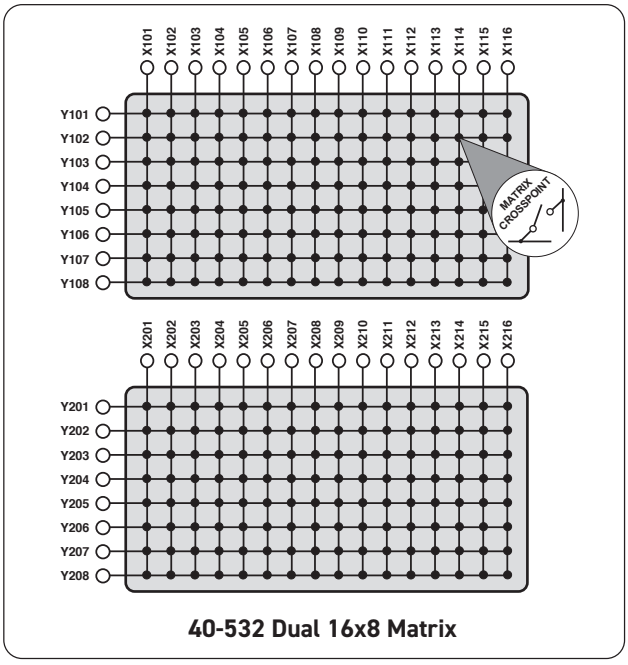
The 40-531/532 very high density matrix module is available in 1-pole, 2-pole and 1-pole screened configurations, the screened version is suitable for switching coaxial signals up to 50MHz. The range is as follows:

- 40-531 Single 32x8 matrix - 1-pole, 2-pole or 1-pole screened
- 40-532 Dual 16x8 matrix - 1-pole, 2-pole or 1-pole screened

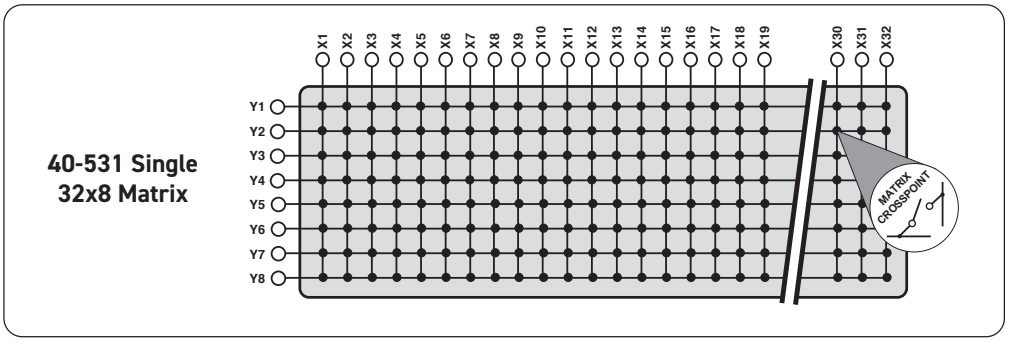
Typical applications include signal routing in Functional ATE and data acquisition systems. These matrix modules are constructed using high reliability reed relays, with 10^9 operations giving maximum switching confidence.

Larger matrices may be constructed by daisy chaining the common signals from multiple modules. However, for applications that require a very large matrix, Pickering's BRIC™ modules are best suited.

Note: For a lower cost alternative to the 40-531-021 Single 32x8 1-pole Matrix, the 40-530-021 should be considered. As well as being a more cost effective solution, it has a higher switching current capability and the same connector pin-out. See the 40-530 data sheet for details.



40-532 Dual 16x8 Matrix



40-531 Single 32x8 Matrix

Relay Type

The 40-531/532 series modules are fitted with ruthenium sputtered reed relays, these offer very long life with good low level switching performance and excellent contact resistance stability. Spare reed relays are built onto the circuit board to allow easy maintenance with minimum downtime.

All reed relays are manufactured by our sister company Pickering Electronics: pickeringrelay.com

Switching Specification

Switch Type:	Ruthenium Reed
Max Switch Voltage:	150VDC/100VAC*
Max Power:	10W
Max Switch Current:	0.5A
Max Carry Current:	0.5A
Initial Path Resistance On (Single Module): Off (Single Module):	 <1200mΩ $>10^9$Ω
Thermal Offset:	<20µV
Operate Time:	<1ms, 0.5ms typical
Release Time:	<1ms, 0.5ms typical
Expected Life Low power load: Full power load:	 $1x10^9$ operations $>5x10^6$ operations

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

RF Specification 40-531-021-S - In a 50Ω System

Bandwidth (-3dB):	50MHz	(40-531-021-S)
Crosstalk (typical):	10kHz: 100kHz: 1MHz 10MHz: 25MHz 50MHz	-90dB -70dB -50dB -35dB -34dB -19dB
Isolation (typical):	10kHz: 100kHz: 1MHz 10MHz: 25MHz 50MHz	90dB 75dB 55dB 39dB 38dB 23dB

Power Requirements

+3.3V	+5V	+12V	-12V
0	1A (typ 280mA)	0	0

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).
Module weight: 400g (40-531-021).
460g (40-531-022-S).
380g (40-531-022).

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 96-pin male 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

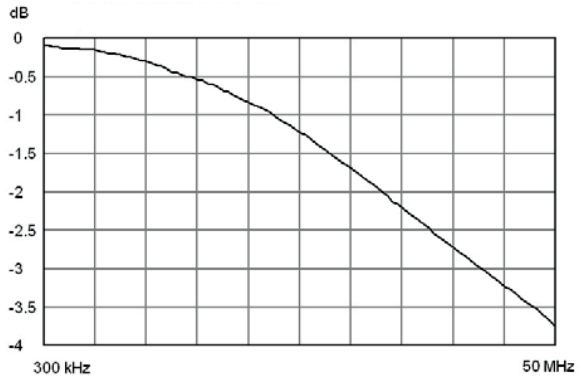
PXI & CompactPCI Compliance

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.



Insertion Loss Plot For 40-531-021-S (typical worst case)

Product Order Codes

Single 32x8 Matrix Module, 1-Pole	40-531-021
Single 32x8 Matrix Module, 2-Pole	40-531-022
Dual 16x8 Matrix Module, 1-Pole	40-532-021
Dual 16x8 Matrix Module, 2-Pole	40-532-022

Options

-S	1-pole versions are available with screened reed relays (e.g. 40-532-021-S)

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 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
40-531/532	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
40-531-021	91-100-018
40-531-021-S	91-100-016
40-531-022	91-100-012
40-532-021	91-100-018
40-532-021-S	91-100-016
40-532-022	91-100-012

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

Mating Connectors & Cabling

For connection accessories for the 40-531/532 modules 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, 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

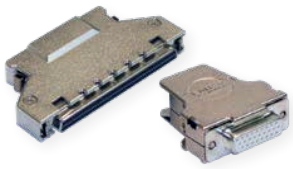
Pickering LXI or LXI/USB Modular Chassis—only accept our 1000+ PXI Switching & Simulation Modules:

- 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

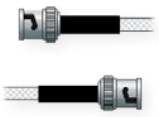
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed to mechanically and electrically mate to our modules.



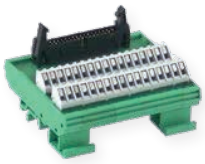
Connectors & Backshells



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

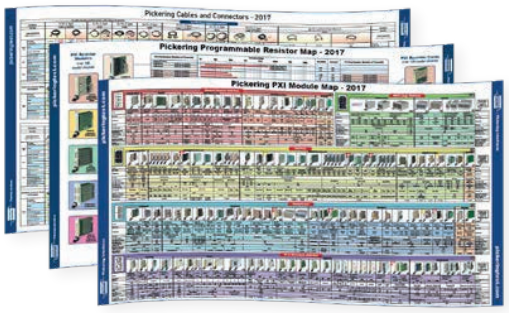
Three Year Warranty & Guaranteed Long-Term Support

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

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SECTION 2 - TECHNICAL DESCRIPTION

FUNCTIONAL DESCRIPTION

A functional block diagram is provided in Figure 2.1. The Ultra High Density Matrix Module is powered by a +5V input via Compact PCI connector J1. The interface to the user test equipment is via the front panel mounted 96-pin micro-D connector, J2. The module comprises one PCB populated with single pole reed relays which are energised via control signals from relay drivers. The relay drivers are addressed by PCI bridge U1 to output the required signal. Module configuration is determined by hardwired links and data stored in EEPROM U8. PCI Bridge U1 is configured by EEPROM U2.

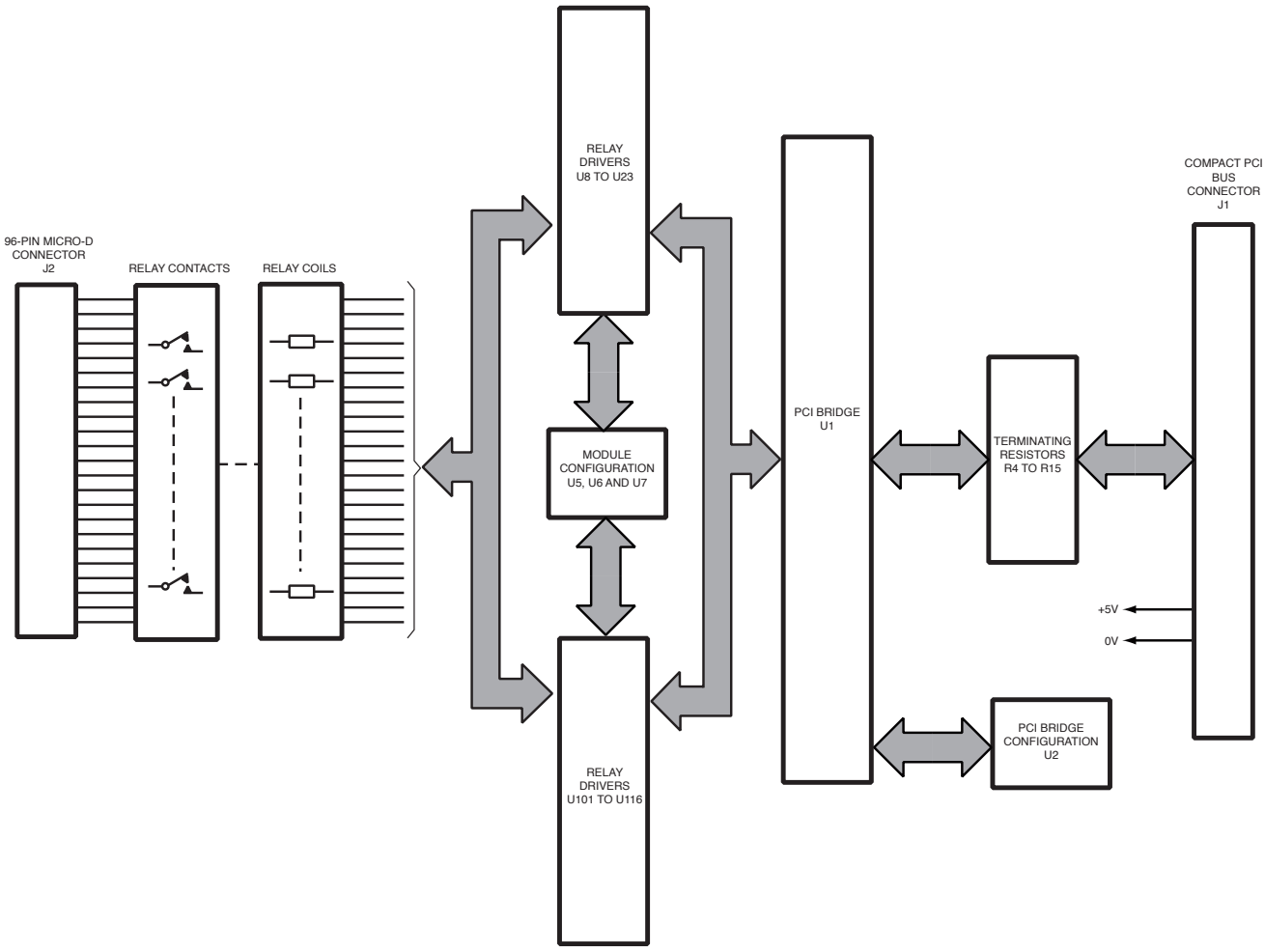


Figure 2.1 - Ultra High Density Matrix Module (40-531/532): Functional Block Diagram

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SECTION 3 - INSTALLATION

Refer to the Warnings and Cautions at the front of this manual

Modular products require installation in a suitable PXI/LXI chassis. The module is designed for indoor use only.

PREOPERATION CHECKS (UNPACKING)

1. Check the module for transport damage and report any damage immediately to Pickering Interfaces. Do not attempt to install the product if any damage is evident.
2. Position the chassis relative to any other equipment the module(s) will connect with. Ensure the chassis is not connected to the electrical supply.
3. Ensure that the designated area for the chassis containing the module is of flat and solid construction to withstand and support the combined weight of the module(s) and chassis.

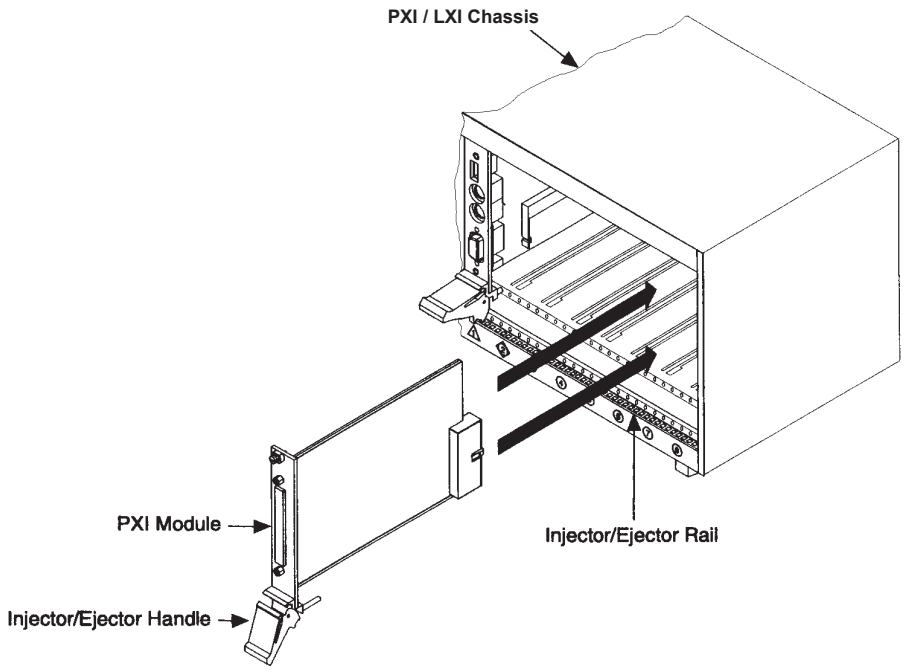


Figure 3.1 - Installing the Module into a PXI/cPCI/LXI Chassis

HARDWARE INSTALLATION
ELECTRICAL CONNECTION (CHASSIS)

1. The chassis must be electrically installed in accordance with local regional electrical codes by a qualified engineer.
2. The chassis must be grounded.

Electrostatic discharge can damage the components on the module. To avoid such damage in handling the board refer to page VII.

Ensure that there is adequate ventilation.

The module should be installed in accordance with the following procedure:

1. Ensure that the system is turned OFF but still connected to mains so that it remains grounded.
2. Choose an appropriate slot in the rack.
3. Remove the blanking plate for the chosen slot.
4. Ensure that the injector/ejector handle is in its downward position. Align the module with the card guides on the top and bottom of the slot.

   Do not raise the injector/ejector handle whilst inserting the module as the module will not insert properly.
5. Hold the handle whilst slowly sliding the module into the card guides until the handle catches on the injector/ejector rail (refer to Figure 3.1).
6. Raise the injector/ejector handle until the module firmly seats into the backplane. The front panel of the module should be flush with the front panel of the chassis.
7. Secure the front panel of the module using both screws to the chassis front panel mounting rails.
8. In a system employing a remote control interface to connect an external controller to a PXI chassis or to link multiple chassis, power-up the system as follows:
   a. For a system comprising an external controller and one chassis, power up the chassis before powering up the external controller.
   b. For a system comprising more than one chassis, turn ON the last chassis in the system followed by the penultimate, etc, and finally turn ON the external controller or chassis containing the system controller.
9. For Pickering Interfaces modular LXI installation there is no requirement to use any particular power up sequence.

SOFTWARE INSTALLATION

First install the appropriate Pickering PXI switch card drivers by running the installer program Setup.exe (provided in a compressed zip file), either from the CD-ROM supplied, or by downloading the latest version from our website **pickeringtest.com** - the recommended method. Setup is accompanied by a ReadMe file containing additional installation information. A single installation covers all cards in the System 40, System 45 and System 50 ranges.

When installation completes, the installed drivers' ReadMe file is offered for display. It can also be displayed later using a shortcut on the Programs>>Pickering menu.

If you are not a LabVIEW user you should choose the "full" version, and once that has been installed run the LabVIEW Runtime Engine installer via the shortcut on the Programs>>Pickering menu. In the absence of LabVIEW the Runtime Engine is required to support the Pickering Test Panels application.

TESTING OPERATION

After installation of the hardware and Pickering PXI Driver software package start the General Soft Front Panel (GSFP) using the desktop icon or via the Start menu (***Start Menu-> Pickering Interfaces Ltd -> General Soft Front Panel***).



Figure 3.2 - General Soft Front Panel Icon

A selector panel will appear, listing all installed Pickering PCI, PXI or LXI switch cards and resistor cards. Click on the card you wish to control, and a graphical control panel is presented allowing operation of the card. Panels can be opened simultaneously for all the installed cards.

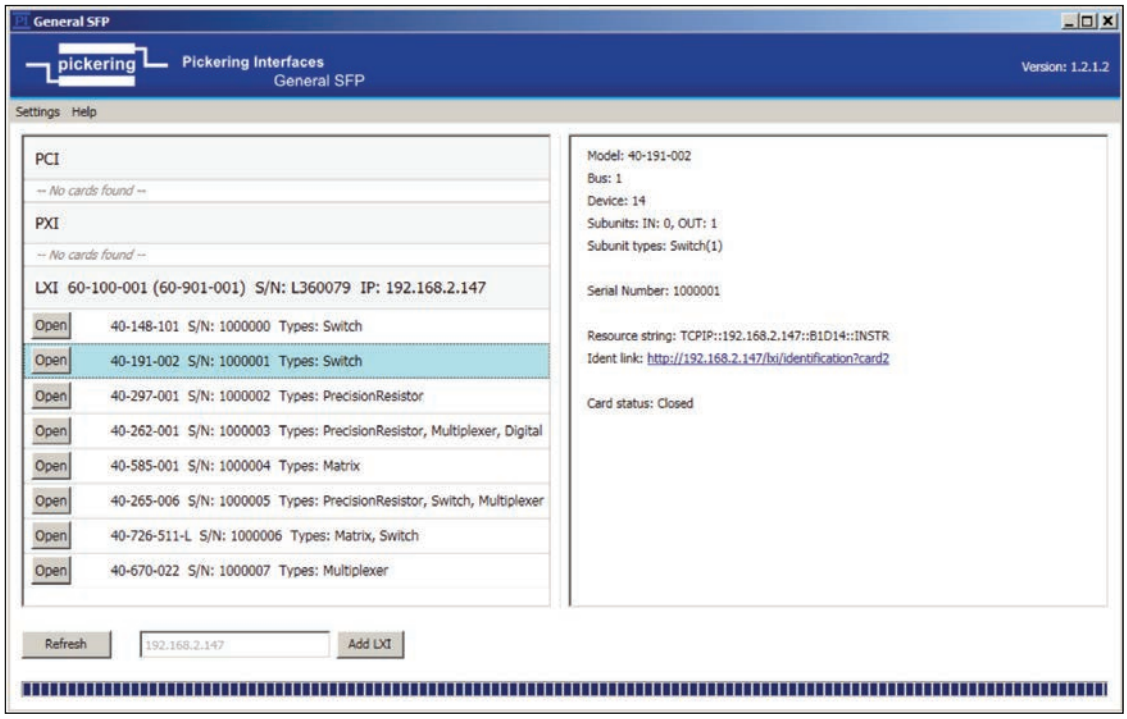


Figure 3.3 - General Soft Front Panel Selector

More details how to use the GSFP can be found in the manual, via menu ***Help\Manual***

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SECTION 4 - PROGRAMMING GUIDE

PROGRAMMING OPTIONS FOR PICKERING INTERFACES PXI MODULES

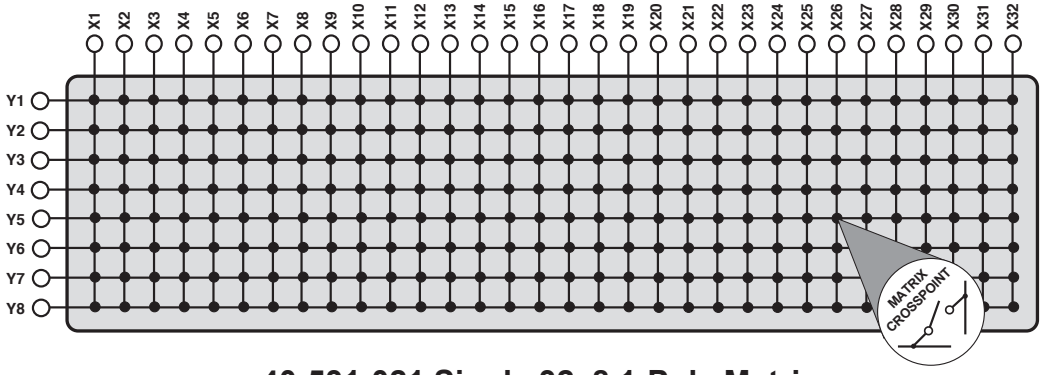
For information on the installation and use of drivers and the programming of Pickering's products in various software environments, please refer to the Software User Manual.

This is available as a download from:
https://www.pickeringtest.com/support/software-drivers-and-downloads

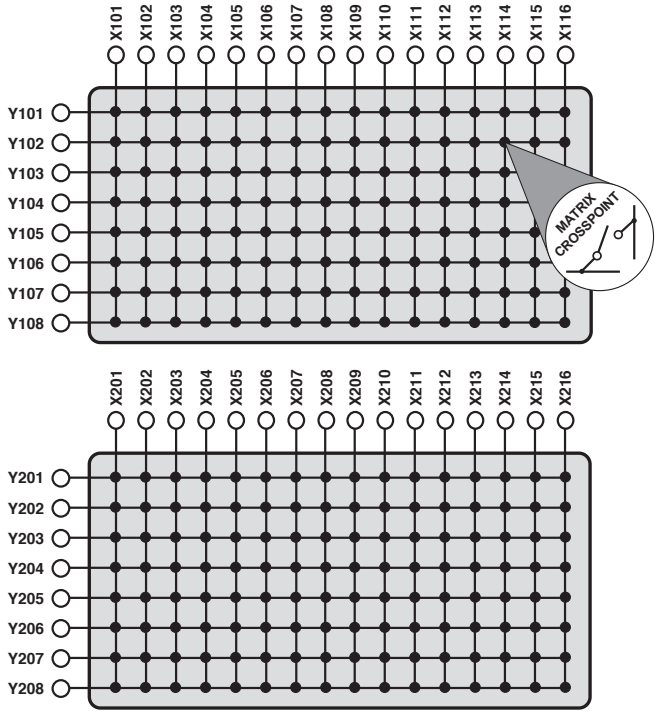
Also, it can be accessed from the DVD supplied with the product:
<DVD_DRIVE>\downloads\Documentation\Software-Manual.pdf

MODULE ARCHITECTURE

The 40-531 is a single 1-pole switching matrix with 32 connections on the X-axis and 8 connections on the Y-axis. Connections are made by operating the relays at the crosspoints between X and Y lines allowing single X-Y connections, or X-X connections using a Y line as a path. The 40-532, is controlled in the same way but is a dual 16x8 matrix. The 40-531 and 40-532 are also available as 2-pole matrices. In this case, both poles of a crosspoint are activated simultaneously when a signal path is enabled. The matrix architectures are shown in the diagrams below:



40-531-021 Single 32x8 1-Pole Matrix



40-532-021 Dual 16x8 1-Pole Matrix

In the case of the single matrix, the entire matrix is treated as a single programming sub-unit designated as Sub-Unit 1. The dual matrix is divided into sub-units 1 and 2. The following page gives some simple examples using the provided drivers: the IVI driver, the Direct IO driver, and the IVI compliant driver.

PROGRAMMING THE MODULE

Using The IVI Driver, Direct Driver or VISA Driver

This section provides some code fragments which show how to control the matrix using the IVI Driver, Direct Driver or the VISA Driver.

Once the drivers are installed the manual “Sys40Prg.pdf” and driver help files which fully describes these functions can be found in the Pickering folder(s) or the Pickering entries on your Start Menu.

The card must be opened before use and closed after using the following function calls:

Direct Driver - Open with `PIL_OpenCards` or `PIL_OpenSpecifiedCard` and close with `PIL_CloseCards` or `PIL_CloseSpecifiedCards` respectively.

VISA Driver - Open with `pipx40_init`, and close with, `pipx40_close`.

Setting a Matrix Crosspoint:

Using the IVI driver:

Note: the following example is for bank 1 of a dual matrix. Bank 1 is identified as A, bank 2 would be identified as B, and a single matrix would have no letter identifier.

```
pi40iv_Connect(vi, xA1, yA2); //set crosspoint x1, y2 to on
pi40iv_Disonnect(vi, xA1, yA2); //set crosspoint x1, y2 to off
```

Using the Pickering Direct driver:

```
DWORD SubUnit = 1;    //select bank 1 (dual matrix) or whole matrix (single matrix)
PIL_ClearSub(CardNo, SubUnit);    //clear all crosspoints to off state
PIL_OpCrosspoint(CardNo, SubUnit, 2, 1, 1); //set crosspoint x1, y2 to on
PIL_OpCrosspoint(CardNo, SubUnit, 2, 1, 0); //set crosspoint x1, y2 to off
```

Using the VISA driver:

```
ViUInt32 SubUnit = 1; //select bank 1 (dual matrix) or whole matrix (single matrix)
pipx40_clearSub(vi, SubUnit); //clear all crosspoints off state
pipx40_setCrosspointState (vi, SubUnit, 2, 1, VI_ON); //set crosspoint x1, y2 on
pipx40_setCrosspointState (vi, SubUnit, 2, 1, VI_OFF); //set crosspoint x1, y2 off
```

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SECTION 5 - CONNECTOR INFORMATION

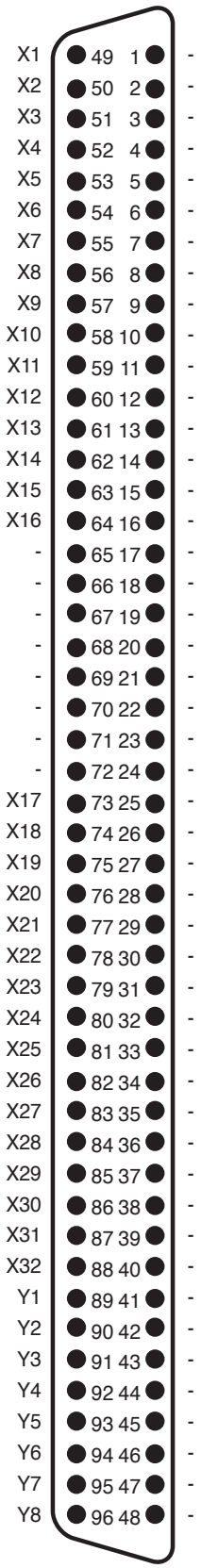


Figure 5.1 - Pinout: 40-531-021 Single 1-Pole 32x8 Ultra High Density Matrix Module (96-pin male micro-D connector viewed from front of module)

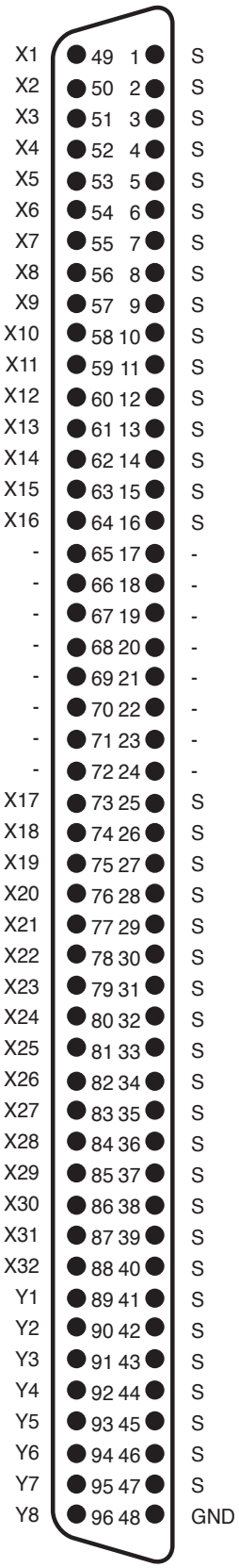


Figure 5.2 - Pinout: 40-531-021-S
Single 1-Pole Screened 32x8
Ultra High Density Matrix Module
(96-pin male micro-D connector
viewed from front of module)

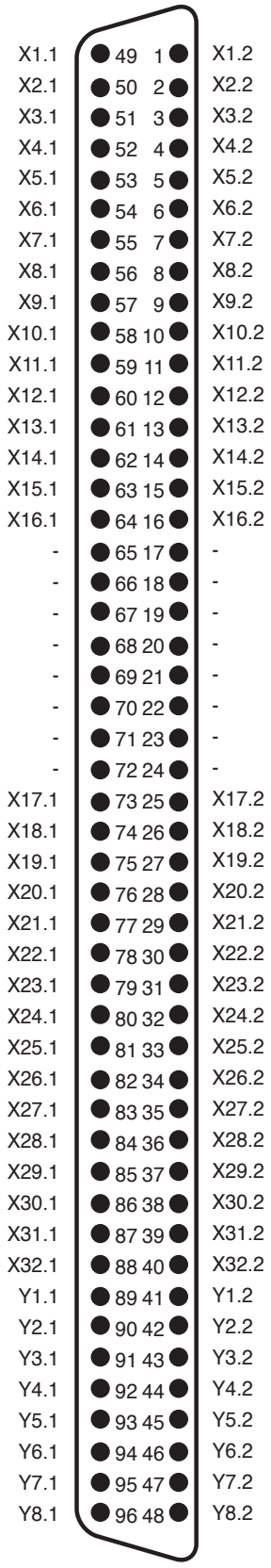


Figure 5.3 - Pinout: 40-531-022
Single 2-Pole 32x8
Ultra High Density Matrix Module
(96-pin male micro-D connector
viewed from front of module)

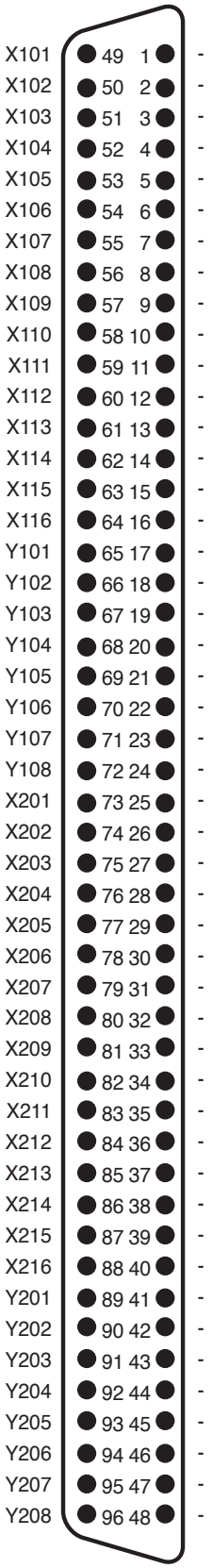


Figure 5.4 - Pinout: 40-532-021 Dual 1-Pole 16x8 Ultra High Density Matrix Module (96-pin male micro-D connector viewed from front of module)

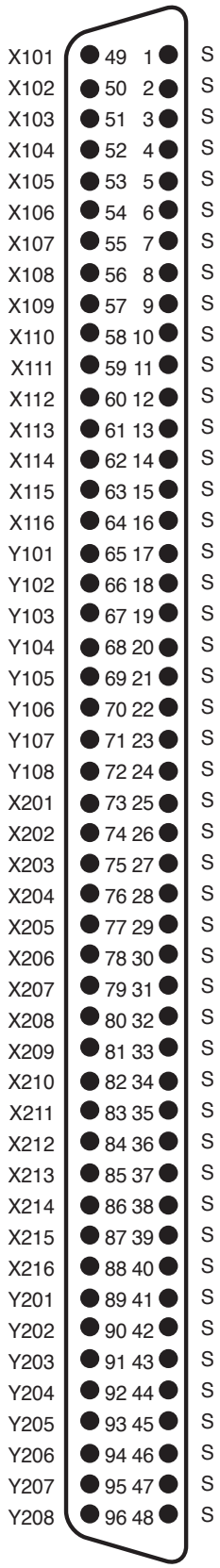


Figure 5.5 - Pinout: 40-532-021-S
Dual 1-Pole Screened 16x8
Ultra High Density Matrix Module
(96-pin male micro-D connector viewed from front of module)

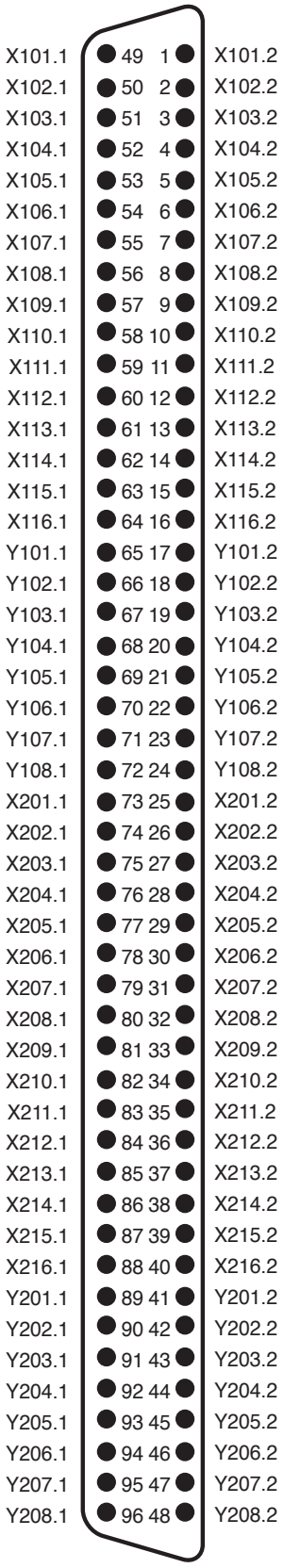


Figure 5.6 - Pinout: 40-532-022
Dual 2-Pole 16x8
Ultra High Density Matrix Module
(96-pin male micro-D connector viewed from front of module)

SECTION 6 - TROUBLE SHOOTING

Refer to the Warnings and Cautions at the front of this manual 

INSTALLATION PROBLEMS

The Plug & Play functionality of Pickering switch cards generally ensures trouble-free installation.

If you do experience any installation problems you should first ensure that all cards are properly seated in their slots. Improperly mated cards may go undetected by the operating system, or may be detected as a card of an unknown type. They can also cause the computer to freeze at various stages in the boot sequence.

If your system employs a remote control interface you should check the integrity of all remote control interface links. When the system is powered up, and during Windows start-up, you should expect to see periodic activity on the remote control interface RX/TX (yellow) indicators, clearing to leave only the PWR/LNK (green) LEDs illuminated. The RX/TX indicators should show activity when you attempt to access a card.

DIAGNOSTIC UTILITY

The Pickering Diagnostic Utility (accessible through the Programs>>Pickering>>PXI Utilities menu) generates a diagnostic report of the system's PCI configuration, highlighting any potential configuration problems. Specific details of all installed Pickering switch cards are included. All the installed Pickering switch cards should be listed in the "Pilpxi information" section - if one or more cards is missing it may be possible to determine the reason by referring to the PCI configuration dump contained in the report, but interpretation of this information is far from straightforward, and the best course is to contact Pickering support: support@pickeringtest.com, if possible including a copy of the diagnostic report.

In the "VISA information" section, if VISA is not installed its absence will be reported. This does not affect operation using the Direct I/O driver, and is not a problem unless you wish to use VISA. VISA is a component of National Instruments LabWindows/CVI and LabVIEW, or is available as a standalone environment.

If VISA is present and is of a sufficiently recent version, the section "Pipx40 information" should present a listing similar to "Pilpxi information".

Please note that the Diagnostic Utility cannot access cards if they are currently opened by some other application, such as the Test Panels or Terminal Monitor.

SWITCHING SYSTEM TEST TOOLS

Please refer to Section 7 - Maintenance Information.

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SECTION 7 - MAINTENANCE INFORMATION

Refer to the Warnings and Cautions at the front of this manual 

PERIODIC MAINTENANCE

This product and its corresponding chassis do not require any periodic maintenance.

GENERAL CLEANING

- Isolate the electrical power from the chassis and ensure that no user I/O signals are being applied.
- Wipe the product & chassis surfaces with a clean dry anti-static cloth only.

SOFTWARE UPDATE

For PXI modules operating in a PXI chassis, no module software updates are required. For the latest version of the driver please refer to our web site **pickeringtest.com** where links to our Software Download page will provide the latest version of the driver software for the various programming environments encountered.

For PXI modules which are supported in one of Pickering Interfaces' Modular LXI Chassis (such as the 60-102B and 60-103B) no module software update is required. If the module was introduced after the LXI chassis was manufactured the module may not be recognized, in this case the chassis firmware may need upgrading. This is a simple process which is described in the manual for the Modular LXI Chassis.

SWITCHING SYSTEM TEST TOOLS

We recommend the use of ***eBIRST*** to provide a check of the correct operation of relays and to identify the location of any faulty relay. For more information on ***eBIRST*** click here.

RELAY LOOK-UP TABLES

The following pages provide a cross reference between the signal paths of the product and the physical relays on the PCB. The tables can be used in the fault finding process and should be used in conjunction with the corresponding PCB layout diagrams to identify the position of faulty relays. Users of ***eBIRST*** switching system test tools do not need to use this information to locate faulty relays.

NOTE

This is a very high density design, as a consequence removal of the relays can be awkward since there is no access to the relay sides to grip them during de-soldering. Further guidance on removal can be obtained on our Knowledgebase http://wiki.pickeringtest.net/Replacing+Relays or search the Knowledgebase for "Replacing Relays".

RELAY LOOK-UP TABLES

NOTE: Relays on the motherboard are highlighted in blue and relays on the daughterboard are highlighted in yellow.

TABLE 7.1 - Single 32x8 Ultra High Density Matrix 40-531-021/022 Relay Numbering

Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.
X	Y		X	Y		X	Y		X	Y	
1	1	A32	1	2	A1	1	3	B1	1	4	C1
2	1	A31	2	2	A2	2	3	B2	2	4	C2
3	1	A30	3	2	A3	3	3	B3	3	4	C3
4	1	A29	4	2	A4	4	3	B4	4	4	C4
5	1	A28	5	2	A5	5	3	B5	5	4	C5
6	1	A27	6	2	A6	6	3	B6	6	4	C6
7	1	A26	7	2	A7	7	3	B7	7	4	C7
8	1	A25	8	2	A8	8	3	B8	8	4	C8
9	1	A24	9	2	A9	9	3	B9	9	4	C9
10	1	A23	10	2	A10	10	3	B10	10	4	C10
11	1	A22	11	2	A11	11	3	B11	11	4	C11
12	1	A21	12	2	A12	12	3	B12	12	4	C12
13	1	A20	13	2	A13	13	3	B13	13	4	C13
14	1	A19	14	2	A14	14	3	B14	14	4	C14
15	1	A18	15	2	A15	15	3	B15	15	4	C15
16	1	A17	16	2	A16	16	3	B16	16	4	C16
17	1	A32	17	2	B32	17	3	C32	17	4	D32
18	1	A31	18	2	B31	18	3	C31	18	4	D31
19	1	A30	19	2	B30	19	3	C30	19	4	D30
20	1	A29	20	2	B29	20	3	C29	20	4	D29
21	1	A28	21	2	B28	21	3	C28	21	4	D28
22	1	A27	22	2	B27	22	3	C27	22	4	D27
23	1	A26	23	2	B26	23	3	C26	23	4	D26
24	1	A25	24	2	B25	24	3	C25	24	4	D25
25	1	A24	25	2	B24	25	3	C24	25	4	D24
26	1	A23	26	2	B23	26	3	C23	26	4	D23
27	1	A22	27	2	B22	27	3	C22	27	4	D22
28	1	A21	28	2	B21	28	3	C21	28	4	D21
29	1	A20	29	2	B20	29	3	C20	29	4	D20
30	1	A19	30	2	B19	30	3	C19	30	4	D19
31	1	A18	31	2	B18	31	3	C18	31	4	D18
32	1	A17	32	2	B17	32	3	C17	32	4	D17

TABLE 7.1 - Single 32x8 Ultra High Density Matrix 40-531-021/022 Relay Numbering (Continued)

Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.
X	Y		X	Y		X	Y		X	Y	
1	5	D1	1	6	E1	1	7	F1	1	8	G1
2	5	D2	2	6	E2	2	7	F2	2	8	G2
3	5	D3	3	6	E3	3	7	F3	3	8	G3
4	5	D4	4	6	E4	4	7	F4	4	8	G4
5	5	D5	5	6	E5	5	7	F5	5	8	G5
6	5	D6	6	6	E6	6	7	F6	6	8	G6
7	5	D7	7	6	E7	7	7	F7	7	8	G7
8	5	D8	8	6	E8	8	7	F8	8	8	G8
9	5	D9	9	6	E9	9	7	F9	9	8	G9
10	5	D10	10	6	E10	10	7	F10	10	8	G10
11	5	D11	11	6	E11	11	7	F11	11	8	G11
12	5	D12	12	6	E12	12	7	F12	12	8	G12
13	5	D13	13	6	E13	13	7	F13	13	8	G13
14	5	D14	14	6	E14	14	7	F14	14	8	G14
15	5	D15	15	6	E15	15	7	F15	15	8	G15
16	5	D16	16	6	E16	16	7	F16	16	8	G16
17	5	E32	17	6	F32	17	7	G32	17	8	G16
18	5	E31	18	6	F31	18	7	G31	18	8	G15
19	5	E30	19	6	F30	19	7	G30	19	8	G14
20	5	E29	20	6	F29	20	7	G29	20	8	G13
21	5	E28	21	6	F28	21	7	G28	21	8	G12
22	5	E27	22	6	F27	22	7	G27	22	8	G11
23	5	E26	23	6	F26	23	7	G26	23	8	G10
24	5	E25	24	6	F25	24	7	G25	24	8	G9
25	5	E24	25	6	F24	25	7	G24	25	8	G8
26	5	E23	26	6	F23	26	7	G23	26	8	G7
27	5	E22	27	6	F22	27	7	G22	27	8	G6
28	5	E21	28	6	F21	28	7	G21	28	8	G5
29	5	E20	29	6	F20	29	7	G20	29	8	G4
30	5	E19	30	6	F19	30	7	G19	30	8	G3
31	5	E18	31	6	F18	31	7	G18	31	8	G2
32	5	E17	32	6	F17	32	7	G17	32	8	G1

TABLE 7.2 - Dual 16x8 Ultra High Density Matrix 40-532-021/022 Relay Numbering

Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.
X	Y		X	Y		X	Y		X	Y	
101	101	A32	101	102	A1	101	103	B1	101	104	C1
102	101	A31	102	102	A2	102	103	B2	102	104	C2
103	101	A30	103	102	A3	103	103	B3	103	104	C3
104	101	A29	104	102	A4	104	103	B4	104	104	C4
105	101	A28	105	102	A5	105	103	B5	105	104	C5
106	101	A27	106	102	A6	106	103	B6	106	104	C6
107	101	A26	107	102	A7	107	103	B7	107	104	C7
108	101	A25	108	102	A8	108	103	B8	108	104	C8
109	101	A24	109	102	A9	109	103	B9	109	104	C9
110	101	A23	110	102	A10	110	103	B10	110	104	C10
111	101	A22	111	102	A11	111	103	B11	111	104	C11
112	101	A21	112	102	A12	112	103	B12	112	104	C12
113	101	A20	113	102	A13	113	103	B13	113	104	C13
114	101	A19	114	102	A14	114	103	B14	114	104	C14
115	101	A18	115	102	A15	115	103	B15	115	104	C15
116	101	A17	116	102	A16	116	103	B16	116	104	C16
201	201	A32	201	202	B32	201	203	C32	201	204	D32
202	201	A31	202	202	B31	202	203	C31	202	204	D31
203	201	A30	203	202	B30	203	203	C30	203	204	D30
204	201	A29	204	202	B29	204	203	C29	204	204	D29
205	201	A28	205	202	B28	205	203	C28	205	204	D28
206	201	A27	206	202	B27	206	203	C27	206	204	D27
207	201	A26	207	202	B26	207	203	C26	207	204	D26
208	201	A25	208	202	B25	208	203	C25	208	204	D25
209	201	A24	209	202	B24	209	203	C24	209	204	D24
210	201	A23	210	202	B23	210	203	C23	210	204	D23
211	201	A22	211	202	B22	211	203	C22	211	204	D22
212	201	A21	212	202	B21	212	203	C21	212	204	D21
213	201	A20	213	202	B20	213	203	C20	213	204	D20
214	201	A19	214	202	B19	214	203	C19	214	204	D19
215	201	A18	215	202	B18	215	203	C18	215	204	D18
216	201	A17	216	202	B17	216	203	C17	216	204	D17

TABLE 7.2 - Dual 16x8 Ultra High Density Matrix 40-532-021/022 Relay Numbering (Continued)

Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.	Matrix Crosspoint		Relay No.
X	Y		X	Y		X	Y		X	Y	
101	105	D1	101	106	E1	101	107	F1	101	108	G1
102	105	D2	102	106	E2	102	107	F2	102	108	G2
103	105	D3	103	106	E3	103	107	F3	103	108	G3
104	105	D4	104	106	E4	104	107	F4	104	108	G4
105	105	D5	105	106	E5	105	107	F5	105	108	G5
106	105	D6	106	106	E6	106	107	F6	106	108	G6
107	105	D7	107	106	E7	107	107	F7	107	108	G7
108	105	D8	108	106	E8	108	107	F8	108	108	G8
109	105	D9	109	106	E9	109	107	F9	109	108	G9
110	105	D10	110	106	E10	110	107	F10	110	108	G10
111	105	D11	111	106	E11	111	107	F11	111	108	G11
112	105	D12	112	106	E12	112	107	F12	112	108	G12
113	105	D13	113	106	E13	113	107	F13	113	108	G13
114	105	D14	114	106	E14	114	107	F14	114	108	G14
115	105	D15	115	106	E15	115	107	F15	115	108	G15
116	105	D16	116	106	E16	116	107	F16	116	108	G16
201	205	E32	201	206	F32	201	207	G32	201	208	G16
202	205	E31	202	206	F31	202	207	G31	202	208	G15
203	205	E30	203	206	F30	203	207	G30	203	208	G14
204	205	E29	204	206	F29	204	207	G29	204	208	G13
205	205	E28	205	206	F28	205	207	G28	205	208	G12
206	205	E27	206	206	F27	206	207	G27	206	208	G11
207	205	E26	207	206	F26	207	207	G26	207	208	G10
208	205	E25	208	206	F25	208	207	G25	208	208	G9
209	205	E24	209	206	F24	209	207	G24	209	208	G8
210	205	E23	210	206	F23	210	207	G23	210	208	G7
211	205	E22	211	206	F22	211	207	G22	211	208	G6
212	205	E21	212	206	F21	212	207	G21	212	208	G5
213	205	E20	213	206	F20	213	207	G20	213	208	G4
214	205	E19	214	206	F19	214	207	G19	214	208	G3
215	205	E18	215	206	F18	215	207	G18	215	208	G2
216	205	E17	216	206	F17	216	207	G17	216	208	G1

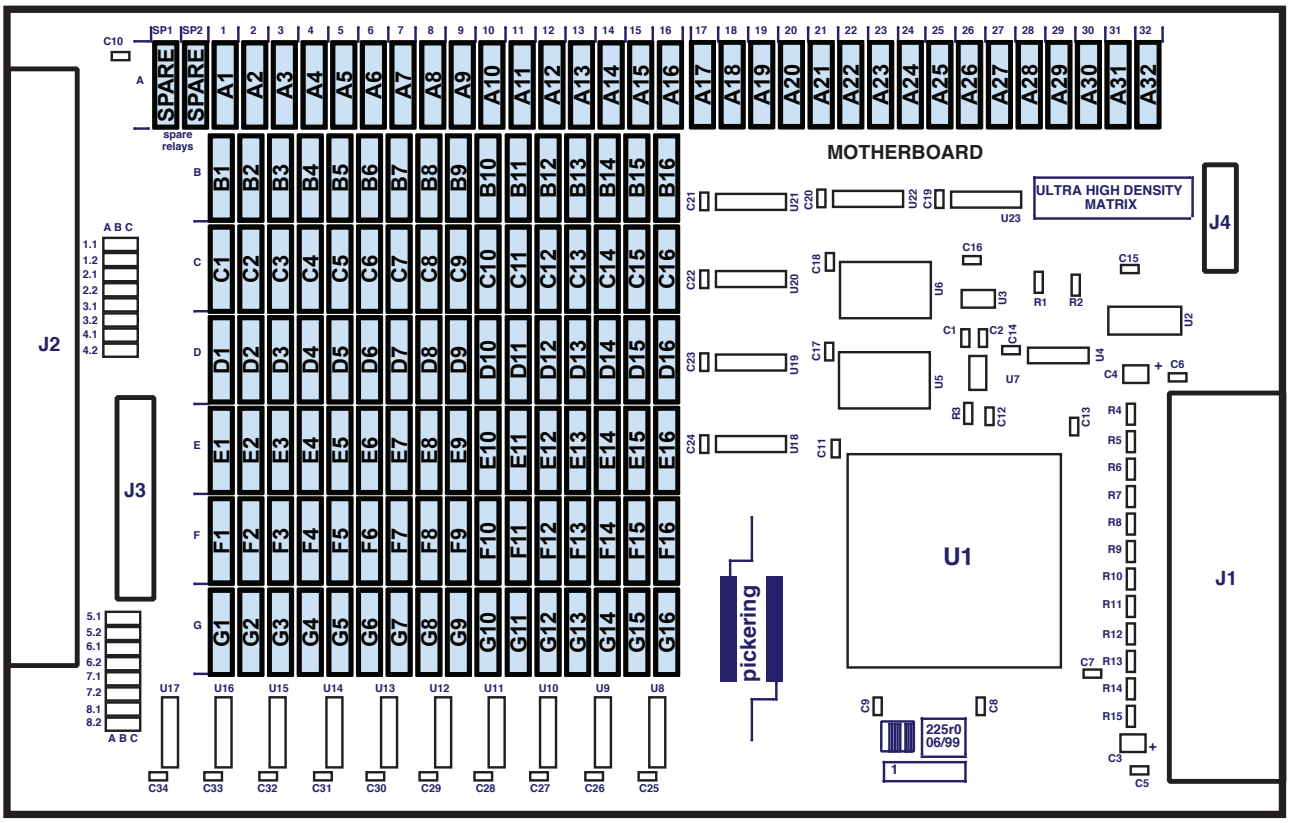


Figure 7.1 - 40-531/532 Ultra High Density Matrix Module Motherboard Layout

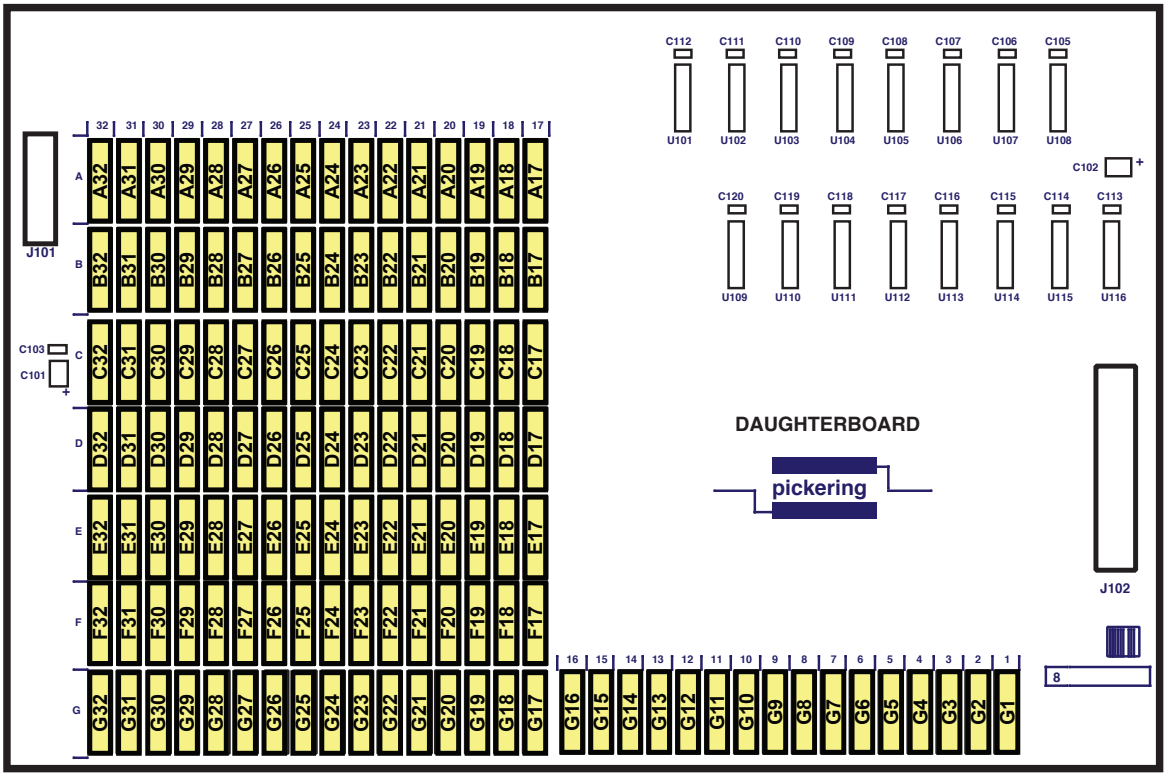


Figure 7.2 - 40-531/532 Ultra High Density Matrix Module Daughterboard Layout

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