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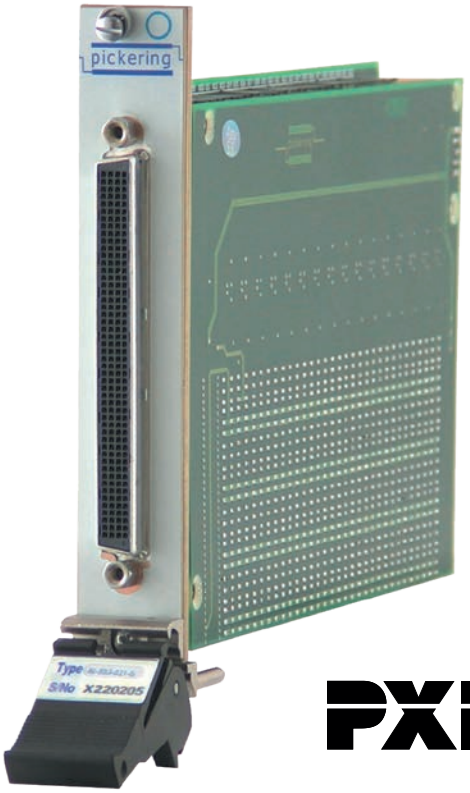
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40-533/533A User Manual

PXI Ultra High Density Matrix Module



PXI

Issue 9.3 February 2020

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ISO 9001
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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

LA SÉCURITÉ DES PRODUITS

SAFETY SYMBOLS

SYMBOLES DE SÉCURITÉ

The following safety symbols may be used on the product and throughout the product documentation.	Les symboles de sécurité suivants peuvent être utilisés sur le produit et dans l'ensemble de la documentation produit.

MEANING / DESCRIPTION	SYMBOL	SIGNIFICATION / DESCRIPTION
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.		MISE À LA TERRE Pour identifier les bornes destinées à être raccordées à un conducteur externe de protection contre les chocs électriques en cas de défaut d'isolement, ou pour marquer la borne de mise à la terre.
DANGEROUS VOLTAGE To indicate hazards arising from dangerous voltages.		TENSION DANGEREUSE Pour indiquer les dangers découlant des tensions dangereuses.
WARNING / CAUTION An appropriate safety instruction should be followed or caution to a potential hazard exists. Refer to the relevent instructions detailed within the product manual.		AVERTISSEMENT - ATTENTION Des consignes de sécurité appropriées doivent être suivies. En cas de danger potentiel existant, prendre des précautions. Consulter les instructions détaillées dans le manuel du produit.
HEAVY If this product is heavy reference should be made to the safety instructions for provisions of lifting and moving.		CHARGE LOURDE Si ce produit est lourd il convient de se référer aux consignes de sécurité pour les dispositions de levage et de déplacement.
STATIC SENSITIVE To indicate that static sensitive devices are present and handling precautions should be followed.		SENSIBILITÉ STATIQUE Pour indiquer que des appareils sensibles statiques sont présents et les précautions de manipulation doivent être suivies.

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WARNINGS AND CAUTIONS

AVERTISSEMENTS ET PRÉCAUTIONS

WARNING HAZARDOUS ENVIRONMENTS	SYMBOL	AVERTISSEMENT ENVIRONNEMENTS DANGEREUX
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.		Ce produit n'est spécifiquement pas conçu pour un usage dans des environnements dangereux, par exemple en atmosphères explosives. Si le produit doit être utilisé dans des environnements dangereux, nous recommandons à l'utilisateur de s'assurer que des mesures de protection appropriées soient prises.

WARNING DANGER OF ELECTRIC SHOCK	SYMBOL	AVERTISSEMENT DANGER DE CHOC ELECTRIQUE
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 PXI/LXI 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.		Ce module peut contenir des tensions dangereuses. Avant de retirer le module de la baie, enlever toutes les fournitures et déconnecter les signaux d'E/S utilisateur. Les slots non utilisés dans le châssis PXI/LXI sont peuplées d'obturateurs pour empêcher l'accès aux signaux d'E/S utilisateur qui peuvent être présents. Les obturateurs sont disponibles sur commande chez Pickering dans une variété de largeur de fente. Si le produit est utilisé sans obturateur, par exemple en utilisant une carte d'extension, alors des précautions supplémentaires doivent être prises pour éviter tout contact avec les signaux exposés. Ne pas utiliser dans des circuits critiques de sécurité, se référer à nos Conditions Générales de Ventes. Ce module ne doit pas être utilisé pour la commutation des circuits principaux. Pour la commutation de tensions jusqu'à la spécification complète du module, les alimentations des circuits secondaires et l'appareil sous test doivent être complètement isolés des circuits principaux et de la terre de sécurité. Le châssis hôte doit être correctement installé et connecté à la terre ou au réseau de sécurité d'usine. Veuillez-vous reporter au manuel d'installation de votre châssis.

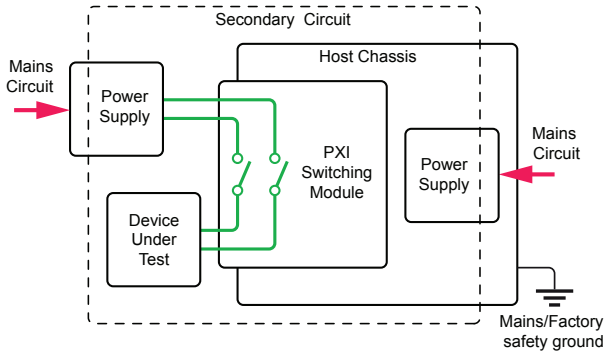


Diagram Showing Separation Between The Mains Circuit and Secondary Circuit / DUT

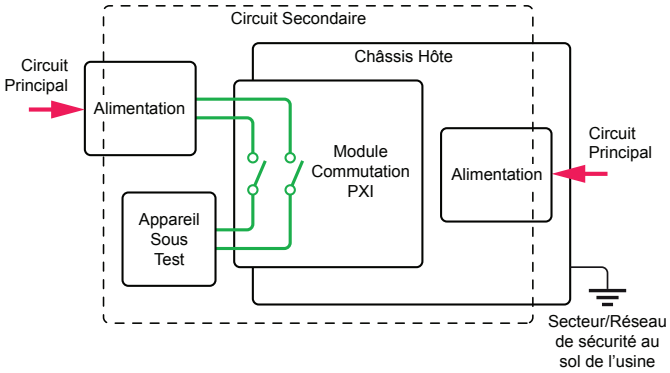


Diagramme Montrant la Séparation Entre le Circuit Principal et le Circuit Secondaire

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.	Aux fins du présent document, un circuit principal est une installation classée dans la Catégorie de Surtension Groupe II jusqu'à 300V. la séparation entre le circuit secondaire et le circuit principal est réalisée par un transformateur dans lequel les enroulements primaires sont séparés des enroulements secondaires par une isolation renforcée, une double isolation ou un blindage relié à la borne de conducteur de protection.

CAUTION - HANDLING OF ELECTROSTATIC-SENSITIVE SEMICONDUCTOR DEVICES	SYMBOL	ATTENTION - MANIPULATION DES APPAREILS SENSIBLES ELECTROSTATIQUES
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.		Certains appareils semi-conducteurs utilisés dans cet équipement sont susceptibles d'être endommager en raison de la tension statique. Respectez les précautions suivantes lorsque vous manipulez ces appareils dans leur état non terminé, ou sous-ensembles contenant ces appareils : 1. Les personnes démontant partiellement l'équipement à l'aide de ces appareils doivent être mises à la terre par bracelet antistatique et une résistance au point prévu sur l'équipement. 2. Les fers à souder utilisés pendant les opérations de réparation doivent être de type "basse tension" avec des bouts reliés à la terre et isolés à partir de la tension du réseau par un transformateur à double isolation. 3. Les vêtements externes ne doivent pas générer des charges électrostatiques. 4. Les cartes de circuits imprimés (PCB) équipées de ces appareils doivent être entreposées et transportées dans des sacs antistatiques.

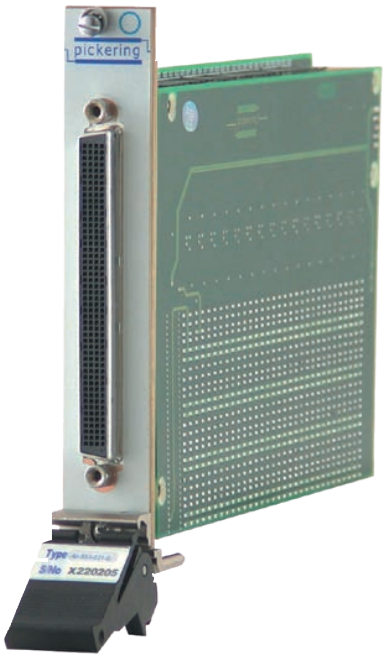
CAUTION PRODUCT DOCUMENTATION	SYMBOL	ATTENTION DOCUMENTATION PRODUIT
Suitably qualified & trained users should ensure that the accompanying documentation is fully read and understood before attempting to install or operate the product.		Les utilisateurs qualifiés et formés doivent veiller à ce que la documentation soit entièrement lue et comprise avant l'installation ou l'utilisation du produit.

SAFETY INSTRUCTIONS

SAFETY INSTRUCTIONS	CONSIGNES DE SÉCURITÉ
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.	Les travaux de nettoyage et de réparation nécessitent que l'équipement soit isolé et déconnecté de la source d'alimentation et des signaux d'E/S utilisateur (voir la section Entretien). • Les procédures de manipulation manuelle appropriées doivent être suivies en fonction du poids du module seul ou le poids combiné des modules et du châssis. • En cas de défaut avec le module ou le châssis, isoler immédiatement et débrancher l'alimentation entrant au châssis et les signaux d'E/S utilisateur. • S'assurer que le matériel est installé, utilisé et entre-tenu par du personnel formé et autorisé. • Pour les produits convenablement équipés, en cas d'urgence, appuyez sur le bouton rouge "arrêt d'urgence" situé sur l'avant de l'unité.

SECTION 1 - TECHNICAL SPECIFICATION

- Ultra High Density Reed Relay Matrix With 256 Crosspoints
- Configured as a Single 64x4 Matrix
- 1-Pole, 2-Pole or 1-Pole Screened Versions
- Large Matrices Built Using Multiple Modules
- Uses High Reliability Pickering Ruthenium Reed Relays For Maximum Performance
- Fast Operating Speed <1000µs
- Switch up to 150VDC/100VAC with 10W Max Power
- Max Switch Current 0.5A
- VISA, IVI & Kernel Drivers Supplied for Windows
- Supported by PXI or LXI Chassis
- Supported by *eBIRST* ™
- 3 Year Warranty



The 40-533A is an ultra high density PXI switching matrix constructed with reed relays. The range is as follows:

- 40-533A-021 Single 64x4 matrix - 1-pole or 1-pole screened
- 40-533A-022 Single 64x4 matrix - 2-pole

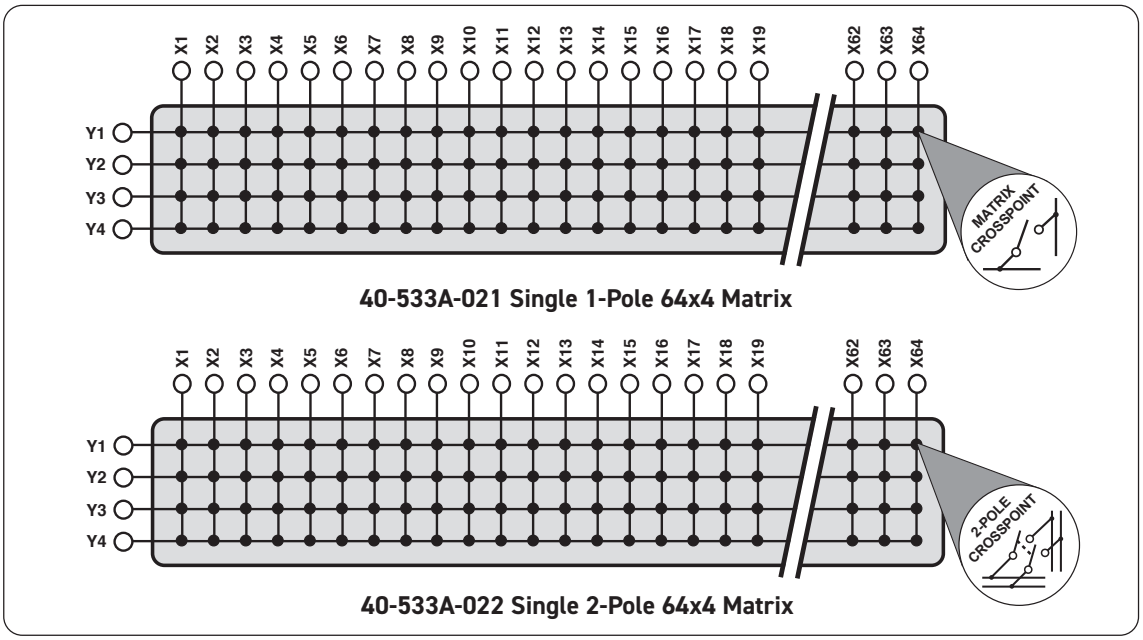
Typical applications include signal routing in Functional ATE and data acquisition systems. These PXI matrix modules are constructed using high reliability sputtered ruthenium reed relays, offering >10^9 operations to give maximum switching confidence with long life and stable contact resistance.

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.

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



40-533A-021 Single 1-Pole 64x4 Matrix

40-533A-022 Single 2-Pole 64x4 Matrix

Relay Type

The 40-533A 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):	<1Ω
Off (Single Module):	$>10^9\Omega$
Thermal Offset:	<5µV
Operate Time:	<1ms, 0.5ms typical
Release Time:	<1ms, 0.5ms typical
Expected Life	
Low power load:	$1x10^9$ operations
Full power load:	$>5x10^6$ operations

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

Power Requirements

+3.3V	+5V	+12V	-12V
0	400mA (typ 280mA)	0	0

Mechanical Characteristics

Single slot 3U PXI (CompactPCI card).
Module weight: 420g (40-533A-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 200-pin female LFH 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

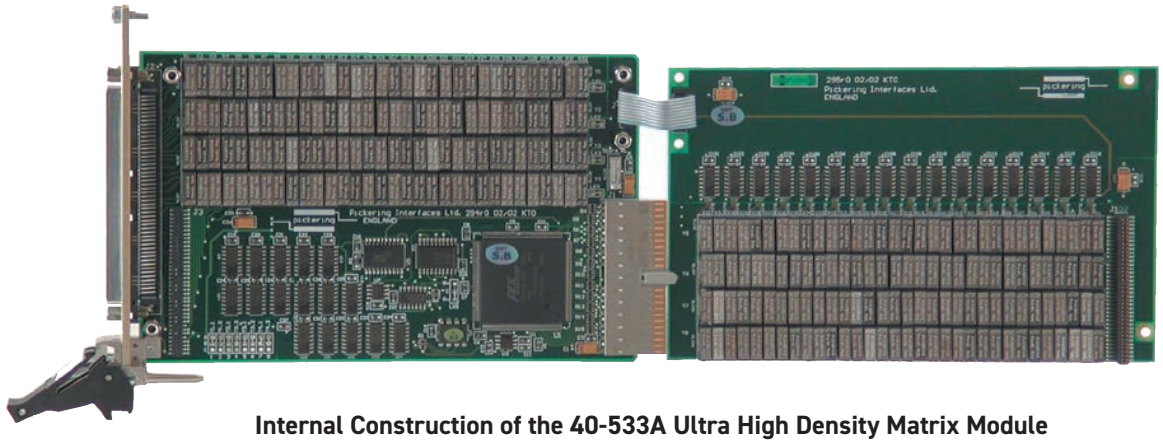
PXI & CompactPCI Compliance

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.



Internal Construction of the 40-533A Ultra High Density Matrix Module

Product Order Codes

Single 64x4 Matrix Module, 1 Pole	40-533A-021
Single 64x4 Matrix Module, 2 Pole	40-533A-022

Options

-S	1 pole version is available with screened reed relays (e.g. 40-533A-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
40-533A	93-002-001	Not Required

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
40-533A-021	91-100-018
40-533A-021-S	91-100-016
40-533A-022	91-100-012

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

Mating Connectors & Cabling

For connection accessories for the 40-533A modules please refer to the 90-002D 200-pin LFH 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

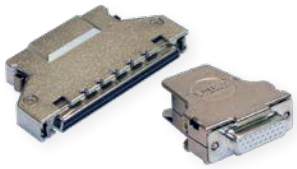
Pickering LXI or LXI/USB Modular Chassis—only accept our 1000+ PXI Switching & Simulation Modules:

- 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

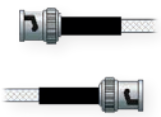
We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with 1200+ products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed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



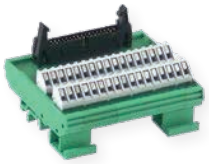
Connectors & Backshells



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.



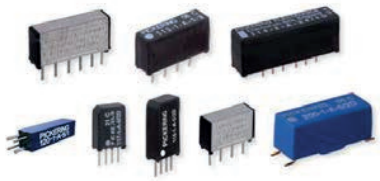
Mass Interconnect

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

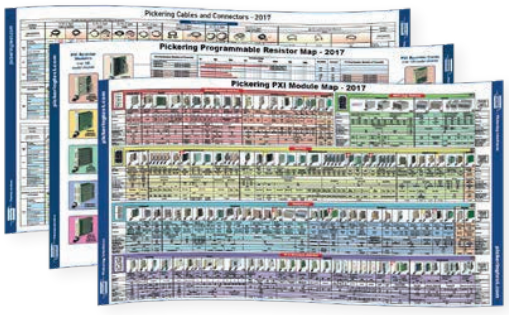
Three Year Warranty & Guaranteed Long-Term Support

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 200-pin LFH connector, J2. The module comprises two PCBs populated with single pole, screened single pole or two pole relays, depending on the module type. The PCBs are connected via a ribbon cable (for digital control signals) and a socket (for switch signals). The relays are energised via control signals from relay drivers. The relay drivers are addressed by PCI bridge U1 to output the required signal. Module configuration, i.e. single 64x4 matix, is determined by hardwired links and data stored in EEPROM U8. PCI Bridge U1 is configured by EEPROM U2.

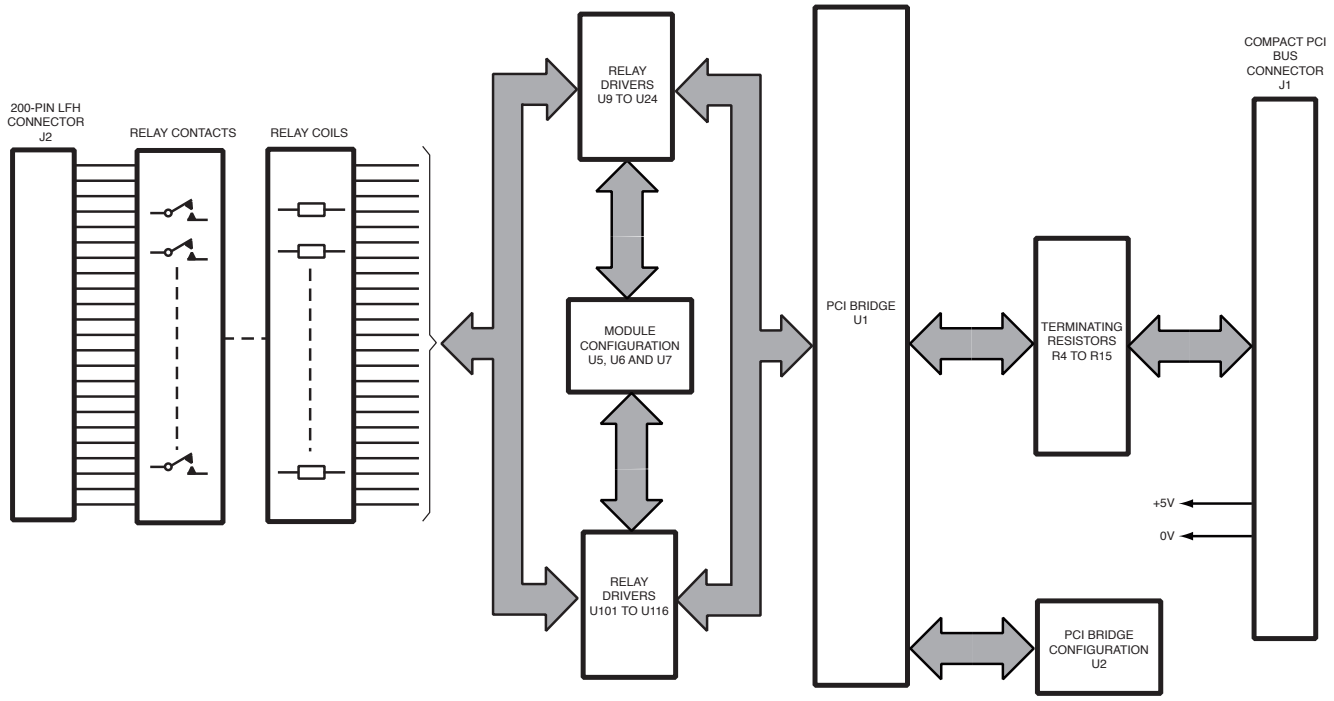


Figure 2.1 - Ultra High Density Matrix Module 40-533A: Functional Block Diagram

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SECTION 3 INSTALLATION

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.

Reportez-vous aux Avertissements et Mises en garde au début du manuel.



Les produits modulaires nécessitent une installation dans un châssis PXI/LXI approprié. Le module est conçu pour une utilisation en intérieur.

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 and chassis.

CONTRÔLES AVANT UTILISATION (DÉBALLAGE)



1. Vérifiez que le module n'est pas été endommagé pendant le transport et signalez immédiatement tout dommage à Pickering Interfaces. N'essayez pas d'installer le matériel si des dégâts sont évidents.
2. Placez le châssis contenant le module par rapport à tout autre équipement qui est censé se connecter avec. Assurez-vous que le châssis n'est pas connecté à l'alimentation électrique.
3. Assurez-vous que la zone désignée pour le châssis contenant le module est de construction plate et solide afin de résister et supporter le poids du module et le châssis.

HARDWARE INSTALLATION ELECTRICAL CONNECTION (CHASSIS)



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

INSTALLATION DU MATÉRIEL RACCORDEMENT ÉLECTRIQUE (CHASSIS)



1. Le châssis contenant le module doit être installé électriquement en conformité aux normes en vigueur par un ingénieur qualifié.
2. Le châssis contenant le module doit être mis à la terre. 

Les décharges électrostatiques peuvent endommager les composants du module. Pour éviter de tels dommages en manipulant la carte se reporter à la Page VII. 

Assurez-vous que la ventilation est adéquate.

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.

Le module doit être installé conformément à la procédure suivante:

1. Assurez-vous que le système est éteint mais qu'il reste connecté au réseau électrique afin qu'il reste relié à la terre.
2. Choisissez un emplacement approprié dans la baie.
3. Retirez la plaque d'obturation de l'emplacement choisi.
4. Assurez-vous que la poignée insertion / éjection est dans sa position vers le bas. Alignez le module avec les guides de la carte sur le haut et le bas de la fente.

   Ne pas lever la poignée insertion / éjection tout en insérant le module, sinon celui-ci ne sera pas inséré correctement.
5. Tenez la poignée tout en glissant lentement le module dans les guides de la carte jusqu'à la prise des poignées sur le rail insertion / éjection (voir la Figure 3.1).
6. Relevez la poignée insertion / éjection jusqu'à ce que le module se place fermement dans le fond de panier. Le panneau avant du module doit être aligné avec le panneau avant du châssis.
7. Fixez le panneau avant du module en utilisant les deux vis du panneau avant du rail de montage du châssis.
8. Dans un système utilisant une interface de commande à distance, pour connecter un contrôleur externe à un châssis PXI ou pour relier plusieurs châssis, faites la mise sous tension du système comme suit:
   a. Pour un système comprenant un contrôleur externe et un châssis, mettez le châssis avant d'allumer le contrôleur externe.
   b. Pour un système comprenant plus d'un châssis, allumez le dernier châssis dans le système suivi par l'avant-dernier, etc, et enfin activez le contrôleur ou le châssis externe contenant le contrôleur système.
9. Pour l'installation modulaire LXI de Pickering Interfaces, il n'est pas nécessaire d'utiliser une séquence de mise sous tension particulière.

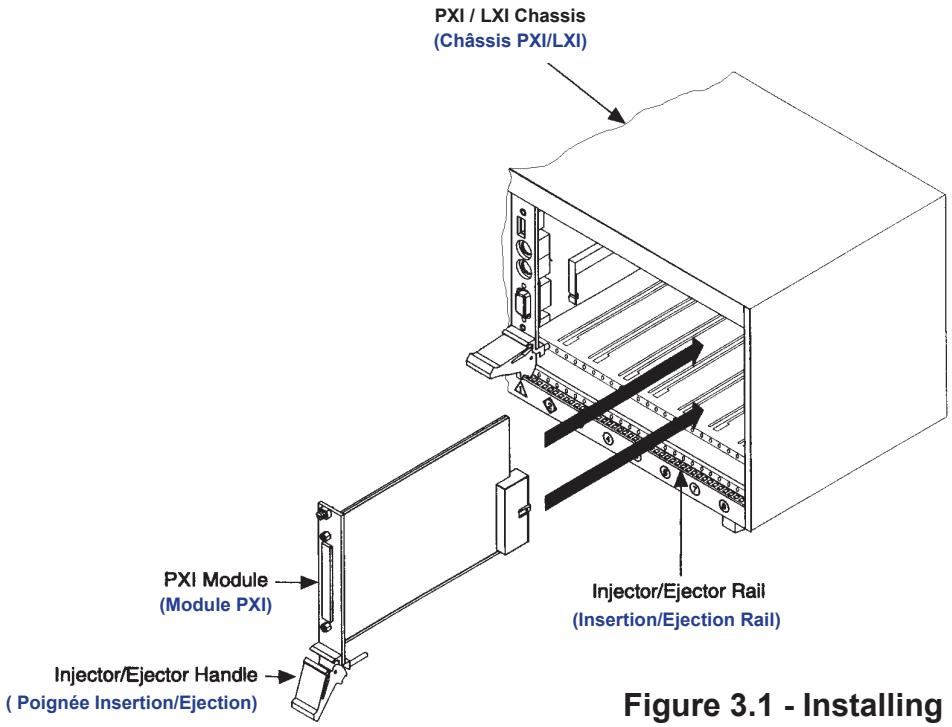


Figure 3.1 - Installing the module into a PXI/cPCI/LXI Chassis

(Figure 3.1 Installation du module dans un châssis PXI/cPCI/LXI)

SOFTWARE INSTALLATION	INSTALLATION DU LOGICIEL
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.	D'abord, installez les pilotes de la carte de commutation PXI de Pickering en exécutant le programme d'installation Setup.exe (fourni dans un fichier compressé zip), soit à partir du CD-ROM fourni, ou en téléchargeant la dernière version sur notre site **pickeringtest.com** - la méthode recommandée. Setup est accompagné d'un fichier "Lisez-moi" contenant des informations supplémentaires sur l'installation. Une seule installation pour toutes les cartes dans les gammes Système 40, Système 45 et Système 50. Une fois l'installation terminée, le pilote installé "Lisez-moi" est offert à l'affichage. Il peut également être affiché ultérieurement à l'aide d'un raccourci dans le menu Programs >> Pickering. Si vous n'êtes pas un utilisateur de LabVIEW, vous devez choisir la version "complète", et une fois qu'elle a été installée. Lancer le programme d'installation LabVIEW Runtime Engine via le raccourci dans le menu Programs >> Pickering. En l'absence de LabVIEW, le Runtime Engine est nécessaire pour supporter l'application Test Panels de Pickering.

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.

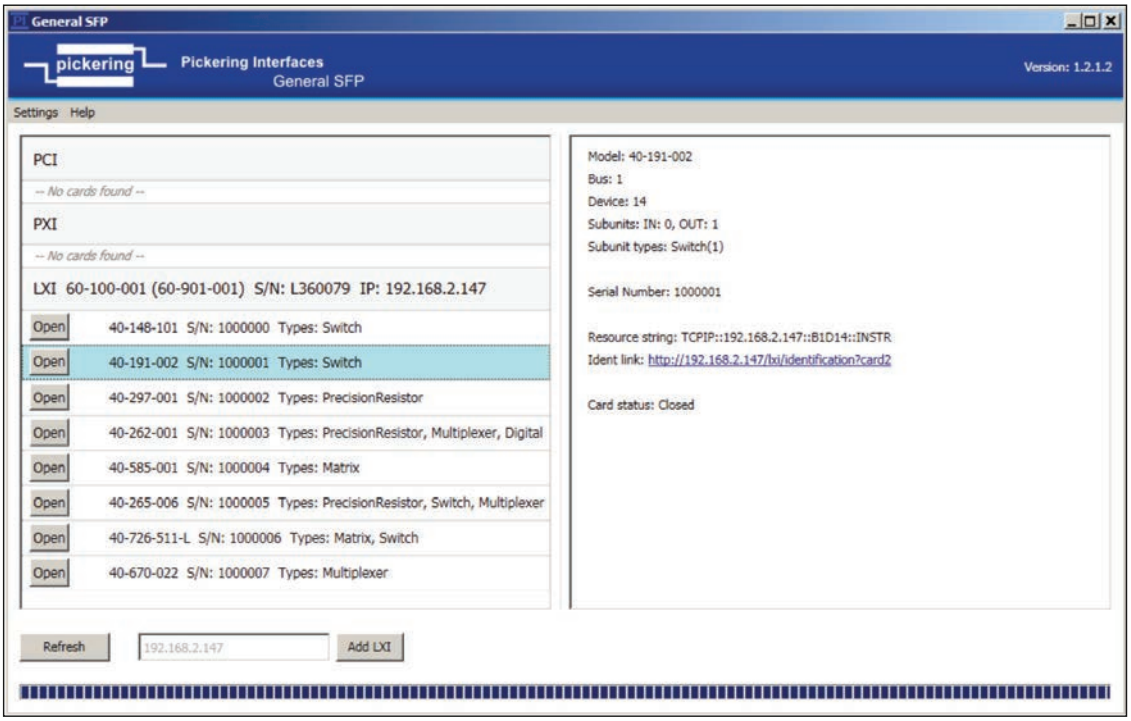


Figure 3.3 - General Soft Front Panel Selector

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

SECTION 4 - PROGRAMMING GUIDE

PROGRAMMING OPTIONS FOR PICKERING INTERFACES PXI MODULES

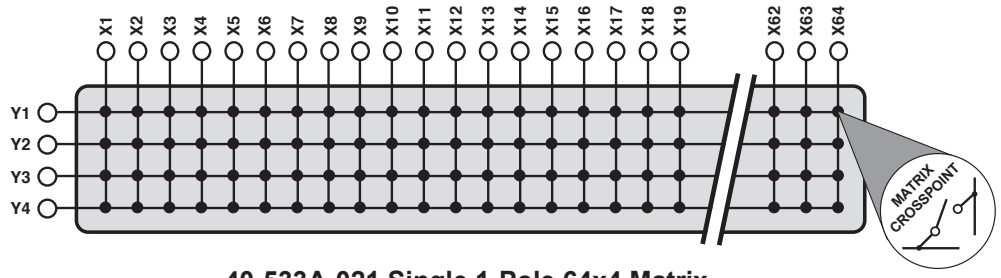
For information on the installation and use of drivers and the programming of Pickering's products in various software environments, please refer to the Software User Manual.

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

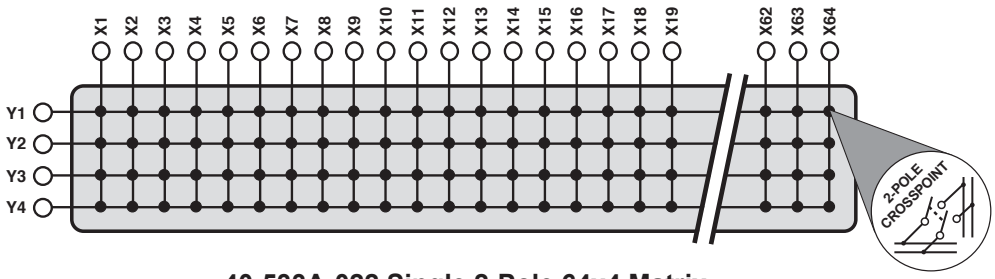
Also, it can be accessed from the DVD supplied with the product:
<DVD_DRIVE>\downloads\Documentation\Software-Manual.pdf

MODULE ARCHITECTURE

The 40-533A is a single switching matrix with 64 connections on the X-axis, 4 connections on the Y-axis, and is available in 1-pole or 2-pole configurations. 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. In the case of 2-pole matrices, both poles of a crosspoint are activated simultaneously when a signal path is enabled. The matrix architectures are shown in the diagrams below:



40-533A-021 Single 1-Pole 64x4 Matrix



40-533A-022 Single 2-Pole 64x4 Matrix

The entire matrix is treated as a single programming sub-unit designated as Sub-Unit 1. The following page gives some simple examples using the provided drivers: the IVI driver, the Direct I/O driver, and the IVI compliant driver.

USING THE IVI DRIVER, DIRECT I/O DRIVER OR VISA DRIVER

This section provides some code fragments which show how to control the High Density Matrix using the IVI Driver, Direct I/O 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 I/O 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:

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

Using the Pickering Direct I/O Driver:

```
DWORD SubUnit = 1;    //select 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 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

40-533A PINOUTS

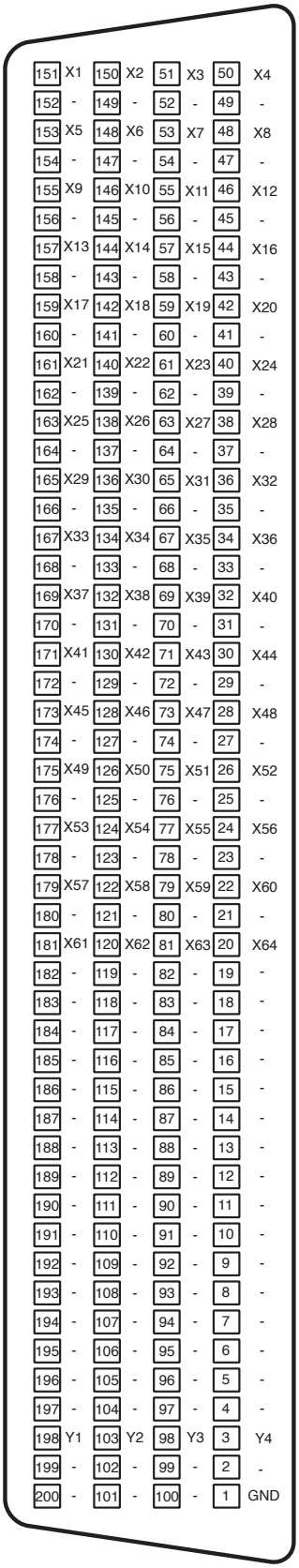


Figure 5.1 - Single 1-Pole 64x4 Matrix Module 40-533A-021: Connector Pinouts (200-pin Female LFH Connector Viewed From Front of Module)

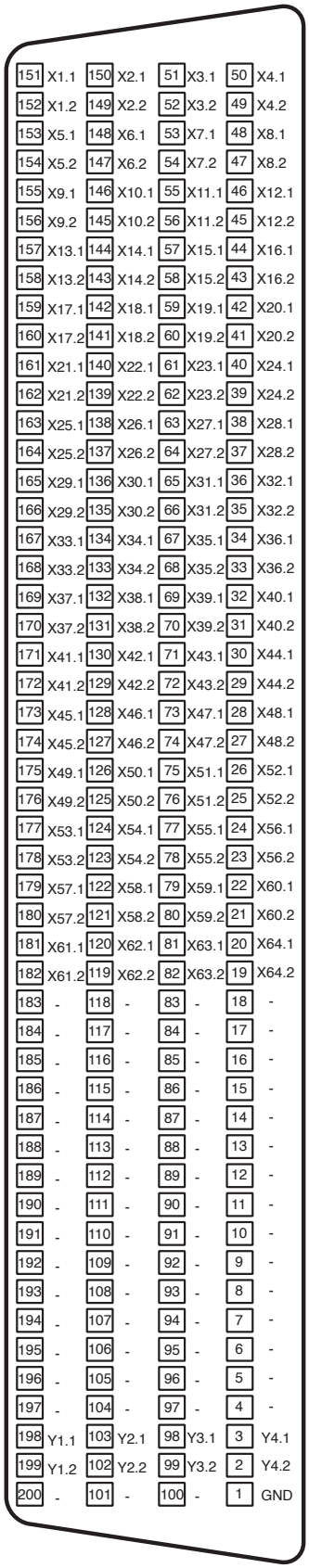


Figure 5.2 - Single 2-Pole 64x4 Matrix Module 40-533A-022: Connector Pinouts (200-pin Female LFH Connector Viewed From Front of Module)

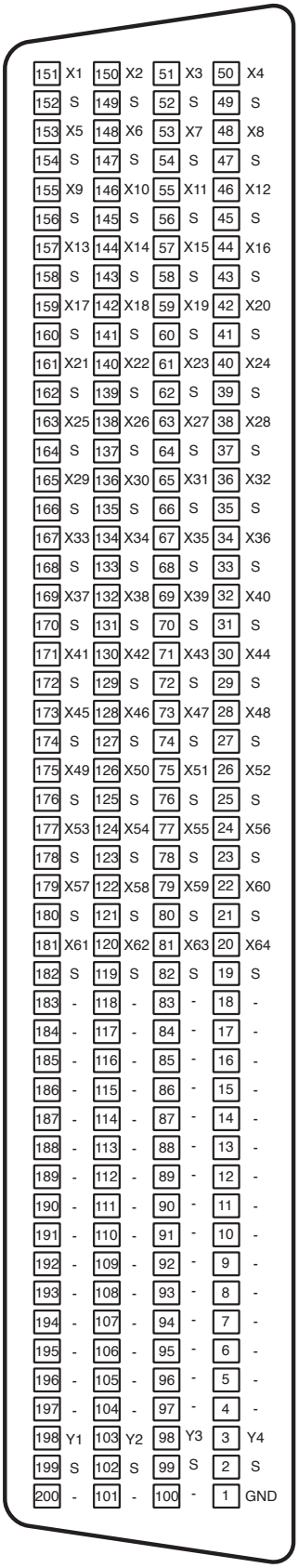


Figure 5.3 - Single 1-Pole Screened 64x4 Matrix Module 40-533A-021-S: Connector Pinouts (200-pin Female LFH Connector Viewed From Front of Module)

40-533 PINOUTS - FOR LEGACY USE

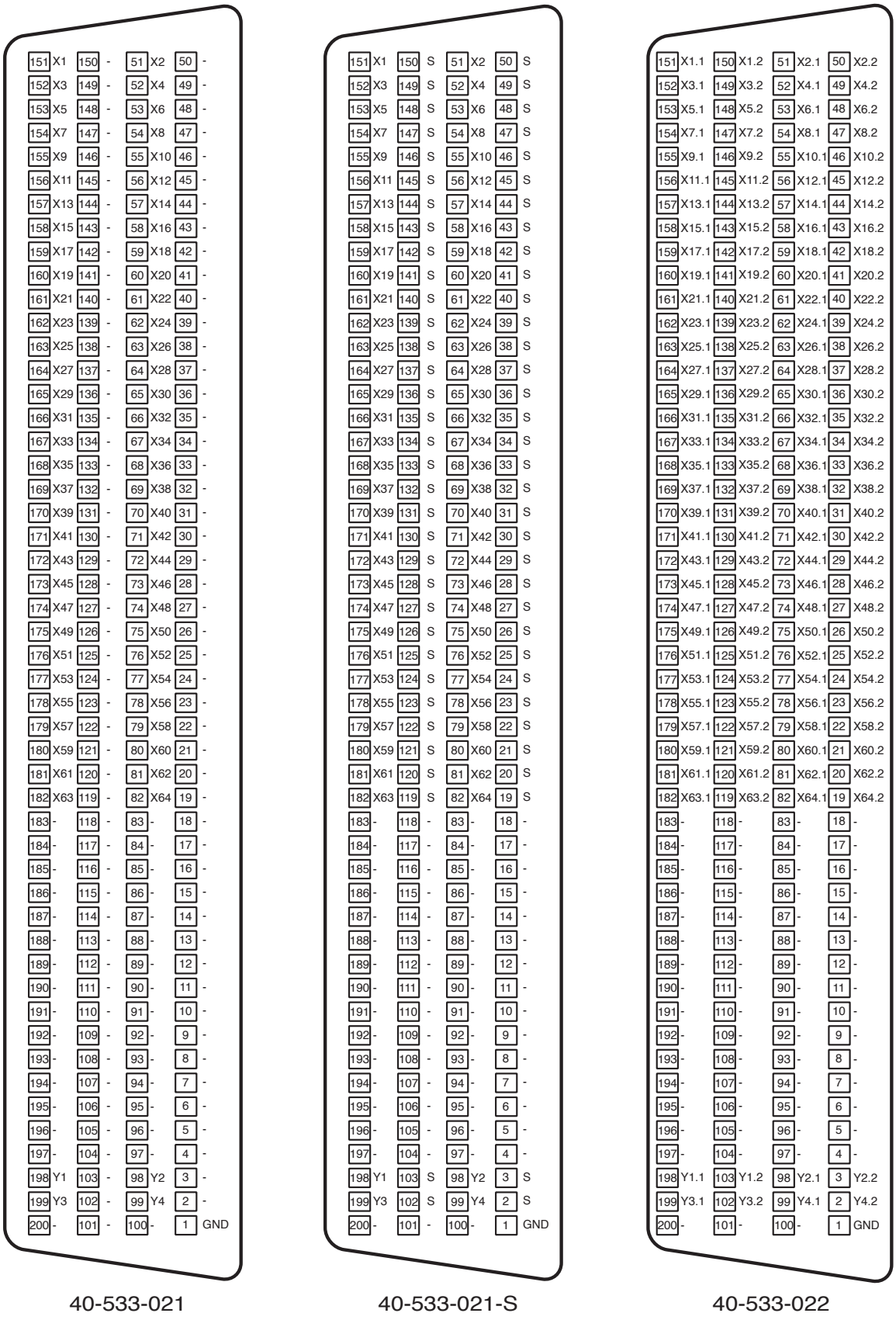


Figure 5.4 - High Density Matrix Module 40-533: Connector Pinouts (200-pin Female LFH Connector Viewed From Front of Module)

SECTION 6 TROUBLE SHOOTING

SECTION 6 DÉPANNAGE

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

Reportez-vous aux Avertissements et Mises en garde au début du manuel.

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.

PROBLÈMES D'INSTALLATION

La fonctionnalité Plug & Play des cartes de commutation Pickering assure généralement une installation sans problème.

Si vous rencontrez des problèmes d'installation, vous devez d'abord vous assurer que toutes les cartes sont correctement insérées dans les slots. Les cartes mal accouplées peuvent passer inaperçues par le système d'exploitation, ou peuvent être détectées comme une carte d'un type inconnu. Elles peuvent également entraîner le blocage de l'ordinateur à divers stades du démarrage.

Si votre système utilise une interface de commande à distance, vous devez vérifier l'intégrité de tous les liens de l'interface de commande à distance. Lorsque le système est sous tension, et pendant le démarrage de Windows, vous devriez vous attendre à voir l'activité périodique sur l'interface de commande à distance RX / TX indicateur (jaune), de compensation pour ne laisser que les LED PWR/LNK (vert) allumées. Les indicateurs RX/TX doivent montrer une activité lorsque vous tentez d'accéder à une carte.

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.

UTILITAIRE DE DIAGNOSTIC

L'utilitaire de diagnostic Pickering (accessible via les programs >> Pickering >> menu Utilities PXI) génère un rapport de diagnostic de la configuration du système PCI, mettant en évidence les problèmes potentiels de configuration. Les détails spécifiques de toutes les cartes de commutation Pickering installées sont inclus. Toutes les cartes de commutation installées de Pickering doivent être répertoriées dans la section «Information Pilpxi" - si une ou plusieurs cartes manquent, il est possible de déterminer la raison en se référant au détail de la configuration PCI contenu dans le rapport, mais l'interprétation de cette information est loin d'être simple, et la meilleure solution est de contacter le support Pickering: support@pickeringtest.com, si possible, avec une copie du rapport de diagnostic.

DIAGNOSTIC UTILITY	UTILITAIRE DE DIAGNOSTIC
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.	Dans la section “Informations VISA” si VISA n’est pas installé cette absence sera signalée. Cela n’affecte pas le fonctionnement en utilisant le pilote Direct I/O, et n’est pas un problème, sauf si vous souhaitez utiliser VISA. VISA est une composante de LabWindows/CVI et LabVIEW de National Instruments, il est disponible comme un environnement autonome. Si VISA est présent et s’il est d’une version suffisamment récente, la section «Information Pipx40” devrait présenter une liste similaire pour les «Information Pilpxi”. Veuillez noter que l’utilitaire de diagnostic ne peut pas accéder aux cartes si celles-ci sont actuellement ouvertes par quelques autres applications, telles que les panneaux test ou moniteur de terminal.

SWITCHING SYSTEM TEST TOOLS	OUTILS DE TEST DE SYSTEME DE COMMUTATION
Please refer to Section 7 - Maintenance Information	Référez-vous à la Section 7 - Information sur l’entretien

SECTION 7 MAINTENANCE INFORMATION

SECTION 7 INFORMATION SUR L'ENTRETIEN

Refer to the Warnings and Cautions at the front of this manual 	**Reportez-vous aux Avertissements et Mises en garde au début du manuel.** 

PERIODIC MAINTENANCE	L'ENTRETIEN PÉRIODIQUE
This product and its corresponding chassis do not require any periodic maintenance.	Ce produit et son châssis correspondant ne nécessitent pas d'entretien périodique.

GENERAL CLEANING	NETTOYAGE GÉNÉRAL
• 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.	• Isolez l'alimentation électrique du châssis et assurez-vous qu'aucun signaux d'E/S utilisateur sont appliqués. • Nettoyez la surface des produits et des châssis uniquement avec un chiffon antistatique propre et sec.

SOFTWARE UPDATE	MISE À JOUR LOGICIELLE
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.	Pour les modules PXI opérant dans un châssis PXI, aucune mise à jour du logiciel du module n'est nécessaire. Veuillez-vous référer à notre site Web **pickeringtest.com** où des liens vers la page de téléchargement du logiciel vous fourniront la dernière version du pilote logiciel pour les différents environnements de programmation rencontrés. Pour les modules PXI qui sont pris en charge dans l'un des châssis modulaire LXI de Pickering Interfaces (comme le 60-102B et 60-103B) aucune mise à jour du logiciel du module n'est nécessaire. Si le module a été introduit après que le châssis LXI ait été fabriqué, le module peut ne pas être reconnu, dans ce cas, le firmware du châssis peut avoir besoin d'une mise à niveau. C'est un processus simple qui est décrit dans le manuel du châssis LXI modulaire.

SWITCHING SYSTEM TEST TOOLS	OUTILS DE TEST DE SYSTEME DE COMMUTATION
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.	Nous recommandons l'utilisation de ***eBIRST*** afin de contrôler le fonctionnement correct des relais et d'identifier l'emplacement de n'importe quel relais défectueux. Pour plus d'informations sur ***eBIRST*** cliquez ici.

RELAY LOOK-UP TABLES	CONSULTATION TABLEAUX RELAIS
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.	Les pages suivantes fournissent une référence croisée entre les chemins de signaux du produit et des relais physiques sur le circuit imprimé. Les tables peuvent être utilisées dans le processus de recherche de défaut et doivent être utilisées en conjonction avec les schémas de disposition de circuits imprimés correspondants pour identifier la position des relais défaillants. Utilisateurs ***eBIRST***, les outils de test de système de commutation n'ont pas besoin d'utiliser cette fonction pour localiser les relais défectueux.

TABLE 7.1 - 40-533/533A Motherboard Relay Cross Reference

Y	X	Relay Ref.	Board	Y	X	Relay Ref.	Board
1	1	RL1	Mother	3	1	RL65	Mother
1	2	RL2	Mother	3	2	RL66	Mother
1	3	RL3	Mother	3	3	RL67	Mother
1	4	RL4	Mother	3	4	RL68	Mother
1	5	RL5	Mother	3	5	RL69	Mother
1	6	RL6	Mother	3	6	RL70	Mother
1	7	RL7	Mother	3	7	RL71	Mother
1	8	RL8	Mother	3	8	RL72	Mother
1	9	RL9	Mother	3	9	RL73	Mother
1	10	RL10	Mother	3	10	RL74	Mother
1	11	RL11	Mother	3	11	RL75	Mother
1	12	RL12	Mother	3	12	RL76	Mother
1	13	RL13	Mother	3	13	RL77	Mother
1	14	RL14	Mother	3	14	RL78	Mother
1	15	RL15	Mother	3	15	RL79	Mother
1	16	RL16	Mother	3	16	RL80	Mother
1	17	RL17	Mother	3	17	RL81	Mother
1	18	RL18	Mother	3	18	RL82	Mother
1	19	RL19	Mother	3	19	RL83	Mother
1	20	RL20	Mother	3	20	RL84	Mother
1	21	RL21	Mother	3	21	RL85	Mother
1	22	RL22	Mother	3	22	RL86	Mother
1	23	RL23	Mother	3	23	RL87	Mother
1	24	RL24	Mother	3	24	RL88	Mother
1	25	RL25	Mother	3	25	RL89	Mother
1	26	RL26	Mother	3	26	RL90	Mother
1	27	RL27	Mother	3	27	RL91	Mother
1	28	RL28	Mother	3	28	RL92	Mother
1	29	RL29	Mother	3	29	RL93	Mother
1	30	RL30	Mother	3	30	RL94	Mother
1	31	RL31	Mother	3	31	RL95	Mother
1	32	RL32	Mother	3	32	RL96	Mother
2	1	RL33	Mother	4	1	RL97	Mother
2	2	RL34	Mother	4	2	RL98	Mother
2	3	RL35	Mother	4	3	RL99	Mother
2	4	RL36	Mother	4	4	RL100	Mother
2	5	RL37	Mother	4	5	RL101	Mother
2	6	RL38	Mother	4	6	RL102	Mother
2	7	RL39	Mother	4	7	RL103	Mother
2	8	RL40	Mother	4	8	RL104	Mother
2	9	RL41	Mother	4	9	RL105	Mother
2	10	RL42	Mother	4	10	RL106	Mother
2	11	RL43	Mother	4	11	RL107	Mother
2	12	RL44	Mother	4	12	RL108	Mother
2	13	RL45	Mother	4	13	RL109	Mother
2	14	RL46	Mother	4	14	RL110	Mother
2	15	RL47	Mother	4	15	RL111	Mother
2	16	RL48	Mother	4	16	RL112	Mother
2	17	RL49	Mother	4	17	RL113	Mother
2	18	RL50	Mother	4	18	RL114	Mother
2	19	RL51	Mother	4	19	RL115	Mother
2	20	RL52	Mother	4	20	RL116	Mother
2	21	RL53	Mother	4	21	RL117	Mother
2	22	RL54	Mother	4	22	RL118	Mother
2	23	RL55	Mother	4	23	RL119	Mother
2	24	RL56	Mother	4	24	RL120	Mother
2	25	RL57	Mother	4	25	RL121	Mother
2	26	RL58	Mother	4	26	RL122	Mother
2	27	RL59	Mother	4	27	RL123	Mother
2	28	RL60	Mother	4	28	RL124	Mother
2	29	RL61	Mother	4	29	RL125	Mother
2	30	RL62	Mother	4	30	RL126	Mother
2	31	RL63	Mother	4	31	RL127	Mother
2	32	RL64	Mother	4	32	RL128	Mother

TABLE 7.2 - 40-533/533A Daughterboard Relay Cross Reference

Y	X	Relay Ref.	Board	Y	X	Relay Ref.	Board
1	33	RL101	Daughter	3	33	RL165	Daughter
1	34	RL102	Daughter	3	34	RL166	Daughter
1	35	RL103	Daughter	3	35	RL167	Daughter
1	36	RL104	Daughter	3	36	RL168	Daughter
1	37	RL105	Daughter	3	37	RL169	Daughter
1	38	RL106	Daughter	3	38	RL170	Daughter
1	39	RL107	Daughter	3	39	RL171	Daughter
1	40	RL108	Daughter	3	40	RL172	Daughter
1	41	RL109	Daughter	3	41	RL173	Daughter
1	42	RL110	Daughter	3	42	RL174	Daughter
1	43	RL111	Daughter	3	43	RL175	Daughter
1	44	RL112	Daughter	3	44	RL176	Daughter
1	45	RL113	Daughter	3	45	RL177	Daughter
1	46	RL114	Daughter	3	46	RL178	Daughter
1	47	RL115	Daughter	3	47	RL179	Daughter
1	48	RL116	Daughter	3	48	RL180	Daughter
1	49	RL117	Daughter	3	49	RL181	Daughter
1	50	RL118	Daughter	3	50	RL182	Daughter
1	51	RL119	Daughter	3	51	RL183	Daughter
1	52	RL120	Daughter	3	52	RL184	Daughter
1	53	RL121	Daughter	3	53	RL185	Daughter
1	54	RL122	Daughter	3	54	RL186	Daughter
1	55	RL123	Daughter	3	55	RL187	Daughter
1	56	RL124	Daughter	3	56	RL188	Daughter
1	57	RL125	Daughter	3	57	RL189	Daughter
1	58	RL126	Daughter	3	58	RL190	Daughter
1	59	RL127	Daughter	3	59	RL191	Daughter
1	60	RL128	Daughter	3	60	RL192	Daughter
1	61	RL129	Daughter	3	61	RL193	Daughter
1	62	RL130	Daughter	3	62	RL194	Daughter
1	63	RL131	Daughter	3	63	RL195	Daughter
1	64	RL132	Daughter	3	64	RL196	Daughter
2	33	RL133	Daughter	4	33	RL197	Daughter
2	34	RL134	Daughter	4	34	RL198	Daughter
2	35	RL135	Daughter	4	35	RL199	Daughter
2	36	RL136	Daughter	4	36	RL200	Daughter
2	37	RL137	Daughter	4	37	RL201	Daughter
2	38	RL138	Daughter	4	38	RL202	Daughter
2	39	RL139	Daughter	4	39	RL203	Daughter
2	40	RL140	Daughter	4	40	RL204	Daughter
2	41	RL141	Daughter	4	41	RL205	Daughter
2	42	RL142	Daughter	4	42	RL206	Daughter
2	43	RL143	Daughter	4	43	RL207	Daughter
2	44	RL144	Daughter	4	44	RL208	Daughter
2	45	RL145	Daughter	4	45	RL209	Daughter
2	46	RL146	Daughter	4	46	RL210	Daughter
2	47	RL147	Daughter	4	47	RL211	Daughter
2	48	RL148	Daughter	4	48	RL212	Daughter
2	49	RL149	Daughter	4	49	RL213	Daughter
2	50	RL150	Daughter	4	50	RL214	Daughter
2	51	RL151	Daughter	4	51	RL215	Daughter
2	52	RL152	Daughter	4	52	RL216	Daughter
2	53	RL153	Daughter	4	53	RL217	Daughter
2	54	RL154	Daughter	4	54	RL218	Daughter
2	55	RL155	Daughter	4	55	RL219	Daughter
2	56	RL156	Daughter	4	56	RL220	Daughter
2	57	RL157	Daughter	4	57	RL221	Daughter
2	58	RL158	Daughter	4	58	RL222	Daughter
2	59	RL159	Daughter	4	59	RL223	Daughter
2	60	RL160	Daughter	4	60	RL224	Daughter
2	61	RL161	Daughter	4	61	RL225	Daughter
2	62	RL162	Daughter	4	62	RL226	Daughter
2	63	RL163	Daughter	4	63	RL227	Daughter
2	64	RL164	Daughter	4	64	RL228	Daughter

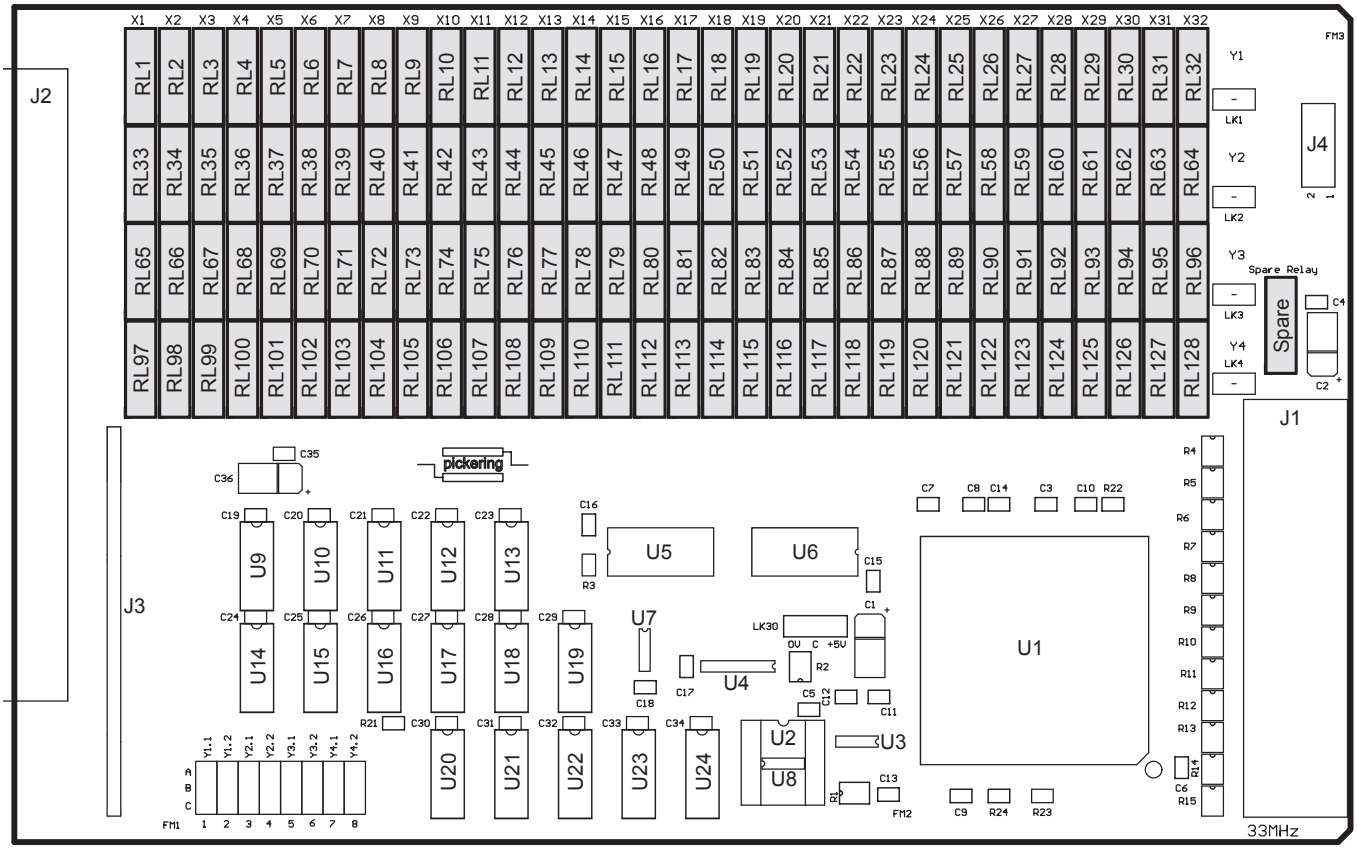


Figure 7.1 - High Density Matrix Module: Motherboard Component Layout

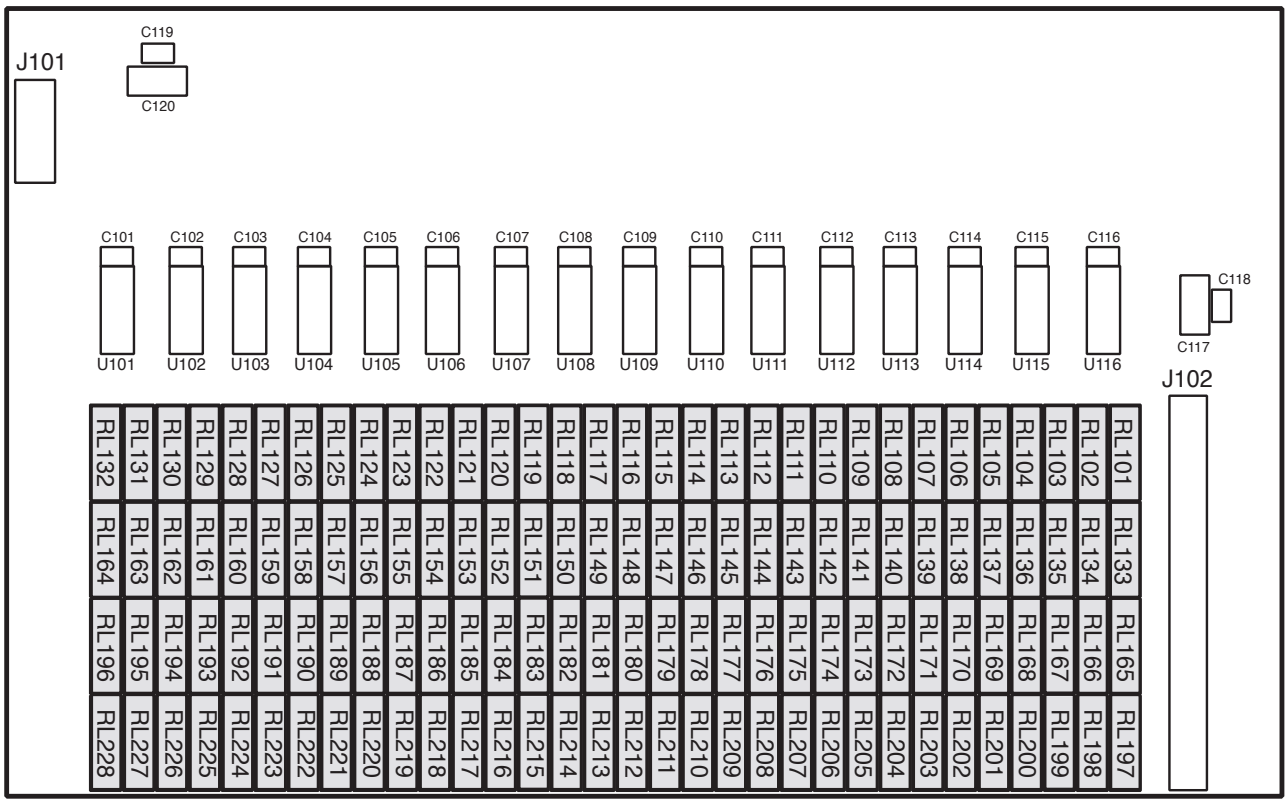


Figure 7.2 - High Density Matrix Module: Daughterboard Component Layout

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