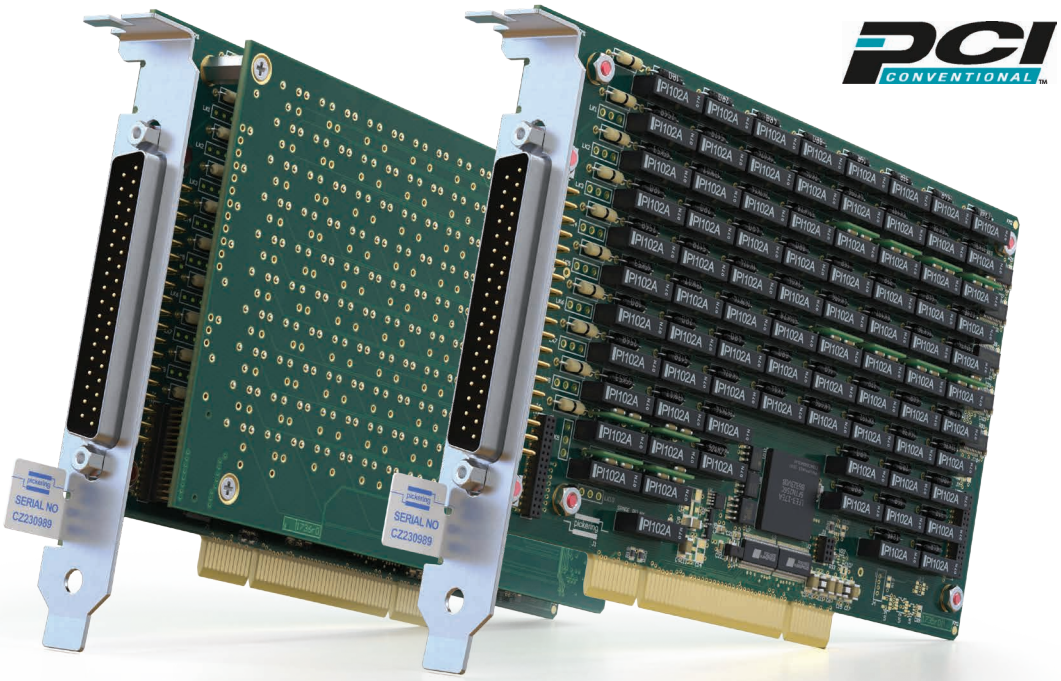
PCI Programmable Resistor/Potentiometer Card



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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 fulfill 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 endeavors 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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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.	

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Appendix A

Product Lifecycle Status A.1

Warnings & 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 PXI/PXIe/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.	

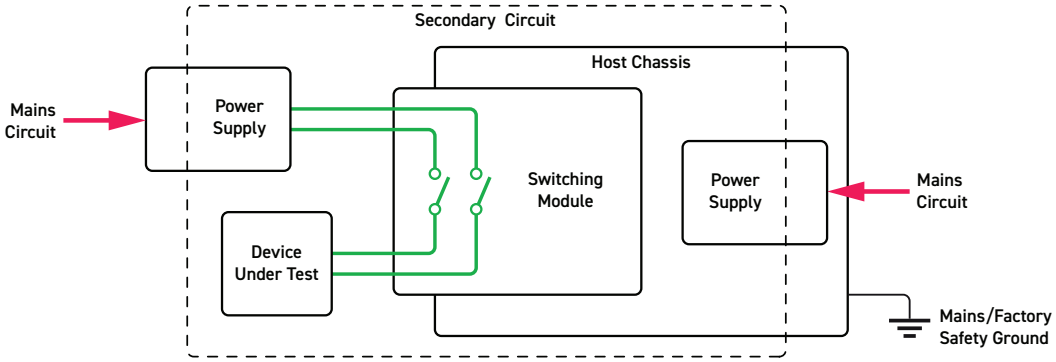


Diagram Showing Separation Between The Mains Circuit and Secondary Circuit / DUT

For the purposes of this document, a Mains Circuit is an installation classified as Overvoltage Category II up to 300 V. 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: • 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. • 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. • Outer clothing worn must be unable to generate static charges. • Printed Circuit Boards (PCBs) fitted with these devices must be stored and transported in anti-static bags.	

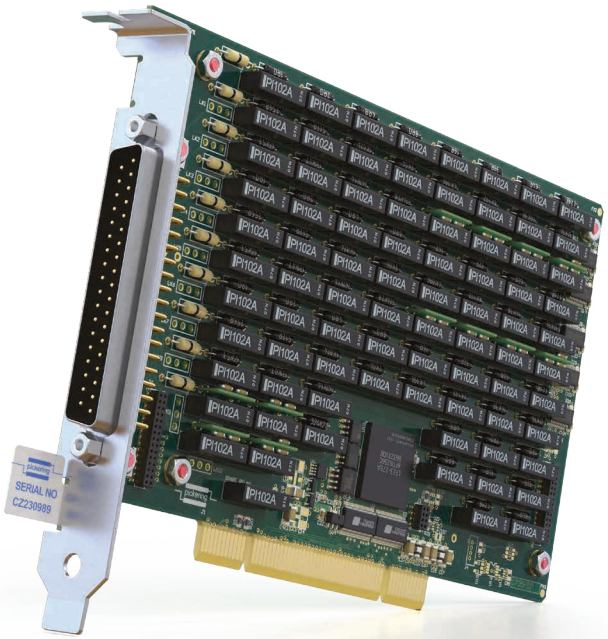
CAUTION - Product Documentation	Symbol
Suitably qualified & trained users should ensure that the accompanying documentation is fully read and understood before attempting to install or operate the product.	

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

- High Density Resistor Card
- Available in 8, 12, 16, or 24-Bit Resolutions
- Up to 18 Channels of 8-Bit Resolution
- Up to 10 Channels of 16-Bit Resolution
- Provides Fully Isolated Variable Resistors
- Available as an Adjustable Resistor or Potentiometer
- Built-in Non-Volatile Parametric Memory for Calibration Data
- Uses High Reliability Pickering Reed Relays for Maximum Performance
- Up to 2000 Value Changes Per Second
- Special Versions With Non-Standard Resistors Built to Order
- Relay Cycle Counting Included
- VISA & Kernel Drivers Supplied for Windows Plus Soft Front Panel
- 3 Year Warranty



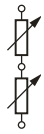
The 50-295B is a programmable resistor card with up to 18-channels of 8-bit resolution resistor chains in a single PCI slot. The flexible architecture allows the card to be supplied with 12-bit, 16-bit or 24-bit resolution for applications requiring finer resolution, greater resistance range or higher channel count. The card is ideal for simulating sensors for control and management systems under test, allowing the user to verify responses in design verification or manufacturing test applications.

The 50-296B version of the card is configured as a potentiometer with two end connections and a wiper for simulating adjustable components.

Versions with other resistor values can be provided for specific applications. The resistor chains include an offset resistor that can be used to set the minimum value.

Requests for these versions can be entered on a simple web based form from the Pickering Interfaces web site, allowing users a quick and easy way of obtaining a quotation.

The card is available in a variety of densities that allow the user to select the most appropriate solution in terms of density and cost for an application.

Resolution	Resistance Range	Configuration	Number Per Card
8-Bit	0 Ω to 255 Ω	 Resistor	10 or 18
12-Bit	0 Ω to 4 kΩ		5 or 10
16-Bit	0 Ω to 65 kΩ		5 or 10
24-Bit	0 Ω to 16 MΩ		3 or 6
8-Bit	0 Ω to 255 Ω Wiper	 Potentiometer	5 or 9
12-Bit	0 Ω to 4 kΩ Wiper		2 or 4
16-Bit	0 Ω to 65 kΩ Wiper		2 or 4
24-Bit	0 Ω to 16 MΩ Wiper		1 or 3

Programmable Resistor Card Options Overview

The card's high channel count enables large systems to be simulated with minimal PCI slot occupancy.

All switches are instrument grade reed relays with low thermal offset voltage to ensure accurate operation under all conditions and a long service life.

To give maximum accuracy each resistor chain has on-board E^2PROM, this allows accurate calibration data to be recorded.

The card is supplied with VISA drivers and a soft front panel.

Section 1 - Technical Specification

Relay Cycle Counting

To aid with module "health" monitoring all versions are provided with a relay cycle counting feature. The number of operations per contact are stored on the module and can be used to determine if a relay is approaching EOL. This information could allow system connections to be revised so that signals applied to heavily used contacts are swapped with lightly used contacts to prolong the working life of the relay(s).

Updated Product Information

This product has been introduced as a "form & fit" update to the 50-295A/296A, the changes are to provide relay cycle counting and an updated bus interface which will require the use of an updated software driver. Otherwise, the electrical performance is very similar and the software and pinout are identical.

Programmable Resistor Specification

Max Switching Voltage:	100 V*
Resolution	1 Ω
† Accuracy of Fitted Resistor:	± 0.5 % (0 to 1 MΩ) ± 1 % (>1 MΩ)
Residual Resistance, typical: (when chain resistance is set to 0 Ω)	1 Ω (8-bit) 1.5 Ω (12-bit) 2 Ω (16-bit) 3 Ω (24-bit)
Max Power: Max Switch Current: Max Carry Current:	0.5 W 0.5 A 1.0 A
Operate Time: Release Time:	<0.5 ms <0.5 ms
Expected Life Low power load: Full power load:	 >1x10^8 operations >1x10^6 operations

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

† Overall accuracy of module is a combination of the fitted resistor accuracy and the relay/track resistance that makes up the residual path resistance.

Relay Type

The 50-295B/296B is fitted with sputtered ruthenium reed relays, these offer very long life with good low level switching performance and excellent contact resistance stability.
All reed relays are manufactured by our Relay Division. For more information, please visit: pickeringrelay.com

Power Requirements

+3.3 V	+5 V	+12 V	-12 V
230 mA	550 mA	0	0

Mechanical Characteristics

Single slot short PCI format.
Card weight: 330 g
3D models for all versions in a variety of popular file formats are available on request.

Connectors

Resistor connections via a 37-pin male D-Type connector. For pin outs please refer to the operating manual.

PCI Compliance

The 50-295B/296B comply with the PCI Specification 2.0 (issued Feb 2004).

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

Safety & CE Compliance

All cards are fully CE compliant and meet applicable EU directives:
Low-voltage safety EN61010-1:2010,
EMC Immunity EN61326-1:2013,
Emissions EN55011:2009+A1:2010.

Operating/Storage Conditions

Operating Temperature:	0 °C to +55 °C
Humidity:	Up to 90 % non-condensing
Altitude:	5000 m
Storage/Transport Temperature:	-20 °C to +75 °C
Humidity:	Up to 90 % non-condensing
Altitude:	15000 m

High Density Resistor Card Order Codes

10 x 8 Bit (0 Ω to 255 Ω)	50-295B-021-10/8
18 x 8 Bit (0 Ω to 255 Ω)	50-295B-121-18/8
5 x 12 Bit (0 Ω to 4 kΩ)	50-295B-021-5/12
10 x 12 Bit (0 Ω to 4 kΩ)	50-295B-121-10/12
5 x 16 Bit (0 Ω to 65 kΩ)	50-295B-021-5/16
10 x 16 Bit (0 Ω to 65 kΩ)	50-295B-121-10/16
3 x 24 Bit (0 Ω to 16 MΩ)	50-295B-021-3/24
6 x 24 Bit (0 Ω to 16 MΩ)	50-295B-121-6/24

High Density Potentiometer Card Order Codes

5 x 8 Bit Pot (0 Ω to 255 Ω Wiper)	50-296B-021-5/8
9 x 8 Bit Pot (0 Ω to 255 Ω Wiper)	50-296B-121-9/8
2 x 12 Bit Pot (0 Ω to 4 kΩ Wiper)	50-296B-021-2/12
4 x 12 Bit Pot (0 Ω to 4 kΩ Wiper)	50-296B-121-4/12
2 x 16 Bit Pot (0 Ω to 65 kΩ Wiper)	50-296B-021-2/16
4 x 16 Bit Pot (0 Ω to 65 kΩ Wiper)	50-296B-121-4/16
1 x 24 Bit Pot (0 Ω to 16 MΩ Wiper)	50-296B-021-1/24
3 x 24 Bit Pot (0 Ω to 16 MΩ Wiper)	50-296B-121-3/24

Other Resistor Cards

Pickering Interfaces manufacture a range of variable resistor cards in the PXI and PCI formats. If you have a requirement for a variable resistor card please contact your local sales office with the information below and we will advise you on the best solution for your application.

Lowest Resistance †	
Highest Resistance	
Resistance Resolution	
Overall Accuracy	
Maximum Power/Current	
Number of Channels (variable resistors)	

† Resistance is as measured across the user connector terminals, minimum resistance must have a non-zero value.

Support Products

Mating Connectors & Cabling

For connection accessories for the 50-295B/296B series please refer to the 90-007D 37-pin D-Type Connector Accessories data sheet where a complete list and documentation can be found for accessories.



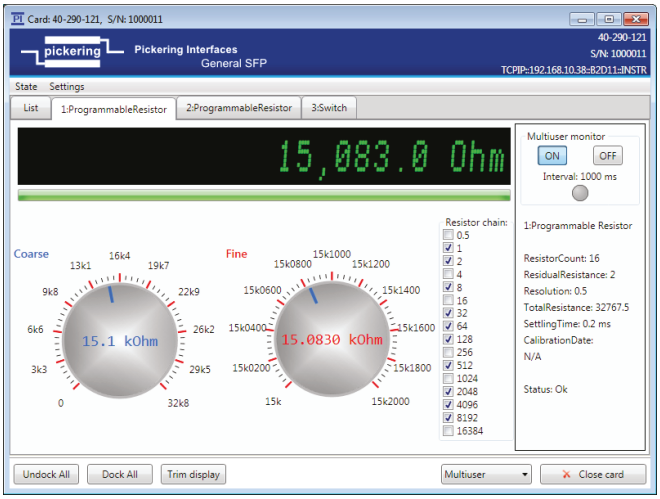
Pickering can supply mating connectors and cable assemblies to enable easy integration of the 50-295B/296B series of PCI cards

Product Customization

Pickering PCI cards are designed and manufactured on our own flexible manufacturing lines, giving complete product control and enabling simple customization to meet very specific requirements. Customization can include:

- Alternative resistance range
- Alternative resolution
- Different number of channels
- 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.



Soft Front Panel for Programmable Resistor Cards

Functional Description

A functional block diagram is provided in Figure 2.1. Figures 2.2 and 2.3 provide examples of resistor chain schematic diagrams for the 50-295B-121-18/8 version of the resistor card and figures 2.4 and 2.5 provide examples of resistor chain schematic diagrams for the 50-296B-121-9/8 version of the potentiometer card. The Programmable Resistor/Potentiometer Card is powered by +5 V inputs via the edge connector. The interface to the user test equipment is via the front panel mounted 37-pin D-type connector, J2. The card comprises two PCBs populated with resistor chains which are switched via single pole relays. The two PCBs are connected via a plug and socket connector arrangement. The relays are energized via control signals from relay drivers which are addressed by PCI bridge U1, via the control logic comprising U3 to U6, to output the required signal. Card configuration is determined by hardwired links and data stored in EEPROM U7 PCI Bridge U1 is configured by EEPROM U2.

Each resistor chain includes an offset resistor that can be used to set the minimum resistance value.

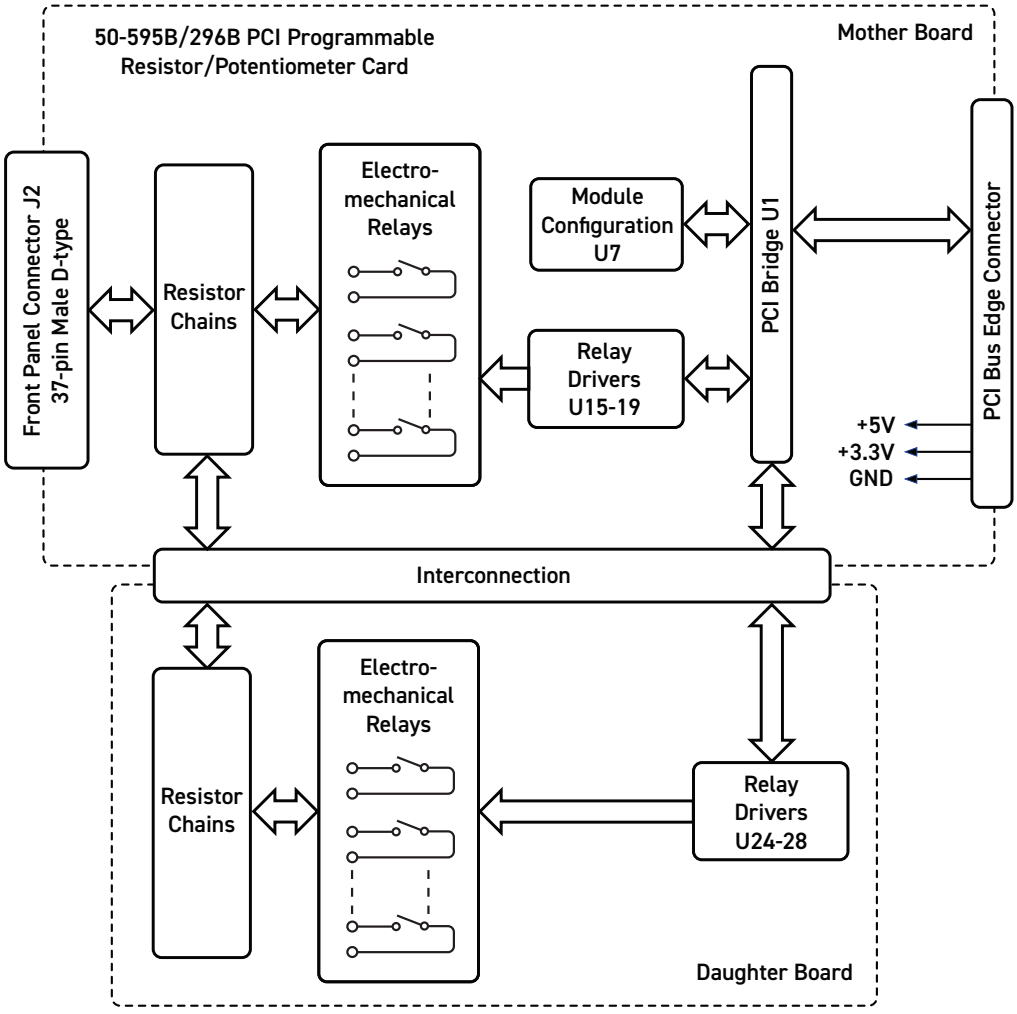


Figure 2.1 - Programmable Resistor/Potentiometer Card 50-295B/296B: Functional Block Diagram

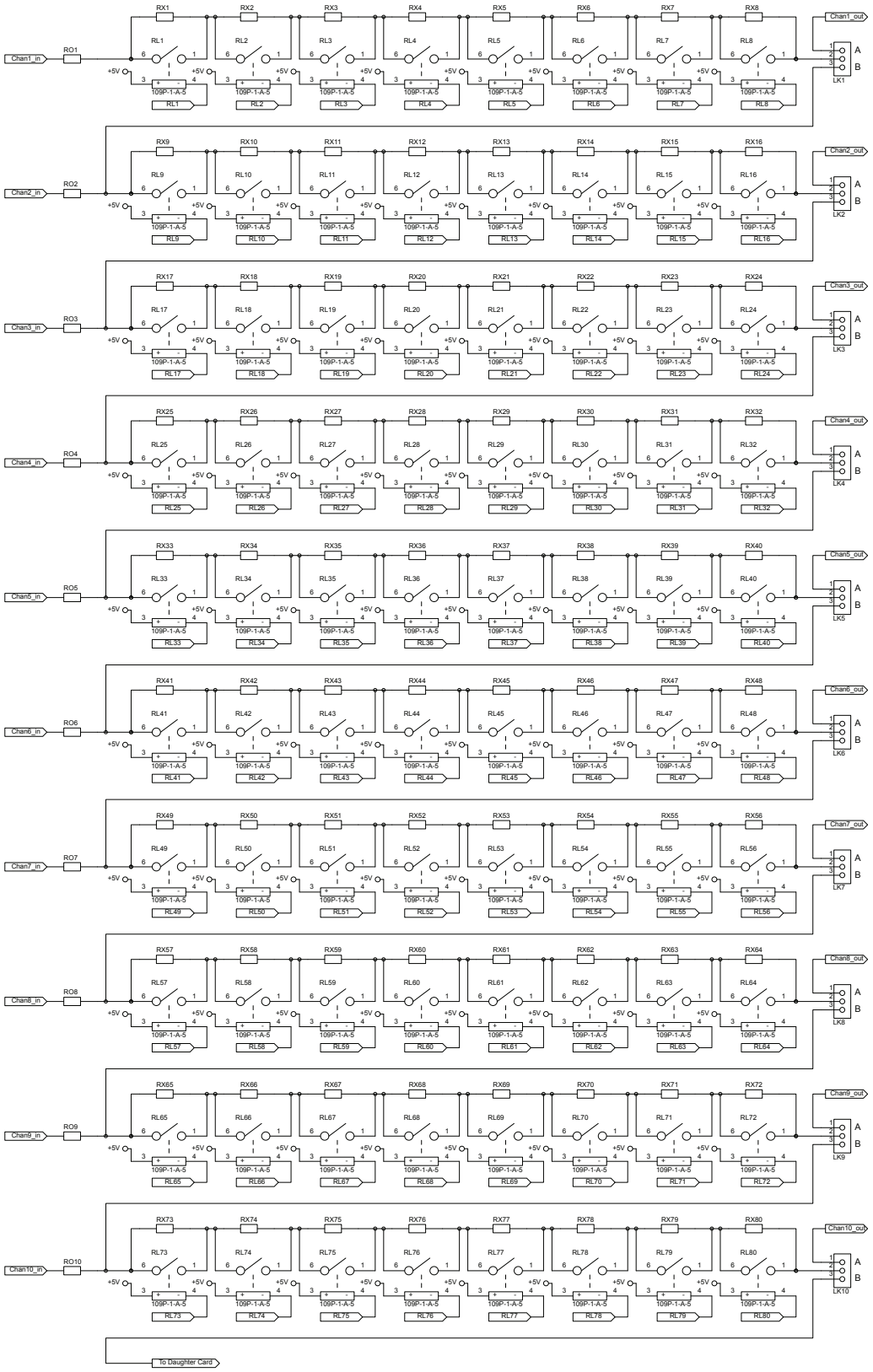


Figure 2.2 - Programmable Resistor Card 50-295B-121-18/8: Motherboard Example Schematic Diagram

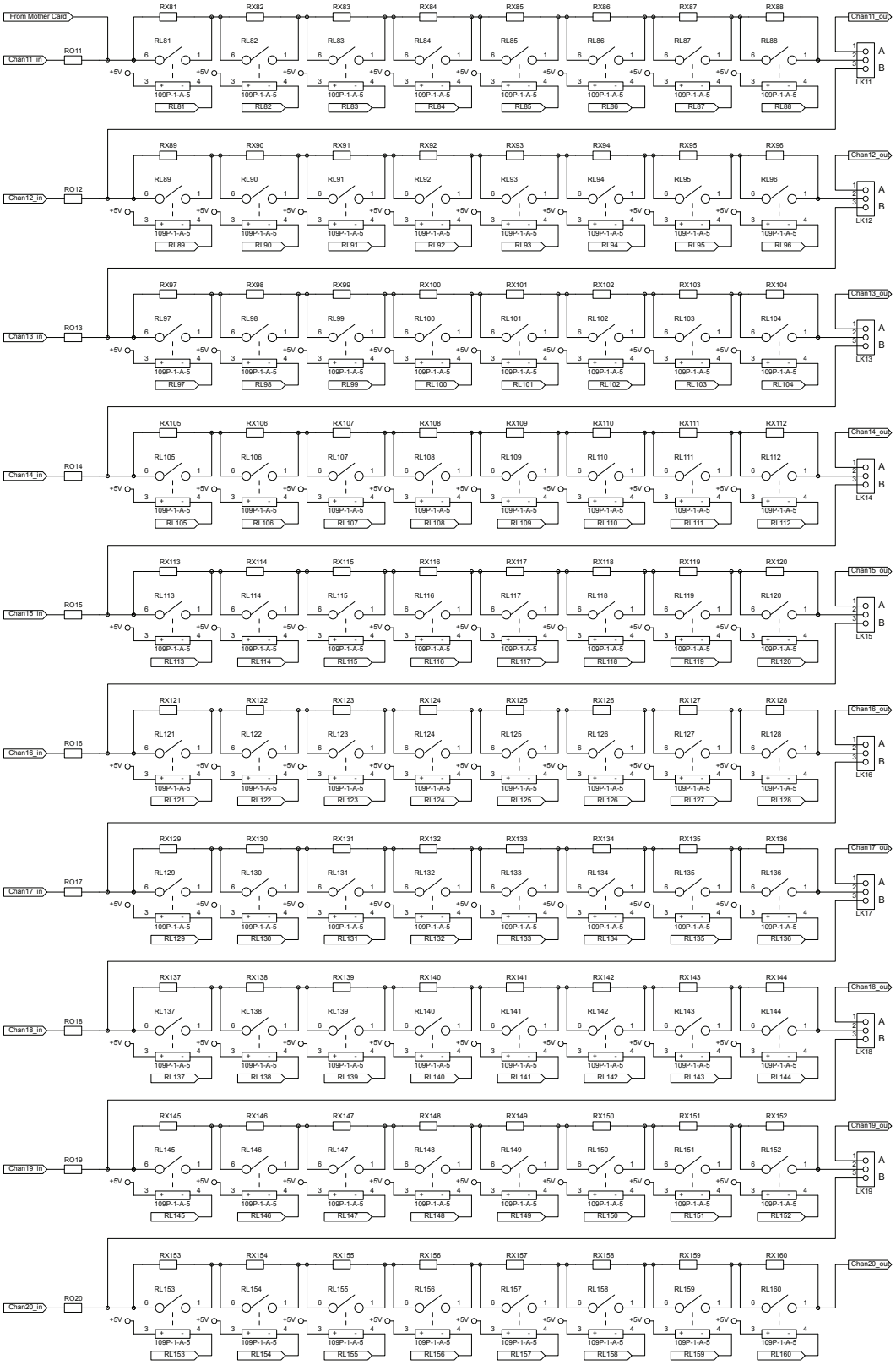


Figure 2.3 - Programmable Resistor Card 50-295B-121-18/8: Daughterboard Example Schematic Diagram

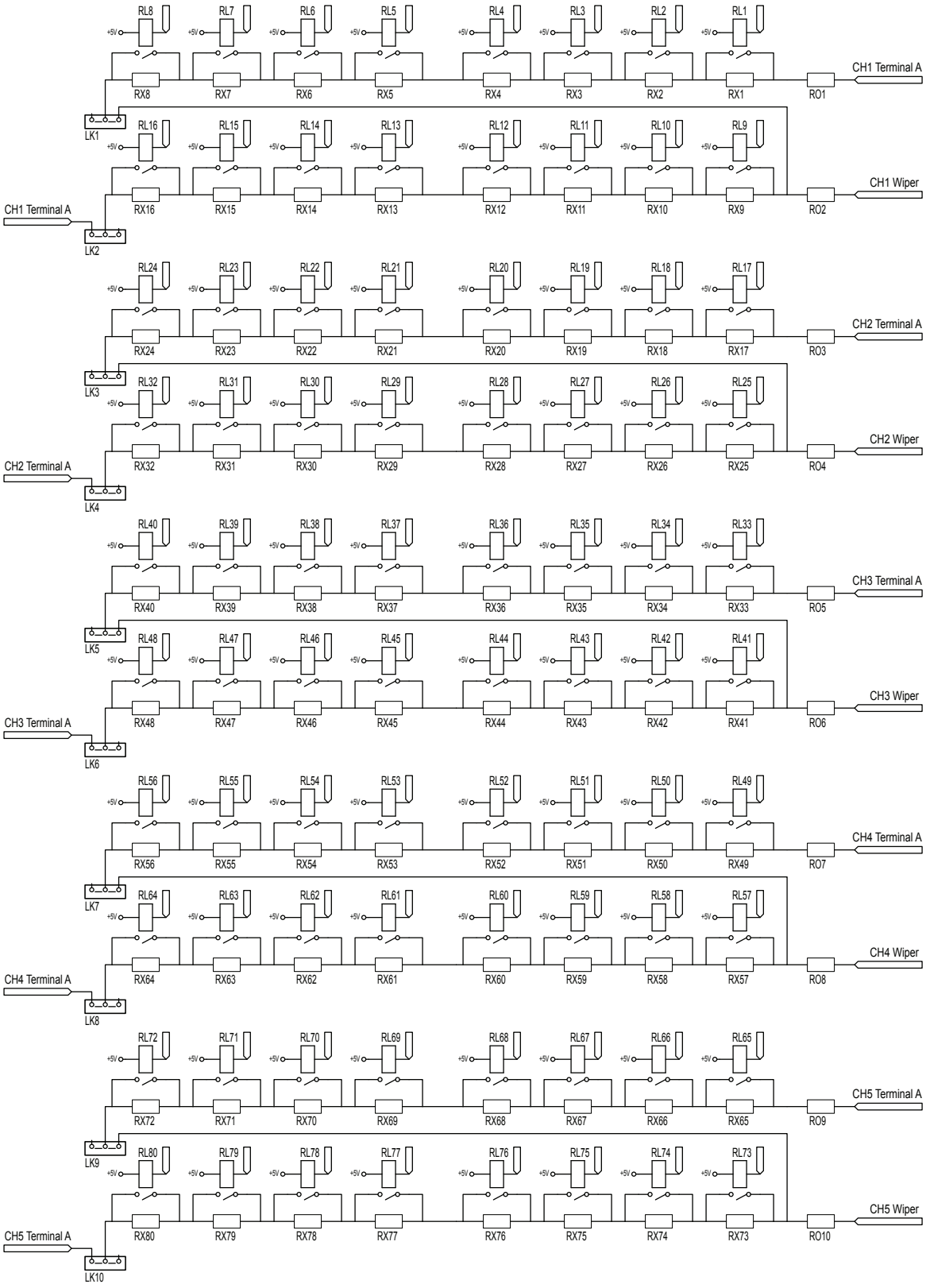


Figure 2.4 - Programmable Potentiometer Card 50-296B-121-9/8: Motherboard Example Schematic Diagram

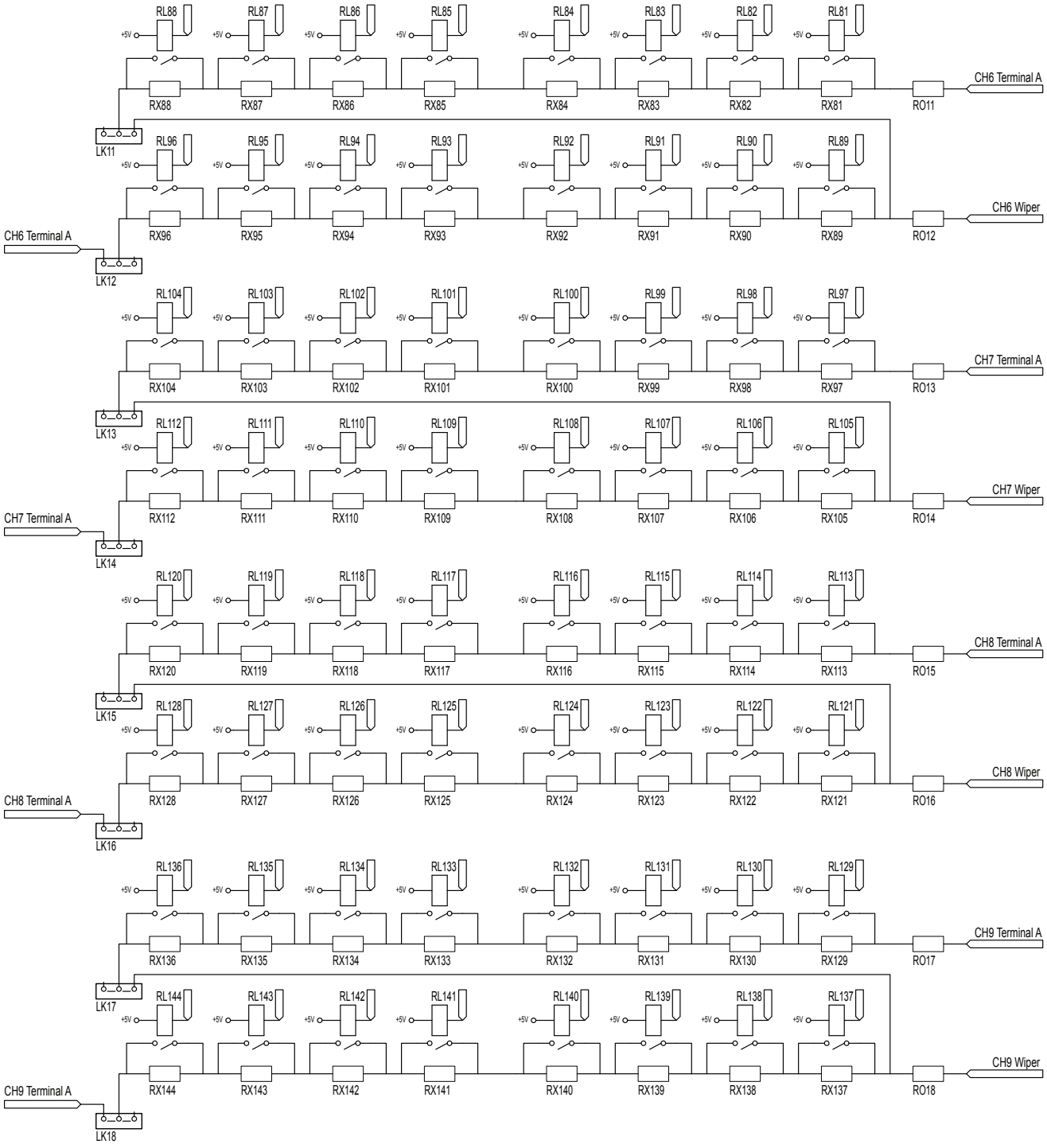


Figure 2.5 - Programmable Potentiometer Card 50-296B-121-9/8: Daughterboard Example Schematic Diagram

Section 3 - Installation

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

Modular products require installation in a suitable chassis. The card is designed for indoor use only.

Pre-operation Checks (Unpacking)

1. Check the card 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 card(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 card(s) is of flat and solid construction to withstand and support the combined weight of the PC chassis and cards.



Figure 3.1 - Inserting a PCI Card into a PC Chassis

Hardware Installation Electrical Connection (Chassis)

The PCI card must be electrically installed in accordance with local regional electrical codes by a qualified engineer.

The PC chassis must be grounded.

Electrostatic discharge can damage the components on the card and in the chassis. To avoid such damage in handling the board

refer to page vii.

Ensure that there is adequate ventilation.

The card 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 free PCI slot in the host system.
3. Remove the blanking plate for the chosen slot and retain the fixing screw.
4. Carefully remove the card from its anti-static bag and insert the card's edge connector into the free slot in the host system (refer to Figure 3.1).
5. Ensure the card is fully inserted into the edge connector and the front panel is fully in contact with the back of card aperture in the host chassis.
6. Use the fixing screw to secure the front panel of the card to the host chassis' mounting rail.
7. Replace the chassis cover(s).
8. Power-up the host system.

Software Installation

First install the appropriate Pickering PCI 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 Pickering switching and simulation PCI, PXI and PXIe products.

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.

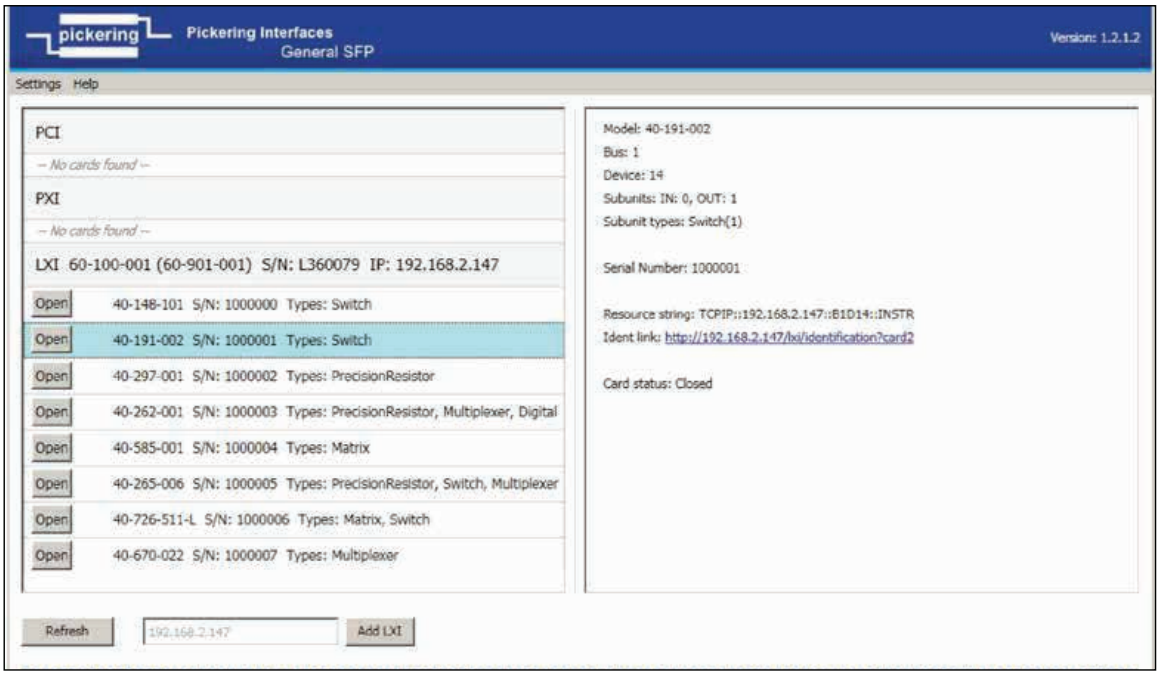


Figure 3.3 - General Soft Front Panel Selector

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

Section 4 - Programming

Programming options for Pickering Interfaces PCI Cards

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:
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

Relay Cycle Counting Feature Details

For information related to the relay cycle counting feature present on this product, please refer to the Relay Cycle Counting User Guide.

This is available as a download from:
pickeringtest.com/portal/web/256/content/private/manuals/Relay-Cycle-Counting-User-Guide.pdf

Also, it can be accessed from the DVD supplied with the product:
<DVD_DRIVE>\downloads\Documentation\Relay-Cycle-Counting-User-Guide.pdf

Card Architecture - 50-295B Programmable Resistor

The 8-bit version of the 50-295B Resistor Card is available with 10 or 18 separate channels which can be programmed with values between 0 Ω and 255 Ω. 12-bit, 16-bit and 24-bit versions are also available which have fewer channels and a greater resistance range - see the Specifications section for details.

Each channel has two terminals designated IN and OUT linked by a resistor chain with an optional series connected offset resistor. In its default state, all relays are open, giving maximum resistance between the input and output terminals. The architecture of one channel of the 8-bit version is shown in Figure 4.1 below. Other versions with greater bit counts operate in basically the same way.

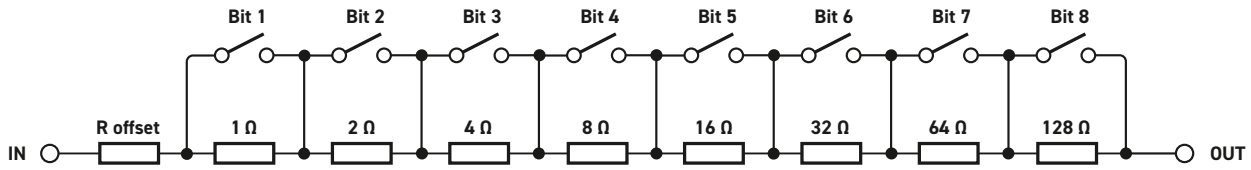


Figure 4.1 - 50-295B Resistor Card - Architecture of One Channel (8-Bit Version)

Programming the 50-295B Resistor Card

The 50-295B Resistor Card is programmed using a sub-unit for each channel. The relationship between the individual bits of each sub-unit and the corresponding resistance value is show in Tables 4.1, 4.2, 4.3 and 4.4.

Enabling a particular bit takes the corresponding resistor out of circuit. For example: If bits 1 and 2 are set in the resistor chain, a 252 Ω resistor is created (not including the value of the offset resistor). This is outlined in Figure 4.2 and shown in the following program examples.

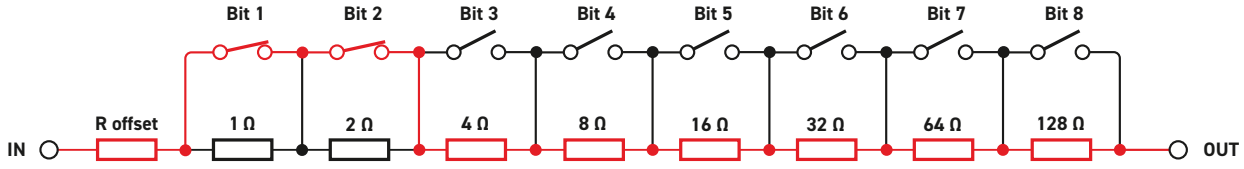


Figure 4.2 - 50-295B Resistor Card - Setting The Resistance of One Channel

Here are examples of using the drivers with the 8-bit versions of the 50-295B. Other versions operate in the same way but have a different number of bits in their sub-units.

Using PILPXI

To operate a relay the user could use the simple OpBit command or the WriteSub commands

OpBit

```
DWORD sub_unit = 1;                // Select channel 1
PIL_OpBit( card_num, sub_unit, 1, 1);   // Operates bit 1 (resistor relay 1)
PIL_OpBit( card_num, sub_unit, 2, 1);   // Operates bit 2 (resistor relay 2)

PIL_OpBit( card_num, sub_unit, 1, 0);   // Releases bit 1 (resistor relay 1)
PIL_OpBit( card_num, sub_unit, 2, 0);   // Releases bit 2 (resistor relay 2)
```

WriteSub

```
// Sub-unit is 8 bits wide, so 1 DWORD is needed to hold the pattern
DWORD data[1];
data[0] = 0x03// Operates bits 1 and 2
PIL_WriteSub( card_num, sub_unit, data);
data[0] = 0// Releases all bits of channel
PIL_WriteSub( card_num, sub_unit, data);
```

Using PIPX40

setChannelState

```
ViUInt32 sub_unit = 1;             // Select channel 1
pipx40_setChannelState(vi, sub_unit, 1, VI_ON);   // Operates bit 1 (resistor relay 1)
pipx40_setChannelState(vi, sub_unit, 2, VI_ON);   // Operates bit 2 (resistor relay 2)

pipx40_setChannelState(vi, sub_unit, 1, VI_OFF);  // Releases bit 1 (resistor relay 1)
pipx40_setChannelState(vi, sub_unit, 2, VI_OFF);  // Releases bit 2 (resistor relay 2)
```

setChannelPattern

```
// Sub-unit is 8 bits wide, so 1 ViUInt32 value is needed to hold the entire pattern
ViUInt32 data[1];
data[0] = 0x03;    // Operates bits 1 and 2
pipx40_setChannelPattern( vi, sub_unit, data);
data[0] = 0;       // Releases all bits of channel
pipx40_setChannelPattern( vi, sub_unit, data);
```

Table 4.1 - 50-295B - 8-Bit Versions - Sub-Unit, Resistor & Relay Cross Reference

Sub-Unit	Bit	Resistor	Resistor Value	Relay No.
1	1	1	1Ω	1
	2	2	2Ω	2
	3	3	4Ω	3
	4	4	8Ω	4
	5	5	16Ω	5
	6	6	32Ω	6
	7	7	64Ω	7
	8	8	128Ω	8
2	1	1	1Ω	9
	2	2	2Ω	10
	3	3	4Ω	11
	4	4	8Ω	12
	5	5	16Ω	13
	6	6	32Ω	14
	7	7	64Ω	15
	8	8	128Ω	16
3	1	1	1Ω	17
	2	2	2Ω	18
	3	3	4Ω	19
	4	4	8Ω	20
	5	5	16Ω	21
	6	6	32Ω	22
	7	7	64Ω	23
	8	8	128Ω	24
4	1	1	1Ω	25
	2	2	2Ω	26
	3	3	4Ω	27
	4	4	8Ω	28
	5	5	16Ω	29
	6	6	32Ω	30
	7	7	64Ω	31
	8	8	128Ω	32
5	1	1	1Ω	33
	2	2	2Ω	34
	3	3	4Ω	35
	4	4	8Ω	36
	5	5	16Ω	37
	6	6	32Ω	38
	7	7	64Ω	39
	8	8	128Ω	40
6	1	1	1Ω	41
	2	2	2Ω	42
	3	3	4Ω	43
	4	4	8Ω	44
	5	5	16Ω	45
	6	6	32Ω	46
	7	7	64Ω	47
	8	8	128Ω	48
7	1	1	1Ω	49
	2	2	2Ω	50
	3	3	4Ω	51
	4	4	8Ω	52
	5	5	16Ω	53
	6	6	32Ω	54
	7	7	64Ω	55
	8	8	128Ω	56
8	1	1	1Ω	57
	2	2	2Ω	58
	3	3	4Ω	59
	4	4	8Ω	60
	5	5	16Ω	61
	6	6	32Ω	62
	7	7	64Ω	63
	8	8	128Ω	64
9	1	1	1Ω	65
	2	2	2Ω	66
	3	3	4Ω	67
	4	4	8Ω	68
	5	5	16Ω	69
	6	6	32Ω	70
	7	7	64Ω	71
	8	8	128Ω	72
10	1	1	1Ω	73
	2	2	2Ω	74
	3	3	4Ω	75
	4	4	8Ω	76
	5	5	16Ω	77
	6	6	32Ω	78
	7	7	64Ω	79
	8	8	128Ω	80
11	1	1	1Ω	81
	2	2	2Ω	82
	3	3	4Ω	83
	4	4	8Ω	84
	5	5	16Ω	85
	6	6	32Ω	86
	7	7	64Ω	87
	8	8	128Ω	88
12	1	1	1Ω	89
	2	2	2Ω	90
	3	3	4Ω	91
	4	4	8Ω	92
	5	5	16Ω	93
	6	6	32Ω	94
	7	7	64Ω	95
	8	8	128Ω	96
13	1	1	1Ω	97
	2	2	2Ω	98
	3	3	4Ω	99
	4	4	8Ω	100
	5	5	16Ω	101
	6	6	32Ω	102
	7	7	64Ω	103
	8	8	128Ω	104
14	1	1	1Ω	104
	2	2	2Ω	106
	3	3	4Ω	107
	4	4	8Ω	108
	5	5	16Ω	109
	6	6	32Ω	110
	7	7	64Ω	111
	8	8	128Ω	112
15	1	1	1Ω	113
	2	2	2Ω	114
	3	3	4Ω	115
	4	4	8Ω	116
	5	5	16Ω	117
	6	6	32Ω	118
	7	7	64Ω	119
	8	8	128Ω	120
16	1	1	1Ω	121
	2	2	2Ω	122
	3	3	4Ω	123
	4	4	8Ω	124
	5	5	16Ω	125
	6	6	32Ω	126
	7	7	64Ω	127
	8	8	128Ω	128
17	1	1	1Ω	129
	2	2	2Ω	130
	3	3	4Ω	131
	4	4	8Ω	132
	5	5	16Ω	133
	6	6	32Ω	134
	7	7	64Ω	135
	8	8	128Ω	136
18	1	1	1Ω	137
	2	2	2Ω	138
	3	3	4Ω	139
	4	4	8Ω	140
	5	5	16Ω	141
	6	6	32Ω	142
	7	7	64Ω	143
	8	8	128Ω	144
–	–	Not Fitted		145
	–	Not Fitted		146
	–	Not Fitted		147
	–	Not Fitted		148
	–	Not Fitted		149
	–	Not Fitted		150
	–	Not Fitted		151
	–	Not Fitted		152
	–	Not Fitted		153
	–	Not Fitted		154
	–	Not Fitted		155
	–	Not Fitted		156
	–	Not Fitted		157
	–	Not Fitted		158
	–	Not Fitted		159
	–	Not Fitted		160

Table 4.2 - 50-295B - 12-Bit Versions - Sub-Unit, Resistor & Relay Cross Reference

Sub-Unit	Bit	Resistor	Resistor Value	Relay No.
1	1	1	1Ω	1
	2	2	2Ω	2
	3	3	4Ω	3
	4	4	8Ω	4
	5	5	16Ω	5
	6	6	32Ω	6
	7	7	64Ω	7
	8	8	128Ω	8
	9	9	256Ω	9
	10	10	512Ω	10
	11	11	1024Ω	11
	12	12	2048Ω	12
–	–	Not Fitted		13
	–	Not Fitted		14
	–	Not Fitted		15
	–	Not Fitted		16
2	1	1	1Ω	17
	2	2	2Ω	18
	3	3	4Ω	19
	4	4	8Ω	20
	5	5	16Ω	21
	6	6	32Ω	22
	7	7	64Ω	23
	8	8	128Ω	24
	9	9	256Ω	25
	10	10	512Ω	26
	11	11	1024Ω	27
	12	12	2048Ω	28
–	–	Not Fitted		29
	–	Not Fitted		30
	–	Not Fitted		31
	–	Not Fitted		32
3	1	1	1Ω	33
	2	2	2Ω	34
	3	3	4Ω	35
	4	4	8Ω	36
	5	5	16Ω	37
	6	6	32Ω	38
	7	7	64Ω	39
	8	8	128Ω	40
	9	9	256Ω	41
	10	10	512Ω	42
	11	11	1024Ω	43
	12	12	2048Ω	44
–	–	Not Fitted		45
	–	Not Fitted		46
	–	Not Fitted		47
	–	Not Fitted		48
4	1	1	1Ω	49
	2	2	2Ω	50
	3	3	4Ω	51
	4	4	8Ω	52
	5	5	16Ω	53
	6	6	32Ω	54
	7	7	64Ω	55
	8	8	128Ω	56
4	9	9	256Ω	57
	10	10	512Ω	58
	11	11	1024Ω	59
	12	12	2048Ω	60
–	–	Not Fitted		61
	–	Not Fitted		62
	–	Not Fitted		63
	–	Not Fitted		64
5	1	1	1Ω	65
	2	2	2Ω	66
	3	3	4Ω	67
	4	4	8Ω	68
	5	5	16Ω	69
	6	6	32Ω	70
	7	7	64Ω	71
	8	8	128Ω	72
	9	9	256Ω	73
	10	10	512Ω	74
	11	11	1024Ω	75
	12	12	2048Ω	76
–	–	Not Fitted		77
	–	Not Fitted		78
	–	Not Fitted		79
	–	Not Fitted		80
6	1	1	1Ω	81
	2	2	2Ω	82
	3	3	4Ω	83
	4	4	8Ω	84
	5	5	16Ω	85
	6	6	32Ω	86
	7	7	64Ω	87
	8	8	128Ω	88
	9	9	256Ω	89
	10	10	512Ω	90
	11	11	1024Ω	91
	12	12	2048Ω	92
–	–	Not Fitted		93
	–	Not Fitted		94
	–	Not Fitted		95
	–	Not Fitted		96
7	1	1	1Ω	97
	2	2	2Ω	98
	3	3	4Ω	99
	4	4	8Ω	100
	5	5	16Ω	101
	6	6	32Ω	102
	7	7	64Ω	103
	8	8	128Ω	104
	9	9	256Ω	104
	10	10	512Ω	106
	11	11	1024Ω	107
	12	12	2048Ω	108
–	–	Not Fitted		109
	–	Not Fitted		110
	–	Not Fitted		111
	–	Not Fitted		112
8	1	1	1Ω	113
	2	2	2Ω	114
	3	3	4Ω	115
	4	4	8Ω	116
	5	5	16Ω	117
	6	6	32Ω	118
	7	7	64Ω	119
	8	8	128Ω	120
	9	9	256Ω	121
	10	10	512Ω	122
	11	11	1024Ω	123
	12	12	2048Ω	124
–	–	Not Fitted		125
	–	Not Fitted		126
	–	Not Fitted		127
	–	Not Fitted		128
9	1	1	1Ω	129
	2	2	2Ω	130
	3	3	4Ω	131
	4	4	8Ω	132
	5	5	16Ω	133
	6	6	32Ω	134
	7	7	64Ω	135
	8	8	128Ω	136
	9	9	256Ω	137
	10	10	512Ω	138
	11	11	1024Ω	139
	12	12	2048Ω	140
–	–	Not Fitted		141
	–	Not Fitted		142
	–	Not Fitted		143
	–	Not Fitted		144
10	1	1	1Ω	145
	2	2	2Ω	146
	3	3	4Ω	147
	4	4	8Ω	148
	5	5	16Ω	149
	6	6	32Ω	150
	7	7	64Ω	151
	8	8	128Ω	152
	9	9	256Ω	153
	10	10	512Ω	154
	11	11	1024Ω	155
	12	12	2048Ω	156
–	–	Not Fitted		157
	–	Not Fitted		158
	–	Not Fitted		159
	–	Not Fitted		160

Table 4.3 - 50-295B - 16-Bit Versions - Sub-Unit, Resistor & Relay Cross Reference

Sub-Unit	Bit	Resistor	Resistor Value	Relay No.
1	1	1	1Ω	1
	2	2	2Ω	2
	3	3	4Ω	3
	4	4	8Ω	4
	5	5	16Ω	5
	6	6	32Ω	6
	7	7	64Ω	7
	8	8	128Ω	8
	9	9	256Ω	9
	10	10	512Ω	10
	11	11	1024Ω	11
	12	12	2048Ω	12
	13	13	4096Ω	13
	14	14	8192Ω	14
	15	15	16384Ω	15
	16	16	32768Ω	16
2	1	1	1Ω	17
	2	2	2Ω	18
	3	3	4Ω	19
	4	4	8Ω	20
	5	5	16Ω	21
	6	6	32Ω	22
	7	7	64Ω	23
	8	8	128Ω	24
	9	9	256Ω	25
	10	10	512Ω	26
	11	11	1024Ω	27
	12	12	2048Ω	28
	13	13	4096Ω	29
	14	14	8192Ω	30
	15	15	16384Ω	31
	16	16	32768Ω	32
3	1	1	1Ω	33
	2	2	2Ω	34
	3	3	4Ω	35
	4	4	8Ω	36
	5	5	16Ω	37
	6	6	32Ω	38
	7	7	64Ω	39
	8	8	128Ω	40
	9	9	256Ω	41
	10	10	512Ω	42
	11	11	1024Ω	43
	12	12	2048Ω	44
	13	13	4096Ω	45
	14	14	8192Ω	46
	15	15	16384Ω	47
	16	16	32768Ω	48
4	1	1	1Ω	49
	2	2	2Ω	50
	3	3	4Ω	51
	4	4	8Ω	52
	5	5	16Ω	53
	6	6	32Ω	54
	7	7	64Ω	55
	8	8	128Ω	56
4	9	9	256Ω	57
	10	10	512Ω	58
	11	11	1024Ω	59
	12	12	2048Ω	60
	13	13	4096Ω	61
	14	14	8192Ω	62
	15	15	16384Ω	63
	16	16	32768Ω	64
5	1	1	1Ω	65
	2	2	2Ω	66
	3	3	4Ω	67
	4	4	8Ω	68
	5	5	16Ω	69
	6	6	32Ω	70
	7	7	64Ω	71
	8	8	128Ω	72
	9	9	256Ω	73
	10	10	512Ω	74
	11	11	1024Ω	75
	12	12	2048Ω	76
	13	13	4096Ω	77
	14	14	8192Ω	78
	15	15	16384Ω	79
	16	16	32768Ω	80
6	1	1	1Ω	81
	2	2	2Ω	82
	3	3	4Ω	83
	4	4	8Ω	84
	5	5	16Ω	85
	6	6	32Ω	86
	7	7	64Ω	87
	8	8	128Ω	88
	9	9	256Ω	89
	10	10	512Ω	90
	11	11	1024Ω	91
	12	12	2048Ω	92
	13	13	4096Ω	93
	14	14	8192Ω	94
	15	15	16384Ω	95
	16	16	32768Ω	96
7	1	1	1Ω	97
	2	2	2Ω	98
	3	3	4Ω	99
	4	4	8Ω	100
	5	5	16Ω	101
	6	6	32Ω	102
	7	7	64Ω	103
	8	8	128Ω	104
	9	9	256Ω	104
	10	10	512Ω	106
	11	11	1024Ω	107
	12	12	2048Ω	108
	13	13	4096Ω	109
	14	14	8192Ω	110
	15	15	16384Ω	111
	16	16	32768Ω	112
8	1	1	1Ω	113
	2	2	2Ω	114
	3	3	4Ω	115
	4	4	8Ω	116
	5	5	16Ω	117
	6	6	32Ω	118
	7	7	64Ω	119
	8	8	128Ω	120
	9	9	256Ω	121
	10	10	512Ω	122
	11	11	1024Ω	123
	12	12	2048Ω	124
	13	13	4096Ω	125
	14	14	8192Ω	126
	15	15	16384Ω	127
	16	16	32768Ω	128
9	1	1	1Ω	129
	2	2	2Ω	130
	3	3	4Ω	131
	4	4	8Ω	132
	5	5	16Ω	133
	6	6	32Ω	134
	7	7	64Ω	135
	8	8	128Ω	136
	9	9	256Ω	137
	10	10	512Ω	138
	11	11	1024Ω	139
	12	12	2048Ω	140
	13	13	4096Ω	141
	14	14	8192Ω	142
	15	15	16384Ω	143
	16	16	32768Ω	144
10	1	1	1Ω	145
	2	2	2Ω	146
	3	3	4Ω	147
	4	4	8Ω	148
	5	5	16Ω	149
	6	6	32Ω	150
	7	7	64Ω	151
	8	8	128Ω	152
	9	9	256Ω	153
	10	10	512Ω	154
	11	11	1024Ω	155
	12	12	2048Ω	156
	13	13	4096Ω	157
	14	14	8192Ω	158
	15	15	16384Ω	159
	16	16	32768Ω	160

Table 4.4 - 50-295B - 24-Bit Versions - Sub-Unit, Resistor & Relay Cross Reference

Sub-Unit	Bit	Resistor	Resistor Value	Relay No.
1	1	1	1 Ω	1
	2	2	2 Ω	2
	3	3	4 Ω	3
	4	4	8 Ω	4
	5	5	16 Ω	5
	6	6	32 Ω	6
	7	7	64 Ω	7
	8	8	128 Ω	8
	9	9	256 Ω	9
	10	10	512 Ω	10
	11	11	1024 Ω	11
	12	12	2048 Ω	12
	13	13	4096 Ω	13
	14	14	8192 Ω	14
	15	15	16384 Ω	15
	16	16	32768 Ω	16
	17	17	65536 Ω	17
	18	18	131072 Ω	18
	19	19	262144 Ω	19
	20	20	524288 Ω	20
	21	21	1048576 Ω	21
	22	22	2097152 Ω	22
	23	23	4194304 Ω	23
	24	24	8388608 Ω	24
2	1	1	1 Ω	25
	2	2	2 Ω	26
	3	3	4 Ω	27
	4	4	8 Ω	28
	5	5	16 Ω	29
	6	6	32 Ω	30
	7	7	64 Ω	31
	8	8	128 Ω	32
	9	9	256 Ω	33
	10	10	512 Ω	34
	11	11	1024 Ω	35
	12	12	2048 Ω	36
	13	13	4096 Ω	37
	14	14	8192 Ω	38
	15	15	16384 Ω	39
	16	16	32768 Ω	40
	17	17	65536 Ω	41
	18	18	131072 Ω	42
	19	19	262144 Ω	43
	20	20	524288 Ω	44
	21	21	1048576 Ω	45
	22	22	2097152 Ω	46
	23	23	4194304 Ω	47
	24	24	8388608 Ω	48
3	1	1	1 Ω	49
	2	2	2 Ω	50
	3	3	4 Ω	51
	4	4	8 Ω	52
	5	5	16 Ω	53
	6	6	32 Ω	54
	7	7	64 Ω	55
	8	8	128 Ω	56
3	9	9	256 Ω	57
	10	10	512 Ω	58
	11	11	1024 Ω	59
	12	12	2048 Ω	60
	13	13	4096 Ω	61
	14	14	8192 Ω	62
	15	15	16384 Ω	63
	16	16	32768 Ω	64
	17	17	65536 Ω	65
	18	18	131072 Ω	66
	19	19	262144 Ω	67
	20	20	524288 Ω	68
	21	21	1048576 Ω	69
	22	22	2097152 Ω	70
	23	23	4194304 Ω	71
	24	24	8388608 Ω	72
4	1	1	1 Ω	73
	2	2	2 Ω	74
	3	3	4 Ω	75
	4	4	8 Ω	76
	5	5	16 Ω	77
	6	6	32 Ω	78
	7	7	64 Ω	79
	8	8	128 Ω	80
	9	9	256 Ω	81
	10	10	512 Ω	82
	11	11	1024 Ω	83
	12	12	2048 Ω	84
	13	13	4096 Ω	85
	14	14	8192 Ω	86
	15	15	16384 Ω	87
	16	16	32768 Ω	88
	17	17	65536 Ω	89
	18	18	131072 Ω	90
	19	19	262144 Ω	91
	20	20	524288 Ω	92
	21	21	1048576 Ω	93
	22	22	2097152 Ω	94
	23	23	4194304 Ω	95
	24	24	8388608 Ω	96
5	1	1	1 Ω	97
	2	2	2 Ω	98
	3	3	4 Ω	99
	4	4	8 Ω	100
	5	5	16 Ω	101
	6	6	32 Ω	102
	7	7	64 Ω	103
	8	8	128 Ω	104
	9	9	256 Ω	104
	10	10	512 Ω	106
	11	11	1024 Ω	107
	12	12	2048 Ω	108
	13	13	4096 Ω	109
	14	14	8192 Ω	110
	15	15	16384 Ω	111
	16	16	32768 Ω	112
5	17	17	65536 Ω	113
	18	18	131072 Ω	114
	19	19	262144 Ω	115
	20	20	524288 Ω	116
	21	21	1048576 Ω	117
	22	22	2097152 Ω	118
	23	23	4194304 Ω	119
	24	24	8388608 Ω	120
6	1	1	1 Ω	121
	2	2	2 Ω	122
	3	3	4 Ω	123
	4	4	8 Ω	124
	5	5	16 Ω	125
	6	6	32 Ω	126
	7	7	64 Ω	127
	8	8	128 Ω	128
	9	9	256 Ω	129
	10	10	512 Ω	130
	11	11	1024 Ω	131
	12	12	2048 Ω	132
	13	13	4096 Ω	133
	14	14	8192 Ω	134
	15	15	16384 Ω	135
	16	16	32768 Ω	136
	17	17	65536 Ω	137
	18	18	131072 Ω	138
	19	19	262144 Ω	139
	20	20	524288 Ω	140
	21	21	1048576 Ω	141
	22	22	2097152 Ω	142
	23	23	4194304 Ω	143
	24	24	8388608 Ω	144
–	–	Not Fitted		145
	–	Not Fitted		146
	–	Not Fitted		147
	–	Not Fitted		148
	–	Not Fitted		149
	–	Not Fitted		150
	–	Not Fitted		151
	–	Not Fitted		152
	–	Not Fitted		153
	–	Not Fitted		154
	–	Not Fitted		155
	–	Not Fitted		156
	–	Not Fitted		157
	–	Not Fitted		158
	–	Not Fitted		159
	–	Not Fitted		160

Card Architecture - 50-296B Programmable Potentiometer

The 8-bit version of the 50-296B Potentiometer Card is available with 5 or 9 separate channels which can be programmed with values between 0 Ω and 255 Ω. 12-bit, 16-bit and 24-bit versions are also available which have fewer channels and a greater resistance range - see the Specifications section for details.

Each channel has two resistor chains A and B corresponding to the two sides of the potentiometer, with the common point between the two chains corresponding to the wiper. In its default state, all relays are open, giving maximum resistance on both sides of the potentiometer. The architecture of one channel of the 8-bit version is shown in Figure 4.3 below. Other versions with greater bit counts operate in basically the same way.

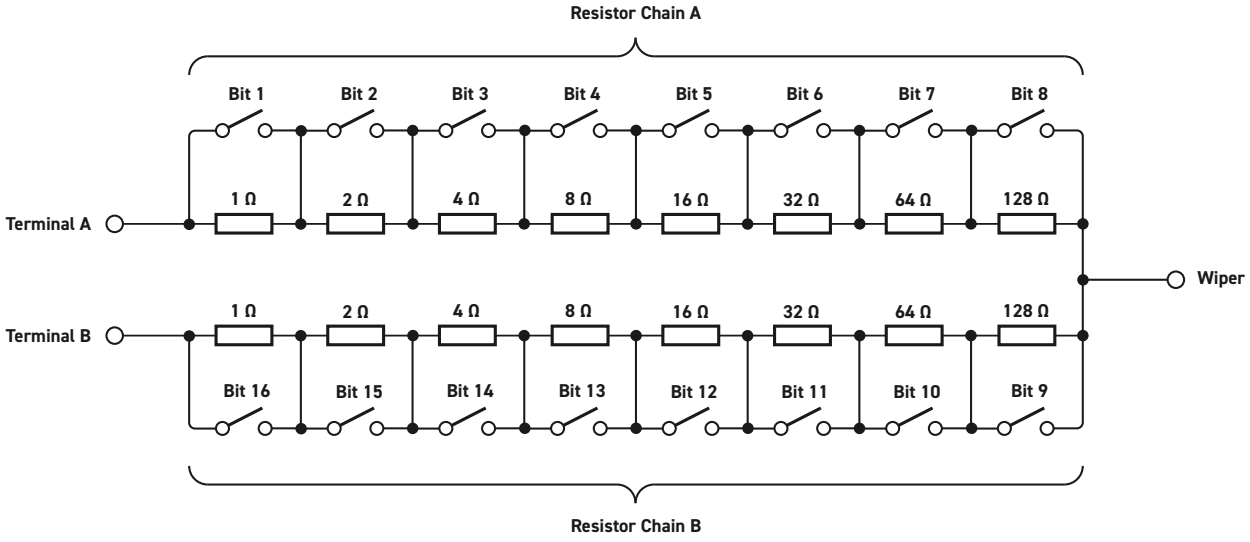


Figure 4.3 - 50-296B Potentiometer Card - Architecture of One Channel (8-Bit Version)

Programming the 50-296B Potentiometer Card

The 50-296B Potentiometer Card is programmed using a sub-unit for each channel, with resistor chains A and B being programmed individually. The relationship between the individual bits of each sub-unit and the corresponding resistance value is show in Tables 4.5, 4.6, 4.7 and 4.8.

In order to make the card perform as a true potentiometer, resistor chains A and B have to be programmed such that one is the complement of the other. For example: If bits 1 and 2 are set in resistor chain A, bits 9, 10, 11, 12, 13 and 14 have to be set in resistor chain B. This is outlined in Figure 4.4 and shown in the following program examples.

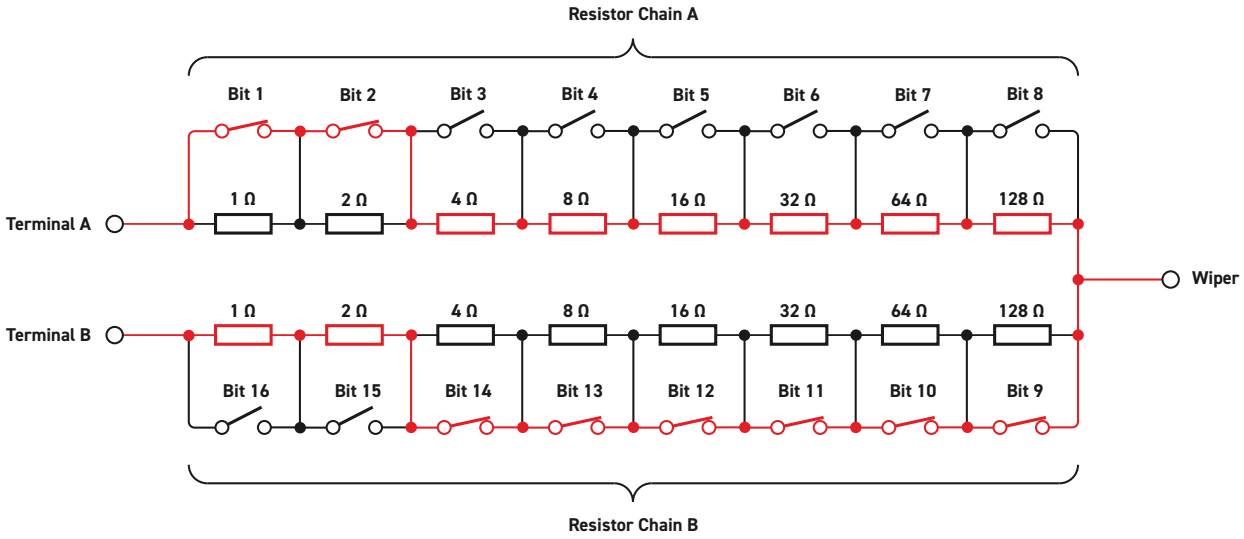


Figure 4.4 - 50-296B Potentiometer Card - Setting The Resistance of One Channel

Here are examples of using the drivers with the 8-bit versions of the 50-296B. Other versions operate in the same way but have a different number of bits in their sub-units.

Using PILPXI

To operate a relay the user could use the simple OpBit command or the WriteSub commands.

OpBit

```
DWORD sub_unit = 1;                // Select channel 1
PIL_OpBit( card_num, sub_unit, 1, 1);   // Operates bit 1 (A1 resistor relay)
PIL_OpBit( card_num, sub_unit, 2, 1);   // Operates bit 2 (A2 resistor relay)
PIL_OpBit( card_num, sub_unit, 9, 1);   // Operates bit 9 (B1 resistor relay)
PIL_OpBit( card_num, sub_unit, 10, 1); // Operates bit 10 (B2 resistor relay)
PIL_OpBit( card_num, sub_unit, 11, 1); // Operates bit 11 (B3 resistor relay)
PIL_OpBit( card_num, sub_unit, 12, 1); // Operates bit 12 (B4 resistor relay)
PIL_OpBit( card_num, sub_unit, 13, 1); // Operates bit 13 (B5 resistor relay)
PIL_OpBit( card_num, sub_unit, 14, 1); // Operates bit 14 (B6 resistor relay)

PIL_OpBit( card_num, sub_unit, 1, 0);   // Releases bit 1 (A1 resistor relay)
PIL_OpBit( card_num, sub_unit, 2, 0);   // Releases bit 2 (A2 resistor relay)
PIL_OpBit( card_num, sub_unit, 9, 0);   // Releases bit 9 (B1 resistor relay)
PIL_OpBit( card_num, sub_unit, 10, 0); // Releases bit 10 (B2 resistor relay)
PIL_OpBit( card_num, sub_unit, 11, 0); // Releases bit 11 (B3 resistor relay)
PIL_OpBit( card_num, sub_unit, 12, 0); // Releases bit 12 (B4 resistor relay)
PIL_OpBit( card_num, sub_unit, 13, 0); // Releases bit 13 (B5 resistor relay)
PIL_OpBit( card_num, sub_unit, 14, 0); // Releases bit 14 (B6 resistor relay)
```

WriteSub

```
// Sub-unit is 16 bits wide, so 1 DWORD is needed to hold the pattern
DWORD data[1];
data[0] = 0x3F03// Operates bits 1, 2, 9, 10, 11, 12, 13 and 14
PIL_WriteSub( card_num, sub_unit, data);
data[0] = 0// Releases all bits of channel
PIL_WriteSub( card_num, sub_unit, data);
```

Using PIPX40

setChannelState

```
ViUInt32 sub_unit = 1;            // Select channel 1
pipx40_setChannelState(vi, sub_unit, 1, VI_ON);   // Operates bit 1 (A1 resistor relay)
pipx40_setChannelState(vi, sub_unit, 2, VI_ON);   // Operates bit 2 (A2 resistor relay)
pipx40_setChannelState(vi, sub_unit, 9, VI_ON);   // Operates bit 9 (B1 resistor relay)
pipx40_setChannelState(vi, sub_unit, 10, VI_ON);  // Operates bit 10 (B2 resistor relay)
pipx40_setChannelState(vi, sub_unit, 11, VI_ON);  // Operates bit 11 (B3 resistor relay)
pipx40_setChannelState(vi, sub_unit, 12, VI_ON);  // Operates bit 12 (B4 resistor relay)
pipx40_setChannelState(vi, sub_unit, 13, VI_ON);  // Operates bit 13 (B5 resistor relay)
pipx40_setChannelState(vi, sub_unit, 14, VI_ON);  // Operates bit 14 (B6 resistor relay)

pipx40_setChannelState(vi, sub_unit, 1, VI_OFF);  // Releases bit 1 (A1 resistor relay)
pipx40_setChannelState(vi, sub_unit, 2, VI_OFF);  // Releases bit 2 (A2 resistor relay)
pipx40_setChannelState(vi, sub_unit, 9, VI_OFF);  // Releases bit 9 (B1 resistor relay)
pipx40_setChannelState(vi, sub_unit, 10, VI_OFF); // Releases bit 10 (B2 resistor relay)
pipx40_setChannelState(vi, sub_unit, 11, VI_OFF); // Releases bit 11 (B3 resistor relay)
pipx40_setChannelState(vi, sub_unit, 12, VI_OFF); // Releases bit 12 (B4 resistor relay)
pipx40_setChannelState(vi, sub_unit, 13, VI_OFF); // Releases bit 13 (B5 resistor relay)
pipx40_setChannelState(vi, sub_unit, 14, VI_OFF); // Releases bit 14 (B6 resistor relay)
```

setChannelPattern

```
// Sub-unit is 16 bits wide, so 1 ViUInt32 value is needed to hold the entire pattern

ViUInt32 data[1];
data[0] = 0x3F03; // Operates bits 1, 2, 9, 10, 11, 12, 13 and 14
pipx40_setChannelPattern( vi, sub_unit, data);

data[0] = 0;      // Releases all bits of channel
pipx40_setChannelPattern( vi, sub_unit, data);s
```

Table 4.5 - 50-296B - 8-Bit Versions - Sub-Unit, Resistor & Relay Cross Reference

Sub-Unit	Bit	Channel/ Resistor	Resistor Value	Relay No.
1	1	1/A1	1Ω	1
	2	1/A2	2Ω	2
	3	1/A3	4Ω	3
	4	1/A4	8Ω	4
	5	1/A5	16Ω	5
	6	1/A6	32Ω	6
	7	1/A7	64Ω	7
	8	1/A8	128Ω	8
	9	1/B1	128Ω	16
	10	1/B2	64Ω	15
	11	1/B3	32Ω	14
	12	1/B4	16Ω	13
	13	1/B5	8Ω	12
	14	1/B6	4Ω	11
	15	1/B7	2Ω	10
	16	1/B8	1Ω	9
2	1	2/A1	1Ω	17
	2	2/A2	2Ω	18
	3	2/A3	4Ω	19
	4	2/A4	8Ω	20
	5	2/A5	16Ω	21
	6	2/A6	32Ω	22
	7	2/A7	64Ω	23
	8	2/A8	128Ω	24
	9	2/B1	128Ω	32
	10	2/B2	64Ω	31
	11	2/B3	32Ω	30
	12	2/B4	16Ω	29
	13	2/B5	8Ω	28
	14	2/B6	4Ω	27
	15	2/B7	2Ω	26
	16	2/B8	1Ω	25
3	1	3/A1	1Ω	33
	2	3/A2	2Ω	34
	3	3/A3	4Ω	35
	4	3/A4	8Ω	36
	5	3/A5	16Ω	37
	6	3/A6	32Ω	38
	7	3/A7	64Ω	39
	8	3/A8	128Ω	40
	9	3/B1	128Ω	48
	10	3/B2	64Ω	47
	11	3/B3	32Ω	46
	12	3/B4	16Ω	45
	13	3/B5	8Ω	44
	14	3/B6	4Ω	43
	15	3/B7	2Ω	42
	16	3/B8	1Ω	41
4	1	4/A1	1Ω	49
	2	4/A2	2Ω	50
	3	4/A3	4Ω	51
	4	4/A4	8Ω	52
	5	4/A5	16Ω	53
	6	4/A6	32Ω	54
4	7	4/A7	64Ω	55
	8	4/A8	128Ω	56
	9	4/B1	128Ω	64
	10	4/B2	64Ω	63
	11	4/B3	32Ω	62
	12	4/B4	16Ω	61
	13	4/B5	8Ω	60
	14	4/B6	4Ω	59
	15	4/B7	2Ω	58
	16	4/B8	1Ω	57
5	1	5/A1	1Ω	65
	2	5/A2	2Ω	66
	3	5/A3	4Ω	67
	4	5/A4	8Ω	68
	5	5/A5	16Ω	69
	6	5/A6	32Ω	70
	7	5/A7	64Ω	71
	8	5/A8	128Ω	72
	9	5/B1	128Ω	80
	10	5/B2	64Ω	79
	11	5/B3	32Ω	78
	12	5/B4	16Ω	77
	13	5/B5	8Ω	76
	14	5/B6	4Ω	75
	15	5/B7	2Ω	74
	16	5/B8	1Ω	73
6	1	6/A1	1Ω	81
	2	6/A2	2Ω	82
	3	6/A3	4Ω	83
	4	6/A4	8Ω	84
	5	6/A5	16Ω	85
	6	6/A6	32Ω	86
	7	6/A7	64Ω	87
	8	6/A8	128Ω	88
	9	6/B1	128Ω	96
	10	6/B2	64Ω	95
	11	6/B3	32Ω	94
	12	6/B4	16Ω	93
	13	6/B5	8Ω	92
	14	6/B6	4Ω	91
	15	6/B7	2Ω	90
	16	6/B8	1Ω	89
7	1	7/A1	1Ω	97
	2	7/A2	2Ω	98
	3	7/A3	4Ω	99
	4	7/A4	8Ω	100
	5	7/A5	16Ω	101
	6	7/A6	32Ω	102
	7	7/A7	64Ω	103
	8	7/A8	128Ω	104
	9	7/B1	128Ω	112
	10	7/B2	64Ω	111
	11	7/B3	32Ω	110
	12	7/B4	16Ω	109
7	13	7/B5	8Ω	108
	14	7/B6	4Ω	107
	15	7/B7	2Ω	106
	16	7/B8	1Ω	105
8	1	8/A1	1Ω	113
	2	8/A2	2Ω	114
	3	8/A3	4Ω	115
	4	8/A4	8Ω	116
	5	8/A5	16Ω	117
	6	8/A6	32Ω	118
	7	8/A7	64Ω	119
	8	8/A8	128Ω	120
	9	8/B1	128Ω	128
	10	8/B2	64Ω	127
	11	8/B3	32Ω	126
	12	8/B4	16Ω	125
	13	8/B5	8Ω	124
	14	8/B6	4Ω	123
	15	8/B7	2Ω	122
	16	8/B8	1Ω	121
9	1	9/A1	1Ω	129
	2	9/A2	2Ω	130
	3	9/A3	4Ω	131
	4	9/A4	8Ω	132
	5	9/A5	16Ω	133
	6	9/A6	32Ω	134
	7	9/A7	64Ω	135
	8	9/A8	128Ω	136
	9	9/B1	128Ω	144
	10	9/B2	64Ω	143
	11	9/B3	32Ω	142
	12	9/B4	16Ω	141
	13	9/B5	8Ω	140
	14	9/B6	4Ω	139
	15	9/B7	2Ω	138
	16	9/B8	1Ω	137
–	–	Not Fitted		145
	–	Not Fitted		146
	–	Not Fitted		147
	–	Not Fitted		148
	–	Not Fitted		149
	–	Not Fitted		150
	–	Not Fitted		151
	–	Not Fitted		152
	–	Not Fitted		160
	–	Not Fitted		159
	–	Not Fitted		158
	–	Not Fitted		157
	–	Not Fitted		156
	–	Not Fitted		155
	–	Not Fitted		154
	–	Not Fitted		153

Table 4.6 - 50-296B - 12-Bit Versions - Sub-Unit, Resistor & Relay Cross Reference

Sub-Unit	Bit	Channel/ Resistor	Resistor Value	Relay No.
1	1	1/A1	1 Ω	1
	2	1/A2	2 Ω	2
	3	1/A3	4 Ω	3
	4	1/A4	8 Ω	4
	5	1/A5	16 Ω	5
	6	1/A6	32 Ω	6
	7	1/A7	64 Ω	7
	8	1/A8	128 Ω	8
	9	1/A9	256 Ω	9
	10	1/A10	512 Ω	10
	11	1/A11	1024 Ω	11
	12	1/A12	2048 Ω	12
–	–	Not Fitted		13
	–	Not Fitted		14
	–	Not Fitted		15
	–	Not Fitted		16
	–	Not Fitted		32
	–	Not Fitted		31
	–	Not Fitted		30
	–	Not Fitted		29
1	13	1/B1	2048 Ω	28
	14	1/B2	1024 Ω	27
	15	1/B3	512 Ω	26
	16	1/B4	256 Ω	25
	17	1/B5	128 Ω	24
	18	1/B6	64 Ω	23
	19	1/B7	32 Ω	22
	20	1/B8	16 Ω	21
	21	1/B9	8 Ω	20
	22	1/B10	4 Ω	19
	23	1/B11	2 Ω	18
	24	1/B12	1 Ω	17
2	1	2/A1	1 Ω	33
	2	2/A2	2 Ω	34
	3	2/A3	4 Ω	35
	4	2/A4	8 Ω	36
	5	2/A5	16 Ω	37
	6	2/A6	32 Ω	38
	7	2/A7	64 Ω	39
	8	2/A8	128 Ω	40
	9	2/A9	256 Ω	41
	10	2/A10	512 Ω	42
	11	2/A11	1024 Ω	43
	12	2/A12	2048 Ω	44
–	–	Not Fitted		45
	–	Not Fitted		46
	–	Not Fitted		47
	–	Not Fitted		48
	–	Not Fitted		64
	–	Not Fitted		63
	–	Not Fitted		62
	–	Not Fitted		61
2	13	2/B1	2048 Ω	60
	14	2/B2	1024 Ω	59
2	15	2/B3	512 Ω	58
	16	2/B4	256 Ω	57
	17	2/B5	128 Ω	56
	18	2/B6	64 Ω	55
	19	2/B7	32 Ω	54
	20	2/B8	16 Ω	53
	21	2/B9	8 Ω	52
	22	2/B10	4 Ω	51
	23	2/B11	2 Ω	50
	24	2/B12	1 Ω	49
3	1	3/A1	1 Ω	65
	2	3/A2	2 Ω	66
	3	3/A3	4 Ω	67
	4	3/A4	8 Ω	68
	5	3/A5	16 Ω	69
	6	3/A6	32 Ω	70
	7	3/A7	64 Ω	71
	8	3/A8	128 Ω	72
	9	3/A9	256 Ω	73
	10	3/A10	512 Ω	74
	11	3/A11	1024 Ω	75
	12	3/A12	2048 Ω	76
–	–	Not Fitted		77
	–	Not Fitted		78
	–	Not Fitted		79
	–	Not Fitted		80
	–	Not Fitted		96
	–	Not Fitted		95
	–	Not Fitted		94
	–	Not Fitted		93
3	13	3/B1	2048 Ω	92
	14	3/B2	1024 Ω	91
	15	3/B3	512 Ω	90
	16	3/B4	256 Ω	89
	17	3/B5	128 Ω	88
	18	3/B6	64 Ω	87
	19	3/B7	32 Ω	86
	20	3/B8	16 Ω	85
	21	3/B9	8 Ω	84
	22	3/B10	4 Ω	83
	23	3/B11	2 Ω	82
	24	3/B12	1 Ω	81
4	1	4/A1	1 Ω	97
	2	4/A2	2 Ω	98
	3	4/A3	4 Ω	99
	4	4/A4	8 Ω	100
	5	4/A5	16 Ω	101
	6	4/A6	32 Ω	102
	7	4/A7	64 Ω	103
	8	4/A8	128 Ω	104
	9	4/A9	256 Ω	105
	10	4/A10	512 Ω	106
	11	4/A11	1024 Ω	107
	12	4/A12	2048 Ω	108
–	–	Not Fitted		109
	–	Not Fitted		110
	–	Not Fitted		111
	–	Not Fitted		112
	–	Not Fitted		128
	–	Not Fitted		127
	–	Not Fitted		126
	–	Not Fitted		125
4	13	4/B1	2048 Ω	124
	14	4/B2	1024 Ω	123
	15	4/B3	512 Ω	122
	16	4/B4	256 Ω	121
	17	4/B5	128 Ω	120
	18	4/B6	64 Ω	119
	19	4/B7	32 Ω	118
	20	4/B8	16 Ω	117
	21	4/B9	8 Ω	116
	22	4/B10	4 Ω	115
	23	4/B11	2 Ω	114
	24	4/B12	1 Ω	113
–	–	Not Fitted		129
	–	Not Fitted		130
	–	Not Fitted		131
	–	Not Fitted		132
	–	Not Fitted		133
	–	Not Fitted		134
	–	Not Fitted		135
	–	Not Fitted		136
	–	Not Fitted		137
	–	Not Fitted		138
	–	Not Fitted		139
	–	Not Fitted		140
	–	Not Fitted		160
	–	Not Fitted		159
	–	Not Fitted		158
	–	Not Fitted		157
	–	Not Fitted		156
	–	Not Fitted		155
	–	Not Fitted		154
	–	Not Fitted		153
	–	Not Fitted		152
	–	Not Fitted		151
	–	Not Fitted		150
	–	Not Fitted		149
	–	Not Fitted		148
	–	Not Fitted		147
	–	Not Fitted		146
	–	Not Fitted		145
	–	Not Fitted		144
	–	Not Fitted		143
	–	Not Fitted		142
	–	Not Fitted		141

Table 4.7 - 50-296B - 16-Bit Versions - Sub-Unit, Resistor & Relay Cross Reference

Sub-Unit	Bit	Channel/ Resistor	Resistor Value	Relay No.
1	1	1/A1	1 Ω	1
	2	1/A2	2 Ω	2
	3	1/A3	4 Ω	3
	4	1/A4	8 Ω	4
	5	1/A5	16 Ω	5
	6	1/A6	32 Ω	6
	7	1/A7	64 Ω	7
	8	1/A8	128 Ω	8
	9	1/A9	256 Ω	9
	10	1/A10	512 Ω	10
	11	1/A11	1024 Ω	11
	12	1/A12	2048 Ω	12
	13	1/A13	4096 Ω	13
	14	1/A14	8192 Ω	14
	15	1/A15	16384 Ω	15
	16	1/A16	32768 Ω	16
	17	1/B1	32768 Ω	32
	18	1/B2	16384 Ω	31
	19	1/B3	8192 Ω	30
	20	1/B4	4096 Ω	29
	21	1/B5	2048 Ω	28
	22	1/B6	1024 Ω	27
	23	1/B7	512 Ω	26
	24	1/B8	256 Ω	25
	25	1/B9	128 Ω	24
	26	1/B10	64 Ω	23
	27	1/B11	32 Ω	22
	28	1/B12	16 Ω	21
	29	1/B13	8 Ω	20
	30	1/B14	4 Ω	19
	31	1/B15	2 Ω	18
	32	1/B16	1 Ω	17
2	1	2/A1	1 Ω	33
	2	2/A2	2 Ω	34
	3	2/A3	4 Ω	35
	4	2/A4	8 Ω	36
	5	2/A5	16 Ω	37
	6	2/A6	32 Ω	38
	7	2/A7	64 Ω	39
	8	2/A8	128 Ω	40
	9	2/A9	256 Ω	41
	10	2/A10	512 Ω	42
	11	2/A11	1024 Ω	43
	12	2/A12	2048 Ω	44
	13	2/A13	4096 Ω	45
	14	2/A14	8192 Ω	46
	15	2/A15	16384 Ω	47
	16	2/A16	32768 Ω	48
	17	2/B1	32768 Ω	64
	18	2/B2	16384 Ω	63
	19	2/B3	8192 Ω	62
	20	2/B4	4096 Ω	61
	21	2/B5	2048 Ω	60
	22	2/B6	1024 Ω	59
2	23	2/B7	512 Ω	58
	24	2/B8	256 Ω	57
	25	2/B9	128 Ω	56
	26	2/B10	64 Ω	55
	27	2/B11	32 Ω	54
	28	2/B12	16 Ω	53
	29	2/B13	8 Ω	52
	30	2/B14	4 Ω	51
	31	2/B15	2 Ω	50
	32	2/B16	1 Ω	49
3	1	3/A1	1 Ω	65
	2	3/A2	2 Ω	66
	3	3/A3	4 Ω	67
	4	3/A4	8 Ω	68
	5	3/A5	16 Ω	69
	6	3/A6	32 Ω	70
	7	3/A7	64 Ω	71
	8	3/A8	128 Ω	72
	9	3/A9	256 Ω	73
	10	3/A10	512 Ω	74
	11	3/A11	1024 Ω	75
	12	3/A12	2048 Ω	76
	13	3/A13	4096 Ω	77
	14	3/A14	8192 Ω	78
	15	3/A15	16384 Ω	79
	16	3/A16	32768 Ω	80
	17	3/B1	32768 Ω	96
	18	3/B2	16384 Ω	95
	19	3/B3	8192 Ω	94
	20	3/B4	4096 Ω	93
	21	3/B5	2048 Ω	92
	22	3/B6	1024 Ω	91
	23	3/B7	512 Ω	90
	24	3/B8	256 Ω	89
	25	3/B9	128 Ω	88
	26	3/B10	64 Ω	87
	27	3/B11	32 Ω	86
	28	3/B12	16 Ω	85
	29	3/B13	8 Ω	84
	30	3/B14	4 Ω	83
	31	3/B15	2 Ω	82
	32	3/B16	1 Ω	81
4	1	4/A1	1 Ω	97
	2	4/A2	2 Ω	98
	3	4/A3	4 Ω	99
	4	4/A4	8 Ω	100
	5	4/A5	16 Ω	101
	6	4/A6	32 Ω	102
	7	4/A7	64 Ω	103
	8	4/A8	128 Ω	104
	9	4/A9	256 Ω	105
	10	4/A10	512 Ω	106
	11	4/A11	1024 Ω	107
	12	4/A12	2048 Ω	108
4	13	4/A13	4096 Ω	109
	14	4/A14	8192 Ω	110
	15	4/A15	16384 Ω	111
	16	4/A16	32768 Ω	112
	17	4/B1	32768 Ω	128
	18	4/B2	16384 Ω	127
	19	4/B3	8192 Ω	126
	20	4/B4	4096 Ω	125
	21	4/B5	2048 Ω	124
	22	4/B6	1024 Ω	123
	23	4/B7	512 Ω	122
	24	4/B8	256 Ω	121
	25	4/B9	128 Ω	120
	26	4/B10	64 Ω	119
	27	4/B11	32 Ω	118
	28	4/B12	16 Ω	117
	29	4/B13	8 Ω	116
	30	4/B14	4 Ω	115
	31	4/B15	2 Ω	114
	32	4/B16	1 Ω	113
–	–	Not Fitted		129
	–	Not Fitted		130
	–	Not Fitted		131
	–	Not Fitted		132
	–	Not Fitted		133
	–	Not Fitted		134
	–	Not Fitted		135
	–	Not Fitted		136
	–	Not Fitted		137
	–	Not Fitted		138
	–	Not Fitted		139
	–	Not Fitted		140
	–	Not Fitted		160
	–	Not Fitted		159
	–	Not Fitted		158
	–	Not Fitted		157
	–	Not Fitted		156
	–	Not Fitted		155
	–	Not Fitted		154
	–	Not Fitted		153
	–	Not Fitted		152
	–	Not Fitted		151
	–	Not Fitted		150
	–	Not Fitted		149
	–	Not Fitted		148
	–	Not Fitted		147
	–	Not Fitted		146
	–	Not Fitted		145
	–	Not Fitted		144
	–	Not Fitted		143
	–	Not Fitted		142
	–	Not Fitted		141

Table 4.8 - 50-296B - 24-Bit Versions - Sub-Unit, Resistor & Relay Cross Reference

Sub-Unit	Bit	Channel/ Resistor	Resistor Value	Relay No.
1	1	1/A1	1 Ω	1
	2	1/A2	2 Ω	2
	3	1/A3	4 Ω	3
	4	1/A4	8 Ω	4
	5	1/A5	16 Ω	5
	6	1/A6	32 Ω	6
	7	1/A7	64 Ω	7
	8	1/A8	128 Ω	8
	9	1/A9	256 Ω	9
	10	1/A10	512 Ω	10
	11	1/A11	1024 Ω	11
	12	1/A12	2048 Ω	12
	13	1/A13	4096 Ω	13
	14	1/A14	8192 Ω	14
	15	1/A15	16384 Ω	15
	16	1/A16	32768 Ω	16
	17	1/A17	65536 Ω	17
	18	1/A18	131072 Ω	18
	19	1/A19	262144 Ω	19
	20	1/A20	524288 Ω	20
	21	1/A21	1048576 Ω	21
	22	1/A22	2097152 Ω	22
	23	1/A23	4194304 Ω	23
	24	1/A24	8388608 Ω	24
	25	1/B1	8388608 Ω	48
	26	1/B2	4194304 Ω	47
	27	1/B3	2097152 Ω	46
	28	1/B4	1048576 Ω	45
	29	1/B5	524288 Ω	44
	30	1/B6	262144 Ω	43
	31	1/B7	131072 Ω	42
	32	1/B8	65536 Ω	41
	33	1/B9	32768 Ω	40
	34	1/B10	16384 Ω	39
	35	1/B11	8192 Ω	38
	36	1/B12	4096 Ω	37
	37	1/B13	2048 Ω	36
	38	1/B14	1024 Ω	35
	39	1/B15	512 Ω	34
	40	1/B16	256 Ω	33
	41	1/B17	128 Ω	32
	42	1/B18	64 Ω	31
	43	1/B19	32 Ω	30
	44	1/B20	16 Ω	29
	45	1/B21	8 Ω	28
	46	1/B22	4 Ω	27
	47	1/B23	2 Ω	26
	48	1/B24	1 Ω	25
2	1	2/A1	1 Ω	49
	2	2/A2	2 Ω	50
	3	2/A3	4 Ω	51
	4	2/A4	8 Ω	52
	5	2/A5	16 Ω	53
	6	2/A6	32 Ω	54
2	7	2/A7	64 Ω	55
	8	2/A8	128 Ω	56
	9	2/A9	256 Ω	57
	10	2/A10	512 Ω	58
	11	2/A11	1024 Ω	59
	12	2/A12	2048 Ω	60
	13	2/A13	4096 Ω	61
	14	2/A14	8192 Ω	62
	15	2/A15	16384 Ω	63
	16	2/A16	32768 Ω	64
	17	2/A17	65536 Ω	65
	18	2/A18	131072 Ω	66
	19	2/A19	262144 Ω	67
	20	2/A20	524288 Ω	68
	21	2/A21	1048576 Ω	69
	22	2/A22	2097152 Ω	70
	23	2/A23	4194304 Ω	71
	24	2/A24	8388608 Ω	72
	25	2/B1	8388608 Ω	96
	26	2/B2	4194304 Ω	95
	27	2/B3	2097152 Ω	94
	28	2/B4	1048576 Ω	93
	29	2/B5	524288 Ω	92
	30	2/B6	262144 Ω	91
	31	2/B7	131072 Ω	90
	32	2/B8	65536 Ω	89
	33	2/B9	32768 Ω	88
	34	2/B10	16384 Ω	87
	35	2/B11	8192 Ω	86
	36	2/B12	4096 Ω	85
	37	2/B13	2048 Ω	84
	38	2/B14	1024 Ω	83
	39	2/B15	512 Ω	82
	40	2/B16	256 Ω	81
	41	2/B17	128 Ω	80
	42	2/B18	64 Ω	79
	43	2/B19	32 Ω	78
	44	2/B20	16 Ω	77
	45	2/B21	8 Ω	76
	46	2/B22	4 Ω	75
	47	2/B23	2 Ω	74
	48	2/B24	1 Ω	73
3	1	3/A1	1 Ω	97
	2	3/A2	2 Ω	98
	3	3/A3	4 Ω	99
	4	3/A4	8 Ω	100
	5	3/A5	16 Ω	101
	6	3/A6	32 Ω	102
	7	3/A7	64 Ω	103
	8	3/A8	128 Ω	104
	9	3/A9	256 Ω	105
	10	3/A10	512 Ω	106
	11	3/A11	1024 Ω	107
	12	3/A12	2048 Ω	108
3	13	3/A13	4096 Ω	109
	14	3/A14	8192 Ω	110
	15	3/A15	16384 Ω	111
	16	3/A16	32768 Ω	112
	17	3/A17	65536 Ω	113
	18	3/A18	131072 Ω	114
	19	3/A19	262144 Ω	115
	20	3/A20	524288 Ω	116
	21	3/A21	1048576 Ω	117
	22	3/A22	2097152 Ω	118
	23	3/A23	4194304 Ω	119
	24	3/A24	8388608 Ω	120
	25	3/B1	8388608 Ω	144
	26	3/B2	4194304 Ω	143
	27	3/B3	2097152 Ω	142
	28	3/B4	1048576 Ω	141
	29	3/B5	524288 Ω	140
	30	3/B6	262144 Ω	139
	31	3/B7	131072 Ω	138
	32	3/B8	65536 Ω	137
	33	3/B9	32768 Ω	136
	34	3/B10	16384 Ω	135
	35	3/B11	8192 Ω	134
	36	3/B12	4096 Ω	133
	37	3/B13	2048 Ω	132
	38	3/B14	1024 Ω	131
	39	3/B15	512 Ω	130
	40	3/B16	256 Ω	129
	41	3/B17	128 Ω	128
	42	3/B18	64 Ω	127
	43	3/B19	32 Ω	126
	44	3/B20	16 Ω	125
	45	3/B21	8 Ω	124
	46	3/B22	4 Ω	123
	47	3/B23	2 Ω	122
	48	3/B24	1 Ω	121
–	–	Not Fitted		145
	–	Not Fitted		146
	–	Not Fitted		147
	–	Not Fitted		148
	–	Not Fitted		149
	–	Not Fitted		150
	–	Not Fitted		151
	–	Not Fitted		152
	–	Not Fitted		153
	–	Not Fitted		154
	–	Not Fitted		155
	–	Not Fitted		156
	–	Not Fitted		157
	–	Not Fitted		158
	–	Not Fitted		159
	–	Not Fitted		160

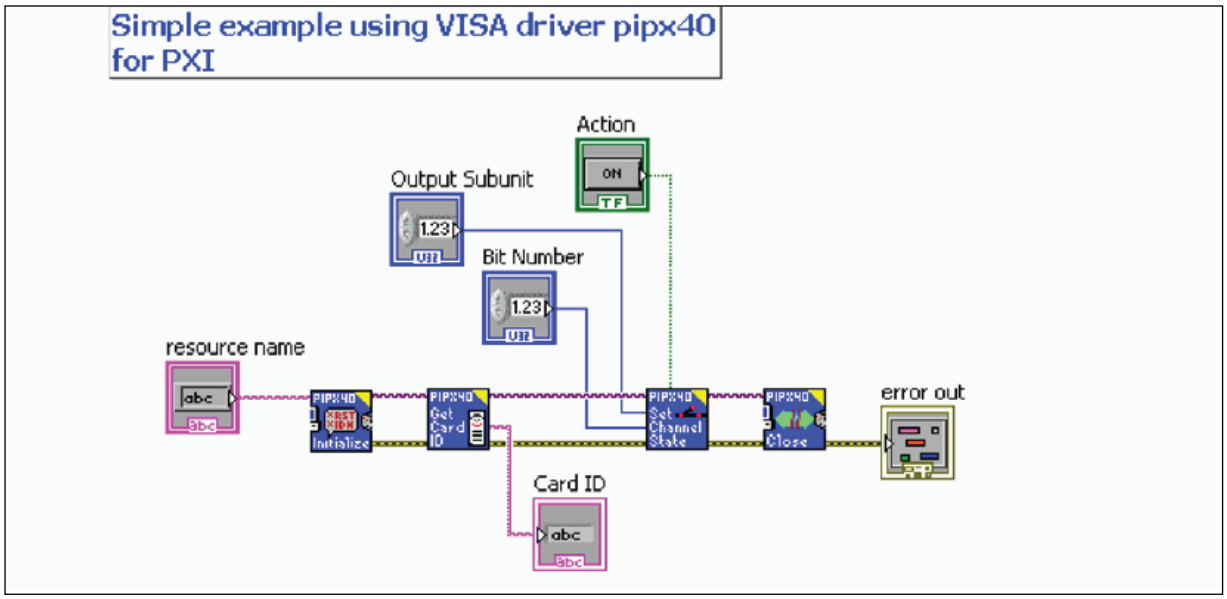
Using Pickering Drivers In LabVIEW

Most Pickering drivers include a LabVIEW wrapper to permit full operation of the Pickering product from the LabVIEW environment. These wrappers are normally installed to the current LabVIEW folder system during installation of the Pickering driver.

The process of controlling a Pickering product normally consists of the following steps:

1. Open a control session on the product.
2. Use functions in the library to operate the product.
3. Close the control session.

Following is a simple example of the use of the most common Pickering drivers:



Example Use of Pickering Drivers in LabVIEW

To download LabVIEW examples, please go to:

Using Pickering Drivers in LabVIEW

Connector Pinouts - 50-295B Programmable Resistor

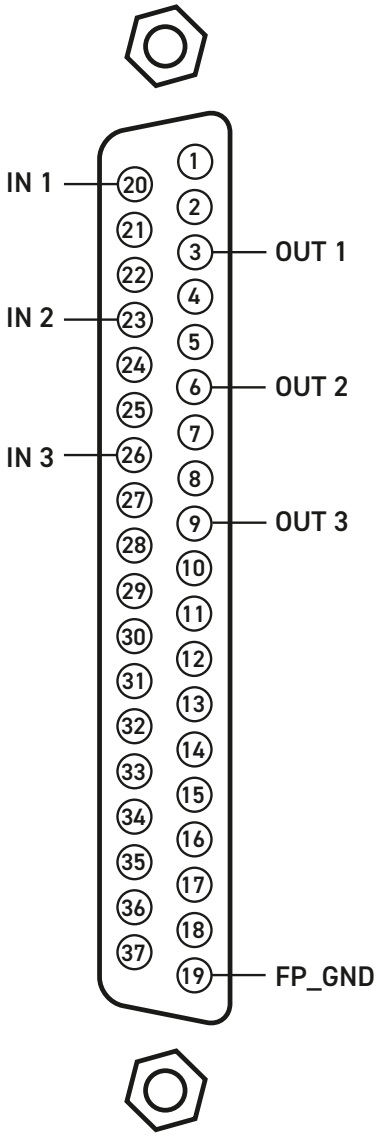


Figure 5.1 - Resistor Card Pinout:
50-295B-021-3/24
3 Channel, 24-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

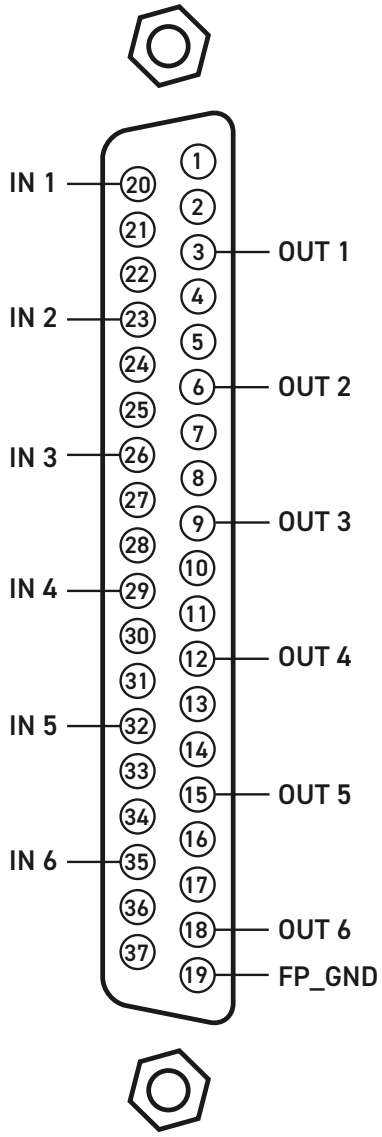


Figure 5.2 - Resistor Card Pinout:
50-295B-121-6/24
6 Channels, 24-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

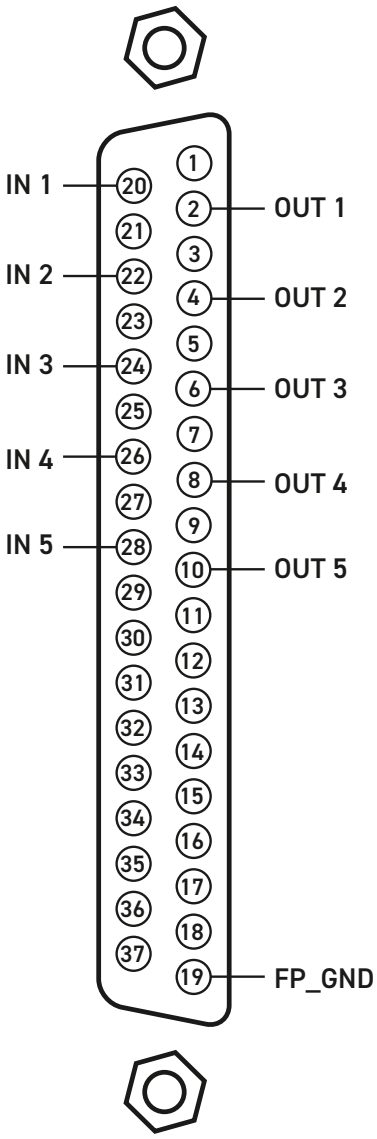


Figure 5.3 - Resistor Card Pinout:
50-295B-021-5/12
& 50-295B-021-5/16
5 Channels, 12 & 16-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

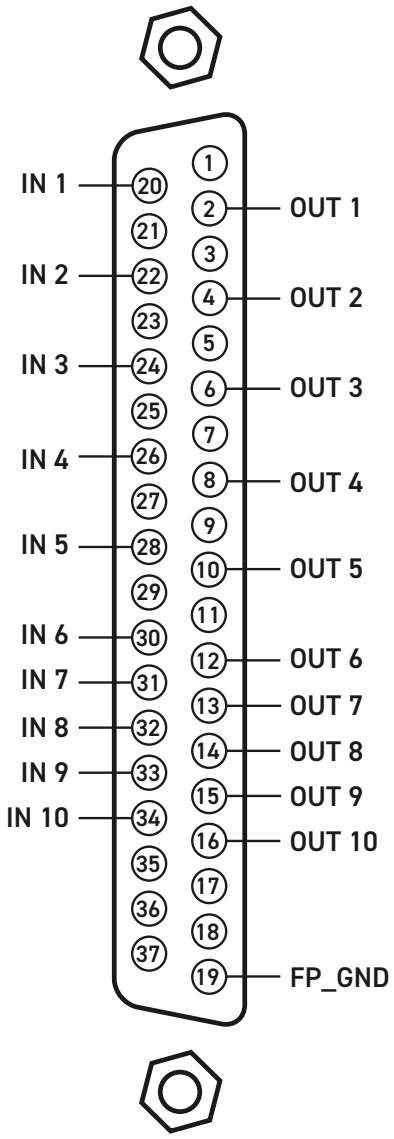


Figure 5.4 - Resistor Card Pinout:
50-295B-121-10/12
& 50-295B-121-10/16
10 Channels, 12 & 16-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

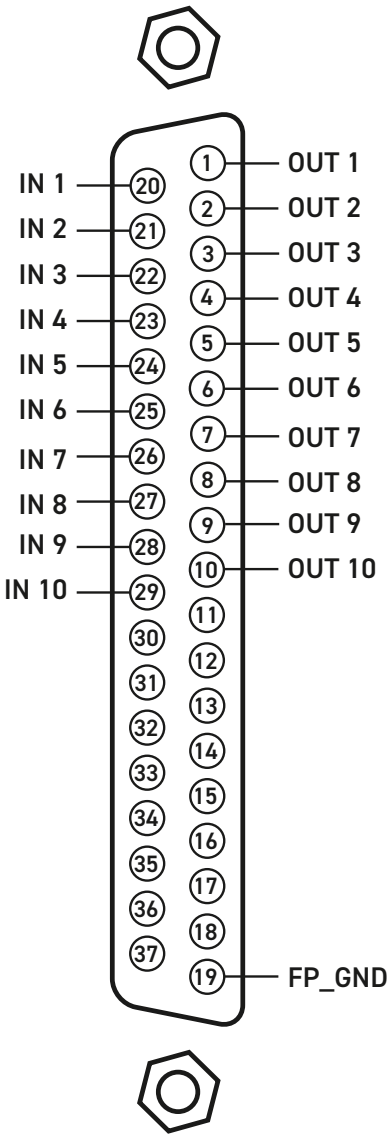


Figure 5.5 - Resistor Card Pinout:
50-295B-021-10/8
10 Channels, 8-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

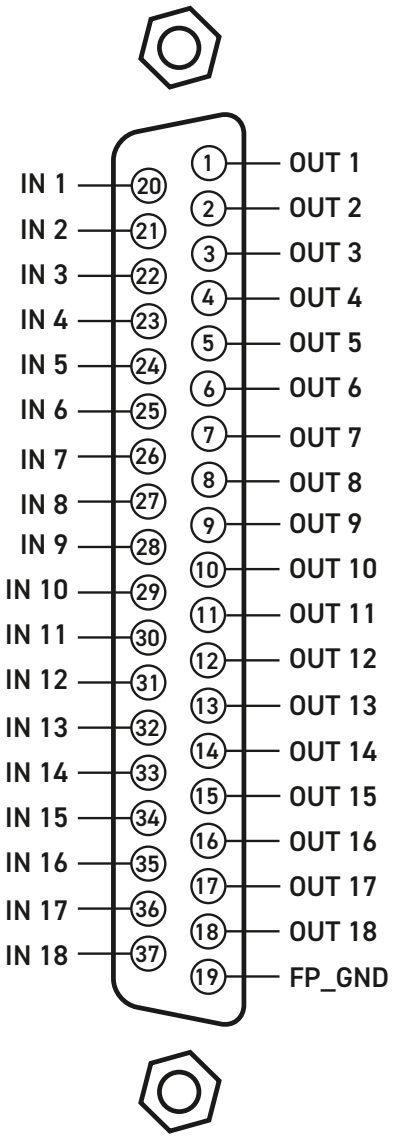


Figure 5.6 - Resistor Card Pinout:
50-295B-121-18/8
18 Channels, 8-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

Connector Pinouts - 50-296B Programmable Potentiometer

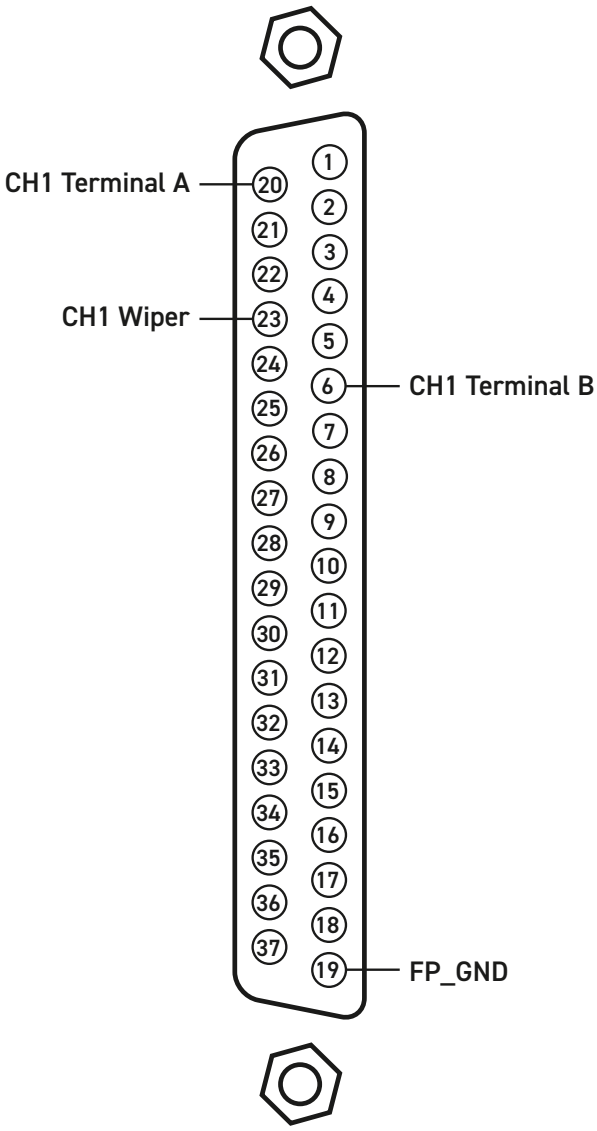


Figure 5.7 - Potentiometer Card Pinout:
50-296B-021-1/24
1 Channel, 24-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

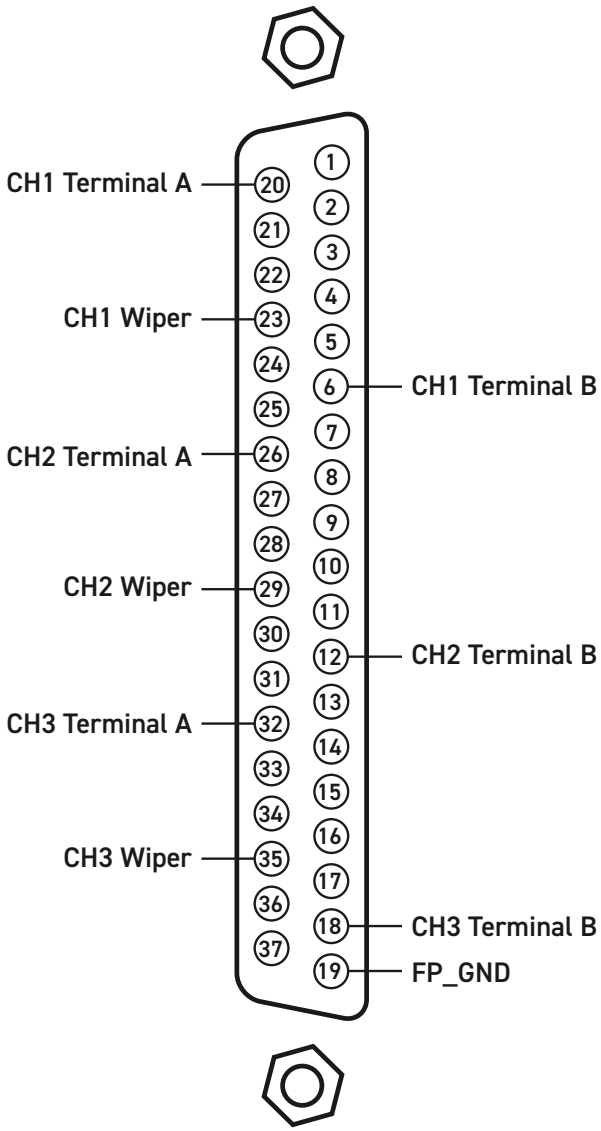


Figure 5.8 - Potentiometer Card Pinout:
50-296B-121-3/24
3 Channels, 24-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

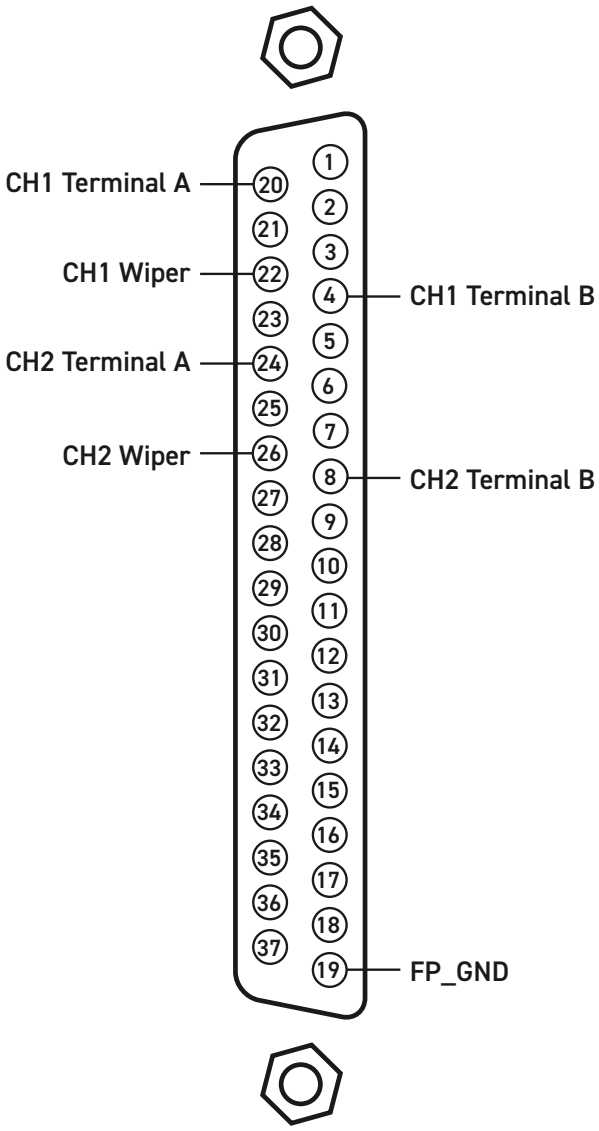


Figure 5.9 - Potentiometer Card Pinout:
50-296B-021-2/12
& 50-296B-021-2/16
2 Channels, 12 & 16-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

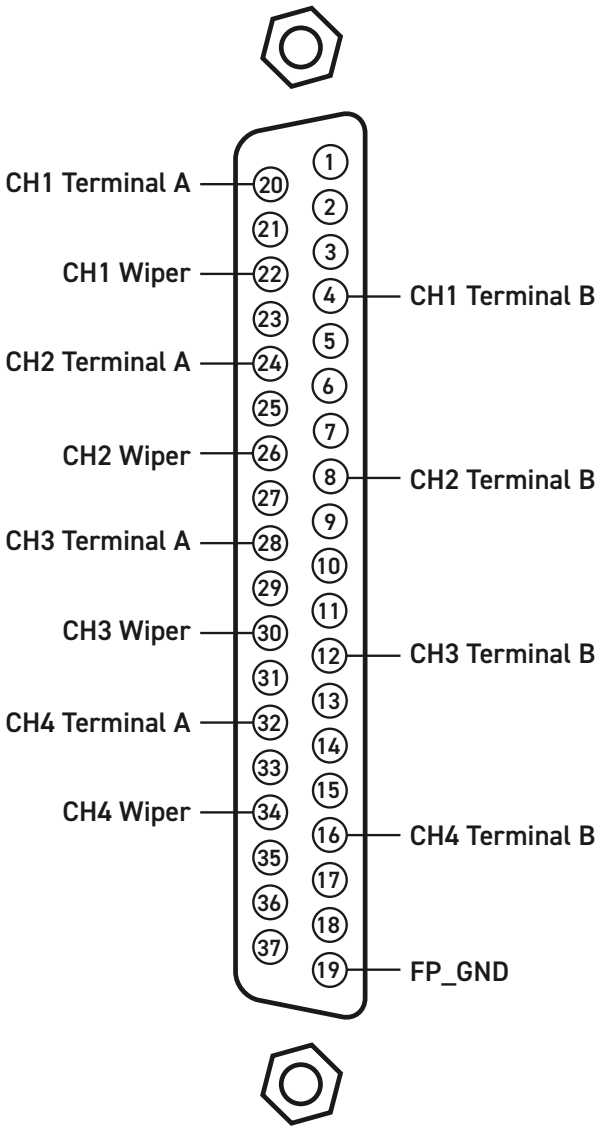


Figure 5.10 - Potentiometer Card Pinout:
50-296B-121-4/12
& 50-296B-121-4/16
4 Channels, 12 & 16-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

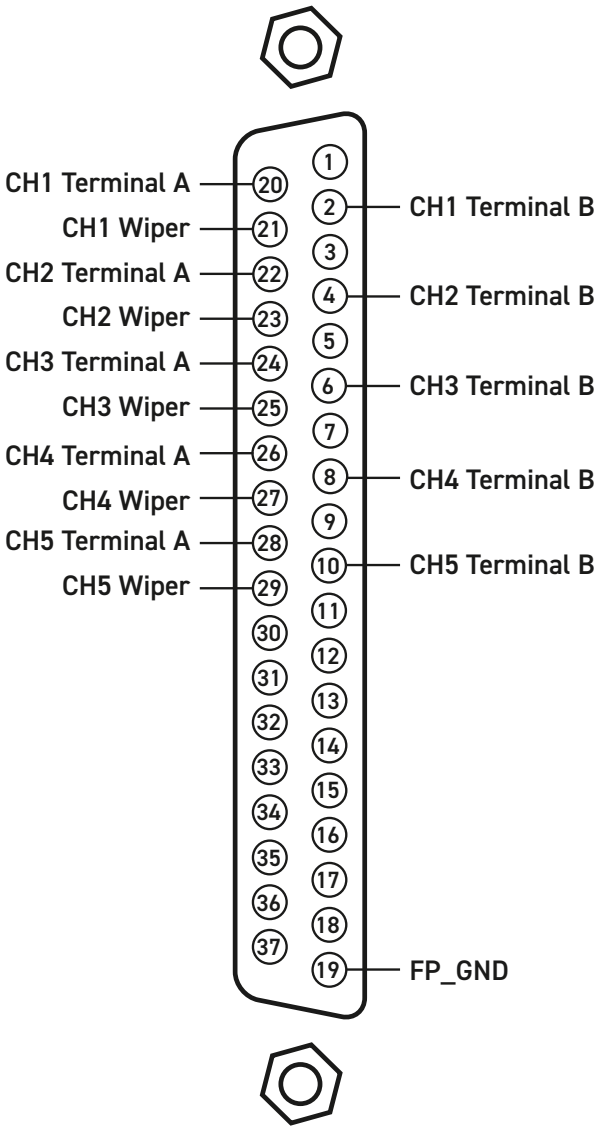


Figure 5.11 - Potentiometer Card Pinout:
50-296B-021-5/8
5 Channels, 8-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

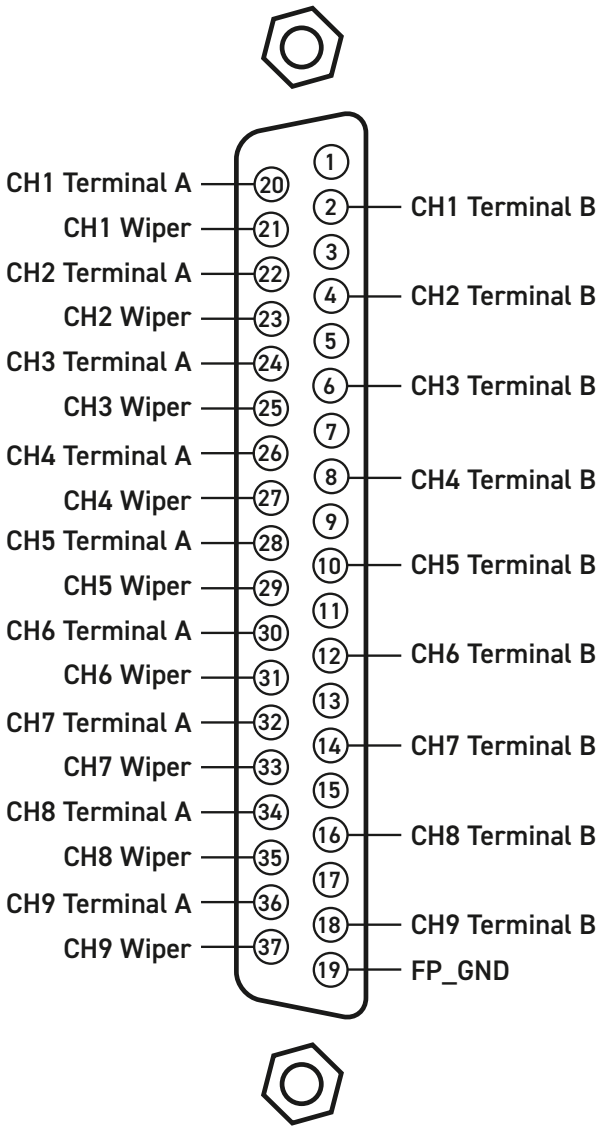


Figure 5.12 - Potentiometer Card Pinout:
50-296B-121-9/8
9 Channels, 8-Bit
(37-pin Male D-type Connector
Viewed From Front of Card)

Section 6 - Troubleshooting

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.

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.

Section 7 - Maintenance Information

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

Periodic Maintenance

The PCI card does not require any periodic maintenance. Please consult the chassis supplier regarding any periodic maintenance required for the chassis.

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 PCI cards operating in a PCI system, 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.

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.

Relay Tables - 50-295B Programmable Resistor

Table 7.1 - 50-295B - 8-Bit Versions - Relay Look-Up Table

Mother Card						Daughter Card					
Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay
1	1	RL1	6	1	RL41	11	1	RL81	16	1	RL121
1	2	RL2	6	2	RL42	11	2	RL82	16	2	RL122
1	3	RL3	6	3	RL43	11	3	RL83	16	3	RL123
1	4	RL4	6	4	RL44	11	4	RL84	16	4	RL124
1	5	RL5	6	5	RL45	11	5	RL85	16	5	RL125
1	6	RL6	6	6	RL46	11	6	RL86	16	6	RL126
1	7	RL7	6	7	RL47	11	7	RL87	16	7	RL127
1	8	RL8	6	8	RL48	11	8	RL88	16	8	RL128
2	1	RL9	7	1	RL49	12	1	RL89	17	1	RL129
2	2	RL10	7	2	RL50	12	2	RL90	17	2	RL130
2	3	RL11	7	3	RL51	12	3	RL91	17	3	RL131
2	4	RL12	7	4	RL52	12	4	RL92	17	4	RL132
2	5	RL13	7	5	RL53	12	5	RL93	17	5	RL133
2	6	RL14	7	6	RL54	12	6	RL94	17	6	RL134
2	7	RL15	7	7	RL55	12	7	RL95	17	7	RL135
2	8	RL16	7	8	RL56	12	8	RL96	17	8	RL136
3	1	RL17	8	1	RL57	13	1	RL97	18	1	RL137
3	2	RL18	8	2	RL58	13	2	RL98	18	2	RL138
3	3	RL19	8	3	RL59	13	3	RL99	18	3	RL139
3	4	RL20	8	4	RL60	13	4	RL100	18	4	RL140
3	5	RL21	8	5	RL61	13	5	RL101	18	5	RL141
3	6	RL22	8	6	RL62	13	6	RL102	18	6	RL142
3	7	RL23	8	7	RL63	13	7	RL103	18	7	RL143
3	8	RL24	8	8	RL64	13	8	RL104	18	8	RL144
4	1	RL25	9	1	RL65	14	1	RL105	NOT FITTED		RL145
4	2	RL26	9	2	RL66	14	2	RL106	NOT FITTED		RL146
4	3	RL27	9	3	RL67	14	3	RL107	NOT FITTED		RL147
4	4	RL28	9	4	RL68	14	4	RL108	NOT FITTED		RL148
4	5	RL29	9	5	RL69	14	5	RL109	NOT FITTED		RL149
4	6	RL30	9	6	RL70	14	6	RL110	NOT FITTED		RL150
4	7	RL31	9	7	RL71	14	7	RL111	NOT FITTED		RL151
4	8	RL32	9	8	RL72	14	8	RL112	NOT FITTED		RL152
5	1	RL33	10	1	RL73	15	1	RL113	NOT FITTED		RL153
5	2	RL34	10	2	RL74	15	2	RL114	NOT FITTED		RL154
5	3	RL35	10	3	RL75	15	3	RL115	NOT FITTED		RL155
5	4	RL36	10	4	RL76	15	4	RL116	NOT FITTED		RL156
5	5	RL37	10	5	RL77	15	5	RL117	NOT FITTED		RL157
5	6	RL38	10	6	RL78	15	6	RL118	NOT FITTED		RL158
5	7	RL39	10	7	RL79	15	7	RL119	NOT FITTED		RL159
5	8	RL40	10	8	RL80	15	8	RL120	NOT FITTED		RL160

Table 7.2 - 50-295B - 12-Bit Versions - Relay Look-Up Table

Mother Card						Daughter Card					
Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay
1	1	RL1	3	9	RL41	6	1	RL81	8	9	RL121
1	2	RL2	3	10	RL42	6	2	RL82	8	10	RL122
1	3	RL3	3	11	RL43	6	3	RL83	8	11	RL123
1	4	RL4	3	12	RL44	6	4	RL84	8	12	RL124
1	5	RL5	NOT FITTED		RL45	6	5	RL85	NOT FITTED		RL125
1	6	RL6	NOT FITTED		RL46	6	6	RL86	NOT FITTED		RL126
1	7	RL7	NOT FITTED		RL47	6	7	RL87	NOT FITTED		RL127
1	8	RL8	NOT FITTED		RL48	6	8	RL88	NOT FITTED		RL128
1	9	RL9	4	1	RL49	6	9	RL89	9	1	RL129
1	10	RL10	4	2	RL50	6	10	RL90	9	2	RL130
1	11	RL11	4	3	RL51	6	11	RL91	9	3	RL131
1	12	RL12	4	4	RL52	6	12	RL92	9	4	RL132
NOT FITTED		RL13	4	5	RL53	NOT FITTED		RL93	9	5	RL133
NOT FITTED		RL14	4	6	RL54	NOT FITTED		RL94	9	6	RL134
NOT FITTED		RL15	4	7	RL55	NOT FITTED		RL95	9	7	RL135
NOT FITTED		RL16	4	8	RL56	NOT FITTED		RL96	9	8	RL136
2	1	RL17	4	9	RL57	7	1	RL97	9	9	RL137
2	2	RL18	4	10	RL58	7	2	RL98	9	10	RL138
2	3	RL19	4	11	RL59	7	3	RL99	9	11	RL139
2	4	RL20	4	12	RL60	7	4	RL100	9	12	RL140
2	5	RL21	NOT FITTED		RL61	7	5	RL101	NOT FITTED		RL141
2	6	RL22	NOT FITTED		RL62	7	6	RL102	NOT FITTED		RL142
2	7	RL23	NOT FITTED		RL63	7	7	RL103	NOT FITTED		RL143
2	8	RL24	NOT FITTED		RL64	7	8	RL104	NOT FITTED		RL144
2	9	RL25	5	1	RL65	7	9	RL105	10	1	RL145
2	10	RL26	5	2	RL66	7	10	RL106	10	2	RL146
2	11	RL27	5	3	RL67	7	11	RL107	10	3	RL147
2	12	RL28	5	4	RL68	7	12	RL108	10	4	RL148
NOT FITTED		RL29	5	5	RL69	NOT FITTED		RL109	10	5	RL149
NOT FITTED		RL30	5	6	RL70	NOT FITTED		RL110	10	6	RL150
NOT FITTED		RL31	5	7	RL71	NOT FITTED		RL111	10	7	RL151
NOT FITTED		RL32	5	8	RL72	NOT FITTED		RL112	10	8	RL152
3	1	RL33	5	9	RL73	8	1	RL113	10	9	RL153
3	2	RL34	5	10	RL74	8	2	RL114	10	10	RL154
3	3	RL35	5	11	RL75	8	3	RL115	10	11	RL155
3	4	RL36	5	12	RL76	8	4	RL116	10	12	RL156
3	5	RL37	NOT FITTED		RL77	8	5	RL117	NOT FITTED		RL157
3	6	RL38	NOT FITTED		RL78	8	6	RL118	NOT FITTED		RL158
3	7	RL39	NOT FITTED		RL79	8	7	RL119	NOT FITTED		RL159
3	8	RL40	NOT FITTED		RL80	8	8	RL120	NOT FITTED		RL160

Table 7.3 - 50-295B - 16-Bit Versions - Relay Look-Up Table

Mother Card						Daughter Card					
Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay
1	1	RL1	3	9	RL41	6	1	RL81	8	9	RL121
1	2	RL2	3	10	RL42	6	2	RL82	8	10	RL122
1	3	RL3	3	11	RL43	6	3	RL83	8	11	RL123
1	4	RL4	3	12	RL44	6	4	RL84	8	12	RL124
1	5	RL5	3	13	RL45	6	5	RL85	8	13	RL125
1	6	RL6	3	14	RL46	6	6	RL86	8	14	RL126
1	7	RL7	3	15	RL47	6	7	RL87	8	15	RL127
1	8	RL8	3	16	RL48	6	8	RL88	8	16	RL128
1	9	RL9	4	1	RL49	6	9	RL89	9	1	RL129
1	10	RL10	4	2	RL50	6	10	RL90	9	2	RL130
1	11	RL11	4	3	RL51	6	11	RL91	9	3	RL131
1	12	RL12	4	4	RL52	6	12	RL92	9	4	RL132
1	13	RL13	4	5	RL53	6	13	RL93	9	5	RL133
1	14	RL14	4	6	RL54	6	14	RL94	9	6	RL134
1	15	RL15	4	7	RL55	6	15	RL95	9	7	RL135
1	16	RL16	4	8	RL56	6	16	RL96	9	8	RL136
2	1	RL17	4	9	RL57	7	1	RL97	9	9	RL137
2	2	RL18	4	10	RL58	7	2	RL98	9	10	RL138
2	3	RL19	4	11	RL59	7	3	RL99	9	11	RL139
2	4	RL20	4	12	RL60	7	4	RL100	9	12	RL140
2	5	RL21	4	13	RL61	7	5	RL101	9	13	RL141
2	6	RL22	4	14	RL62	7	6	RL102	9	14	RL142
2	7	RL23	4	15	RL63	7	7	RL103	9	15	RL143
2	8	RL24	4	16	RL64	7	8	RL104	9	16	RL144
2	9	RL25	5	1	RL65	7	9	RL105	10	1	RL145
2	10	RL26	5	2	RL66	7	10	RL106	10	2	RL146
2	11	RL27	5	3	RL67	7	11	RL107	10	3	RL147
2	12	RL28	5	4	RL68	7	12	RL108	10	4	RL148
2	13	RL29	5	5	RL69	7	13	RL109	10	5	RL149
2	14	RL30	5	6	RL70	7	14	RL110	10	6	RL150
2	15	RL31	5	7	RL71	7	15	RL111	10	7	RL151
2	16	RL32	5	8	RL72	7	16	RL112	10	8	RL152
3	1	RL33	5	9	RL73	8	1	RL113	10	9	RL153
3	2	RL34	5	10	RL74	8	2	RL114	10	10	RL154
3	3	RL35	5	11	RL75	8	3	RL115	10	11	RL155
3	4	RL36	5	12	RL76	8	4	RL116	10	12	RL156
3	5	RL37	5	13	RL77	8	5	RL117	10	13	RL157
3	6	RL38	5	14	RL78	8	6	RL118	10	14	RL158
3	7	RL39	5	15	RL79	8	7	RL119	10	15	RL159
3	8	RL40	5	16	RL80	8	8	RL120	10	16	RL160

Table 7.4 - 50-295B - 24-Bit Versions - Relay Look-Up Table

Mother Card						Daughter Card					
Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay
1	1	RL1	2	17	RL41	4	9	RL81	6	1	RL121
1	2	RL2	2	18	RL42	4	10	RL82	6	2	RL122
1	3	RL3	2	19	RL43	4	11	RL83	6	3	RL123
1	4	RL4	2	20	RL44	4	12	RL84	6	4	RL124
1	5	RL5	2	21	RL45	4	13	RL85	6	5	RL125
1	6	RL6	2	22	RL46	4	14	RL86	6	6	RL126
1	7	RL7	2	23	RL47	4	15	RL87	6	7	RL127
1	8	RL8	2	24	RL48	4	16	RL88	6	8	RL128
1	9	RL9	3	1	RL49	4	17	RL89	6	9	RL129
1	10	RL10	3	2	RL50	4	18	RL90	6	10	RL130
1	11	RL11	3	3	RL51	4	19	RL91	6	11	RL131
1	12	RL12	3	4	RL52	4	20	RL92	6	12	RL132
1	13	RL13	3	5	RL53	4	21	RL93	6	13	RL133
1	14	RL14	3	6	RL54	4	22	RL94	6	14	RL134
1	15	RL15	3	7	RL55	4	23	RL95	6	15	RL135
1	16	RL16	3	8	RL56	4	24	RL96	6	16	RL136
1	17	RL17	3	9	RL57	5	1	RL97	6	17	RL137
1	18	RL18	3	10	RL58	5	2	RL98	6	18	RL138
1	19	RL19	3	11	RL59	5	3	RL99	6	19	RL139
1	20	RL20	3	12	RL60	5	4	RL100	6	20	RL140
1	21	RL21	3	13	RL61	5	5	RL101	6	21	RL141
1	22	RL22	3	14	RL62	5	6	RL102	6	22	RL142
1	23	RL23	3	15	RL63	5	7	RL103	6	23	RL143
	24	RL24	3	16	RL64	5	8	RL104	6	24	RL144
2	1	RL25	3	17	RL65	5	9	RL105	NOT FITTED		RL145
2	2	RL26	3	18	RL66	5	10	RL106	NOT FITTED		RL146
2	3	RL27	3	19	RL67	5	11	RL107	NOT FITTED		RL147
2	4	RL28	3	20	RL68	5	12	RL108	NOT FITTED		RL148
2	5	RL29	3	21	RL69	5	13	RL109	NOT FITTED		RL149
2	6	RL30	3	22	RL70	5	14	RL110	NOT FITTED		RL150
2	7	RL31	3	23	RL71	5	15	RL111	NOT FITTED		RL151
2	8	RL32	3	24	RL72	5	16	RL112	NOT FITTED		RL152
2	9	RL33	4	1	RL73	5	17	RL113	NOT FITTED		RL153
2	10	RL34	4	2	RL74	5	18	RL114	NOT FITTED		RL154
2	11	RL35	4	3	RL75	5	19	RL115	NOT FITTED		RL155
2	12	RL36	4	4	RL76	5	20	RL116	NOT FITTED		RL156
2	13	RL37	4	5	RL77	5	21	RL117	NOT FITTED		RL157
2	14	RL38	4	6	RL78	5	22	RL118	NOT FITTED		RL158
2	15	RL39	4	7	RL79	5	23	RL119	NOT FITTED		RL159
2	16	RL40	4	8	RL80	5	24	RL120	NOT FITTED		RL160

Relay Tables - 50-296B Programmable Potentiometer

Table 7.5 - 50-296B - 8-Bit Versions - Relay Look-Up Table

Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay
1	A1	RL1	3	B1	RL48	6	A1	RL81	8	B1	RL128
1	A2	RL2	3	B2	RL47	6	A2	RL82	8	B2	RL127
1	A3	RL3	3	B3	RL46	6	A3	RL83	8	B3	RL126
1	A4	RL4	3	B4	RL45	6	A4	RL84	8	B4	RL125
1	A5	RL5	3	B5	RL44	6	A5	RL85	8	B5	RL124
1	A6	RL6	3	B6	RL43	6	A6	RL86	8	B6	RL123
1	A7	RL7	3	B7	RL42	6	A7	RL87	8	B7	RL122
1	A8	RL8	3	B8	RL41	6	A8	RL88	8	B8	RL121
1	B1	RL16	4	A1	RL49	6	B1	RL96	9	A1	RL129
1	B2	RL15	4	A2	RL50	6	B2	RL95	9	A2	RL130
1	B3	RL14	4	A3	RL51	6	B3	RL94	9	A3	RL131
1	B4	RL13	4	A4	RL52	6	B4	RL93	9	A4	RL132
1	B5	RL12	4	A5	RL53	6	B5	RL92	9	A5	RL133
1	B6	RL11	4	A6	RL54	6	B6	RL91	9	A6	RL134
1	B7	RL10	4	A7	RL55	6	B7	RL90	9	A7	RL135
1	B8	RL9	4	A8	RL56	6	B8	RL89	9	A8	RL136
2	A1	RL17	4	B1	RL64	7	A1	RL97	9	B1	RL144
2	A2	RL18	4	B2	RL63	7	A2	RL98	9	B2	RL143
2	A3	RL19	4	B3	RL62	7	A3	RL99	9	B3	RL142
2	A4	RL20	4	B4	RL61	7	A4	RL100	9	B4	RL141
2	A5	RL21	4	B5	RL60	7	A5	RL101	9	B5	RL140
2	A6	RL22	4	B6	RL59	7	A6	RL102	9	B6	RL139
2	A7	RL23	4	B7	RL58	7	A7	RL103	9	B7	RL138
2	A8	RL24	4	B8	RL57	7	A8	RL104	9	B8	RL137
2	B1	RL32	5	A1	RL65	7	B1	RL112	NOT FITTED		RL145
2	B2	RL31	5	A2	RL66	7	B2	RL111	NOT FITTED		RL146
2	B3	RL30	5	A3	RL67	7	B3	RL110	NOT FITTED		RL147
2	B4	RL29	5	A4	RL68	7	B4	RL109	NOT FITTED		RL148
2	B5	RL28	5	A5	RL69	7	B5	RL108	NOT FITTED		RL149
2	B6	RL27	5	A6	RL70	7	B6	RL107	NOT FITTED		RL150
2	B7	RL26	5	A7	RL71	7	B7	RL106	NOT FITTED		RL151
2	B8	RL25	5	A8	RL72	7	B8	RL105	NOT FITTED		RL152
3	A1	RL33	5	B1	RL80	8	A1	RL113	NOT FITTED		RL160
3	A2	RL34	5	B2	RL79	8	A2	RL114	NOT FITTED		RL159
3	A3	RL35	5	B3	RL78	8	A3	RL115	NOT FITTED		RL158
3	A4	RL36	5	B4	RL77	8	A4	RL116	NOT FITTED		RL157
3	A5	RL37	5	B5	RL76	8	A5	RL117	NOT FITTED		RL156
3	A6	RL38	5	B6	RL75	8	A6	RL118	NOT FITTED		RL155
3	A7	RL39	5	B7	RL74	8	A7	RL119	NOT FITTED		RL154
3	A8	RL40	5	B8	RL73	8	A8	RL120	NOT FITTED		RL153

Table 7.6 - 50-296B - 12-Bit Versions - Relay Look-Up Table

Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay
1	A1	RL1	2	A9	RL41	NOT FITTED		RL96	4	B5	RL120
1	A2	RL2	2	A10	RL42	NOT FITTED		RL95	4	B6	RL119
1	A3	RL3	2	A11	RL43	NOT FITTED		RL94	4	B7	RL118
1	A4	RL4	2	A12	RL44	NOT FITTED		RL93	4	B8	RL117
1	A5	RL5	NOT FITTED		RL45	3	B1	RL92	4	B9	RL116
1	A6	RL6	NOT FITTED		RL46	3	B2	RL91	4	B10	RL115
1	A7	RL7	NOT FITTED		RL47	3	B3	RL90	4	B11	RL114
1	A8	RL8	NOT FITTED		RL48	3	B4	RL89	4	B12	RL113
1	A9	RL9	NOT FITTED		RL64	3	B5	RL88	NOT FITTED		RL129
1	A10	RL10	NOT FITTED		RL63	3	B6	RL87	NOT FITTED		RL130
1	A11	RL11	NOT FITTED		RL62	3	B7	RL86	NOT FITTED		RL131
1	A12	RL12	NOT FITTED		RL61	3	B8	RL85	NOT FITTED		RL132
NOT FITTED		RL13	2	B1	RL60	3	B9	RL84	NOT FITTED		RL133
NOT FITTED		RL14	2	B2	RL59	3	B10	RL83	NOT FITTED		RL134
NOT FITTED		RL15	2	B3	RL58	3	B11	RL82	NOT FITTED		RL135
NOT FITTED		RL16	2	B4	RL57	3	B12	RL81	NOT FITTED		RL136
NOT FITTED		RL32	2	B5	RL56	4	A1	RL97	NOT FITTED		RL137
NOT FITTED		RL31	2	B6	RL55	4	A2	RL98	NOT FITTED		RL138
NOT FITTED		RL30	2	B7	RL54	4	A3	RL99	NOT FITTED		RL139
NOT FITTED		RL29	2	B8	RL53	4	A4	RL100	NOT FITTED		RL140
1	B1	RL28	2	B9	RL52	4	A5	RL101	NOT FITTED		RL160
1	B2	RL27	2	B10	RL51	4	A6	RL102	NOT FITTED		RL159
1	B3	RL26	2	B11	RL50	4	A7	RL103	NOT FITTED		RL158
1	B4	RL25	2	B12	RL49	4	A8	RL104	NOT FITTED		RL157
1	B5	RL24	3	A1	RL65	4	A9	RL105	NOT FITTED		RL156
1	B6	RL23	3	A2	RL66	4	A10	RL106	NOT FITTED		RL155
1	B7	RL22	3	A3	RL67	4	A11	RL107	NOT FITTED		RL154
1	B8	RL21	3	A4	RL68	4	A12	RL108	NOT FITTED		RL153
1	B9	RL20	3	A5	RL69	NOT FITTED		RL109	NOT FITTED		RL152
1	B10	RL19	3	A6	RL70	NOT FITTED		RL110	NOT FITTED		RL151
1	B11	RL18	3	A7	RL71	NOT FITTED		RL111	NOT FITTED		RL150
1	B12	RL17	3	A8	RL72	NOT FITTED		RL112	NOT FITTED		RL149
2	A1	RL33	3	A9	RL73	NOT FITTED		RL128	NOT FITTED		RL148
2	A2	RL34	3	A10	RL74	NOT FITTED		RL127	NOT FITTED		RL147
2	A3	RL35	3	A11	RL75	NOT FITTED		RL126	NOT FITTED		RL146
2	A4	RL36	3	A12	RL76	NOT FITTED		RL125	NOT FITTED		RL145
2	A5	RL37	NOT FITTED		RL77	4	B1	RL124	NOT FITTED		RL144
2	A6	RL38	NOT FITTED		RL78	4	B2	RL123	NOT FITTED		RL143
2	A7	RL39	NOT FITTED		RL79	4	B3	RL122	NOT FITTED		RL142
2	A8	RL40	NOT FITTED		RL80	4	B4	RL121	NOT FITTED		RL141

Table 7.7 - 50-296B - 16-Bit Versions - Relay Look-Up Table

Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay
1	A1	RL1	2	A9	RL41	3	B1	RL96	4	B9	RL120
1	A2	RL2	2	A10	RL42	3	B2	RL95	4	B10	RL119
1	A3	RL3	2	A11	RL43	3	B3	RL94	4	B11	RL118
1	A4	RL4	2	A12	RL44	3	B4	RL93	4	B12	RL117
1	A5	RL5	2	A13	RL45	3	B5	RL92	4	B13	RL116
1	A6	RL6	2	A14	RL46	3	B6	RL91	4	B14	RL115
1	A7	RL7	2	A15	RL47	3	B7	RL90	4	B15	RL114
1	A8	RL8	2	A16	RL48	3	B8	RL89	4	B16	RL113
1	A9	RL9	2	B1	RL64	3	B9	RL88	NOT FITTED		RL129
1	A10	RL10	2	B2	RL63	3	B10	RL87	NOT FITTED		RL130
1	A11	RL11	2	B3	RL62	3	B11	RL86	NOT FITTED		RL131
1	A12	RL12	2	B4	RL61	3	B12	RL85	NOT FITTED		RL132
1	A13	RL13	2	B5	RL60	3	B13	RL84	NOT FITTED		RL133
1	A14	RL14	2	B6	RL59	3	B14	RL83	NOT FITTED		RL134
1	A15	RL15	2	B7	RL58	3	B15	RL82	NOT FITTED		RL135
1	A16	RL16	2	B8	RL57	3	B16	RL81	NOT FITTED		RL136
1	B1	RL32	2	B9	RL56	4	A1	RL97	NOT FITTED		RL137
1	B2	RL31	2	B10	RL55	4	A2	RL98	NOT FITTED		RL138
1	B3	RL30	2	B11	RL54	4	A3	RL99	NOT FITTED		RL139
1	B4	RL29	2	B12	RL53	4	A4	RL100	NOT FITTED		RL140
1	B5	RL28	2	B13	RL52	4	A5	RL101	NOT FITTED		RL141
1	B6	RL27	2	B14	RL51	4	A6	RL102	NOT FITTED		RL142
1	B7	RL26	2	B15	RL50	4	A7	RL103	NOT FITTED		RL143
1	B8	RL25	2	B16	RL49	4	A8	RL104	NOT FITTED		RL144
1	B9	RL24	3	A1	RL65	4	A9	RL105	NOT FITTED		RL160
1	B10	RL23	3	A2	RL66	4	A10	RL106	NOT FITTED		RL159
1	B11	RL22	3	A3	RL67	4	A11	RL107	NOT FITTED		RL158
1	B12	RL21	3	A4	RL68	4	A12	RL108	NOT FITTED		RL157
1	B13	RL20	3	A5	RL69	4	A13	RL109	NOT FITTED		RL156
1	B14	RL19	3	A6	RL70	4	A14	RL110	NOT FITTED		RL155
1	B15	RL18	3	A7	RL71	4	A15	RL111	NOT FITTED		RL154
1	B16	RL17	3	A8	RL72	4	A16	RL112	NOT FITTED		RL153
2	A1	RL33	3	A9	RL73	4	B1	RL128	NOT FITTED		RL152
2	A2	RL34	3	A10	RL74	4	B2	RL127	NOT FITTED		RL151
2	A3	RL35	3	A11	RL75	4	B3	RL126	NOT FITTED		RL150
2	A4	RL36	3	A12	RL76	4	B4	RL125	NOT FITTED		RL149
2	A5	RL37	3	A13	RL77	4	B5	RL124	NOT FITTED		RL148
2	A6	RL38	3	A14	RL78	4	B6	RL123	NOT FITTED		RL147
2	A7	RL39	3	A15	RL79	4	B7	RL122	NOT FITTED		RL146
2	A8	RL40	3	A16	RL80	4	B8	RL121	NOT FITTED		RL145

Table 7.8 - 50-296B - 24-Bit Versions - Relay Look-Up Table

Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay	Chan.	Resistor	Relay
1	A1	RL1	1	B17	RL32	2	B9	RL88	3	B1	RL144
1	A2	RL2	1	B18	RL31	2	B10	RL87	3	B2	RL143
1	A3	RL3	1	B19	RL30	2	B11	RL86	3	B3	RL142
1	A4	RL4	1	B20	RL29	2	B12	RL85	3	B4	RL141
1	A5	RL5	1	B21	RL28	2	B13	RL84	3	B5	RL140
1	A6	RL6	1	B22	RL27	2	B14	RL83	3	B6	RL139
1	A7	RL7	1	B23	RL26	2	B15	RL82	3	B7	RL138
1	A8	RL8	1	B24	RL25	2	B16	RL81	3	B8	RL137
1	A9	RL9	2	A1	RL49	2	B17	RL80	3	B9	RL136
1	A10	RL10	2	A2	RL50	2	B18	RL79	3	B10	RL135
1	A11	RL11	2	A3	RL51	2	B19	RL78	3	B11	RL134
1	A12	RL12	2	A4	RL52	2	B20	RL77	3	B12	RL133
1	A13	RL13	2	A5	RL53	2	B21	RL76	3	B13	RL132
1	A14	RL14	2	A6	RL54	2	B22	RL75	3	B14	RL131
1	A15	RL15	2	A7	RL55	2	B23	RL74	3	B15	RL130
1	A16	RL16	2	A8	RL56	2	B24	RL73	3	B16	RL129
1	A17	RL17	2	A9	RL57	3	A1	RL97	3	B17	RL128
1	A18	RL18	2	A10	RL58	3	A2	RL98	3	B18	RL127
1	A19	RL19	2	A11	RL59	3	A3	RL99	3	B19	RL126
1	A20	RL20	2	A12	RL60	3	A4	RL100	3	B20	RL125
1	A21	RL21	2	A13	RL61	3	A5	RL101	3	B21	RL124
1	A22	RL22	2	A14	RL62	3	A6	RL102	3	B22	RL123
1	A23	RL23	2	A15	RL63	3	A7	RL103	3	B23	RL122
1	A24	RL24	2	A16	RL64	3	A8	RL104	3	B24	RL121
1	B1	RL48	2	A17	RL65	3	A9	RL105	NOT FITTED		RL145
1	B2	RL47	2	A18	RL66	3	A10	RL106	NOT FITTED		RL146
1	B3	RL48	2	A19	RL67	3	A11	RL107	NOT FITTED		RL147
1	B4	RL45	2	A20	RL68	3	A12	RL108	NOT FITTED		RL148
1	B5	RL44	2	A21	RL69	3	A13	RL109	NOT FITTED		RL149
1	B6	RL43	2	A22	RL70	3	A14	RL110	NOT FITTED		RL150
1	B7	RL42	2	A23	RL71	3	A15	RL111	NOT FITTED		RL151
1	B8	RL41	2	A24	RL72	3	A16	RL112	NOT FITTED		RL152
1	B9	RL40	2	B1	RL96	3	A17	RL113	NOT FITTED		RL153
1	B10	RL39	2	B2	RL95	3	A18	RL114	NOT FITTED		RL154
1	B11	RL38	2	B3	RL94	3	A19	RL115	NOT FITTED		RL155
1	B12	RL37	2	B4	RL93	3	A20	RL116	NOT FITTED		RL156
1	B13	RL36	2	B5	RL92	3	A21	RL117	NOT FITTED		RL157
1	B14	RL35	2	B6	RL91	3	A22	RL118	NOT FITTED		RL158
1	B15	RL34	2	B7	RL90	3	A23	RL119	NOT FITTED		RL159
1	B16	RL33	2	B8	RL89	3	A24	RL120	NOT FITTED		RL160

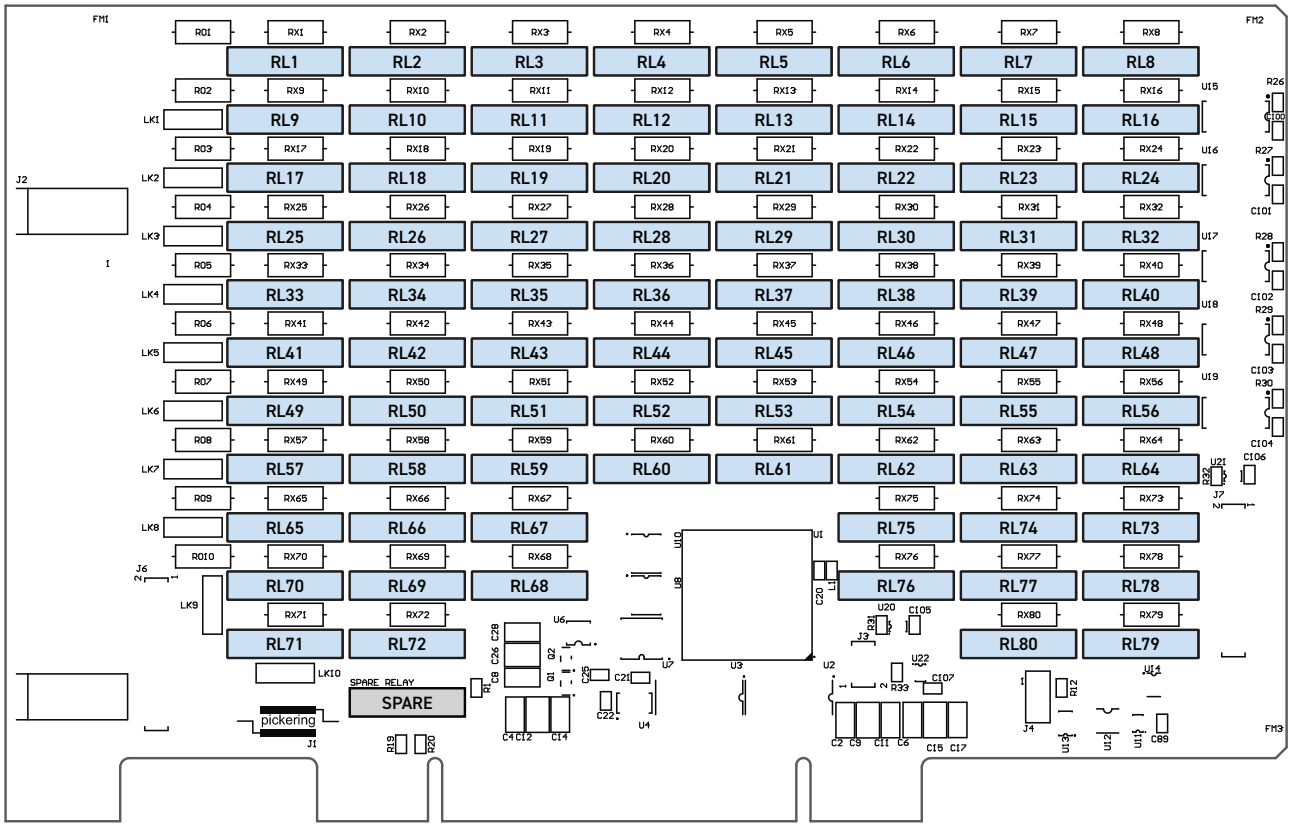


Figure 7.1 - 50-295B/296B Motherboard Component Layout

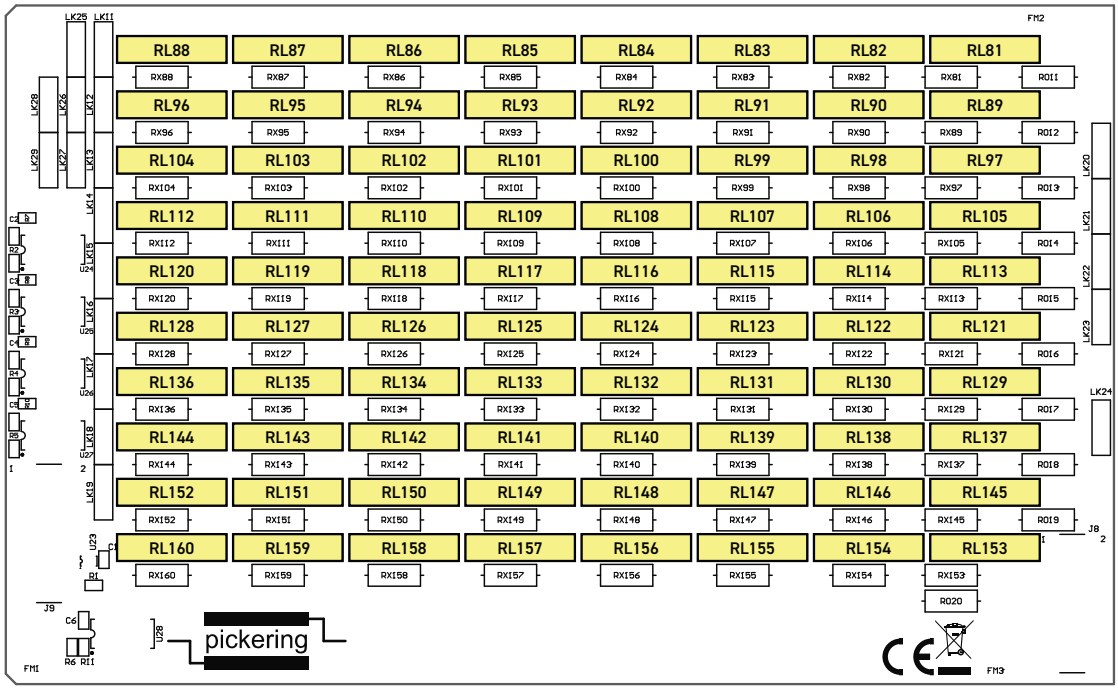


Figure 7.2 - 50-295B/296B Daughterboard Component Layout

Appendix A

Product Lifecycle Status

Product Number:	50-295/296
Introduced:	2013
Product Change Notification (If applicable):	Not applicable
Status:	Obsolete
Compatibility, forward:	50-295B/296B
Compatibility, backward:	Not applicable
Last Time Buy Date:	Not defined
Form, fit, function to previous version:	Not applicable, original version
Details of update from previous version:	Not applicable, original version

Product Number:	50-295A/296A
Introduced:	2019
Product Change Notification (If applicable):	Not applicable
Status:	Obsolete
Compatibility, forward:	50-295B/296B
Compatibility, backward:	Not applicable
Last Time Buy Date:	30th Nov-26
Form, fit, function to previous version:	Yes / No, driver update required
Details of update from previous version:	Updated to PCI Universal Signalling

Product Number:	50-295B/296B
Introduced:	2026
Product Change Notification (If applicable):	PCN0012-26
Status:	Active
Compatibility, forward:	Not applicable, latest version
Compatibility, backward:	50-295A/296A
Last Time Buy Date:	Not applicable
Form, fit, function to previous version:	Yes / No, driver update required
Details of update from previous version:	Backplane control interface replaced. Relay cycle counting feature added.