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USER MANUAL

Model No. **10-110/115/120/125**

General Purpose Reed Relay Module

Screened Reed Relay Module

Designed & Manufactured by:-

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HELP!!!

If you need assistance with your Pickering Interfaces Switching System: *Switching problems, Programming or Integration within your Test System. – Please ring Pickering Interfaces and ask for "Technical Support".*

Alternatively you may fax, email or connect to our Internet Web Site.

A full set of operating manuals, application notes and software drivers is available on CD ROM.

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Section 1
General Purpose Reed Relay Modules

1.1 Features

- 8 General Purpose Reed Relays per Module
- Available in SPST, DPST, 4PST, SPDT and DPDT Switch Configurations
- Screened Versiosn Available in SPST, DPST and SPDT Switch Configurations
- Dry (Ruthenium) and Mercury Wetted Reed Switch Contacts
- LED Indicators For Each Relay
- Switch up to 200V d.c., 2Amps, 50W Max Power

Models 10-110 and 10-115 are general purpose reed relay switching modules available with a wide choice of switch types. Suitable for the construction of switching networks, for slaving up to larger switches or for operating external devices.

Models 10-120 and 10-120 are shielded reed relays intended for applications requiring screened relays, e.g. where high crosstalk/isolation or good bandwidth (up to 50MHz) is important.

1.1.1 Range Description

The 10-110/115 range of switching modules is available in changeover (SPDT and DPDT) and normally open (SPST, DPST and 4PST) configurations. Suitable for the construction of small switching networks, for slaving up to larger switches or for operating external devices (e.g. lamps, solenoids etc.). The 10-120/125 range is available in screened SPST, DPST and SPDT versions, suitable for twisted pair cabling.

Two reed switch options are available: Dry (ruthenium) switches are the most popular and economical type and Mercury wetted switches which are more expensive but exhibit extended life with lower contact resistance and excellent contact resistance stability.

10-110 8 x Changeover Reed Relay, with SPDT or DPDT configurations.

10-115 8 x Normally Open Reed Relays, with SPST, DPST or 4PST configurations.

10-120 8 x Changeover Screened Reed Relay, with SPDT configuration.

10-125 8 x Normally Open Screened Reed Relays, with SPST or DPST configuration.

See tables 1.2 and 1.3 for a summary of switching capabilities.

1.1.2 Notes

All reed relay switching modules may be ordered with a built–in limiting resistor on each switch. This can be very useful in preventing high current in-rushes which may result in damage to the reed switch. These links are normally shorted, however when ordering you may specify limiting resistors if you wish.

Mercury wetted reed relay modules must always be mounted to within 30° of vertical.

A **Spare Reed Relay** is built onto the circuit board to facilitate easy maintenance with minimum downtime.

1.1.3 Connectors Width and Dimensions

Connections to all modules are made via front panel mounted D-type connectors (37 way or high density 62 way). A 24 way Terminal Block is available for some versions (only suitable for voltages < 40Vd.c.).

The General Purpose Reed Relay Module conforms to the 3U height (128mm) Eurocard standard and is housed in a 160mm deep screened plug-in module. Panel width for all versions with D-Type connector is 1.2 Inches while the Screw Terminal types are 2.4 Inches wide.

10-110: 8 x Changeover Reed Relays		
	Dry Reed	**Mercury**
37 Way D-Type Connector:		
1 Pole	**10-110-001**	**10-110-011**
Screw Terminal Connector:		
1 Pole	**10-110-101**	**10-110-111**
62 Way D-Type Connector:		
2 Pole	**10-110-002**	**10-110-012**

10-115: 8 x Normally Open Reed Relays		
	Mercury	**Dry (Ruthenium)**
37 Way D-Type Connector:		
1 Pole	**10-115-011**	**10-115-021**
2 Pole	**10-115-012**	**10-115-022**
Screw Terminal Connector:		
1 Pole	**10-115-111**	**10-115-121**
62 Way D-Type Connector (7 relays only)**:**		
4 Pole	**10-115-014**	**10-115-024**

10-120: 8 x Screened SPDT Reed Relays	
62 Way D-Type Connector:	
1 Pole	**10-120-001**

10-125: 8 x Screened Normally Open Reed Relays	
62 Way D-Type Connector:	
1 Pole	**10-125-021**
2 Pole	**10-125-022**

Mating Connectors:	
37 Way D-Type Plug with Crimp Pins	**10-960-037**
62 Way D-Type Plug with Crimp Pins	**10-960-062**

Table 1.1 Product Order Codes

Switch Type	**Dry Reed**	**Mercury Wet**
Max Standoff Voltage	200V†	200V†
Max Power	3W	28W
Max Switch Current	0.25A	1.0A
Max Carry Current	1.2A	1.5A
Contact Resistance		
On:	200mΩ	150mΩ
Off:	> 10^9 Ω	> 10^9 Ω
Differential Thermal Offset	<5µV	<10µV
Capacitance		
Open Switch	< 6pF	< 6pF
Switch-Switch	< 3pF	< 3pF
Bandwidth (50Ω)	> 15MHz	> 15MHz
Max Operate Time	1.5mS	3.0mS
Max Release Time	0.75mS	1.5mS
Expected Life (Operations)		
Low power load	> 10^8	> 10^9
Full power load	> 5x10^6	> 10^8

† Higher voltage standoffs are available.

Table 1.2 SPDT Relay Switching Specification

1.2 SPST Switch

A summary of these modules capability is in table 1.2, specification as per the DPST version.
Additional data is included below:-

Dry Reed Relay Type	107-1-A-12/1D
Screened Dry Reed Relay Type	102M-1-A-12/1D
Mercury Wetted Reed Relay Type	107-1-A-12/6D

1.3 SPDT and DPDT Switch

A summary of these modules capability is in table 1.2.
Additional data is included below:-

Dry Reed Relay Type	107-1-C-12/3D
Screened Dry Reed Relay Type	102M-1-C-12/3D
Mercury Wetted Reed Relay Type	107-1-C-12/7D

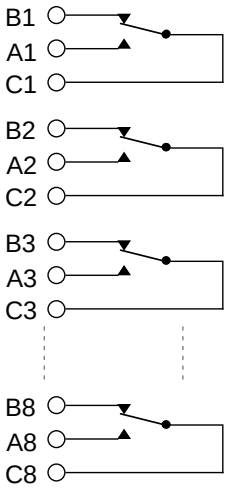


Fig 1.1 8 x SPDT Reed Relay (Model 10-110-001)

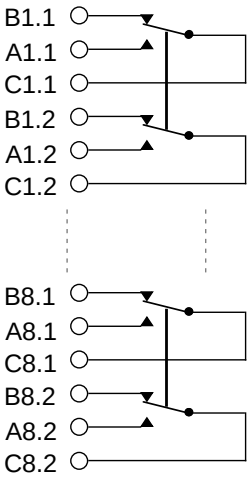


Fig 1.2 8 x DPDT Reed Relay (Model 10-110-002)

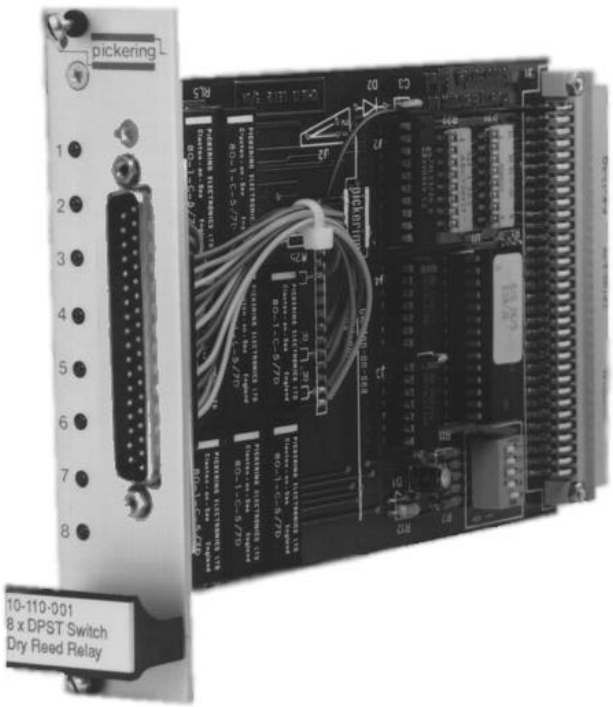


Fig 1.3 Model 115: 8 x DPST Reed Relay (old version)

1.4 DPST and 4PST Switch

A summary of these modules capability is in table 1.3.
Additional data is included below:-

Dry Reed Relay Type 107-2-A-12/1D
Mercury Wetted Reed Relay Type 107-2-A-12/6D

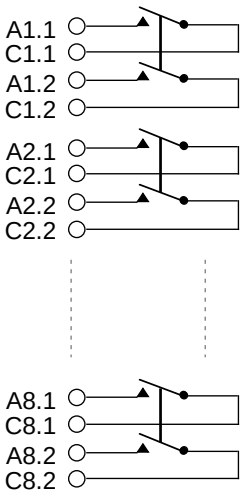


Fig 1.4 8 x DPST Reed Relay (Model 10-115-022)

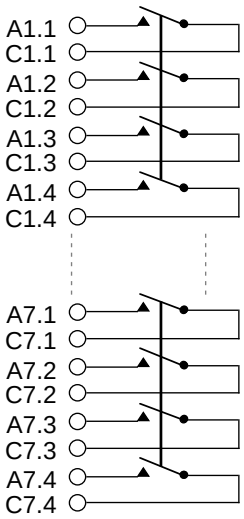


Fig 1.5 7 x 4PST Reed Relay (Model 10-115-024)

Switch Type	Ruthenium	MercuryWet
Max Standoff Voltage	200V†	200V†
Max Power	20W	50W
Max Switch Current	0.5A	2.0A
Max Carry Current	1.0A	4.0A
Contact Resistance		
On:	200mΩ	150mΩ
Off:	> 10^9 Ω	> 10^9 Ω
Differential Thermal Offset	<5µV	<10µV
Capacitance		
Open Switch	< 6pF	< 6pF
Switch-Switch	< 3pF	< 3pF
Bandwidth (50Ω)	> 15MHz	> 15MHz
Max Operate Time	1.5mS	3.0mS
Max Release Time	0.75mS	1.5mS
Expected Life (Operations)		
Low power load	> 10^8	> 10^9
Full power load	> 10^6	> 10^8

† Higher voltage standoffs are available.

Table 1.3 SPST, DPST and 4PST Relay Switching Specification

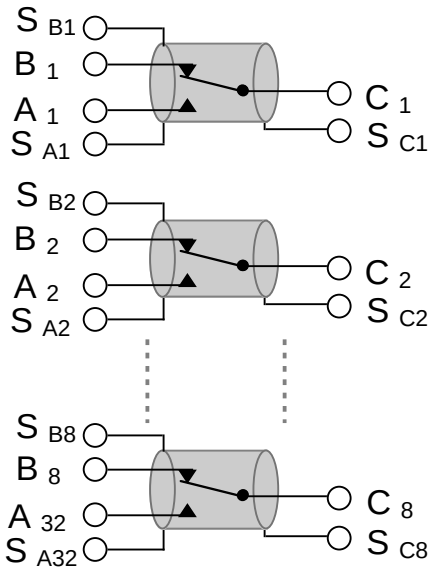


Fig 1.6 8 x Shielded SPDT Reed Relay (Model 10-120-001)

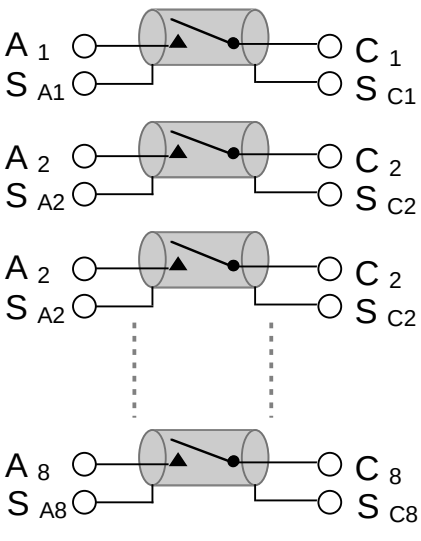


Fig 1.7 8 x Shielded SPST Reed Relay (Model 10-125-021)

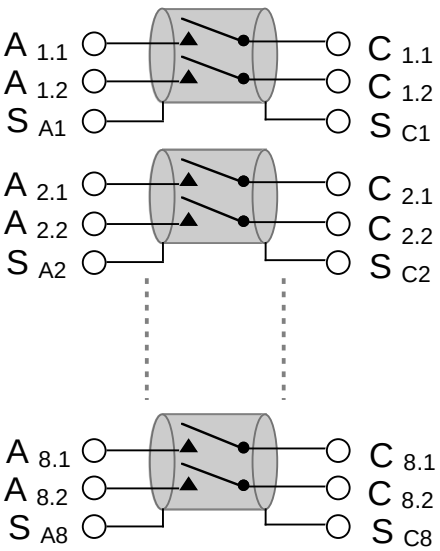
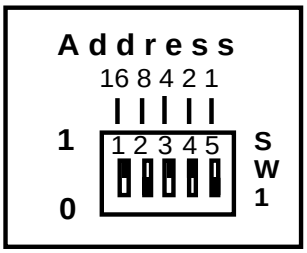


Fig 1.8 8 x Shielded DPST Reed Relay (Model 10-125-022)

Section 2
Programming

2.1 Select Module Address



Choose device address (from 0 - 30) using the address select switch on the driver card. The address selected in the illustration is 22 (16 + 4 + 2 = 22).

2.2 Programming Using the Intelligent GPIB/RS-232 Interface

The general purpose reed relay module is simple to program either by single bit or by word (8 bits).

ARESET a Clear all outputs on module **a**
CLOSE a,b Set bit number **b** on module **a**
DELAY t Force a minimum delay of **t** milliseconds between two instructions
OPEN a,b Clear bit number **b** on module **a**
RESET Clear all bits/switches on all modules
VIEW? a[,b] View status of module **a**, can be viewed at any time either as a word or by bit **b** as a logical value (1 or 0)
WRITE a,w Send word **w** to module **a**

The module is programmed as an 8 bit output port using either single bit or whole byte (8 bits) programming:-

To close relay number 5 on module 11.

CLOSE 11,5

Or to close all relays on module 8.

WRITE 8,255

Now to look at status of module 11.

VIEW? 8 will return “255”

For more details on programming see the programming manual for the IEEE-488/RS-232 interface module.

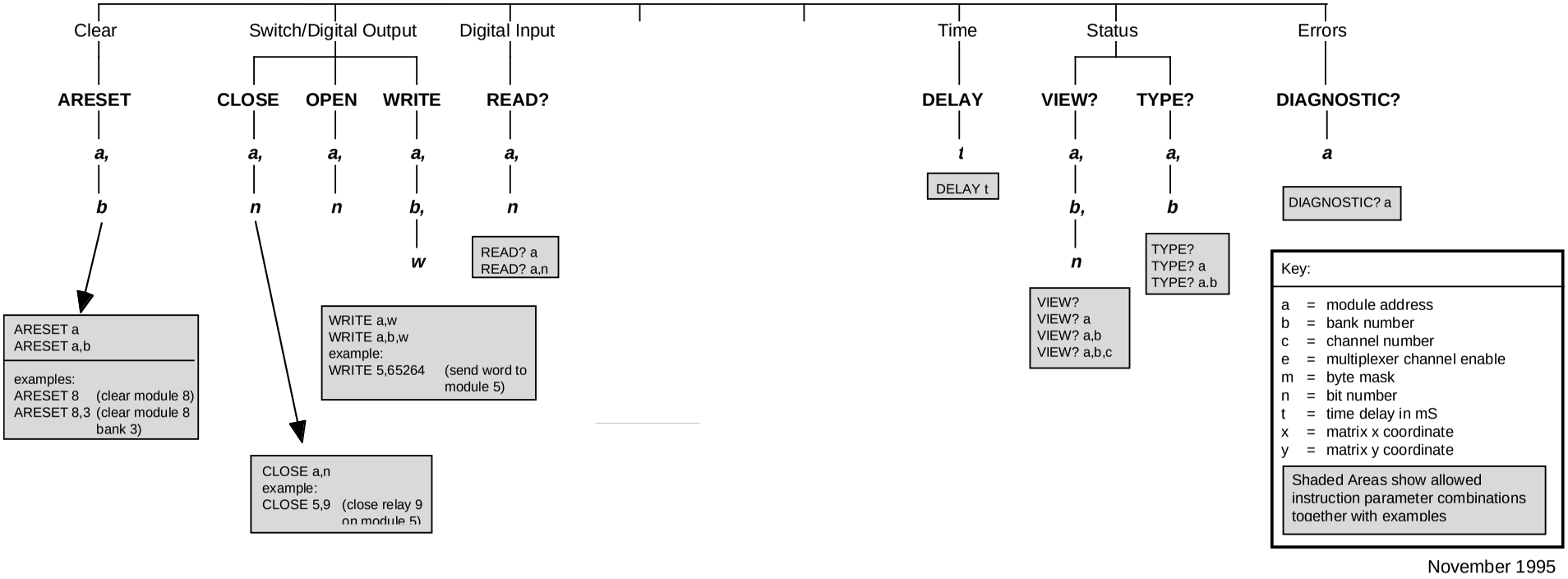


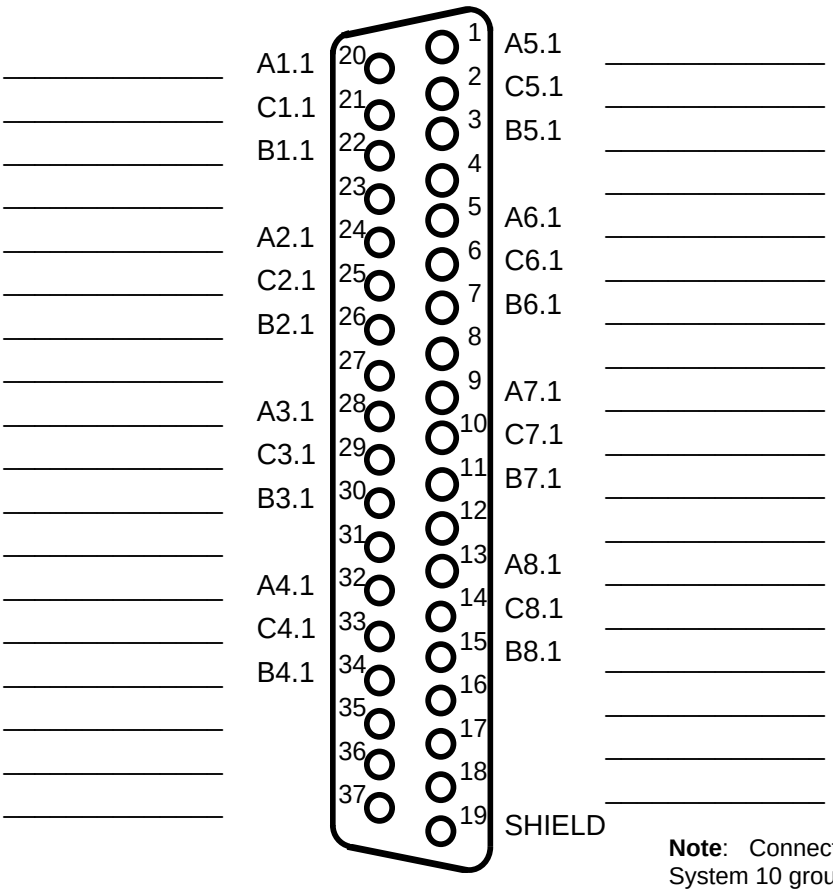
Fig 2.2 10-110/115 Reed Relay Module Instruction Set

Section 3
Connector Pin-Out Diagrams

Connectors

All modules have a choice of:-

- 37 way D-type connector (illustrated on P4).
- 62 way high density D-type connector.
- 24 way Terminal Block (only suitable for voltages < 40Vd.c. or 30Va.c r.m.s.).



Note: Connector shield is tied to System 10 ground potential.

Fig 3.1 10-110 37 Way D-Type Way Connector

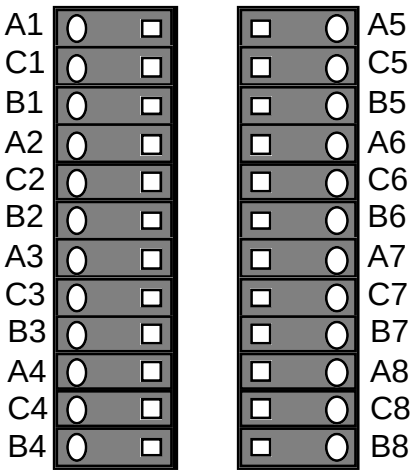


Fig 3.2 10-110 24 Way Screw Terminal Connector

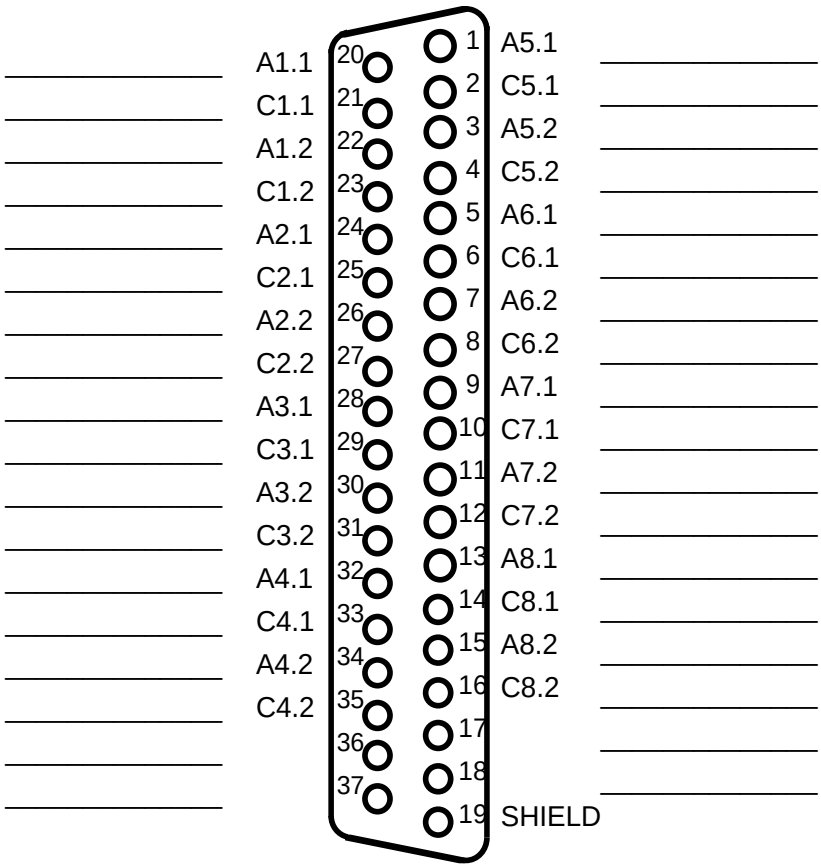


Fig 3.3 10-115 37 Way D-Type Connector

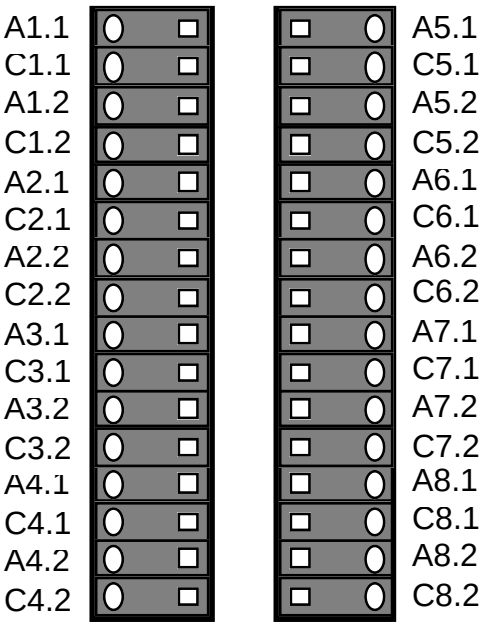


Fig 3.4 10-115 Screw Terminal Connector

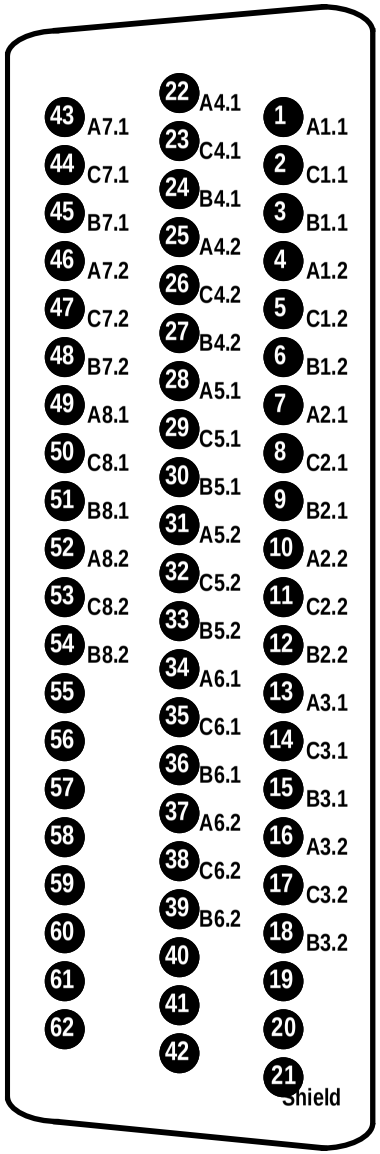


Fig 3.5 10-110, 2 Pole Version, 62 Way D-Type Connector

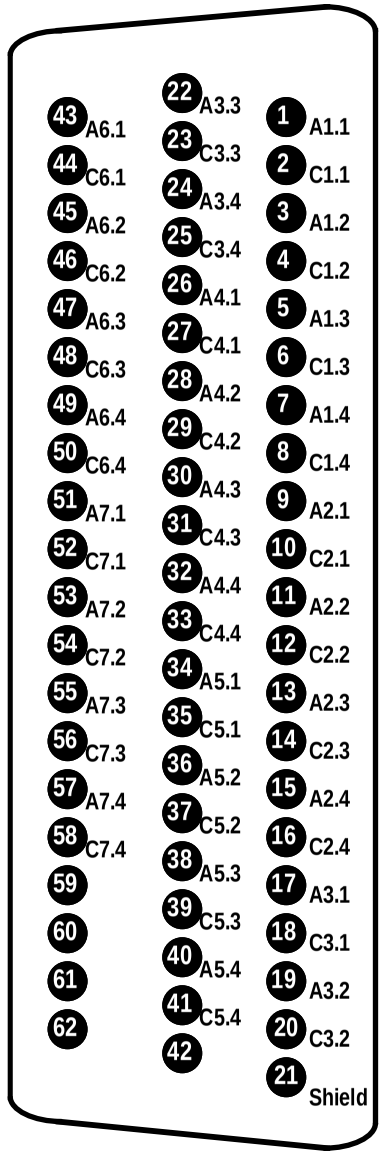


Fig 3.6 10-115, 4 Pole Version, 62 Way D-Type Connector

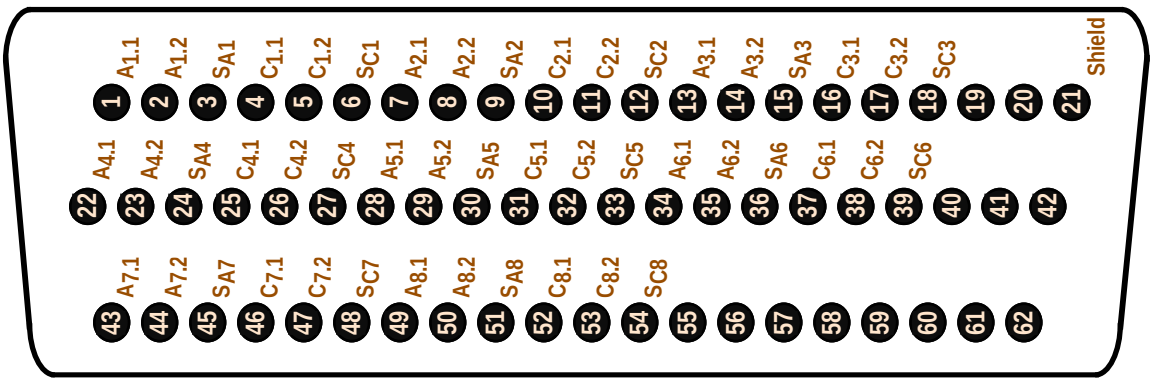


Fig 3.7 10-125-021 (Shielded SPST) and 10-125-022 (Shielded DPST) Pin Out, 62 Way D-Type Connector

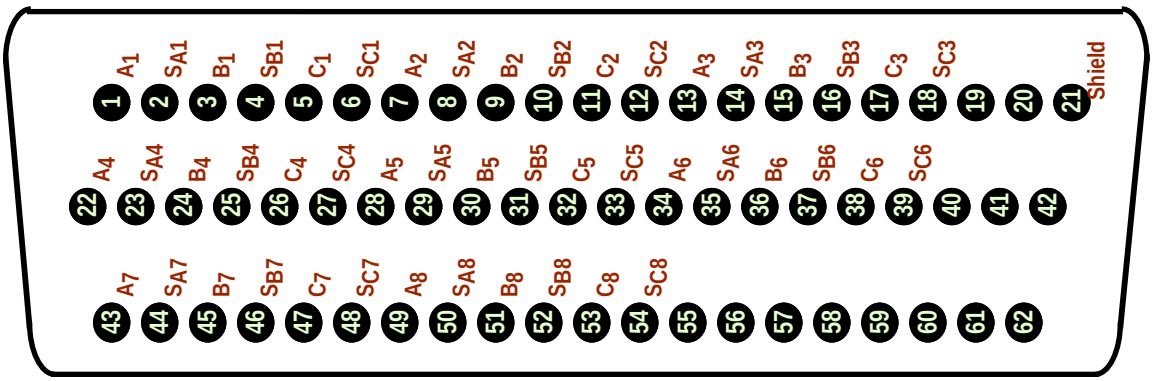


Fig 3.8 10-120-001 (Shielded SPDT) Pin Out, 62 Way D-Type Connector

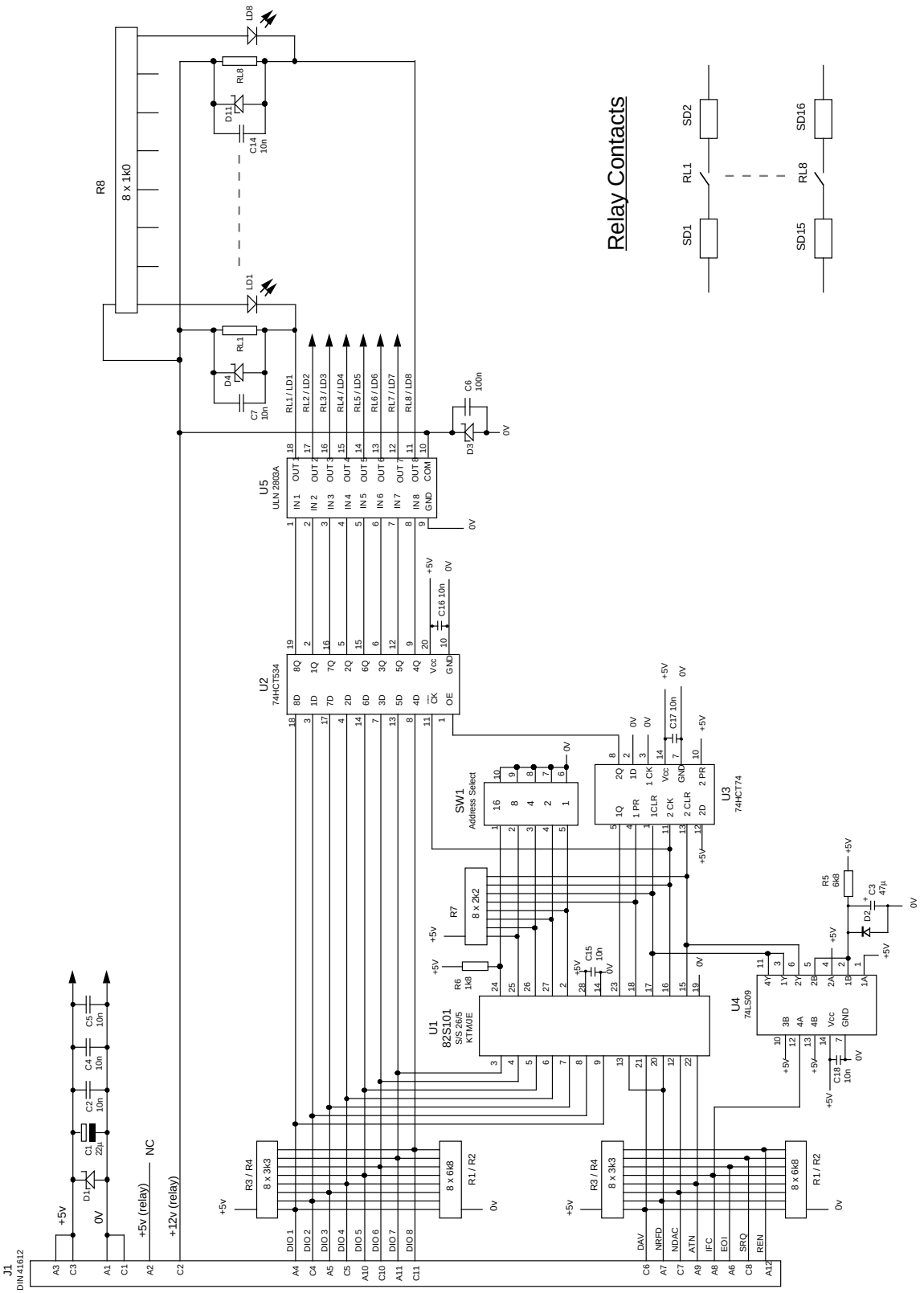


Fig 4.1 Circuit Diagram

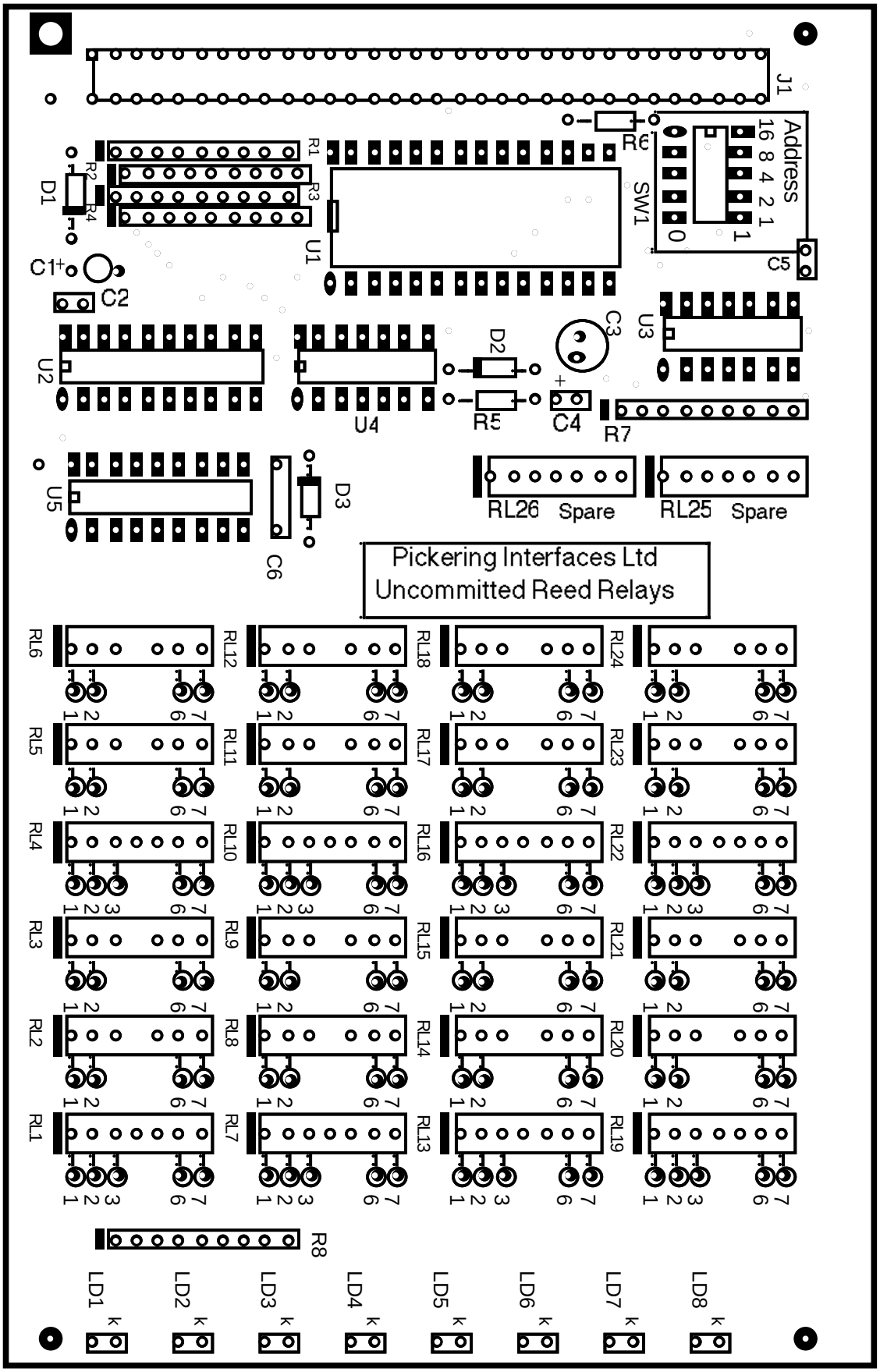


Fig 4.2 PCB Layout (all versions)

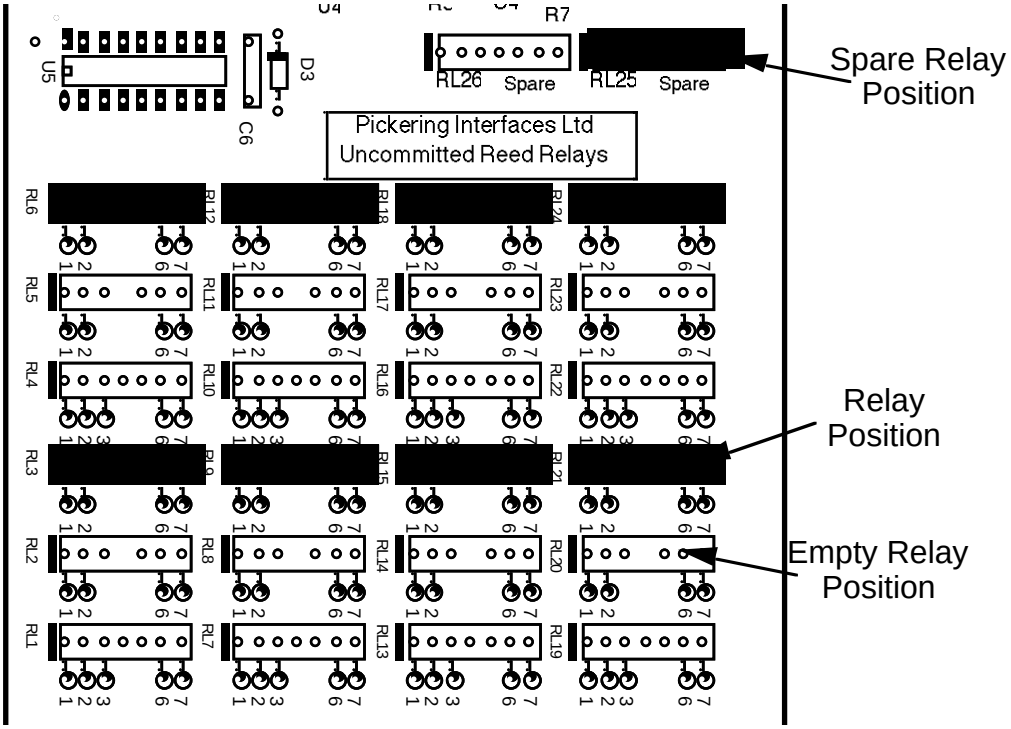


Fig 4.3 Relay Positions for SPST, DPST and SPDT Versions

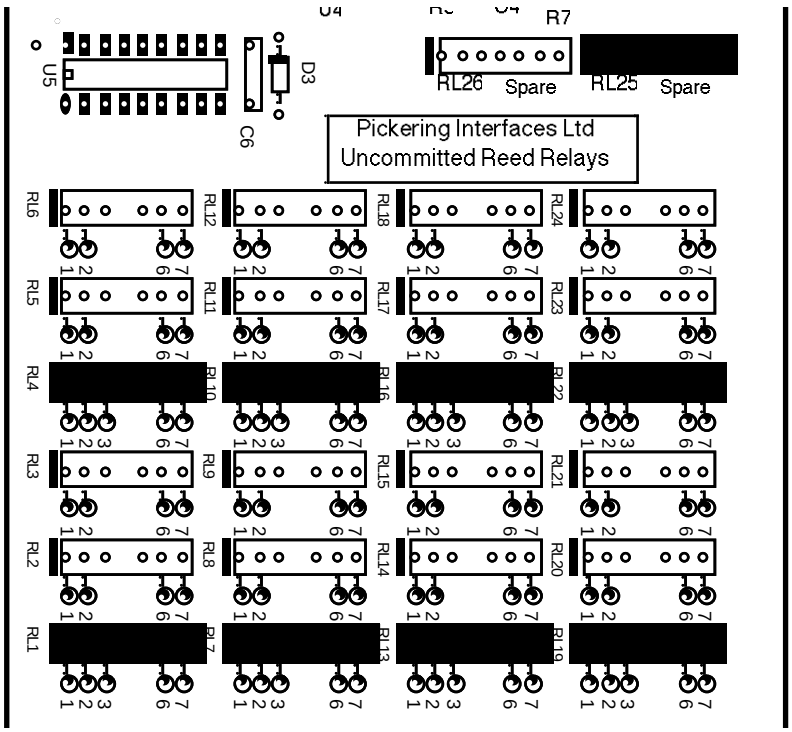


Fig 4.4 Relay Positions for 10-120 SPDT Versions

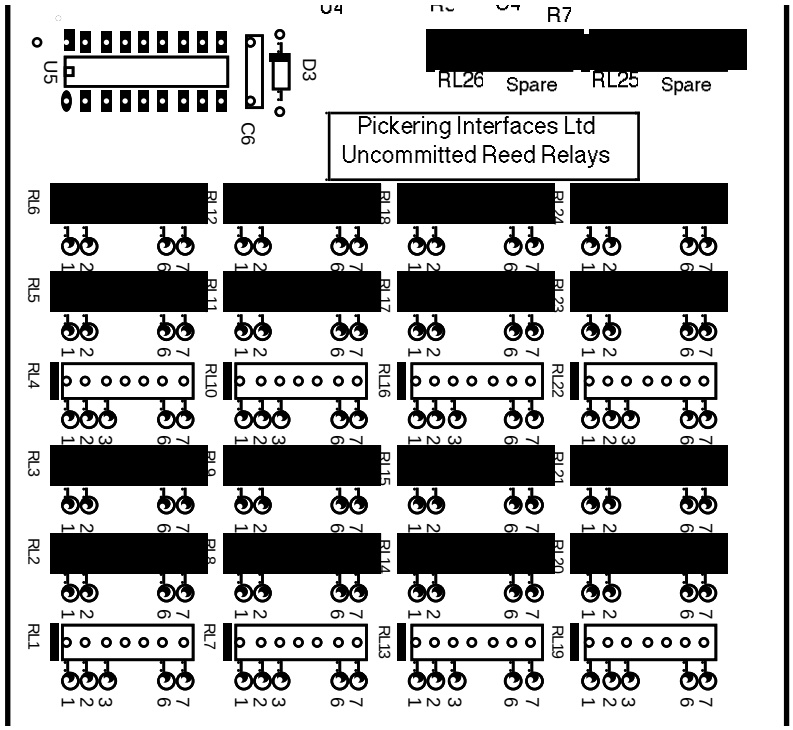


Fig 4.5 Relay Positions for DPDT and 4PST Versions

PCB Location	Part Number	Description	Quan
C1	C/CP/003	Cap Tant 22uF 16v	1
C2, 4, 5	C/CP/001	Cap Cer 10nF 63v	3
C3	C/CP/002	Cap Elect 47uF 16v	1
C6	C/CP/004	Cap Cer 100nF 100v	1
D1	C/SC/010	5v Transient Suppressor	1
D2	C/SC/012	“Diode 1N4148, small signal”	1
D3	C/SC/011	12V Transient suppressor	1
J1	C/CN/001	41612C Plg R/A pcb mtg 64 way A/C	1
LD1..8	C/SC/004	LED T1 Red high eff	8
U1	C/IC/011	PLS101N Preprogrammed	1
U2	C/IC/036	74HCT534 Inverting Octal Latch	1
U3	C/IC/014	74HCT74	1
U4	C/IC/005	74LS09N	1
U5	C/IC/015	ULN 2803A Darlington Driver	1
R1, 2	C/RS/039	Res n/w 6k8 9 pin sip	2
R3, 4	C/RS/038	Res n/w 3k3 9 pin sip	2
R5	C/RS/012	Res 6k8 5% 1/4W Carbon Film	1
R6	C/RS/010	Res 1k8 5% 1/4W Carbon Film	1
R7	C/RS/014	Res n/w 2k2 9 pin SIP (8 resistors)	1
R8	C/RS/028	Res n/w 1kΩ 9 pin SIP (8 Resistors)	1
RL 1..24	C/RL/014	Relays See, Sections 1.2 to 1.4	8 or 16
RL 25, 26	C/RL/014	Spare Relays, See Sections 1.2 to 1.4	1 or 2
SW1	C/SW/001	DIP switch 5p st	1

Table 4.1 Parts List

Section 5
Electrical, Environmental & Mechanical Specifications

Environmental

Operating Temperature 0°C to 50°C.

Storage Temperature -20°C to 75°C.

Humidity 95% non condensing.

Weight Dimensions and Power Requirements

		10-110/120		10-115/125	
		D-Type	Screw Term	D-Type	Screw Term
Approx. Weight/g		190	240	200	290
Dimensions/mm	3U	Eurocard, as specified in DIN 41494, for details consult factory.			
Front Panel Width		30.4	60.9	30.4	60.9
Height 128.5		128.5	128.5	128.5	
Overall Length †		189	189	189	189
Power /Current Consumption					
Max	5V/mA	200	200	200	200
	12V/mA	120	120	120	120
	Power/W	2.5	2.5	2.5	2.5
Min.	5V/mA	120	120	120	120
	12V	0	0	0	0
	Power/W	0.6	0.6	0.6	0.6

† Approx. dimensions. Standard 160mm Eurocard.

Voltage Supplies

Logic Supply 5Vdc ±5%.

Relay Supply 5Vdc ±10%

Relay Supply 12Vdc ±10%

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