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USER MANUAL

VERY HIGH DENSITY MULTIPLEXER MODULE (MODEL No. 40-670)



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Observe the Electrical Hazard Warning detailed in Section 7.



Observe the Electrostatic Sensitive Device Caution detailed in Section 7.

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CONTENTS

Copyright Statement ii

Technical Support and Warranty iii

Contents (this page) v

Section 1
Introduction 1.1

Section 2
Connector Pin Outs 2.1

Section 3
Programming 3.1

Section 4
Fault Diagnosis 4.1

Section 5
Technical Specification 5.1

Section 6
Parts List 6.1

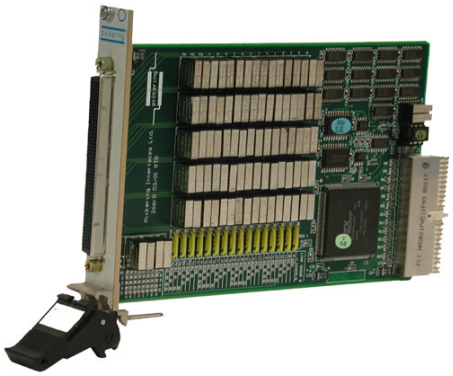
Section 7
Warnings and Cautions 7.1

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SECTION 1 - INTRODUCTION

GENERAL

The 40-670 range of Very High Density Multiplexer Modules which form part of the System 40 PXI Programmable Switching system feature a wide range of switching configurations. Typical applications include signal routing in ATE and data acquisition systems.



The 40-670 multiplexer may be operated as a conventional multiplexer with break-before-make action when a new channel is selected. In addition multiple channels may be simultaneously selected (not available in 1 pole mode).

Built-in Automatic Isolation Switching (available in 1, 2 and 4 pole mode) connects only the currently active multiplexer bank to the analogue common, thereby keeping capacitive loading and leakage currents in large multiplexer systems to a minimum. Larger multiplexers may be constructed by daisy chaining the common signals from multiple PXI cards.

Connections are made via a front panel 200 pin connector.

The screened version (40-670-022-S) is suitable for switching frequencies up to 100MHz. It may also be used with low frequency signals where very good isolation and crosstalk performance is required.

The Multiplexer Module is provided in the following configurations (typical schematics are provided in Figure 1.1):

Single Mode

- V H D MUX 198 Channel 1 Pole 40-670-022-198/1

Multi-Mode

- H D 99 Channel 1 Pole 40-670-021-99/1
- H D 49 Channel 2 Pole 40-670-021-49/2
- H D 24 Channel 4 Pole 40-670-021-24/4
- H D 10 Channel 8 Pole 40-670-021-10/8
- H D 5 Channel 16 Pole 40-670-021-S-5/16
- V H D MUX 99 Channel 2 Pole 40-670-022-99/2
- V H D MUX 49 Channel 4 Pole 40-670-022-49/4
- V H D MUX 24 Channel 8 Pole 40-670-022-24/8
- V H D MUX 10 Channel 16 Pole 40-670-022-10/16
- V H D MUX 5 Channel 32 Pole 40-670-022-5/32
- H D Screened 99 Channel 1 Pole 40-670-021-S-99/1
- H D Screened 49 Channel 2 Pole 40-670-021-S-49/2
- H D Screened 24 Channel 4 Pole 40-670-021-S-24/4
- H D Screened 10 Channel 8 Pole 40-670-021-S-10/8
- H D Screened 5 Channel 16 Pole 40-670-021-S-5/16

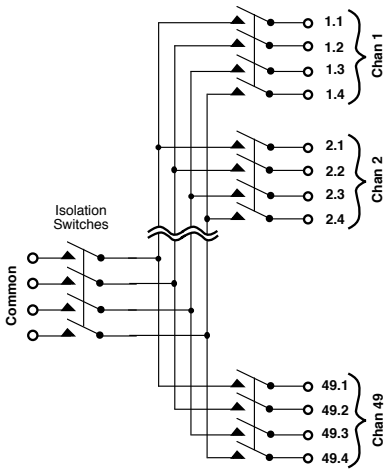
MECHANICAL DESCRIPTION



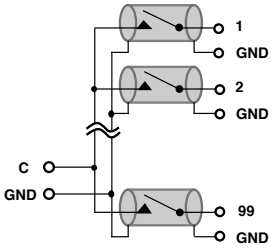
The 40-670 range of Multiplexer Modules conform to the 3U height (128mm) Eurocard standard. Each module comprises the following:

- CPCI Ejector Handle
- Front Panel mounted 200-way SCSI 2 Type connector
- 100 Ruthenium Reed Switches, or
- 100 Screened Ruthenium Reed Switches (-S) versions only
- Two spare Reed Switches (Relays RL101 and 102)
- Compact PCI backplane connector
- PCI Bridge (U1)
- Control Logic

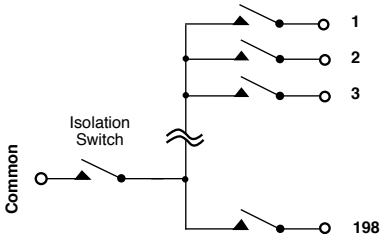
The front panel is secured to the PCB by two M2.5 x 6mm pan-head posi-drive screws.



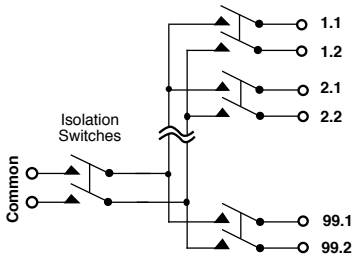
40-670-022 49 Channel 4 Pole Multiplexer



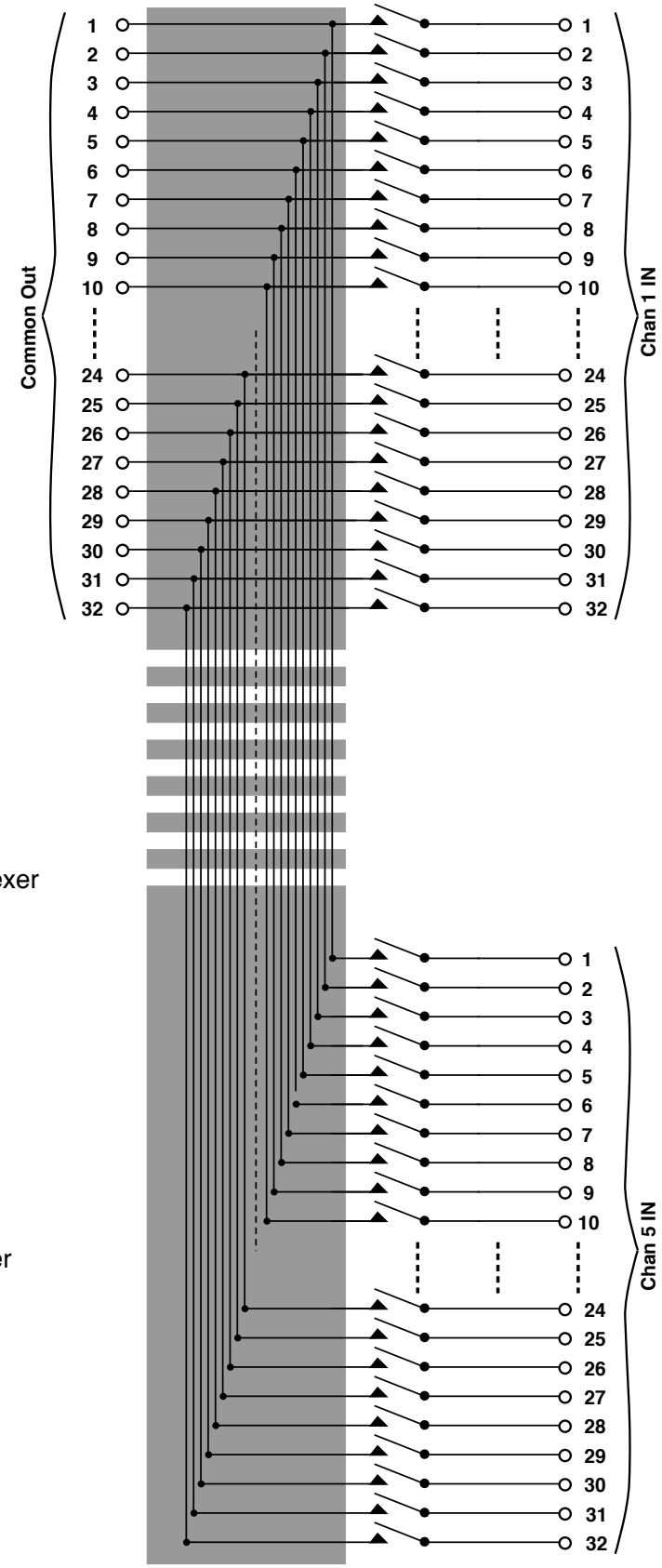
40-670-021-S 99 Channel Screened Multiplexer



40-670-022 198 Channel 1 Pole Multiplexer



40-670-022 99 Channel 2 Pole Multiplexer



40-670-022 5 Channel 32 Pole Multiplexer

Figure 1.1 - Multiplexer Module (40-670): Schematic Diagrams

FUNCTIONAL DESCRIPTION

A functional block diagram is provided in Figure 1.2. The Multiplexer Module is powered by a +5V input via Compact PCI connector J1. The interface to the user test equipment is via the front panel mounted 200-way SCSI type connector, J2. A bank of relays are energised via control signals from storage registers U8 to U20. The storage registers are addressed by PCI bridge U1 to output the required signal. Module configuration is determined by hardwired links and data stored in EEPROM U7. PCI Bridge U1 is configured by EEPROM U2.

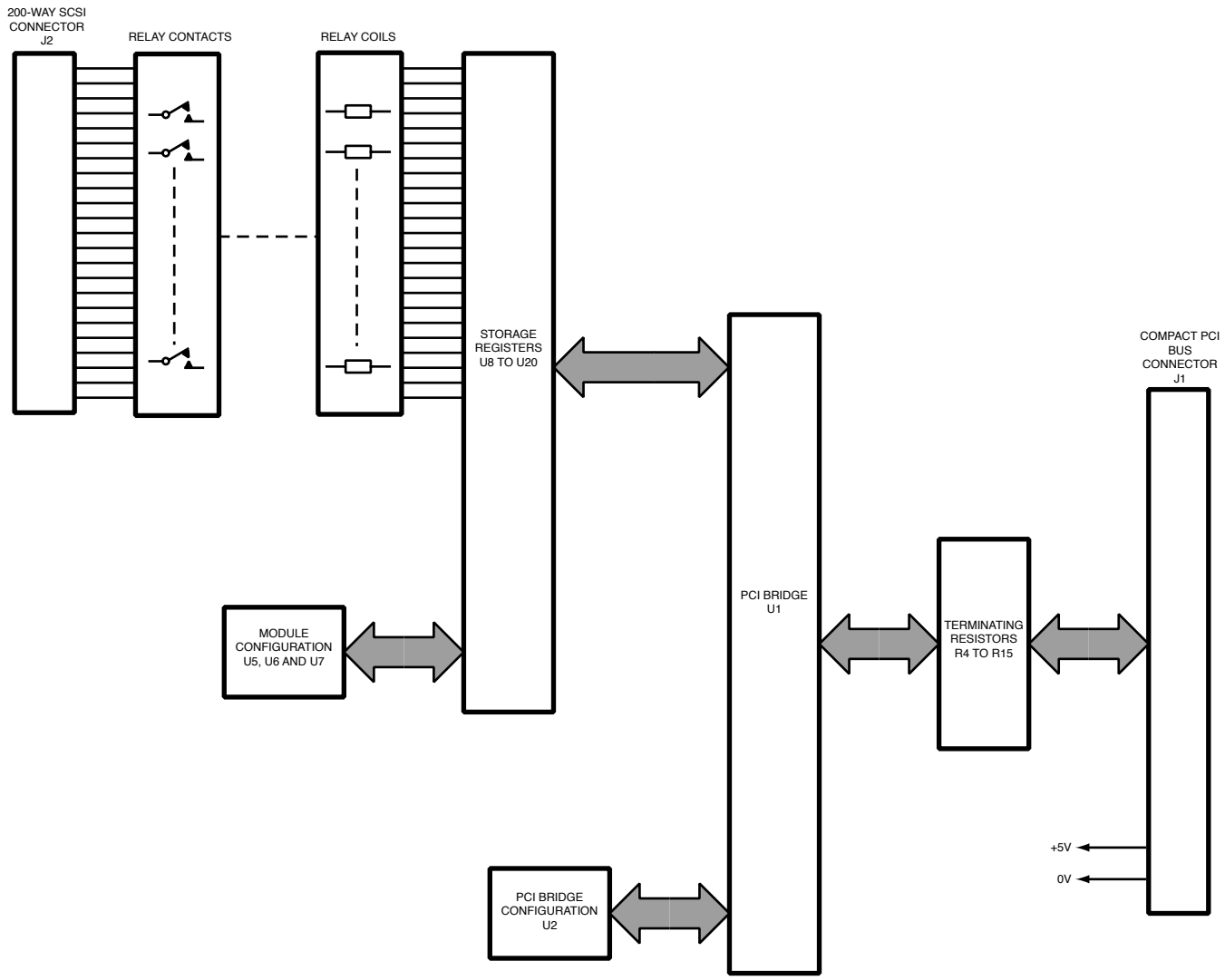
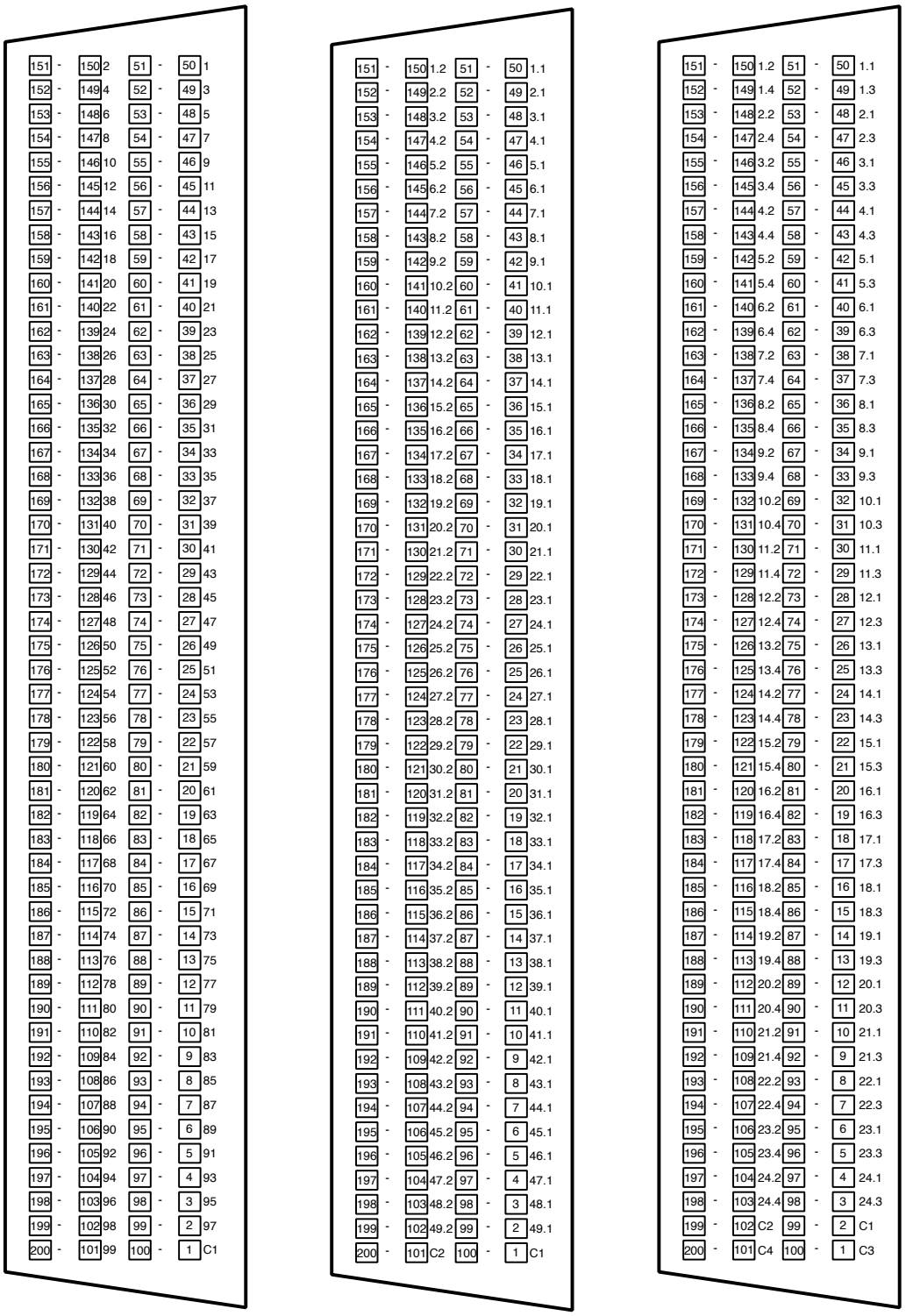


Figure 1.2 - Multiplexer Module (40-670): Functional Block Diagram

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SECTION 2 - CONNECTOR PIN OUTS

Figures 2.1 to 2.6 provide pin outs for the Multiplexer Modules in the 40-670 model range.

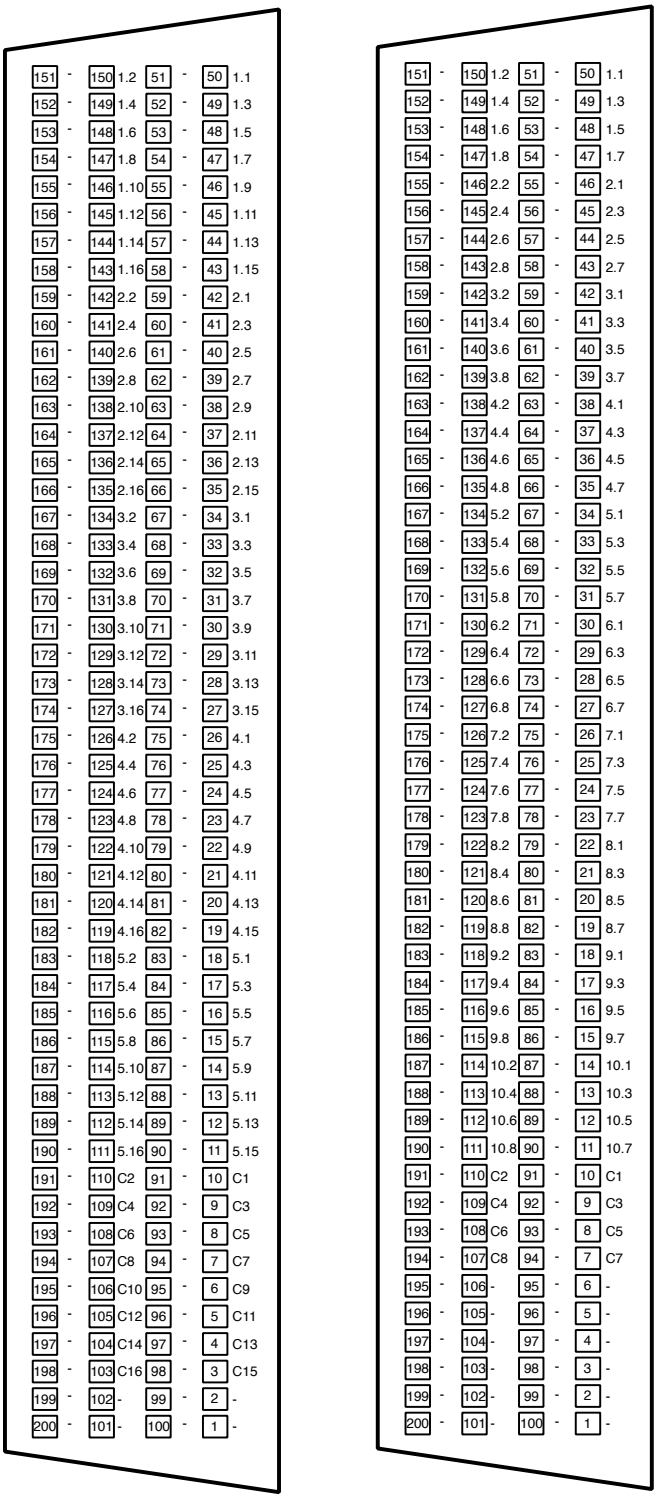


99 CHANNEL 1 POLE
40-670-021-99/1

49 CHANNEL 2 POLE
40-670-021-49/2

24 CHANNEL 4 POLE
40-670-021-24/4

Figure 2.1 - Multiplexer Module: Pin Outs



5 CHANNEL 16 POLE
40-670-021-5/16

10 CHANNEL 8 POLE
40-670-021-10/8

Figure 2.2 - Multiplexer Module: Pin Outs

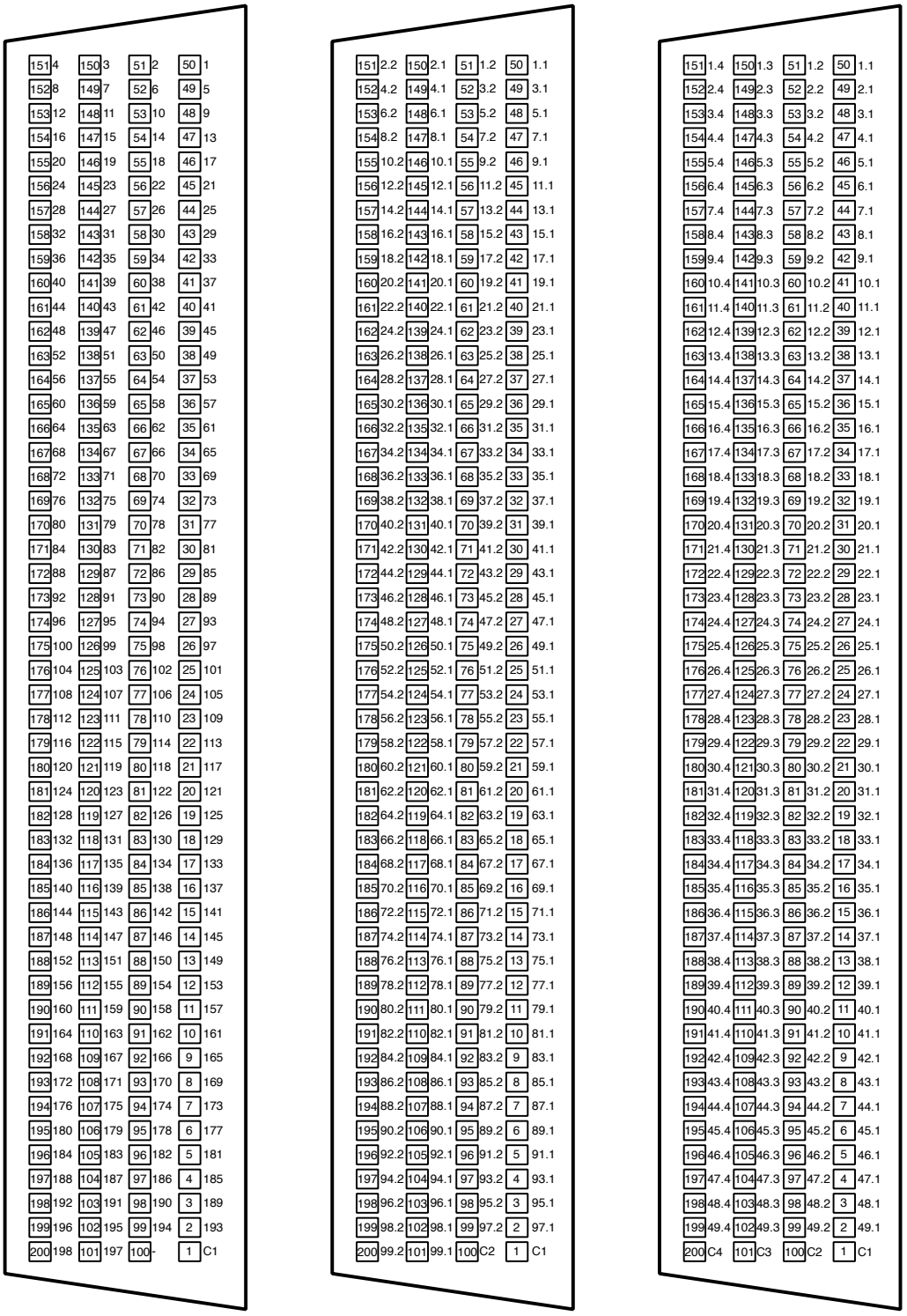
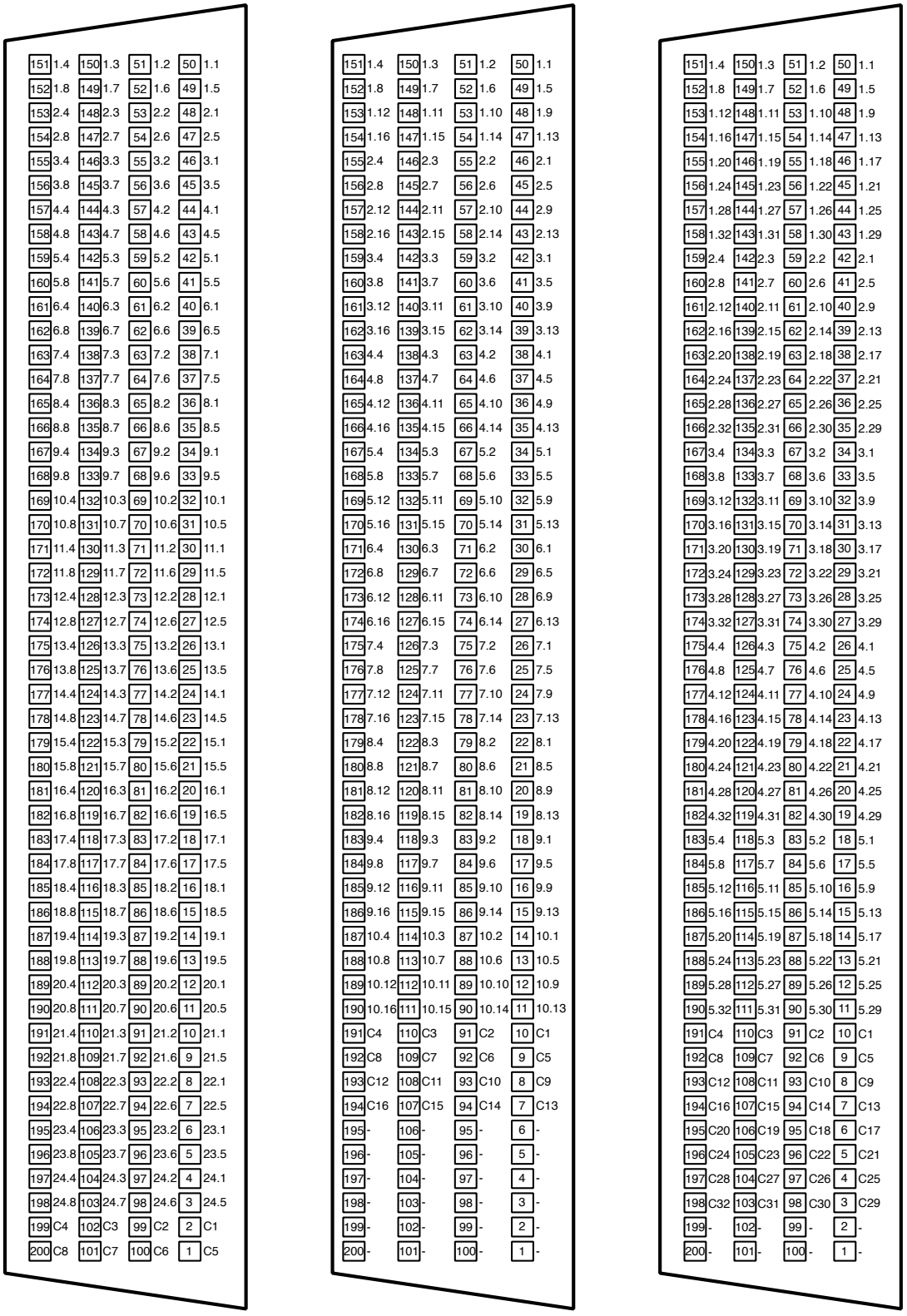


Figure 2.3 - Multiplexer Module: Pin Outs

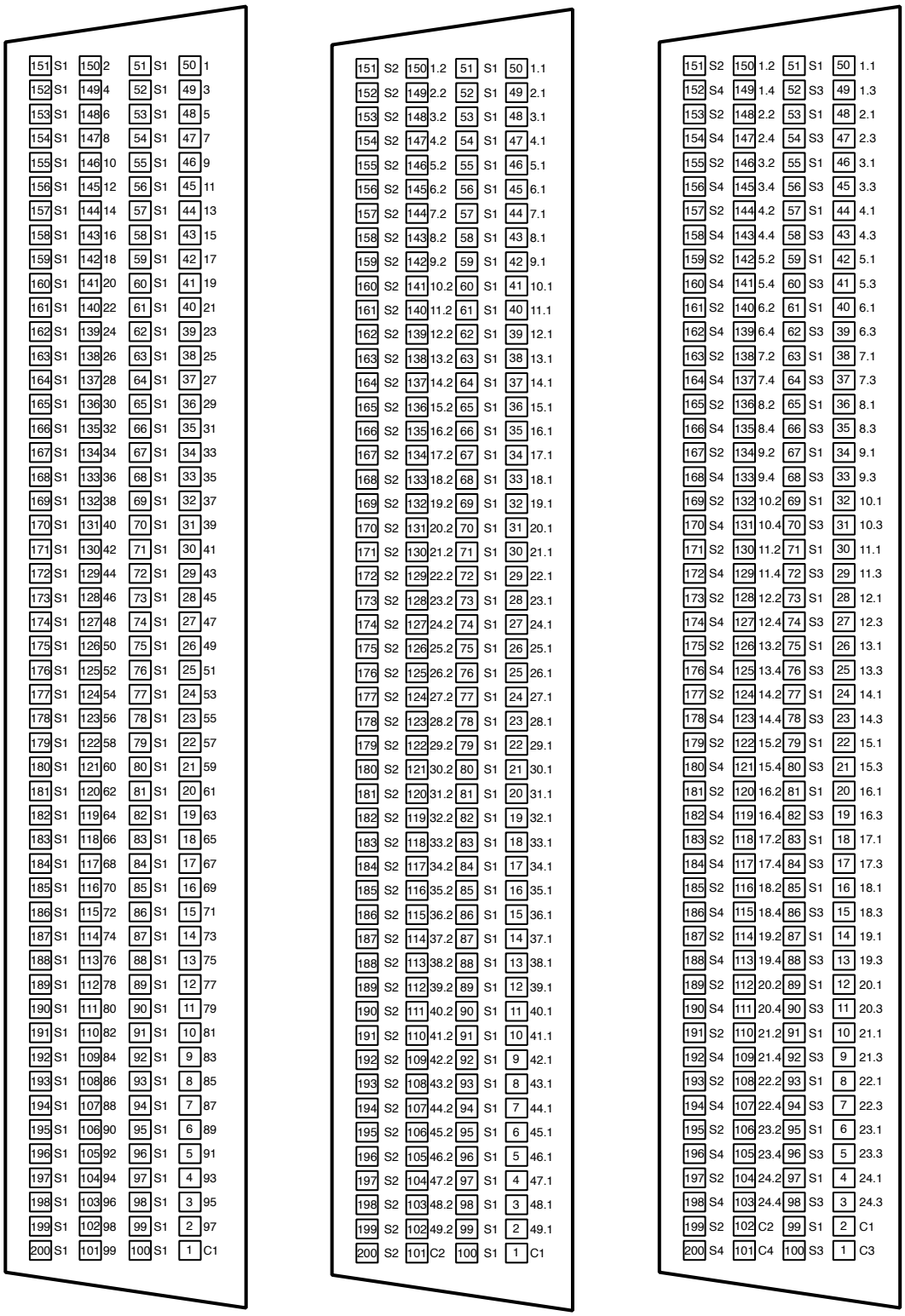


24 CHANNEL 8 POLE
40-670-022-24/8

10 CHANNEL 16 POLE
40-670-022-10/16

5 CHANNEL 32 POLE
40-670-022-5/32

Figure 2.4 - Multiplexer Module: Pin Outs

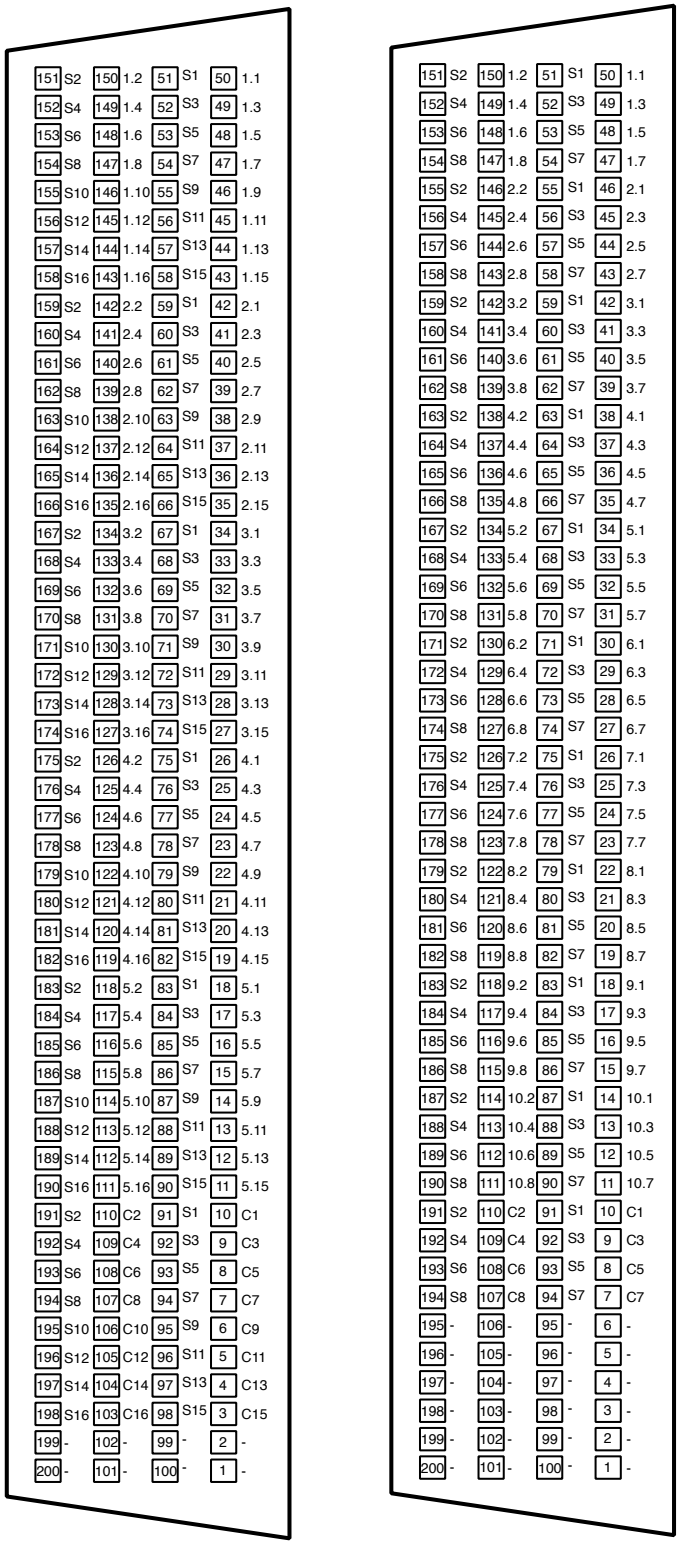


99 CHANNEL 1 POLE SCREENED
40-670-021-S-99/1

49 CHANNEL 2 POLE SCREENED
40-670-021-S-49/2

24 CHANNEL 4 POLE SCREENED
40-670-021-S-24/4

Figure 2.5 - Multiplexer Module: Pin Outs



5 CHANNEL 16 POLE
SCREENED
40-670-021-S-5/16

10 CHANNEL 8 POLE
SCREENED
40-670-021-S-10/8

Figure 2.6 - Multiplexer Module: Pin Outs

SECTION 3 - PROGRAMMING

Please refer to the PXI Software manual for programming information. This manual is available on the Pickering Interfaces website at www.pickeringswitch.com.

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SECTION 4 - FAILURE DIAGNOSIS

There is no self-test facility provided on the 40-670 series Multiplexer Modules. Failure diagnosis is limited to identification of faulty relays. Relay Look-Up Tables will be provided at a later date.

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SECTION 5 - SPECIFICATION

POWER REQUIREMENTS

Power consumption from the 5V backplane supply is as follows:

Minimum 0.8W Typical 1.4W Maximum 1.8W.

SWITCHING SPECIFICATION

Switch Type	Ruthenium Reed
Max Standoff Voltage:	100V
Max Power:	20W
Max Switch Current:	0.5A
Max Carry Current:	1.2A
Path Resistance	
On (Single Module):	< 300mΩ
Off (Single Module):	> 10^9Ω
Differential Thermal Offset:	< 5µV
Capacitance -022 version	
Open Channel:	< 6pF
Channel to Channel:	< 15pF
Crosstalk -022 version (Single Chan On, 50Ω)	
Channel to Channel 10kHz:	> 90dB
Channel to Channel 100kHz:	> 70dB
Channel to Channel 1MHz:	> 50dB
Bank to Bank 100kHz:	> 100dB
Bank to Bank 1MHz:	> 85dB
Bandwidth (3dB, 1 module):	> 20MHz
Noise Level (0 to 1MHz in 50Ω System):	< - 80dBm
Operate Time:	< 0.5ms
Release Time:	< 0.5ms
Expected Life (Operations)	
Low power load:	> 10^8
Full power load:	> 10^6

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SECTION 6 - PARTS LIST

The following pages provide parts lists and a component layout diagram for the 40-670 Multiplexer Module.

Table 6.1 provides a parts list and Figure 6.1 a component layout diagram for the 40-670 Multiplexer Module.

TABLE 6.1 - Multiplexer Module Parts List

PCB Location	Pickering Interfaces Part Number	Part Description	Quantity
R1, R2	C/RS/079	RESISTOR N/W 4 x 10k 1206	2
R3	C/RS/085	RESISTOR 10k 0805	1
R4 to R15	C/RS/102	RESISTOR N/W 4 x 10R 1206	12
40-670-022-198/1 RL1 to RL102, 97B	C/RL/111	RELAY 109S-2-A-5/1D	103
40-670-022-99/2 RL1 to RL102	C/RL/111	RELAY 109S-2-A-5/1D	102
40-670-021-S-99/1 RL1 to RL102	C/RL/121	RELAY 109SRF-1-A-5/1D	102
40-670-021-99/1 RL1 to RL102	C/RL/129	RELAY 109S-1-A-5/501D	102
40-670-022-49/4 RL1 to RL102	C/RL/111	RELAY 109S-2-A-5/1D	102
40-670-021-S-49/2 RL1 to RL102	C/RL/121	RELAY 109SRF-1-A-5/1D	102
40-670-021-49/2 RL1 to RL102	C/RL/129	RELAY 109S-1-A-5/501D	102
40-670-022-24/8 RL1 to RL96, 101, 102	C/RL/111	RELAY 109S-2-A-5/1D	98
40-670-021-S-24/4 RL1 to RL96, 101, 102	C/RL/121	RELAY 109SRF-1-A-5/1D	98
40-670-021-24/4 RL1 to RL96, 101, 102	C/RL/129	RELAY 109S-1-A-5/501D	98
40-670-022-10/16 RL1 to RL102	C/RL/111	RELAY 109S-2-A-5/1D	102
40-670-021-S-10/8 RL1 to RL102	C/RL/121	RELAY 109SRF-1-A-5/1D	102
40-670-021-10/8 RL1 to RL102	C/RL/129	RELAY 109S-1-A-5/501D	102
40-670-022-5/32 RL17 to RL102	C/RL/111	RELAY 109S-2-A-5/1D	86
40-670-021-S-5/16 RL17 to RL102	C/RL/121	RELAY 109SRF-1-A-5/1D	86
40-670-021-5/16 RL17 to RL102	C/RL/129	RELAY 109S-1-A-5/501D	86
C3-C19, C21, C23-C35	C/CP/034	CAPACITOR 100nF 0603	31
C1, C2, C20, C22	C/CP/024	CAPACITOR 10uF TANT SMD	4
J1	C/CN/355	cPCI J1 CONNECTOR	1
	C/MS/071	FEMALE CODING KEY, BRILLIANT BLUE, V	1
J2	C/CN/461	SCSI3 200 PIN	1
U1	C/IC/098	PCI9050 PQFP	1
U2	C/IC/099	93CS46 DIP	1
	C/IC/035	8 PIN DIP SKT	1
U3	C/IC/056	7705 SOP	1
U4	C/IC/087	74HCT32 SOP	2
U5	C/IC/100	74HCT273 SOP	1
U6	C/IC/101	74HCT244 SOP	1
U7	C/IC/090	93C56 SOP	1
U8 to U20	C/IC/080	HEF4794B	13

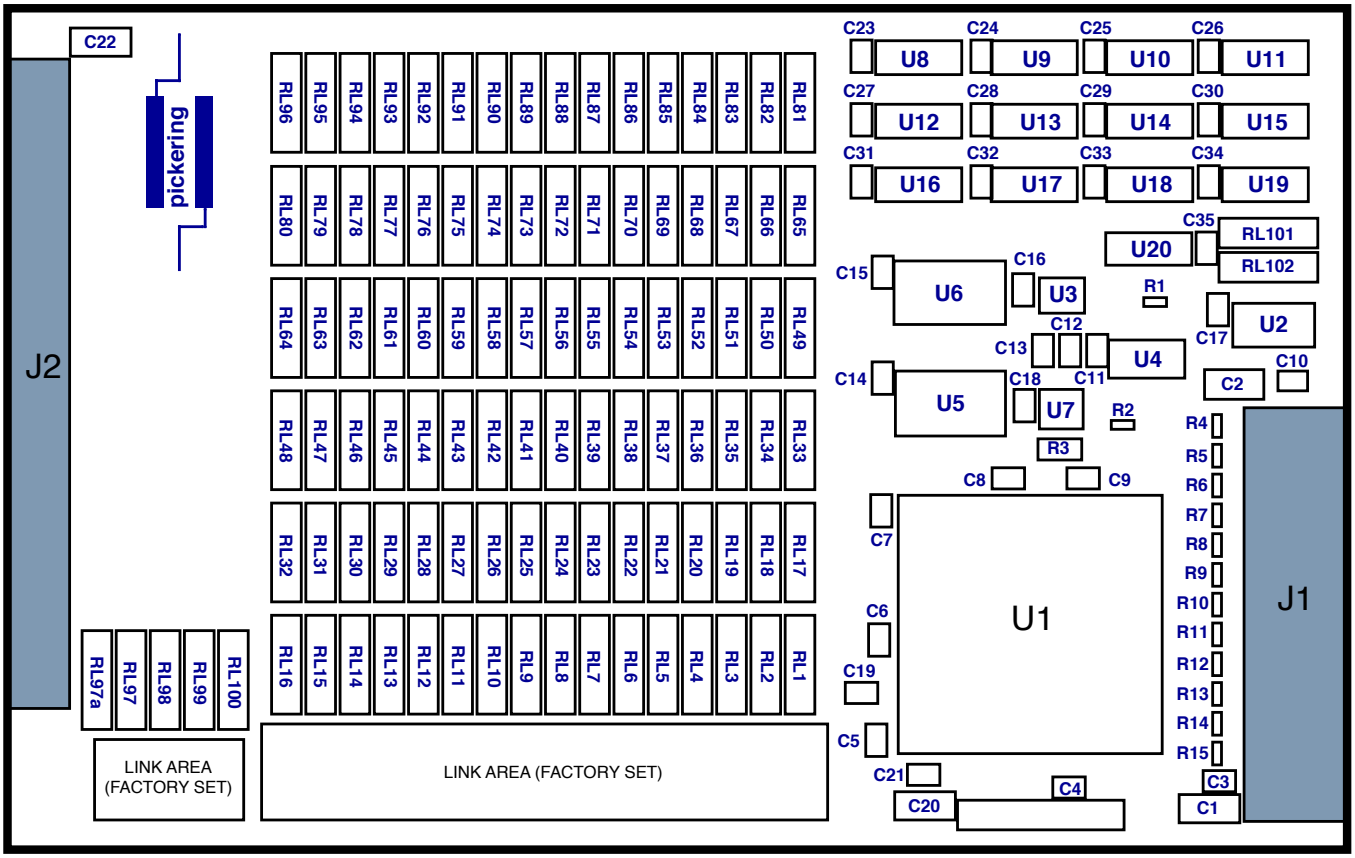
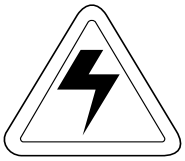


Figure 6.1 - Multiplexer Module: Component Layout

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SECTION 7 - WARNINGS AND CAUTIONS



WARNING - DANGER OF ELECTRIC SHOCK

THIS MODULE MAY CONTAIN HAZARDOUS VOLTAGES. BEFORE REMOVING THE MODULE FROM THE RACK REMOVE ALL SUPPLIES.



CAUTION
Handling of Electrostatic-Sensitive Semiconductor Devices

Certain semiconductor devices used in the equipment are liable to damage due to static voltage. Observe the following precautions when handling these devices in their unterminated state, or sub-units containing these devices:

(1) Persons removing sub-units from an equipment using these devices must be earthed by a wrist strap and a resistor at the point provided on the equipment.

(2) Soldering irons used during the repair operations must be low voltage types with earthed tips and isolated from the mains voltage by a double insulated transformer.

(3) Outer clothing worn must be unable to generate static charges.

(4) Printed Circuit Boards (PCBs) fitted with these devices must be stored and transported in anti-static bags.

1 SHOUT FOR HELP. SWITCH OFF ELECTRICITY IF POSSIBLE.

Do this immediately. If not possible, don't waste time searching for a switch.

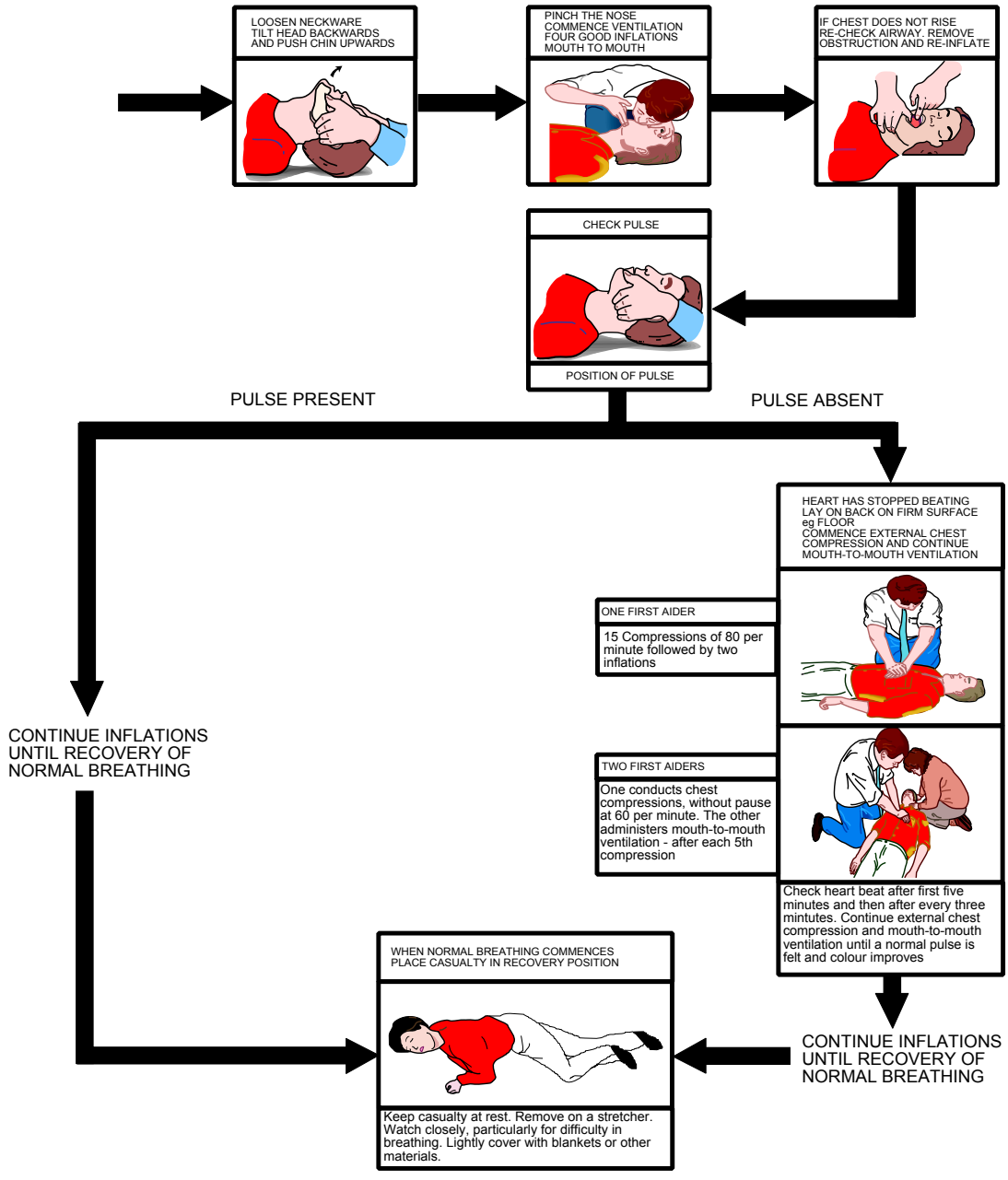
2 REMOVE FROM DANGER.

Safeguard yourself when removing casualty from hazard. If casualty is still in contact with electricity, and the supply cannot be isolated, stand on a dry non-conducting material (rubber mat, wood, linoleum).

Use rubber gloves, dry clothing, length of dry rope or wood to pull or push casualty away from the hazard.

3 REMOVE OBVIOUS OBSTRUCTION TO BREATHING.

If casualty is not breathing start resuscitation at once.



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