MVME SYS 121

MAINTENANCE INFORMATION

First Edition, August 1986

coutant

The modern art of power

COUTANT ELECTRONICS LIMITED

ML HANDBOOK

HIGH VOLTAGE WARNING

Dangerous voltages are present within the power supply and isolation transformers should be used between rails and power supply if work is to be carried out with the safety covers removed.

1. INTRODUCTION

The ML range of highly flexible multi-output switched mode power supplies is available in three forms, standard, modular and OEM. The standard units are available in three power levels and provide an inherent flexibility in output trading that is not possible using conventional switch mode techniques.

All ML units feature RFI filtering and triac inrush current limiting and are built to the most stringent safety standards.

2. INSTALLATION INSTRUCTIONS

(a) Check for visible damage.
(b) Check that the link for 115V operation is in position if appropriate.

Cooling

The power supply is convection cooled and should be mounted such that adequate airflow is maintained through the unit. Particular regard should be paid to providing ventilation holes in any chassis on which the supply is mounted. Where the unit is to be used in a totally enclosed environment contact Coutant Application Engineer for advice.

3. MAINS CONNECTION

The mains terminal block is located on the PCB and access to it is provided by removing the plate above the mains cable slot in the cover. Connect live to L, neutral to N and earth to E. Never connect the mains to any of the output terminals.

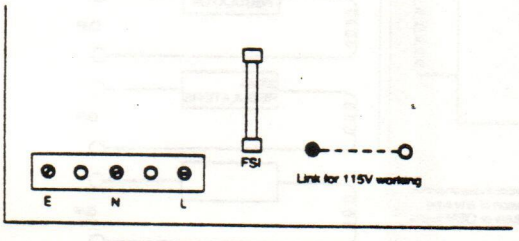
4. INPUT VOLTAGE

The input voltage will be set to operate from 198V AC to 264V AC unless otherwise stated on your order.

To change the input voltage setting remove the cover and link the terminals lugs adjacent to the mains input connector marked 'link for 115V working'.

Mains Fuse Values (FSI)

Converter board	Input voltage 115V	230V
75W	4A	2A
150W	5A	3.15A
300W	10A	5A



5. REMOTE SENSING

To compensate for voltage drops in the output leads the links connecting +output to +sense and −output to −sense can be removed and the sensing terminals connected directly to the load with separate leads, the correct output voltage will then be regulated at the load. The maximum line drop which can be compensated for by sensing is 0.25V per line.

Remote sensing is available on fully regulated units of 3A and above.

Note:

1. Route the sensing leads to prevent pick up (from motors, etc.) which may appear as ripple on the output of the unit (balance screen pair or twisted pair).
2. Never disconnect the output power rail with the sensing still connected to the load. This may burn out the internal resistors connected between power and sensing terminals. (Do not alter ANY connections with power applied.)

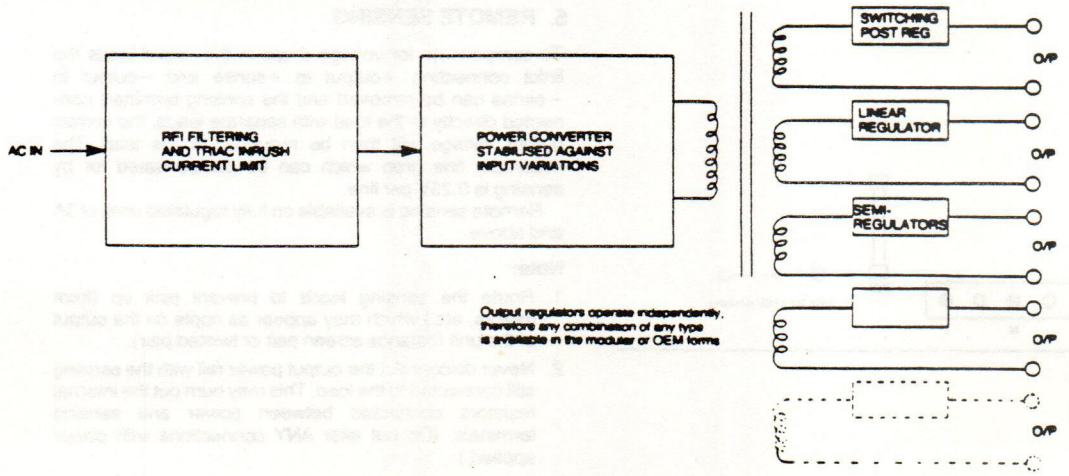
6. SPECIFICATION

Input voltage:	187–274V AC, 99–132V AC
Input frequency:	47–440Hz
Output power:	75W, 150W, 300W
Hold up:	½ cycle mains loss at 198V
Inrush current:	±18A peak
Overcurrent protection:	Fast – pulse by pulse Slow – converter shut-down automatic soft restart
Operating temperature:	0–70°C in free air (derating above 50°C 2½ %/°C)
Storage temperature:	−30 to +85°C
Temperature coefficient:	0.02%/°C
Input over-volt protection:	Shut down >2% above maximum specified with automatic restart
R.F.I.:	VDE 0871 Class A/0875 Curve N
Safety:	VDE 0804, IEC 380, BS 5850. Designed to meet U.L., C.S.A.
Mains fuse:	Fitted
Operating frequency:	75kHz nominal
Start-up time:	<0.5 seconds
Efficiency:	70%–85% dependent on configuration – at maximum rated output
Cross regulation (semi-regulated outputs only):	<5% dependent on configuration

ML specification – output regulators

Parameters	*Switching post regulators*	*Linear regulators*	*Semi-regulated*
Output voltages:	3V–24V	5V–24V	12V–28V
Output current:	Up to 40A	Up to 3A	Up to 4A
Line regulation for −15% to +10% of nominal mains:	0.05%	0.05%	2%
Load regulation:	0.1%	0.2%–1A 0.1%–3A 2% on 1.5A dual rails	5% for 25% to 100% load change
Ripple:	50mV switching	0.2% switching	1% peak-peak
Spike:	50mV peak-peak	50mV +0.5% peak-peak	1% peak-peak
Transient response: 50%–100% load change:	500μSec	25μSec – 1A 50μSec – 3A	
Off load voltage:	As set	As set	125% of set voltage
Over current protection:	Constant current	1. Constant current with thermal foldback to 1.5A.	None
		2. Foldback current limit to 3A.	None
Overvoltage protection:	OV clamps standard on 5V. Optional on other voltages and on modular units.	Limited to 125% of output voltage	Limited to 125% of output voltage

7. CIRCUIT DESCRIPTION AND BLOCK DIAGRAM



Circuit description

The mains is limited by a triac inrush circuit on switch-on and is RFI filtered to below VDE 0871 by an internal filter. The power converter rectifies and smooths the mains to give around 350V d.c. This d.c. supply is switched into the transformer at 75kHz, using 2 power FETs in the diagonal bridge forward converter mode. The mean voltage from the transformer is maintained at a constant level by varying the pulse width from the converter to compensate for fluctuations in the input supply.

The benefits of this are that semi-regulated outputs have good line regulation, linear regulators run at higher efficiencies, due to the better input control, and because no feedback loop is required any number of any type of outputs can be used.

The high power outputs are provided by switching post regulators, which modulate the width of the pulse from the transformer to compensate for load and residual line variation. The switching element used is a magnetic amplifier which is extremely efficient and reliable. The energy supplied to the transformer for magnetisation is fed back to the 350V d.c. supply during the flyback mode, thus making the overall system very efficient even at low loads.

The semi-regulated units rectify the transformer pulses and pass them into a choke input filter, which is sufficient to give semi-regulated performance. A clamp circuit is provided to ensure that when a semi-regulated unit is lightly loaded, its output will not rise above 125% of nominal, thus protecting attached circuitry.

Linear regulators have a similar choke input filter circuit followed by a series regulator. Because of the control on the input voltage to the series regulator, high efficiencies are achieved.

8. TEST PROCEDURE

Measurement of output ripple waveforms can be prone to error unless measured in the following manner:

Using a 50MHz bandwidth oscilloscope 20mV/div on the Y axis and 20μ/div on the X axis. The single input method requires the oscilloscope probe leads to be kept as short as possible (10mm or less) as shown in the diagram.

The differential input oscilloscope method needs the earth leads on both scope probes to be disconnected if the oscilloscope is earthed.

Note:

Care should be taken when measuring any switched mode power supplies output that the test equipment does not form an earth loop with the PSU and corrupt the output measurements.

When operating switched mode power supplies it is important to remember that when commoning output rails the 0V leads should be kept as short as possible to keep the noise levels within specification. If outputs are to be commoned remote from the power supplies then additional capacitors should be fitted between common point and the outputs.

Recommended values of capacitor are:

0.1μF disc ceramic

100μF aluminium electrolytic of appropriate voltage rating

9. HEALTH AND SAFETY

ML units are designed to meet:

IEC 380 – Safety of electrically energised office machines.

BSI 3861 – Electrical safety of office machines.

VDE0804/5.72 – Regulation for Telecommunication apparatus and information.

When installed correctly in equipment, ML power supplies do not prevent that equipment meeting the above specifications.

The ML cover (optional on the standard units) is designed to protect skilled personnel from hazards. They are not intended to be used as part of the external covers of the equipment where they may be accessible to operators.

Under full load conditions the chassis may reach temperatures in excess of those considered safe for operator access.

SPARES AND SERVICE

1. A full stock of tested converters and modules is held at our Ilfracombe factory for customers who require to repair units themselves.
2. When returning units to our Service Department please ensure they are adequately packed for the journey. The units must also be accompanied by information as to their origin, and the nature of the defect. This information will greatly assist us in giving speedy turn around, please supply too much information rather than too little.
3. COUTANT ELECTRONICS LIMITED reserve the right to make design and component change without notice. Equivalent components may be used in place of those listed.

SERVICE AND SPARES

Kingsley Avenue,
Ilfracombe,
North Devon EX34 8ES.
Tel: Ilfracombe (0271) 63781.
Telex: 46310.

Modular units

Switching Post Regulator Guide

For all high power outputs select a switching post regulator type.

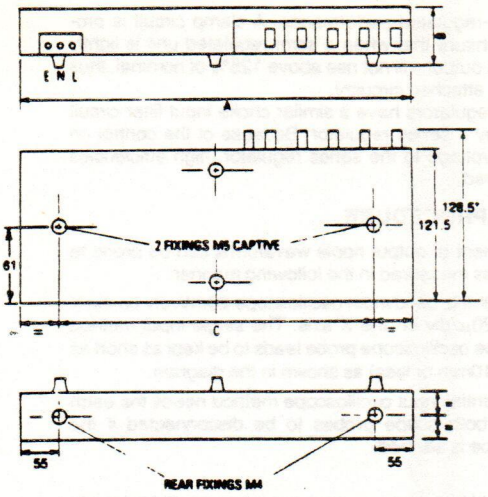
Output Voltage Range (volts)	Maximum Current (amps)	Ordering Reference
3–7	8	L
3–7	20	M
3–7	40	X
10–15	10	Q
10–24	4	N
10–24	8	Y

Dual Outputs Guide

If you need two linear output rails first check for a cost effective dual type.

Output Voltage	Maximum Current per Output	Ordering Reference
12V 12V	1.5* 0.5	BT
12V 5V	1.5* 0.5	CT
15V 15V	1.0 1.0	DT

* Reduced spec on line and load reg.



*Note: Max penetration of screw thread 6mm.

* 135 on X and Y modules

Linear Output Guide

Having selected high power and dual outputs any additional linear outputs can be ordered as indicated.

Output Voltage	Ordering 1 amp	Reference 3 amps
5	5B	5C
12	12B	12C
15	—	15C
24	24B	24C

*Note: 300 watt units require a heatsink to be added to the rear of the box for convection cooling at power levels above 200 watts. A suitable metal surface can be used or forced air to maintain a maximum case temperature of 70°C.

Options

	Ordering Reference
Semi-regulated Output Rails (up to 4 amps at the standard voltage)	
12 volts	12E
15 volts	15E
24 volts	24E
28 volts	28E
Overvoltage (Switching Post Regulator) (standard on main 5V output)	0V
Mains Fail Signal*	MF
Power good signal*	PG
Extended Hold-up†	EH
110 volt Nominal Input Setting	110V
N-12 RFI Filter†	NF
Short Case (110mm height)	SC

* This is a 30mm module.
† These options require a separate box.

Dimensional Guide

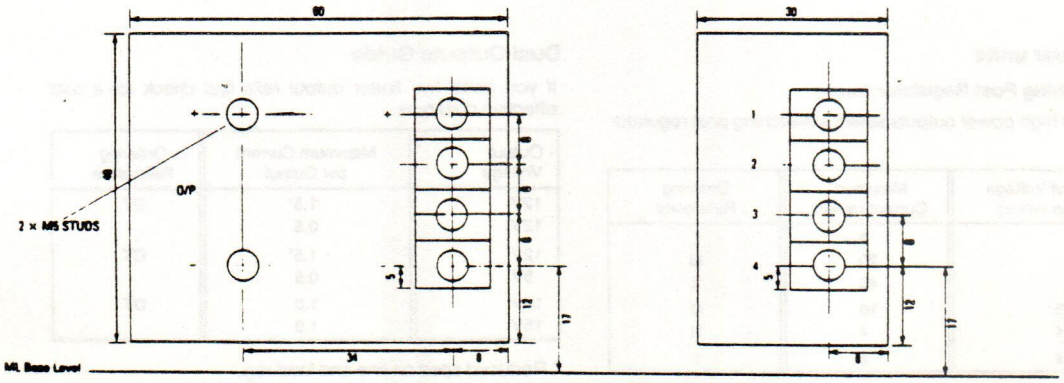
Power Level	Cross Sectional (incl. Covers)	Unit Length (mm) Converter	W–Z	L–S	B–H
75 watts	121.5 x 60mm	180	+90	+60	+30
150 watts	121.5 x 60mm	180	+90	+60	+30
300 watts	121.5 x 80mm	195	+90	+60	+30

Cases available in 3 sizes for 75 and 150 watt units or 2 sizes for 300 watts units.

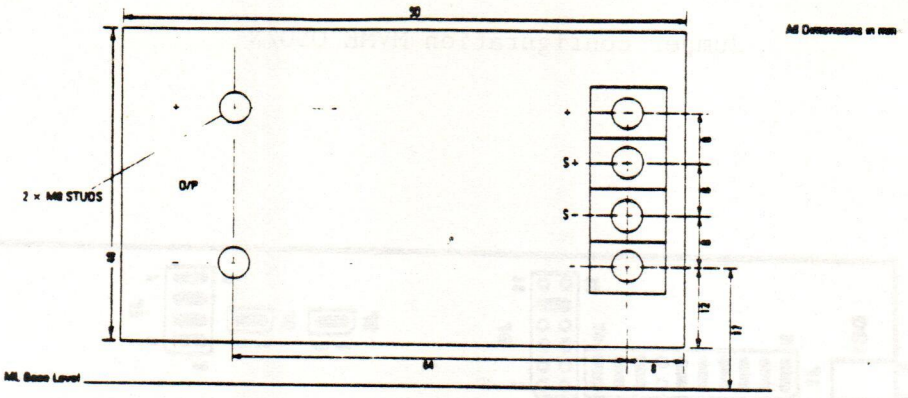
Dimensions (mm)

Units	A			B	C		
ML 75	300	330	360	60	255	285	315
ML 150	300	330	360	60	255	285	315
ML 300	—	345	405	80	—	305	365

FRONT PANEL LAYOUT OF MODULES



MODULE TYPE L-S **MODULE TYPE B-H**



MODULE TYPE X-Z

(only available in 80mm high case)

MODULE TYPE X–Z

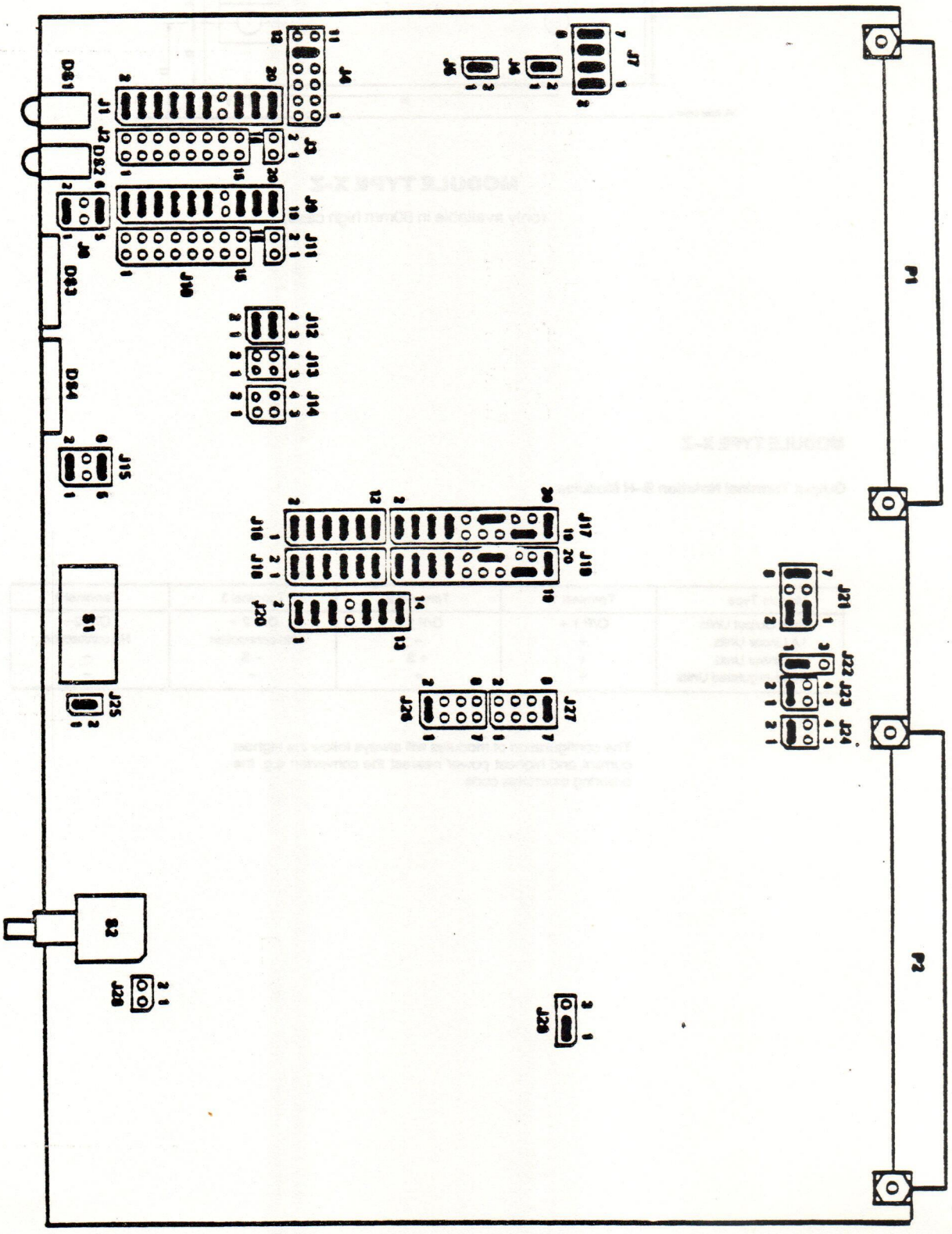
Output Terminal Notation B–H Modules

Module Type	Terminal 1	Terminal 2	Terminal 3	Terminal 4
Dual Output Units	O/P 1 +	O/P 1 –	O/P 2 +	O/P 2–
1A Linear Units	+	–	No connection	No connection
3A Linear Units	+	+ S	– S	–
Semi-regulated Units	+	+	–	–

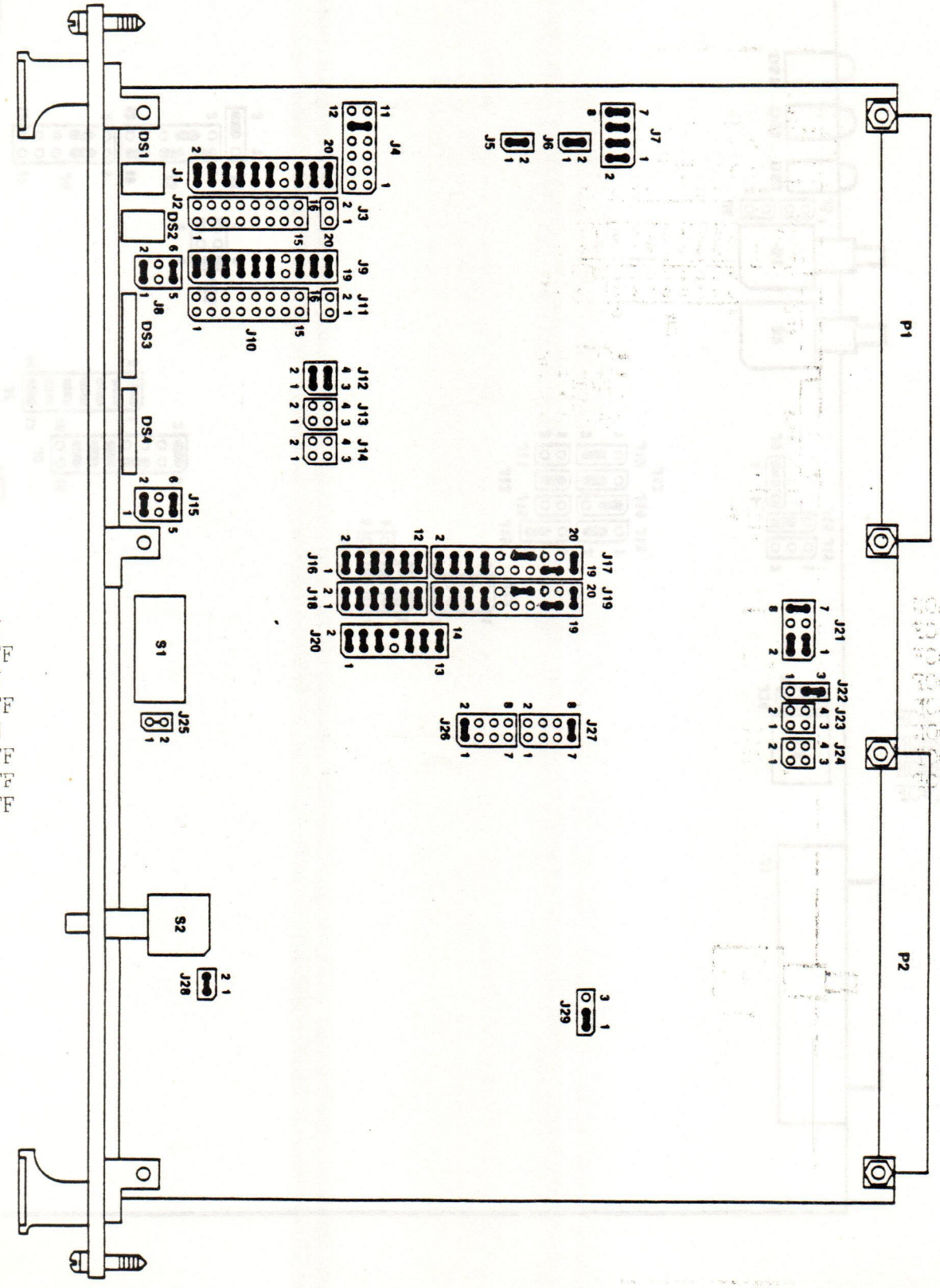
The configuration of modules will always follow the highest current and highest power nearest the converter: e.g. the ordering examples code.

Jumper configuration MVME 050/N

S1:
1=ON
2=OF
3=OF
4=OF
5=ON
6=ON
7=OF
8=OF



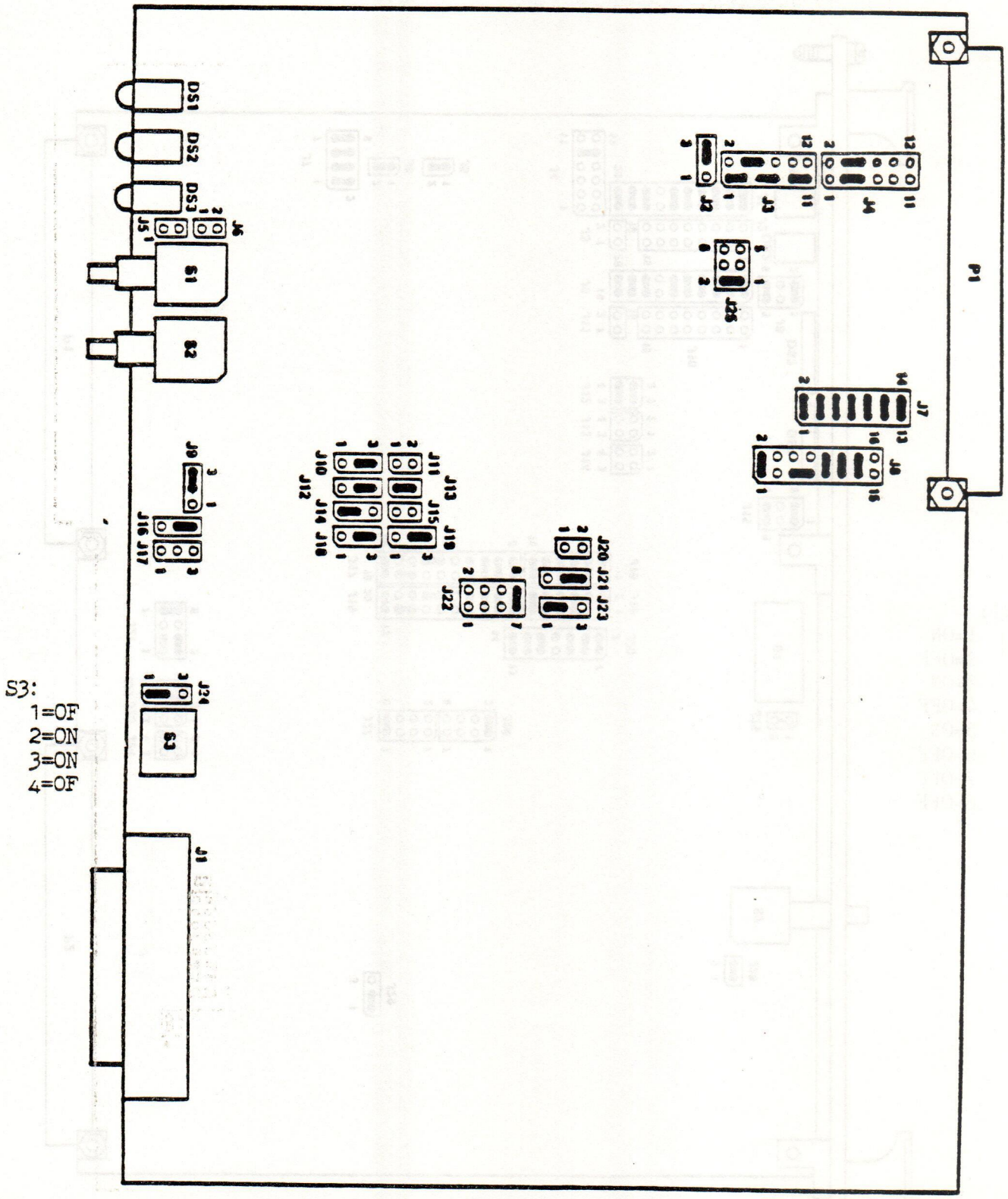
Jumper configuration MVME 050/V



S1:

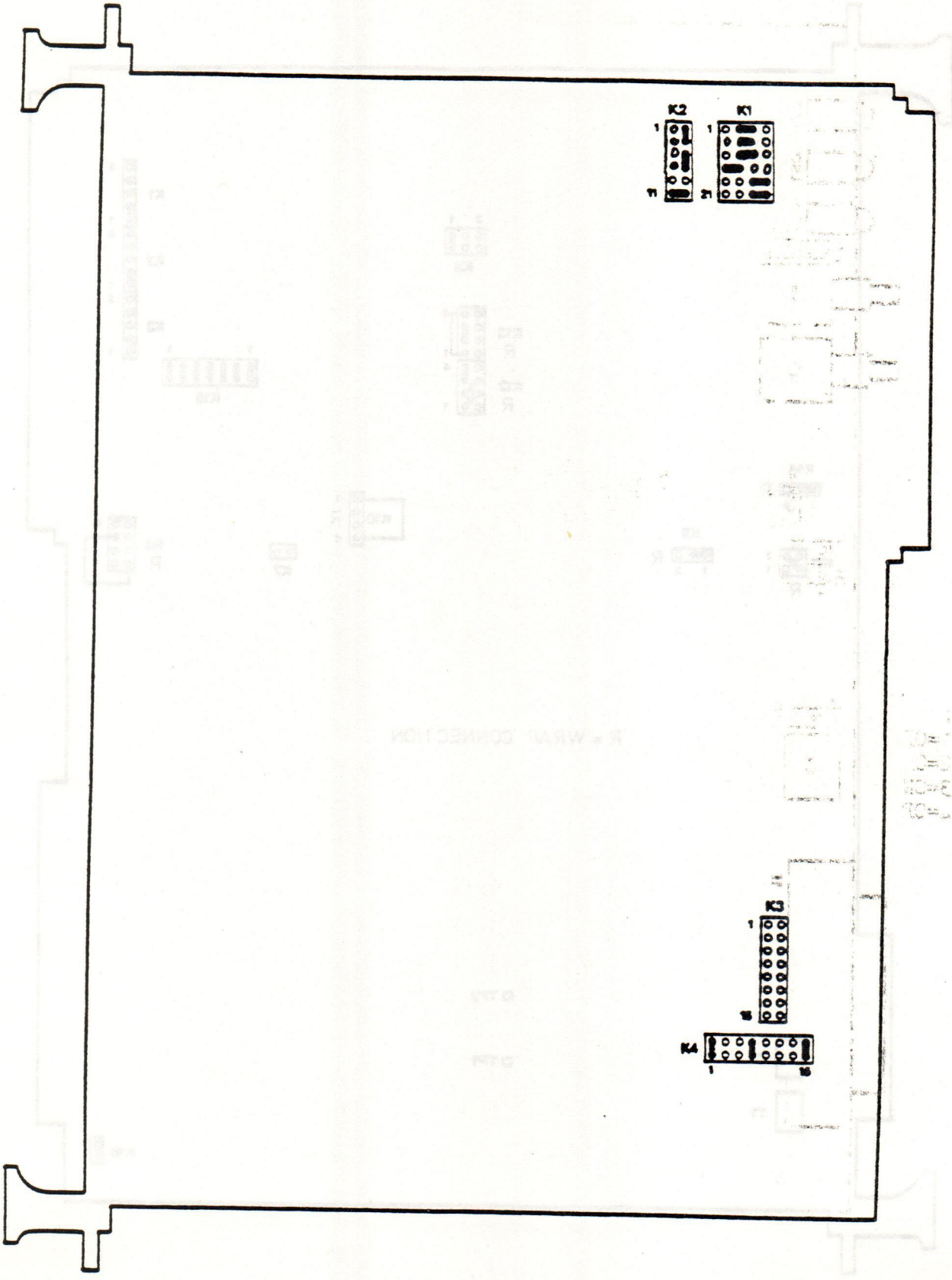
1=ON
2=OFF
3=ON
4=OFF
5=ON
6=OFF
7=OFF
8=OFF

MVME 121 JUMPER LOCATIONS

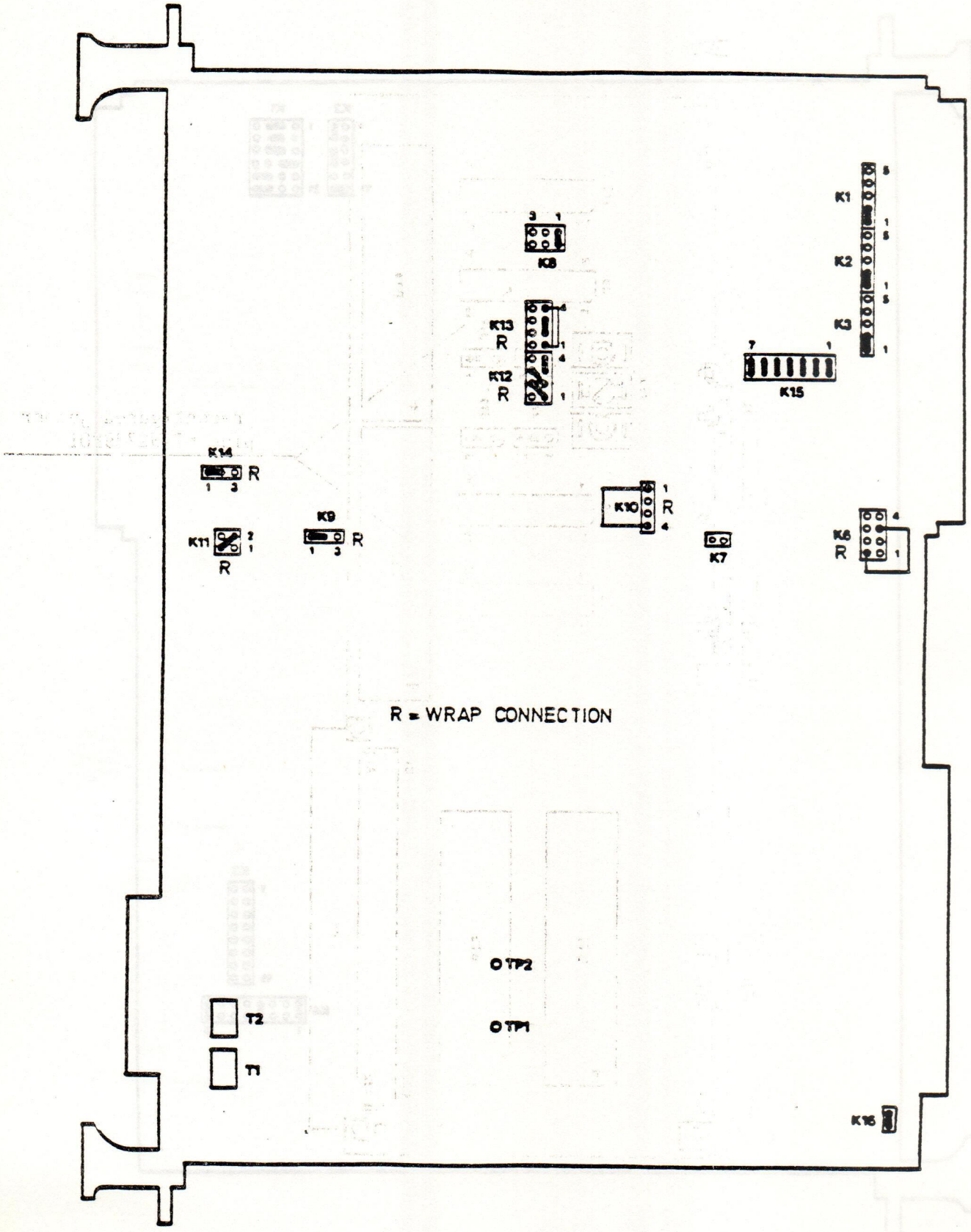


S3:
1=OF
2=ON
3=ON
4=OF

Jumper configuration MVME 222-2

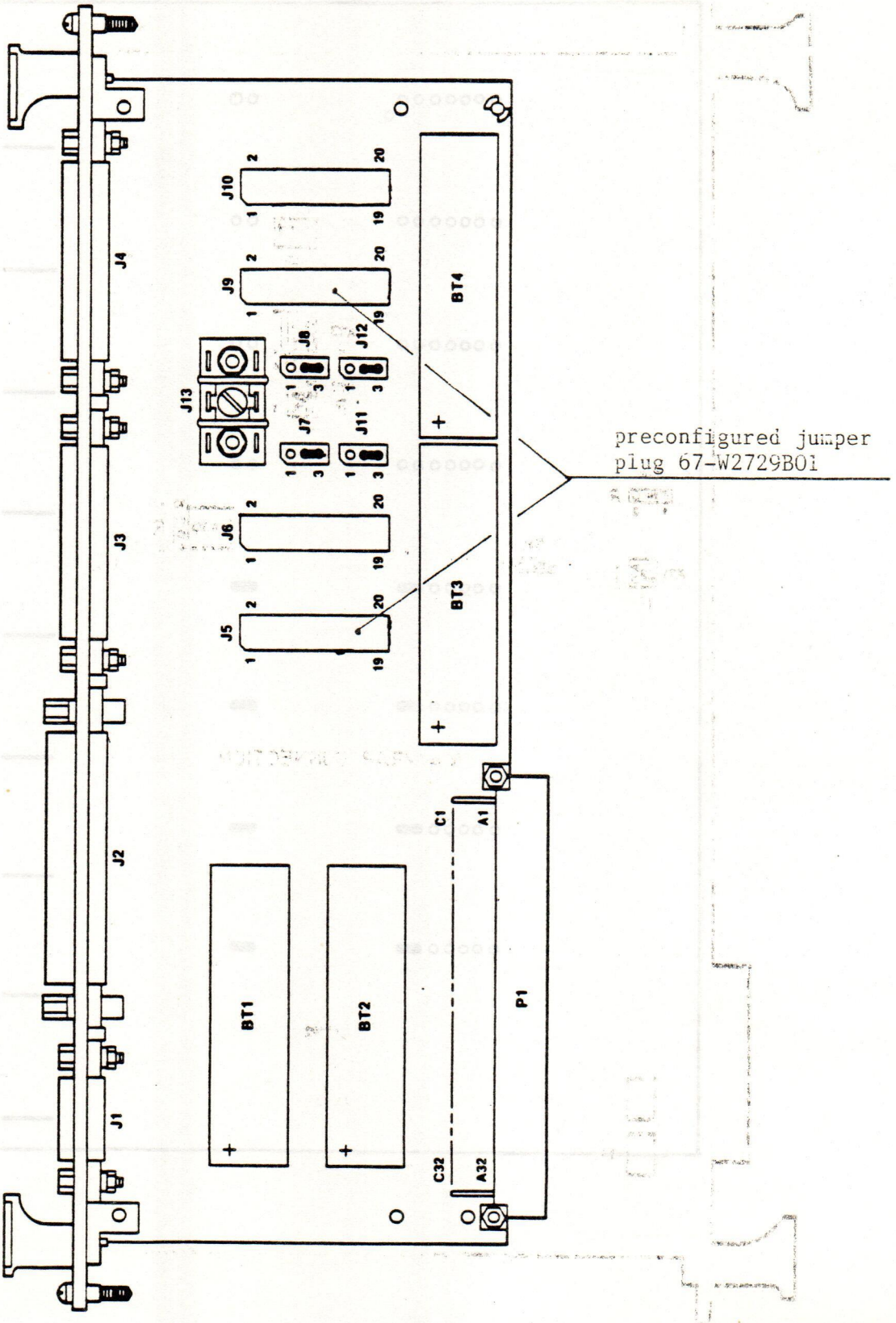


MVME 319 jumper locations

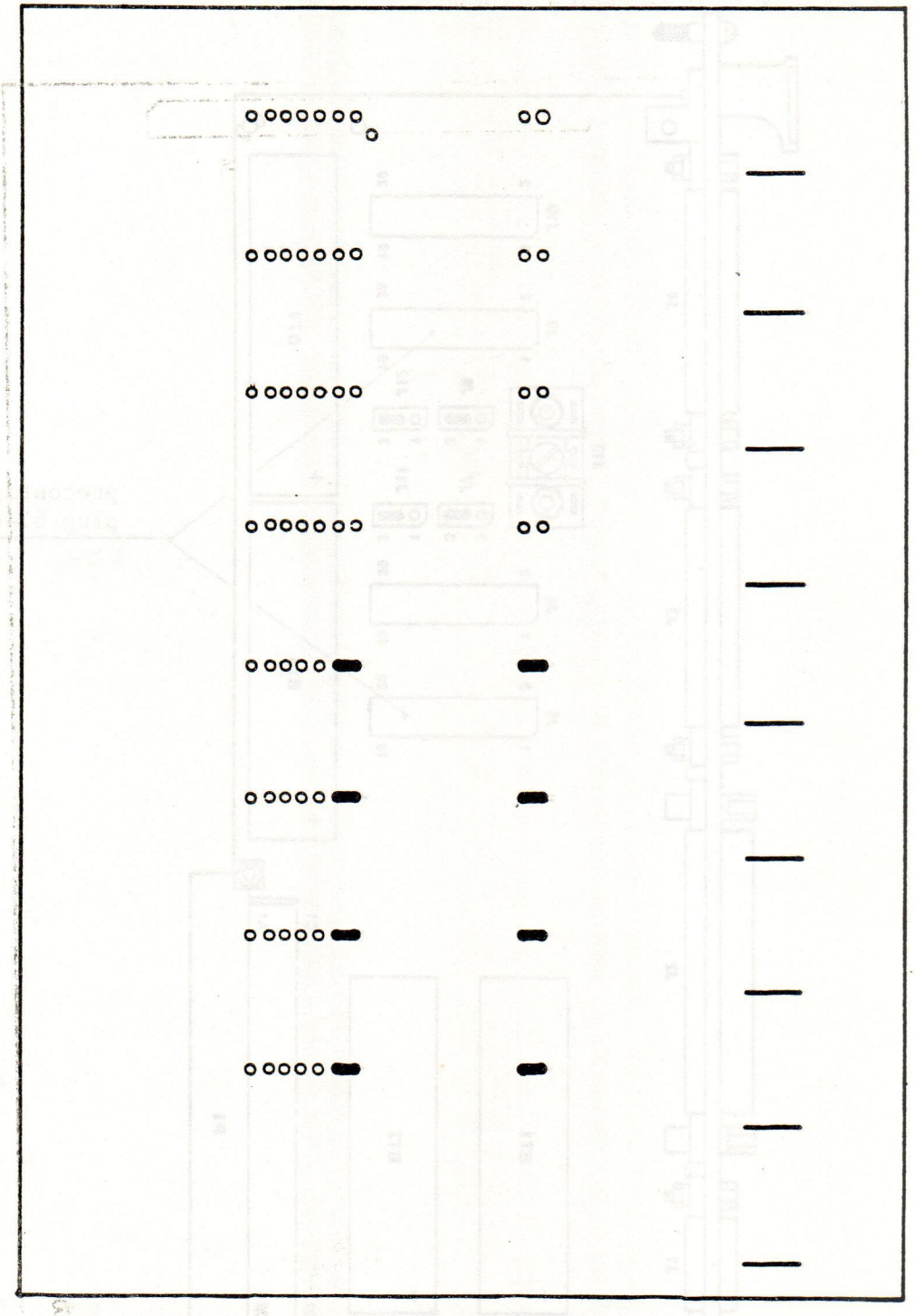


R = WRAP CONNECTION

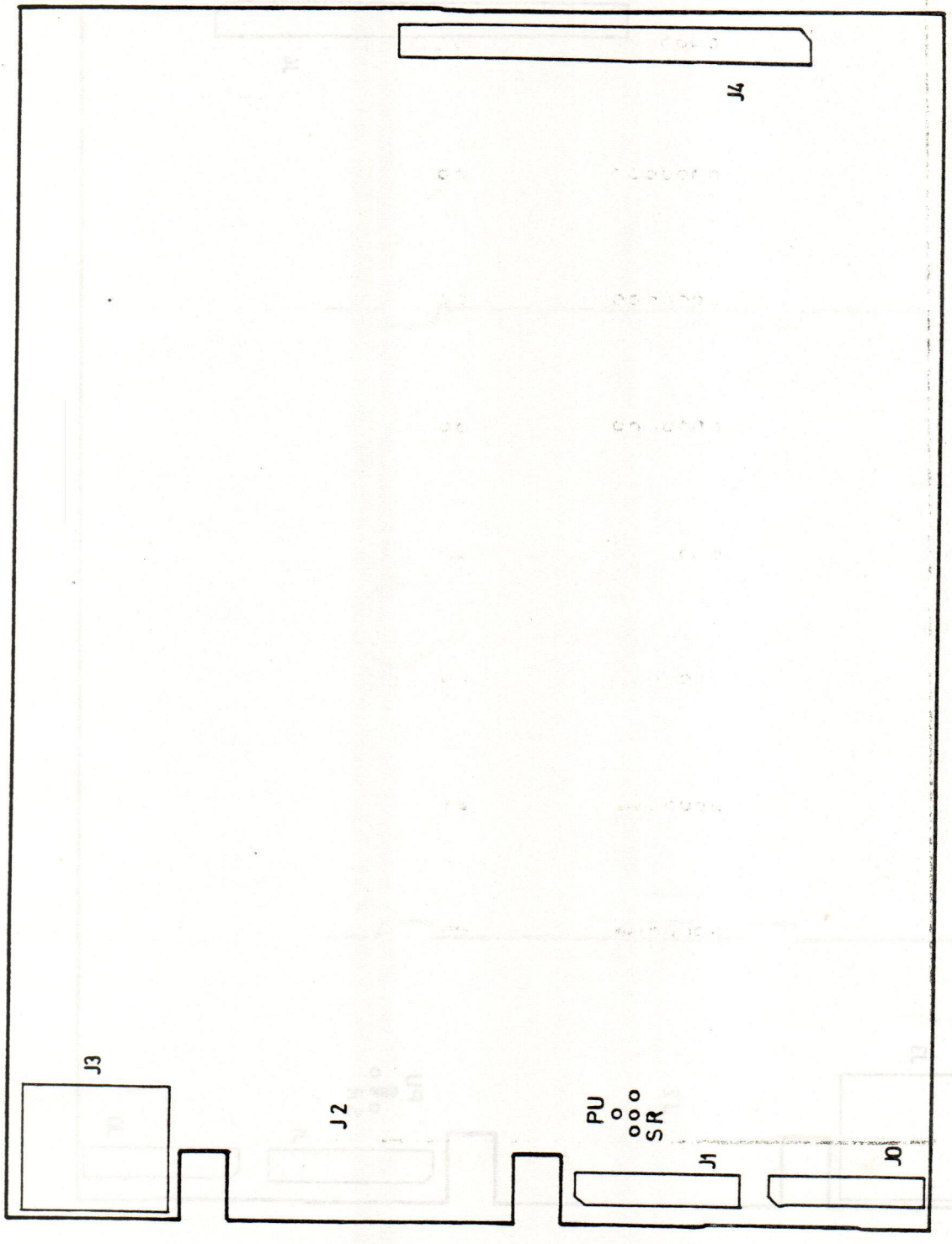
Jumper configuration MVME 701A



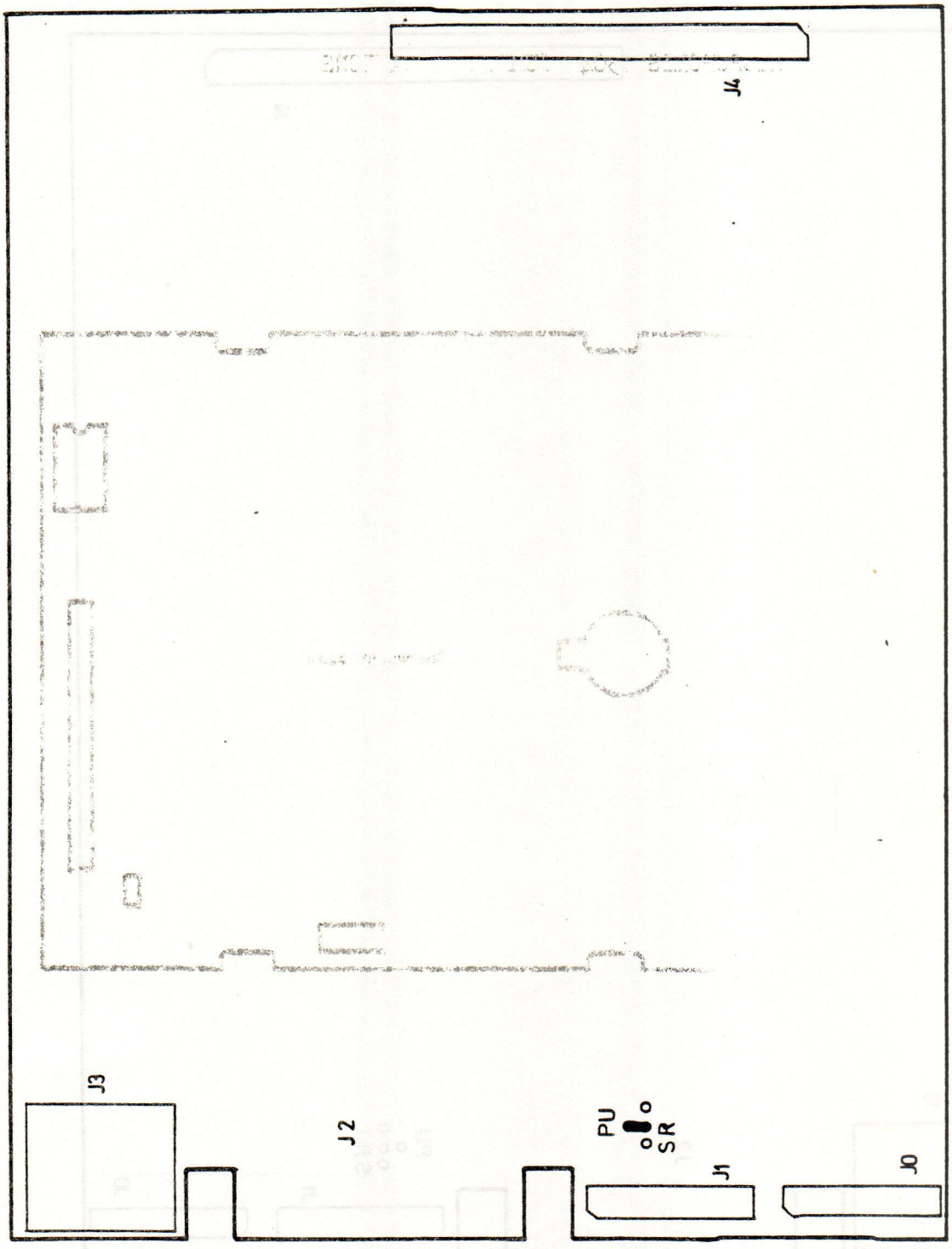
Jumper configuration MVME 921



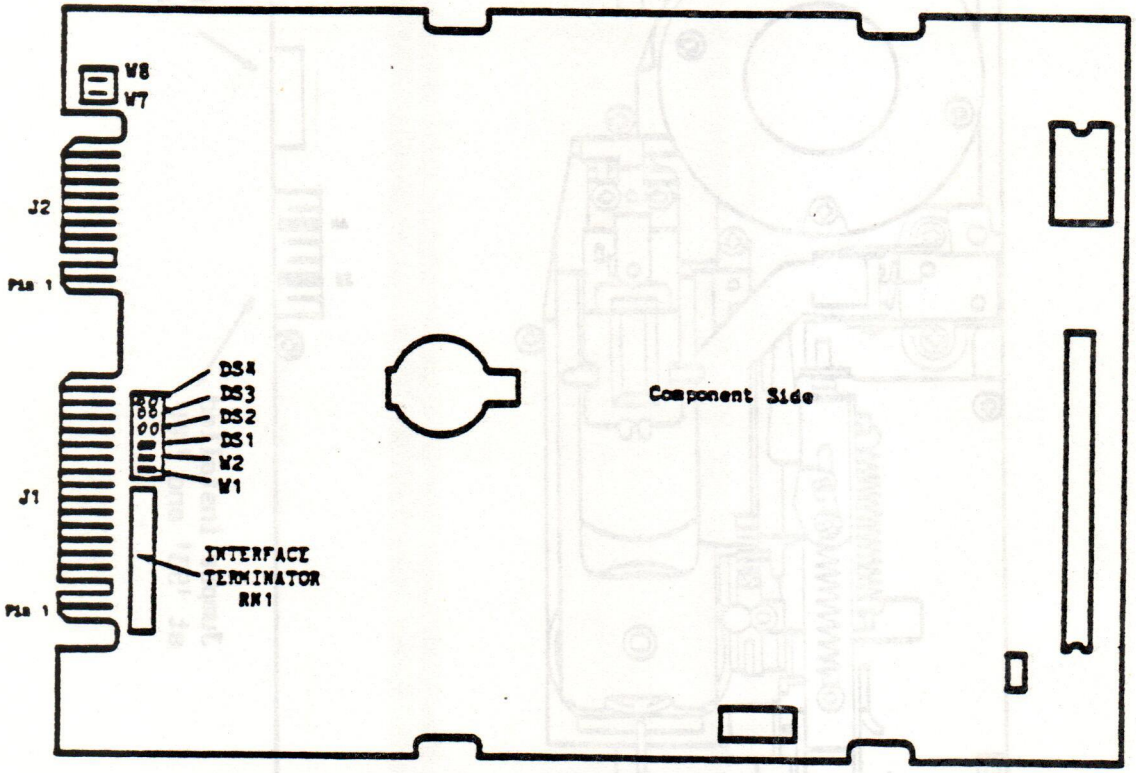
Jumper configuration ACB 4000A/N

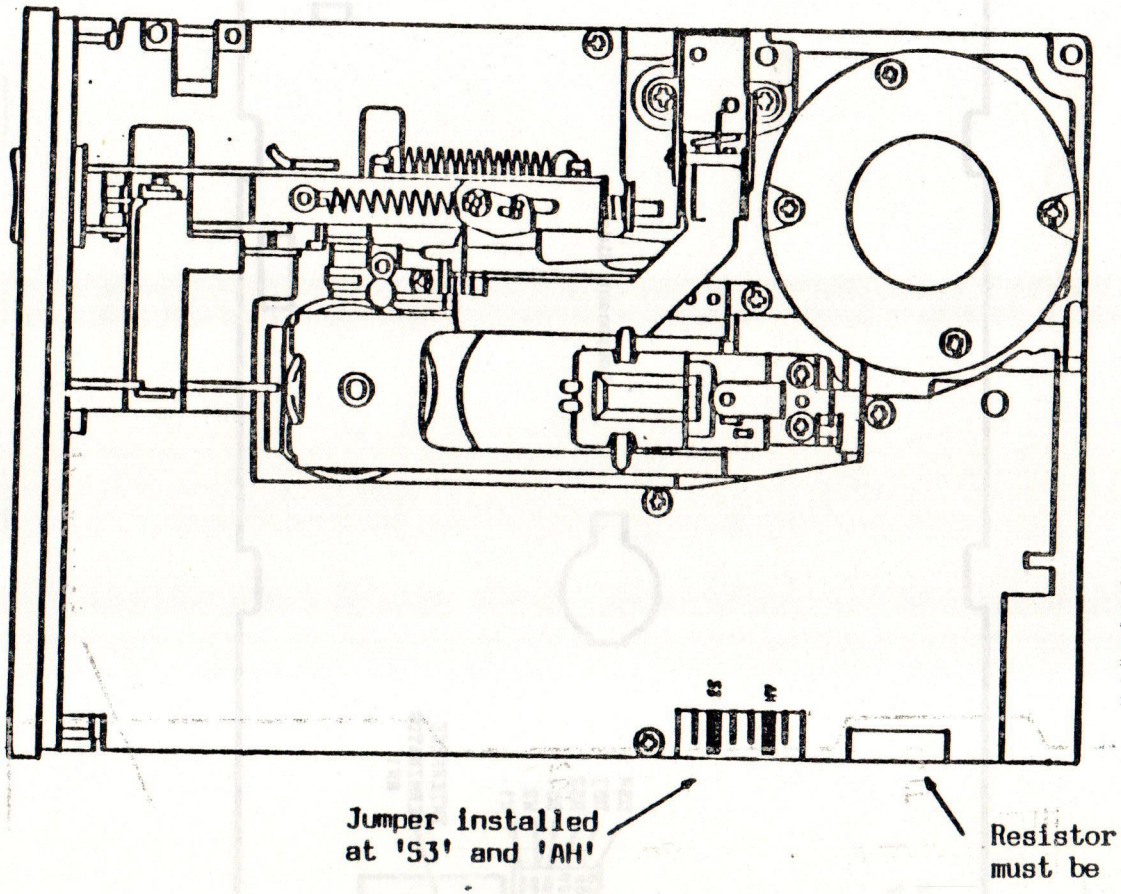


Jumper configuration ACB 4000A/V



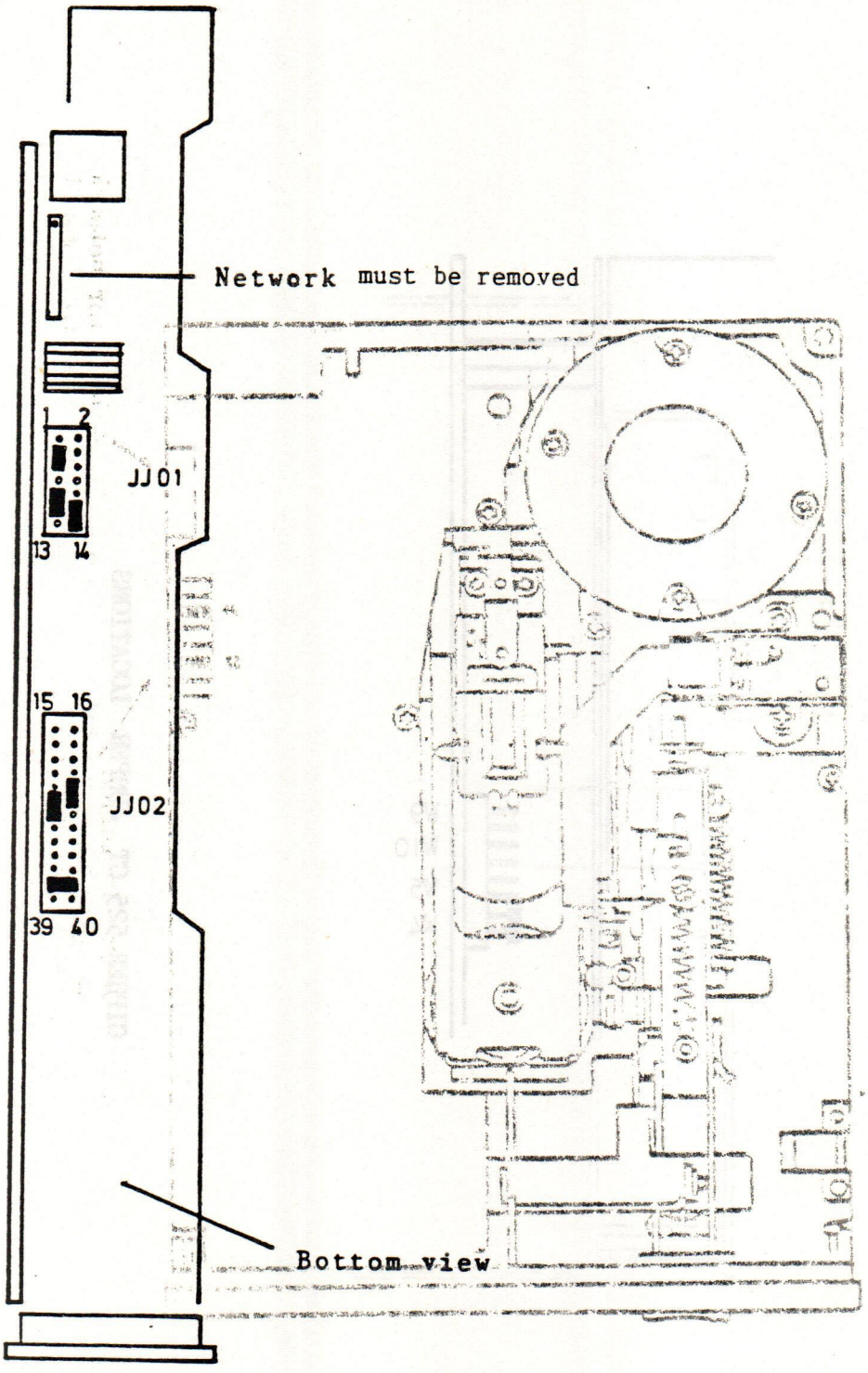
MICROPOLIS 1304 JUMPER LOCATIONS

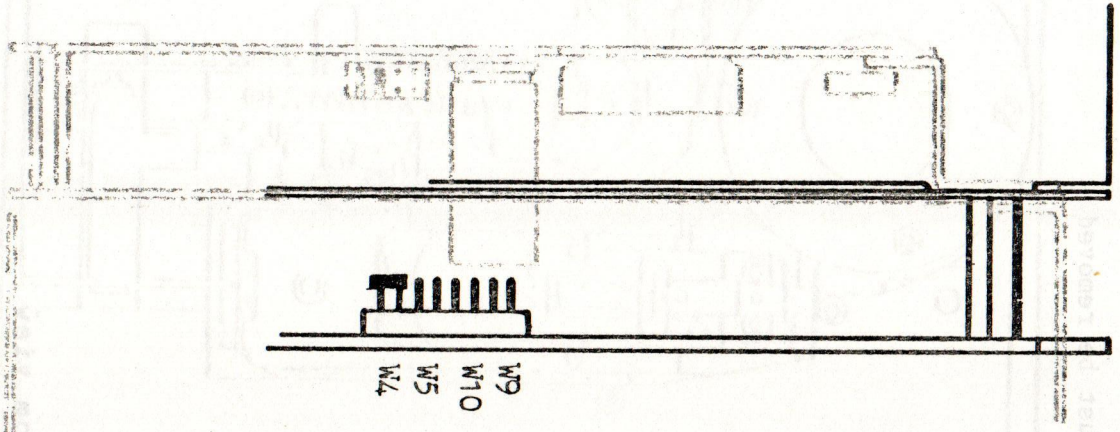




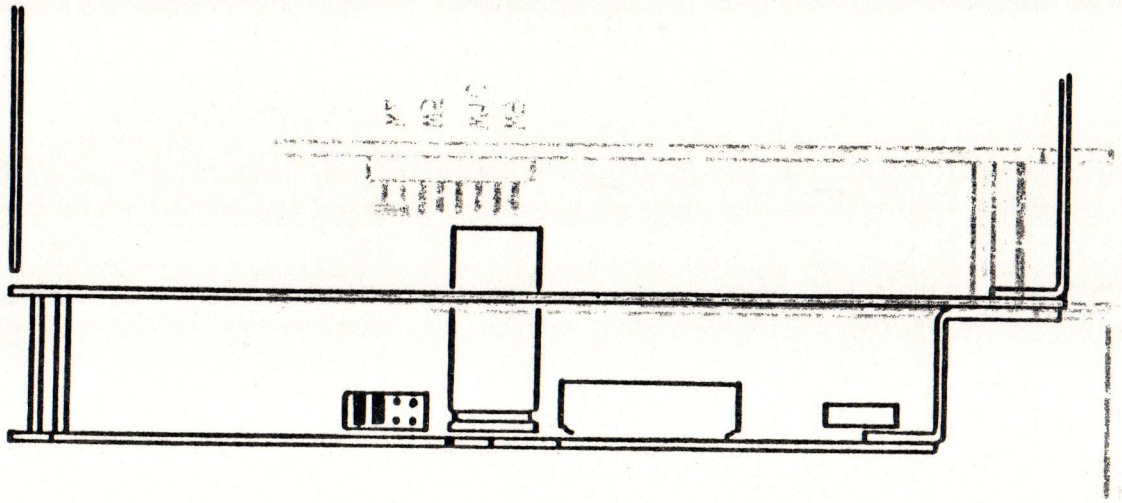
BASF 6138 JUMPER LOCATIONS

Jumper configuration BASF 6138B

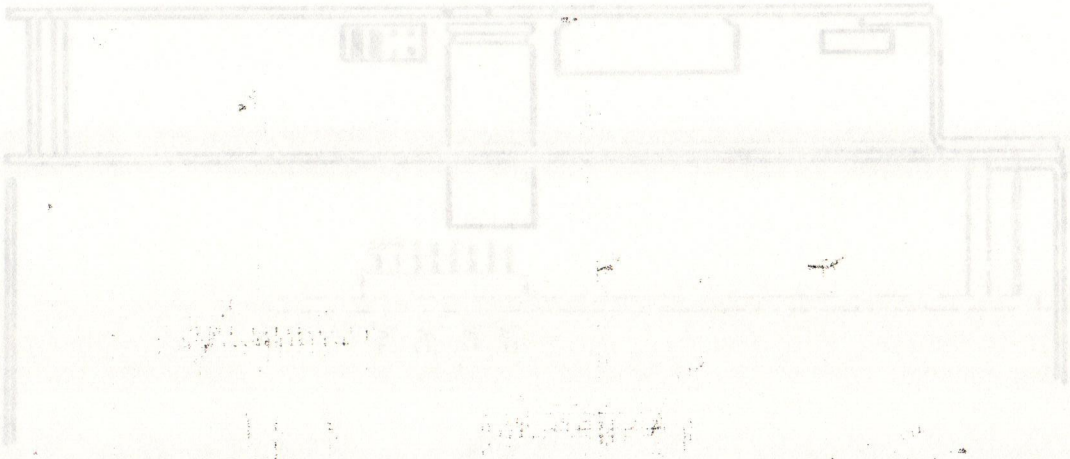


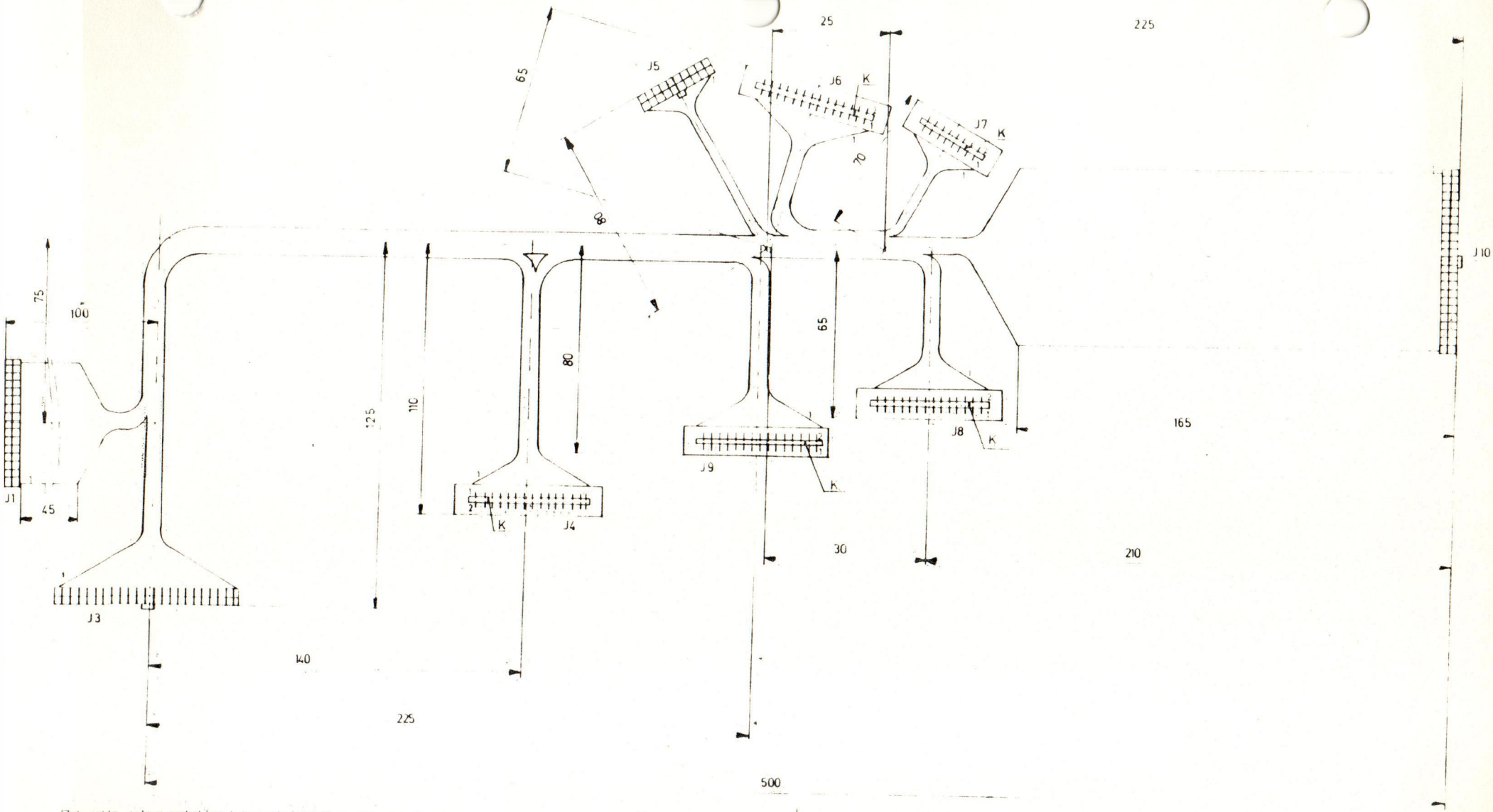


CIPHER 525 CT JUMPER LOCATIONS



CIPHER 525 CT JUMPER LOCATIONS





Flat cable colour coded (pin 1 brown), seperate every second wire

or Flat cable grey (pin 1 red)

Connections J1 - J4-J9
J3 - J10
J5 - J7
J6 - J8

Connectors	J1	34pin	female socket conn
	J3 J10	50pin	" "
	J5	20pin	" "
	J4, J6, J8, J9	34pin	card edge conn
	J7	20pin	" "

K = Polarising key

Connect J1 - MVME 319 P5
J3 - MVME 319 P3
J4 - BASF 6138 J1
J5 - ADAPTEC ACB 4000 J0

Connect J6 to MICROPOLIS 1304 J1
J7 - J2
J8 - ADAPTEC ACB 4000 J2
J9 - CIPHER 525 CT J1
J10 - ADAPTEC ACB 4000 J4

ISSUE	LOC	COMMENT	DATE	SIGN
A	-	Initial Release	30/7/85	C

UNLESS OTHERWISE SPECIFIED
DIMENSIONS MM (INCHES)
SCALE 1 : 1
REMOVE ALL BURRS AND SHARP EDGES — SURFACE QUALITY IN MICROMETER
TOLERANCE ± 5
2 PLACE DEC ± ± — HOLES ± ±
3 PLACE DEC ± ± — ANGELS ± ±
BM

DRAWN BY — DATE 18/7/85
CHECKED BY — 7/8/85
ENGINEER
MANAGER — 9/8/85

MOTOROLA microsystem

TITLE
Data cable harness SYS 121

DRAWING NO
30CG4244M01

SHEET
OF