SOLARTRON

Instruction Manual

for the

'Vari-Pack'

Type SRS153S

Inter Service Reference

No. CT397

Joint Services Catalogue

No. 6625-99-943-3268

and

Type SRS153.2

Issue : Four

Date : March, 1962.

Mod. Ref. : 153S/30

SOLARTRON LABORATORY INSTRUMENTS LTD.

COX LANE · CHESSINGTON · SURREY · ENGLAND

Telephone: LOWer Hook 5252 *Cables: Solartron Chessington*

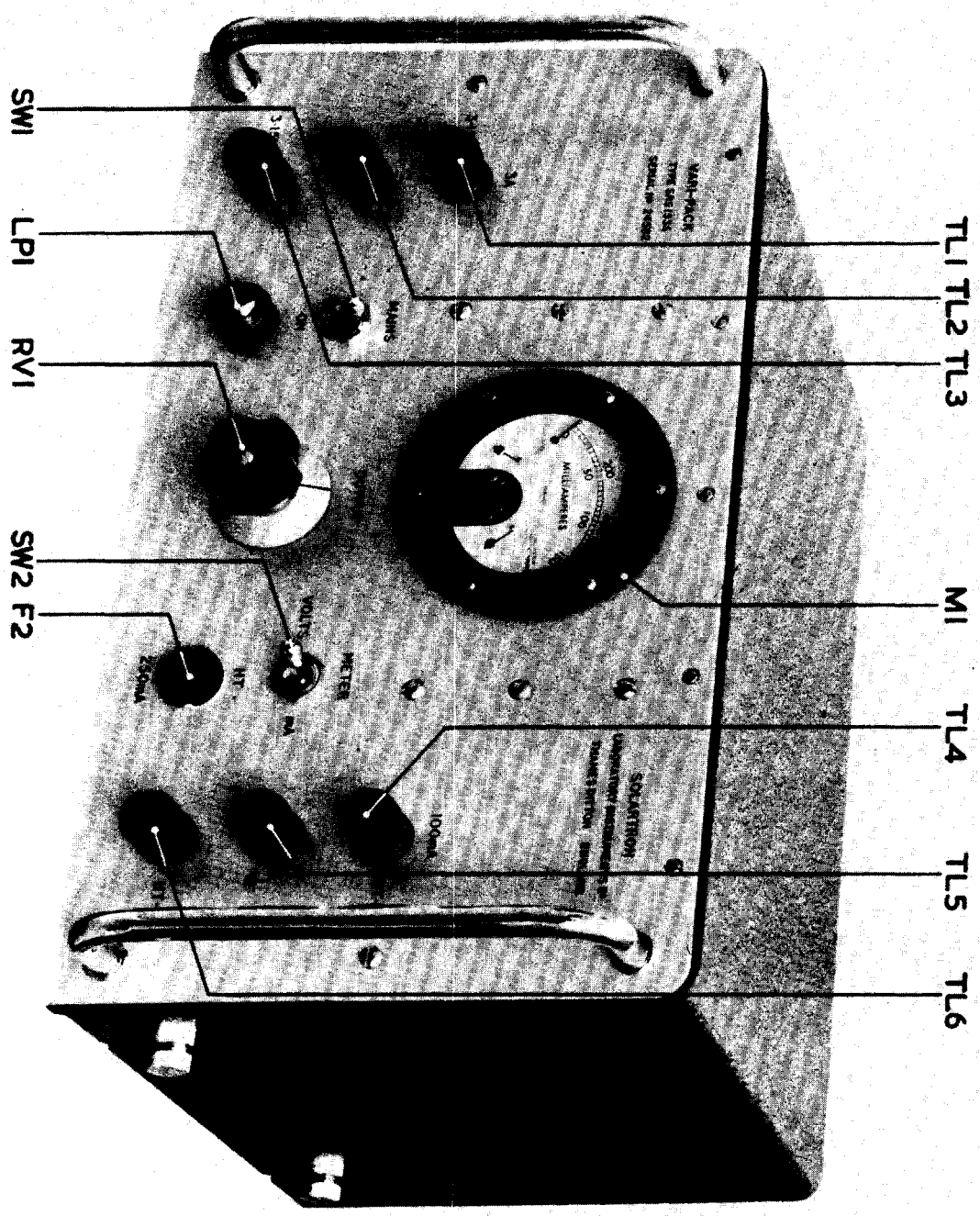
International Telex: 23842 Solartron Chess.

LIST OF CONTENTS

		Page
Section 1	Introduction	1
Section 2	Performance Specification	1
Section 3	Operating Instructions	1
Section 4	Circuit Description	2
Section 5	Maintenance Information	2
Section 6	SRS153. 2	3
Section 7	Component List	3

LIST OF ILLUSTRATIONS

Frontispiece	The Vari-Pack SRS153. S.	IV
Fig. 1	Regulation of Power supply at maximum output voltage	1
Fig. 2	Block Diagram of power supply	2
Fig. 3	Component layout underside view of Chassis	5
Fig. 4	Component layout Top view of Chassis	6
Fig. 5	Circuit Diagram SRS153. S	7



Frontispiece The Vari-Pack SRS153. S

SECTION 1

INTRODUCTION

This small, inexpensive unit provides a light and portable unregulated power supply capable of supplying a wide range of HT voltages.

It is used in many branches of industry, by the services, and in training establishments of all kinds.

SECTION 2

PERFORMANCE SPECIFICATION

D. C. Output Voltage:	0-500 Volts Positive or Negative. Both positive and negative lines are isolated from earth and insulated for 1,000 Volt working so that two supplies may be used in series.
D. C. Output Current:	100 m amps at potentials from 0-350 Volts. Above 350 Volts the current output falls in accordance with the graph opposite. Fig. (1).
A. C. Output:	6. 3 Volts 3 Amps centre Tapped.
Ripple on D. C. Output:	$<$170 mVolts R. M. S.
D. C. Output Resistance:	10 ma - 100 ma approximately 700Ω.
Supply Voltage:	110V or 220V $\pm$ 20V.
Supply Frequency:	40 to 60c/s and 400c/s.
Permissible Mains Variation:	$\pm$ 7%.
Supply Power:	140 V. A. at full load.

A built in meter is supplied to measure HT voltage or current

Dimensions:	$13\frac{1}{2}$" x 13" x 8" height.
Weight:	35 lbs.

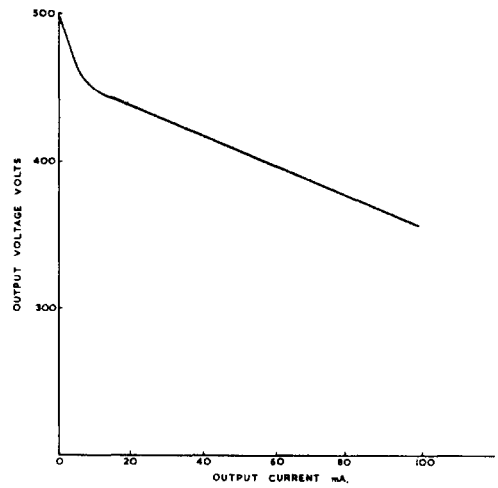


Fig. 1 Regulation of Power supply at maximum output voltage

SECTION 3

OPERATING INSTRUCTIONS

Check that the transformer tap selecting panel is correctly set.

Connect the 'Vari-Pack' outputs to the work as required.

Ensure that the 'Vari-Pack' is switched off, and connect it to the supply main.

Set the meter selector switch to volts, and switch on the instrument.

Adjust the variable control to obtain the required voltage. Switch to current to check that the current drain is not excessive.

SECTION 4

CIRCUIT DESCRIPTION

The circuit is best described by subdividing into four sections as follows:

1) Mains Transformer
2) H. T. rectifier
3) Negative line rectifier
4) Output Cathode Follower

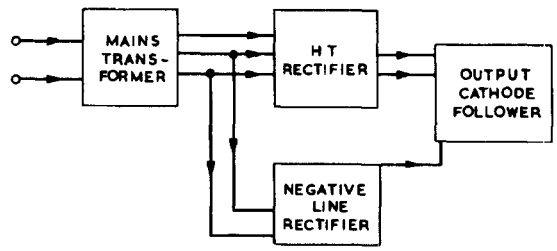


Fig. 2 Block Diagram of power supply

1) The Mains transformer T1 is a C core transformer with a universal primary accepting input voltages between 90 and 240, at 40-60 c/s and 400 c/s. There are six secondary windings as follows:

6. 3V at 2. 4A supplying V1 and V2 rectifiers.
6. 3V at 1. 2A supplying V3 the negative H. T. rectifier.
6. 3A at 2A supplying V4 and V5 the series control valves.
5V at 0. 1A supplying the mains indicator lamp.
3. 15 - 0 - 3. 15 at 3A for external use
625V - 0 - 625V at 100 mA supplying

The output of the 625 - 0 - 625 volt winding is full wave rectified by V1 and V2 and smoothed in a choke input filter consisting of L1 and C1, C2, C3. R1 is provided to discharge these capacitors when the unit is switched off.

V3 is a half wave rectifier drawing a very small current from one side of the H. T. winding to provide a negative potential. The smoothing of the negative supply is by a resistor capacitor filter R2, C4, C5.

The resistor chain R3, RV2, RV1 determines the grid potential of V4 and V5 and consequently the output voltage from the unit.

C8 and C6 provide decoupling in the resistor chain to ensure that no hum is introduced into the H. T. supply.

Anode, screen grid, and control grid stoppers are fitted to V4 and V5 as a precaution against self oscillation and R4, R11, provide some autobias to equalise the loading between the two valves.

The meter M1 has its own shunt and external series resistor and will measure H. T. current and voltage.

SECTION 5

MAINTENANCE INFORMATION

An abbreviated account of the setting up and test procedure is given as a guide when servicing. The instrument is correctly set up and fully operational when it leaves the factory and should require no adjustment unless a fault develops.

The mains tapping panel is correctly set and the instrument is connected to the supply, switched on, and allowed 15 minutes to warm up.

The front panel control is set to maximum (fully clockwise) and RV2 in the unit is rotated until the output voltage at no load is 520 volts. The instrument is now set up.

Readjust the H. T. to approximately 300 volts and draw a load current of 100 ma. Reduce the load current to 10 ma and finally to zero. At each setting of current measure the output voltage and the ripple. The ripple measured should never exceed 170 mV. The change in voltage between 100 ma and 10 ma loading divided by the change in current gives a measure of the D C resistance which should be approximately 700 Ω.

With the instrument operating at no load, the following potentials were measured:

Test Point	Reading
Across C1	670V
Across C4	940V

SECTION 6

SRS 153. 2

The SRS 153. 2 has an identical circuit to the SRS 153. S. The only difference is that certain interservice approved components have been replaced by their commercial equivalents: these are listed below:

L1 is an unsealed choke to Solartron Part Number 292007
T1 is an unsealed transformer to Solartron Part Number 295031
M1 is an unsealed meter to Solartron Part Number 341019
LP1 is a 6. 5V 0. 3A 11MM M. E. S. lamp
TL1-6 are terminals tc Solartron Part Number 408461

These are Belling & Lee type L1001/1SB

SW1	D. P. C. O.	3A	Arrow Elect.	81055/BT/34/CH
SW2	D. P. C. O.	3A	Arrow Elect.	81058/BT/34/CH

SECTION 7

COMPONENT LISTS

Notes

1) Blank spaces denote no change from the preceeding line.

2) Direct equivalents from other manufacturers may be used in some instruments.

3) Abbreviations:

W. W.	Wire Wound
H. S.	High Stability
R. Pa.	Rectangular Paper
T. Pa.	Tubular Paper
T. C. C.	Telegraph Condenser Co.
S. T. C.	Standard Telephone & Cables.

Resistors (Fixed)

CCT REF.	VALUE OHMS	TOL %	INTER SERVICE REF. No.	MANUFACTURER & TYPE	RATING WATTS	SOLARTRON PART NO.
			5905-99			
R 1	68K	5	011-4680	Painton P302 W. W.	6	239047
R 2	470K	10	022-3133	Erie 8 Carbon	1	226557
R 3	10K	10	022-2131	Erie 9 Carbon	$\frac{1}{4}$	226337
R 4	10	0. 25Ω	-	109 H. S.	$\frac{1}{8}$	N22126
R 5	47	10	022-1068	9 Carbon	$\frac{1}{4}$	226309
R 6	100	10	022-1110		$\frac{1}{4}$	226313
R 7	1000	10	022-2005		$\frac{1}{4}$	226325
R 8	1000	10	022-2005		$\frac{1}{4}$	226325
R 9	100	10	022-1110		$\frac{1}{4}$	226313
R10	47	10	022-1068		$\frac{1}{4}$	226309
R11	10	0. 25Ω	-	109 H. S.	$\frac{1}{8}$	N22126
R12	330K	10	011-1518	Eriegan 10 Carbon	1	N22492
R13	600K		-	Supplied with Meter		-

Resistors Variable

RV1	500K	20	Z262551	Morgan H Carbon	$\frac{3}{4}$	251560
RV2	100K	20	Z262171	LH	$\frac{1}{4}$	251208

Capacitors

CCT REF.	VALUE µFd	TOL %	INTER SERVICE REF. No.	MANUFACTURER & TYPE		RATING VOLTS	SOLARTRON PART NO.
C 1	8	20	Z112629	T. C. C.	CP152V R. Pa	800	211304
C 2	8	20	Z112629			800	211304
C 3	8	20	Z112629			800	211304
C 4	0.5	20	Z111377		CP142W	1000	N20073
C 5	1	20	Z112823		CP142T	600	211201
C 6	1	20	Z112823			600	211201
C 7	1	20	Z112823			600	211201
C 8	0.1	20	5910 Z117829		CP47W T. Pa	1000	214407

Valves

V 1	CV2235	S. T. C.	R18 Rectifier
V 2	CV2235		R18
V 3	CV2235		R18
V 4	CV428		5B/254M Tetrode
V 5	CV428		5B/254M

Miscellaneous

CCT REF.	VALUE	TOL %	INTER SERVICE REF. No.	MANUFACTURER & TYPE		RATING	SOLARTRON PART No.
L 1	20HY			Parmeko	P480 L. F. Choke	120mA	
T 1			5950-99-911-6380		Transformer		295021
SW1			Z510504	Painton	501085 Switch		
SW2			Z510504	Painton	501085 Switch		
M 1				Victoria inst.	341014 Meter		341014
F 1			Z590111	Belling & Lee	L1055/3A	3A	372275
F 2			Z590107		L1055/250mA	250mA	372266
PL1			Z560565	Plessey	CZ48993/5 Plug Mk IV	Pl 250mA	
MSP				Mcmurdo	279001 Mains Selector Panel		279001
LP1			Z959119	Thorn	Lamp Midget	6V. 1A	
TL1				Belling & Lee	L1001/325 Terminal		
TL2							
TL3							
TL4							
TL5							
TL6							

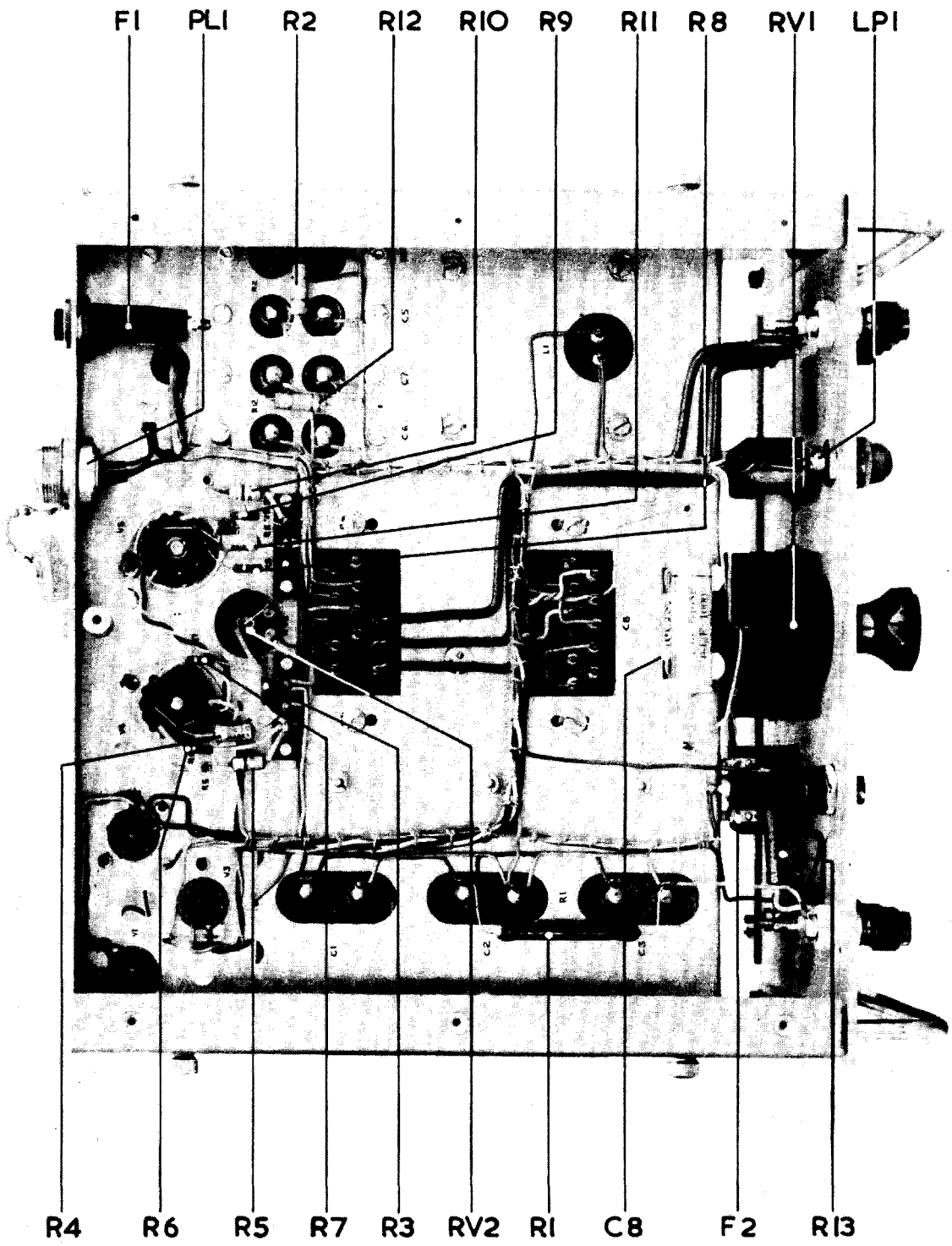


Fig. 3 Component layout underside view of Chassis

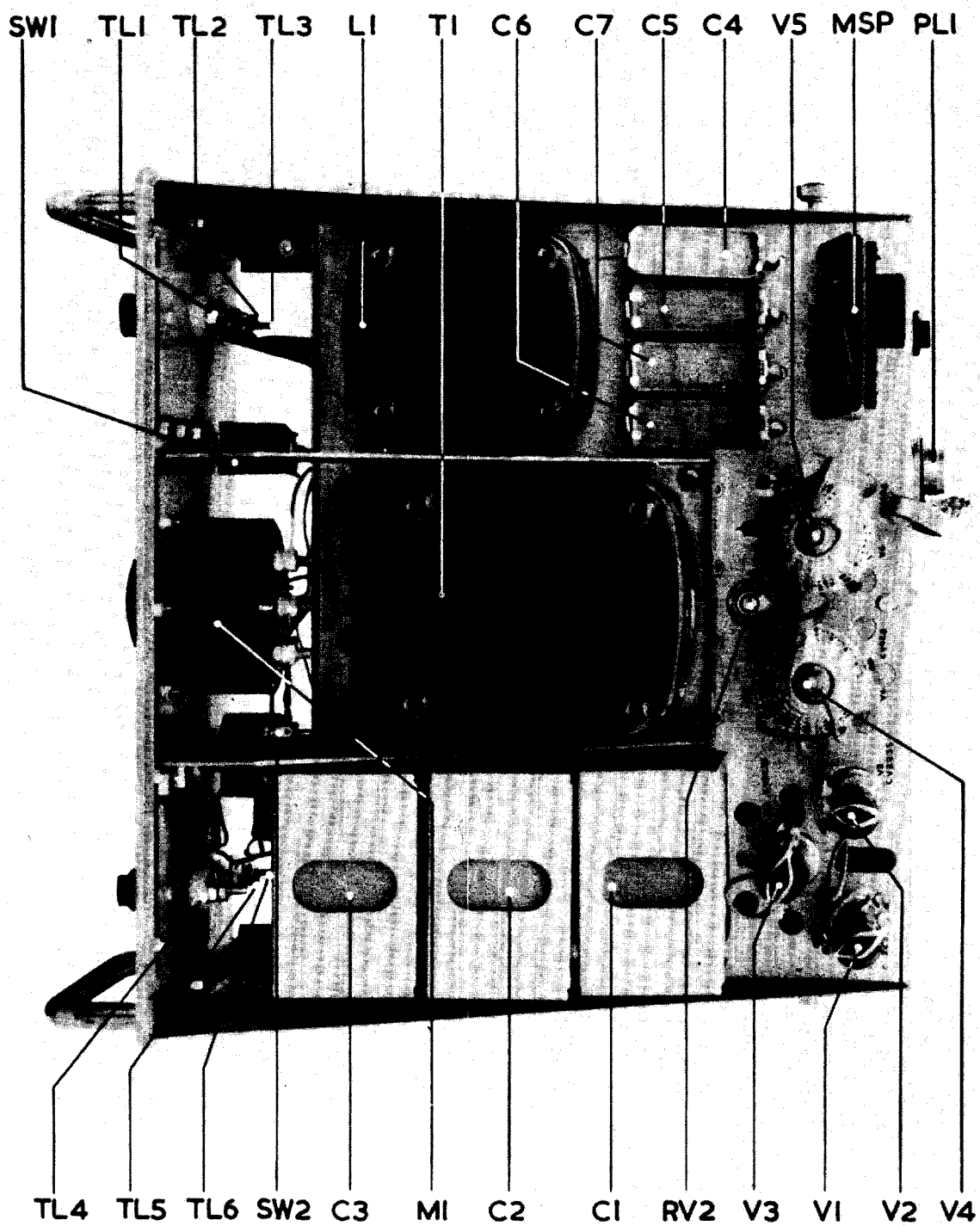


Fig. 4 Component layout Top view of Chassis