

TESTERS, VALVE, AVO

TECHNICAL HANDBOOK - FAULT-FINDING AND REPAIR DATA

Note: This Part 2, together with the Part 1, supersedes Tels Y 802, Issue 1, dated 19 Aug 44.

This Part 2 contains fault-finding and repair data in tabular and diagrammatic form. The text, describing how various operations are to be carried out, is in the Part 1 and the regulations dealing with unit, field and base repairs.

INDEX TO TABLES

Table No	Designation	Page
	TESTER, VALVE, AVO, No 1	
2001	Component values	1002
2002	Consolidated test equipment	1003
	TESTER, VALVE, AVO, No 3	
2003	Component values	1003
2004	Consolidated test equipment	1006
	TESTER VALVE AVO CT 160	
2005	Component values	1007
2006	Consolidated test equipment	1009
2007	Valve holders - all testers	1009

INDEX TO FIGURES

Fig No	Designation	Page
2001	Circuit diagram T.V.A. No 1	1010
2002	Underside view of main unit (r.h. view) T.V.A. No 1	1011
2003	Underside view of main unit (l.h. view) T.V.A. No 1	1012
2004	Diagrams of transformer tappings T.V.A. No 1	1013
2005	Circuit diagram T.V.A. No 3	1014
2006	Transformer assemblies T.V.A. No 3	1015
2007	Circuit diagram T.V.A. CT 160	1016
2008	Component panel T.V.A. CT 160	1017
2009	Underside of control unit T.V.A. CT 160	1018

Table 2001 - Tester, valve, Avo, No 1 - components

Part No	Circuit ref	Value	Tolerance and rating	Type	Figure and location
RESISTORS					
W4/WY 2049	R1	9Ω + 1Ω	0.5%	W.W. card	2001/J1
W4/WY 2050	R2	40Ω (approx)		W.W. card	2001/H1
W4/WY 2024	R3	50Ω		W.W. bobbin	2001/L2
Z/Z 111427	R4*	82Ω	10% 1W	Carbon, grade 2, insulated	2001/K5
Z1/ZA 15503	R5	470Ω	20% 0.5W	No 3A	2001/M3
Z/Z 223038	R6	100kΩ	10% 0.5W	Carbon, grade 2, non-insulated	2001/H5
Z/Z 223079	R7	220kΩ	10% 0.5W	Carbon, grade 2, non-insulated	2001/N5
Z/Z 223079	R8	220kΩ	10% 0.5W	Carbon, grade 2, non-insulated	2001/N5
* Preferred value replacement					
CAPACITORS					
Z1/ZA 318925	C1	0.05μF	20% 1000V	Paper, metal, tubular	2001/F4
Z1/ZA 17113	C2	0.001μF	20% 1000V	Paper, metal, tubular	2001/A1
Z1/ZA 21380	C3	25μF		Ceramic	2001/B2
Z1/ZA 17113	C4	0.001μF	20% 1000V	Paper, metal, tubular	2001/C1
POTENTIOMETERS					
W4/WY 1997	RV1	90Ω		W.W.	2001/J1
W4/WY 1996)	RV2	500Ω (inner)		W.W.	2001/M1
W4/WY 1995)		1.88kΩ (outer)			
SWITCHES					
Z1/ZA 8724	SA	-	3A 250V	Toggle, single-pole, one-way	2001/P8
-	SB	-	Special	Rotary, 1-pole, 14-position	2001/L 7, 8
-	SC	-	Special	Rotary, 1-pole, 8-position	2001/L3
-	SD	-	Special	Rotary, 1-pole, 8-position	2001/L2
-	SE	-	Special	Rotary, 1-pole, 4-position	2001/E2
-	SF	-	Special	Key-operated, leaf, centre-loaded, 6 + 1-pole, 2-way	2001/G3,4,5

Table 2001 (cont)
SWITCHES (cont)

Part No	Circuit ref	Value	Tolerance and rating	Type	Figure and location
-	SG	-	Special	Assemblies, rotary, 9-unit, 1-pole, 10-position	2001/A5, 6
Z1/ZA 6675	SH	-	3A 230V	Toggle, double-pole, 2-way	2001/B8

TRANSFORMERS

W4/WY 2019	T1	Multi secondary	230V	h.t. & g.b. supplies	
W4/WY 2018	T2	Multi secondary	200-250V	Heater supplies	
W4/WY 2023	T3	7:1 step down	-	Auto-wound	

RECTIFIER

Z1/ZA 21751	MR1	-	1/6A	Metal	2001/L2
-------------	-----	---	------	-------	---------

METER

-	M1	-	0.7mA f.s.d.	5½ in. scale	2001/G2
---	----	---	--------------	--------------	---------

VALVES

Z1/ZA 0608		-	-	Neon G.E.C. Tuneon	2001/P5
------------	--	---	---	--------------------	---------

Table 2002 - Consolidated test equipment

Type of repair	Equipment
Unit	Instrument, testing, Avometer, universal, 50-range, Mk 1 WY 0760

Table 2003 - Tester, valve, Avo, No 3 - components

Part No	Circuit ref	Value	Tolerance and rating	Type	Location
RESISTORS					
Z/Z 223079	R1	220kΩ	10% 0.25W	Carbon, grade 2, insulated	2005/E3
Z/Z 244166	R2	24kΩ	5% 6W	W.W. vitreous, wire end	2005/H1
Z4/ZD 00482	R3	150Ω	5% -	W.W. bobbin	2005/Q5
Z1/ZA 38770	R4	125kΩ	1% 0.5W	Carbon, grade 1, non-insulated	2005/P8
-	R5	22Ω	- -	Supplied as part of RV4	2005/L6
Z1/ZA 38774	R6	175kΩ	5% 1W	Carbon, grade 1, non-insulated	2004/Q8
Z/Z 222089	R7	4.7kΩ	10% 0.5W	Carbon, grade 2, insulated	2004/Q8
Z/Z 222089	R8	4.7kΩ	10% 0.5W	Carbon, grade 2, insulated	2005/Q8
Z/Z 218087	R9	20kΩ	10% 0.75W	Carbon, grade 1, non-insulated	2005/Q7

Table 2003 (cont)

RESISTORS (cont)

Part No	Circuit ref	Value	Tolerance and rating	Type	Location
Z4/ZD 00483	R10	2.5Ω	0.5% -	W.W. bobbin	2005/K6
Z/Z 223038	R11	100kΩ	10% 0.5W	Carbon, grade 2, insulated	2005/M7
Z4/ZD 00484	R12	7.5Ω	0.5% -	W.W. bobbin	2005/L6
Z/Z 217075	R13	200Ω	5% 0.25W	Carbon, grade 1, non-insulated	2005/R6
Z4/ZD 00487	R14	50Ω	0.5% -	W.W. bobbin	2005/J6
Z4/ZD 00488	R15	80.8Ω	0.5% -	W.W. bobbin	2005/J6
Z4/ZD 00490	R16	12.78Ω	0.5% -	W.W. bobbin	2005/H6
Z4/ZD 00489	R17	3.21Ω	0.5% -	W.W. bobbin	2005/H6
Z4/ZD 00491	R18	1.61Ω	0.5% -	W.W. bobbin	2005/G6
Z4/ZD 00492	R19	0.793Ω	0.5% -	W.W. bobbin	2005/G6
Z4/ZD 00493	R20	0.807Ω	0.5% -	W.W. bobbin	2005/F6
Z4/ZD 00462	(R21	900Ω	5% -	Strips, resistance, 900Ω. ± 5% + 900Ω ± 5%	2005/F7
	(R22	900Ω	5% -		2005/G7
Z/Z 244030	R23	2kΩ	5% 6.0W	W.W. vitreous, wire end	2005/G7
Z4/ZD 00495	R24	4.2kΩ	5% -	W.W. bobbin	2005/H7
Z4/ZD 00494	R25	17kΩ	5% -	W.W. bobbin	2005/H7
Z4/ZD 00487	R26	50Ω	0.5% -	W.W. bobbin	2005/M6
Z4/ZD 00486	R27	75Ω	0.5% -	W.W. bobbin	2005/M6
Z4/ZD 00485	R28	15Ω	0.5% -	W.W. bobbin	2005/L6
Z/Z 222089	R29	4.7kΩ	10% 0.5W	Carbon, grade 2, insulated	2005/E10 J10
Z1/ZA 41516	R30 ≠	75Ω	25% 0.5W	Carbon, grade 2, insulated	2005/E10
Z1/ZA 41516	R31	75Ω	25% 0.5W	Carbon, grade 2, insulated	2005/E10, K10
Z1/ZA 41516	R32	75Ω	25% 0.5W	Carbon, grade 2, insulated	2005/E10, J10
Z/Z 221122	R33	120Ω	10% 0.5W	Carbon, grade 2, insulated	2005/B10
	(R34 ≠	120Ω	10% 0.5W	Carbon, grade 2, insulated	2005/B10
	(R35 ≠	120Ω	10% 0.5W	Carbon, grade 2, insulated	2005/B10
	(R36 ≠	120Ω	10% 0.5W	Carbon, grade 2, insulated	2005/B10
Z/Z 221122	(R37 ≠	120Ω	10% 0.5W	Carbon, grade 2, insulated	2005/B11
	(R38 ≠	120Ω	10% 0.5W	Carbon, grade 2, insulated	2005/B11
	(R39 ≠	120Ω	10% 0.5W	Carbon, grade 2, insulated	2005/C12
	(R40 ≠	120Ω	10% 0.5W	Carbon, grade 2, insulated	2005/C12
	(R41 ≠	120Ω	10% 0.5W	Carbon, grade 2, insulated	2005/D12
Z1/ZA 41516	(R42*	75Ω	25% 0.5W	Carbon, grade 2, insulated	2005/K11
	(R43*	75Ω	25% 0.5W	Carbon, grade 2, insulated	2005/L11
	(R44*	75Ω	25% 0.5W	Carbon, grade 2, insulated	2005/F10

≠ Not in the circuit of the Mk I instrument
* Not in the circuit of the Mk 2 instrument
/ Preferred valve replacement

Table 2003 (cont)

CAPACITORS

Part No	Circuit ref	Value	Tolerance and rating	Type	Location
Z/Z 145059	C1	0.8 μ F	20% 350V	Electrolytic, ins., tub.	2005/F6
Z1/ZA 38925	C2	0.05 μ F	20% 1000V	Paper, metal, tubular	2005/P1
Z1/ZA 38925	C3	0.05 μ F	20% 1000V	Paper, metal, tubular	2005/P3
Z 115281	C4*	0.005 μ F	20% 750V	Paper, metal, tubular	2005/G11
Z 115281	C5*	0.005 μ F	20% 750V	Paper, metal, tubular	2005/G12

* Not in the circuit of the Mk 2 instrument

POTENTIOMETERS

Z4/ZD 00457	RV1)	525 Ω + 1282.5 Ω	-	W.W.special	2005/R5
Z4/ZD 00457	RV2)				
Z4/ZD 00458	RV3	20.5k Ω + 500 Ω	--	W.W.special	2005/Q7
Z4/ZD 00456	RV4	288 Ω + 22 Ω (R5)		W.W.special	2005/N6
Z1/ZA 38773	RV5	1k Ω	-	1W W.W.linear, miniature	2005/Q6
Z1/ZA 38772	RV6	5k Ω	-	1W W.W.linear, miniature	2005/R8
Z1/ZA 38771	RV7	2.5k Ω	-	1W W.W.linear, miniature	2005/L5

RECTIFIERS

Z1/ZA 21751	MR1	-	-	1/6A Metal	2005/Q5
Z1/ZA 21751	MR2	-	-	1/6A Metal	2005/N3
Z4/ZD 00460	MR3	-	3.5V	5mA Metal, type KG1	2005/R6
Z4/ZD 00459	MR4	-	135V	8mA Selenium, type 16K9	2005/R7

RELAY

Z4/ZD 00461	RL1	-		50-70mA Two-coil, polarized, electro-magnetic	2005/N2, 3
-------------	-----	---	--	--	---------------

FUSE

Z1/ZA 3586	FS1	-	-	2.0A Cartridge	2005/T7
------------	-----	---	---	----------------	---------

METER

Z4/ZD 00449	M1	-		44.0 μ A f.s.d. 3 $\frac{1}{2}$ in. scale, flush mounting	2005/L5
-------------	----	---	--	--	---------

TRANSFORMERS

Z4/ZD 00473	T1	-		0 - 95V/255V Heater supplies 0-16V+0-116V (tapped)	
Z4/ZD 00474	T2	-		200V Power, g.b. and h.t. Multi- secondary supplies	

Table 2003 (Cont)

SWITCHES

Part No	Circuit ref	Value	Tolerance and rating	Type	Location
Z1/ZA 37451	SA	-	250V	3A Toggle, 2-pole, 1-way	2005/T7
Z4/ZD 00467	SB	-	-	Rotary, wafer, 1-bank, 1-pole, 11-position	2005/T11, 12
Z4/ZD 00468	SC	-	-	Rotary, wafer, 1-bank, 1+1-pole, 12-position	2005/Q9, 10
Z4/ZD 00470	SD	-	-	Rotary, wafer, 2-bank, 2+2-pole, 12-position	2005/NP11, 12
Z4/ZD 00465	SE	-	-	Rotary, 1-pole, 17-position	
Z4/ZD 00465	SF	-	-	Rotary, 1-pole, 17-position	
Z4/ZD 00469	SG	-	-	Rotary, wafer, 2-bank, 2 + 2-pole, 6-position	
Z4/ZD 00471	SH	-	-	Rotary, wafer, 2-bank 3 + 3-pole, 3-position	
Z4/ZD 00472	SI	-	-	Rotary, wafer, 6-bank, 2 x 6-pole, 6-position	
Z4/ZD 00466	SJ	-	-	Rotary, wafer, 1-bank, 1 + 1-pole, 9-position	
Z4/ZD 00464	{SK SL SM	- - -	- - -	) Push button,) three unit 2 + 2 + 1-) pole, 2-position	
Z1/ZA 32606	SN	-	-	D.P. changeover	
Z4/ZD 00463	SO	-	-	Assemblies, rotary, 9-unit 1-pole, 10-position	

VALVES

Z/CV 1092	V1	-	-	Valves, electronic	2005/E4
-----------	----	---	---	--------------------	---------

LAMPS

Y3/X951225	ILP1		6.5V 2.36W	Lamps, filament, vac, M.E.S.C., clear	2005/N4
Y3/X951225	ILP2		6.5V 2.36W	Lamps, filament, vac, M.E.S.C., clear	2005/N4

Table 2004 - Consolidated test equipment

Type of repair	Equipment
Unit Field	Instrument, testing, Avometer, universal, 50-range Mk 1 (WY 0760) (Instrument, testing, Avometer, universal, 50-range Mk 1 (WY 0760) (Voltmeter, valve, No 2, Mk I/I (WD 4188)

Table 2005 - Tester, valve, Avo, CT 160 - components

Part No	Circuit ref	Value	Tolerance and rating	Type	Location	
RESISTORS						
Z1/ZA 48258	R1	2.34k Ω	1% 0.75W	Carbon, high stability, non-insulated	2007/N5	
Z1/ZA 41469	R2	70 Ω	1% 0.25W	) Carbon, high stability, grade 1, non-insulated	2007/P6
Z1/ZA 48265	R3	) 2 resistors matched to total 1.32M Ω	1% 0.25W		2007/M5, 6
Z1/ZA 48251	R4		500 Ω	1% 0.25W) Carbon, high stability, grade 1, non-insulated	2007/N6
Z1/ZA 48263	R5	) 2 resistors matched to total 730 Ω	2% 0.25W	2007/Q5	
Z/5905-Z21698	R6a		330k Ω	2% 0.25W) Carbon, high stability, grade 1, non-insulated	2007/M4
Z/Z 216211	R7	10k Ω	2% 0.25W	2007/M6		
Z/Z 216206	R8	10k Ω	1% 0.25W	) W.W. vitreous, (over-wound by AVO)	2007/K6
Z1/ZA 48264	R9	200 Ω	2 1/2% 4.5W		2007/G4	
Z1/ZA 48259	R10	8k Ω	5% 4.5W	W.W. vitreous	2007/G2	
Z1/ZA 48260	R11	500 Ω	2 1/2% 4.5W	W.W. vitreous	2007/G4	
Z/Z 216291	R12	22k Ω	2% 0.25W	) Carbon, high stability, grade 1, non-insulated	2007/F6
	R14	80 Ω	) Carbon, high stability, grade 1, non-insulated		2007/E9
	(R15)	80 Ω			2007/F9	
	(R16)	80 Ω			2007/F9	
	(R17)	80 Ω			2007/G9	
	(R18)	80 Ω			2007/G9	
Z1/ZA 39593	(R19)	80 Ω			2% 0.25W	2007/G9
	(R20)	80 Ω) Carbon, high stability, grade 1, non-insulated	2007/H9
	(R21)	80 Ω				2007/H9
	(R22)	80 Ω				2007/J9
	(R23)	80 Ω	2007/J9			
	(R24)	240 Ω	) Carbon, high stability, grade 1, non-insulated	2007/J6	
Z/5905-Z21590	(R25)	240 Ω		2% 0.25W	2007/J6	
	(R26)	240 Ω		2% 0.25W	2007/H7	
Z1/ZA 48252	R27	600 Ω	2% 0.25W	) Carbon, high stability, grade 1, non-insulated	2007/R3
Z/Z 215750	R28	3k Ω	2% 0.25W		2007/R3	
Z/Z 216251	R29	15k Ω	2% 0.25W	) Carbon, high stability, grade 1, non-insulated	2007/N3
Z1/ZA 48253	R30	814k Ω	2% 0.25W		2007/H5	
Z1/ZA 48254	R31	406k Ω	2% 0.25W	) Carbon, high stability, grade 1, non-insulated	2007/J5
Z1/ZA 48255	R32	202k Ω	2% 0.25W		2007/J5	
Z/Z 216450	R33	100k Ω	2% 0.25W	) Carbon, high stability, grade 1, non-insulated	2007/J5
Z1/ZA 48256	R34	31.5k Ω	2% 0.25W		2007/J4	
Z1/ZA 48257	R35	4.35k Ω	2% 0.25W	2007/H4		
CAPACITORS						
Z/Z 115830	(C1a)	0.04 μ F	) 20% 150V	Paper, insulated, tubular	2007/L2
	(C1b)	0.04 μ F				
Z/Z 115828	C2	0.02 μ F	20% 150V	Paper, insulated, tubular	2007/L2	
Z/Z 145504	C3	8 μ F	20% 450V	Electrolytic, insulated	2007/M3	

Table 2005 (cont)

Part No	Circuit ref	Value	Tolerance and rating	Type	Location
POTENTIOMETERS					
Z1/AP 64433	RV1	90Ω	2% 1.5W	W.W.linear	2007/K9
Z1/AP 64434	RV2	2.5kΩ	5% 1.5W	W.W.linear	2007/N6
Z1/AP 64435	RV3	10kΩ	5% 1.5W	W.W. special low	2007/N6
Z1/AP 61373	RV4	500Ω	5% 0.5W	W.W.linear	2007/N5
RELAY					
Z4/ZD 03406	RL1			Three-coil, single-pole electro-magnetic	2007/R1, 2
FUSE					
Z1/ZA 3586	{ F1 F2		2.0A	{ Cartridge	2007/U6
METER					
Z4/ZD 03419	M1	-	30μA f.s.d. (Int res 3,250Ω)	Moving coil, 2½ in. scale, flush mounting	2007/K6
TRANSFORMERS					
	T1		0 - 230V) 0 - 5.8V)	Heater supplies	
	T2		0 - 117V) 0 - 105V/250V) 0 - 50V) 0 - 55V) 0 - 440V)	multi-tapped secondary Power supplies h.t. and g.b. Multi-tapped secondary	
SWITCHES					
Z1/ZA 37452	SA	-	250V 3A	Toggle, 2-pole, 2-way	2007/U8
	SB	-	-	Rotary, 1-pole, 18-position	
	SC	-	230V 3V	Toggle, 2-pole, 2-way	2007/T5
	SD	-	-	Rotary, wafer, 1-bank, 1-pole, 11-position	
	SE	-	-	Rotary, wafer, 1-bank, 1-pole, 11-position	
	SF	-	-	Rotary, wafer, 3-bank, 5-position	
Z4/ZD 03390	SG	-	-	Rotary, 3-bank, 3 x 2-pole, 8-position	
Z4/ZD 03391	SH	-	-	Rotary, wafer, composite	
	SJ	-	-	Assemblies, rotary, 9-unit, 1-pole, 10-position	
	SK	-	-	Single-pole, 5-way and screw-tapping (IK4)	2007/T4

Table 2005 (cont)

Part No	Circuit ref	Value	Tolerance and rating	Type	Location
VALVES					
Z/CV 140	V1	-	-	Valves electronic	2007/N1
Z/CV 140	V2	-	-	Valves electronic	2007/R5 2007/Q4
LAMPS					
Y3/X951225	ILP1		6.5V 2.36W	Lamps, fil., vac., M.E.S.C. clear	2007/R9
Z1/ZA 7846	ILP2		200V 15W	Pigmy, SBC, overload indicator	2007/T2

Table 2006 - Consolidated test equipment

Type of repair	Equipment
Unit Field	Instrument, testing, Avometer, universal, 50-range Mk 1 (WY 0760) (Instrument, testing, Avometer, universal, 50-range Mk 1 (WY 0760) (Voltmeter, valve, No 2, Mk I/I (WD 4188)

Table 2007 - Valve holders - all testers

Part No	Designation	T.V.A. No 1	T.V.A. No 3	T.V.A. CT 160
Z/Z 560049	Holder, valve, 3-pin, B3G, No 2	1	1	1
Z1/ZA 38910	Holder, valve, 4-pin, DA4(Sm 4), No 1	-	1	1
Z/Z 560020	Holder, valve, 4-pin, UX4, No 1	1	1	1
Z/Z 560013	Holder, valve, 5-pin, B5, No 3	1	1	1
Z1/ZA 38913	Holder, valve, 5-pin, DA5(Sm 5), No 1	-	1	1
Z/Z 560007	Holder, valve, 5-pin, UX5, No 2	1	1	1
Z1/ZA 40820	Holder, valve, 5-pin, B5A, No 1	1	-	-
Z/Z 560008	Holder, valve, 6-pin, UX6, No 1	1	1	1
Z/Z 560018	Holder, valve, 7-pin, B7, No 2	1	1	1
Z/Z 560009	Holder, valve, 7-pin, USM7, No 1	-	1	1
Z/Z 561120	Holder, valve, 7-pin, USS7 (UX7), No 1	1	1	1
Z1/ZA 41514	Holder, valve, 7-pin, B7G, No 12	1	1	1
Z1/ZA 38924	Holder, valve, 8-contact, SC8, No 1	-	1	1
Z1/ZA 41515	Holder, valve, 8-pin, B8A, No 1	1	1	1
Z1/ZA 38911	Holder, valve, 8-pin, B8G, No 1	1	1	1
Z/Z 560027	Holder, valve, 8-pin, IO, No 1	1	1	1
Z/Z 560031	Holder, valve, 8-pin, IO, No 2	1	1	1
Z1/ZA 38912	Holder, valve, 9-pin, B9, No 1	1	1	1
Z1/ZA 41513	Holder, valve, 9-pin, B9A, No 6	1	1	1
Z/Z 560101	Holder, valve, 9-pin, B9G, No 2	1	1	1
Z4/ZD 02328	Adaptor, valve base, B5B/B8D flying lead	1	-	-
Z4/ZD 03489	(Contacts, valve pin, ceramic, insulated,) 1.1/4 in.) (x 1/2 in. x 1/2 in. overall (To make up flying (lead and disc seal bases)	-	-	17

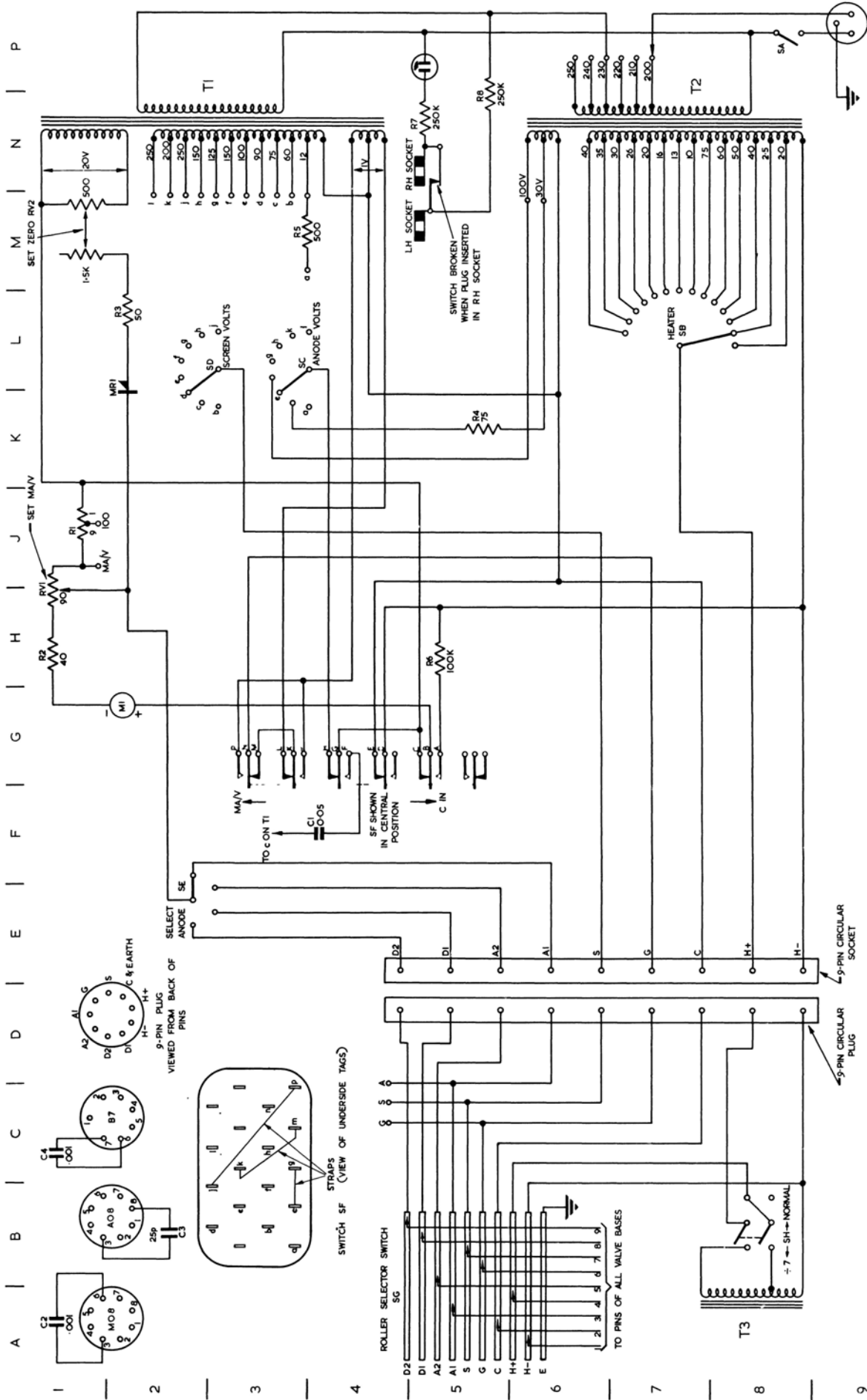


Fig 2001 - Circuit diagram T. V. A. No 1

Y. 812 P2
1-2001

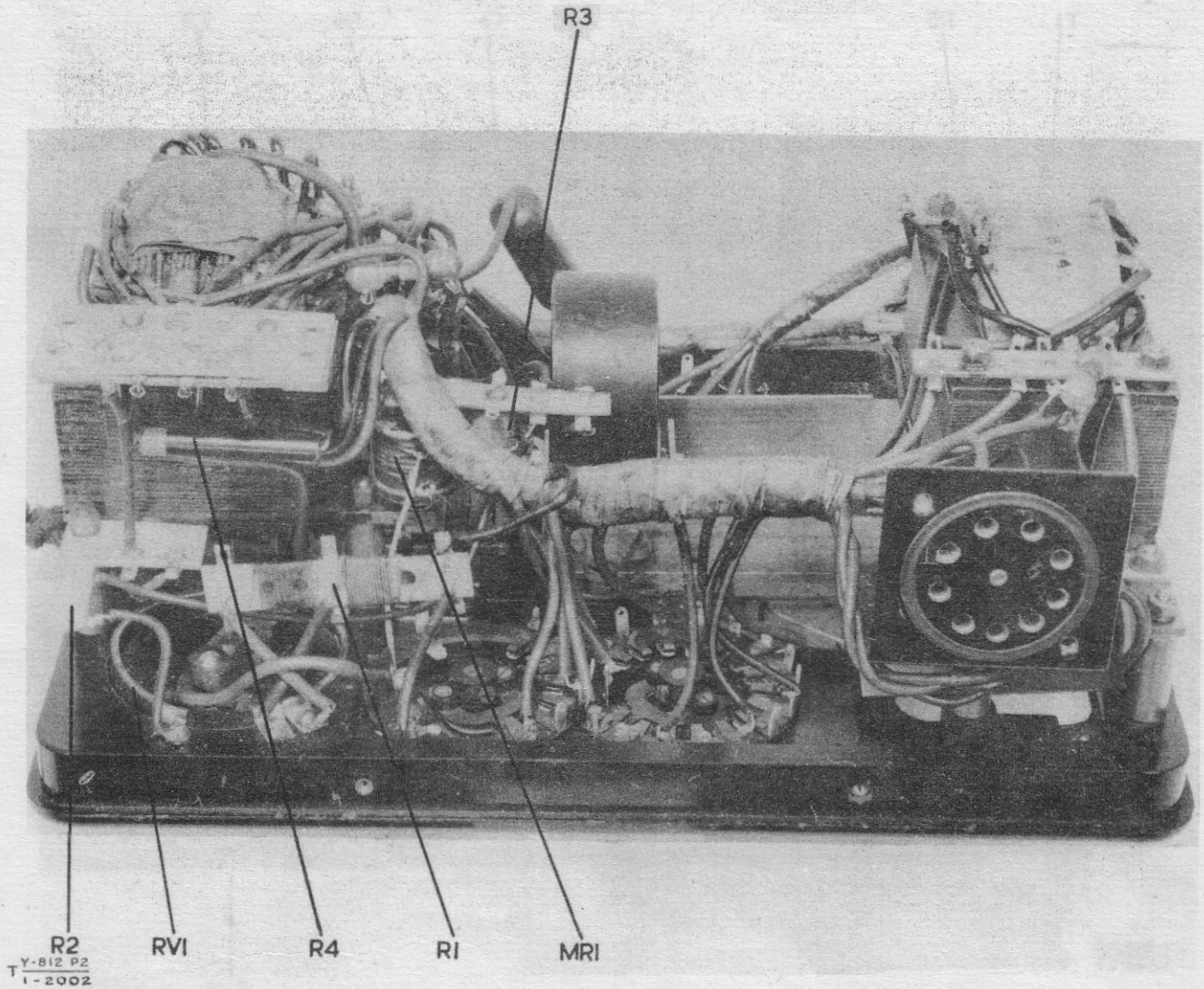
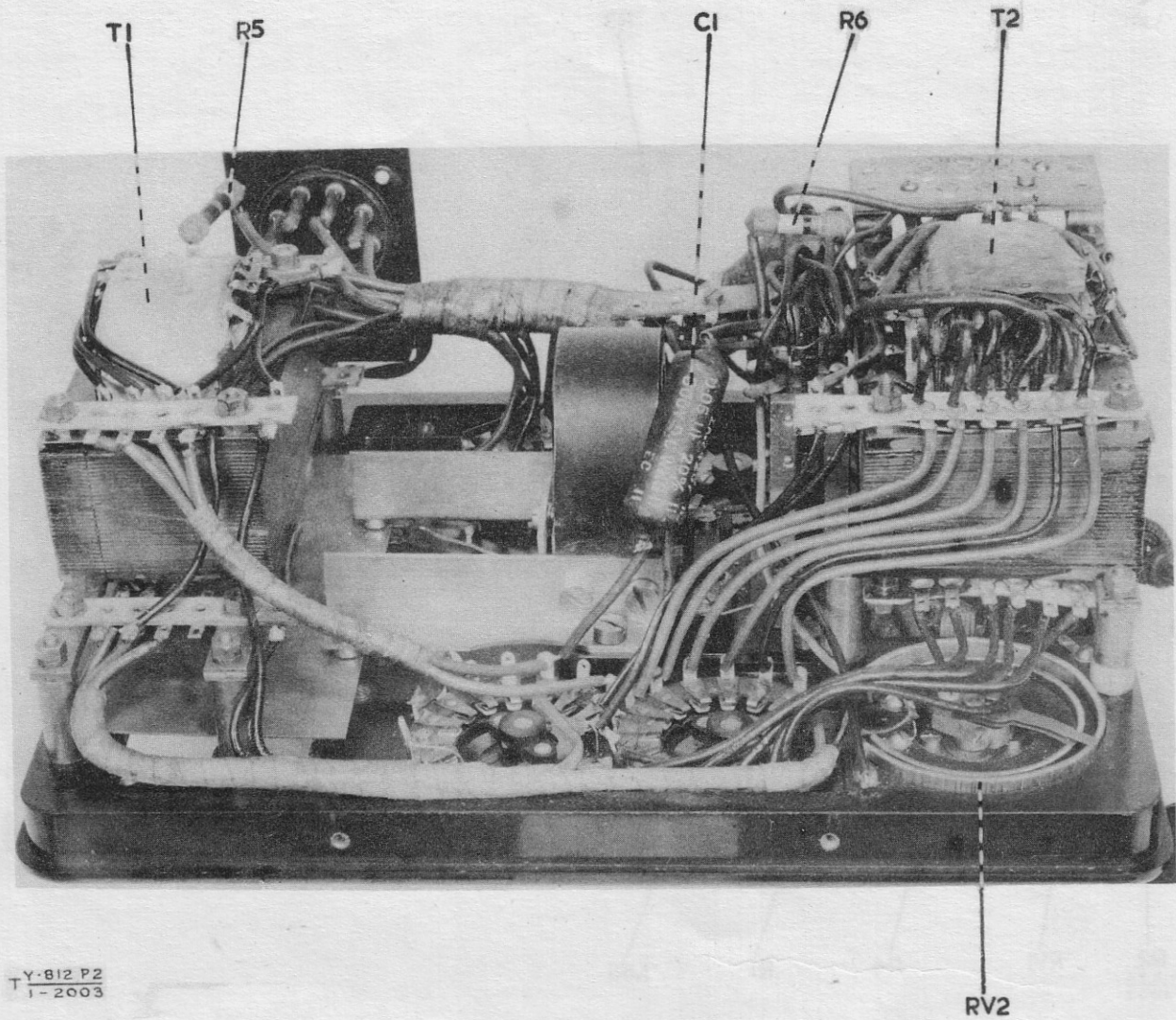
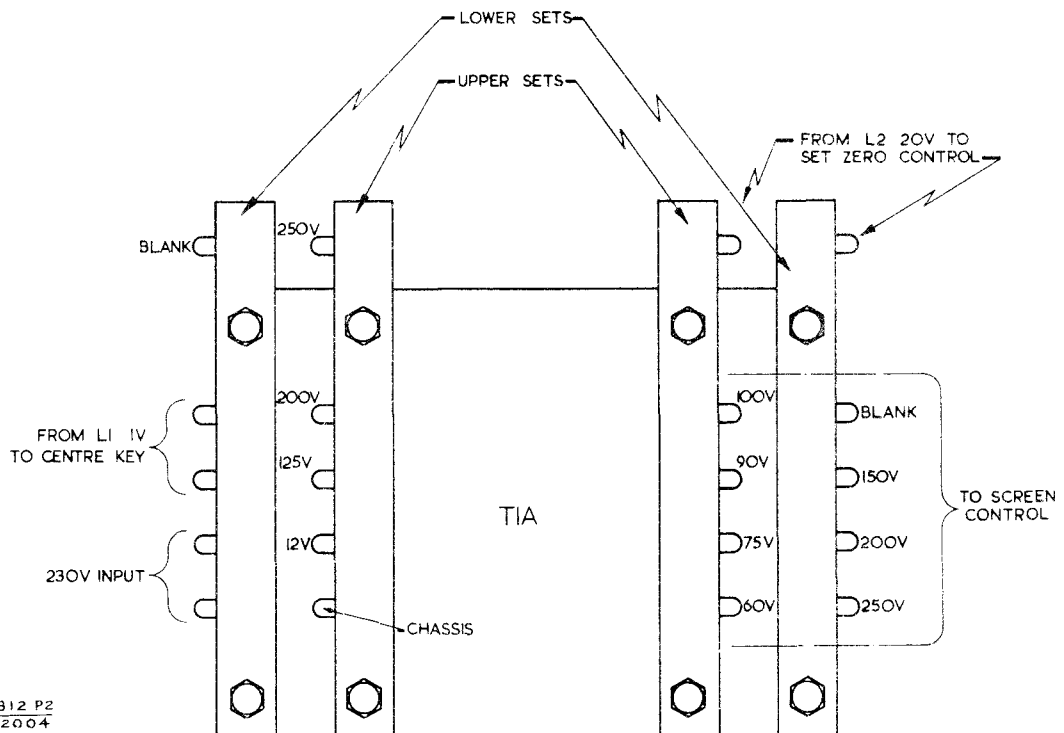
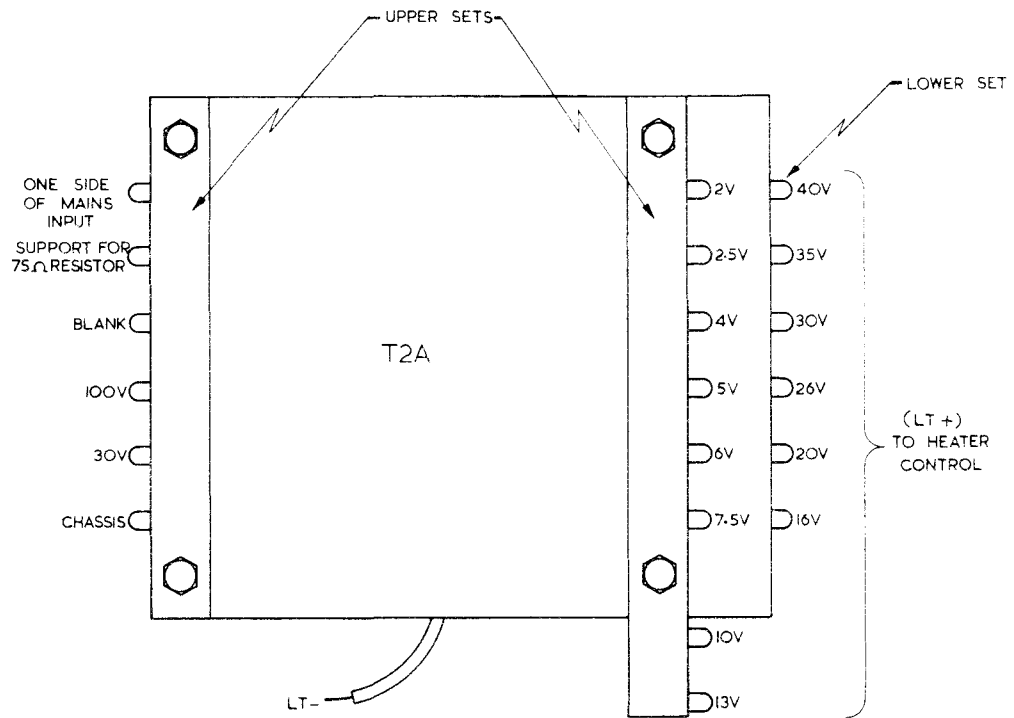


Fig 2002 - Underside view of main unit (r.h. view) T.V.A. No 1



Y-812 P2
1-2003

Fig 2003 - Underside view of main unit (l.h. view) T.V.A. No 1



Y-812 P2
I-2004

Fig 2004 - Diagrams of transformer tapings T.V.A. No 1

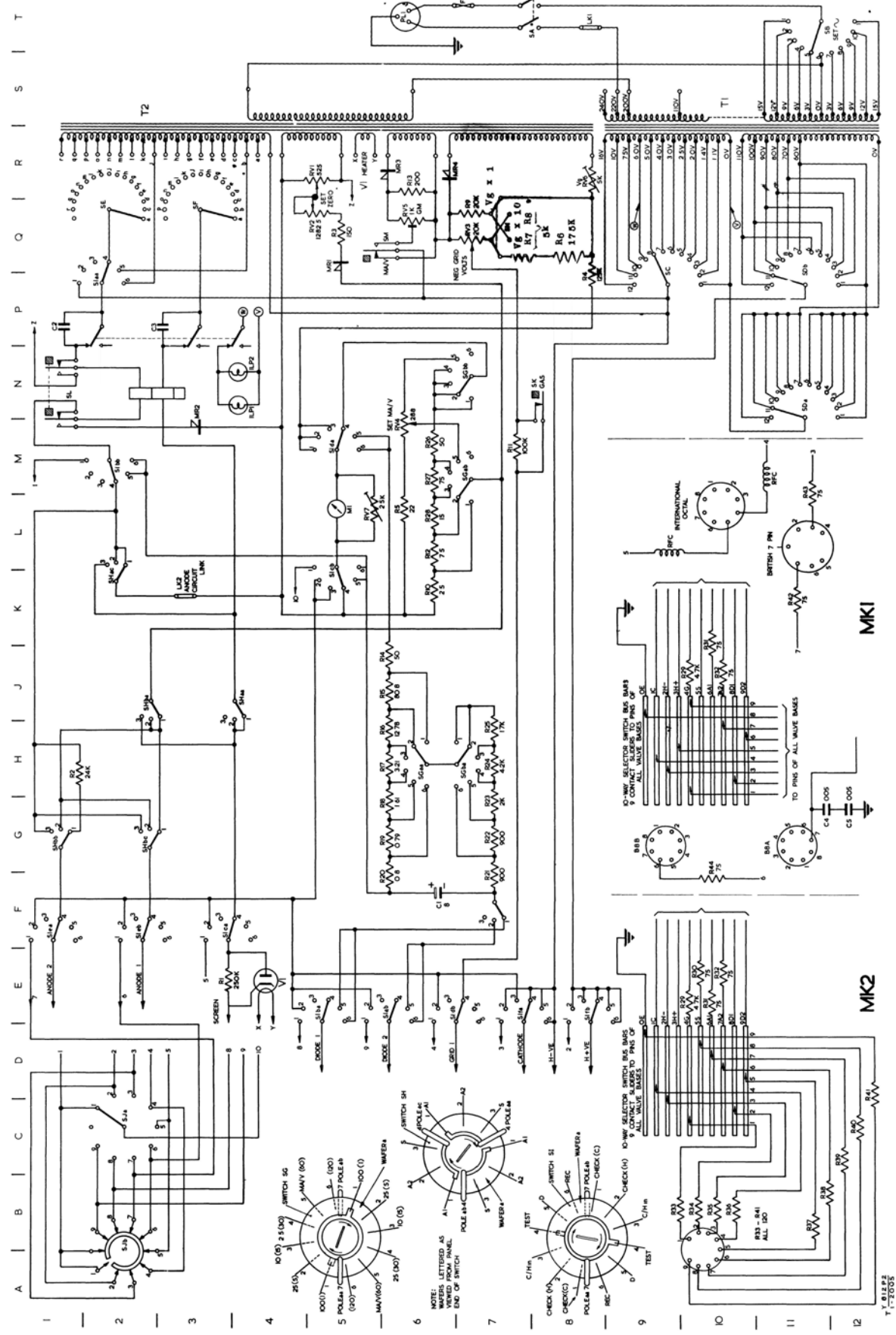
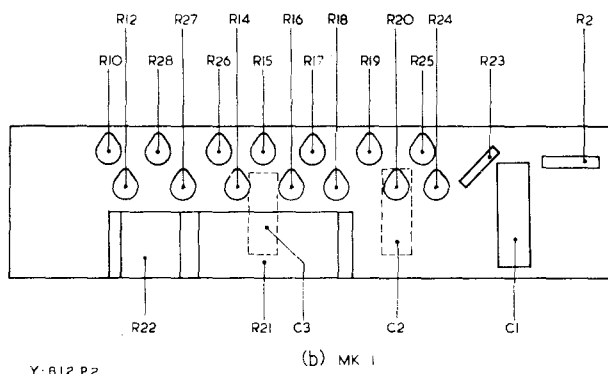
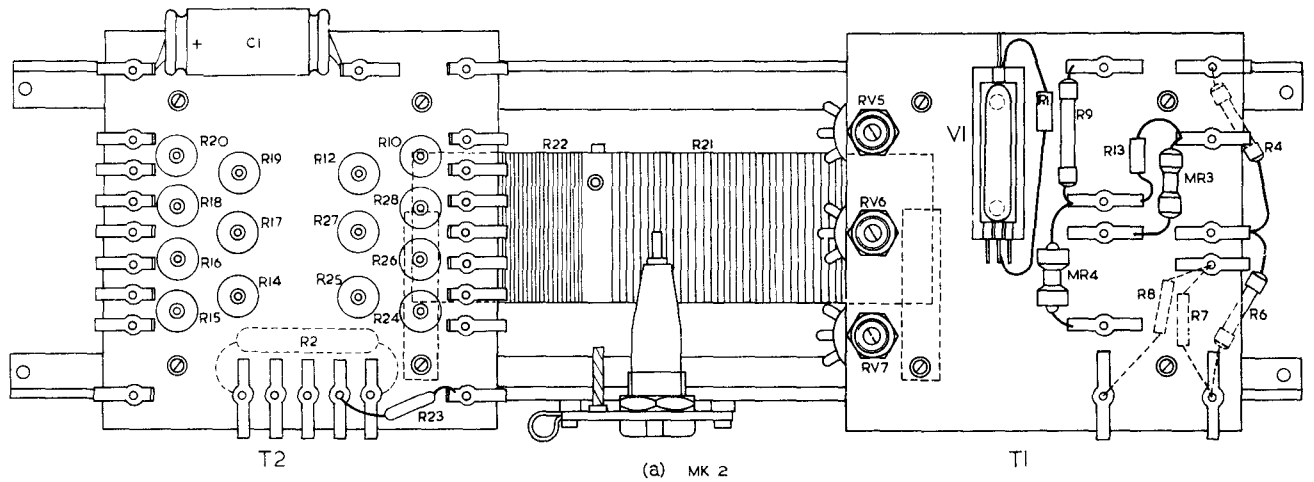


Fig 2005 - Circuit diagram T.V.A. No 3



Y: 812 P2
T: 2006

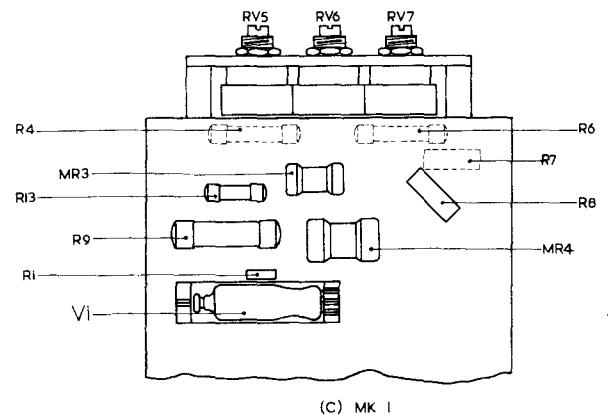


Fig 2006 - Transformer assemblies T.V.A. No 3

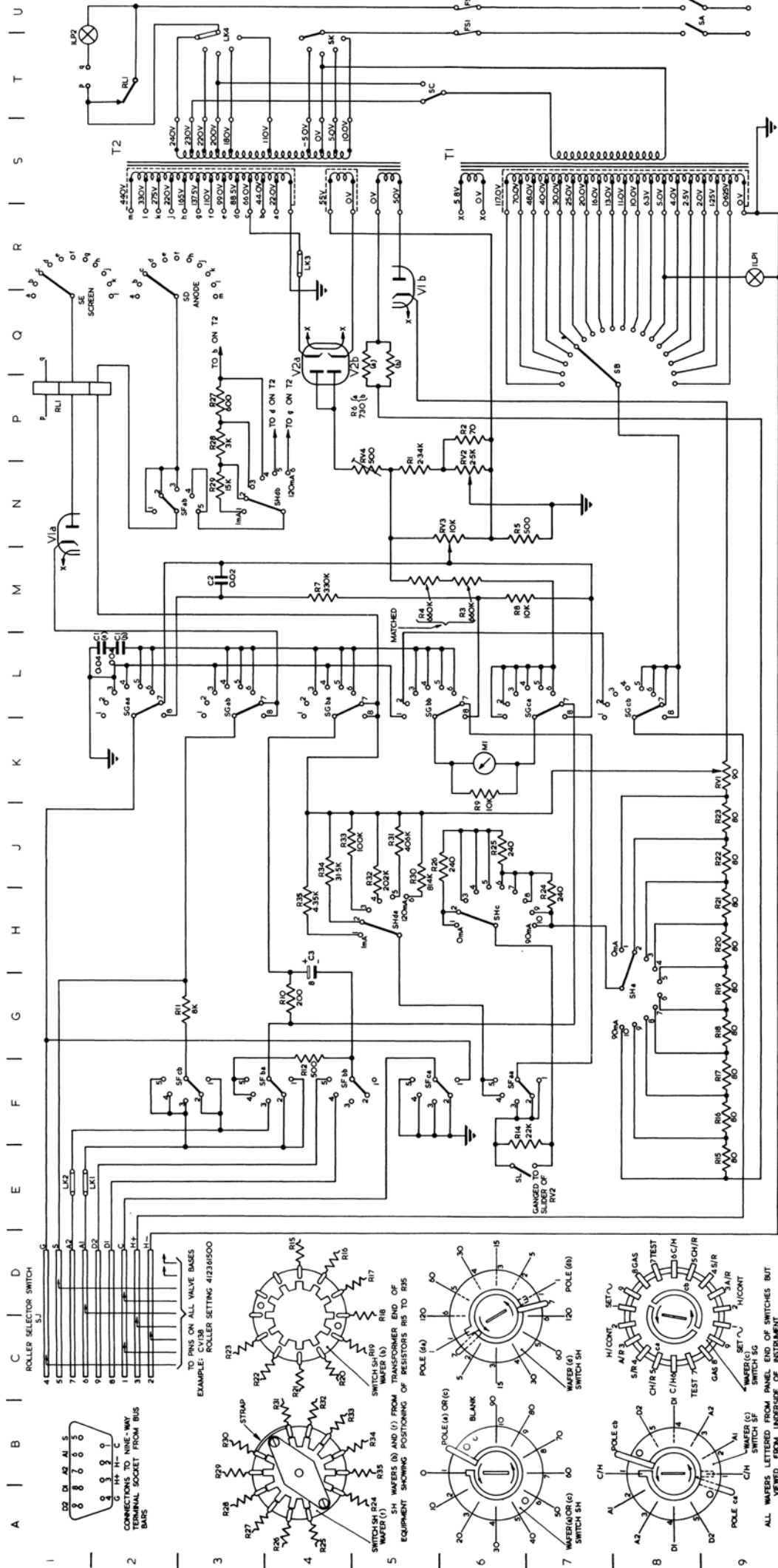
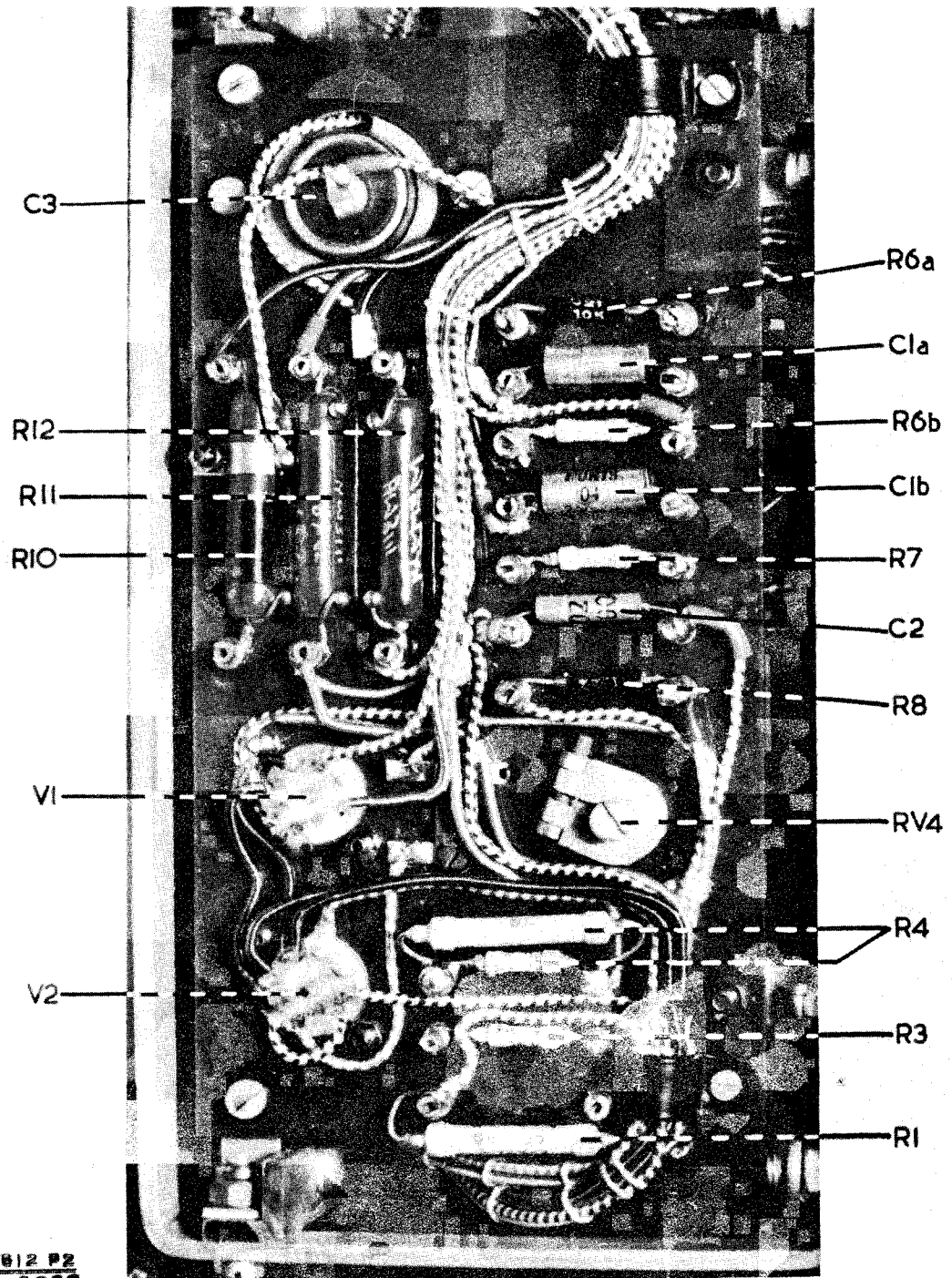
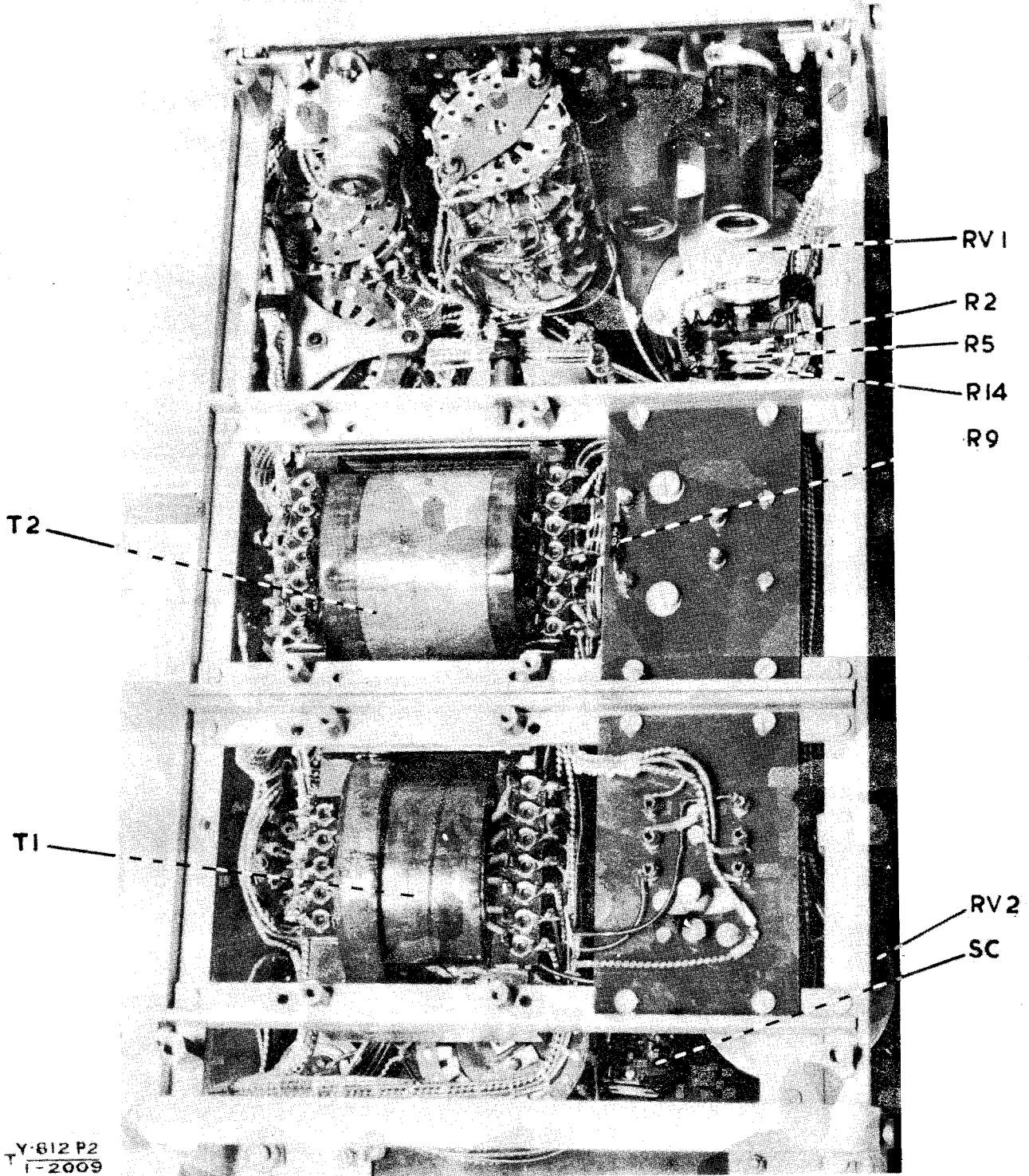


Fig 2007 - Circuit diagram T. V. A. CTF 160



T Y 812 P 2
1-2008

Fig 2008 - Component panel T.V.A. CT 160



Y-812 P2
T-2009

Fig 2009 - Underside of control unit T.V.A. CT 160