MICRONTA®

ServiceManual

22-121

ADJUSTABLE DUAL-TRACKING DC POWER SUPPLY

CAT. NO. 22-121

CUSTOM MANUFACTURED FOR RADIO SHACK, A DIVISION OF TANDY CORPORATION

CONTENTS

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them can not necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by a ⚠ in the schematic diagram and the parts list.

Before replacing any of these components, read the parts list in this manual carefully, the use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

SPECIFICATIONS

ITEMS	UNIT	NOMINAL	LIMIT
INPUT VOLTAGE	VAC	120	108~132
INPUT FREQUENCY	Hz	60	58~62
OUTPUT VOLTAGE	VDC	0~15	-0.2~19
RIPPLE (RMS) (EACH)	mV	0	0~3
MAXIMUM OUTPUT CURRENT	A	1	1.0~1.4
LINE REGULATION (EACH)	V	0	+-0.2
LOAD REGULATION (EACH)	V	0	+-0.2

PROTECTIONS:

CURRENT LIMIT FOR OUTPUT SHORT OR OVERLOAD FOR WITHIN 3 HRS

DIELECTRIC WITHSTAND TEST (HI-POT):

AC 1.5kV 10 mA 1 SEC (INPUT TO GROUND)

DIMENSIONS:

6-¾" x 6-11/16" x 4-½"
172(W) x 170(D) x 115(H) mm
Weight: 7.81 lbs (3.55 kgs)

NOTE: Nominal specs represent the design specs, all units should be able to approximate these-some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition which still might be considered acceptable; in no case should a unit perform to less than within any limit spec.

DISASSEMBLY INSTRUCTIONS

To Remove Top Cabinet:

(1) Turn power switch off and remove line cord from AC outlet.

(2) Remove the 10 screws (A) shown in Figure 1.

(3) Separate the top cabinet and bottom cabinet.

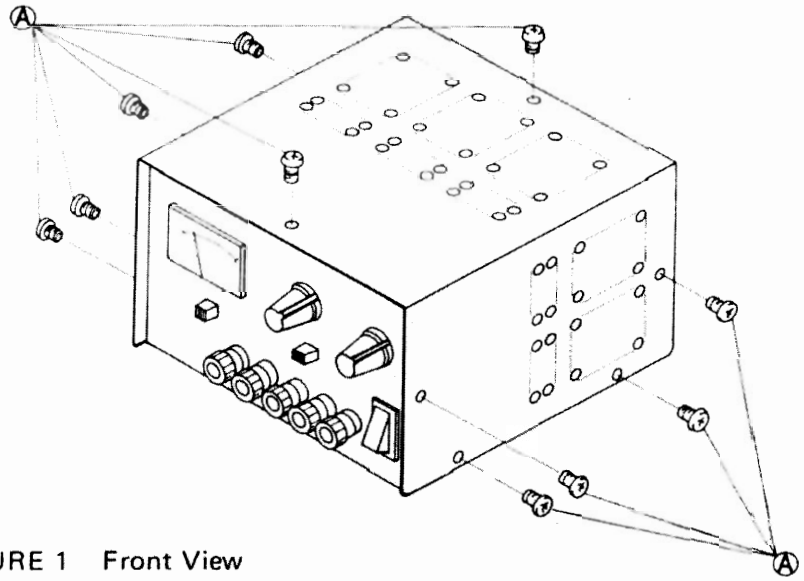


FIGURE 1 Front View

To Remove P.C.B.

(1) Remove the Four Screws (B) in Figure 2.

(2) Remove P.C.B.

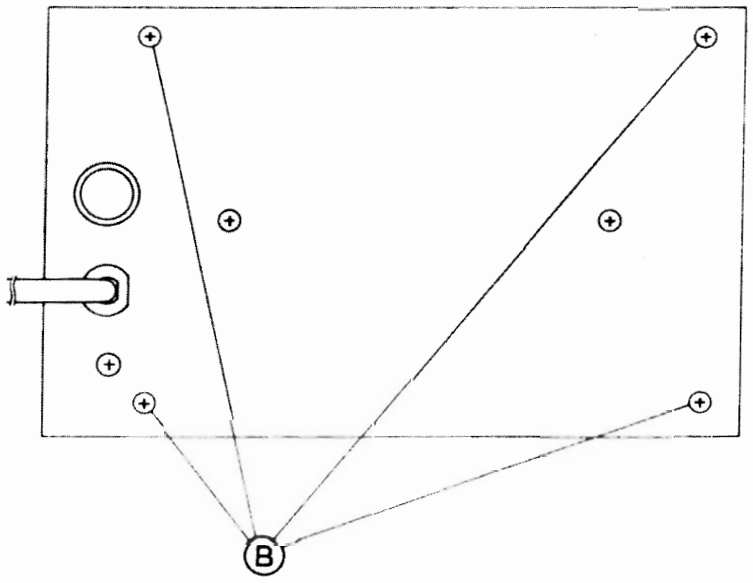
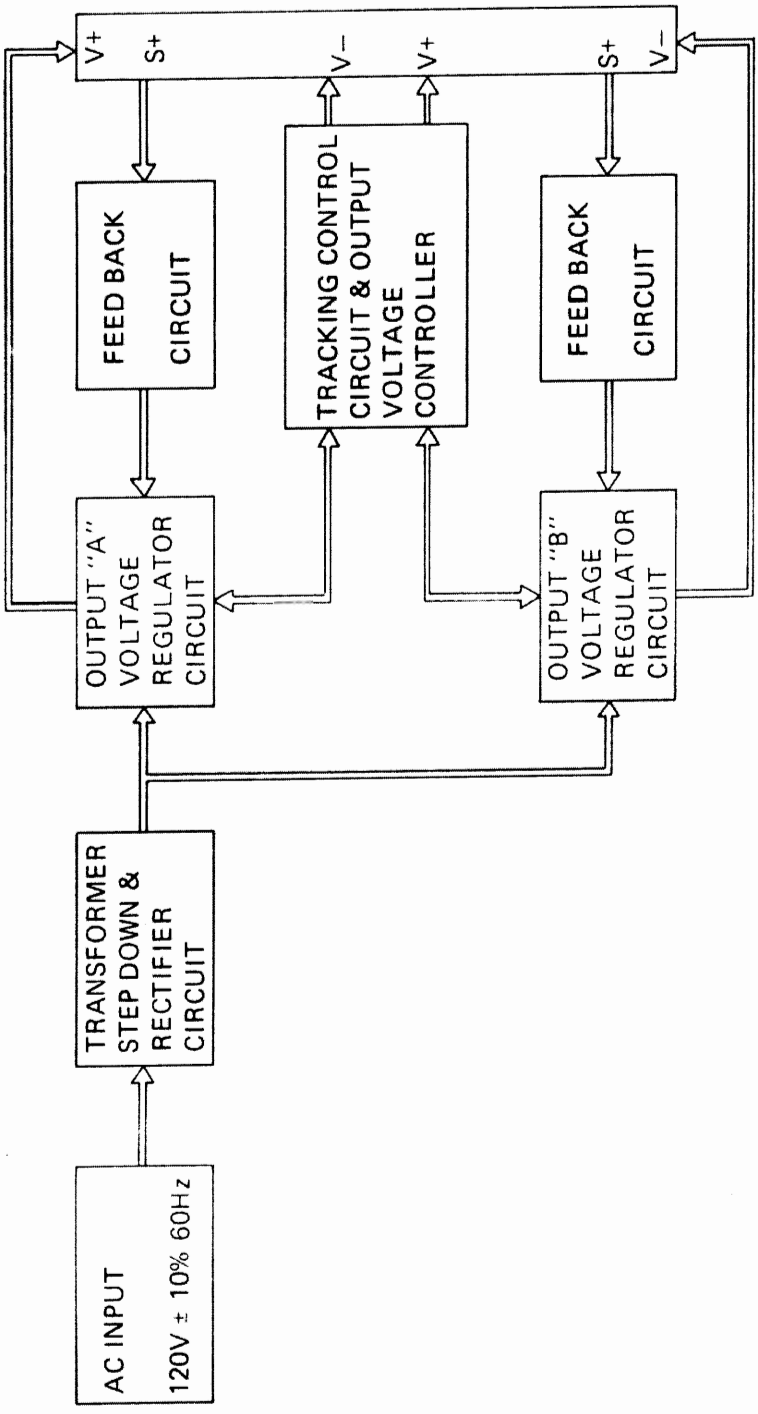
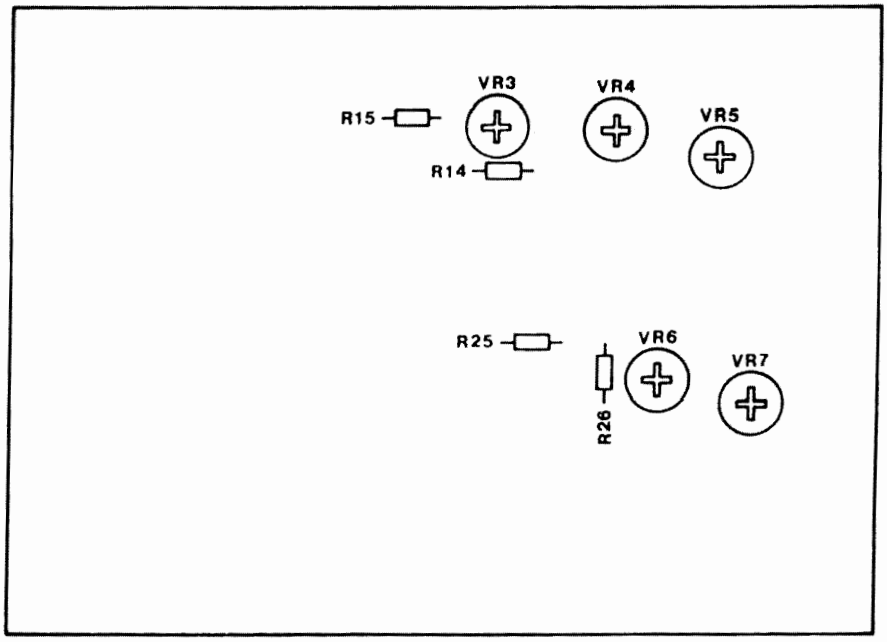


FIGURE 2 Back View

BLOCK DIAGRAM



ALIGNMENT INSTRUCTIONS



TRACKING ALIGNMENT

Switch Position: a) MODE Switch at B TRACKS A, b) Voltage control at maximum

STEP	CONNECT VOLTMETER TO	ADJUST	ADJUST FOR
1	A output terminals and B output terminals	VR3	B output voltage same as A

METER ALIGNMENT

Switch Position: a) MODE Switch at INDEPENDENT. b) Voltage adjust to 15VDC

STEP	CONNECT VOLTMETER TO	SET METERING SWITCH TO	CONNECT AMPEREMETER AND 15 OHMS LOAD TO	ADJUST	ADJUST FOR
1	A output terminals	A VOLTS		VR5	METER indicated same as VOLTMETER
2	A output terminals	A AMPS	A output terminals	VR4	METER indicated same as AMPEREMETER
3	B output terminals	B VOLTS		VR7	METER indicated same as VOLTMETER
4	B output terminals	B AMPS	B output terminals	VR6	METER indicated same as AMPEREMETER

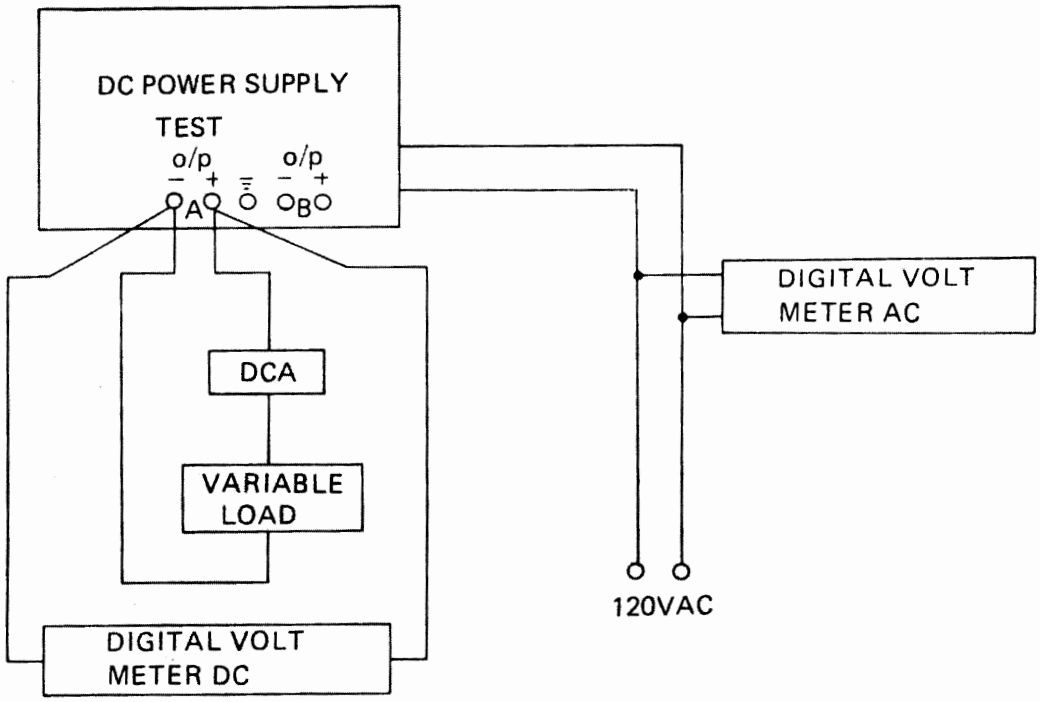
PERFORMANCE CHECKS

Use test connection diagram illustrated below for performance checks.

Check the output voltage ranges of the power supply with a digital voltmeter at the rated load (1 Amp) with a 120 VAC, 60Hz input. Range should be within the following output voltages:

Output Voltage Range
0+0.2/−0.2 volts to 15 +4/−0 volts

TEST CONNECTION DIAGRAM



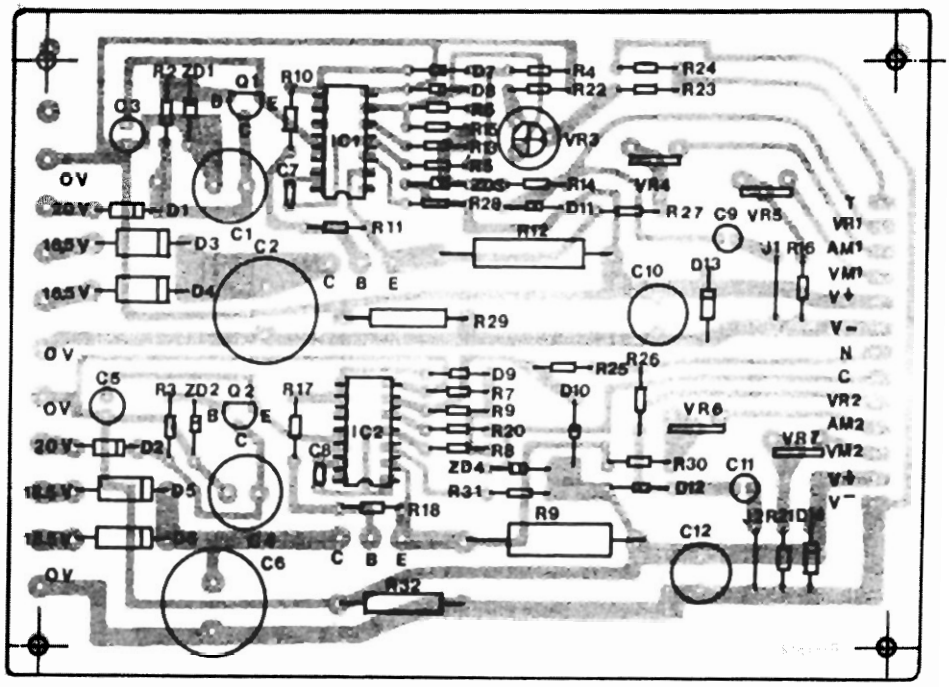
NOTES: This configuration applies to check performance on A-output Terminals
To check performance on B output, connect oscilloscope and DC Voltage Meter to B-output Terminals.

TROUBLESHOOTING GUIDE

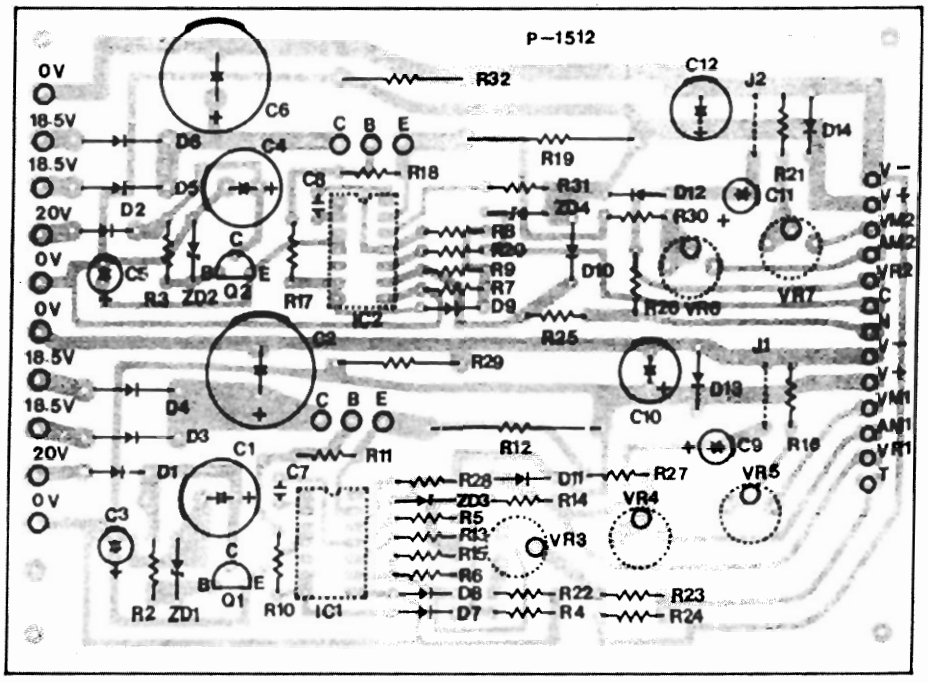
Symptom	Cause	Remedy
PILOT LAMP DEAD	No AC Input/Defective Power Switch	Check AC input connection or replace the POWER switch
	Fuse is blown	Check the fuse and replace
NO DC OUTPUT	Voltage Control component(s) D1 D3, D4, ZD1, Q1, Q3, D8, D13, VR1 or D2, D5, D6, ZD2, D10, D14, and VR2 are defective	Check and replace
DC OUTPUT VOLTAGE IS NOT STABLE	Voltage Control component(s) Q3, IC1, Q1 or Q4, Q2, IC2 are defective	Check and replace
	Capacitors C10, C3, C2 or C12, C5, C6 are open or leaky	Check and replace
DC OUTPUT VOLTAGE IS TOO LOW	Voltage Control component(s) Q1, ZD1, D8, IC1 or Q2, ZD2, D10, IC2 are defective	Check and replace
	Capacitors C9 and C11 leak AC input voltage is too low	Check and replace
OUTPUT CURRENT IS TOO LOW	Resistors R12 and R13 burn out due to overload	Replace the resisters
	Transistors Q3, Q4 or Integrated Circuits IC1 and IC2 damaged	Check and replace
EXCESSIVE RIPPLE	AC input voltage is too low Capacitors C2, C10, C6 and C12 are open or leaky	Check and replace
OUTPUT VOLTAGE IS TOO HIGH	Transistors Q3 and Q4 or Integrated Circuits IC1 and IC2 are damaged	Check and replace
	Voltage Control VR1 and VR2 or lead wire are open.	See if open or broken

PRINTED CIRCUIT BOARD

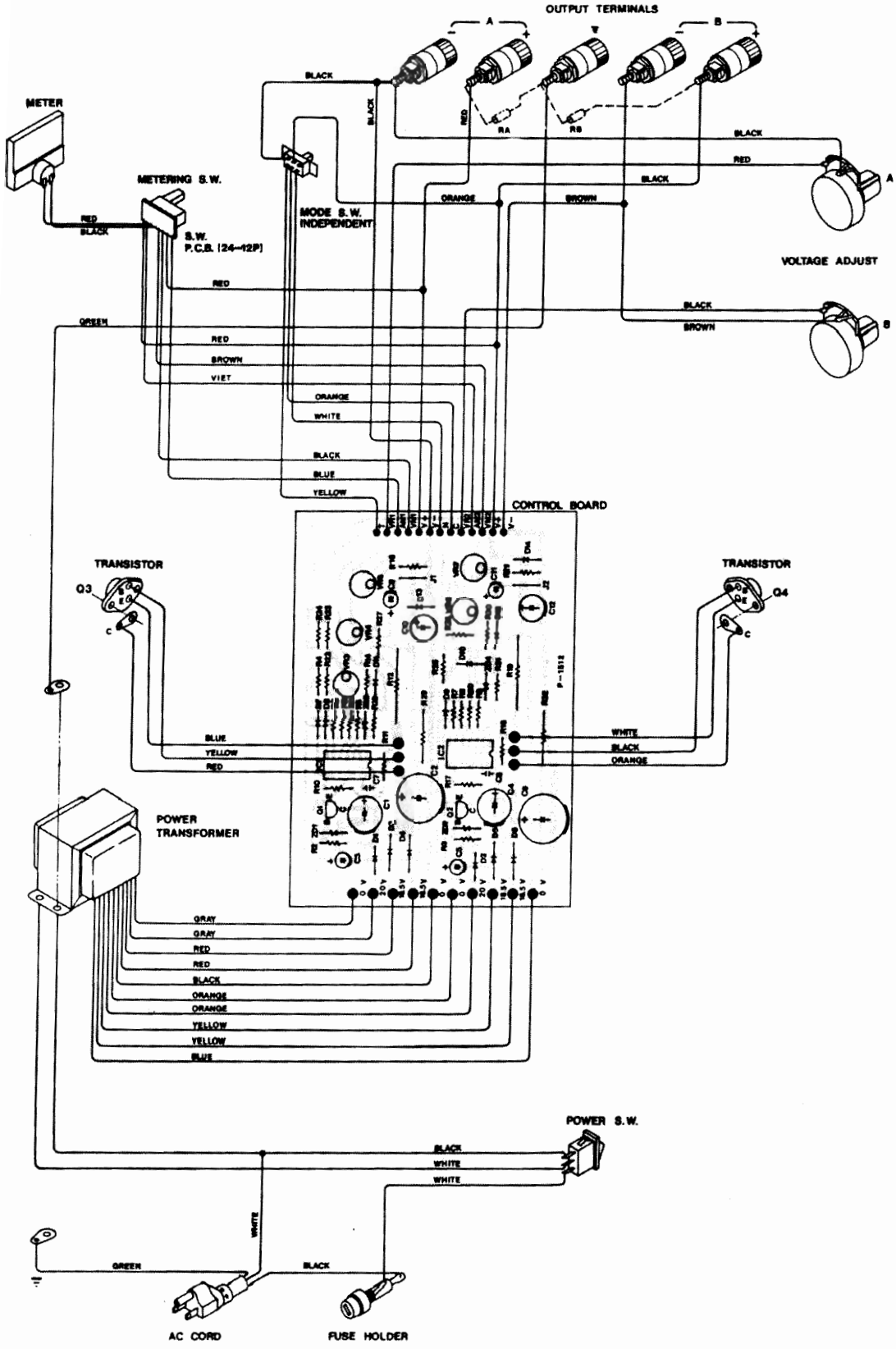
TOP VIEW



BOTTOM VIEW



WIRING DIAGRAM



ELECTRICAL PARTS LIST

PRODUCT SAFETY NOTE: Products marked with a ⚠ have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice of the Service Manual. Don't degrade the safety of the product through improper servicing.

	RS LOCATION	DESCRIPTION	REF. NO.	MFR. PART NO.
	KB-1230	**PCB ASSY, MAIN (Includes following)**		22121/I
		CAPACITORS		
⚠	CC477WGAP	ELECTROLYTIC +50%–10% 470μF 35V	C1	112W1G-0471
⚠	CC228KGAP	ELECTROLYTIC +50%–10% 2200μF 35V	C2	112W1G-0222
⚠	CC226WJAP	ELECTROLYTIC +50%–10% 22μF 50V	C3	112W1H-0220
⚠	CC477WGAP	ELECTROLYTIC +50%–10% 470μF 35V	C4	112W1G-0471
⚠	CC226WJAP	ELECTROLYTIC +50%–10% 22μF 50V	C5	112W1H-0220
⚠	CC228KGAP	ELECTROLYTIC +50%–10% 2200μF 35V	C6	112W1G-0222
	C0102KJOP	POLYESTER ± 10% 0.001μF 50V	C7, C8	141K1H-0102
	CC106WFAP	ELECTROLYTIC +50%–10% 10μF 25V	C9	112W1E-0100
	CC227WFAP	ELECTROLYTIC +50%–10% 220μF 25V	C10	112W1E-0221
	CC106WFAP	ELECTROLYTIC +50%–10% 10μF 25V	C11	112W1E-0100
	CC227WJAP	ELECTROLYTIC +50%–10% 220μF 25V	C12	112W1E-0221
		DIODES		
	DX-0206	RECTIFIER DIODE IN4002	D1, D2	21001-002
	DX-2537	RECTIFIER DIODE 1N5401	D3-D6	21001-009
	DX-0022	RECTIFIER DIODE 1N4148	D7-D12	21001-023
	DX-2061	RECTIFIER DIODE IN4002	D13, D14	21001-002
	DX-2552	ZENER DIODE ½W 14.5V	ZD1, ZD2	21401-007
	DX-0604	ZENER DIODE ½W 6.2V	ZD3, ZD4	21401-024
		I.C.'S		
	MX-7053	μA 723 Regulator	IC1, IC2	22300-006
		POTENTIOMETERS		
	P-6140	V.R. Semi Fixed 2K TRACKING	VR3	25436-005
	P-6145	V.R. Semi Fixed 5K Meter Current	VR4	25411-004
	P-6146	V.R. Semi Fixed 100K Meter Voltage	VR5	25411-008
	P-6145	V.R. Semi Fixed 5K Meter Current	VR6	25411-004
	P-6144	V.R. Semi Fixed 100K Meter Voltage	VR7	25411-008
		PRINT CIRCUIT BOARD		
	NST	P-1512 Blank		29101-137

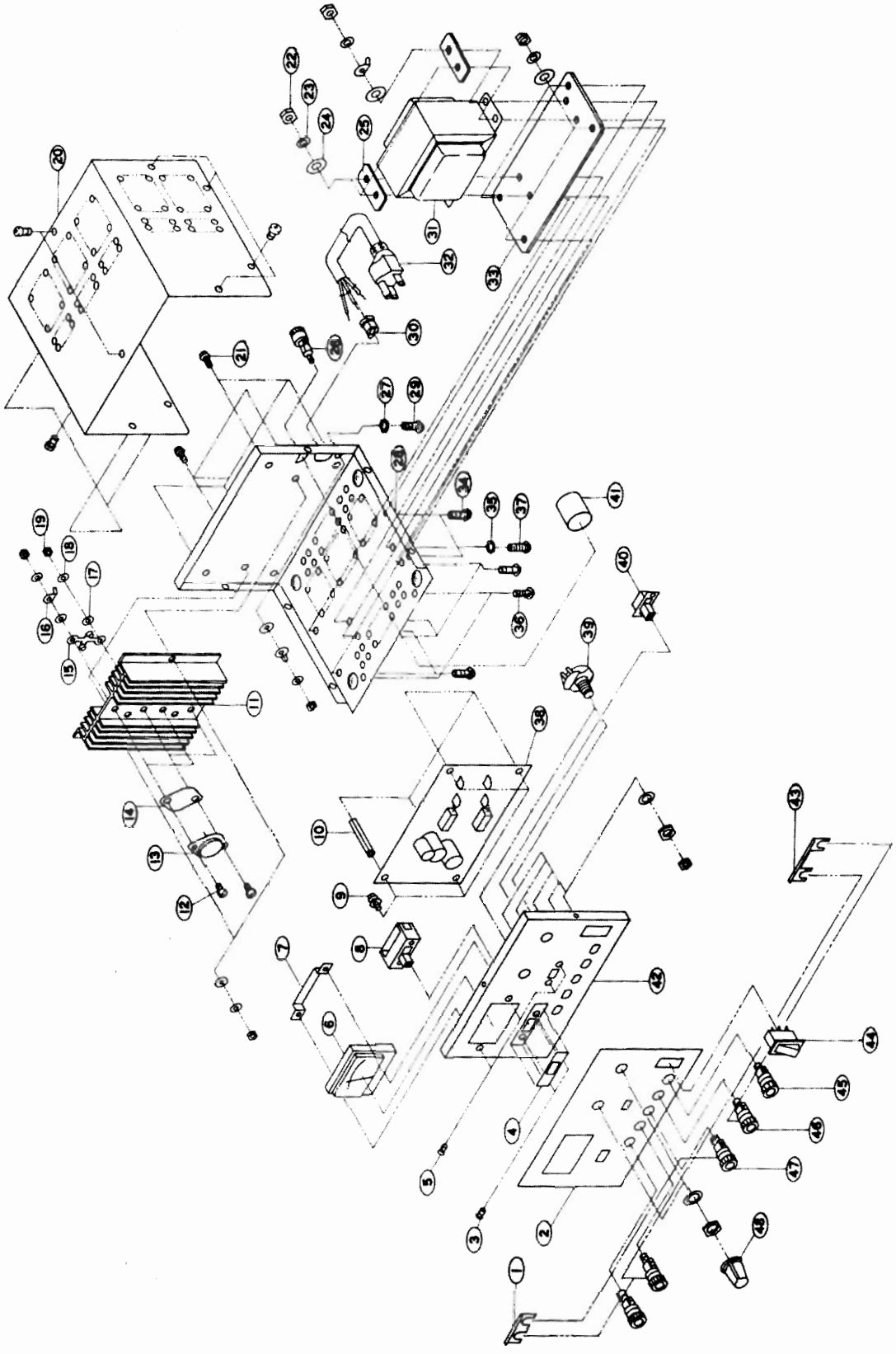
Main PCB Assy to be continued at next page

	RS LOCATION	DESCRIPTION	REF. NO.	MFR. PART NO.
		RESISTORS (ALL CARBON FILM, ¼W, +/–5%, UNLESS NOTED OTHERWISE)		
		Not used	R1	
	N0183EEC	680ohm	R2, R3	171J41-0681
	N0230EEC	3.3K	R4-R9	171J41-0332
	N0132EEC	100ohm	R10	171J41-0101
	N0183EEC	680ohm	R11	171J41-0681
	N0010FJF	CEMENT 3W +/–10% 0.5ohm	R12	172K03-0508
	N0230EEC	3.3K	R13	171J41-0332
	N0243EEC	4.3K	R14, R15	171J41-0432
	N0345EEC	56K	R16	171J41-0563
	N0132EEC	100ohm	R17	171J41-0101
	N0183EEC	680ohm	R18	171J41-0681
	N0010FJF	CEMENT 3W +/–10% 0.5ohm	R19	172K03-0508
	N0330EEC	3.3K	R20	171J41-0332
	N0345EEC	56K	R21	171J41-0563
	N0306EEC	20K	R22	171J41-0203
	N0599BEE	PRECISION +/–1% 30.1K	R23, R24	170F41-3012
	N0243EEC	4.3K	R25, R26	171J41-0432
	N0196EEC	1K	R27	171J41-0102
	N0132EEC	100ohm	R28	171J41-0101
	N0206FHE	METAL FILM 2W +/–10% 1.5K	R29	173J02-0152
	N0196EEC	1K	R30	171J41-0102
	N0132EEC	100ohm	R31	171J41-0101
	N0206FHE	METAL FILM 2W +/–10% 1.5K	R32	173J02-0152
		TRANSISTORS		
	2SD-468	2SD468 Regulator	Q1, Q2	20151-035
		END OF MAIN PCB ASSY		
		MISCELLANEOUS		
	W-2412	Cable, AC Power	29	36160-010
△	HF-1001	Fuse 1A250V 3SB UL L31.75mm		28151-030
△	F-1018	Holder Fuse 10A (AROUND) AC 250V		76105-007
	M-0004	Meter	7	27350Q400003
	P-7882	Potentiometer 20K B Voltage Adjust	VR1, VR2	25421-032
		Switches		
△	S-3467	Switch Power With Lamp Rocker Switch UL		24130-010
	S-3468	Switch METERING, With PCB		24120-017 29101-139
	S-3469	Switch MODE (INDEPENDENT, B, TRACKS A)		24120-007
	T-5838	Terminal ASSY Output Red		76110-225
	J-5839	Terminal ASSY Output Black		76110-226
	J-5840	Terminal ASSY Output Green		76110-227
	TA-0080	Transformer, Power UL		26120-394
	2N3055	Transistors 2N3055		20151-001

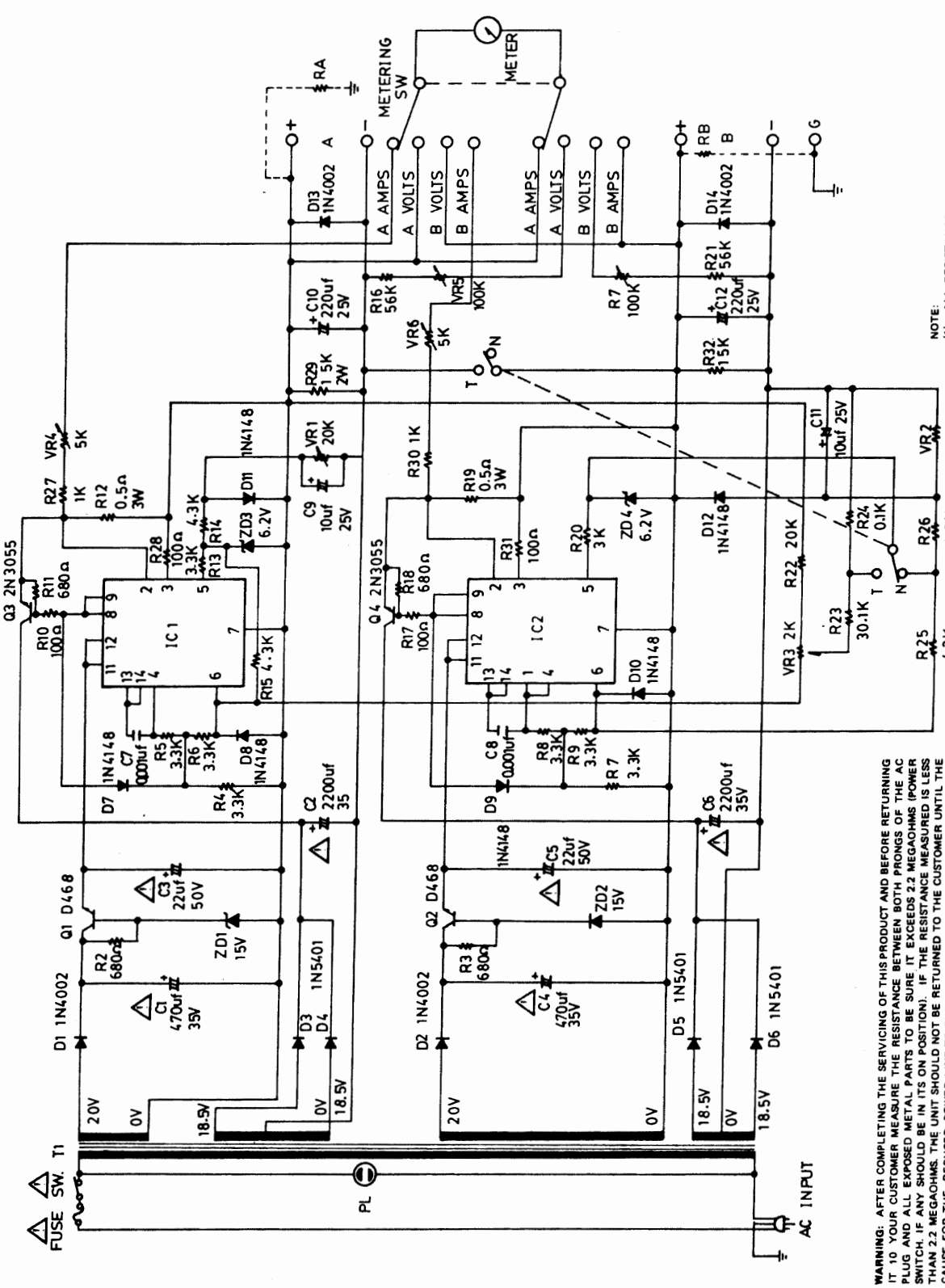
MECHANICAL PARTS LIST

	RS LOCATION	DESCRIPTION	REF. NO.	MFR. PART NO.
		Plate, Short Circuit Terminal	1	62110-020
	HC-1958	Overlay, Front Panel	2	67405-006
	HD-1829	Screw M2.6x4.5 NIKL for Metering Switch	3	56003
	NS	Himelon 35mmx10mm Metering Switch	4	55254-005
△	NS	Screw M3x8 ISO NIKL Meter	5	56002
△	M-0004	Meter	6	27350Q400003
△	HC-4051	Plate, Mounting Meter	7	62110-122
△	S-3468	Switch, Metering with P.C.B.	8	24120-017
△	HD-1830	Screw 3x8 P.C.B.	9	561E0430082
△	IN HDWR KIT	Pillar Hexagon Mounting P.C.B.	10	62110-118
△	NS	Heat Sink FA-0209	11	63201-009
	HD-1832	Screw 3x12 ISO Black Transistor	12	561E0330122
	2N3055	Transistor 2N3055	13	20151-001
	NS	Mica Sheet T0-3	14	37101-001
		Pad Insulation FH-0319 Heat Sink	15	37111-004
	NS	Lug Solder 4mm Heat Sink	16	60101-004
	NS	Washer, Flat 3mm Heat Sink	17	58111-003
	RB-9253	Washer, Spring 3mm Heat Sink	18	58113-003
	NS	Nut 3mm Heat Sink	19	57110-003
	NS	Cabinet Top Metal Black	20	63029-127
		Screw 3x8 ISO Black Mounting P.C.B.	21	561E0330082
	NS	Nut 4mm Transformer	22	57111-004
	HD-9254	Washer, Spring 4mm Transformer	23	58113-004
	NS	Washer, Flat 4mm Transformer	24	58111-004
		Bracket, Transformer	25	63029-168
	HF-1018	Holder, Fuse, AC250V 10A	26	76105-007
	HD-8617	Washer Gear Type 4mm	27	58114-004
	NS	Cabinet Bottom Metal Black	28	63029-128
		Screw 4x10 ISO Black Ground	29	561A0340102
	NS	Bushing, AC Cord, SR-5N-4	30	76101-011
	TA-0080	Transformer, Power UL	31	26120-394
	W-2412	Cable, AC Power	32	36160-010
		Bracket, Transformer	33	63029-153
		Screw 3x12 ISO NIKL Bracket	34	561A0430122
	HD-8617	Washer Gear Type 4mm	35	58114-004
		Screw 3x6 Tap Black Mounting Cabinet	36	562A5330062
	HD-1833	Screw 4x15 ISO NIKL Power Transformer	37	561A0440152
	KB-1230	P.C.B. ASS'Y MAIN	38	22121/I
	P-7882	Potentiometer 20K B Voltage Adjust	39	25421-032
	S-3469	Switch MODE INDEPENDENT B TRACKS A	40	24120-008
		Tubing Shring 3/4" L: 45mm for Fuse Holder	41	37409-034
	NS	Cabinet Front Metal Black	42	63029-138
		Plate Short Circuit Terminal	43	62110-124
	S-3467	Power Switch with lamp, UL	44	24130-018
	J-5839	Terminal ASS'Y Output Black	45	76110-226
	J-5838	Terminal ASS'Y Output Red	46	76110-225
	J-5840	Terminal ASS'Y Output Green	47	76110-227
	KS-0689	Knob, Voltage Adjust	48	76120-023

EXPLODED VIEW (MECHANICAL PARTS)



SCHEMATIC DIAGRAM



WARNING: AFTER COMPLETING THE SERVICING OF THIS PRODUCT AND BEFORE RETURNING IT TO YOUR CUSTOMER MEASURE THE RESISTANCE BETWEEN BOTH PRONGS OF THE AC PLUG AND ALL EXPOSED METAL PARTS TO BE SURE IT EXCEEDS 2.2 MEGAOHMS (POWER SWITCH: IF ANY SHOULD BE IN ITS ON POSITION). IF THE RESISTANCE MEASURED IS LESS THAN 2.2 MEGAOHMS, THE UNIT SHOULD NOT BE RETURNED TO THE CUSTOMER UNTIL THE CAUSE FOR THE REDUCED POWER LINE TO EXPOSED METAL PARTS RESISTANCE HAS BEEN CORRECTED AND THE UNIT PASSES THE AROVE TEST.

⚠ THIS MARK INDICATES THAT THE ADJACENT COMPONENT IS CONSIDERED CRITICAL WITH RESPECT TO THE RISKS OF FIRE AND ELECTRICAL SHOCK ASSOCIATED WITH THIS PRODUCT. WHEN REPLACING ANY OF THESE COMPONENTS, USE ONLY PARTS INDICATED ON THE PARTS LIST ATTACHED.

NOTE:
(1) ALL RESISTANCE VALUES ARE INDICATED IN "OHM" (K=10^3 OHM M = 10^6 OHM)
(2) ALL CAPACITANCE VALUES ARE INDICATED IN "μF" (P = 10^{-6} μF)
(3) RA & RB ARE 3.3M OHMS 1/2W REQUIRED ON MODELS INTENDED FOR USE IN EUROPE, UNITED KINGDOM AND AUSTRALIA

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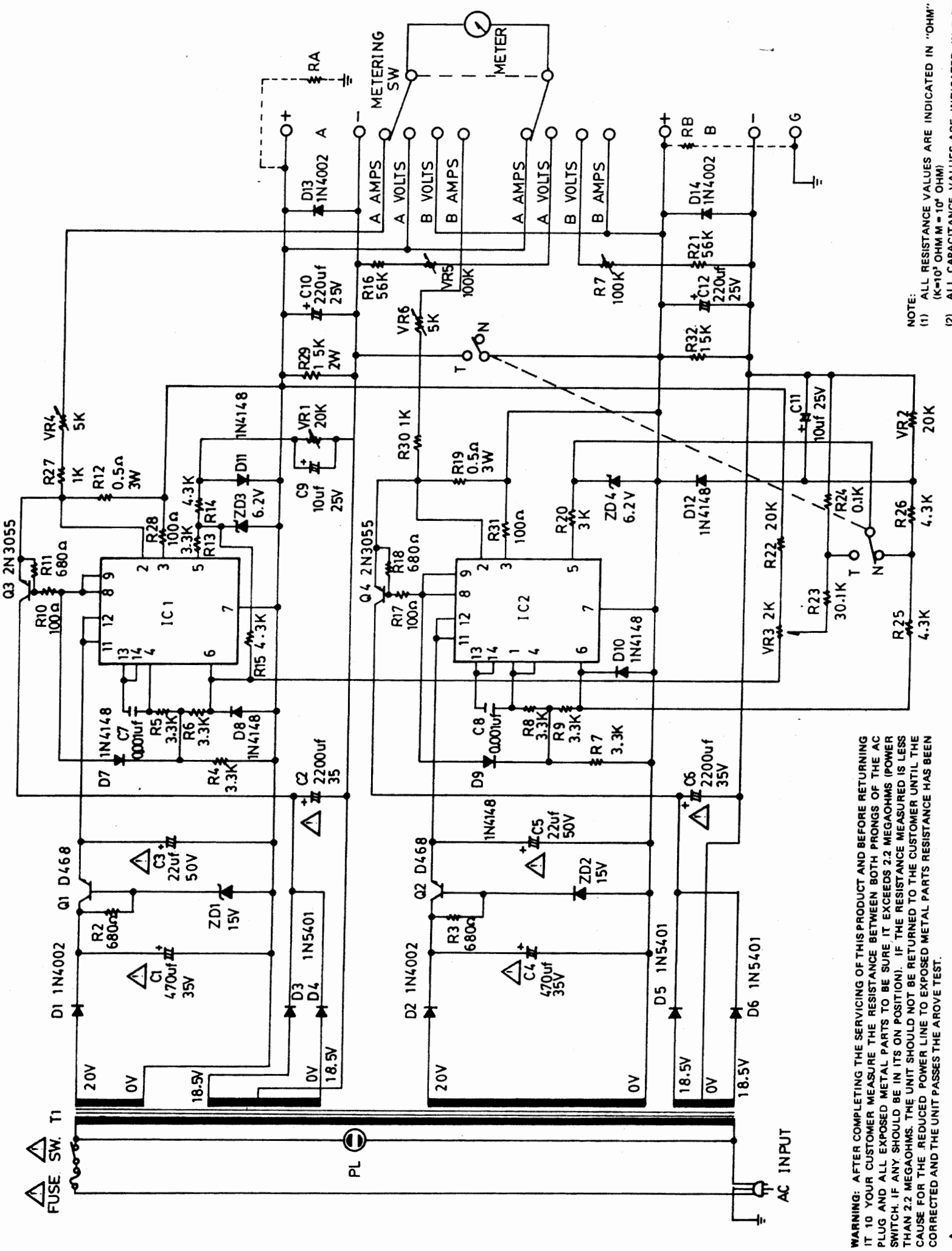

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