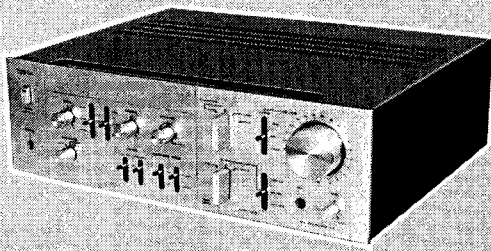


TOSHIBA

STEREO AMPLIFIER

SB-420



SPECIFICATIONS

■ Main-Amplifier

Continuous Output: 20 Hz ~ 20 kHz (8Ω) 42W + 42W
(Both Channel Driven) (4Ω) 50W + 50W
1 kHz (8Ω) 45W + 45W
(4Ω) 55W + 55W

Distortion Factor: Full Higher Harmonic Distortion
0.3% (at rated output)
0.05% (at 1W output)
Cross Modulation Distortion
0.3% (at rated output)
0.05% (at 1W output)

Frequency Characteristic: 10 Hz ~ 80 kHz +0 dB
-1 dB

Output Band Width: 5 ~ 40 kHz 8Ω IHF 0.3% Both
Channel Driven

Impedance: 1 V (50 kΩ)

Residual Noise: Max. 1 mV (8Ω)

Damping Factor: Min. 25

Speaker Impedance: 4Ω ~ 16Ω (8Ω ~ 16Ω for A + B
only)

■ Pre-Amplifier

Impedance: PHONO 1 2.5 mV (50 kΩ)
PHONO 2 2.5 mV (50 kΩ)
TUNER 150 mV (50 kΩ)
AUX 150 mV (50 kΩ)

Recording Output: TAPE REC. 150 mV

DIN 30 mV

Rated Output: PRE OUT 1 V

Frequency Characteristic: 10 Hz ~ 50 kHz +0 dB (AUX)
-1 dB

Full Higher Harmonic
Distortion Factor: 0.05%

Tone Control:

BASS (100 Hz) ±10 dB, ±7 dB
(Turnover frequency: 400 Hz, 200 Hz)

TREBLE (10 kHz) ±10 dB, ±7 dB

(Turnover frequency: 2.5 kHz, 5 kHz)

Filter:

LOW 20 Hz (6 dB/oct.)

HIGH 8 kHz (6 dB/oct.)

Muting:

-10 dB, -20 dB

Loudness Control:

8.5 dB (100 Hz) 3.5 dB (10 kHz)

Equalizer Deviation:

(30 ~ 15 kHz) ±0.3 dB

PHONO Max. Allowable

Input:

(1 kHz) 350 mV

(Higher harmonic distortion factor:
0.1%)

SN Ratio:

PHONO 70 dB (1HF, short circuit,
A network)

AUX 90 dB (1HF, short circuit,
A network)

■ Mic-Amplifier

Impedance: 4 mV (20 kΩ)

Full Higher Harmonic

Distortion Factor: 0.35% (1 kHz)

Rated Output: MIC MIX REC. OUT 1 V

Power Source Voltage: AC 120 V 60 Hz (USA/Canada)

AC 220/240 V, 50 Hz (Europe/
England/Sweden)

Power Consumption: 200 W (AC 120 V, 60 Hz)

Applied Semiconductor: 340 W (220/240 V ~ 50 Hz)

Dimensions (m/m): 43 Transistors, 16 Diodes

Weight: 450 x 148 x 375

11.5 kg

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1. TECHNICAL POINTS

PARALLEL PUSH-PULL

Figure 1 shows common pure complementary output circuit. Connecting these circuit in parallel composes such a circuit as shown in figure 2. This circuit is called parallel push-pull.

Para-push provides a necessary output signal using a transistor which has not enough collector loss to obtain a necessary output signal. Resistors R1 to R4 in figure 2 rectify unevenness of each transistor's V_{be} and adjust a slight unbalance of characteristics between transistors. TR1 and TR2 provide amplifier with linearity and TR3 and TR4 unify the linearity effectively, thereby providing products which have a definite linearity to some extent.

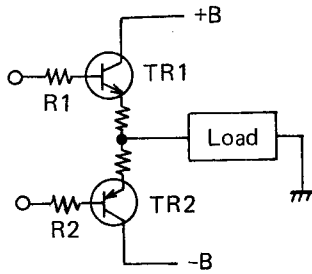


Figure 1

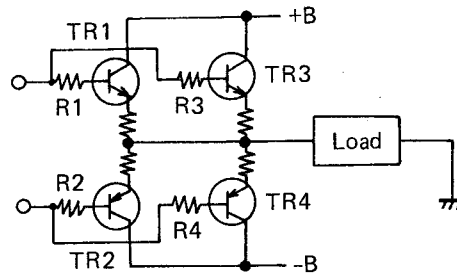


Figure 2

EQUALIZER AMPLIFIER USING BIPOLAR POWER

Use of bipolar power allows A to C points in figure 3 to be kept at 0V (Same potential as ground) and prevents the leakage of capacitor C1 in figure 3, thereby preventing the damage by current leakage.

(For example: switch shock noise of selector switch.)

By combining high metal film fixed resistors and polypropylene capacitors for RIAA element, RIAA difference is reduced within $\pm 3\text{dB}$.

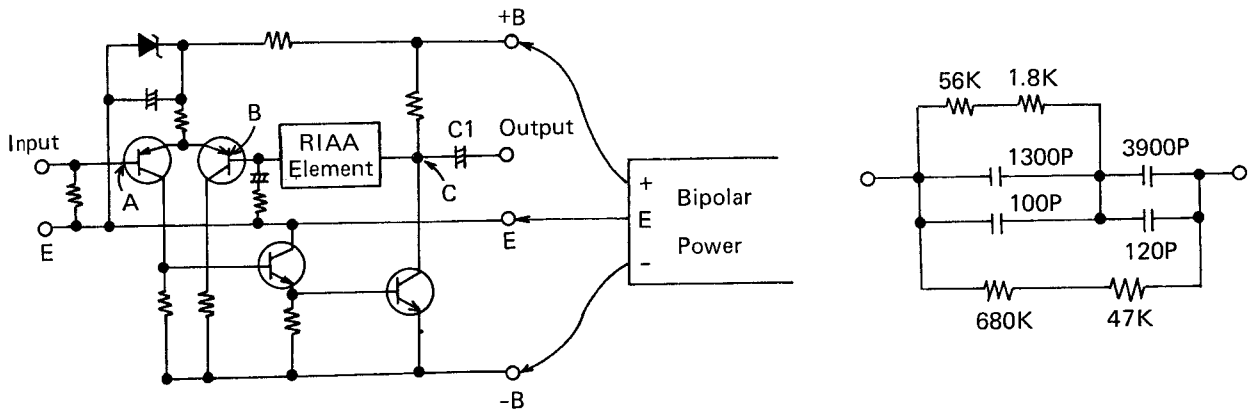


Figure 3

POWER ON-OFF SHOCK NOISE MUTING CIRCUIT

This circuit mutes the amplifier when the power switch is turned ON and protects the speaker from click noise. Capacitor C1 starts charging by the current flowing through resistor R4 immediately after the power switch is turned ON, and transistors TR3 and TR4 are turned ON by the current passing through resistor R3. Input signal (Click noise) is divided by internal resistance of R1 and TR4, and of R2 and TR3 to lower the output level. The internal resistance of transistor which is turned ON is too weak as compared with R1 and R2 to obtain output signal. When the voltage at both terminals of C1 comes to a certain level after a few seconds, TR2 is turned ON and the voltage of negative power which consists of D2, R7 and C2 is applied to the bases of TR3 and TR4 to turn OFF the TR3 and TR4, thereby increasing the internal resistance of TR3 and TR4, and consequently output signal can be obtained without reduction. Any click noise which enters the input signal for these seconds does not present in output signal.

When power switch is turned OFF, the negative power reduces to 0V preceding to +B, emitter potential of TR1 is increased by potential of C1, TR1 is turned ON and C1 is discharged promptly. Then TR2 is turned OFF and +B voltage is applied to TR3 and TR4 through TR3.

As +B voltage reduces slowly even after the power is turned OFF, TR3 and TR4 can be kept to be ON for a certain time during which muting circuit can be activated and click noise that occurs when power is turned OFF can be eliminated.

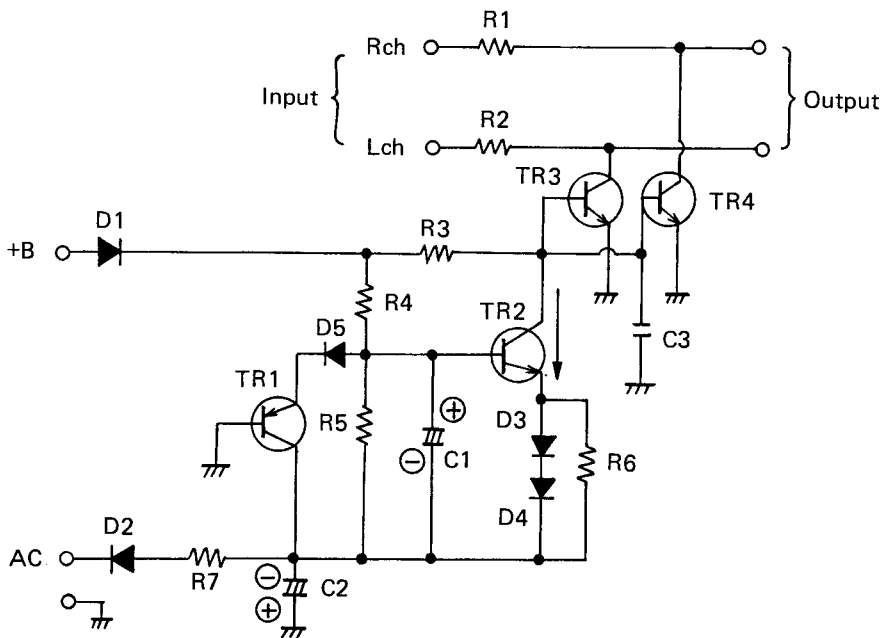


Figure 4

2. OPERATING CONTROLS

FRONT VIEW

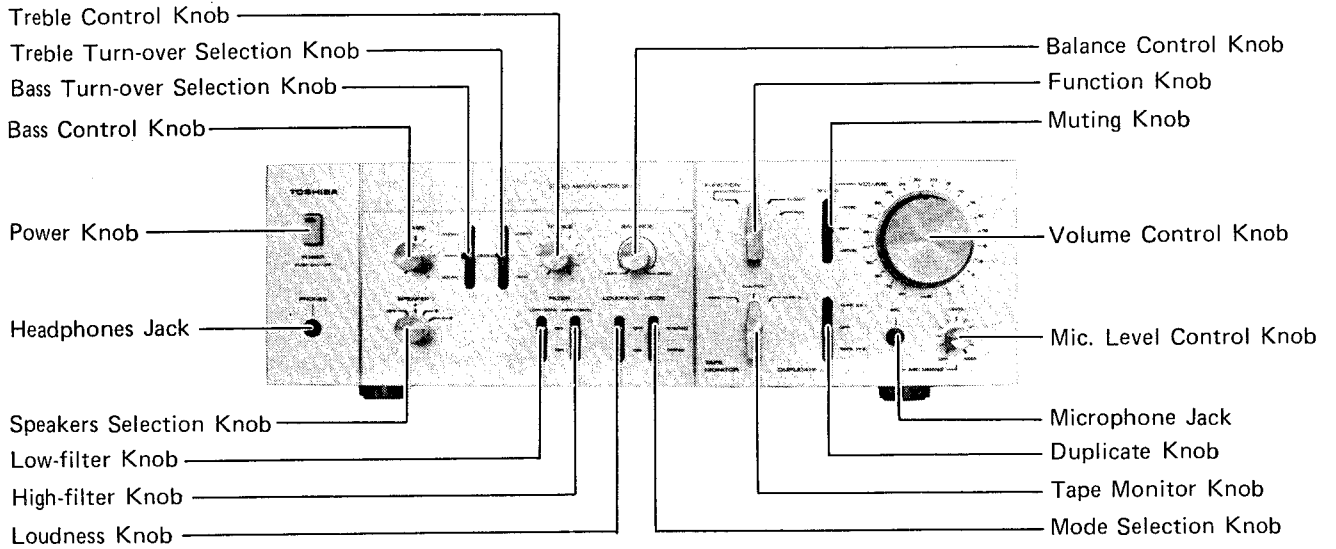


Figure 5

REAR VIEW

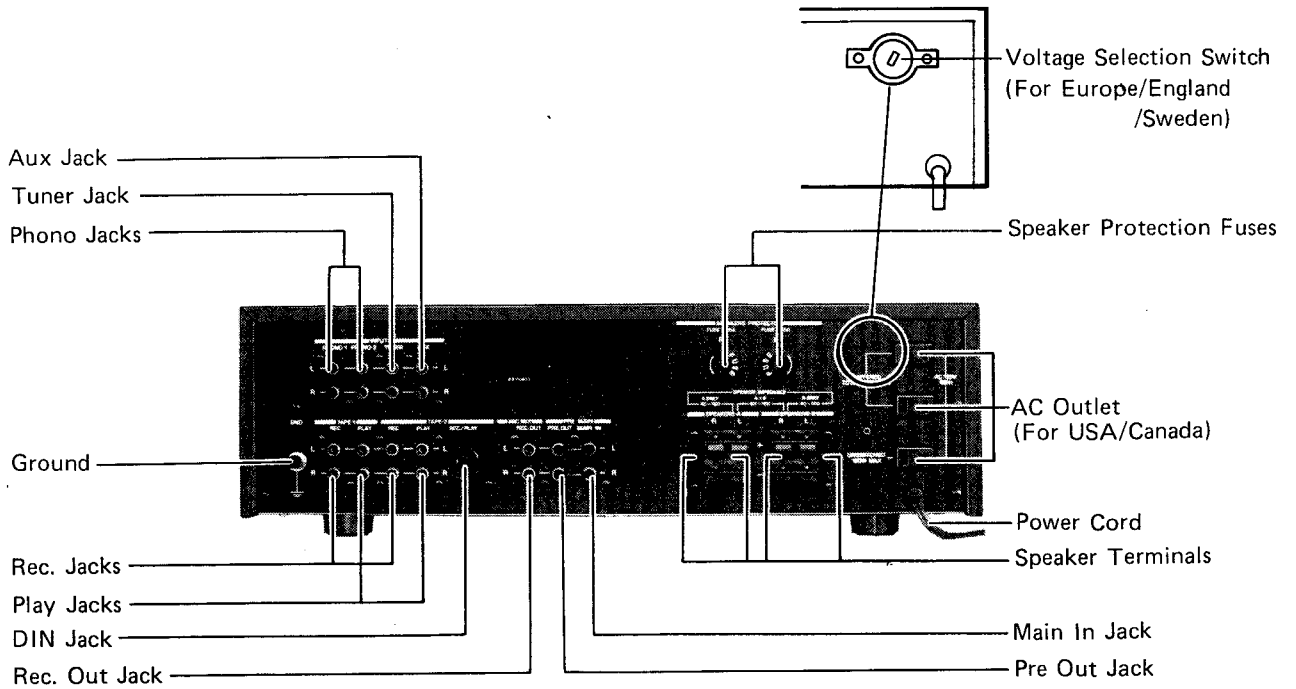


Figure 6

3. DISASSEMBLY INSTRUCTIONS

TOP COVER REMOVAL

1. Remove four screws (①).
See figure 7.

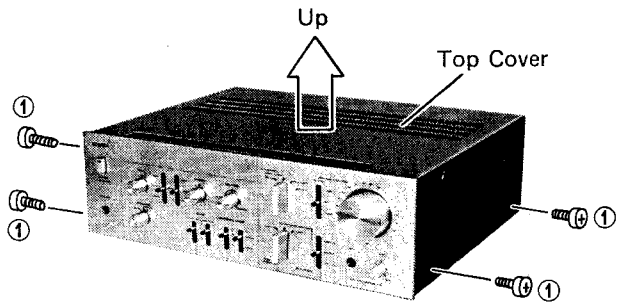


Figure 7

BOTTOM COVER REMOVAL

1. Remove five screws (②).
See figure 8.

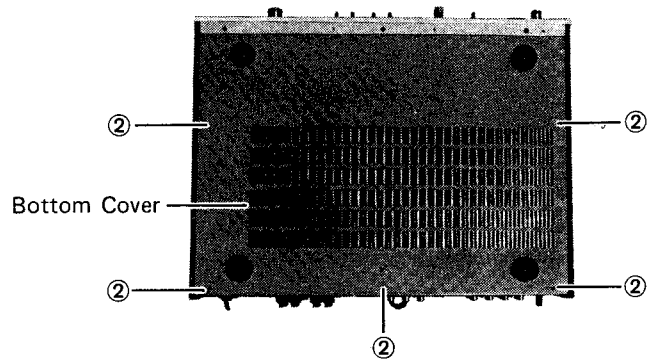


Figure 8

FRONT PANEL REMOVAL

1. Pull out the seven knobs (③). See figure 9.

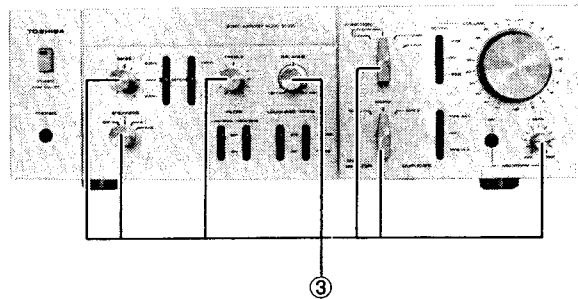


Figure 9

2. Remove two screws (④).
See figure 10.

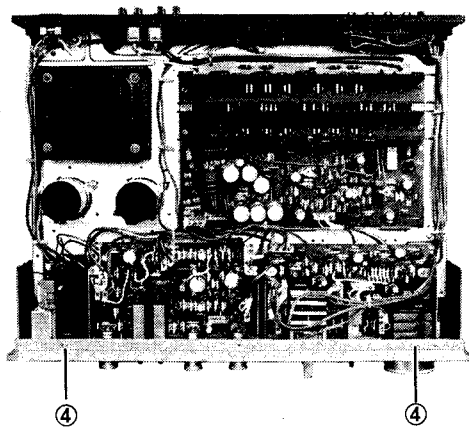


Figure 10

3. Remove two screws (⑤).
See figure 11.

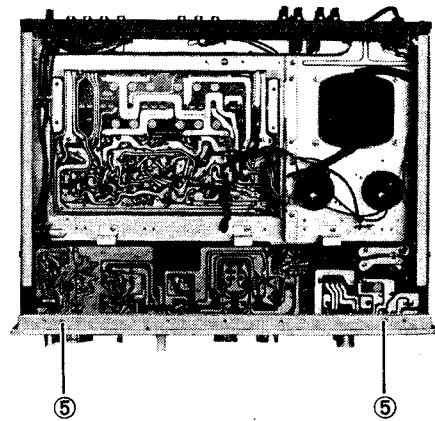


Figure 11

4. CIRCUIT ADJUSTMENTS

POWER TRANSISTOR IDLING CURRENT ADJUSTMENT

While there is no signal (Connect 8 ohm when loading), connect tester to TP001 and TP002 on power amp. P.C. Board and rotate and adjust semi-fixed resistors VR005 and VR006 so that the readings on tester is values described below.

		Reading on tester
R channel TP001	VR005 adjustment	When radiator is warmed 0.015V
L channel TP002	VR006 adjustment	When radiator is cold 0.008V

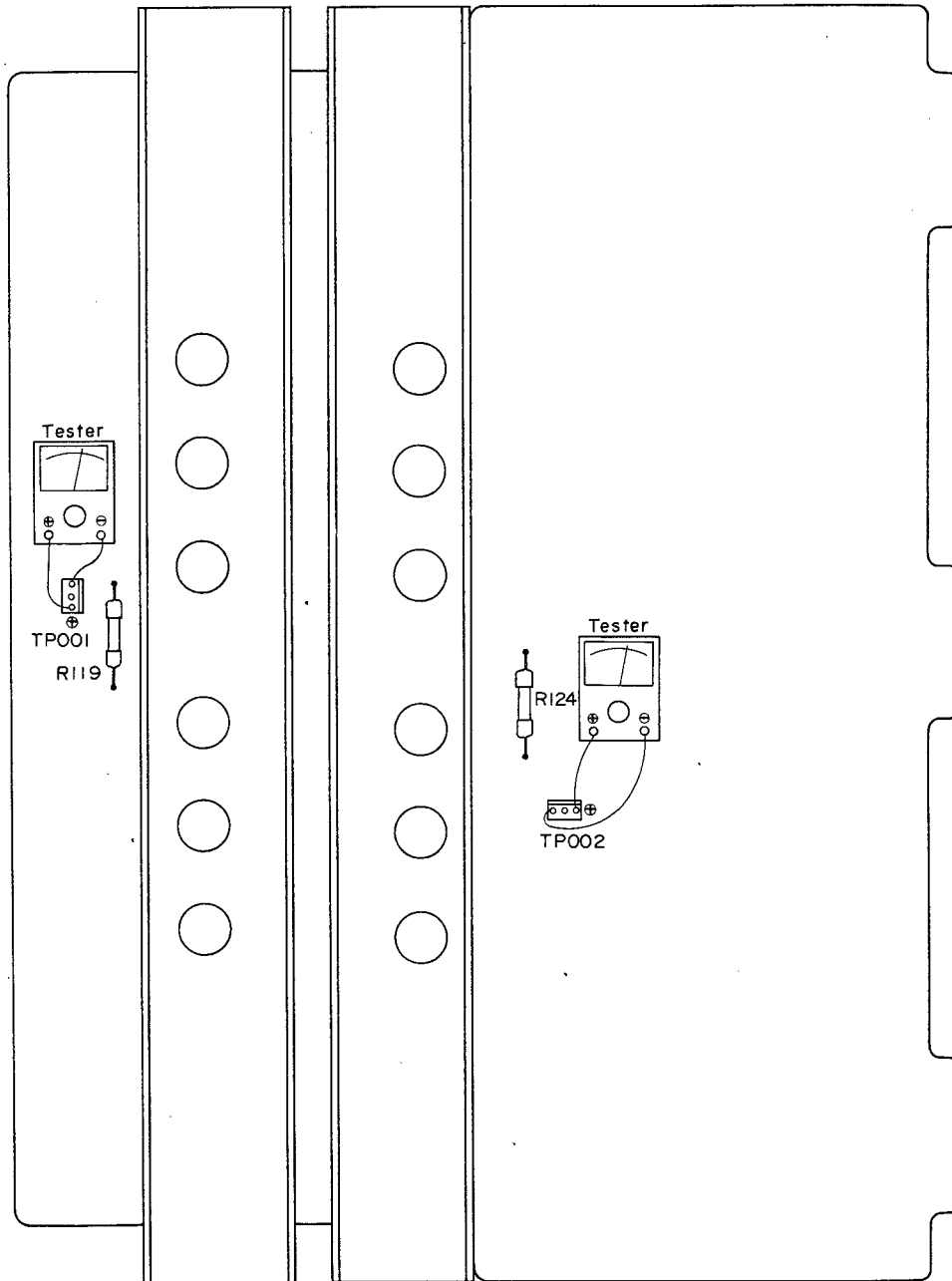


Figure 12. Top View of Power Amp. P.C. Board

5. LEVEL DIAGRAM

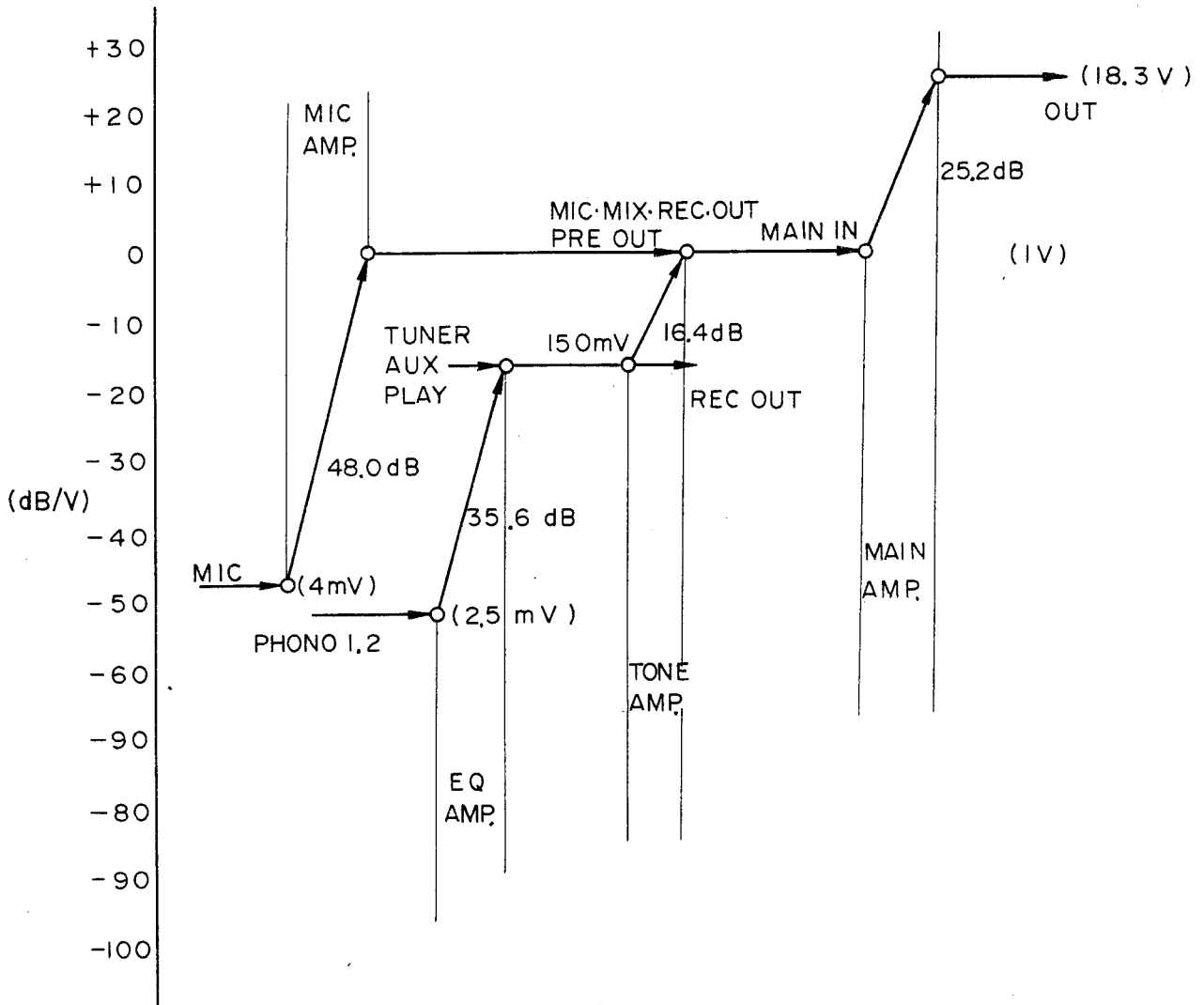


Figure 13

6. BLOCK DIAGRAM

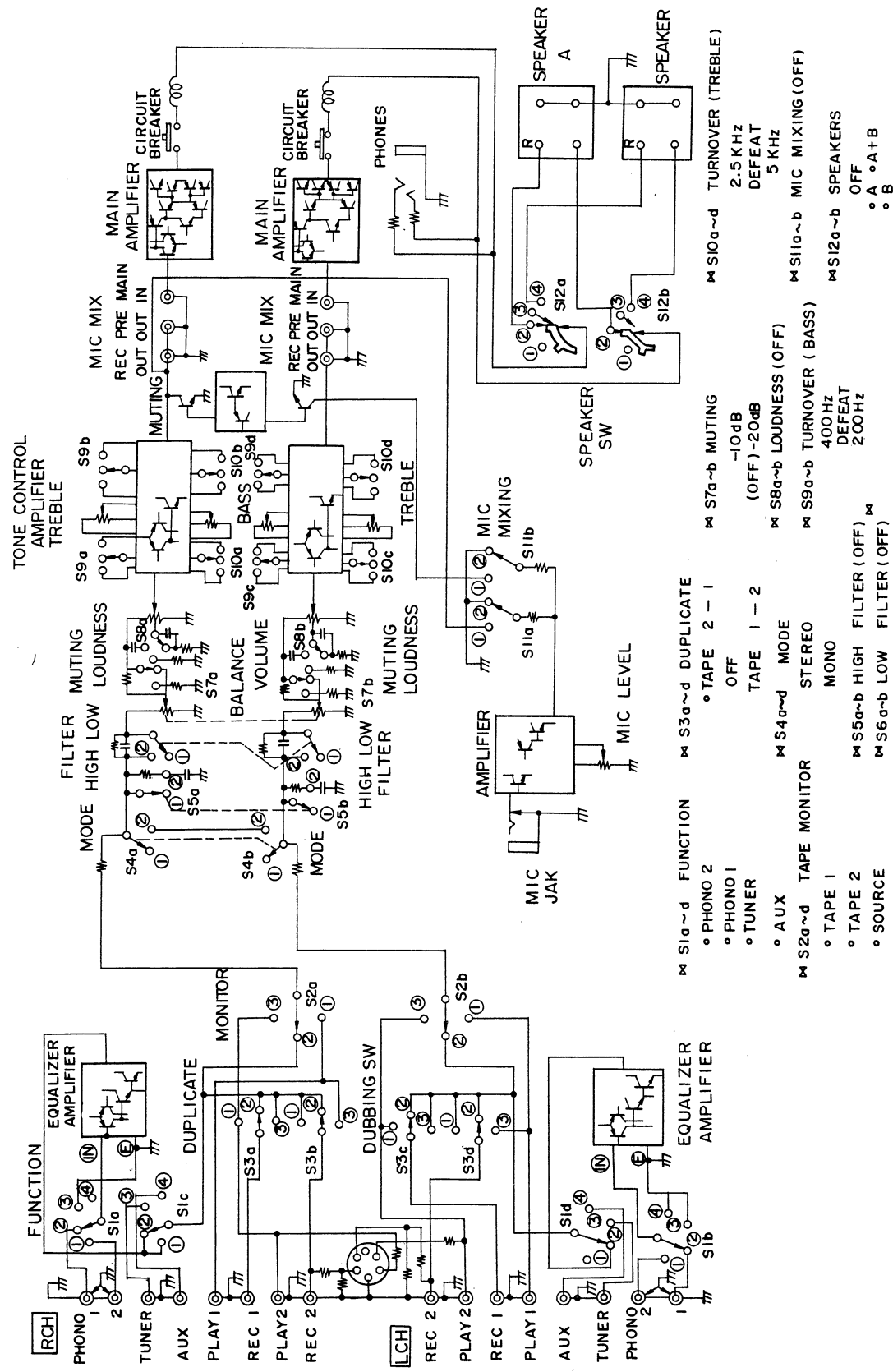


Figure 14.

7. EXPLODED VIEW (CABINET)

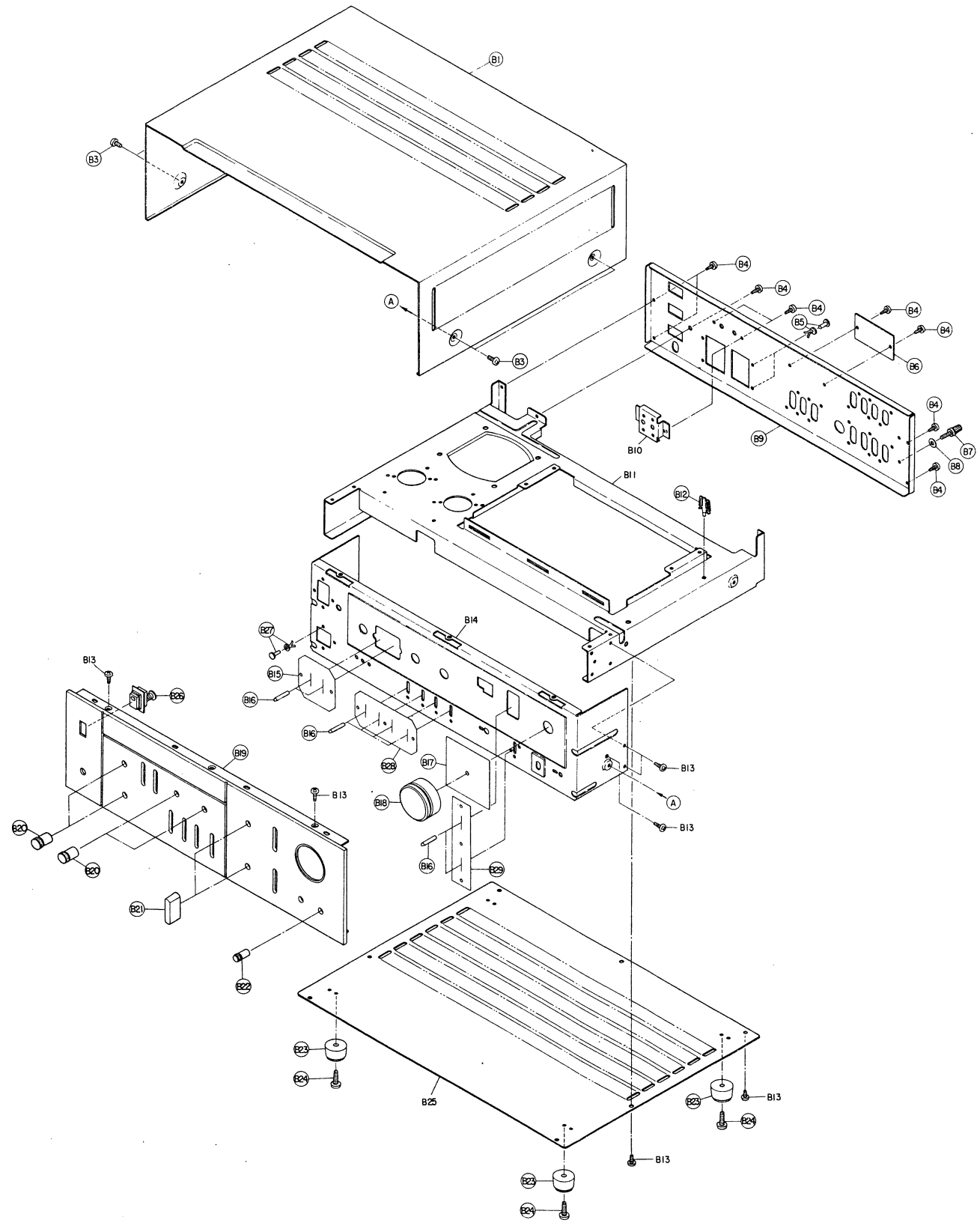


Figure 15

8. P.C. BOARD PARTS LOCATIONS

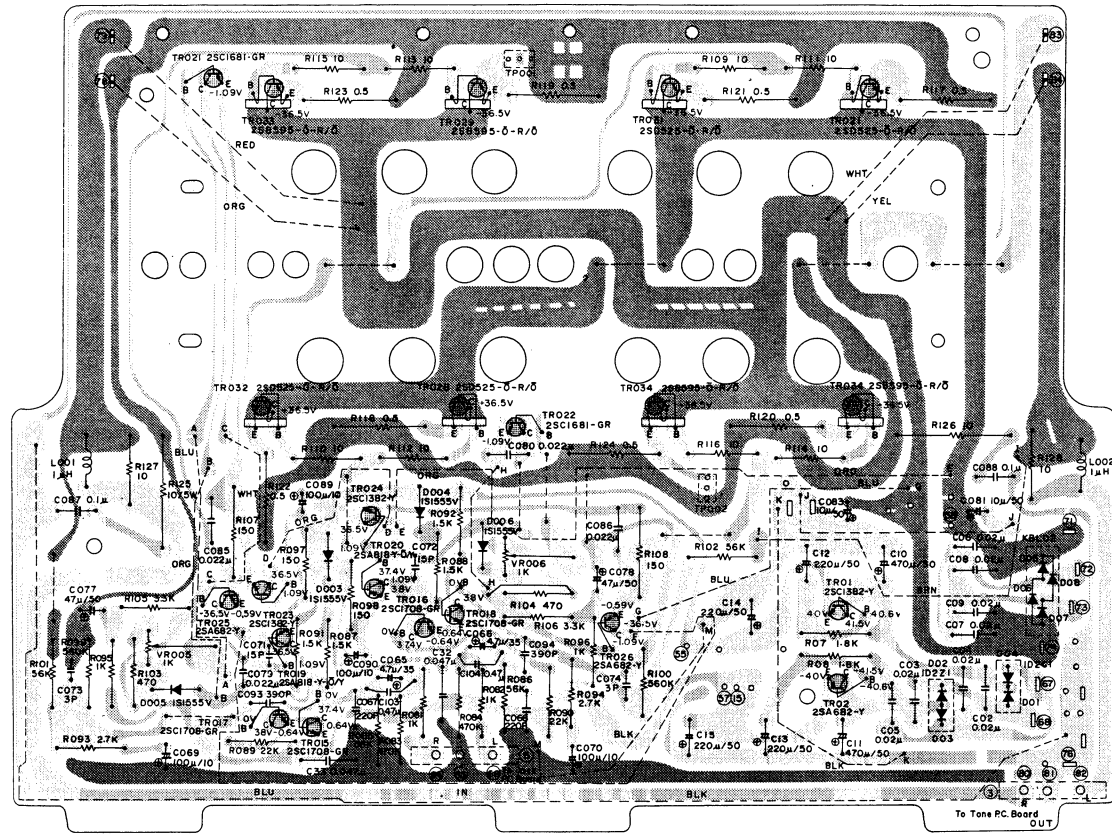


Figure 16. Bottom View of Power Amp. P.C. Board (CCT-PA-C16).

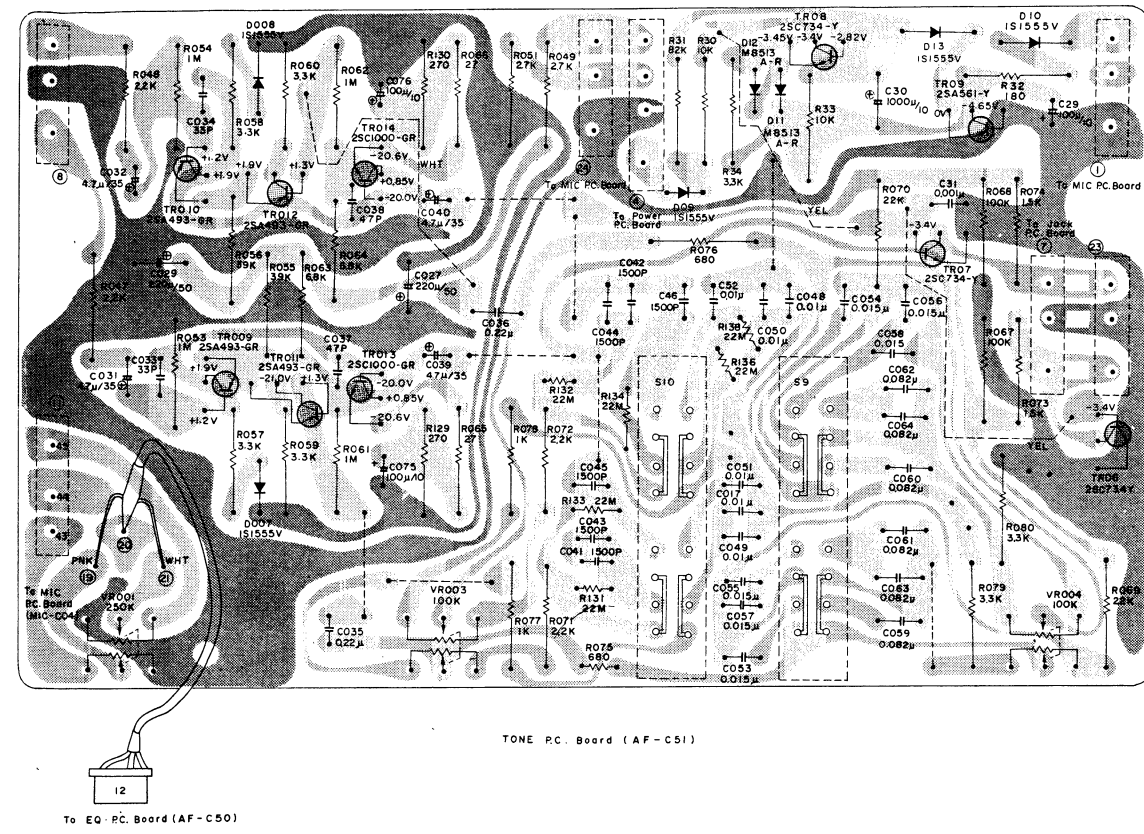


Figure 18. Bottom View of Tone Amp. P.C. Board (CCT-AF-C51).

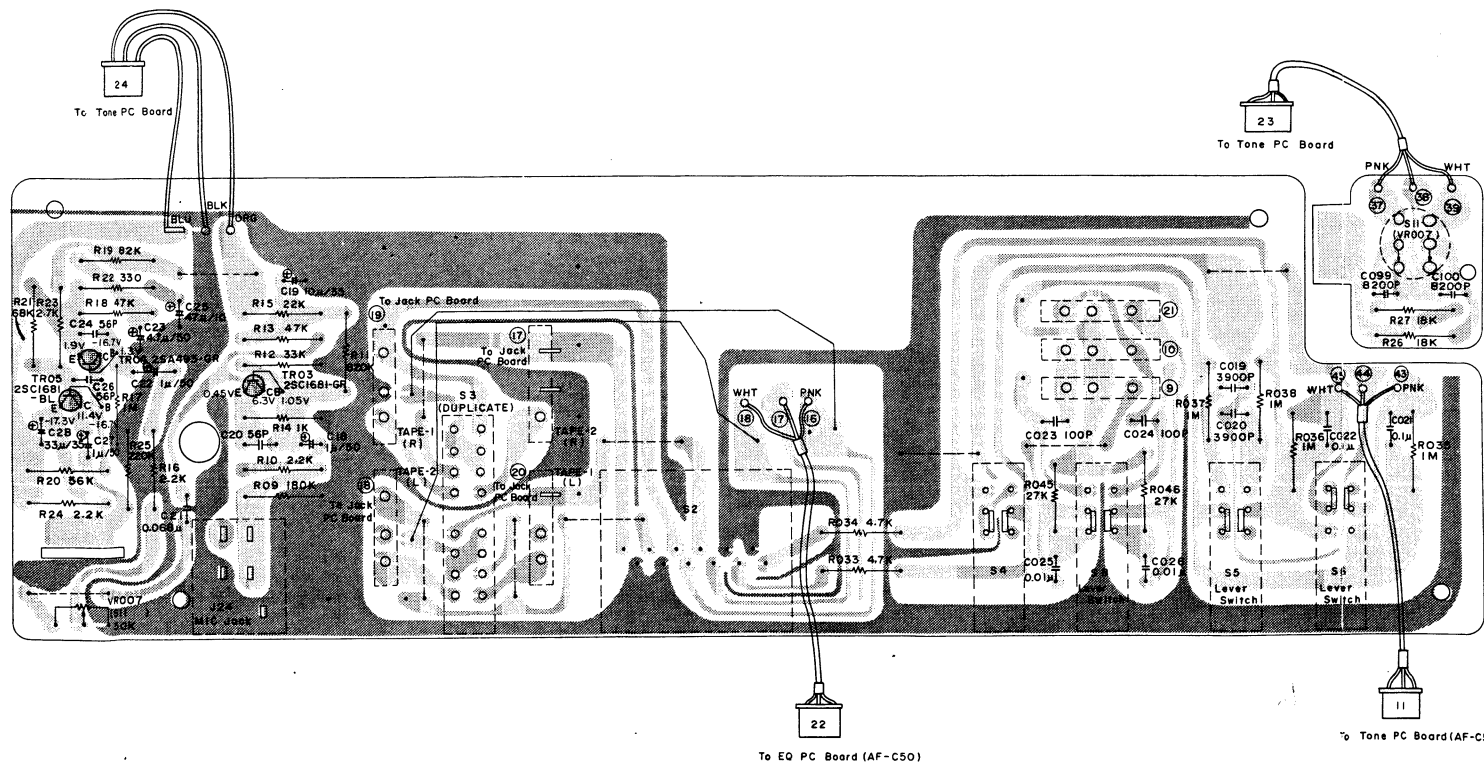


Figure 17. Bottom View of Mic. Amp. P.C. Board (MIC-C04).

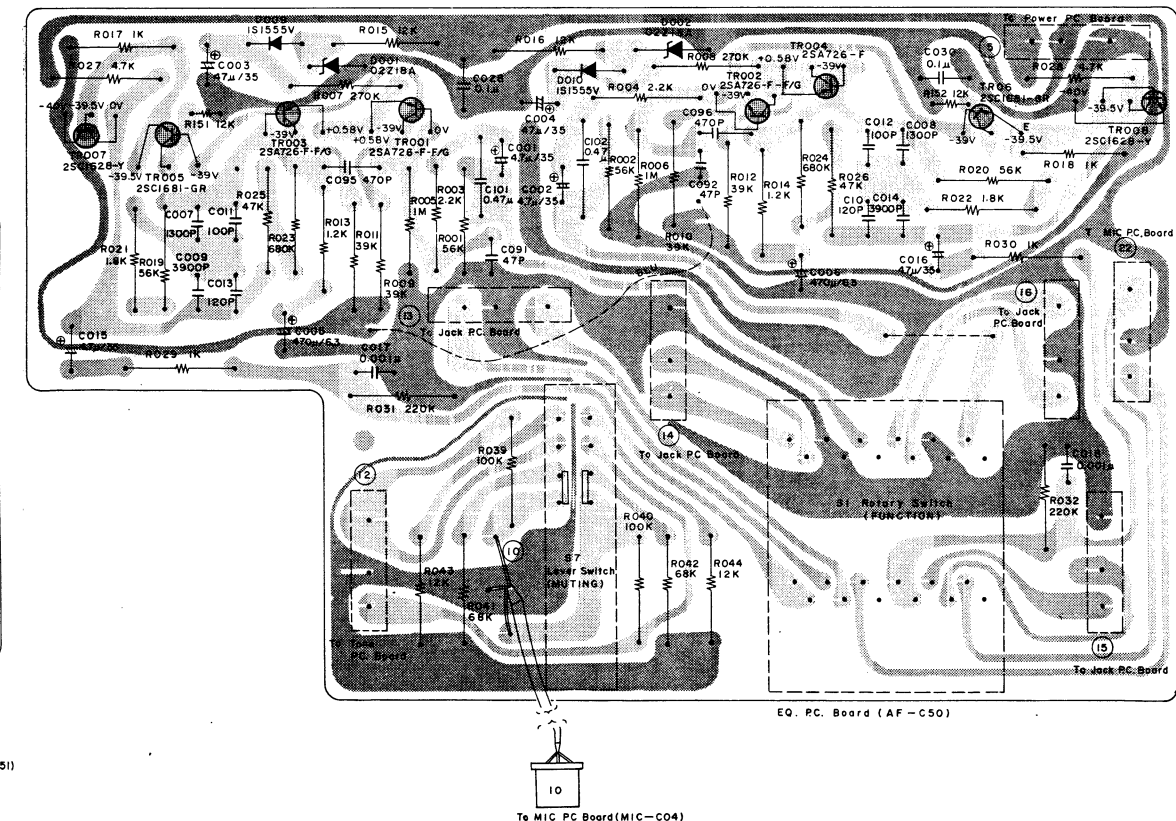


Figure 19. Bottom View of EQ. Amp. P.C. Board (CCT-AF-C50).

9. SCHEMATIC DIAGRAM

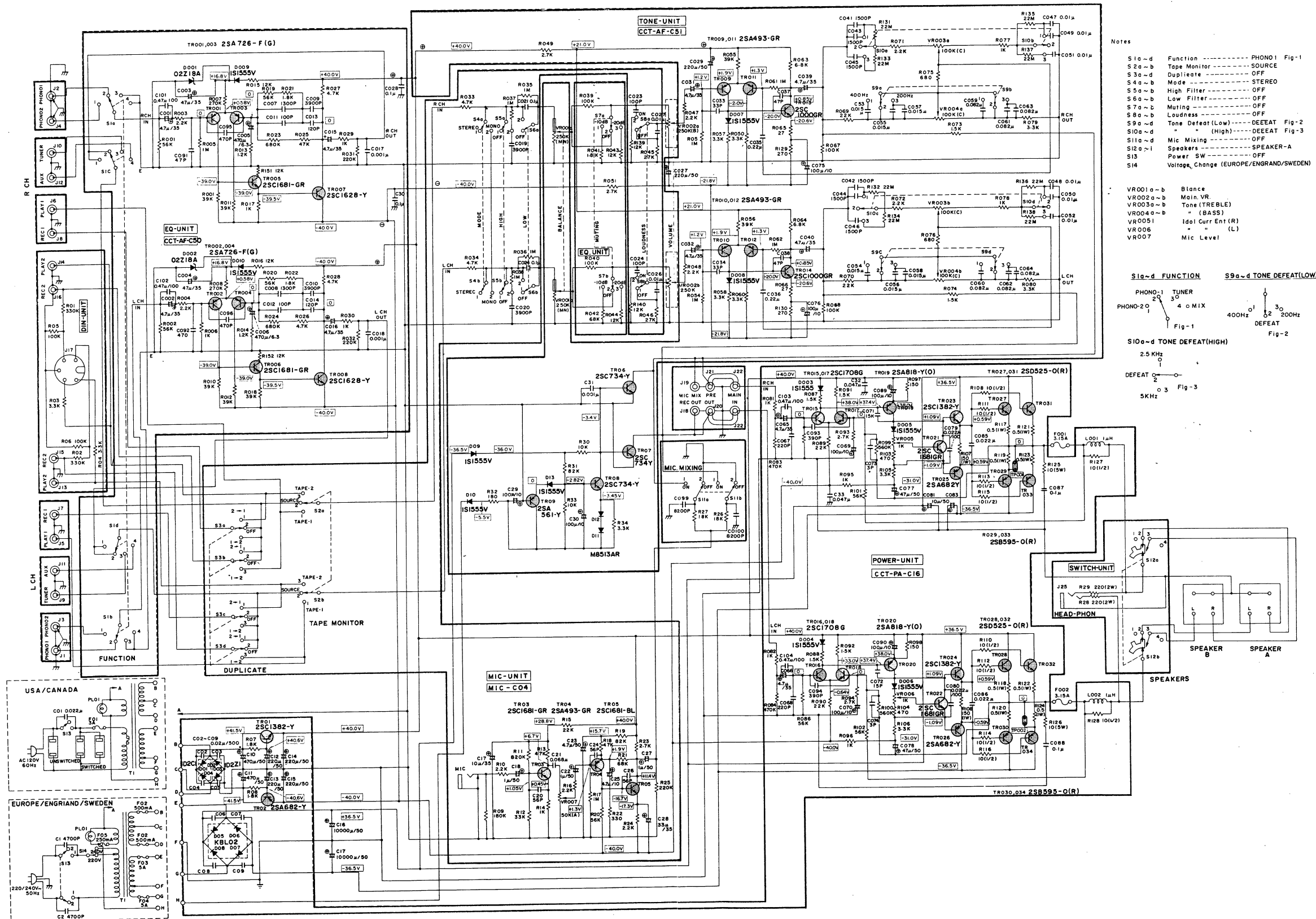


Figure 20

10. PARTS LIST

Symbol No.	Part No.	Description	Symbol No.	Part No.	Description	Symbol No.	Part No.	Description	Symbol No.	Part No.	Description
TRANSISTORS AND DIODES			ELECTRICAL PARTS			CAPACITORS			RESISTORS		
						G=±2%, J=±5%, K=±10%, M=±20%, Z=-20+80%, D=±0.5pF			All resistors are 1/4W, 5% carbon film resistor unless otherwise noted. K=±10%, F=±1%		
CCT-PA-C16		Transistor, 2SC1382-Y	S1	22146757	Switch, Rotary, Function	CCT-PA-C16			CCT-PA-C16		1.8K ohm
TR01		Transistor, 2SA682-Y	S2	22146758	Switch, Rotary, Monitor	C02, 03, 04, 05	22340032	Ceramic, 0.02mfd, 500V, Z	R07, 08	22545182	1K ohm
TR02		Transistor, 2SC1708-GR	S3	22146763	Switch, Lever, Duplicate	C06, 07, 08, 09	22340032	Ceramic, 0.02mfd, 500V, Z	R081, 082	22545102	470K ohm
TR015, 016	22114438	Transistor, 2SC1708-GR	S4, 5, 6, 8	22146762	Switch, Lever	C10, 11	22448471	Electrolytic, 470mfd, 50V	R083, 084	22545474	56K ohm
TR017, 018	22114438	Transistor, 2SC1708-GR	S7	22146764	Switch, Lever, Muting	C12, 13	22448221	Electrolytic, 220mfd, 50V	R085, 086	22545563	56K ohm
TR019, 020		Transistor, 2SA818-Y-O/Y	S9, 10	22146767	Switch, Lever, Tone	C14, 15	22448221	Electrolytic, 220mfd, 50V	R087, 088	22545152	1.5K ohm
TR021, 022		Transistor, 2SC1681-GR	S12	22146727	Switch, Rotary, Speaker	C32	22342473	Ceramic, 0.047mfd, 50V, Z			
TR023, 024		Transistor, 2SC1382-Y-O/Y	S13	22146759	Switch, Push, Power (USA/Canada)	C33	22342473	Ceramic, 0.047mfd, 50V, Z			
TR025, 026		Transistor, 2SA682-Y-O/Y		22146204	Switch, Push, Power (Europe/England/Sweden)	C065, 066	22440052	Electrolytic, 4.7mfd, 35V			
TR027, 028		Transistor, 2SD525-O-R/O	S14	22146707	Switch, Rotary, Voltage (Europe/England/Sweden)	C067, 068	22382221	Polystyrene, 220pF, 50V, K			
TR029, 030		Transistor, 2SB595-O-R/O	L001, 002	22210107	Coil, Trap, 1μH	C069, 070	22443101	Electrolytic, 100mfd, 10V			
TR031, 032		Transistor, 2SD525-O-R/O	J1, 2, 3, 4	22163446	Jack, US4P	C071, 072	22362150	Ceramic, 15pF, 50V, K			
TR033, 034		Transistor, 2SB595-O-R/O	J5, 6, 7, 8	22163443	Jack, US4P	C073, 074	22361309	Ceramic, 3pF, 50V, D			
MIC-C04		Transistor, 2SC1681-GR	J9, 10, 11, 12	22163443	Jack, US4P	C077, 078	22448470	Electrolytic, 47mfd, 50V			
TR03		Transistor, 2SA841-GR	J13, 14, 15, 16, 17	22163445	Jack, US4P, DIN	C079, 080	22321128	Polypropylene, 0.022mfd, 100V, J			
TR04		Transistor, 2SC1681-BL	J18, 19, 20, 21, 22, 23	22163444	Jack, US6P	C081, 083	22448100	Electrolytic, 10mfd, 50V			
TR05		Transistor, 2SC1681-BL	J24	22163517	Jack, Microphone	C085, 086	22373223	Mylar, 0.022mfd, 50V, M			
CCT-AF-C50		Transistor, 2SA726-F-F/G	J25	22163519	Jack, Headphones	C087, 088	22373104	Mylar, 0.1mfd, 50V, M			
TR001, 002	22114405	Transistor, 2SA726-F-F/G	F01	22144235	Fuse, 3A/250V (USA/Canada)	C089, 090	22443101	Electrolytic, 100mfd, 10V			
TR003, 004	22114405	Transistor, 2SA726-F-F/G	F01, 02	22144295	Fuse, 500mA/250V (Europe/England/Sweden)	C093, 094	22382391	Polystyrene, 390pF, 50V, K			
TR005, 006		Transistor, 2SC1681-GR	F03, 04	22144335	Fuse, 5A/250V (Europe/England/Sweden)	C103, 104	22370168	Mylar, 0.47mfd, 100V, K			
TR007, 008		Transistor, 2SC1628-Y	F05	22144289	Fuse, 250mA/250V (Europe/England/Sweden)	MIC-C04					
CCT-AF-C51		Transistor, 2SC734-Y	F001, 002	22144332	Fuse, 3.15A/125V (USA/Canada)	C18	22440060	Electrolytic, 1mfd, 50V			
TR06		Transistor, 2SC734-Y	F001, 002	22144310	Fuse, 3.15A/250V (Europe/England/Sweden)	C19	22447100	Electrolytic, 10mfd, 35V			
TR07		Transistor, 2SC734-Y		22165063	Holder, Fuse (USA/Canada)	C20	22362560	Ceramic, 56pF, 50V, K			
TR08		Transistor, 2SC734-Y		22165075	Holder, Fuse (England/Europe/Sweden)	C21	22372683	Mylar, 0.068mfd, 50V, K			
TR09		Transistor, 2SA561-Y		22176221	Cord, Power (USA/Canada)	C22	22440060	Electrolytic, 1mfd, 50V			
TR009, 010		Transistor, 2SA841-GR		22176286	Cord, Power (Europe)	C23	22448479	Electrolytic, 4.7mfd, 50V			
TR011, 012		Transistor, 2SA841-GR		22176547	Cord, Power (England)	C24	22362560	Ceramic, 56pF, 50V, K			
TR013, 014		Transistor, 2SC1000-GR		22176540	Cord, Power (Sweden)	C25	22443470	Electrolytic, 47mfd, 10V			
CCT-PA-C16		Diode, 1D2C1	T1	22223067	Transformer, Power (USA)	C26	22362560	Ceramic, 56pF, 50V, K			
D01, 04		Diode, 1D2Z1		22223068	Transformer, Power (Europe/Sweden)	C27	22440060	Electrolytic, 1mfd, 50V			
D02, 03		Diode, 1D2Z1		22213502	Transformer, Power (England)	C28	22447330	Electrolytic, 33mfd, 35V			
D05, 06, 07, 08	22115293	Diode, KBL02		22213517	Transformer, Power (Canada)	C019, 020	22372392	Mylar, 3900pF, 50V, K			
D003, 004		Diode, 1S1555V				C021, 022	22372104	Mylar, 0.1mfd, 50V, K			
D005, 006		Diode, 1S1555V				C023, 024	22382101	Polystyrene, 100pF, 50V, K			
CCT-AF-C50		Diode, 02Z18A				C025, 026	22372103	Mylar, 0.01mfd, 50V, K			
D001, 002		Diode, 1S1555V				C099, 100	22372822	Mylar, 8200pF, 50V, K			
D009, 010		Diode, 1S1555V				CCT-AF-C50					
D10		Diode, 1S1555V				C001, 002	22440052	Electrolytic, 4.7mfd, 35V			
D11		Diode, M8513A-R				C003, 004	22447470	Electrolytic, 47mfd, 35V			
D12		Diode, M8513A-R				C005, 006	22440114	Electrolytic, 470mfd, 6.3V			
						C007, 008	22321076	Polypropylene, 1300pF, 100V, G			

Symbol No.	Part No.	Description
R089, 090	22545223	22K ohm
R091, 092	22545152	1.5K ohm
R093, 094	22545272	2.7K ohm
R095, 096	22545102	1K ohm
R097, 098	22545151	150 ohm
R099, 100	22545564	560K ohm
R101, 102	22545563	56K ohm
R103, 104	22500114	470 ohm, 1/4W, Fusible
R105, 106	22545332	3.3K ohm
R107, 108	22570088	150 ohm, 1W, Metal Oxide Film
R109, 110	22563100	10 ohm, 1/2W, Solid Carbon
R111, 112	22563100	10 ohm, 1/2W, Solid Carbon
R113, 114	22563100	10 ohm, 1/2W, Solid Carbon
R115, 116	22563100	10 ohm, 1/2W, Solid Carbon
R117, 118	22570031	0.5 ohm, 1W, Metal Oxide Film
R119, 120	22570031	0.5 ohm, 1W, Metal Oxide Film
R121, 122	22570031	0.5 ohm, 1W, Metal Oxide Film
R123, 124	22570031	0.5 ohm, 1W, Metal Oxide Film
R125, 126	22500047	10 ohm, 5W, Wire Wound
R127, 128	22563100	10 ohm, 1/2W, Solid Carbon
MIC-C04		
R09	22545184	180K ohm
R10	22545222	2.2K ohm
R11	22545824	820K ohm
R12	22545333	33K ohm
R13	22545473	47K ohm
R14	22545102	1K ohm
R15	22545223	22K ohm
R16	22545222	2.2K ohm
R17	22545105	1M ohm
R18	22545473	47K ohm
R19	22545823	82K ohm
R20	22545563	56K ohm
R21	22545683	68K ohm
R22	22545331	330 ohm
R23	22545272	2.7K ohm
R24	22545222	2.2K ohm
R25	22545224	220K ohm
R26	22545183	18K ohm
R27	22545183	18K ohm
R033, 034	22545472	4.7K ohm
R035, 036	22545105	1M ohm
R037, 038	22545105	1M ohm
R045, 046	22545273	27K ohm
CCT-AF-C50		
R001, 002	22545563	56K ohm
R003, 004	22545222	2.2K ohm
R005, 006	22545105	1M ohm
R007, 008	22545274	270K ohm
R009, 010	22545393	39K ohm
R011, 012	22545393	39K ohm

Symbol No.	Part No.	Description
R013, 014	22545122	1.2K ohm
R015, 016	22545123	12K ohm
R017, 018	22545102	1K ohm
R019, 020	22570105	56K ohm, 1/4W, Metal Oxide Film
R021, 022	22545182	1.8K ohm
R023, 024	22570108	680K ohm, 1/4W, Metal Oxide Film
R025, 026	22545473	47K ohm
R027, 028	22545472	4.7K ohm
R029, 030	22545102	1K ohm
R031, 032	22545224	220K ohm
R039, 040	22545104	100K ohm
R041, 042	22545683	68K ohm
R043, 044	22545123	12K ohm
R151, 152	22555123	12K ohm
CCT-AF-C51		
R30	22545103	10K ohm
R31	22545823	82K ohm
R32	22545181	180 ohm
R33	22545103	10K ohm
R34	22545332	3.3K ohm
R047, 048	22545222	2.2K ohm
R049, 051	22545272	2.7K ohm
R053, 054	22545105	1M ohm
R055, 056	22545393	39K ohm
R057, 058	22545332	3.3K ohm
R059, 060	22545332	3.3K ohm
R061, 062	22545105	1M ohm
R063, 064	22545682	6.8K ohm
R065, 066	22545270	27 ohm
R067, 068	22545104	100K ohm
R069, 070	22545223	22K ohm
R071, 072	22545222	2.2K ohm
R073, 074	22545152	1.5K ohm
R075, 076	22545681	680 ohm
R077, 078	22545102	1K ohm
R079, 080	22545332	3.3K ohm
R129, 130	22545271	270 ohm
R131, 132	22500070	22M ohm, 1/2W, Wire Wound
R133, 134	22500070	22M ohm, 1/2W, Wire Wound
R135, 136	22500070	22M ohm, 1/2W, Wire Wound
R137, 138	22500070	22M ohm, 1/2W, Wire Wound
OTHERS		
R01, 02	22545334	330K ohm
R03, 04	22545332	3.3K ohm
R05, 06	22545104	100K ohm
R28, 29	22570022	220 ohm, 2W, Metal Oxide Film
R139, 140	22555123	12K ohm
VARIABLE RESISTORS		
VR001	22651423	250K ohm, Variable

Symbol No.	Part No.	Description
VR002	22651429	250K ohm, Variable
VR003	22651431	100K ohm, Variable
VR004	22651431	100K ohm, Variable
VR005, 006	22658186	1K ohm, Semi-fixed
VR007	22624400	50K ohm, Variable (With S11)
CABINET PARTS		
B1	22841124	Cover
B3	22707040	Screw, M4 x 6mm
B4	22701326	Tapping Screw, M3 x 8mm
B5	22705022	Rivet, 3 ϕ x 55mm
B6	22863866	Nameplate (USA/Canada)
	22863872	Nameplate (Europe/England/ Sweden)
B7	22162338	Terminal, Ground
B8	22703091	Washer
B9	22711434	Plate, Jack (USA/Canada)
	22711457	Plate, Jack (Europe)
	22711398	Plate, Jack (Sweden/England)
B15	22756462	Sheet, Lever Knob
B16	22845211	Knob, Lever
B17	22756445	Sheet, Volume Knob
B18	22834848	Knob, Volume
B19	22843509	Panel
B20	22834842	Knob Ass'y
B21	22834851	Knob, Selector
B22	22834845	Knob, Mic Level
B23	22874032	Leg
B24	22701437	Tapping Screw, M4 x 16mm
B26	22834849	Knob, Power
B27	22705020	Rivet, 3 ϕ x 45mm
B28	22756463	Sheet, Lever Knob
B29	22756464	Sheet, Lever Knob
ACCESSORIES		
	22952524	Instruction Book
	22954336	Owner's Manual (USA/England)
	22954338	Owner's Manual (Canada)
	22954320	Owner's Manual (Europe/Sweden)