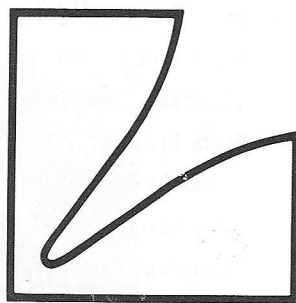


# SERVICE MANUAL



Stereo Integrated Amplifier

# M-117

818-608 6156



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## Specifications

Power Output .....	200W(8ohm, 0.03% THD at 20 ~ 20KHz)
Max Power Output .....	250W(at 4ohm, 1KHz)
Input Sensitivity(1KHz) .....	1V±20%
Input Impedance(1KHz) .....	37Kohm±20%
Frequency Response .....	20~20KHz +0 -0.3dB 5~100KHz $\begin{matrix} +0 \\ -1 \end{matrix}$ dB, $\begin{matrix} +0.5 \\ -2 \end{matrix}$ dB
S/N Ratio .....	110dB
(Input Terminal Shorted)	
T.H.D(at 200W Output, 8ohm, 20~20KHz) .....	0.03%
Residual Noise .....	120 $\mu$ V
Cross Talk .....	1KHz, 70dB 10KHz, 55dB
Power Supply .....	120V, 60Hz
Power Consumption .....	10A
Semiconductors .....	21C's, 59Transistors, 4FETs, 31Diodes, 8Zener Diodes
Dimension .....	438(W)×166(H)×420(D) mm
Weight .....	23.6Kg
<b>&lt; BTL SECTION &gt;</b>	
T.H.D(at 450W, 8ohm, 20 ~20KHz) .....	0.1%
Max Power Output .....	450W(at 1% THD 8ohm, 1KHz)
Input Sensitivity(1KHz) .....	0.75V±20%
S/N Ratio .....	100dB
(Input Terminal Shorted)	

# Parts Locations and Disassembly Instructions

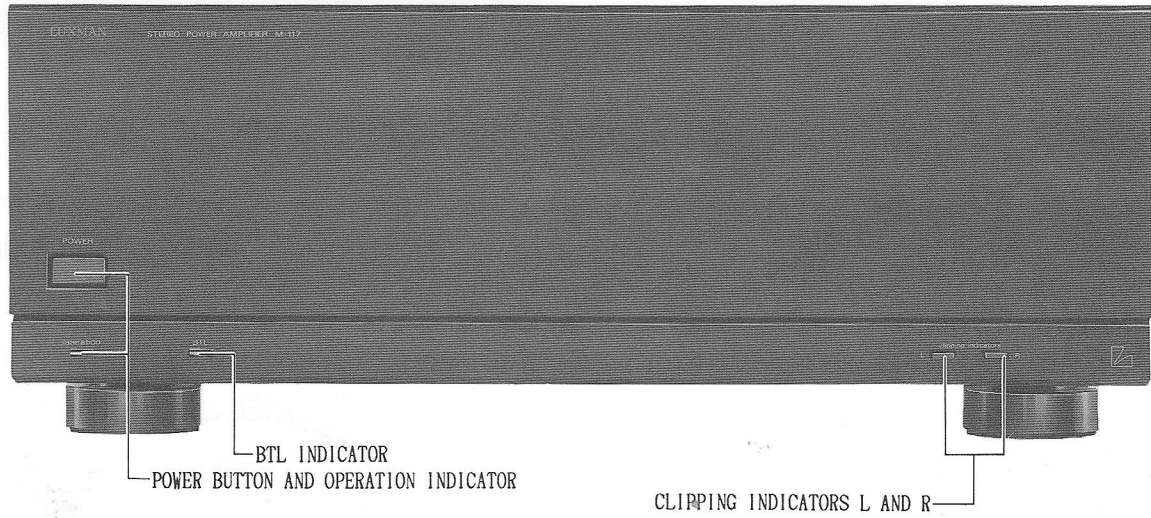


Figure 1

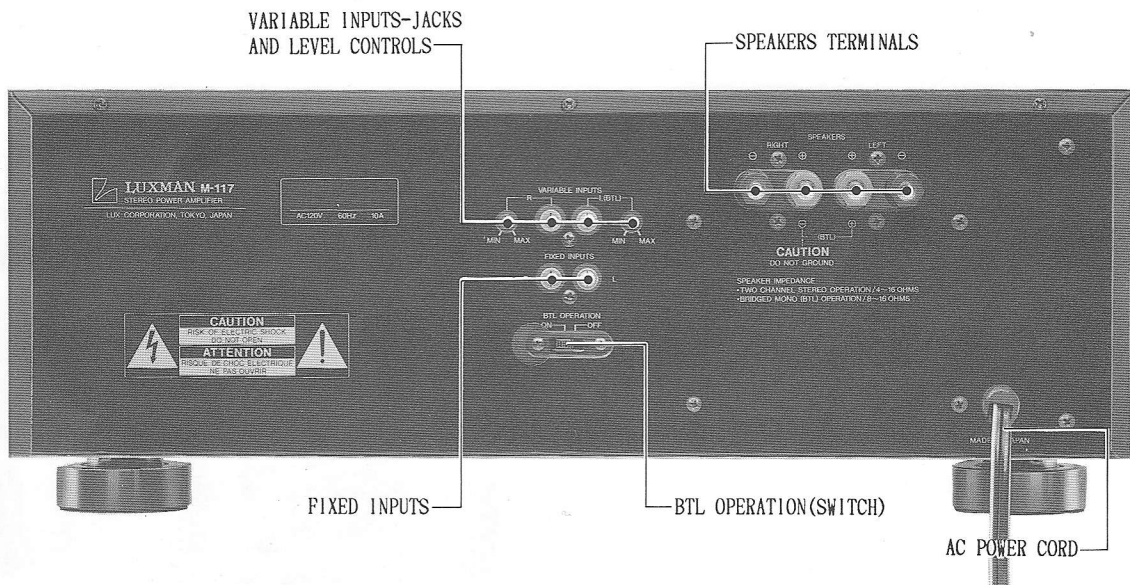


Figure 2

1. Removal of Top Cover

- (1) Remove nine screws marked "○" as shown in Figure 3 and 4.
- (2) Pull out the Top Cover in the direction of the arrow as shown in Figure 3.

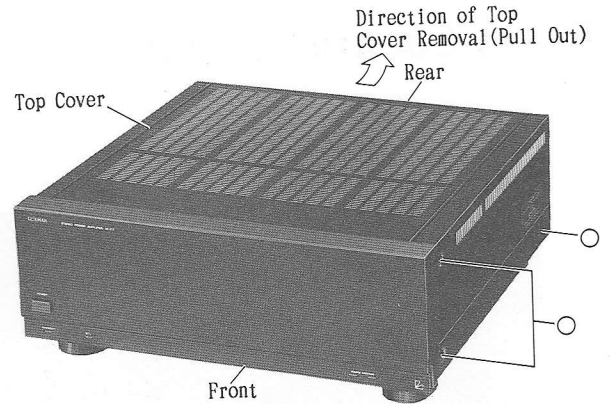


Figure 3

2. Removal of Bottom Cover

- (1) Remove fourteen screws marked "△" as shown in Figure 4.

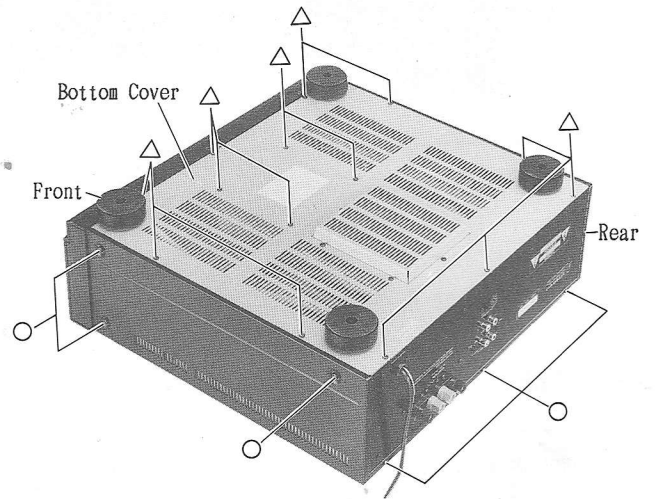


Figure 4

3. Removal of Heatsink(R)

- (1) After removal of Bottom Cover remove four screws marked "●" as shown in Figure 5.
- (2) Disconnect all wires from the Main-Amp(R) P.C. Board.
- (3) Heatsink(R) with main-Amp(R) P.C. Board can be removed completely.

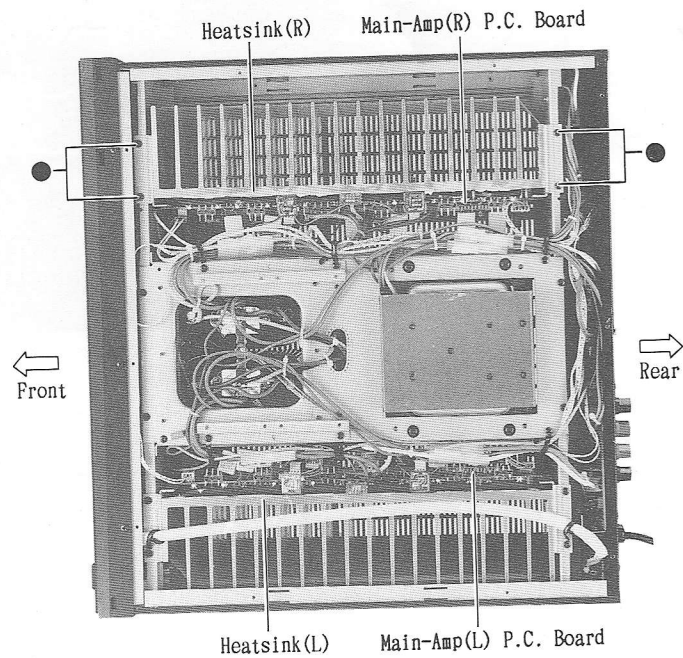


Figure 5



4. Removal of Main-Amp(R) P.C. Board

(1) After removal of Heatsink(R) remove twenty two screws marked " \* " as shown in Figure 6.

NOTE: Take care of handling each transistors when removing the Main-Amp(R) P.C. Board.

5. Removal of Heatsink(L) and Main-Amp(L) P.C. Board

(1) Remove in the same way above mentioned.

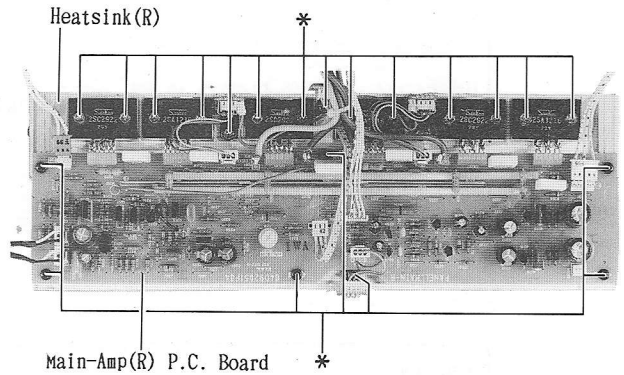


Figure 6

## Adjustment Procedures

1. Connection

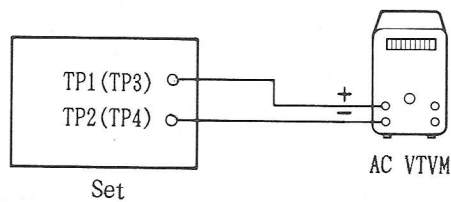


Figure 7

2. Control Setting

Attenuator(Left).....	Minimum	Power Switch .....	ON
Attenuator(Right) .....	Minimum	Others .....	OFF

3. Adjustment Procedure

(1) Idling Adjustment(Figure 7.8 and 9)

Adjust VR101(VR201) so that voltage between TP1(TP3) and TP2(TP4) reaches  $4 \pm 0.5mV$

# Adjustment Locations

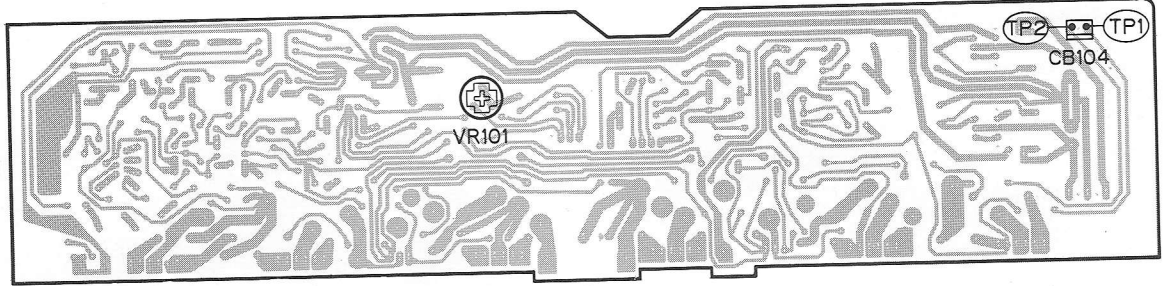


Figure 8 Main-Amp(L) P.C. Board(Component Side)

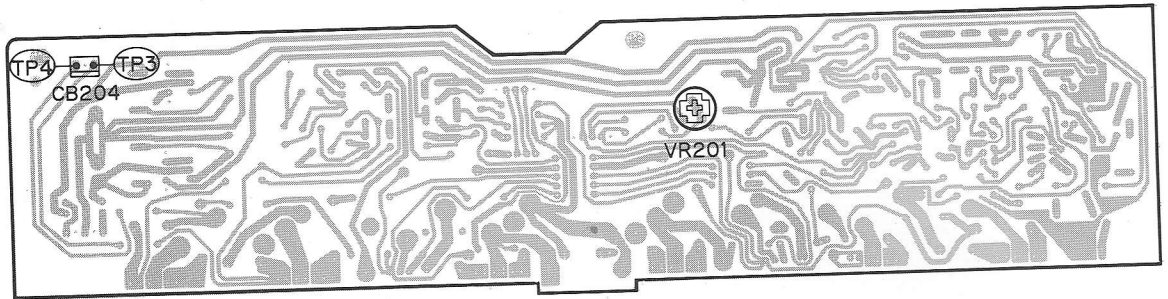
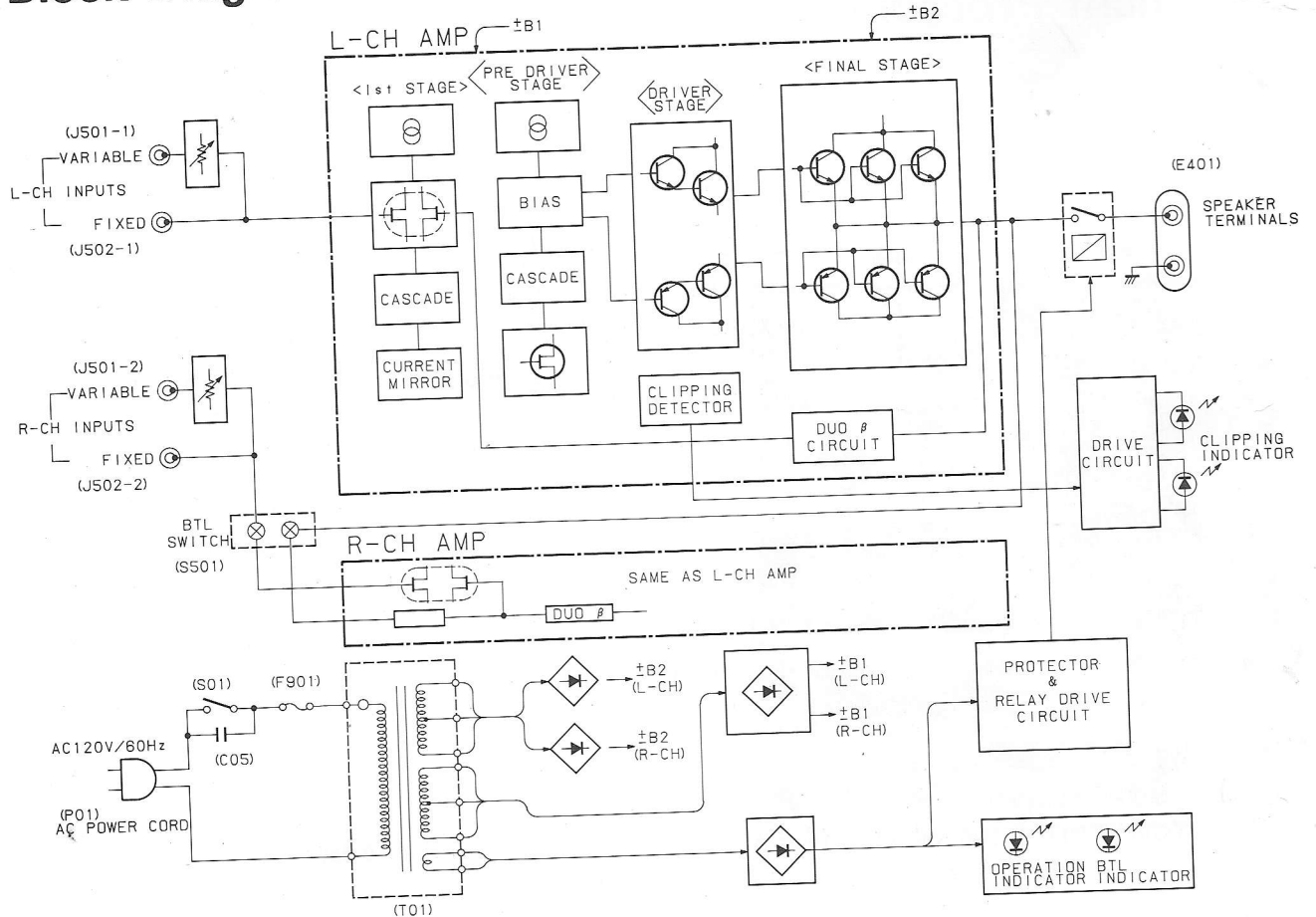


Figure 9 Main-Amp(R) P.C. Board(Component Side)

# Block Diagram



# Electrical Parts List

Resistor: Carbon resistors under 1/8 watts are not mentioned in the parts list, please confirm them by schematic diagram.

Capacitor:  $\mu$ F=microfarads, pF=picofarads

Abbreviations			
CAP.-Capacitor	CER.-Ceramic		
ELY.-Electrolytic	MO.-Metal Oxide Film		
MIC.-Mica	PP.-Polypropylene		
MYL.-Mylar	ZEN.-Zener		
SOL.-Solid	TR.-Transistor		
MF.-Metal Film			
Symbol No.	Part No.	Description	
Main-AMP(L)P.C. Board			
Transistors			
Q101	48T72597F01	2SA995	
Q102	48T27598F01	2SC2291	
Q103	48T72888F01	2SA1208	
Q104	48T72888F01	2SA1208	
Q105	48T71448F01	2SA1361	
Q106	48T71449F01	2SC3424	
Q107	48T82540F04	UN1214	
Q108	48T80986F01	2SC3378	
Q109	48T81444F01	2SA1335	
Q112	48T53301F01	2SC2240	
Q113	48T64240F02	2SC2344	
Q114	48T53301F01	2SC2240	
Q115	48T52545F01	2SA970	
Q116	48T47145F01	2SA1011	
Q117	48T52545F01	2SA970	
Q126	48T71752F01	FET, 2SJ109	
Q127	48T80991F01	FET, 2SK614	
Diodes/LEDs			
D101	48T68764F01	1S2471	
D102	48T68764F01	1S2471	
D103	48T73079F02	1SS82	
D104	48T68764F01	1S2471	
D105	48T68764F01	1S2471	
D106	48T73079F02	1SS82	
D107	48T68764F01	1S2471	
D108	48T68764F01	1S2471	
D109	48T68764F01	1S2471	
LD101	48T60971F01	LED, LTZ-R15(BLU)	
LD102	48T60971F01	LED, LTZ-R15(BLU)	
LD103	48T60971F01	LED, LTZ-R15(BLU)	
ZD101	48T52741F17	ZEN, HZ7C-2L	
ZD102	48T52741F66	ZEN, HZ27-3L	
ZD103	48T40150U58	ZEN, HZ11C-1	

Symbol No.	Part No.	Description		
Capacitors				
C101	08T81196F34	MIC, 100pF		
C102	23T81031F05	ELY, BP 10 $\mu$ F/100V		
C103	08T81196F19	MIC, 33pF		
C104	08T81196F32	MIC, 82pF		
C105	23T00136L99	ELY, 33 $\mu$ F/100V		
C106	08S40656F25	MYL, 0.1 $\mu$ F		
C107	23T00138L78	ELY, 33 $\mu$ F/100V		
C108	08S40656F06	MYL, 2700pF		
C109	08S40656F06	MYL, 2700pF		
C110	23T00138L17	ELY, 10 $\mu$ F/16V		
C111	23T00138L17	ELY, 10 $\mu$ F/16V		
C112	23T00138L77	ELY, 22 $\mu$ F/100V		
C113	23T00138L77	ELY, 22 $\mu$ F/100V		
C114	23T00161L06	ELY, 100 $\mu$ F/100V		
C115	23T00161L06	ELY, 100 $\mu$ F/100V		
C116	23T00138L20	ELY, 47 $\mu$ F/16V		
C117	23T00138L45	ELY, 1 $\mu$ F/50V		
C118	08T81196F25	MIC, 47pF		
C119	08T81196F25	MIC, 47pF		
C121	23T71210F23	ELY, BP 1 $\mu$ F/50V		
C122	08T93192F65	CER, 4700pF		
Resistors				
R149	06T73186F37	MO, 68 ohm 2W		
R150	06T73186F37	MO, 68 ohm 2W		
R151	06T92261F33	MF, 4.7 ohm 2W		
R155	06T92261F33	MF, 4.7 ohm 2W		
R158	06T92261F33	MF, 4.7 ohm 2W		
R159	06T92261F33	MF, 4.7 ohm 2W		
R160	06T63106F02	MPC, 0.22 ohm 5W		
R161	06T63106F02	MPC, 0.22 ohm 5W		
R162	06T63106F02	MPC, 0.22 ohm 5W		
R163	06T63106F02	MPC, 0.22 ohm 5W		
R164	06T63106F02	MPC, 0.22 ohm 5W		
R165	06T63106F02	MPC, 0.22 ohm 5W		
R166	06T92261F33	MF, 4.7 ohm 2W		
R167	06T92261F33	MF, 4.7 ohm 2W		
VR101	18C41732G07	SOL, Variable 1K ohm B		

Symbol No.	Part No.	Description		
Main-AMP(R)P.C. Board				
Transistors				
Q201	48T72597F01	2SA995		
Q202	48T72598F01	2SC2291		
Q203	48T72888F01	2SA1208		
Q204	48T72888F01	2SA1208		
Q205	48T71448F01	2SA1361		
Q206	48T71449F01	2SC3424		
Q207	48T62540F04	UN1214		
Q208	48T80986F01	2SC3378		
Q209	48T81444F01	2SA1335		
Q212	48T53301F01	2SC2240		
Q213	48T64240F02	2SC2344		
Q214	48T53301F01	2SC2240		
Q215	48T52545F01	2SA970		
Q216	48T47145F01	2SA1011		
Q217	48T52545F01	2SA970		
Q226	48T71752F01	FET, 2SJ109		
Q227	48T80991F01	FET, 2SK614		
Diodes/LEDs				
D201	48T68764F01	1S2471		
D202	48T68764F01	1S2471		
D203	48T73079F02	1SS82		
D204	48T68764F01	1S2471		
D205	48T68764F01	1S2471		
D206	48T73079F02	1SS82		
D207	48T68764F01	1S2471		
D208	48T68764F01	1S2471		
D209	48T68764F01	1S2471		
LD201	48T60971F01	LED, LTZ-R15 (BLU)		
LD202	48T60971F01	LED, LTZ-R15 (BLU)		
LD203	48T60971F01	LED, LTZ-R15 (BLU)		
ZD201	48T52741F17	ZEN, HZ7C-2L		
ZD202	48T52741F66	ZEN, HZ27-3L		
ZD203	48T40150U58	ZEN, HZ11C-1		
Capacitors				
C201	08T81196F34	MIC, 100pF		
C202	23T00138L78	ELY, BP 10 $\mu$ F/100V		
C203	08T81196F19	MIC, 33pF		
C204	08T81196F32	MIC, 82pF		
C205	23T00138L78	ELY, 33 $\mu$ F/100V		

Symbol No.	Part No.	Description		
C206	08S40656F25	MYL, 0.1 $\mu$ F		
C207	23T00138L78	ELY, 33 $\mu$ F/100V		
C208	08S40656F06	MYL, 2700pF		
C209	08S40656F06	MYL, 2700pF		
C210	23T00138L17	ELY, 10 $\mu$ F/16V		
C211	23T00138L17	ELY, 10 $\mu$ F/16V		
C212	23T00138L77	ELY, 22 $\mu$ F/100V		
C213	23T00138L77	ELY, 22 $\mu$ F/100V		
C214	23T00161L06	ELY, 100 $\mu$ F/100V		
C215	23T00161L06	ELY, 100 $\mu$ F/100V		
C216	23T00138L20	ELY, 47 $\mu$ F/16V		
C217	23T00138L45	ELY, 1 $\mu$ F/50V		
C218	08T81196F25	MIC, 47pF		
C219	08T81196F25	MIC, 47pF		
C221	23T71210F23	ELY, BP 1 $\mu$ F/50V		
C222	08T93192F65	CER, 4700pF		
Resistors				
R249	06T73186F37	MO, 68 ohm 2W		
R250	06T73186F37	MO, 68 ohm 2W		
R251	06T92261F33	MF, 4.7 ohm 2W		
R255	06T92261F33	MF, 4.7 ohm 2W		
R258	06T92261F33	MF, 4.7 ohm 2W		
R259	06T92261F33	MF, 4.7 ohm 2W		
R260	06T63106F02	MPC, 0.22 ohm 5W		
R261	06T63106F02	MPC, 0.22 ohm 5W		
R262	06T63106F02	MPC, 0.22 ohm 5W		
R263	06T63106F02	MPC, 0.22 ohm 5W		
R264	06T63106F02	MPC, 0.22 ohm 5W		
R265	06T63106F02	MPC, 0.22 ohm 5W		
R266	06T92261F33	MF, 4.7 ohm 2W		
R267	06T92261F33	MF, 4.7 ohm 2W		
VR201	18C41732G07	SOL, Variable 1K ohm B		
Power Supply P.C. Board				
IC's				
IC301	51T67437F01	TA7817P		
IC302	51T72375F01	NJM78M12A		

Symbol No.	Part No.	Description		
Diodes				
D301	48S40477U01	1N4003		
D302	48S40477U01	1N4003		
D303	48S40477U01	1N4003		
D304	48S40477U01	1N4003		
D305	48S40477U01	1N4003		
D306	48S40477U01	1N4003		
D307	48S40477U01	1N4003		
Capacitors				
C301	23T00138L18	ELY. 22 $\mu$ F/16V		
C303	23T00138L18	ELY. 22 $\mu$ F/16V		
C305	23T00138L19	ELY. 33 $\mu$ F/16V		
C306	23T00138L18	ELY. 22 $\mu$ F/16V		
C307	23T00138L31	ELY. 100 $\mu$ F/25V		
C308	23T00138L33	ELY. 330 $\mu$ F/25V		
C309	23T00138L45	ELY. 1 $\mu$ F/50V		
C310	21T68834F01	CER. 0.01 $\mu$ F		
C311	21T68834F01	CER. 0.01 $\mu$ F		
C312	21T68834F01	CER. 0.01 $\mu$ F		
C315	23T00138L44	ELY. 0.47 $\mu$ F/50V		
C316	23T81246F01	ELY. 1000 $\mu$ F/100V		
C317	23T81246F01	ELY. 1000 $\mu$ F/100V		
C318	08S40656F14	MYL. 0.012 $\mu$ F		
C320	08T52448F01	PP. 330pF		
Speaker Terminal P.C. Board				
Diodes				
D401	48S40477U01	1N4003		
D402	48S40477U01	1N4003		
Coils				
L401	24T67517F02	Choke. 1.8 $\mu$ H		
L402	24T67517F02	Choke. 1.8 $\mu$ H		
Relays				
RL401	80T95141F01	DE2T(DC12V)		
RL402	80T95141F01	DE2T(DC12V)		

Symbol No.	Part No.	Description		
Capacitors				
C401	08S40656F25	MYL. 0.1 $\mu$ F		
C402	08S40656F25	MYL. 0.1 $\mu$ F		
C403	08S40656F25	MYL. 0.1 $\mu$ F		
C404	08S40656F25	MYL. 0.1 $\mu$ F		
Resistors				
R401	06T92265F01	MF. 10 ohm 3W		
R402	06T92265F01	MF. 10 ohm 3W		
R407	06T83854F02	MO. 10 ohm 3W		
R408	06T83854F02	MO. 10 ohm 3W		
Drive-LED P.C. Board				
Transistors				
Q851	48T62539F03	UN1113		
Q852	48T62539F03	UN1113		
Q853	48T62540F03	UN1213		
Q854	48T62540F03	UN1213		
Q855	48T62539F03	UN1113		
Diodes				
D851	48T68764F01	1S2471		
D852	48T68764F01	1S2471		
ZD851	48T52741F66	ZEN. HZ27-3L		
ZD852	48T52741F66	ZEN. HZ27-3L		
Capacitors				
C851	23S57007F05	ELY. 1 $\mu$ F 50V		
C852	23S57007F05	ELY. 1 $\mu$ F 50V		
C853	23S57007F11	ELY. 22 $\mu$ F 16V		
Input P.C. Board				
Jacks				
J501	09T92606F01	Input. 2P T5880(Gold)		
J502	09T92606F01	Input. 2P T5880(Gold)		



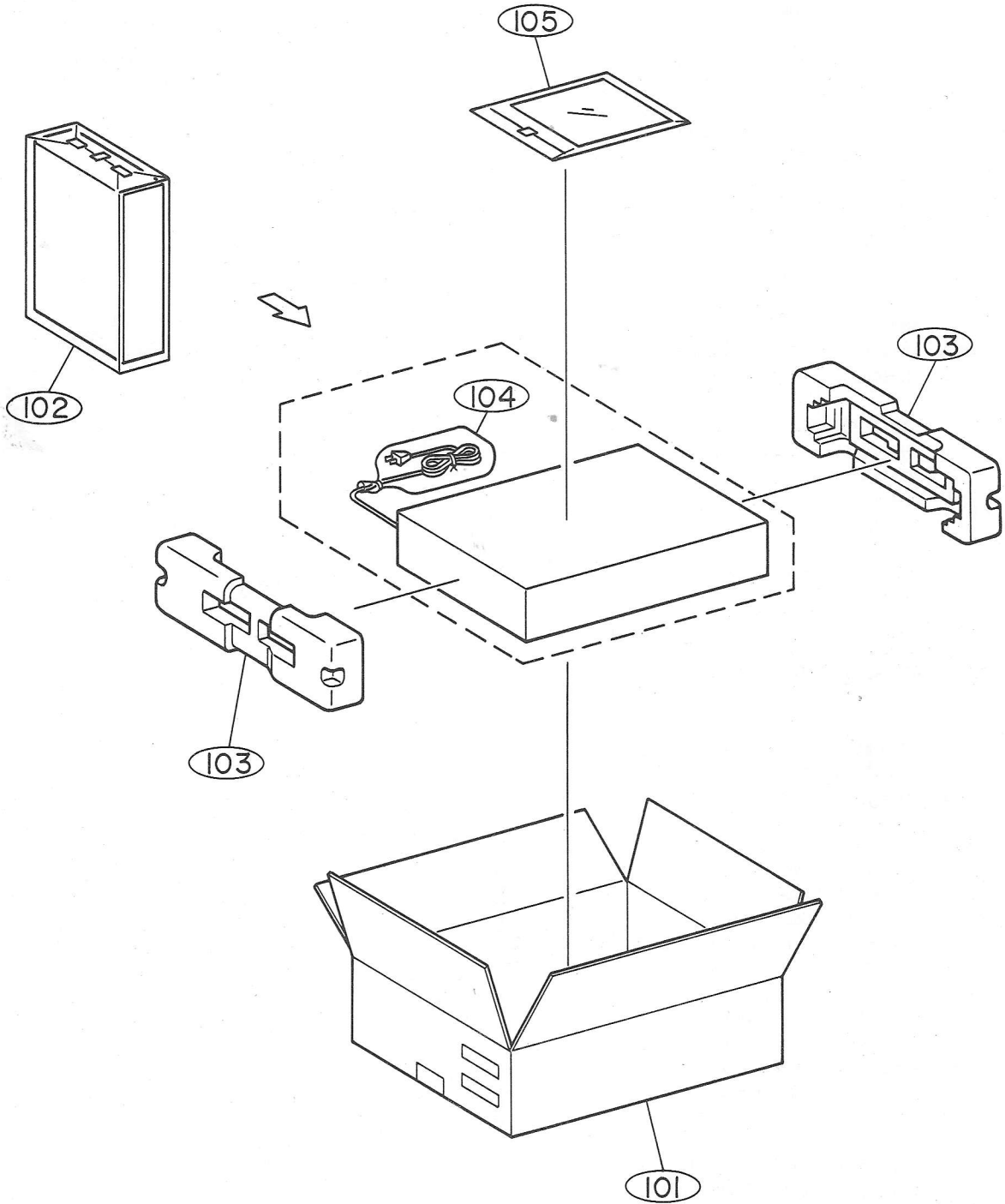
Symbol No.	Part No.	Description		
<b>Switch</b>				
S501	40T92287F01	Slide		
<b>Volumes</b>				
VR501	18T94228F01	Rotary RK09K113 50K-B		
VR502	18T94228F01	Rotary RK09K113 50K-B		
LED Clip P.C. Board				
<b>Diodes</b>				
LD853	48T66616F02	LED, SLR-54VR3 (RED)		
LD854	48T66616F02	LED, SLR-54VR3 (RED)		
O/B LED P.C. Board				
<b>Diodes</b>				
LD851	48T60488F01	LED, SLR-54DU3 (ORG)		
LD852	48T68847F01	LED, SLR-54MC3 (GRN)		
Miscellaneous				
BD01	48T64237F01	Diode, Bridge S15VB40		
BD02	48T64237F01	Diode, Bridge S15VB40		
C01	23T92290F01	Cap, ELY 15000 $\mu$ F-90V		
C02	23T92290F01	Cap, ELY 15000 $\mu$ F-90V		
C03	23T92290F01	Cap, ELY 15000 $\mu$ F-90V		
C04	23T92290F01	Cap, ELY 15000 $\mu$ F-90V		
C05	08T57437F11	Cap, CER 0.01 $\mu$ F		
E401	09T94226F01	Terminal, Speaker 2P		
E402	09T94226F01	Terminal, Speaker 2P		
F301	65T66926F16	Fuse, 51NM 2A-125V		
F302	65T66926F16	Fuse, 51NM 2A-125V		
F303	65T66926F16	Fuse, 51NM 2A-125V		
F901	65T94227F01	Fuse, Buss MDA 20A-250V		
or	65T94671F37	Fuse, 326 20A-250V		
P01	28T66838F01	AC Power Cord		

Symbol No.	Part No.	Description		
Q110	48T62642F01	Tr, 2SC2336		
Q111	48T62641F01	Tr, 2SA1006		
Q118	48T69177F01	Tr, 2SA1358		
Q119	48T81856F02	Tr, 2SA1216		
Q120	48T81856F02	Tr, 2SA1216		
Q121	48T81856F02	Tr, 2SA1216		
Q122	48T81857F02	Tr, 2SC2922		
Q123	48T81857F02	Tr, 2SC2922		
Q124	48T81857F02	Tr, 2SC2922		
Q125	48T69176F02	Tr, 2SC3421		
Q128	48T71447F01	Tr, 2SC2752		
Q129	48T71482F01	Tr, 2SA1156		
Q210	48T62642F01	Tr, 2SC2336		
Q211	48T62641F01	Tr, 2SA1006		
Q218	48T69177F02	Tr, 2SA1358		
Q219	48T81856F02	Tr, 2SA1216		
Q220	48T81856F02	Tr, 2SA1216		
Q221	48T81856F02	Tr, 2SA1216		
Q222	48T81857F02	Tr, 2SC2922		
Q223	48T81857F02	Tr, 2SC2922		
Q224	48T81857F02	Tr, 2SC2922		
Q225	48T69176F02	Tr, 2SC3421		
Q228	48T71447F01	Tr, 2SC2752		
Q229	48T71482F01	Tr, 2SA1156		
S01	40T80736F01	Switch, Push(Power)		
T01	25T92711F01	Trans. Power		

## Packing Assembly Parts List

Symbol No.	Part No.	Description		
101	56S83833F39	Carton, Packing		
102	56B63425F04	Sack, Polyethylene		
103	56D90622F01	Tray, Packing		
104	56B40230G08	Sack, Polyethylene		
105	68P83710F03	Owner's, Manual		

# Packing Method View

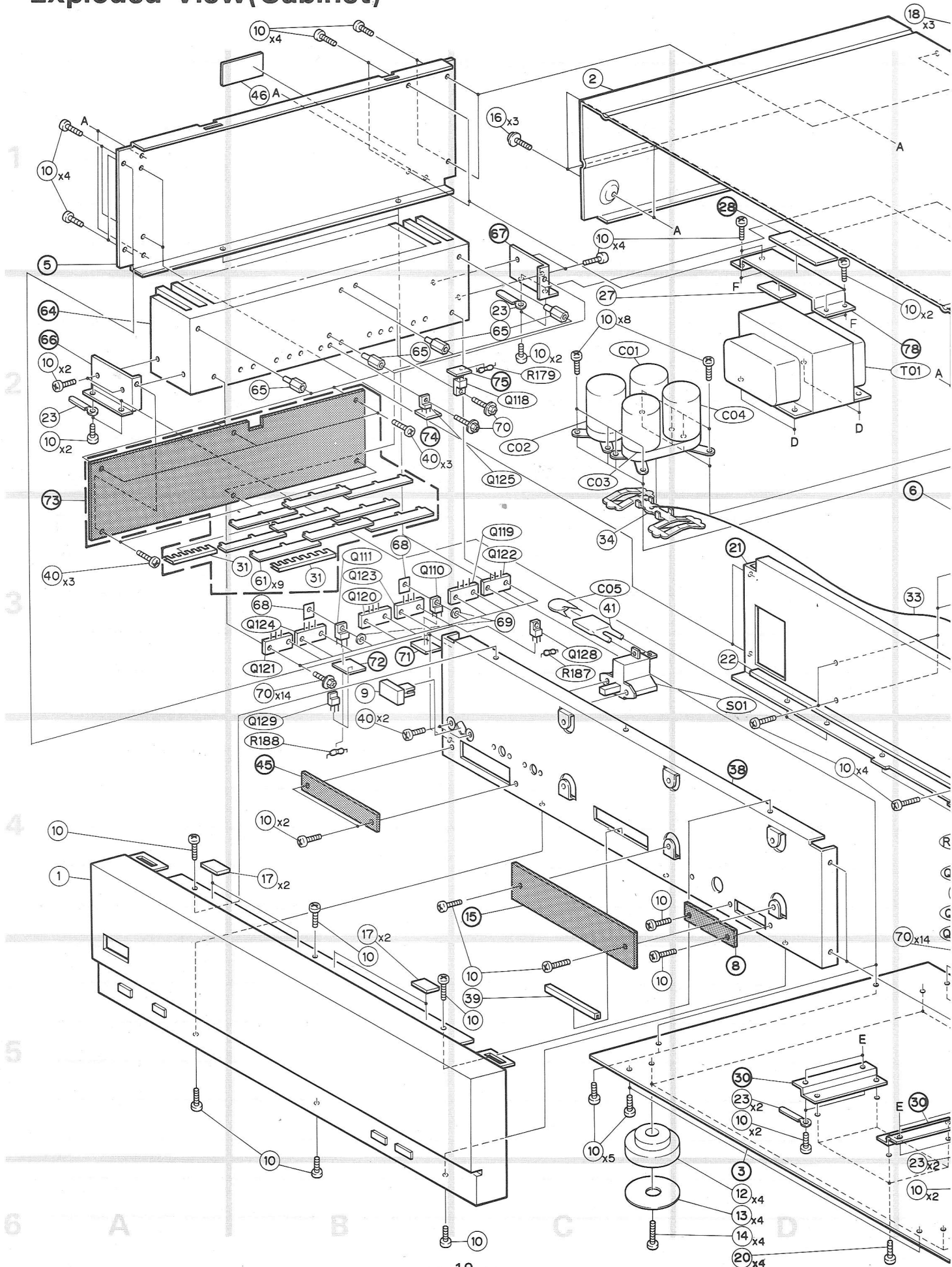


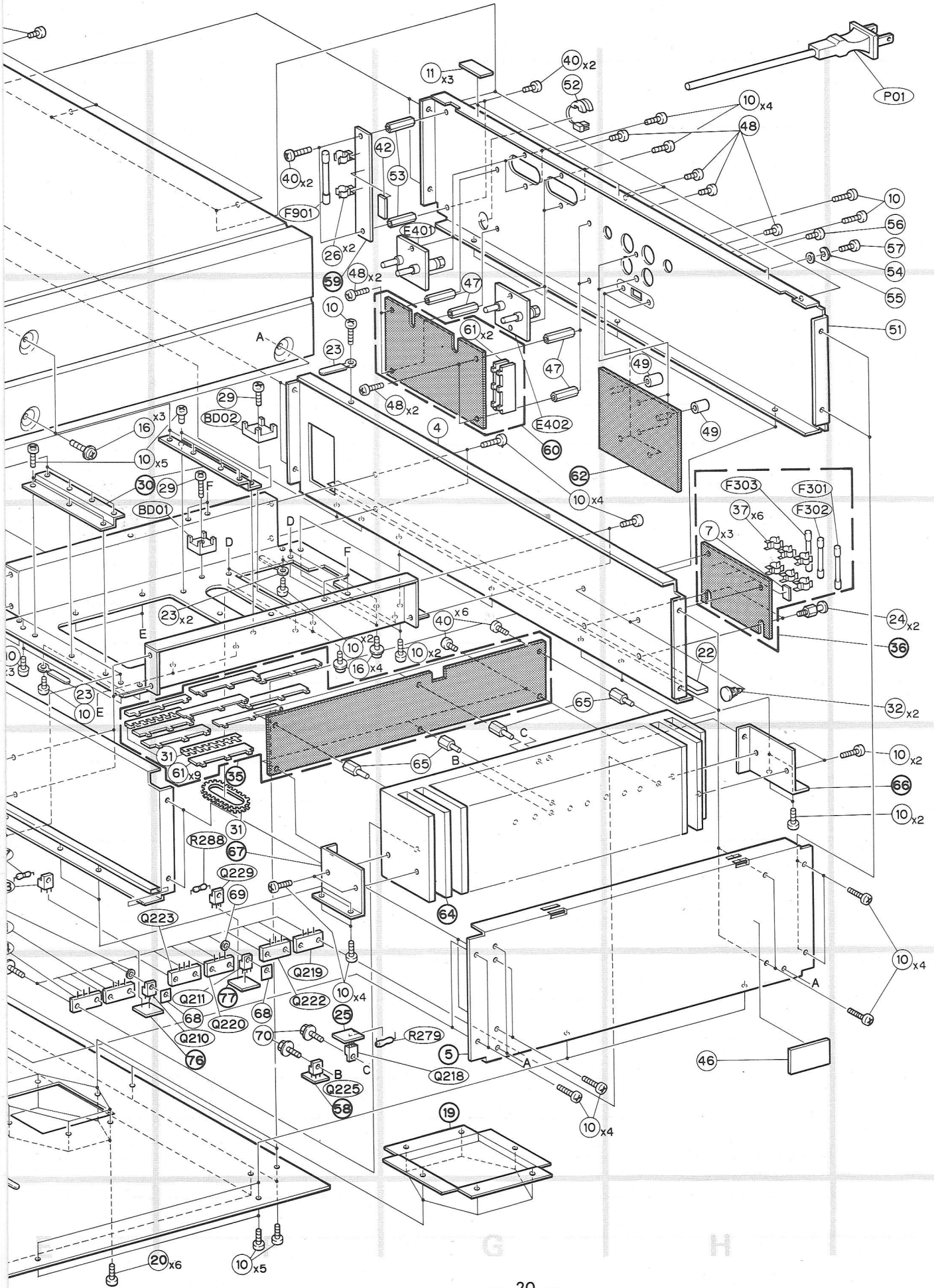
# Cabinet Assembly Parts List

Note: The parts without part numbers are not supplied.

Symbol No.	IN-dex	Part No.	Description	Symbol No.	IN-dex	Part No.	Description
1	4-A	01V93700F54	Assy., Front Panel	65		47C64899F48	Shaft, PCB L=7
2	1-C	15D80717F01	Cover, Top	68		43T94356F01	Spacer
4	2-G	27C90615F01	Chas., Channel Rear	69	4-F	43T45472F01	Bushing, YC40B
7	3-H	54B62266F13	Label, Fuse 2A-125V	70	5-F	03C40121T28	Screw, W/Double Washer (M3x7.5)
9	3-B	36A94152F01	Knob, Push Power				
10		03S40012G93	Screw, Tapping(M3x8)				
11	1-G	14S53018F42	Insulator, (50x5)				
12	6-D	75B80720F02	Trannleg				
13	6-D	75A80719F01	Pad, Trannleg				
14	6-D	03S83857F10	Screw, Tapping(M4x12)				
16		03S40036U01	Screw, W/Washer(M4x8)				
17	4-B	75S62361F60	Cushion, Rubber				
18	1-E	03S81717F01	Screw, Round(M3x6)				
20	6-E	03S44205C02	Screw, Pan(M3x6)				
22	3-D	14S53018F68	Insulator, 1418				
23		29C41045P05	Lug, Wrap 54mm				
24	3-I	47A90966F01	Shaft, PCB L=6				
26	1-F	09T51960F01	Holder, Fuse				
27	2-C	14S81482F51	Insulator, Cover				
29	2-F	03S63857F07	Screw, Tapping(M4x16)				
31	3-B	43A74626F01	Bushing, Wire				
32	3-I	43T92024F02	KGLS-6RT				
33	3-E	01T92306F01	Assy., CWV Lug				
34	3-C	07A92296F01	Bracket, Cap.				
37	3-H	09T51410F01	Holder, Fuse				
39	5-C	14S53017F64	Insulator, Cover				
40	2-E	03S43997P76	Screw, Bind(M3x6)				
41	3-C	43T53136F01	Bush, Cap.				
42	1-G	54B62266F56	Label, Fuse 20A-250V				
43		01T90417F45	Assy., Wire Lug(GRY)				
44		01T90417F46	Assy., Wire Lug(RED)				
46	5-H	54A63997F01	Label, Fuse Caution				
47	2-G	47C64899F58	Shaft, PCB L=8				
48		03S43997P19	Screw, Bind(M3x5)				
49		75A94863F01	Spacer, Volume				
50		01T90417F47	Assy., Wire Lug(BRN)				
51	2-I	15D90617F03	Cover, Rear				
52	1-G	43B41625J05	Stopper, Cord				
53	1-G	47C64899F47	Shaft PCB L=10.5				
54	1-I	43A61764F01	Spacer				
55	2-I	04A53398F02	Washer, Nylon(M3)				
56	1-I	03S43997P83	Screw, Bind(M2.6x4)				
57	1-I	03S43997P67	Screw, Round(M2.6x6)				
61		07A80846F01	Bracket, Power Bus "A"				
63		01T90417F44	Assy., Wire Lug(WHT)				

# Exploded View(Cabinet)

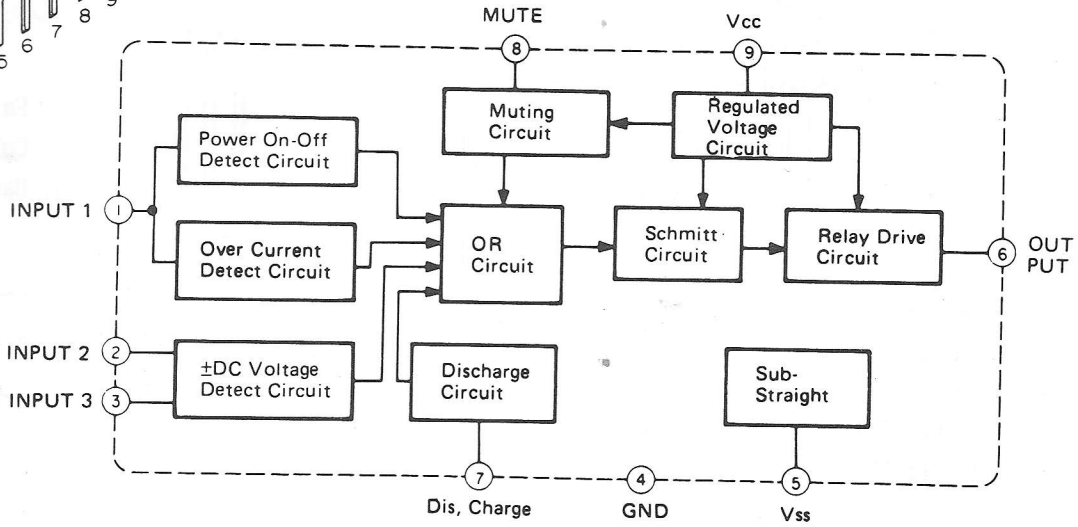
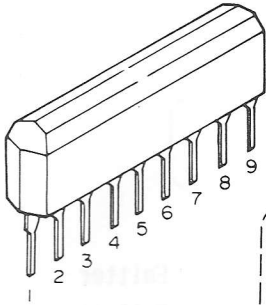




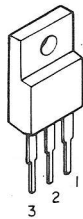


# Semi-Conductor Lead Identifications

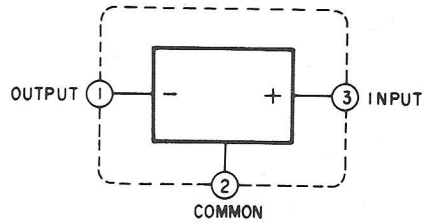
TA7317P: IC301



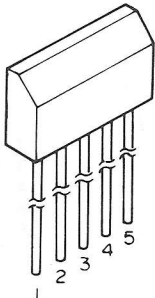
NJM78M12A: IC302



- 1. Output
- 2. Common
- 3. Input



2SA995 :Q101,201  
2SC2291:Q102,202



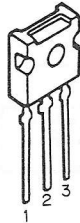
- 1. Emitter 1
- 2. Collector 1
- 3. Base (Common)
- 4. Collector 2
- 5. Emitter 2

2SA1208:Q103,104,203,204



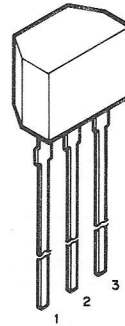
- 1. Emitter
- 2. Collector
- 3. Base

2SA1361:Q105,205  
 2SA1358:Q118,218  
 2SC3424:Q106,206  
 2SC3421:Q125,225



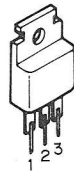
- 1. Emitter
- 2. Collector
- 3. Base

2SA1335:Q109,209  
 2SC3378:Q108,208



- 1. Emitter
- 2. Collector
- 3. Base

2SA1006:Q111,211  
 2SA1011:Q116,216  
 2SC2336:Q110,210  
 2SC2344:Q113,213



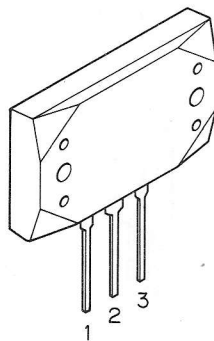
- 1. Emitter
- 2. Collector
- 3. Base

2SA970 :Q115,117,215,217  
 2SC2240:Q112,114,212,214



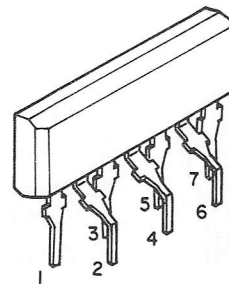
- 1. Emitter
- 2. Collector
- 3. Base

2SA1216:Q119,120,121,219,220,221  
 2SC2922:Q122,123,124,222,223,224



- 1. Base
- 2. Collector
- 3. Emitter

2SJ109:Q126,226



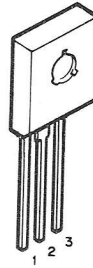
- 1. Drain 1
- 2. Gate 1
- 3. Source 1
- 4. Sub-straight
- 5. Source 2
- 6. Gate 2
- 7. Drain 2

2SK614:Q127,227



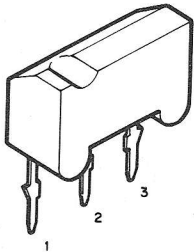
- 1. Source
- 2. Drain
- 3. Gate

2SA1156:Q129,229  
2SC2752:Q128,228

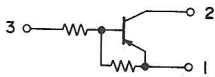


- 1. Emitter
- 2. Collector
- 3. Base

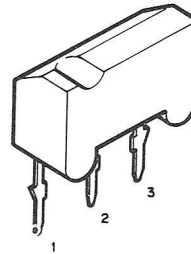
UN1113:Q851,852,855



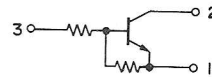
- 1. Emitter
- 2. Collector
- 3. Base



UN1213:Q853,854  
UN1214:Q107,207



- 1. Emitter
- 2. Collector
- 3. Base



IF unit has DC at output, check R106 or  
R206 (10K $\Omega$ ) for being open

IF unit is ~~not~~ has bad FET Q127, 25K~~14~~<sup>614</sup>, use  
NTE491 (we have them in stock).



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Phone: 03-493-4381 Facsimile: 03-494-8426