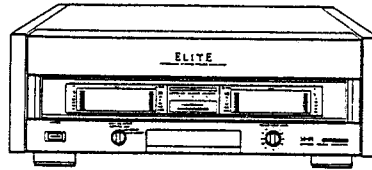


Service Manual

PIONEER
The future of sound and vision.



**ORDER NO.
ARP1634**

STEREO POWER AMPLIFIER

M-91

M-90a

M-91 AND M-90a HAVE FOUR VERSIONS:

Type	Applicable model		Power requirement	Destination
	M-91	M-90a		
KU/CA	○	—	AC120V only	U.S.A. and Canada
HE	—	○	AC220V,240V (switchable)*	European continent
HB	—	○	AC220V,240V (switchable)*	United Kingdom
HEZ	—	○	AC220V,240V (switchable)*	West Germany

*Change the primary winding of the power transformer

- This manual is applicable to the M-91/KU/CA, M90a/HE,HB and HEZ types.
- For the M90a/HE,HB and HEZ types, refer to page 24.

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MC-Service

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YO JULY 1988 Printed in Japan

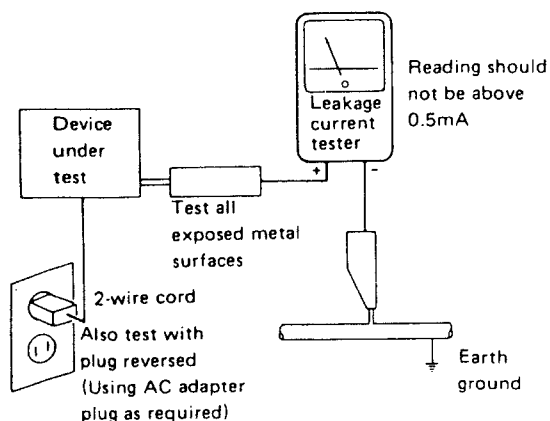
1. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a Δ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. EXPLODED VIEWS AND PARTS LIST

NOTES:

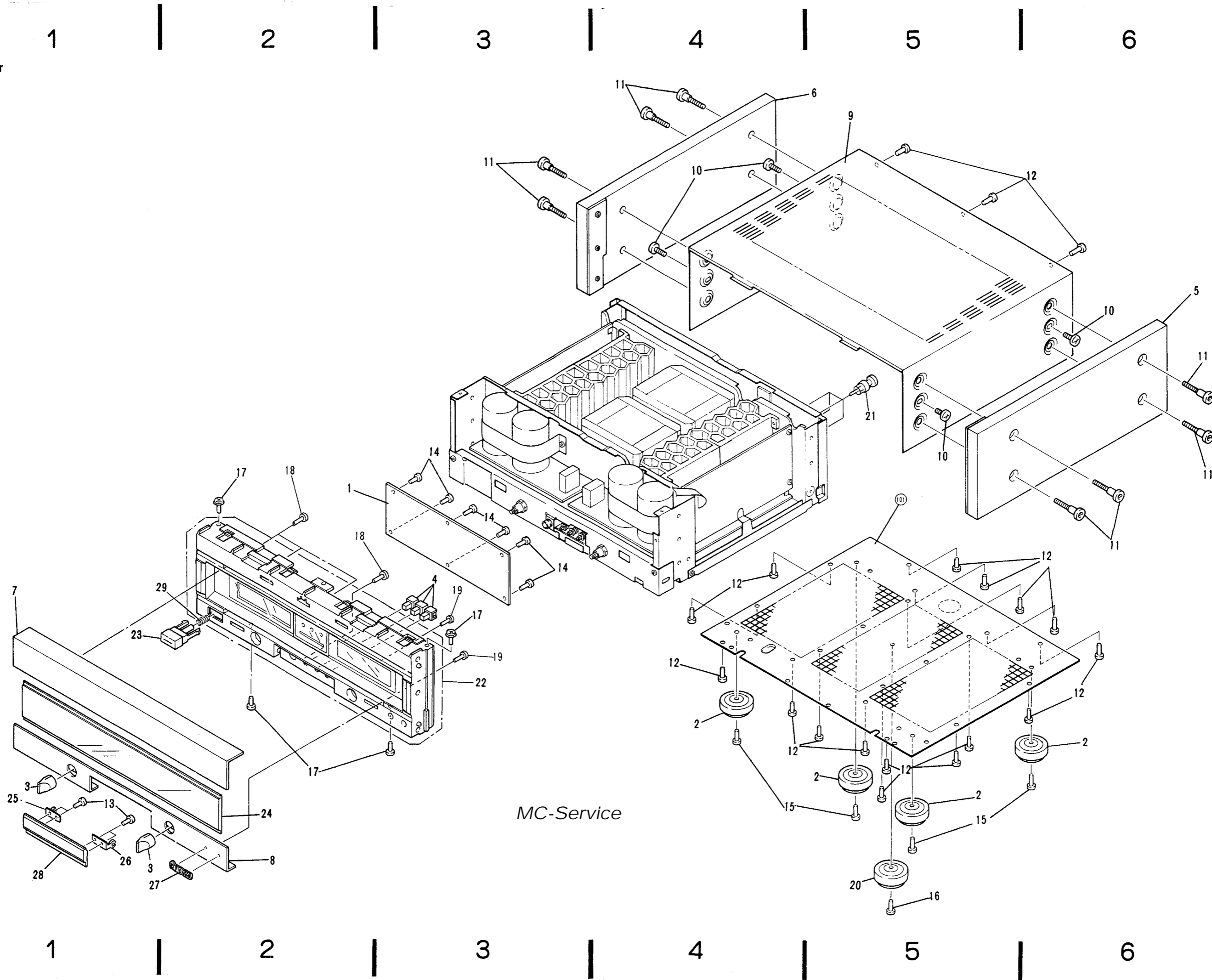
- Parts without part number cannot be supplied.
- The \triangle mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

2.1 Exterior

Parts List of Exterior

Mark	No.	Parts No.	Description
	1	AWZ2041	FL assembly
	2	AMR1159	Leg assembly
	3	AAB1002	Knob (INPUT SELECTOR,CD INPUT LEVEL)
	4	AAV-251	Knob (DISPLAY,SPEAKERS)
	5	AMS1030	Side board R
	6	AMS1029	Side board L
	7	ANB1242	Front panel A
	8	ANB1232	Front panel B
	9	ANE1008	Bonnet case
	10	FBT40P080FZK	Screw
	11	ABA1023	Decorative screw
	12	ABA1048	Screw
	13	CMZ30P050FZB	Screw
	14	ABA-298	Screw
	15	ABA1004	Screw
	16	VMZ30P080FCU	Screw
	17	ABA1011	Screw
	18	VMZ30P060FMC	Screw
	19	VMZ30P080FMC	Screw
	20	AMR1158	Leg assembly
	21	AKM-050	Shorted pin-plug
	22	AZN1826	Front panel assembly
	23	AAD1012	Knob (POWER)
	24	AAK1186	Acrylic panel
	25	AAK1032	Door arm (L)
	26	AAK1033	Door arm (R)
	27	AAM1001	Name plate
	28	AAN1008	Door
	29	ABH1005	Coil spring
	101		Bottom plate

exterior



A

B

C

D



1

2

3

4

5

6

Interior

A

B

C

D

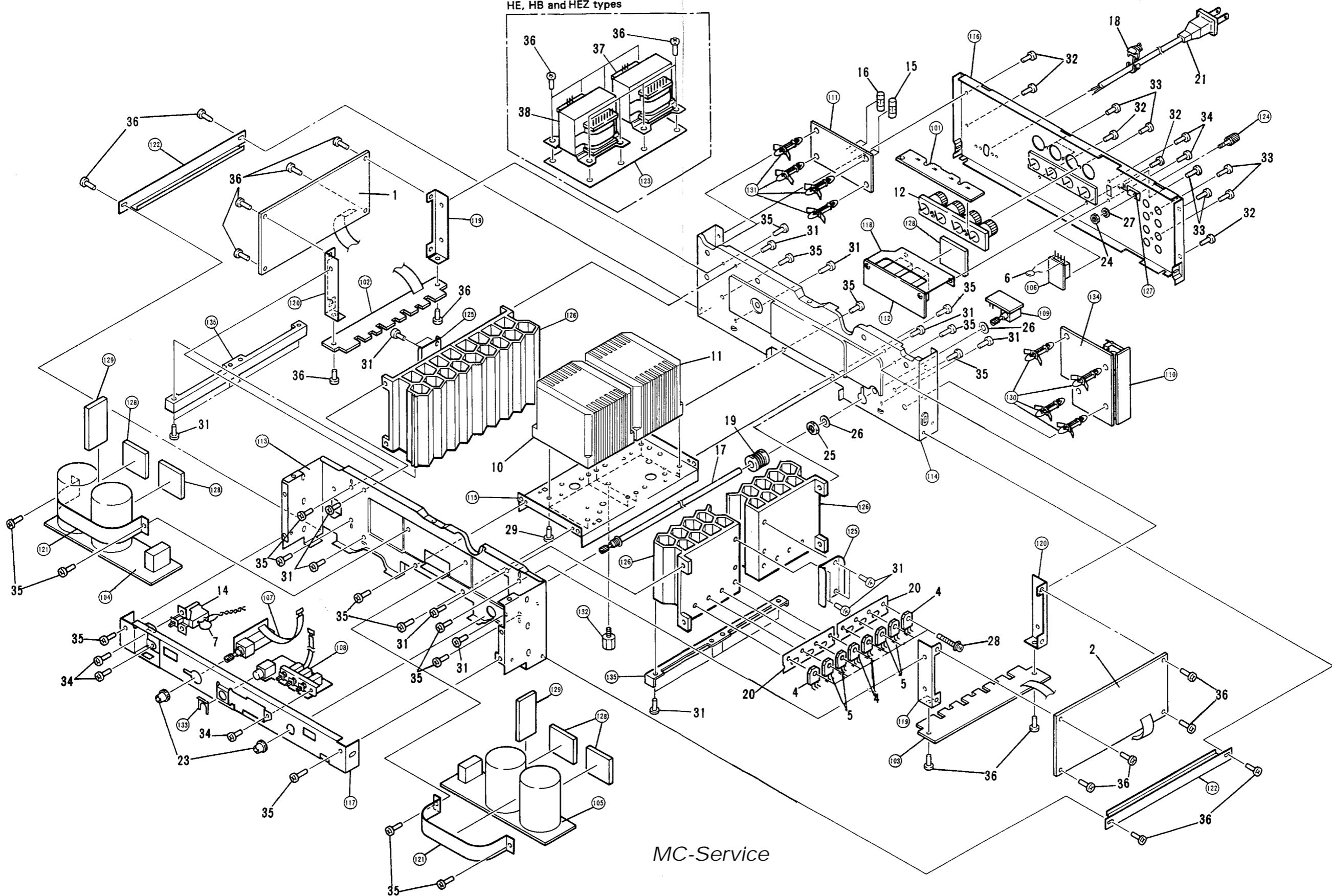
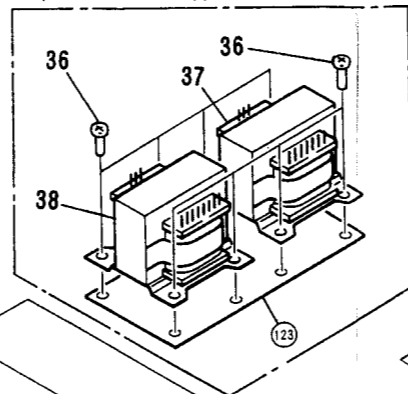
A

B

C

D

HE, HB and HEZ types



MC-Service

1

2

3

4

5

6

2.2 Interior

NOTES:

- *Parts without part number cannot be supplied.*
- *The \triangle mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by “ \odot ” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

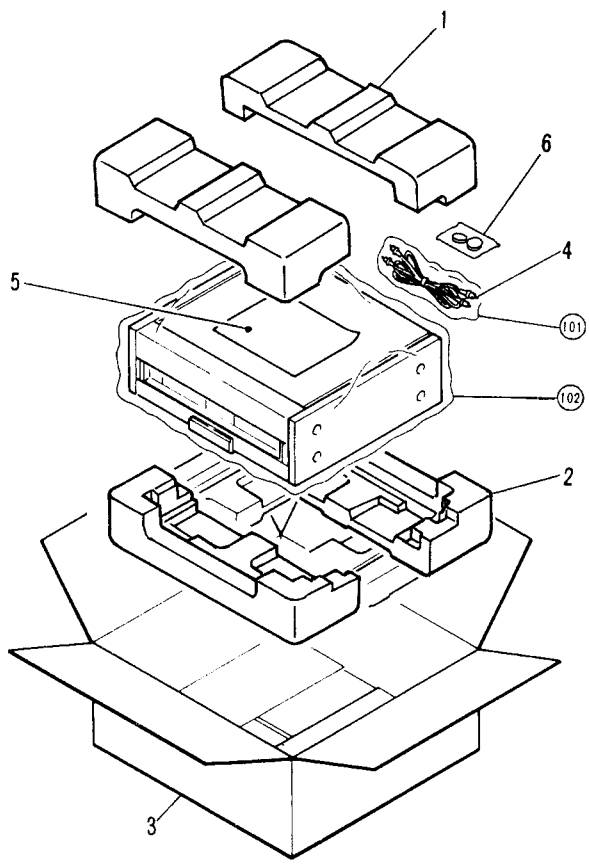
Part List of Interior

Mark	No.	Parts No.	Description	Mark	No.	Parts No.	Description
	1	AWZ2033	Power amp A assembly		101		SP Terminal A assembly (For HEZ type)
	2	AWZ2034	Power amp B assembly				
	3	.....	.....		102		Power amp C assembly
	4	2SA1516P	Transister (Q1-Q8)		103		Power amp D assembly
	5	2SC3907P	Transister (Q9-Q16)		104		Chemical condenser L assembly
					105		Chemical condenser R assembly
	6	CKDYF473Z50	Capacitor (C521)				
\triangle	7	ACG1003	Capacitor (C503)		106		Switch A assembly
	8	.....	.....		107		Switch B assembly
	9	.....	.....		108		Switch C assembly
\triangle	10	ATS1153	Power transformer (T1) (120V)		109		Volume assembly
					110		Pin jack assembly
\triangle	11	ATS1154	Power transformer (T2) (120V)		111		Fuse assembly
					112		Relay assembly
	12	AKE1003	Terminal 4P (SPEAKER)		113		Front frame
	13	.....	.....		114		Rear frame
	14	ASG-553	Switch (POWER)		115		Frame (Transformer frame)
\triangle	15	AEK-119	Fuse (FU5,FU6) (1A)				
					116		Rear panel
\triangle	16	AEK1002	Fuse (FU1,FU2) (8A)		117		Panel stay
	17	AXA1006	Long shaft assembly		118		P.C.B.Holder-F
\triangle	18	AEC-327	Strain relief		119		P.C.B.Holder-A
	19	AEP-098	Unibersal joint		120		P.C.B.Holder-B
	20	AMR1021	Mica sheet				
					121		Holder (Chemical condenser)
\triangle	21	ADG-077	AC Power cord		122		Side frame
	22	.....	.....		123		Damper plate
	23	ABN-028	Nut				(For HE, HB and HEZ types)
	24	NK70FUC	Nut		124		Terminal
	25	NK90FUC	Nut		125		Holder (Heat sink)
	26	ABE1001	Washer		126		Heat sink
	27	WG70FUC	Washer		127		Earth plate
	28	ABA-297	Screw		128		Shield cushion
	29	ABA1034	Screw		129		Cushion
	30	.....	.....		130		P.C.B.Support
	31	ABA-298	Screw		131		P.C.B.Support
	32	ABA1048	Screw		132		Sound pillar
	33	ABA1006	Screw (3 x 8)		133		Mount plate
	34	VMZ30P060FMC	Screw		134		Buffer amp assembly
	35	ABA1009	Screw		135		Holder (Heat sink)
	36	ABA 1014	Screw				
	37	ATS1012	Power transformer (T2) (220V,240V) (For HE, HB and HEZ types)				
	38	ATS1011	Power transformer (T1) (220V,240V) (For HE, HB and HEZ types)				

3. PACKING

Part List of Packing

Mark	No.	Parts No.	Description
	1	AHA1033	Top pad
	2	AHA1034	Bottom pad
	3	AHD1486	Packing case
	4	ADE1013	Connection cord with plug
	5	ARB1125	Operating instruction (English)
	6	AEA1010	Spacer
101			Vinyl
102			Seat



4. ELECTRICAL PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560 Ω	56 \times 10 ¹	561.....	RD1/4PS	Δ	Δ	J
47k Ω	47 \times 10 ³	473.....	RD1/4PS	Δ	Δ	J
0.5 Ω	0R5.....		RN2H	Δ	Δ	K
1 Ω	010.....		RS1P	Δ	Δ	K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω	562 \times 10 ¹	5621.....	RN1/4SR	Δ	Δ	F
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Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	Power amp A assembly	AWZ2033
	Power amp B assembly	AWZ2034
	FL assembly	AWZ2041
	Buffer amp assembly	
	Power amp C assembly	
	Power amp D assembly	
	Chemical condenser L assembly	
	Chemical condenser R assembly	
	Switch A assembly	
	Switch B assembly	
	Switch C assembly	
	Volume assembly	
	Pin jack assembly	
	Fuse assembly	
	Relay assembly	

Mark	Symbol & Description	Part No.
Δ	Strain relief	AEC-327
Δ	AC Power cord	ADG-077

Power amp A assembly (AWZ2033)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC101	PA0016
	Q115,Q121,Q134	2SA1145P
	Q131	2SA965
	Q125A	2SA968B
	Q113	2SA992
	Q137	2SB750A
	Q103,Q105,Q107,Q109,Q111,	2SC1845
	Q127	
	Q129	2SC2235
	Q123A	2SC2238B
	Q117,Q119	2SC2705P
	Q136	2SD836A
	Q135,Q148	2SD880
	Q101	2SK129A
	D148	RD12EB
	D131,D132	RD13EB
	D115,D117,D119,D121	RD39EB
	D105,D107,D141,D143,D145,	1SS252
	D147	
	D123,D125	1S2471
	D127-D130	10E2FD
	D101,D103,D109,D111,D113	11E2

OTHERS

Mark	Symbol & Description	Part No.
Δ	Q1-Q8	2SA1516P
Δ	Q9-Q16	2SC3907P
Δ	S1 Push switch (POWER)	ASG-553
Δ	T1 Power transformer (Lch,120V)	ATS1153
Δ	T2 Power transformer (Rch,120V)	ATS1154
Δ	C503 Ceramic capacitor (0.01 μ F/125V)	ACG1003
Δ	C521 (0.047/50V)	CKDYF473Z50
Δ	FU5,FU6 Fuse (1A/125V)	AEK-119
Δ	FU1,FU2 Fuse (8A/125V)	AEK1002

COIL & TRANSFORMER

Mark	Symbol & Description	Part No.
	L101 AF choke coil	ATH1001

CAPACITORS

Mark	Symbol & Description	Part No.
	C113 (0.01 μF/100)	ACE1018
	C127, C129 (0.1 μF/100)	ACE1019
	C105 (470 μF/50)	ACH-455
	C125 Electrolytic capacitor	CEANP2R2M100
	C147, C148, C156	CEAS100M50
	C141, C142	CEAS101M16
	C139	CEAS102M25
	C144-C146, C153, C155	CEAS470M25
	C140	CEAS471M25
	C131, C133, C135, C137	ACH1092
	C121, C123 Mica capacitor	CMA101J500
	C119 Mica capacitor	ACE1013
	C101 Mica capacitor	ACE1014
	C107, C109 Mica capacitor	ACE1022
	C115, C117 Mica capacitor	ACE1024
	C111	ACE1026
	C103	ACE1029

RESISTORS

Mark	Symbol & Description	Part No.
	R169, R241	RS1LMF□□□J
	R171, R177, R179, R267	RS2LMF□□□J
	R244-R246, R268, R269	RD1/4PM□□□J
	R123, R125, R133, R137, R151, R153, R157, R159, R161, R173, R175	RFA1/4PS□□□J
	R242, R243	RD1/2PM152J
	R105, R121, R129, R131, R135, R259	RDR1/2PM□□□J
	R155	RD1/4PML681J
	R139, R141	RD1/4PM121J
	Other resistors	RDR1/4PM□□□J

Power amp B assembly (AWZ2034)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC102	PA0016
	Q116, Q122	2SA1145P
	Q132	2SA965
	Q126A	2SA968B
	Q114, Q142	2SA992
	Q104, Q106, Q108, Q110, Q112, Q128, Q138, Q139, Q140, Q141, Q143	2SC1845

Mark	Symbol & Description	Part No.
	Q130	2SC2235
	Q124A	2SC2238B
	Q144, Q146, Q147	2SC2603
	Q118, Q120	2SC2705P
	Q145	2SD438
	Q133	2SD836A
	Q102	2SK129A
	D134	HZS6CL
	D116, D118, D120, D122	RD39EB
	D106, D108, D140, D142, D144, D146	1SS252
	D124, D126	1S2471
	D102, D104, D110, D112, D114, D133, D135, D153, D154	11E2

COIL & TRANSFORMER

Mark	Symbol & Description	Part No.
	L102 AF choke coil (2.7 μH)	ATH1001

CAPACITORS

Mark	Symbol & Description	Part No.
	C114	ACE1018
	C128, C130	ACE1019
	C106	ACH-455
	C126 Electrolytic capacitor	CEANP2R2M100
	C157	CEAS220M25
	C151	CEAS330M16
	C149, C150	CEAS331M10
	C143	CEAS470M25
	C152, C158	CEAS6R8M50
	C132, C134, C136, C138	ACH1092
	C154	CKCYB102K50
	C122, C124 Mica capacitor	CMA101J500
	C120 Mica capacitor	ACE1013
	C102 Mica capacitor	ACE1014
	C108, C110 Mica capacitor	ACE1022
	C116, C118 Mica capacitor	ACE1024
	C112	ACE1026
	C104	ACE1029

RESISTORS

Mark	Symbol & Description	Part No.
	R170, R256	RS1LMF□□□J
	R172, R178, R180	RS2LMF□□□J
	R140, R142	RD1/4PMF□□□J
	R249-R255, R266	RD1/4PM□□□J
	R124, R126, R134, R138, R152, R154, R158, R160, R162, R174, R176, R248	RFA1/4PS□□□J

Mark	Symbol & Description	Part No.
	R156	RD1/4PMFL681J
	R106, R122, R130, R132, R136, R258	RDR1/2PM□□□J
	Other resistors	RDR1/4PM□□□J

FL assembly (AWZ2041)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC404	LC7555
	IC401-IC403	NJM4558DXC
	Q401	2SC1740S
	D412-D414	AEL-460
	D436	RD8.2ESB3
	D401-D410, D433-D435	1SS252
	TH401, TH402	TH101-2

CAPACITORS

Mark	Symbol & Description	Part No.
	C411	CEASR68M50
	C407, C408	CEASO10M50
	C417	CEAS100M25
	C401, C402	CEAS100M50
	C409, C410	CEAS2R2M50
	C405, C406	CEJA100M16
	C412	CQMA102J50

RESISTORS

Mark	Symbol & Description	Part No.
	R441-R443	RD1/4PM□□□J
	R449-R452	RS1LMF4R7J
	Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	V401, V402	AAV1003
	Fluorescent indicator tube	AEL1006
	PL401 Pilot lamp	AEL1007
	PL402 Pilot lamp	

Buffer amp assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	Q307, Q308	2SA992
	Q305, Q306	2SC1845
	Q303, Q304	2SJ74
	Q301, Q302	2SK170
	D301, D302	11E2

SWITCHES & RELAYS

Mark	Symbol & Description	Part No.
	RY301, RY302 Relay (INPUT SELECTOR)	ASR101B

CAPACITORS

Mark	Symbol & Description	Part No.
	C309, C310	CEYANP220M50

RESISTORS

Mark	Symbol & Description	Part No.
	R339	RD1/4PMO10J
	Other resistors	RDR1/4PM□□□J

Power amp C assembly

RESISTORS

Mark	Symbol & Description	Part No.
	R207, R209, R211, R213	ACN-11B
	R191, R193, R195, R197, R199, R201, R203, R205	RFA1/4PS4R7J
	Other resistors	RD1/4PMF□□□J

Power amp D assembly

RESISTORS

Mark	Symbol & Description	Part No.
	R208, R210, R212, R214	ACN-11B
	R192, R194, R196, R198, R200, R202, R204, R206	RFA1/4PS4R7J
	Other resistors	RD1/4PMF□□□J

Chemical condenser L assembly

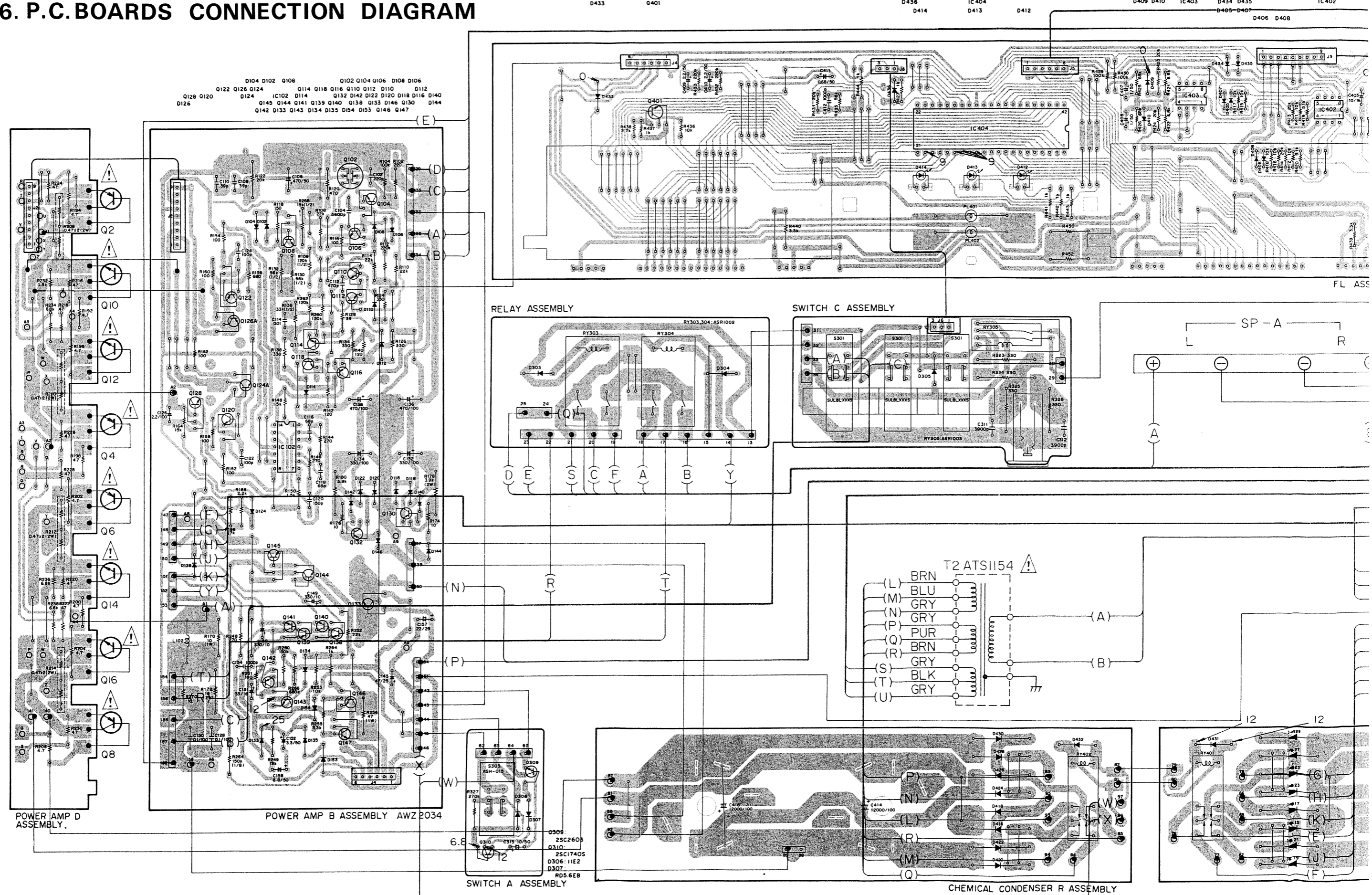
SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	D431	10E2FD
	D415, D417, D419, D421, D423, D425, D427, D429	31DF2FC

6. P.C. BOARDS CONNECTION DIAGRAM

A
B
C
D

1 | 2 | 3 | 4 | 5 | 6



1 | 2 | 3 | 4 | 5 | 6

D104 D102 Q108 Q102 Q104 Q106 D108 D106
 Q122 Q126 Q124 Q114 Q118 Q116 Q110 Q112 D110 D112
 Q128 Q120 D124 IC102 D114 Q132 Q142 D122 D120 D118 D140
 D126 Q145 Q144 Q141 Q139 Q140 Q138 Q133 D146 Q130 D144
 Q142 D133 Q143 D134 D135 D154 D153 Q146 Q147

D433 Q401 D436 IC404 D414 D413 D412 D409 D410 IC403 D434 D435 D405-D407 D406 D408 IC402

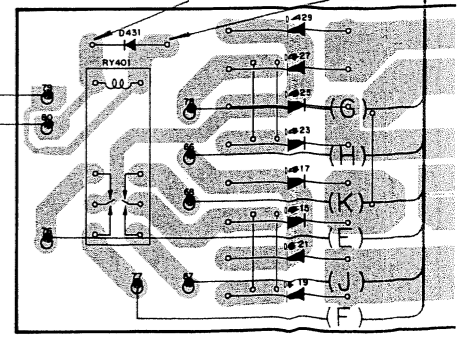
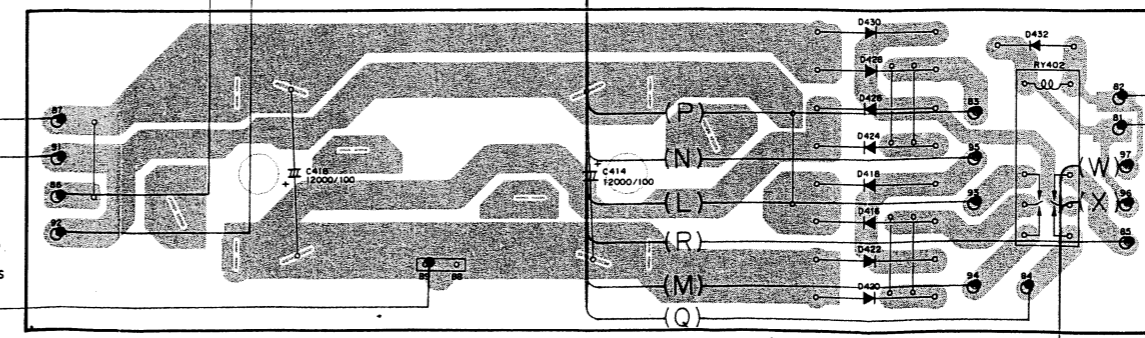
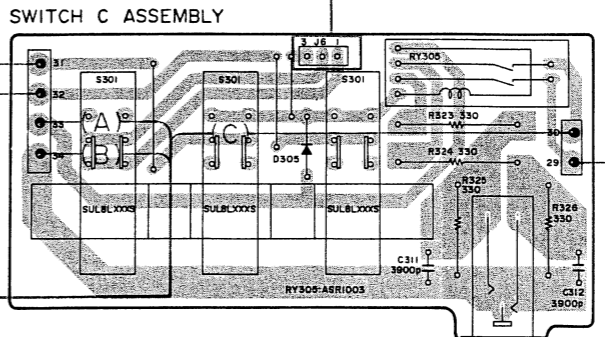
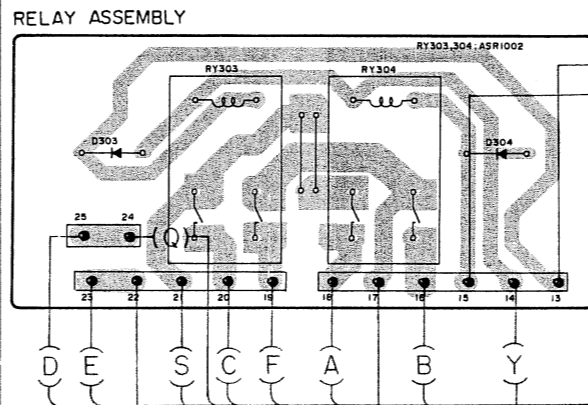
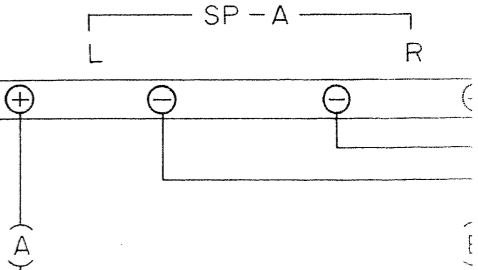
POWER AMP D ASSEMBLY.

POWER AMP B ASSEMBLY AWZ2034

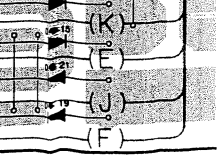
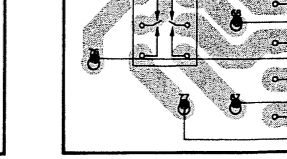
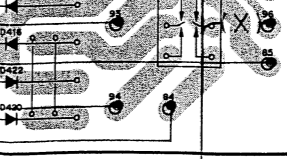
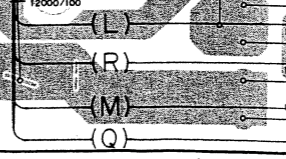
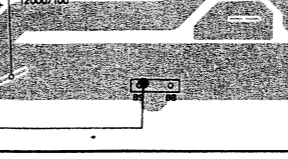
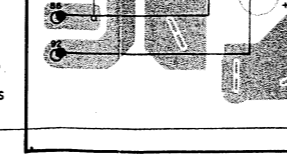
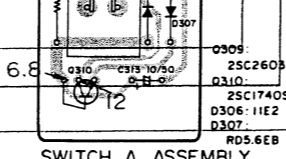
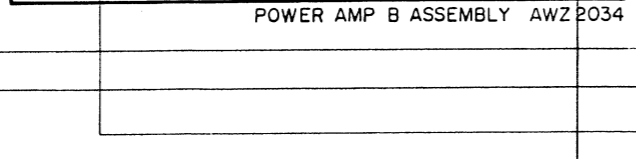
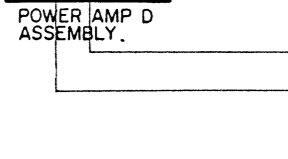
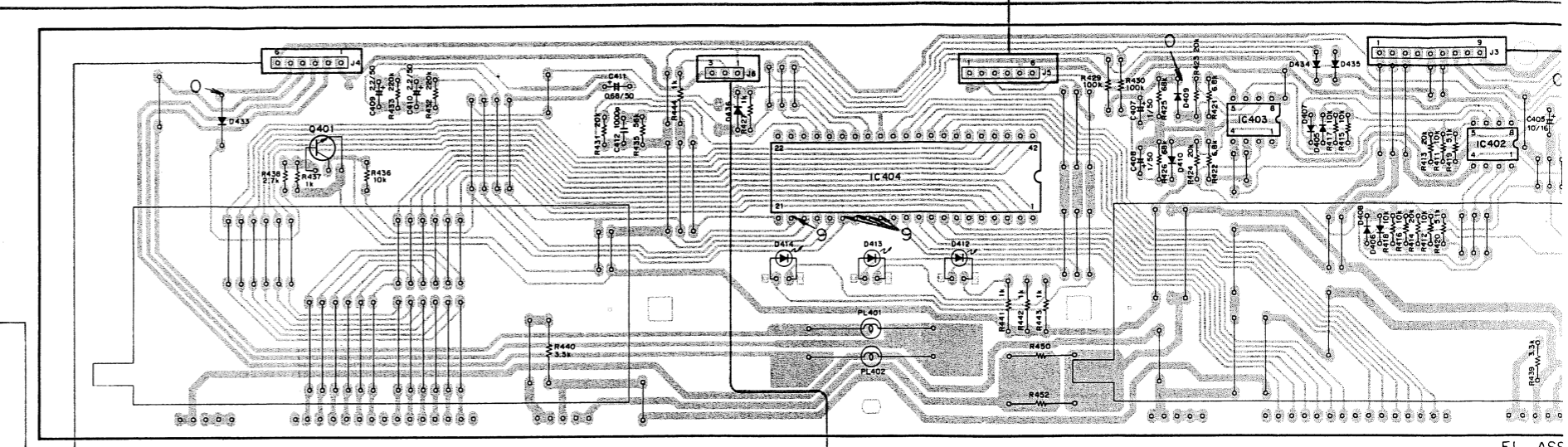
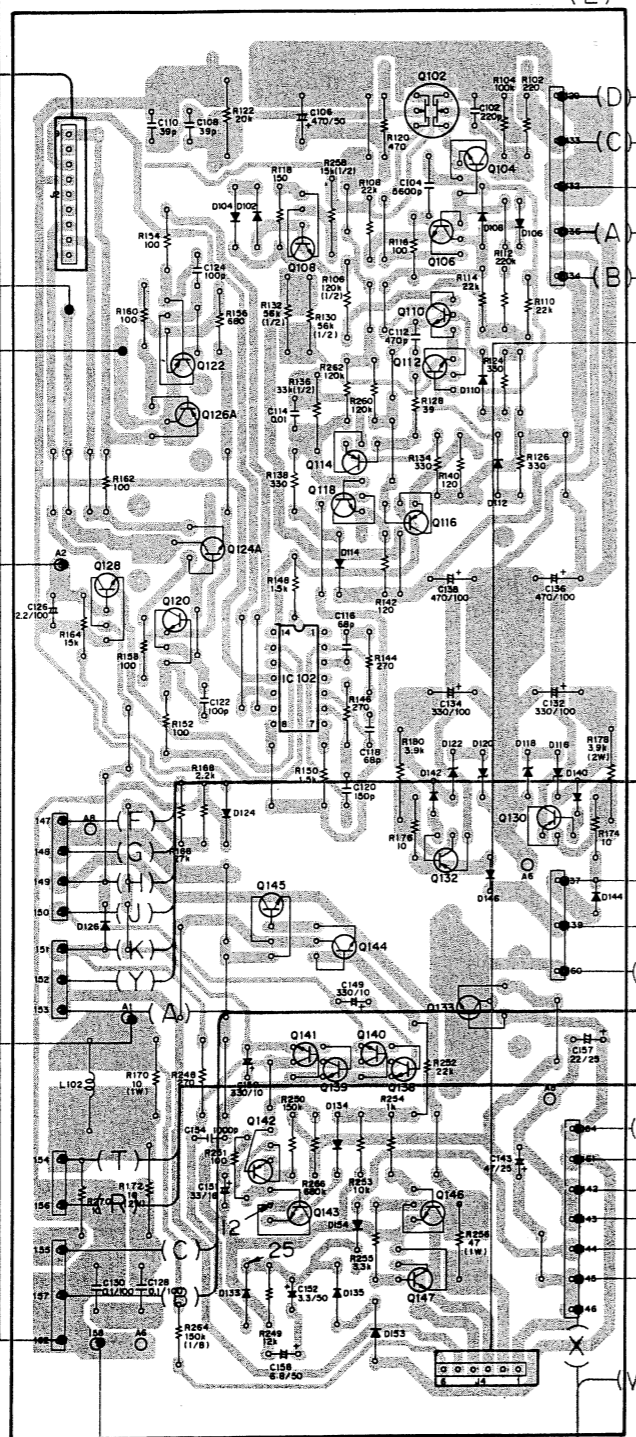
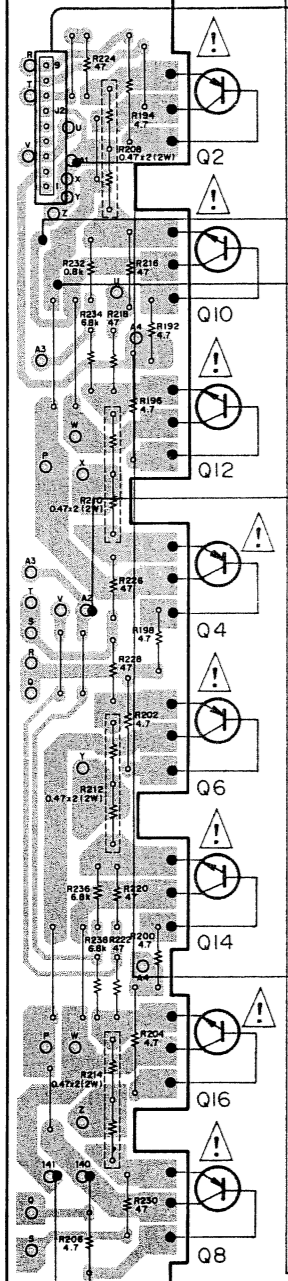
SWITCH A ASSEMBLY

CHEMICAL CONDENSER R ASSEMBLY

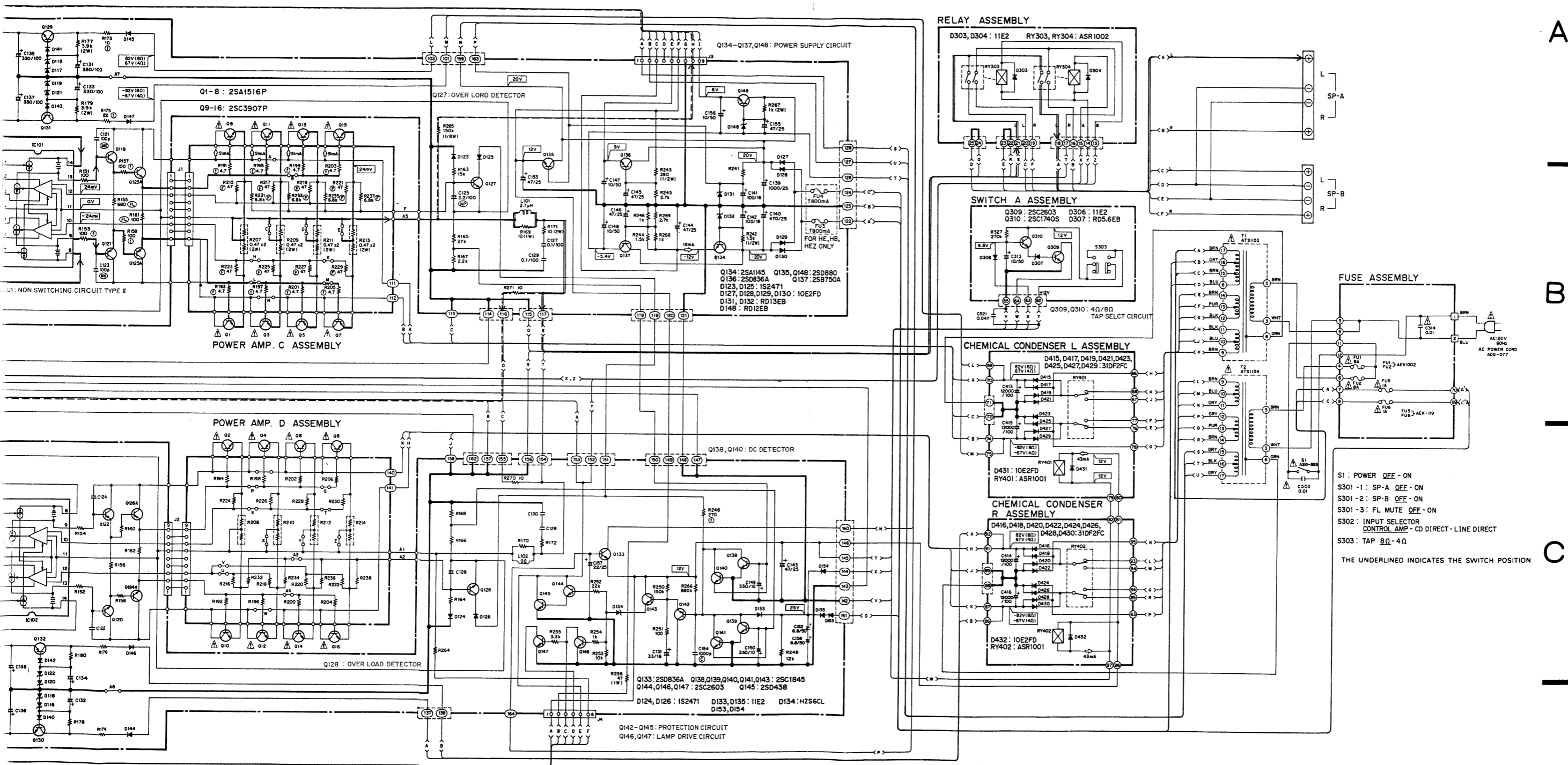
- T2 ATSI154
- (L) BRN
 - (M) BLU
 - (N) GRY
 - (P) PUR
 - (Q) BRN
 - (R) GRY
 - (S) BLK
 - (T) GRY
 - (U)



6.8
 S303
 ASH-018
 D309
 Q310 C315 10/50
 25C2603
 D310
 25C17405
 D306-11E2
 D307
 RDS.6EB



MC-Service



A

B

C

D

- RESISTORS:
Indicated in Ω, 1/4W, and 1/8W. ±5% tolerance unless otherwise noted k, M, Mfl, (F); ±1%, (G); ±2%, (K); ±10%, (M); ±20% tolerance
- CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p, pF. Indication without voltage is 50V except electrolytic capacitor.
- VOLTAGE, CURRENT:
[V] : Signal voltage at 250 W + 250 W, 8Ω output (1 kHz)
[V] : DC voltage (V) at no input signal Value in [] is DC voltage at rated power.
- OTHERS:
[Symbol] : Signal route.
[Symbol] : Adjusting point.
The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
X marked capacitors and resistors have parts numbers. The underlined indicates the switch position.
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

- S1 : POWER OFF - ON
- S301 - 1 : SP-A OFF - ON
- S301 - 2 : SP-B OFF - ON
- S301 - 3 : FL MUTE OFF - ON
- S302 : INPUT SELECTOR CONTROL AMP - CD DIRECT - LINE DIRECT
- S303 : TAP 8Ω - 4Ω

THE UNDERLINED INDICATES THE SWITCH POSITION

RELAY

Mark	Symbol & Description	Part No.
	RY401 Relay (4Ω/8Ω)	ASR1001

CAPACITORS

Mark	Symbol & Description	Part No.
	C413,C415 (12000μF/100)	ACH1095

**Chemical condenser R assembly
SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	D432	10E2FD
	D416,D418,D420,D422,D424, D426,D428,D430	31DF2FC

RELAY

Mark	Symbol & Description	Part No.
	RY402 Relay (4Ω/8Ω)	ASR1001

CAPACITORS

Mark	Symbol & Description	Part No.
	C414,C416 (12000μF/100)	ACH1095

**Switch A assembly
SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	Q310	2SC1740S
	Q309	2SC2603
	D307	RD5.6EB
	D306	11E2

SWITCH & RELAY

Mark	Symbol & Description	Part No.
	S303 Slide switch (SPEAKER IMPEDANCE)	ASH-015

CAPACITOR

Mark	Symbol & Description	Part No.
	C313	CETA100M50

RESISTOR

Mark	Symbol & Description	Part No.
	R327	RD1/4PM274J

**Switch B assembly
SWITCH**

Mark	Symbol & Description	Part No.
	S302 Slide rotary switch (INPUT SELECTOR)	ASE1001

**Switch C assembly
SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	D305	11E2

SWITCH & RELAY

Mark	Symbol & Description	Part No.
	S301 Push switch (SPEAKERS A/B, DISPLAY ON/OFF)	SUL8LXXXS
	RY305 Relay (HEADPHONE ON/OFF)	ASR1003

CAPACITORS

Mark	Symbol & Description	Part No.
	C311,C312 Ceramic capacitor	CKCYB392K500

RESISTORS

Mark	Symbol & Description	Part No.
	R325,R326	RS2LMF331J
	R323,R324	RS3LMF331J

OTHERS

Mark	Symbol & Description	Part No.
	Jack (PHONES)	AKN1022

Volume assembly

RESISTORS

Mark	Symbol & Description	Part No.
	VR301 Volume (CD/LINE INPUT LEVEL)	ACW1004
	R336,R337	RDR1/4PM751J

Pin jack assembly

RESISTORS

Mark	Symbol & Description	Part No.
	All resistors	RDR1/4PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	4P Pin jack	AKB1003

**Fuse assembly
CAPACITOR**

Mark	Symbol & Description	Part No.
⚠	C314 (0.01/μF)	ACG1003

**Relay assembly
SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	D303,D304	11E2

RELAIIES

Mark	Symbol & Description	Part No.
	RY303,RY304 Relay (SPEAKERS A/B)	ASR1002

MC-Service

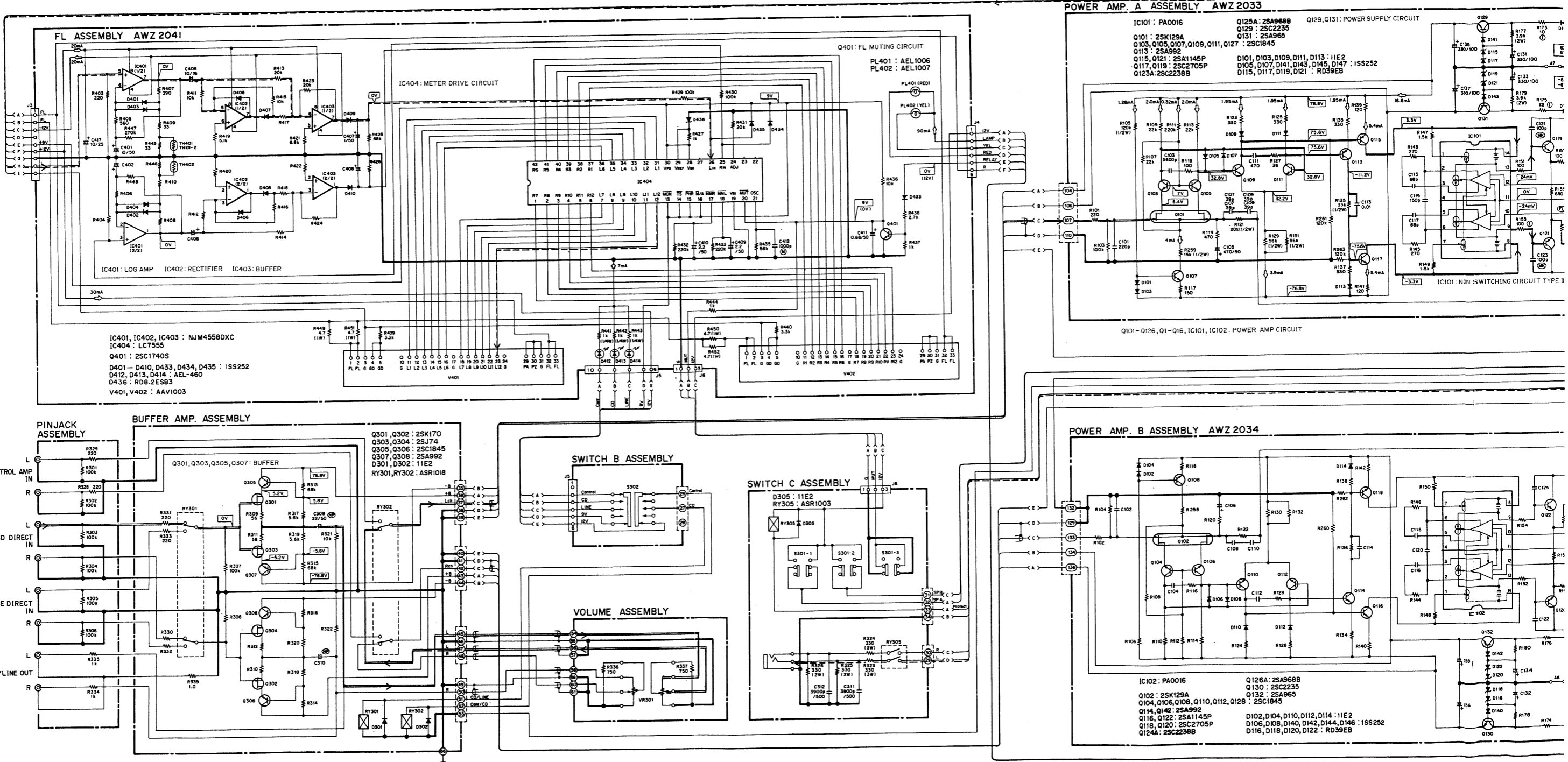
5. SCHEMATIC DIAGRAM

A

B

C

D



7

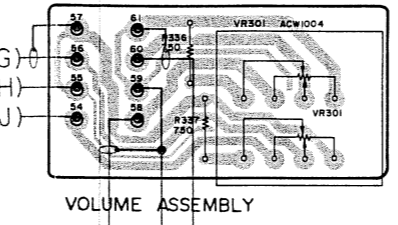
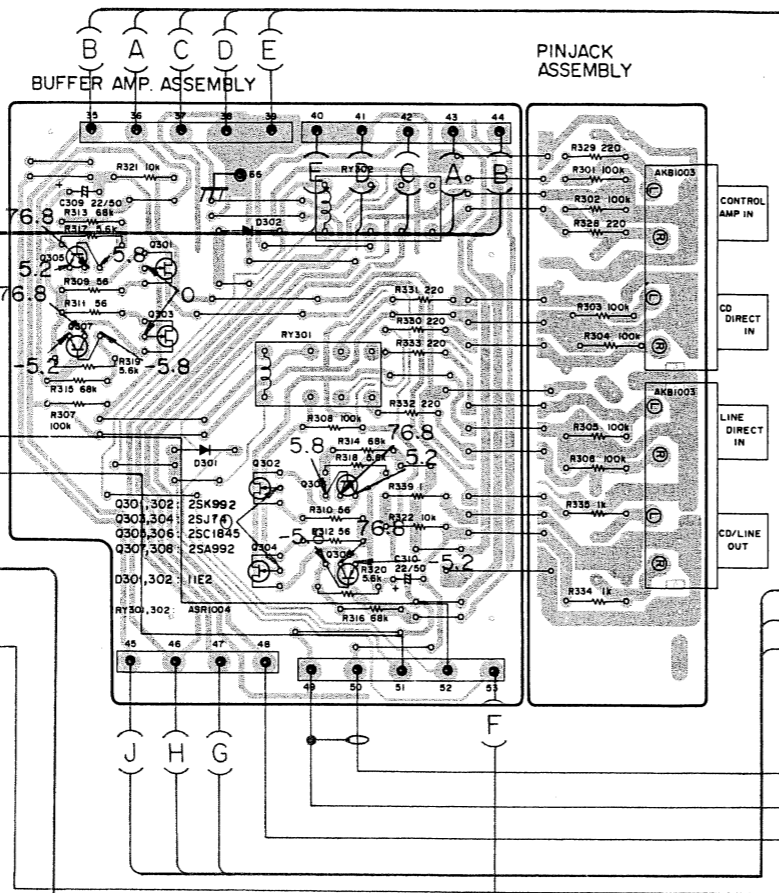
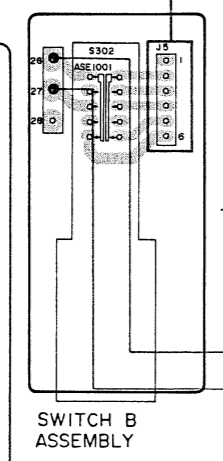
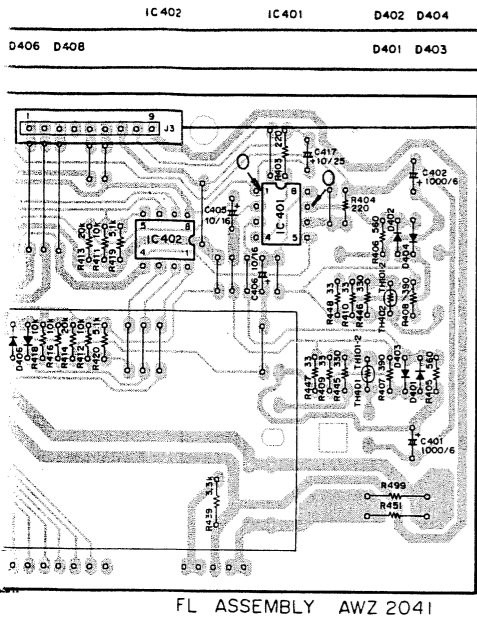
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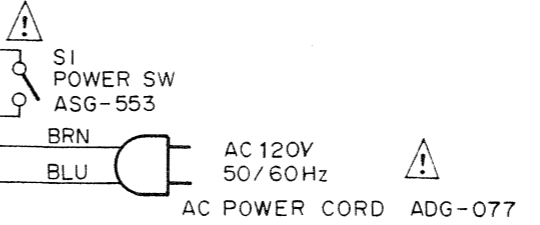
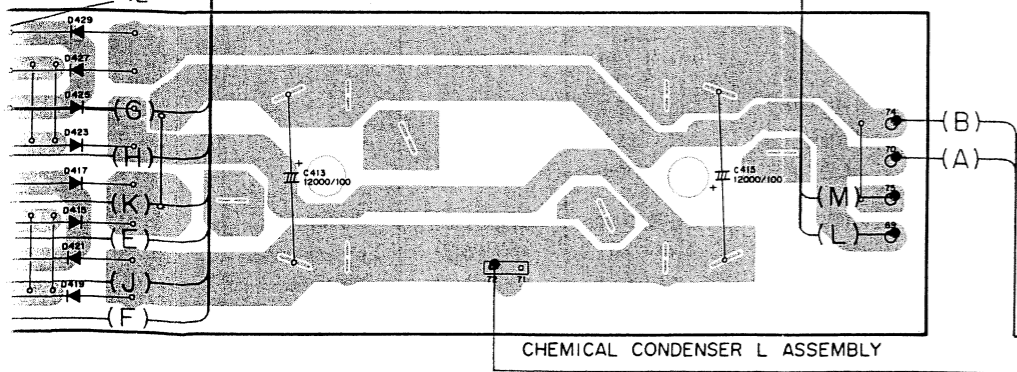
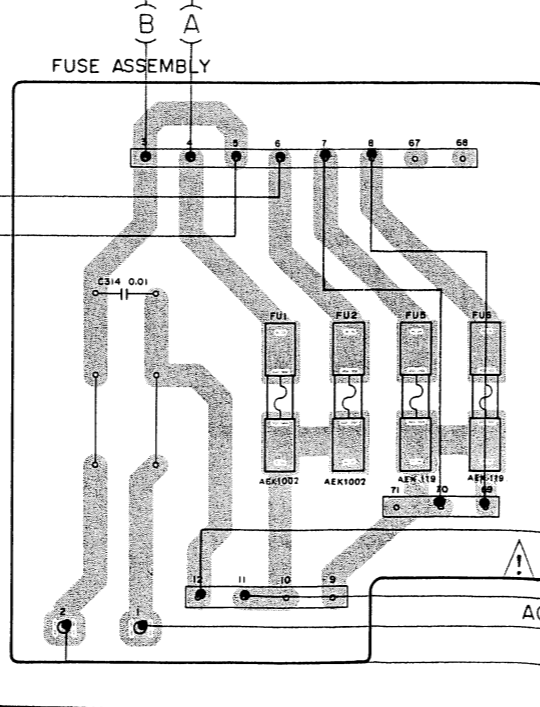
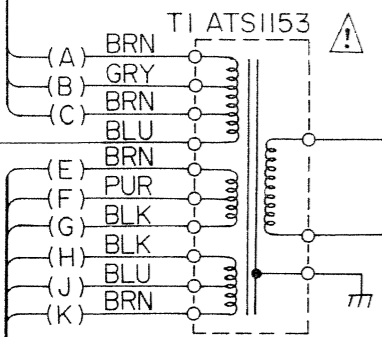
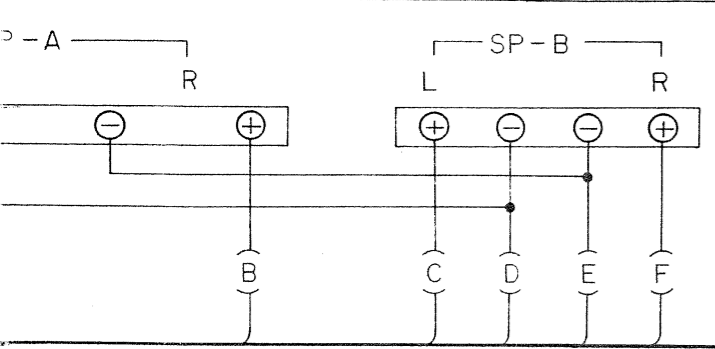
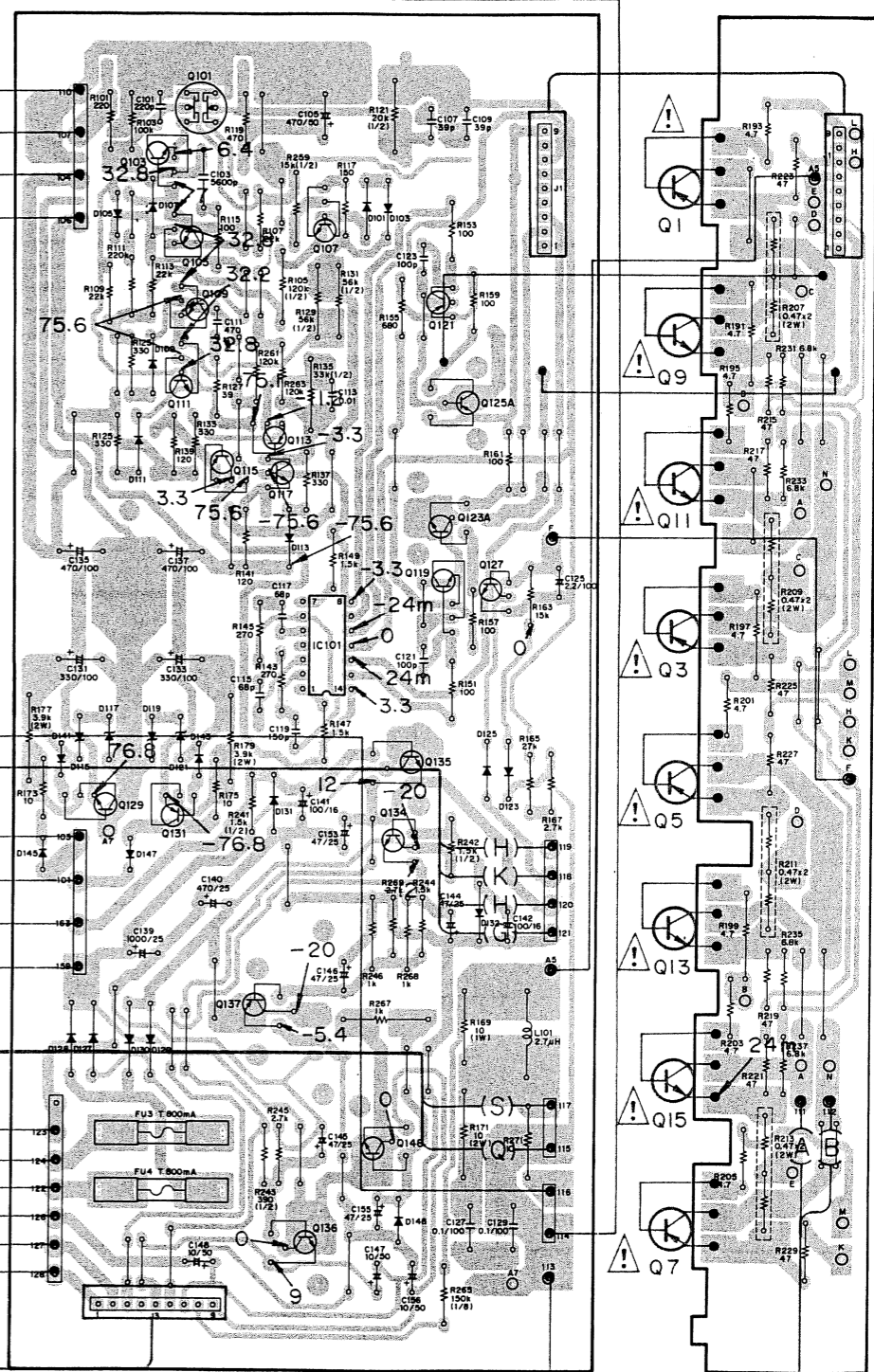
10

11

12



D105 Q103 D107 Q101 D105 Q107 D101 D103
D111 D109 Q111 Q109 Q115 Q113 Q117 D113 Q121 Q123 Q125
D141 D115 Q129 D117 D119 Q131 D121 D143 D131 IC101 Q135 Q119 Q127 D125 D123
D145 D128 D147 D127 D130 D129 Q137 Q136 Q148 D148
Q134 D132



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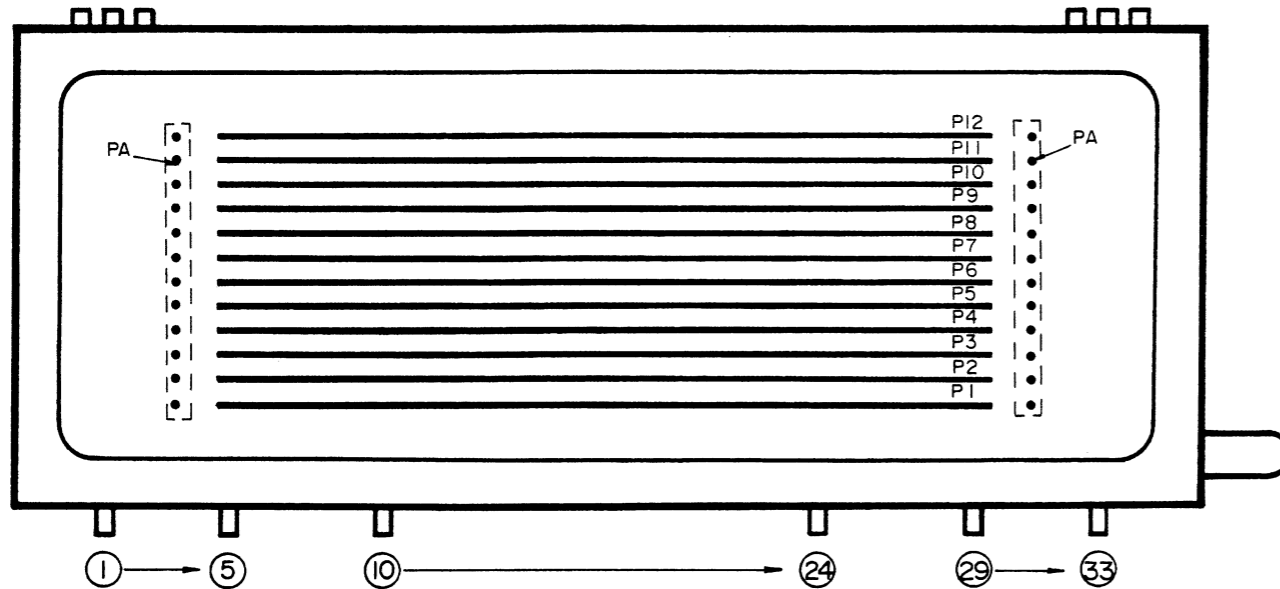
A

B

C

D

7. FL DISPLAY INFORMATION



PIN CONNECTION

Pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Pin Name	F	F	G	Gd	Gd	NP	NP	NP	NP	G	P	P	P	P	P	P
										1	2	3	4	5	6	

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
G	P	P	P	P	P	P	G	NP	NP	NP	NP	P	P	G	F	F
	7	8	9	10	11	12						A	Z			

Note: F:filament, Gd:diffuser grid, Np:no pin, Pz:dummy anode

8. FOR M-90a/HE, HB AND HEZ TYPES

NOTES:

- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

8. FOR M-90a/HE, HB AND HEZ TYPES

CONTRAST OF MISCELLANEOUS PARTS

The M-90a/HE, HB and HEZ types are the same as the M-91/KU/CA type with the exception of the following sections.

Mark	Symbol & Description	Part No.				Remarks
		M-91 / KU/CA type	M-90a/ HE type	M-90a/ HB type	M-90a/ HEZ type	
	Pin jack assembly	Non supply	Non supply	Non supply	Non supply	
	Fuse assembly	Non supply	Non supply	Non supply	Non supply	
	SP terminal assembly	.....	.....	.....	Non supply	
Δ	C508,C510 Ceramic capacitor (0.01/125V,)	.....	.....	.....	ACG1003	
Δ	C509 Ceramic capacitor	.....	.....	.....	ACG1005	
Δ	C504,C505,C511,C512 Ceramic capacitor (1000P/500V)	.....	.....	.....	CKDYB102K500	
Δ	C501,C502,C506,C507 Ceramic capacitor (4700P/500V)	.....	.....	.....	CKDYB472K500	
Δ	T1 Power transformer (AC120V)	ATS1153	.....	.....	.....
Δ	T1 Power transformer (AC220V,240V)	.....	ATS1011	ATS1011	ATS1011	
Δ	T2 Power transformer (AC120V)	ATS1154	.....	.....	.....
Δ	T2 Power transformer (AC220V, 240V).	.....	ATS1012	ATS1012	ATS1012	
Δ	FU1,FU2 Fuse (8A/125V)	AEK1002	.....	.....	.....
Δ	FU1,FU2 Fuse (T3.15A/250V)	.....	AEK-042	AEK-513	AEK-042	
Δ	FU3,FU4 Fuse (T800mA/250V)	.....	AEK-031	AEK-507	AEK-031	
Δ	FU5,FU6 Fuse (1A/125V)	AEK-119	.....	.....	.....
	Terminal 4P (SPEAKERS A)	AKE1003	AKE-110	AKE-110	.....
	Terminal 4P (SPEAKERS B)	AKE1003	AKE-110	AKE-110	AKE-110	
Δ	AC power cord	ADG-077	ADG1036	ADG1041	ADG1036	
	Operating instruction	ARB1125	.....	ARB1146	.....
	Operating instruction	.....	ARE1095	.....	.....
	Operating instruction	.....	.....	.....	ARC1099	
	Packing case	AHD1486	AHD1487	AHD1487	AHD1487	
	Front panel B	ANB1232	ANB1211	ANB1211	ANB1211	
	Front panel A	ANB1242	ANB1004	ANB1004	ANB1004	
	Screw	ABA1034	AWB1014	AWB1014	AWB1014	Transformer
	Screw	ABA1004	ABA1050	ABA1050	ABA1050	Leg assembly
	Screw	ABA1006	ABA1006	ABA1006	ABA1006	SP terminal

Pin jack assembly

The Pin jack assembly (M-90a/HEZ type) is the same as the Pin jack assembly (M-91/KU/CA type) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		M-91/KU/CA	M-90a/HEZ	
	C301-C308	.....	CQSXA391J160	

Fuse assembly

The Fuse assembly (M-90a/HEZ type) is the same as the Fuse assembly (M-91/KU/CA type) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		M-91/KU/CA	M-90a/HEZ	
	L301	.....	ATF1006	

SP Terminal A assembly (M-90a/HEZ type)

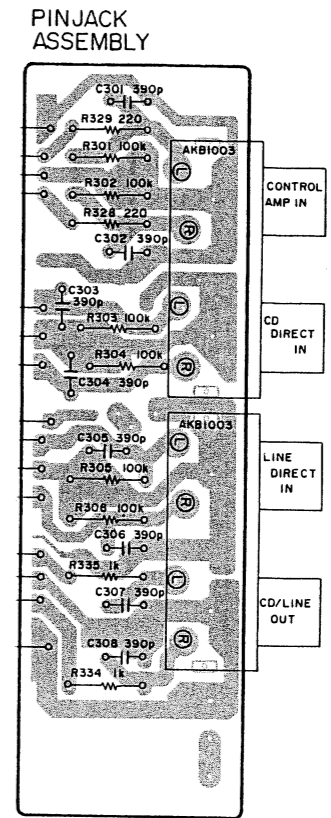
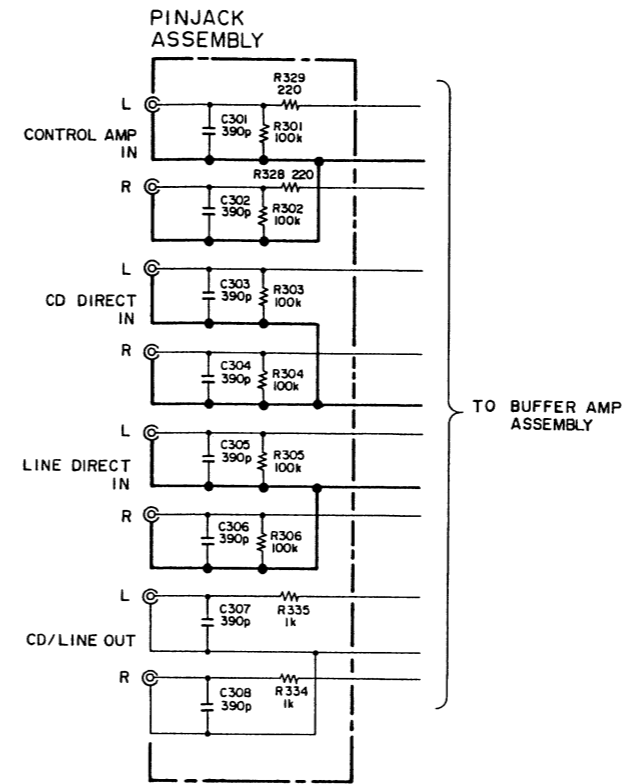
CAPACITOR

Mark	Symbol & Description	Part No.
	C1,C2,C5,C6	CKDYB102K500

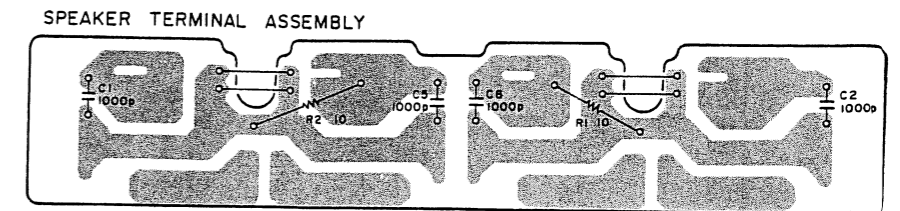
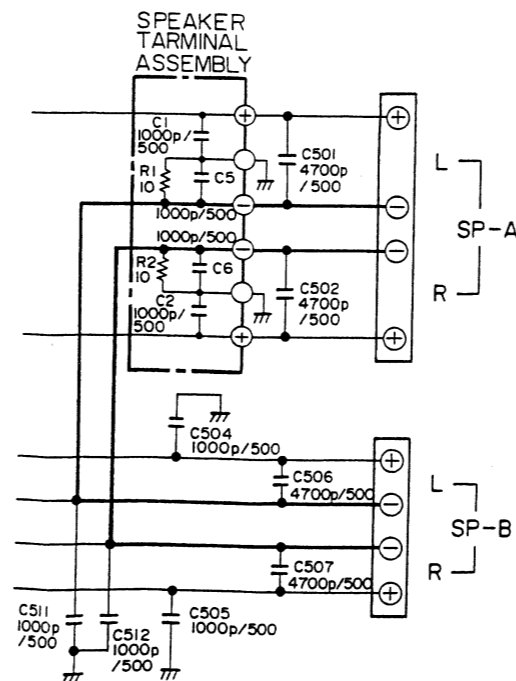
RESISTORS

Mark	Symbol & Description	Part No.
	R1,R2	RD1/4PM100J

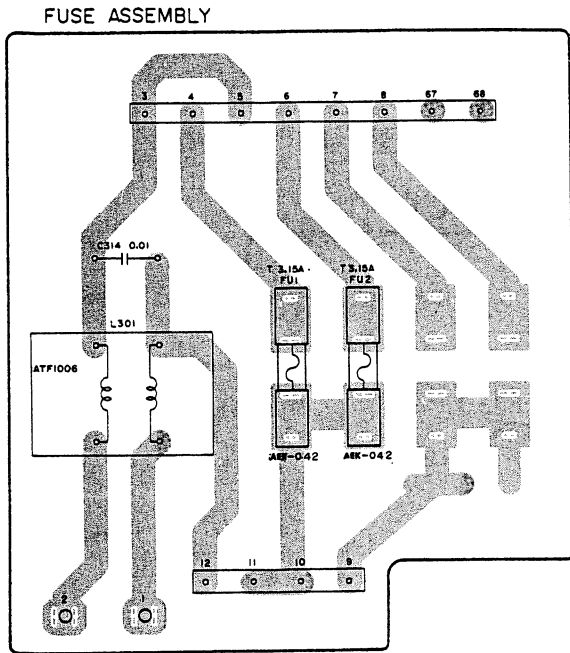
Pin jack assembly (M-90a/HEZ type)



SP Terminal A assembly (M-90a/HEZ type)



Fuse assembly (M-90a/HEZ type)



Line Voltage Selection

(For HEZ, HE and HB types)

Line voltage can be changed with following steps.

1. Disconnect the AC power cord.
2. Remove the Bonnet case.
3. Change the connection of the power transformer lead wire.

- GRY T₁: Gray lead wire of transformer T₁
- BRN T₁: Brown lead wire of transformer T₁
- GRY T₂: Gray lead wire of transformer T₂
- BRN T₂: Brown lead wire of transformer T₂

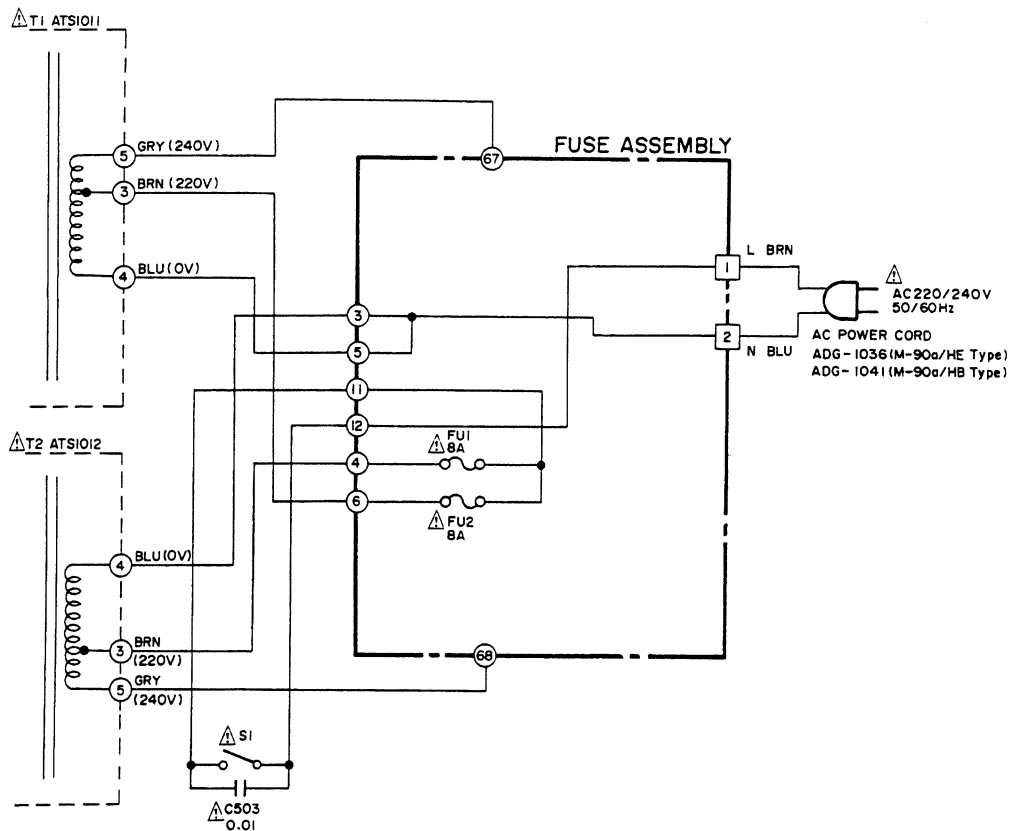
	Terminal numbers of FUSE assembly			
	4	6	67	68
220V	BRN T ₂	BRN T ₁	GRY T ₁	GRY T ₂
240V	GRY T ₂	GRY T ₁	BRN T ₁	BRN T ₂

4. Stick the line voltage label on the rear panel.

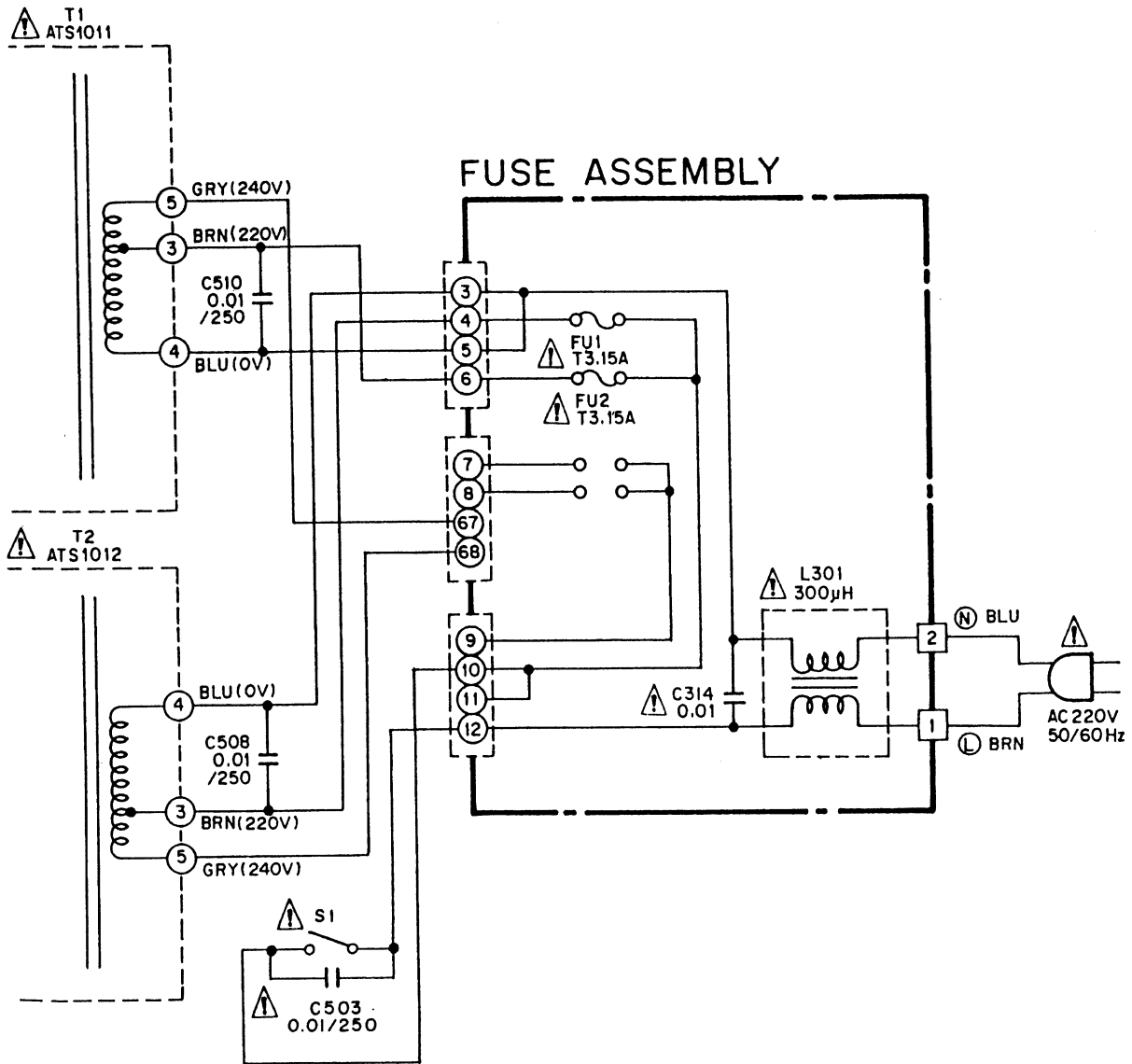
Parts No. Description

Parts No.	Description
AAX-193	220V label
AAX-192	240V label

SCHEMATIC DIAGRAM (HE,HB types.)

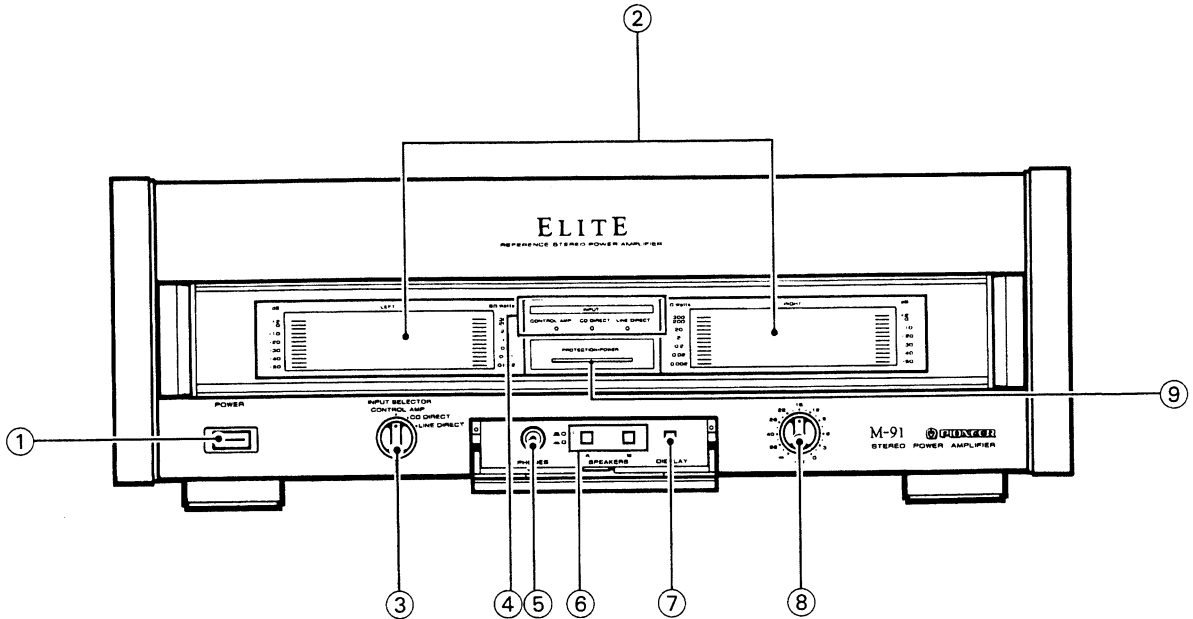


SCHEMATIC DIAGRAM (HEZ type)



9. PANEL FACILITIES

FRONT PANEL



① **POWER switch**

Press to turn power to this unit ON/OFF.

② **Power level meters**

When the display selector switch is in the ON position, these meters display the power level. The meters feature a "peak hold" function which allows the meters to remain lighted for 0.2 to 0.3 seconds after reaching a peak value.

③ **INPUT SELECTOR**

Use to select the component you wish to play back (amplify).

[CONTROL AMP] — The component connected to the control amplifier.

[CD DIRECT] — The compact disc player connected to the rear panel CD DIRECT INPUT terminals.

[LINE DIRECT] — The audio component connected to the rear panel LINE DIRECT INPUT terminals.

④ **INPUT indicator**

Indicates the position of the input selector control.

⑤ **PHONES jack**

When using headphones, connect their plug here.

⑥ **SPEAKERS selector switch**

Use to select the speaker system used.

[A]— Sound is heard from the speaker systems connected to the SPEAKERS A terminals.

[B]— Sound is heard from the speaker systems connected to the SPEAKERS B terminals.

Turn this switch OFF when using headphones.

⑦ **DISPLAY selector switch**

Use to turn the power level meters ON/OFF.

In the OFF condition, the meters will not be displayed.

⑧ **CD/LINE INPUT LEVEL control**

Use to adjust the input level connected to the rear panel CD DIRECT INPUT and LINE DIRECT INPUT terminals.

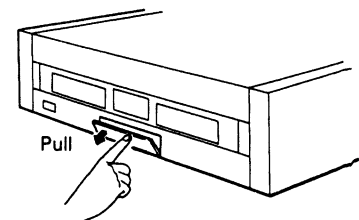
⑨ **PROTECTION/POWER indicator**

Lights when the power is turned ON.

Red (protection): Lights immediately after turning on the power, or in the event of a malfunctioning input from the control amplifier. When lighted, the amplifier will not operate.

Yellow (power): Indicates normal operating condition.

Method of opening cover



10. SPECIFICATION

Amplifier Section

Continuous average power output is 200 watts* per channel, min., at 8 ohms from 20 Hertz to 20,000 Hertz with no more than 0.003% total harmonic distortion.

Dynamic power (EIA test signal)	
8 Ω	300 W + 300 W
4 Ω	550 W + 550 W
2 Ω	800 W + 800 W
Harmonic distortion	
20 Hz – 20 kHz, 200 W, 8 Ω	0.003%
Intermodulation distortion (50 Hz: 7 kHz = 4:1)	
During effective output	0.002%
Input terminals (sensitivity/input impedance)	
CONTROL AMP INPUT, CD DIRECT INPUT	
LINE DIRECT INPUT	1 V/50 kΩ
Frequency response	
CONTROL AMP INPUT, CD DIRECT INPUT,	
LINE DIRECT INPUT, 20 Hz–20 kHz	±0.1 dB
Signal-to-Noise ratio (short circuit, A network)	
CONTROL AMP INPUT, CD DIRECT INPUT,	
LINE DIRECT INPUT	125 dB

MAINTENANCE OF EXTERNAL SURFACES

- Use a polishing cloth or dry cloth to wipe off dust and dirt.
- When the surfaces are very dirty, wipe with a soft cloth dipped in some neutral cleanser diluted five or six times with water, and then wipe again with a dry cloth. Do not use furniture wax or cleaners.
- Never use thinners, benzine, insecticide sprays and other chemicals on or near this unit; since these will corrode the surfaces.

Precautions for installation

To ensure optimum sound quality, observe the following precautions.

- This unit is heavy. Be sure to install it on a firm base which can support its weight. Also, to prevent the flow of cooling air from being blocked off, do not place the unit on soft material such as a carpet or cushion, or install it in a confined space. When installing the unit in a rack, provide adequate space around it to allow heat to dissipate.

Power section, etc.

Power requirements	AC 120 V, 60 Hz
Power consumption	850 W, 1100 VA
External dimensions	457 (W) × 432 (D) × 163 (H) mm
	18 (W) × 17 (D) × 6-7/16 (H) in
Weight	27.3 kg (60 lb 3 oz)

Accessories

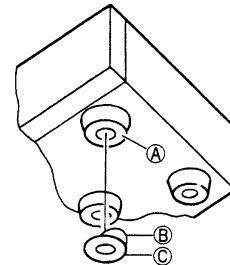
Operating Instructions	1
Pin-plug cord	1
Spacer set	1

NOTE:

- Specifications and design subject to possible modification without notice, due to improvements.
- *Measured pursuant to the Federal Trade Commission's Trade Regulation rule on Power Claims for Amplifier.

If the set is unsteady, attach the included cushion spacer to the bottom of the leg.

< Example >



- (A) Leg
- (B) Peel off paper
- (C) Cushion spacer

- To prevent the control amplifier from picking up noise due to leakage flux from the power amplifier when the control amplifier and power amplifier are installed adjacent to each other, install the control amplifier on the right of the power amplifier. Also, if you install the control amplifier above or below the power amplifier, place a partition between them to separate them by at least 10 cm from each other.
- Install the unit on a level surface so that the feet of the unit are all touching the installation surface.

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