

ONKYO® SERVICE MANUAL

DUAL SUPER SERVO

STEREO POWER AMPLIFIER

MODEL M-5060R

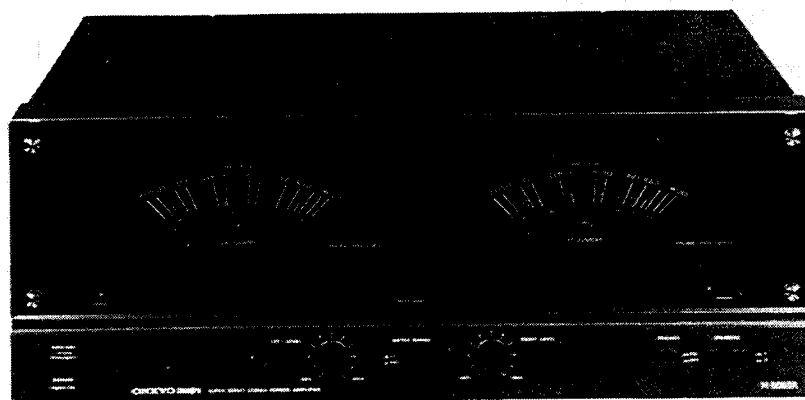


TABLE OF CONTENTS

Item	Page
Specifications	2
Block diagram	2
Precautions	4
Front panel	4
Super servo integral system	5
Adjustments	6
Exploded view	7
Component location	8
Printed circuit board view	9
Schematic diagram	13
System connections	17
Packing procedures	18

ONKYO®
AUDIO COMPONENTS

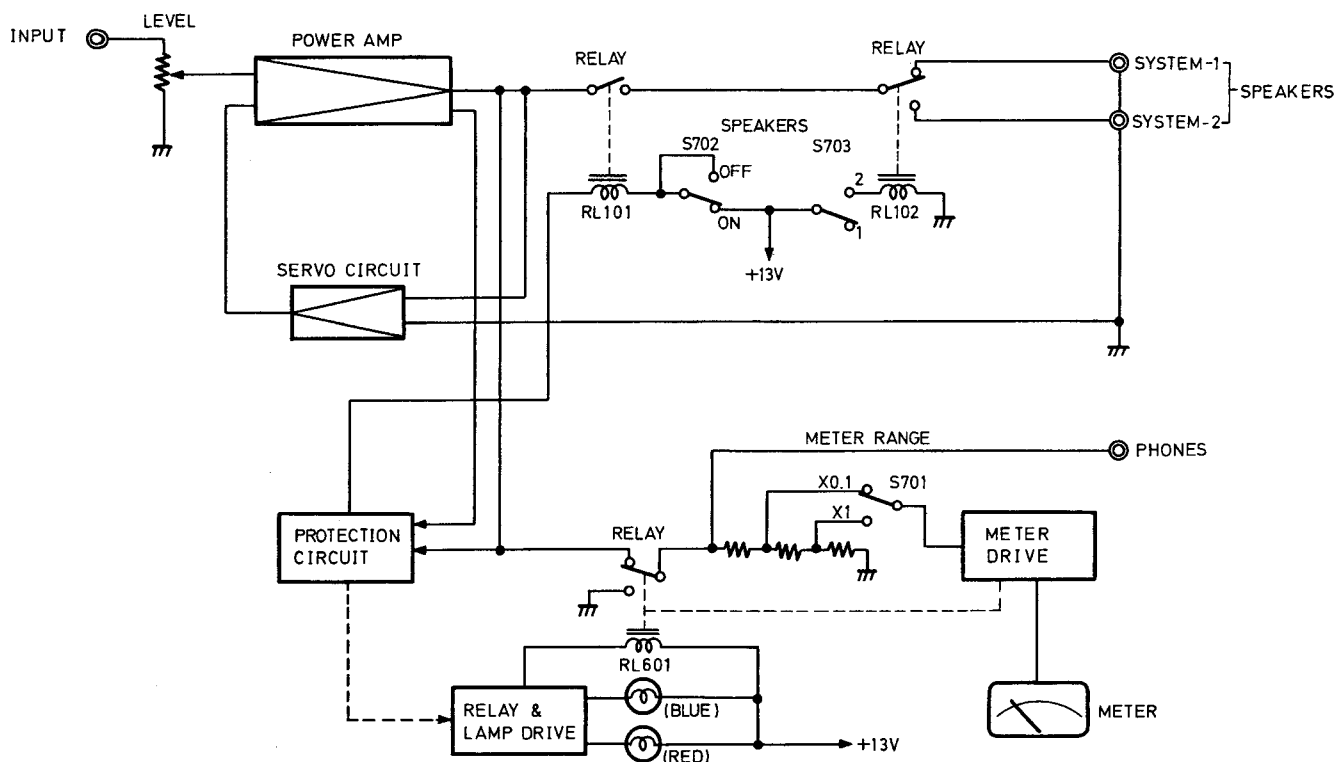
SPECIFICATIONS

Power Output :	130 watts per channel, min RMS, at 8 ohms both channels driven, from 20 Hz to 20 kHz, with no more than 0.01% total harmonic distortion.
Total Harmonic Distortion :	0.01% at Rated power
Intermodulation Distortion :	0.01% at 1 watt output
Frequency Response :	+0, -1.5 dB at 1 Hz ~100 kHz
Input Sensitivity :	1 V
Input Impedance :	47 k Ω
Damping Factor :	180 (8 Ω , 1 kHz)
Signal to Noise Ratio :	94 dB (IHF A-202)
Outputs :	SPEAKERS 1 & 2, PHONES
Inputs :	INPUT P.
Semiconductors :	8 FETs, 49 Transistors, 48 Diodes, 6 ICs
Dimensions :	450 (W) x 174 (H) x 422 (D) mm (17-3/4" x 6-7/8" x 16-5/8")
Weight :	18.5 kg. (40.8 lbs.)

Power Supply: AC 120V 60 Hz (D model)
AC 220V 50 Hz (G model)

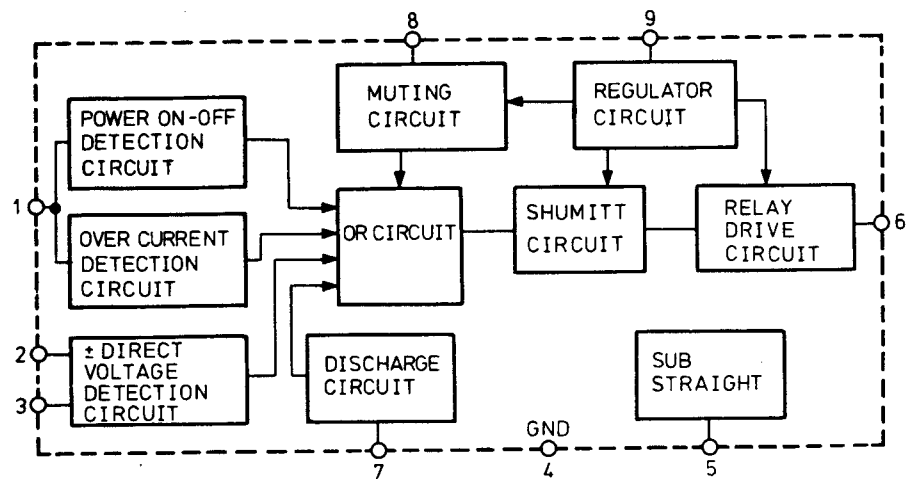
Specifications and features are subject to change without notice.

BLOCK DIAGRAM

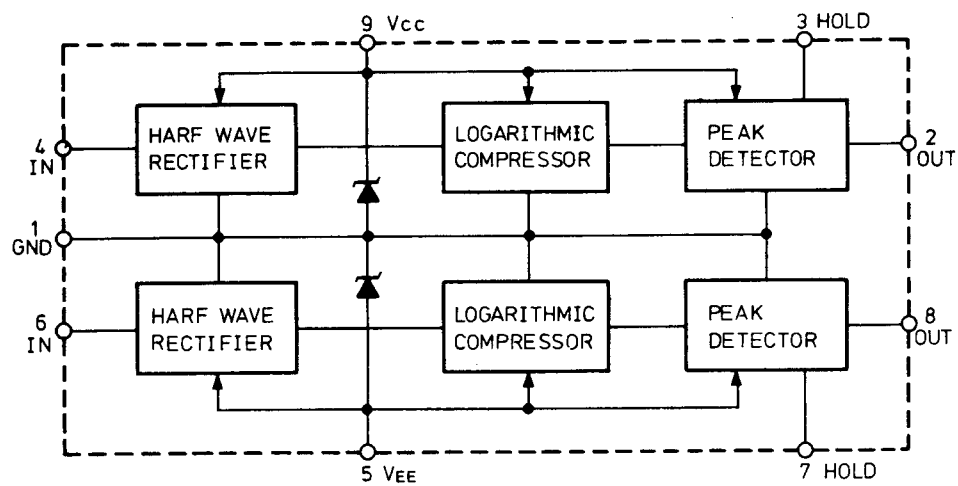


IC BLOCK DIAGRAM

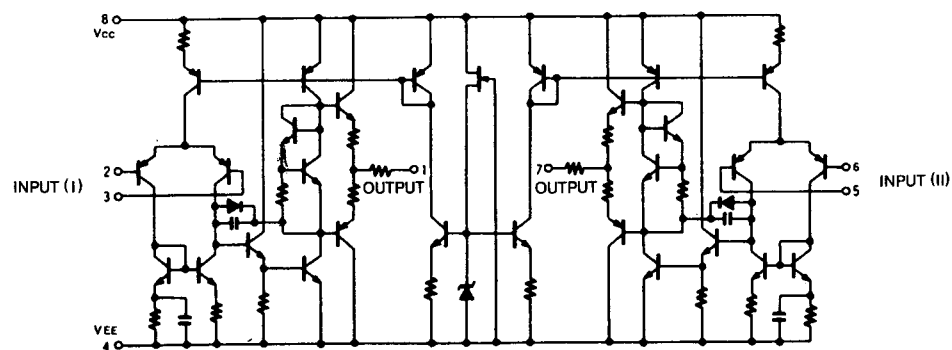
(1) TA7317P



(2) TA7318P



(3) NJM4558



PRECAUTIONS

1. Replacing the fuses

For continued protection against fire hazard, replace only with same type and same rating fuse.

CIRCUIT NO	PARTS NO.	DESCRIPTION	REMARKS
F101, F102	252050	5A (ST-6), AC fuse	120V model
F111, F112	252045	1A (ST-6), AC fuse	120V model
F101, F102	252076	3.15A-SE-EAK, AC fuse	220V model
F111, F112	252070	1A-SE-EAK, AC fuse	220V model
F113-F116	252078	5A-SE-EAK, AC fuse	220V model

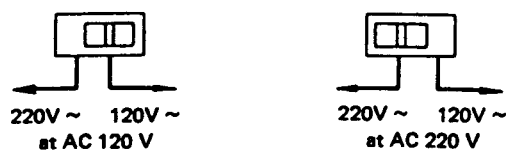
2. Voltage Selector (Rear Panel)

Some models are equipped with a voltage selector to conform with local power supplies.

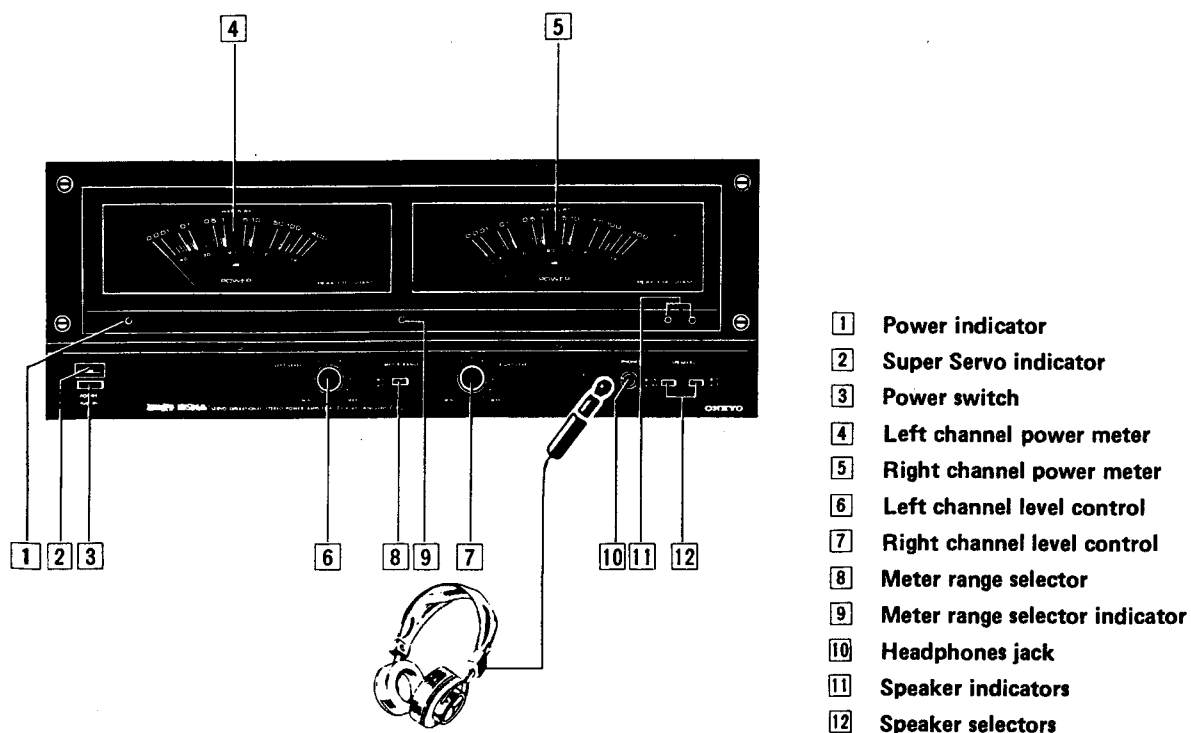
Be sure to set this switch to match the voltage of the power supply in your area before turning the power switch on.

Voltage is changed by sliding the groove in the switch with a screwdriver to the right or left. Confirm that the switch has been moved all the way to the right or left before turning the power switch on.

If there is no voltage selector switch on the unit you have purchased, it can only be used in areas where the power supply voltage is the same as that of the unit.

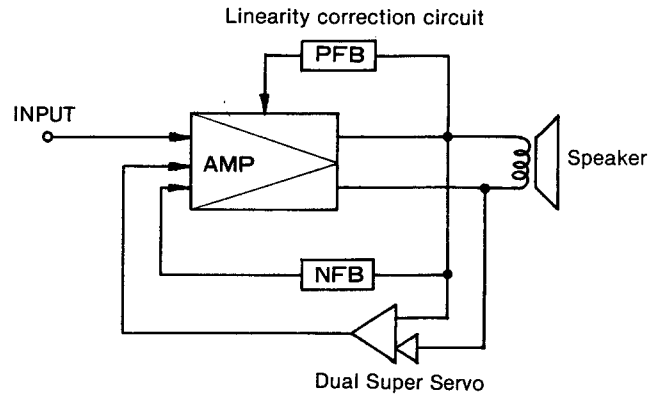


FRONT PANEL



SUPER SERVO INTEGRAL SYSTEM

Up to now, all improvements in amplifier technology have treated the amp as an independent component. Despite this limitation, the performance level of today's audio amplifiers has reached a very high point. Among the many advances, the Dual Super Servo system, based on the understanding that the power supply is a most critical section of an amplifier, has received very high marks for its quality of sound reproduction and the feeling of tremendous power reserves that it imparts. However, as amplifiers reach this very high plateau of performance, remaining problems cannot be solved as long as the amplifier is considered in isolation from the other system components. In power amplifiers, a typical problem is the unwanted signal elements generated by acoustic feedback from the listening room into the speakers and the resultant counterEMF into the amp, resulting from the microphonic effect of speakers. In the pre-amp, vibrations transmitted through the air can generate microphonic noise within the circuitry. Both problems are caused by feedback from the listening area. These sounds are reflected by the listening room and then fed back, so there is a time lag and, in the stereo listening area, each stereo channel can interfere with the other one. Previous amplifiers have corrected non-linearities in the current amplifier stage by using a negative feedback loop. However, the Super Servo Integral system attacks this problem at its source, by improving the current amplification stage. By implementing conventional corrections on top of this, intermodulation distortion is lowered to $1/10$ (-20dB) of its previous value. Time difference distortion has been a major obstacle preventing the attainment of a clear stereo image. Removing this form of distortion has brought sound reproduction much closer to a live performance, an improvement that has to be heard to be truly appreciated.



The Super Servo Integral System

ADJUSTMENTS

1. Preparations

- (1) Place the unit on a level surface, right side up, leaving at least 15mm of space at the ventilation openings.
- (2) There should be no load or signal and the level should be at minimum.
- (3) The air should be calm, as moving air can upset the stability of the gauges.

2. Meter Zero Point

With the power off, align each needle with the 0 mark using the adjustment screw underneath each meter.

Caution: Do not perform this adjustment immediately after turning the power off. Perform after the meter circuit section has discharged.

3. Idling Current

Remove the cover and, five minutes after the power has been turned on, adjust the semi-fixed resistor R441 (R541) so that the voltage between $V_{CT} - I_{ID}$ on printed circuit board NAMA-1195 is 14mV.

4. Meter Offset

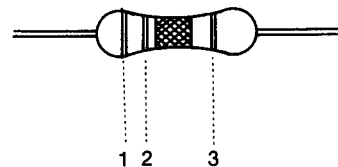
About five minutes after turning power on and with no signal present, adjust the semi-fixed resistor R639 (R640) on the printed circuit board NAME-1196 to align each meter needle with 0.

5. Meter Level

Apply a 1kHz signal to the left channel input terminal and set the M-5060R meter range selector to X 0.1. Adjust the input so that the speaker output terminal voltage (no load) is 10.2V (20.17dBV). Then adjust the semifixed resistor R611 (R612) of printed circuit board NAMA-1196 so that the meter needle is aligned with 0dB. Adjust the right channel in the same manner with the R612. (Do not feed a signal to both the left and right channels at the same time.)

SPECIAL CARBON RESISTORS

The carbon resistor shown in the drawing was specially developed to optimize sound quality and it is used throughout the signal path of this amplifier. The color coding indicating the resistance value is the same as that used on conventional resistors, but since the permissible tolerance is determined from the resistance value, it is not included. (The tolerance applies to J or G type resistors.)

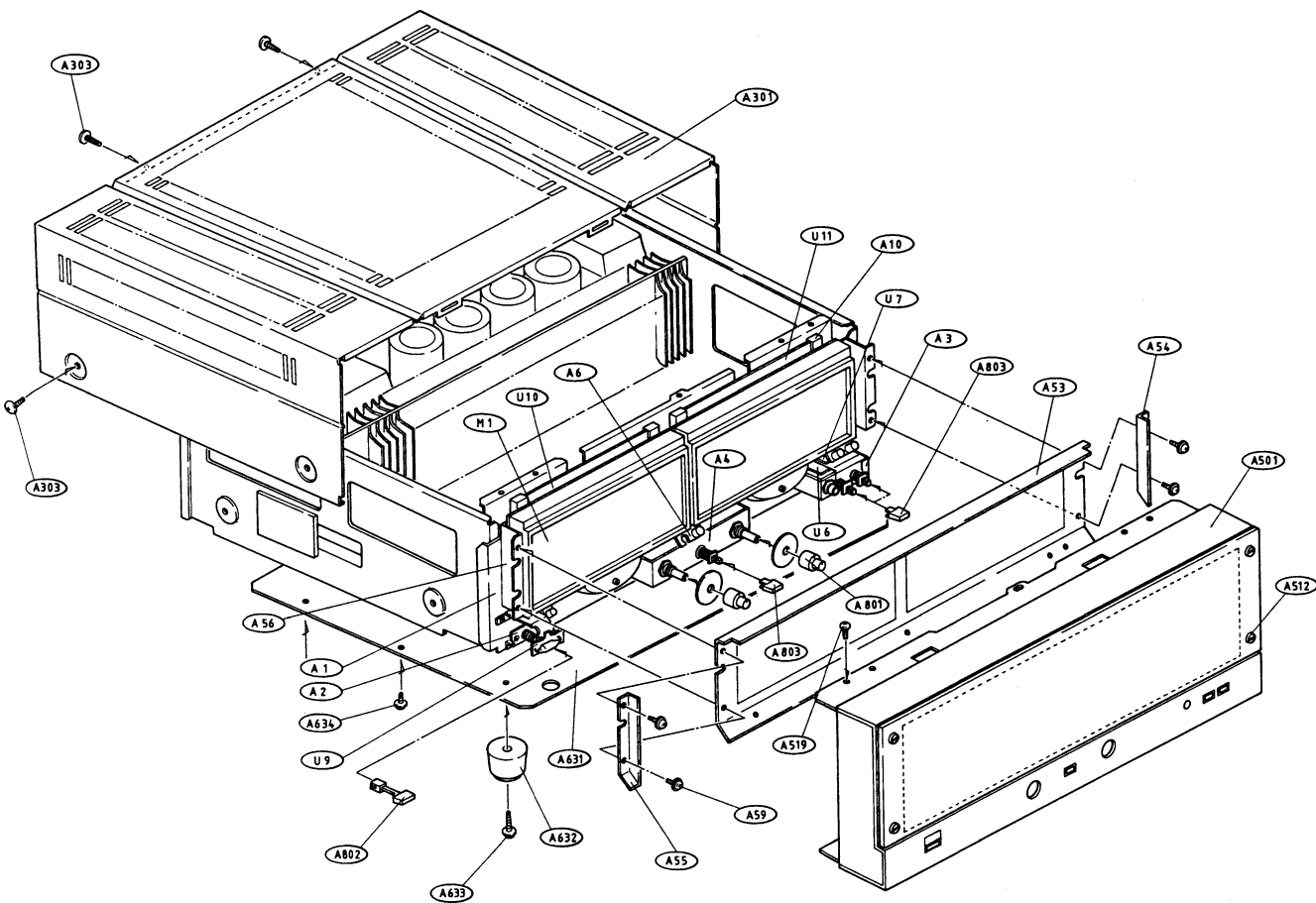


Example:

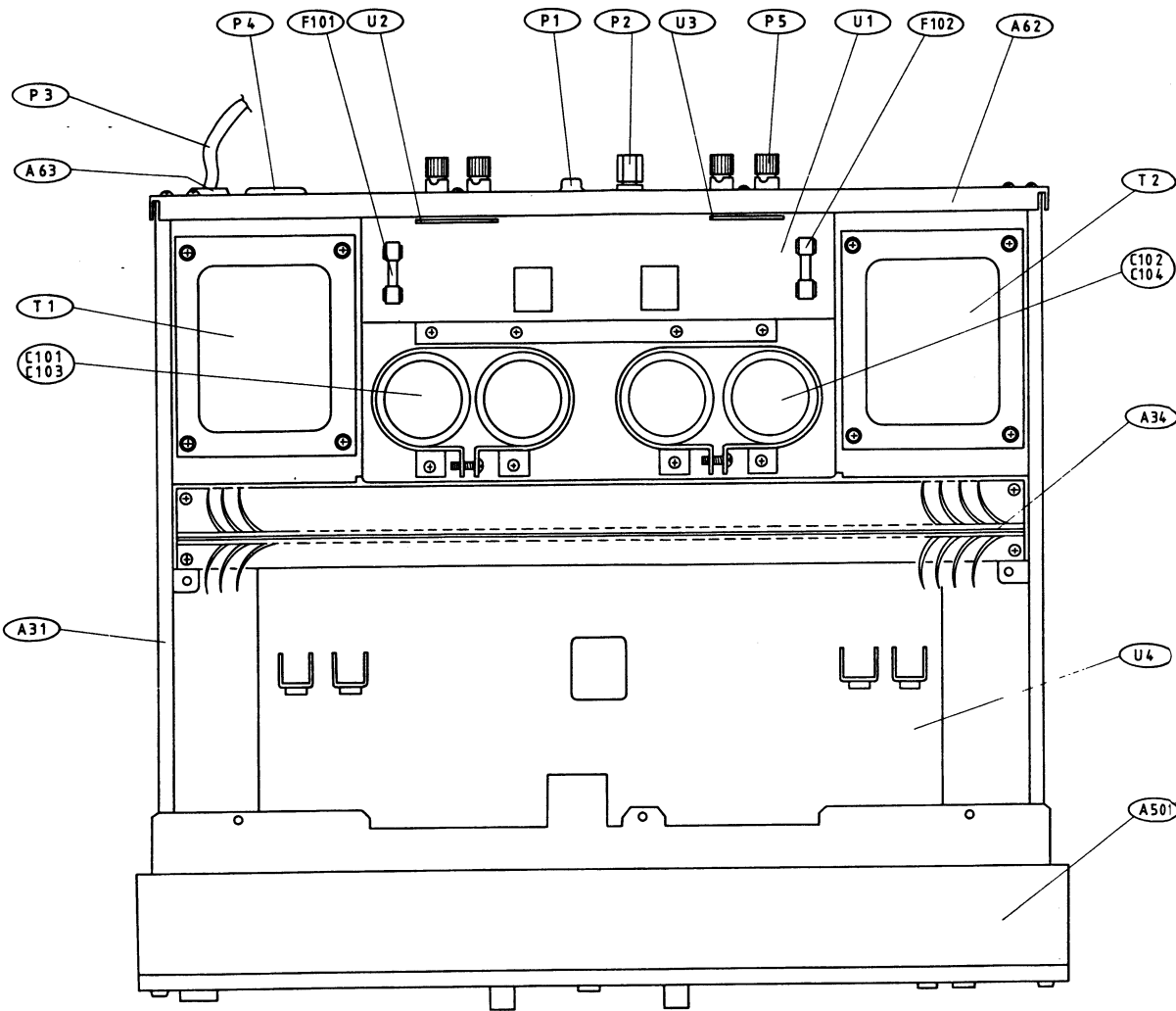
- 1.....brown
- 2.....red
- 3.....orange

$$12 \times 10^3 \Omega = 12k\Omega$$

EXPLODED VIEW



COMPONENT LOCATION



REF. NO.	PARTS NO.	DESCRIPTION
A1	27110149A	Front bracket
A2	27140313	Bracket, Power switch
A3	27140550A	Bracket, Headphone
A4	27140551A	Bracket, Volume
A6	27140553	Bracket, Lamp
A7	27140554	Bracket, Lamp
A10	27190127A	Holder, PC board
A31	27115053B	Side bracket
A34	27160097B	Heatsink
A53	28133054A	Plate
A54	28125096B	End cap, Right
A55	28125097B	End cap, Left
A56	27140555	Bracket
A59	831130088	3TTW + 8B, Tapping screw
A62	27120455	Back panel (D)
	27120456	Back panel (G)
A63	270280	SR-4K-4, Strainrelief
A301	28184120-1	Top cover
A303	838440089	4TTB + 8C (BC), Tapping screw
A501	12388121	Front panel ass'y
A512	27300348	Screw
	27270017A	Spacer

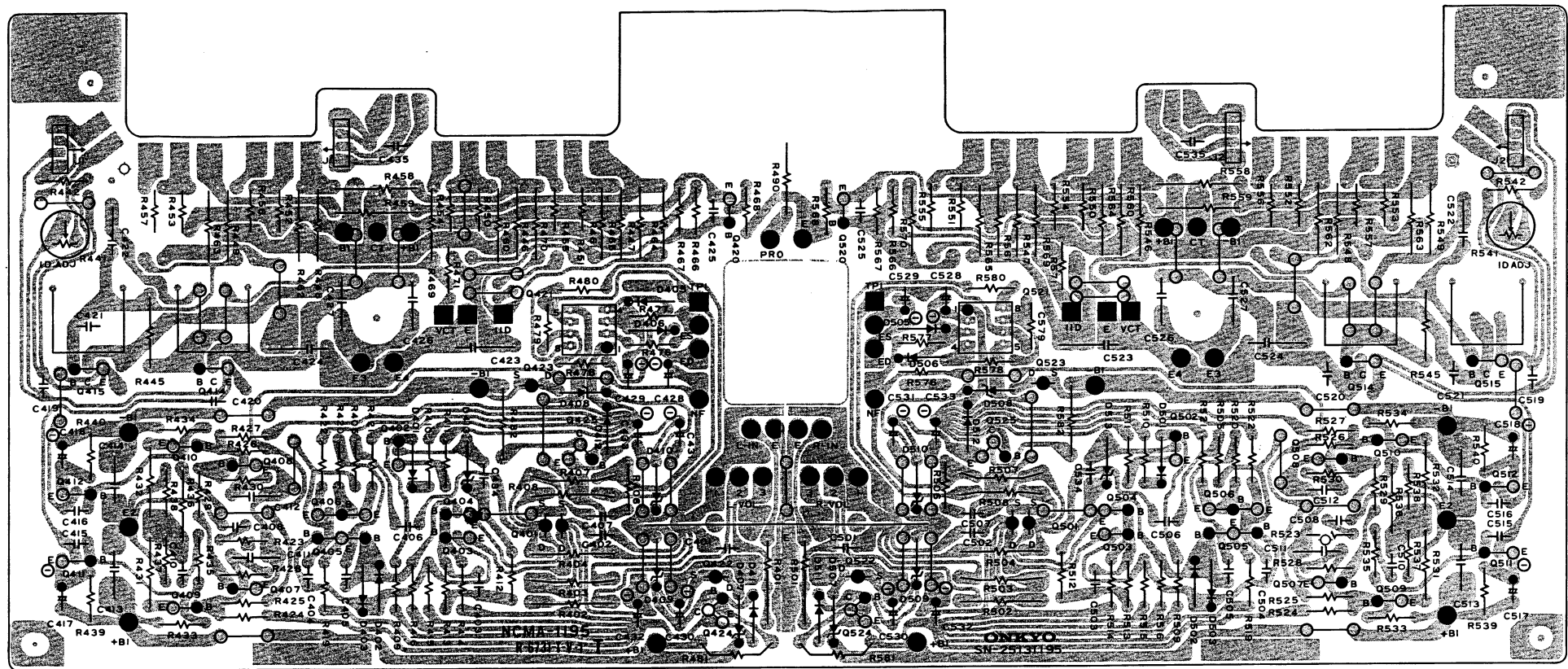
REF. NO.	PARTS NO.	DESCRIPTION
	86214010	WN4x10FN, Nut
	870051	Washer
	870054A	Washer
A519	83443068	3TTS + 6B (BC), Tapping screw
A631	27170067	Bottom board
A632	280889B	Leg
A633	831130168	3TTW + 16B, Tapping screw
A634	831430088	3TTW + 8B(BC), Tapping screw
A801	28320633	Knob, Volume
A802	28320634A	Knob, Power switch
A803	28320645A	Knob, Push switch
Q413, Q513	2211255	2SC1815 (GR), Transistor
Q416, Q516	2201163 or	2SC2581 (O) or
Q417, Q517	2201164	2SC2581 (Y), Transistor
Q418, Q518	2201153 or	2SA1106 (O) or
R419, Q519	2201154	2SA1106 (Y), Transistor
D404, D504	4000068	VD1222, Diode
T1, T2	230660	NPT-756D, Power transformer (D)
	230661	NPT-756G, Power transformer (G)
C1, C2, C3	3500065A	0.01μF, 400V, Capacitor IS
C1a, C2a, C3a	27300080	8116U09, Cover, capacitor

REF. NO.	PARTS NO.	DESCRIPTION
C101-C104	3504126	18000μFx2,69V, Elect. capacitor
R1, R2	5104112	N27D100KB25M, Variable level control
S1	25035061A	NPS-121-L26P, Power switch (D)
	25035176	NPS-111-L140, Power switch (G)
S2	25065091A	1P-105A-95, Thermal switch
P1	25045048	NPJ-2PRBL23, Terminal
P2	TP160B	Ground terminal
P3	253100	AS-UC-4, Power supply cable (D)
	253092	AS-CEE-2, Power supply cable (G)
P4	25050046	NSCT-2P15, AC outlet
P5	25060039	NTM-4PDMN10, Speaker terminal
M1, M2	243141	NIND-2000S141, Output level meter
F101, F102	252050	5A (ST-6), AC fuse (D)
	252076	3.15A-SE-EAK, AC fuse (G)
F111, F112	252045	1A (ST-6), AC fuse (D)
	252070	1A-SE-EAK, AC fuse (G)
F113-F116	252078	5A-SE-EAK, AC fuse (G)
F111a, F112a	25050050	HO438A, Fuseholder (D)
F111a-F116a	25065096	NPF-073, Fuseholder (G)
U1	12388591A	NAPS-1191a, Protector and rectifier circuit pc board ass'y (D)

REF. NO.	PARTS NO.	DESCRIPTION
	12394591B	NAPS-1191b, Protector and rectifier circuit pc board ass'y (G)
U2	12730592	NAOP-1192, Speaker terminal pc board ass'y
U3	12730593	NAOP-1193, Speaker terminal pc board ass'y
U4	12730595	NAMA-1195, Power amplifier pc board ass'y
U5	12730596	NAME-1196, Meter drive circuit pc board ass'y
U6	12730597	NAHP-1197, Headphone jack pc board ass'y
U7	12730598	NASW-1198, Switch circuit pc board ass'y
U8	12730599	NASW-1199, Speaker selector switch pc board ass'y
U9	12730500	NAPL-1200, Lamp pc board ass'y
U10	12730501	NAPL-1201, Lamp pc board ass'y
U11	12730502	NAPL-1202, Lamp pc board ass'y

Note (D) : Only 120V model
(G) : Only 220V model

PRINTED CIRCUIT BOARD VIEW FROM COMPONENT SIDE
NASW-1195



PROTECTOR AND RECTIFIER CIRCUIT PC BOARD
(NAPS-1191a) PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Q101	222584	TA7317P
D101-D108	223841	GP30G
D109, D110	223862	WL01
D111	4000087	NV022D10
D112	223133	DS442X
D113	224098	GZA6.2U
D114	223848 or 223804	GP-08B or SR1K-2
L101, L102	231016	S-0.8D
C101, C102	3504126	18000µF x 2, 69V, Elect.
C103, C104	379134735	0.047µF, 100V, DEW
C107, C108	352744709	47µF, 16V, Elect.
C109, C110	352744719	470µF, 16V, Elect.
C114	352742229	2200µF, 16V, Elect.
C115	352732209	22µF, 10V, Elect.
C117	384171037	0.01µF, 630V, DT
C119, C120	441620474	4.7Ω, 1W, Metal oxide film
R101, R102	441525614	560Ω, 1/2W, Metal oxide film
R103	441722204	22Ω, 2W, Metal oxide film
R105-R108	441520334	3.3Ω, 1/2W, Metal oxide film
R121-R124	25065036	NRL-4P3A-DC12-01
RL101	25065124	NRL-4P3A-DC12-04
RL102		

CIRCUIT NO.	PARTS NO.	DESCRIPTION
F101, F102	250113	S-N5051
	252050	5A (ST-6)

SPEAKER TERMINAL (NAOP-1192/1193) PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
	25060039	NTM-4PDMN10, Speaker terminal

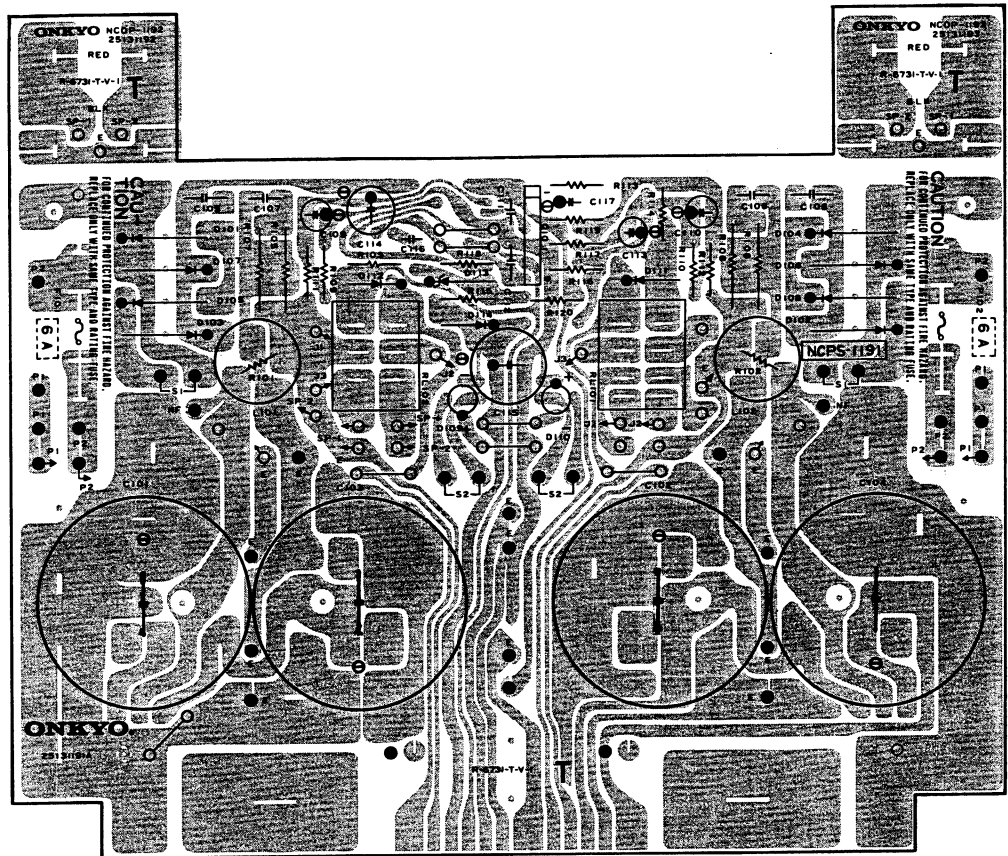
POWER AMPLIFIER PC BOARD (NAMA-1195) PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Q421, Q521	222465	NJM4558D
Q401, Q501	2211916 or 2211917	2SK240 (BL) or 2SK240 (V)
Q402, Q403, Q404	2211255	2SC1815 (GR)
Q407, Q502, Q503		
Q504, Q507		
Q405, Q505	2211140	2SA798 (O-001)
Q406, Q506	2211446 or 2211445	2SC2291 (G) or 2SC2291 (F)
Q408, Q508	2211455	2SA1015 (GR)
Q409, Q509	2211732 or 2211733	2SC1845 (F) or 2SC1845 (E)
Q410, Q510	2211792 or 2211793	2SA992 (F) or 2SA992 (E)
Q420, Q520		

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Q411, Q511	2211742 or 2211743	2SA915 (L) or 2SA915 (M)
Q412, Q512	2211762 or 2211763	2SC1940 (L) or 2SC1940 (M)
Q414, Q514	2200863 or 2200864	2SC2238 (O) or 2SC2238 (Y)
Q415, Q515	2200873 or 2200874	2SA968 (O) or 2SA968 (Y)
Q422, Q423	2211945 or 2211315	2SK246 (GR) or 2SK117 (GR)
Q522, Q523		
Q424, Q524	2200664	2SC1626 (Y)
Q425, Q525	2200674	2SA816 (Y)
D401-D406, D411, D412, D501-D506, D511, D512	223133	DS442X
D407-D410 D507-D510	224119	GZA18L
C401, C501	372121514	150pF, 50V, ST
C402, C502	372122214	220pF, 50V, ST
C403, C503	379122235	0.022µF, 50V, DEW
C411, C511	379121045	0.1µF, 50V, DEW
C412, C512		
C413, C414, C426	379132247	0.22µF, 100V, DEW
C427, C513, C514		
C526, C527		
C419	379221037	0.01µF, 50V, DEW
C422, C522	379122247	0.22µF, 50V, DEW
C423, C424	379131047	0.1µF, 100V, DEW
C523, C524		

CIRCUIT NO.	PARTS NO.	DESCRIPTION
C428, C429, C528, C529	352754709	47µF, 25V, Elect.
C430, C431, C530, C531	352751019	100µF, 25V, Elect.
C432, C433, C532, C533	352752219	220µF, 25V, Elect.
C435, C535	379121235	0.012µF, 50V, Elect.
R431, R432, R531, R532	442526804	68Ω, 1/2W, Metal oxide film
R436, R536	442622724	2.7kΩ, 1W, Metal oxide film
R441, R541	5225074	N10HR10KBDM, Semi-fixed
R445, R545	442521014	100Ω, 1/2W, Metal oxide film
R446-R449, R546-R549	442520224	2.2Ω, 1/2W, Metal oxide film
R450-R453, R550-R553	4000078	0.33Ω, 5W, Metal plate
R454-R457, R554-R557	4000080	0.47Ω, 5W, Metal plate
R458, R459, R558, R559	442620104	1Ω, 1W, Metal oxide film
R460-R463, R560-R563	442520684	6.8Ω, 1/2W, Metal oxide film
R464, R564	442525124	5.1kΩ, 1/2W, Metal oxide film
R465, R565		
R469, R470, R569, R570	442522214	220Ω, 1/2W, Metal oxide film
R481, R482, R581, R582	442626214	620Ω, 1W, Metal oxide film

NAOP-1191



METER DRIVE CIRCUIT PC BOARD (NAME-1196)
PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
ICs		
Q603	222529	TA7318P (R)
Q606, Q607	222502	NJM4558DX
Transistors		
Q601, Q602	2211945	2SK246 (GR)
Q604, Q605	2211255	2SC1815 (GR)
Q608	2200664	2SC1626 (Y)
Q609	2200674	2SA816 (Y)
Q610	2211455	2SA1015 (GR)
Q611, Q612	2201286 or 2201285	2SD882 (P) or 2SD882 (Q)
Diodes		
D601,D602,D605, D609, D610	223133	DS442X
D603,D604,D606, D607, D608	224115	GZA15L
	224124	GZA22U
Capacitors		
C601, C602	352784799	0.47μF, 50V, Elect.
C605, C606, C610, C611	352780339	3.3μF, 50V, Elect.
C607	352780109	1μF, 50V, Elect.
C608, C609	379121035	0.01μF, 50V, DEW
C612, C613, C618, C619	352754709	47μF, 25V, Elect.
C614, C615	352752219	220μF, 25V, Elect.
Resistors		
R611, R612	5221024	N10HR1KBEM, Semi fixed
R639, R640	5221023	N10HR470BEM, Semi fixed
R644	442523324	3.3kΩ, 1/2W, Metal oxide film

CIRCUIT NO.	PARTS NO.	DESCRIPTION
R645	442525124	51kΩ, 1/2W, Metal oxide film
R646, R647	442525614	560Ω, 1/2W, Metal oxide film
R649	442623024	3kΩ, 1W, Metal oxide film
R652, R654	442524714	470Ω, 1/2W, Metal oxide film
R657, R658	442723314	330Ω, 2W, Metal oxide film
R659	442726894	0.68Ω, 2W, Metal oxide film
R660	442720274	2.7Ω, 2W, Metal oxide film
R661	442520564	5.6Ω, 1/2W, Metal oxide film
Relay		
RL601	25065124	NRL-4P3ADC12-04

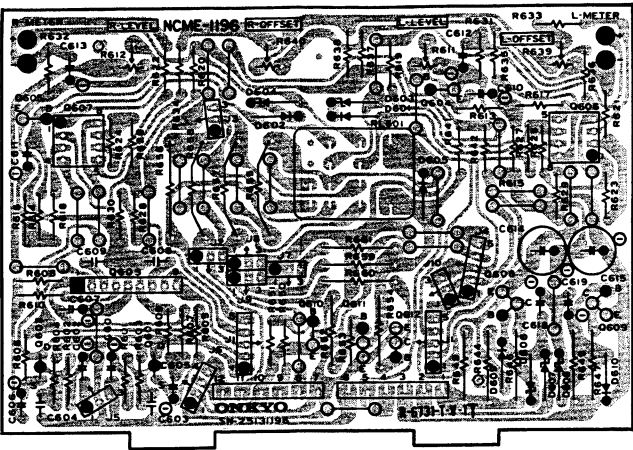
HEADPHONE JACK PC BOARD (NAHP-1197) PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
P701	25045062	M1654-A, Stereo headphone jack

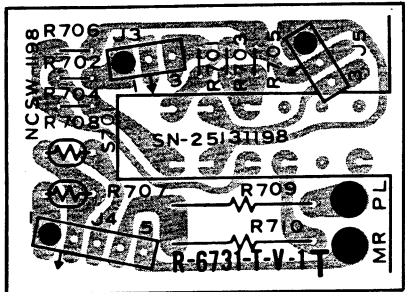
SWITCH CIRCUIT PC BOARD (NASW-1198) PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
Lamps		
PL701	210094	PL14V60mAW-3.0
PL702	210086	PL14V60mAW-0.9
Resistors		
R707, R708	4000028	D33A, Thermistor
R709, R710	442526204	62Ω, 1/2W, Metal oxide film
Switch		
S701	25035097	NPS-142-L62

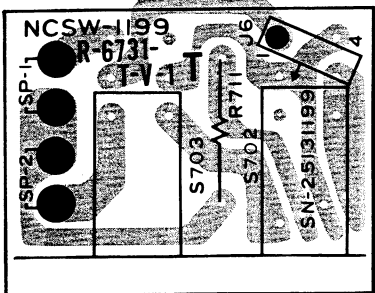
NAME-1196



NASW-1198



NASW-1199



SPEAKER SELECTOR SWITCH PC BOARD (NASW-1199) PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL703, PL704	210086	PL14V67mAW-0.9, Lamp
R711	442526204	62Ω, 1/2W, Metal oxide film resistor
S702, S703	25035165	NPS-222-L129, Switch

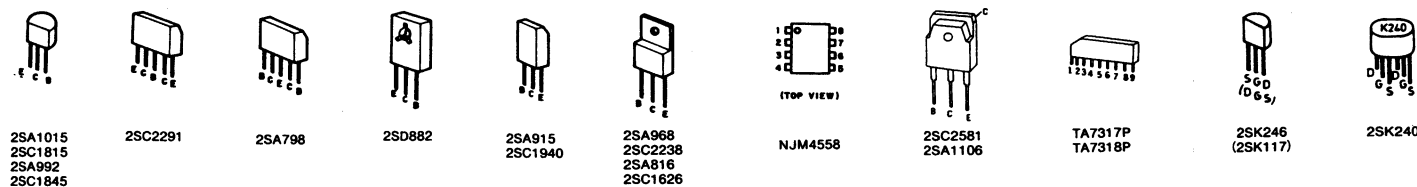
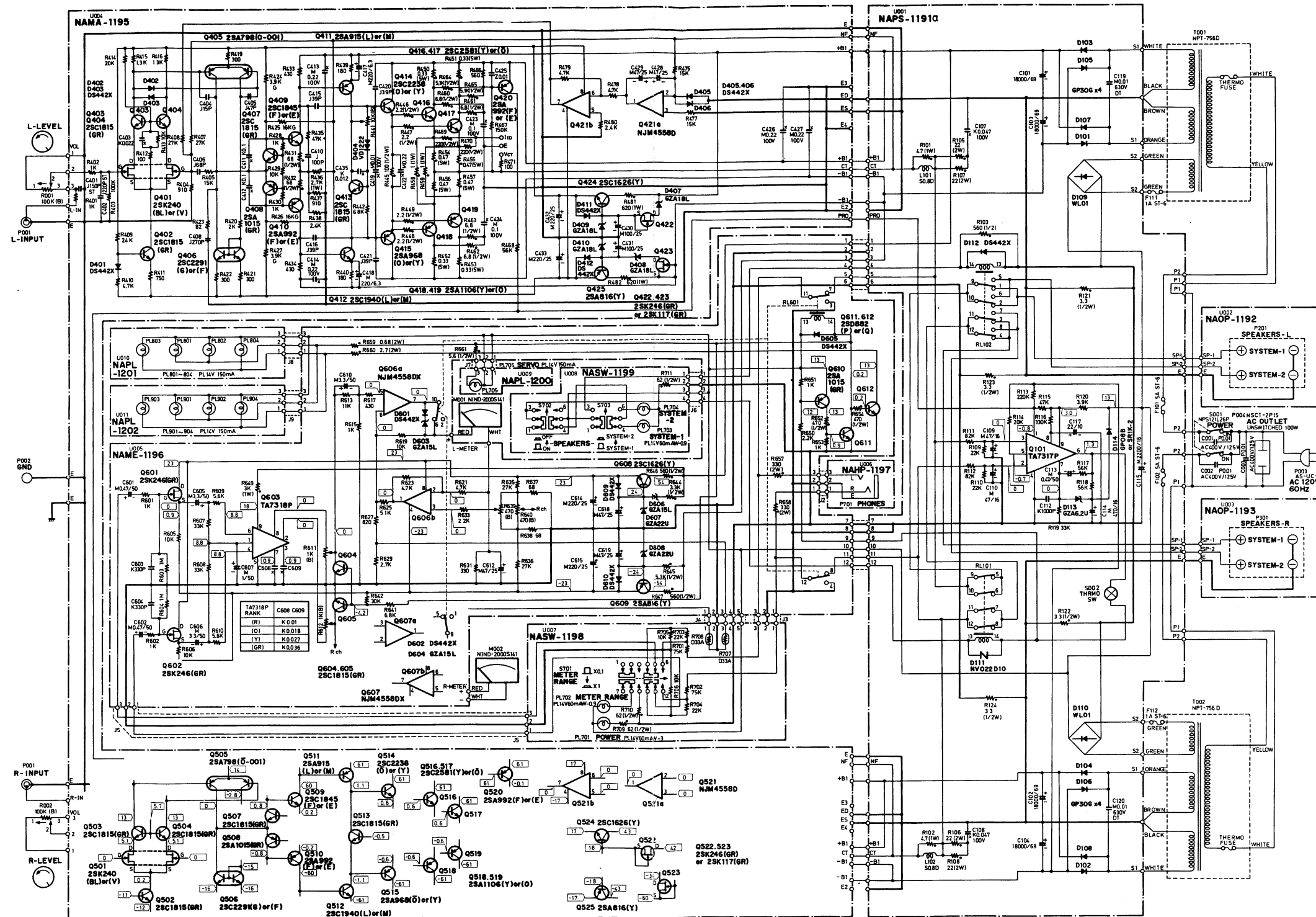
LAMP PC BOARD (NAPL-1201/1202) PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL801-PL804	210092	PL14V150mA, Lamp
	27140552	Bracket, Lamp

LAMP PC BOARD (NAPL-1200) PARTS LIST

CIRCUIT NO.	PARTS NO.	DESCRIPTION
PL705	210092	PL14V150mA, Lamp

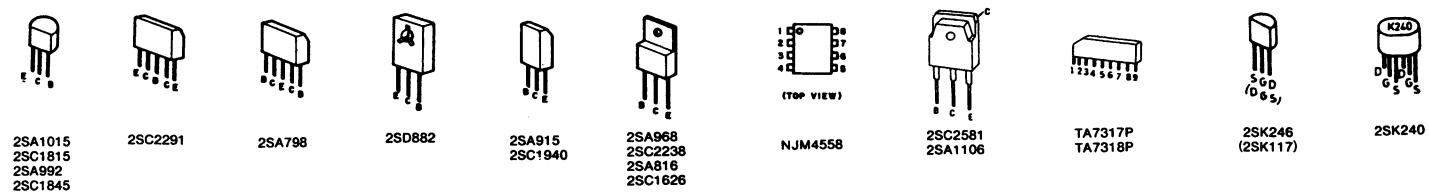
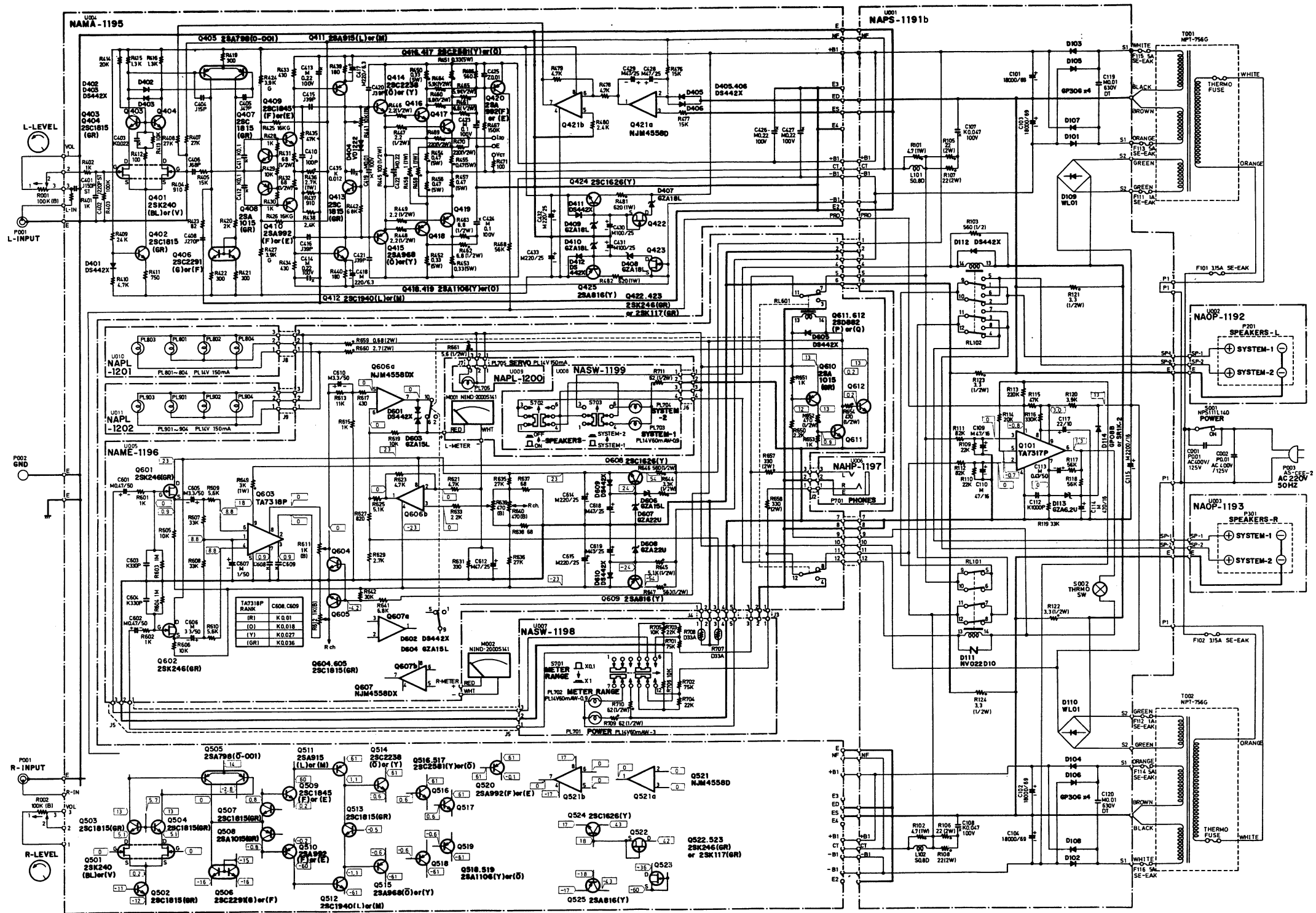
SCHEMATIC DIAGRAM MODEL M-5060R D



- NOTES
- ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.
 - ALL CAPACITORS ARE IN μ F, 50VW UNLESS OTHERWISE NOTED.
 - ELECTROLYTIC CAPACITORS () ARE IN μ FWV.
 - VOLTAGE (MEASURED WITH V.T.V.M.) (NO INPUT SIGNAL)
 - CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

ONKYO CORPORATION

SCHEMATIC DIAGRAM
MODEL M-5060R G

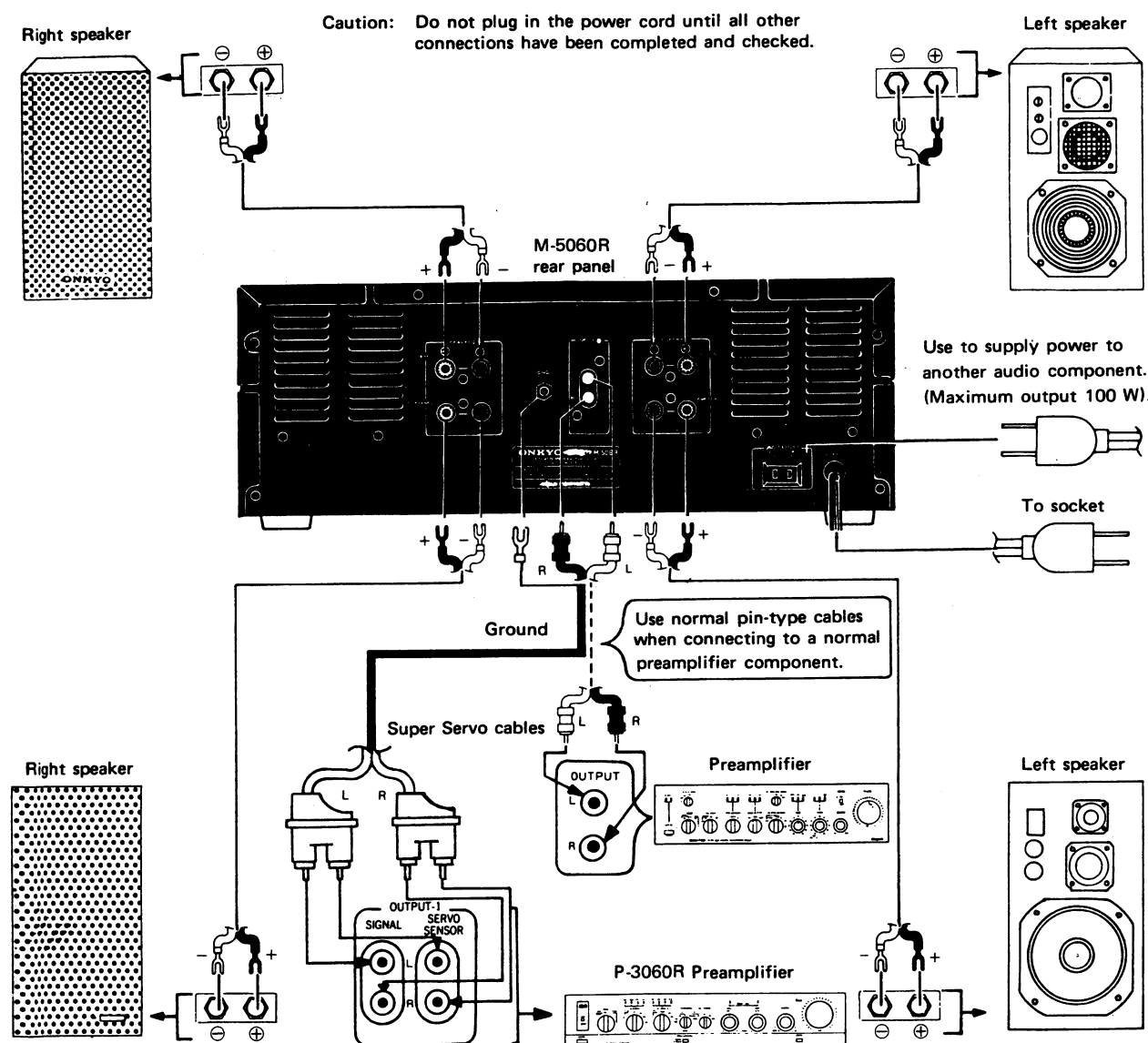


- NOTES
- ALL RESISTORS ARE IN OHMS, 1/4 WATT UNLESS OTHERWISE NOTED.
 - ALL CAPACITORS ARE IN μ F, 50WV UNLESS OTHERWISE NOTED.
 - ELECTROLYTIC CAPACITORS () ARE IN μ FWV.
 - VOLTAGE (MEASURED WITH V.T.V.M.) (NO INPUT SIGNAL)
 - CIRCUIT IS SUBJECT TO CHANGE FOR IMPROVEMENT.

ONKYO CORPORATION

SYSTEM CONNECTIONS

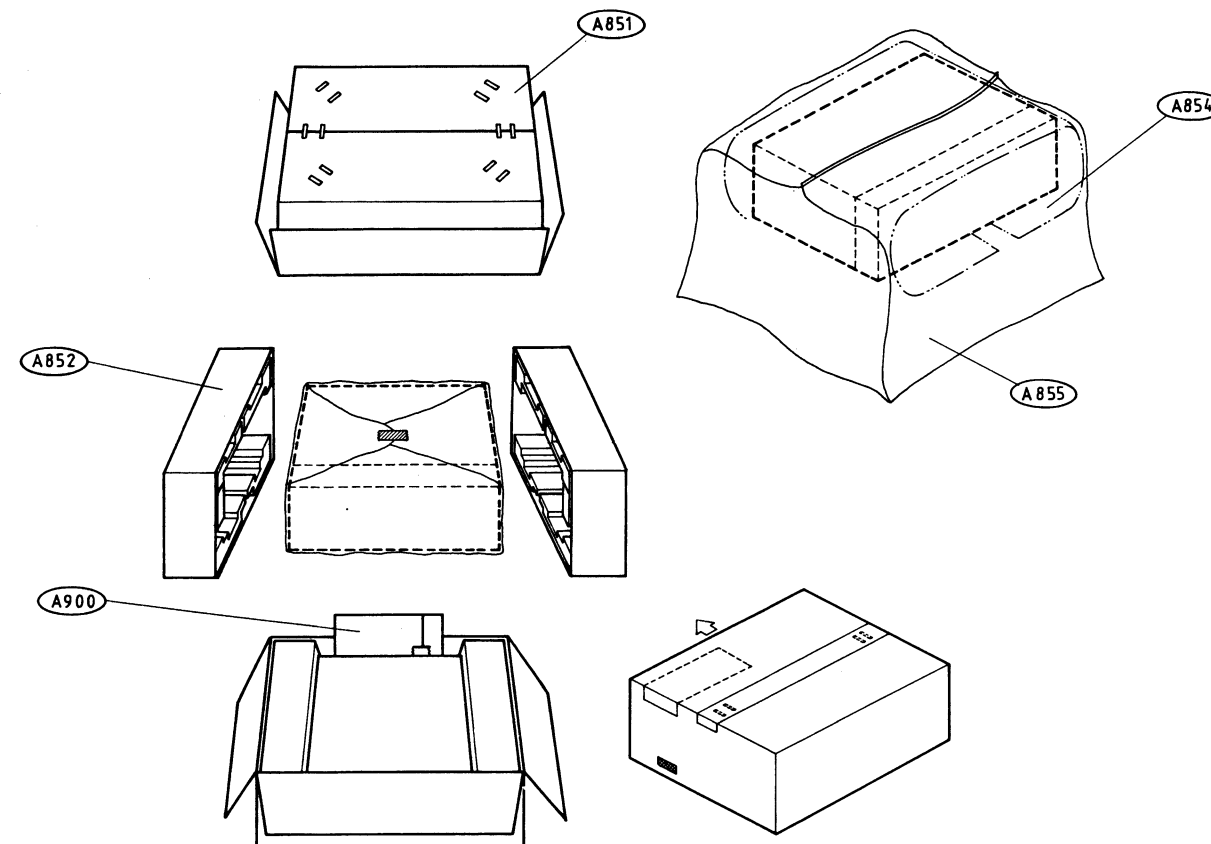
PACKING PROCEDURES



- It is recommended that the Onkyo P-3060R preamplifier be used with the M-5060R because the P-3060R features the same Super Servo Integral system. In this case, connect the M-5060R and P-3060R to each other with the special Super Servo cables supplied (these cables are supplied only with the P-3060R). However, if a different preamplifier is connected to the M-5060R, use normal pin-type connecting cables.
- Since the M-5060R is a high grade high power amplifier component, use only high grade speaker systems capable of doing justice to the excellent quality of sound reproduction achieved by the M-5060R.
- Note that although the allowable speaker impedance range is 4Ω to 16Ω, the speaker systems selected for use with the M-5060R should have a high power handling capacity. If speaker systems of low maximum input power rating are used and the volume level is increased to

very high levels, the speakers will probably be damaged. Check the maximum input power rating before connecting to the M-5060R.

- Use sturdy coaxial speaker cables for the speaker connections. The use of thin leads is not recommended because the resultant higher speaker lead impedance will affect the quality of sound reproduction.
- In order to protect speakers from possible damage, always turn the M-5060R power switch off before connecting (or disconnecting) the speaker systems.
- Be particularly careful not to short circuit the speaker cables at any time.
- Keep the power cord away from the pin-type cables and speaker cables since close proximity can result in induction hum.



REF. NO.	PARTS NO.	DESCRIPTION
A851	29050598	Master carton box
A852	29090628A	Pad
A854	290093-1	500x1200mm, Protection sheet
A855	29100038A	720x950mm, Poly bag
A900	Accessory bag	
	29340651	Instruction manual (D/U)
	29340652	Instruction manual (G/V)
	29365006-4	Warranty card (U)
	29365005-3	Warranty card (V)
	29358002	Service station list (U)
	29100006	350x250mm, Poly bag
	2010069	Connection cord

Note

- (U) : Only U.S.A. model
 (V) : Only West Germany model
 (D) : Only 120V model
 (G) : Only 220V model

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