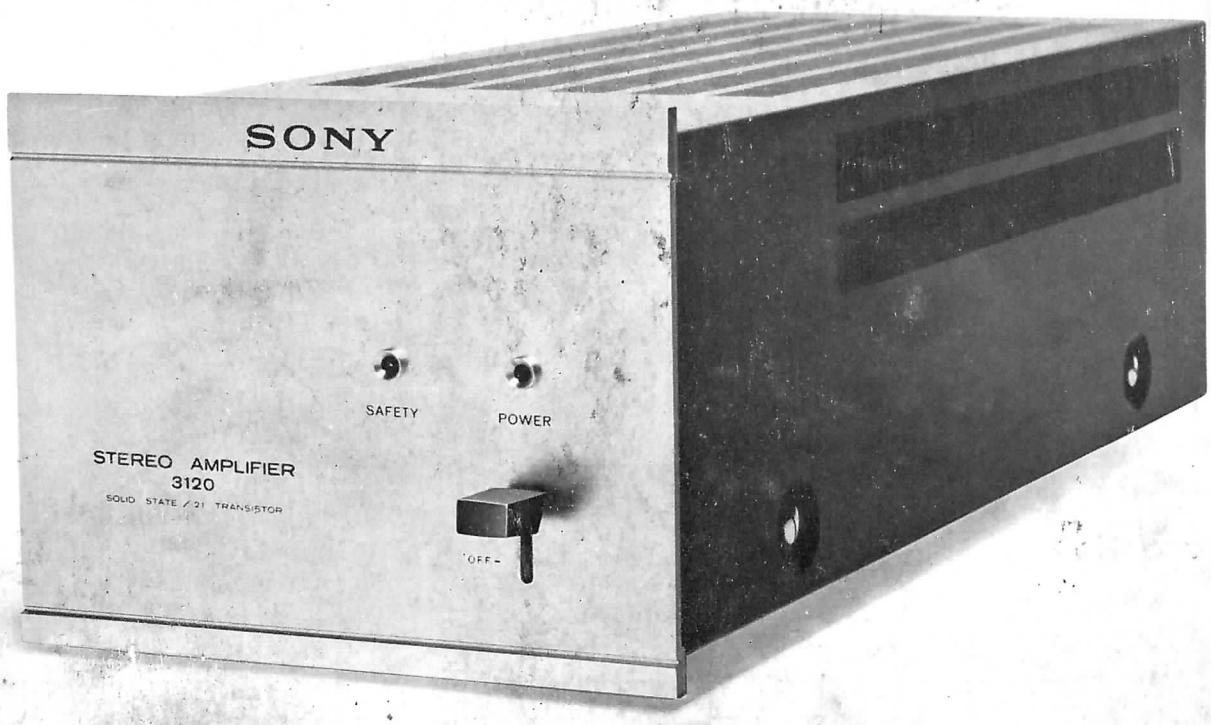
TA-3120



Specifications (1)

System : All Silicon Transistor stereo amplifier

Circuit : Quasi-complementary symmetry circuit

Transistor : 2SC401 (4), 2SC293 (2), 2SC299 (5), 2SD45 (8), 2SA527 (2)

Diode : DS2M (4), S2C (2), 1T206 (10), SV6 (4), 2SF-103 (SCR) (1)

Power requirement : AC 100, 117, 220, 240V, 50/60 Hz

Power consumption : Approx. 30W at zero signal

Approx. 250W at rated output

Dimension : 180 (W)×145 (H)×445mm (D) ($7\frac{1}{8}\times5\frac{3}{4}\times17\frac{1}{2}$")

Weight : Approx. 8 kgs. (17 lbs, 10 ozs.)

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SERVICING GUIDE

Specifications (2)

Power output : Non-clip music power : 160W both channels (8 ohms)
Music power(IHFM) : 120W both channels (8 ohms) ±0.5 db
Rated output : 50W per channel (8 ohms) ±0.5 db
35W per channel (16 ohms) ±0.5 db

Harmonic distortion : At 1 KHz : Less than 0.1% at rated output
Less than 0.07% at 25W output
Less than 0.05% at 500mW output
At 20 Hz - 80 KHz : Less than 0.5% at rated output.

Intermodulation distortion : (SMPTE) Less than 0.3% at rated output, 70 Hz : 7 KHz 4 : 1

Frequency response : Normal : 30 Hz - 100 KHz $^{+0}_{-1}$ db at rated output
Test : 10 Hz - 100 KHz $^{+0}_{-1}$ db at rated output

S/N : Closed circuit 110 db (IHFM)
*through weighted network as per ASAZ 24.3 - 1944 (40 db-A)

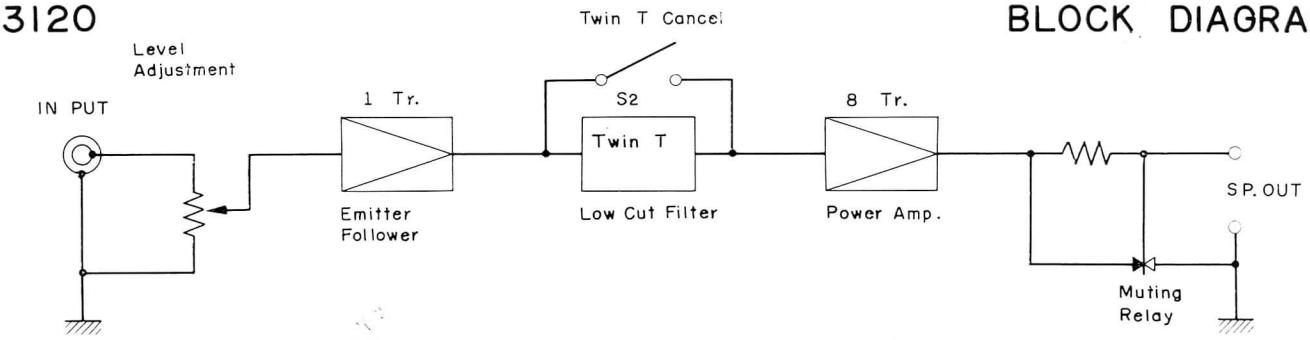
Input impedance : More than 100 k ohms

Damping factor : More than 70 at 1 KHz (8 ohms load)

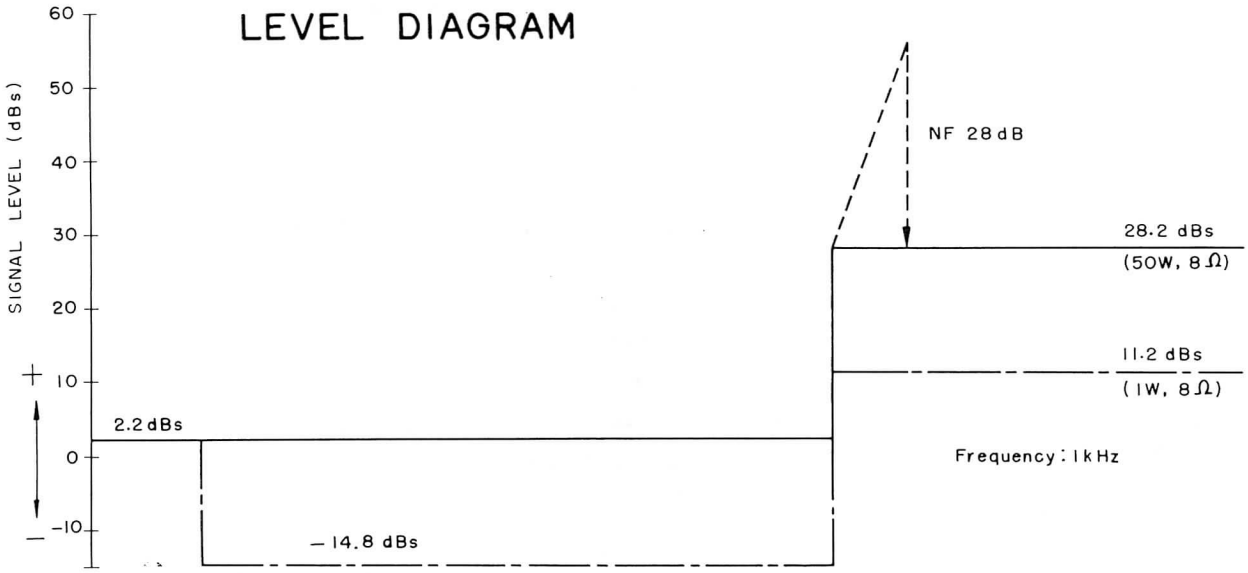
Sensitivity : 1V for 50W output

Rear panel facilities : Input level adjusting screws (semi-fixed)
Low-cut filter switch
Input (2) : Phono type jacks. Accept outputs from Preamplifier
Output (4) : Speaker terminals. Match speakers having 8 - 16 ohm impedance
Grounding terminal
AC outlet : Switched (2)
Unswitched (1)

TA-3120 BLOCK DIAGRAM



LEVEL DIAGRAM



Warm-up Time for TA-3120

Stereo integrated amplifier TA-3120 which have been in stock or not used for a long time, it takes several minutes to start operation after Power Switch is set on for the first time.

It is due to Electrolytic Capacitor in the Muting Relay Circuit which serves to give proper time-lag (usually 6—7 seconds) to the Amplifier.

When Electrolytic Capacitor is left unused, leakage current value increases and it takes much more time than usual for Electrolytic Capacitor to charge up to normal voltage.

It gives no affect to the natural performance of Amplifier itself.

Upon the reports so far received and the result of investigation, attention should be paid to the following points.

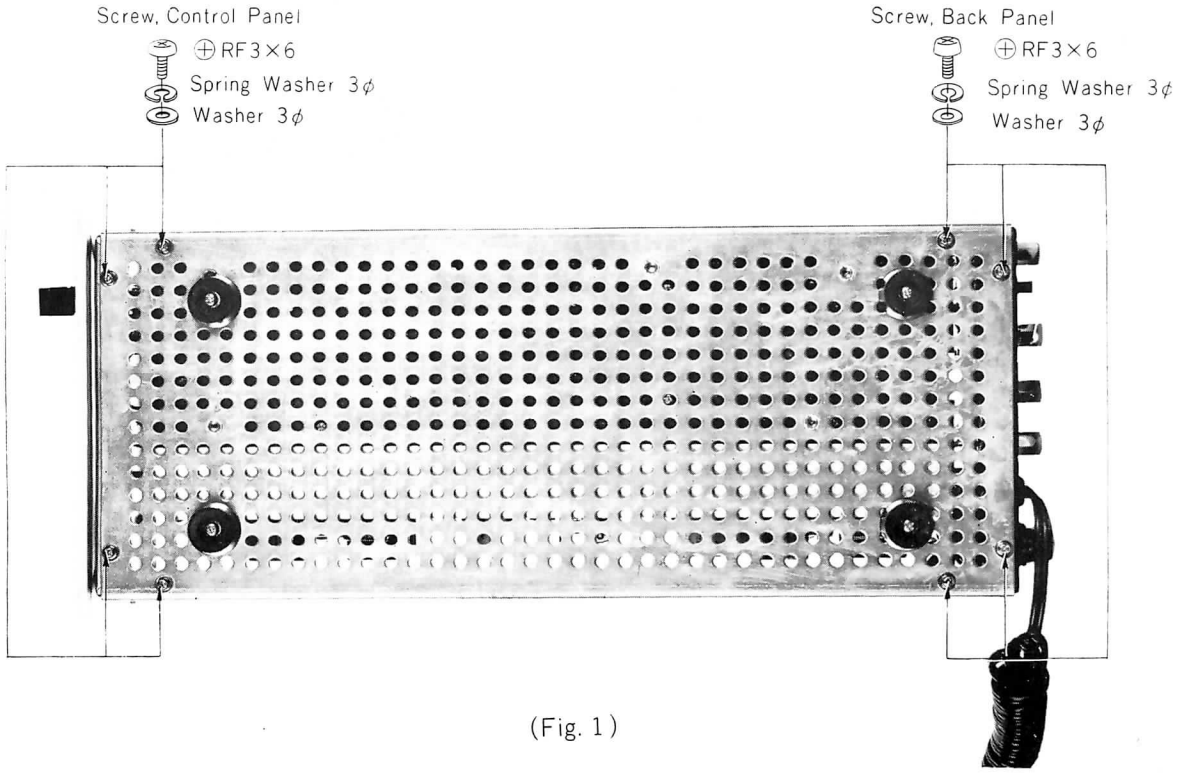
1. It dose not engender excessive time-lag to leave the unit unused for about one month.
2. It takes 2 or 3 minutes at longest to start operation, however only one set took 10 minutes in very rare case.

We hope you will take this phenomena in throughly, especially when you set Power Switch on in customer's presence for the first time.

Notes:

To simplify the discussions, only Channel "1" be described. Channel "2" is identical.

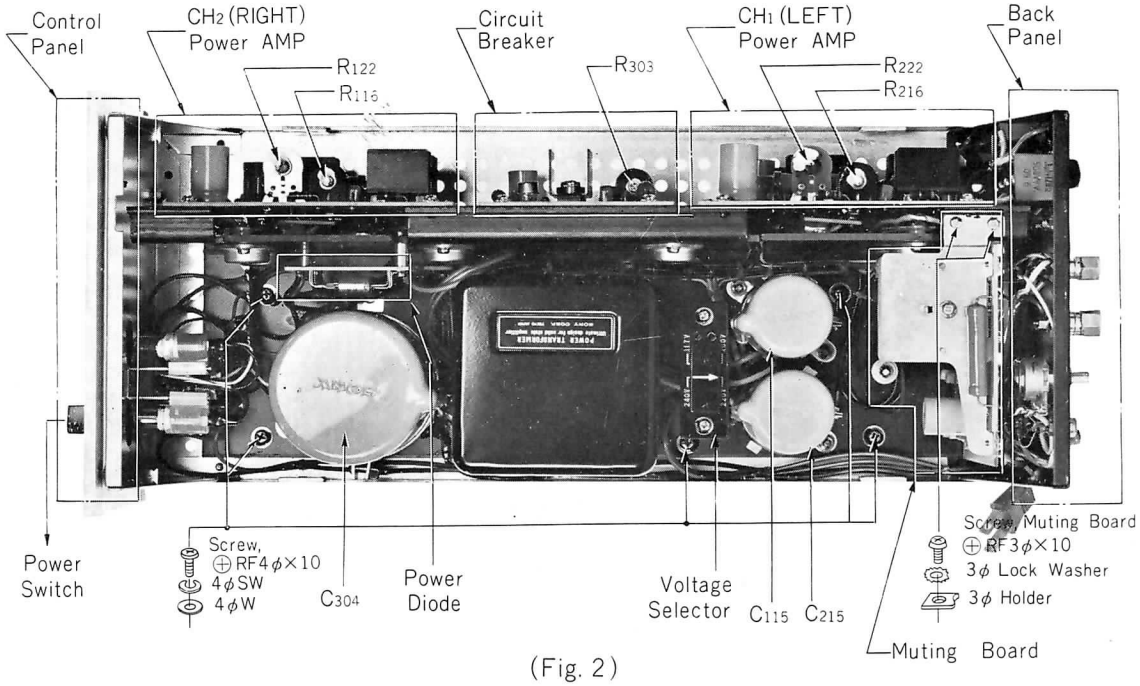
Method of Disassembling the Set



(Fig. 1)

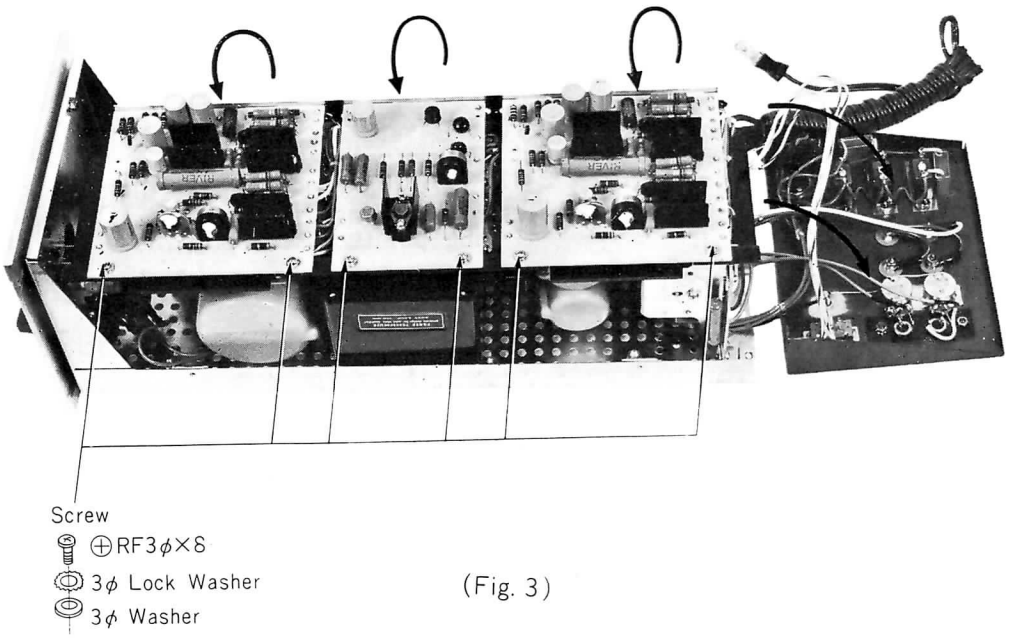
Removal of power amplifier and power supply block.

(a) Remove the four machine screws from both side of the cabinet to take off the chassis cover, then remove the four screws from the bottom of the chassis to release the back panel section as shown in fig. 1.

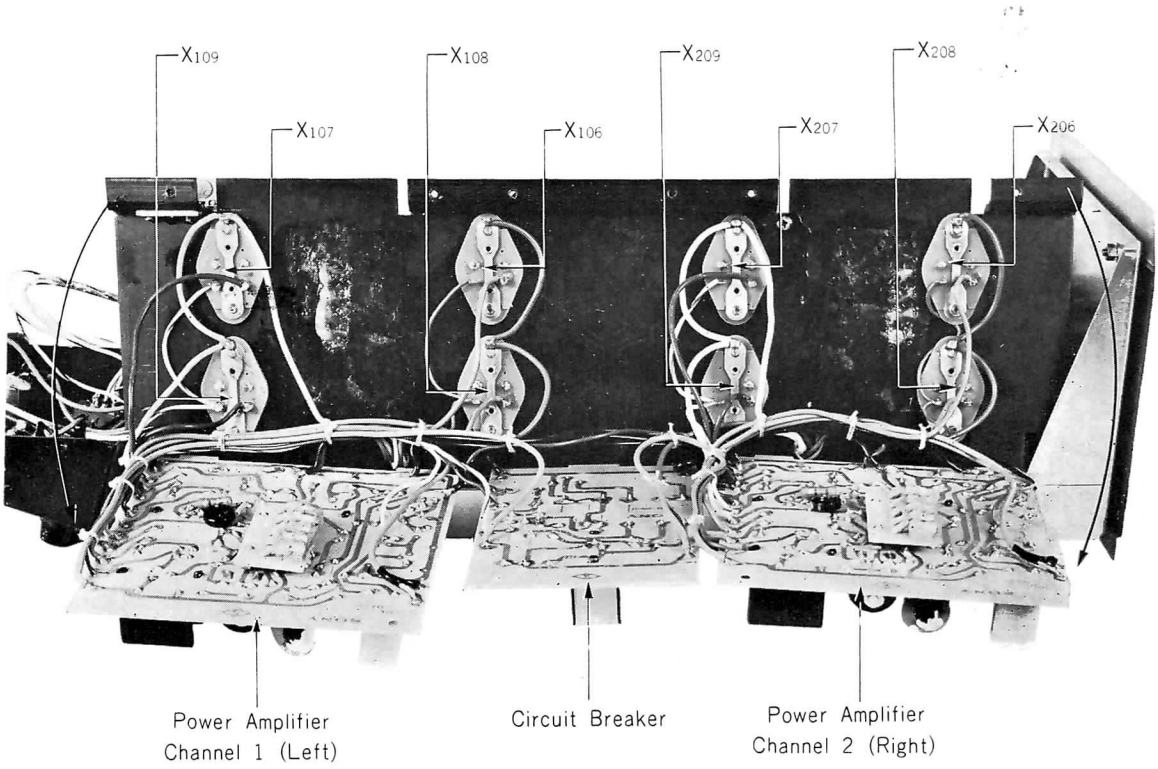


(Fig. 2)

(b) Remove the five screws, RF 4φ×10 from chassis, fig.2, so you can turn that block to make the circuit board up as shown in fig. 3.



(Fig. 3)



(Fig. 4)

(c) In checking the circuit board, removal of screws, RF 3φ×8, is recommended for your convenience, as shown in fig. 3, fig. 4.

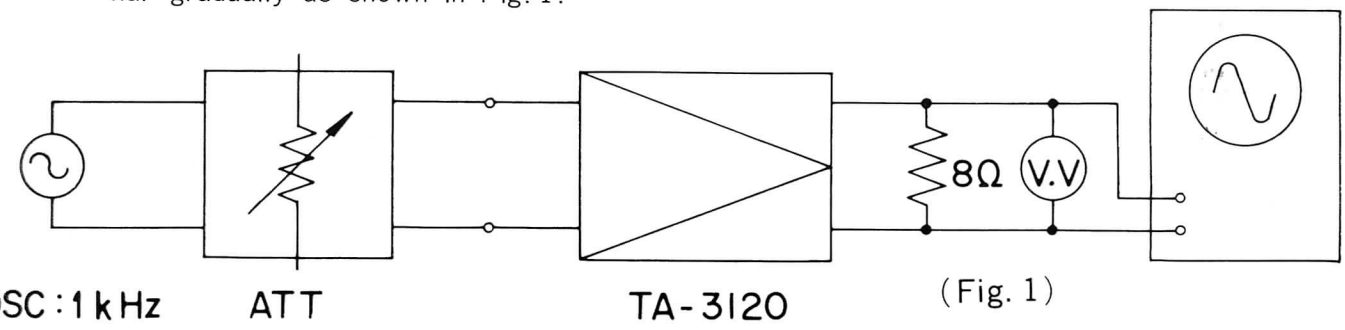
ADJUSTMENT

Preparation for adjustment

* Voltage Selector Plug :	Insert the Plug so that the top arrow mark of the plug points to the proper voltage figure.
* DC Balance Control (R122, 222) :	Turn clockwise to the full.
* Compensation Diode :	Check that the Diode is attached to heat sink.
* Load for output :	Connect an 8 ohms/50w resistor instead of Speaker.
* Fuse :	Set a 5A Fuse.

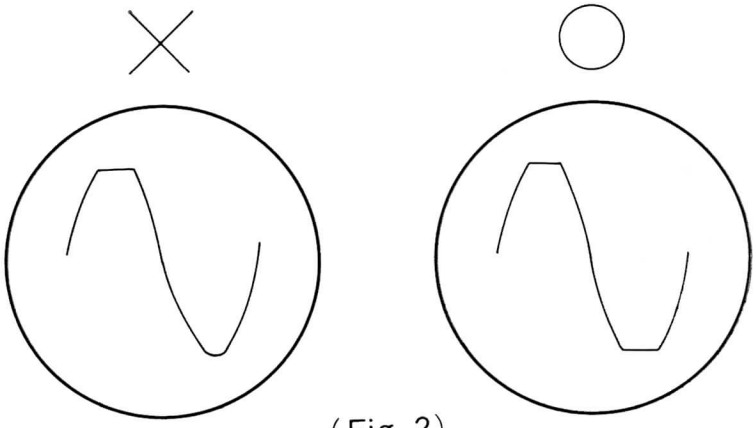
(A) AC Balance Adjustment

1. Connect an oscilloscope and V.T.V.M. across the 8 ohms load resistor.
2. Feed an 1 kHz signal to the input terminal through the attenuator and increase the signal gradually as shown in Fig. 1.



(Fig. 1)

3. When the wave form on the oscilloscope is slightly clipped, adjust 50K ohms potentiometer (R116, 216) so that the both upper side and lower side of wave form are clipped at the same time as shown in Fig. 2.



(Fig. 2)

4. Make the above procedures on both channels.

(B) Current Adjustment at Zero Signal

1. Adjust the input signal to zero (less than −59 dBs.)
2. Connect voltmeter (multitester) across the 0.5 ohms resistor (R135, 136, 235, 236).
3. Adjust the 200 ohms adjustable resistor (R122, 222) to obtain 25mV reading on the Voltmeter.
4. Repeat the above (A) adjustment.

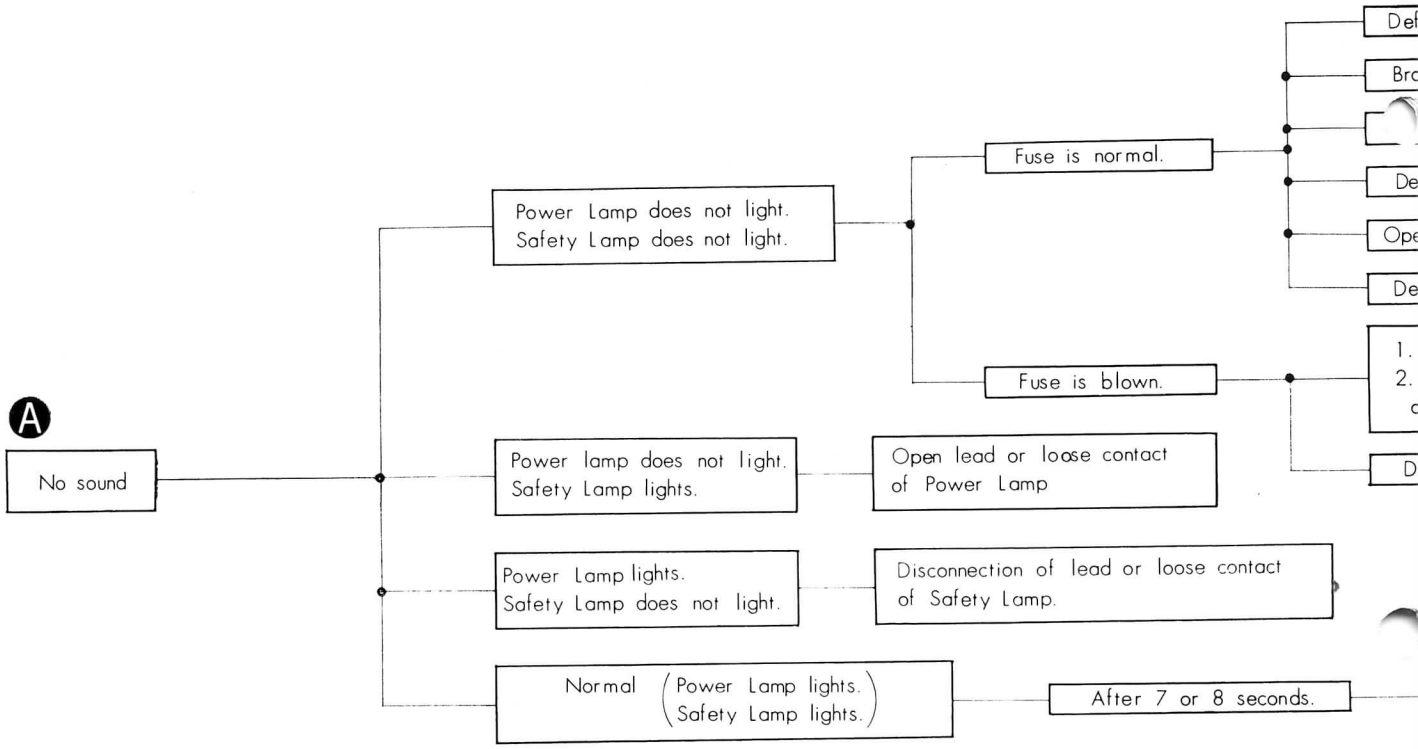
(C) Circuit Breaker Adjustment

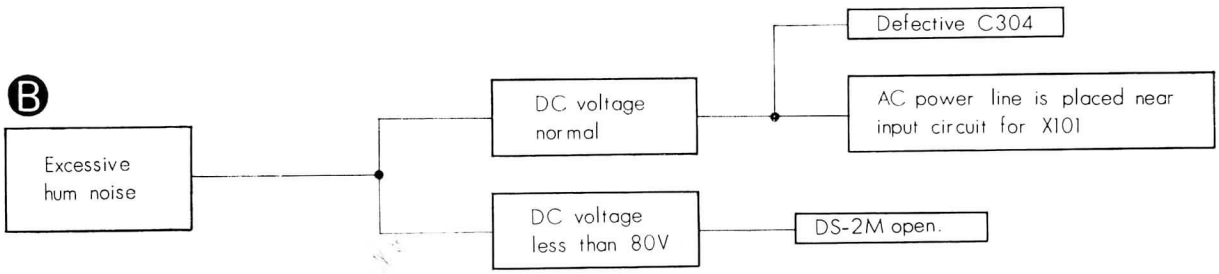
Make it a rule to adjust the circuit breaker block after repairing it, before connect it to amplifier.

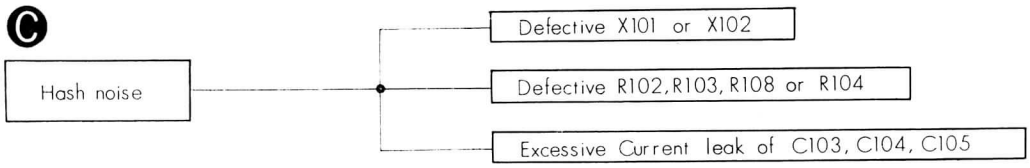
1. Turn the 200 ohms adjustable resistor (R301) counterclockwise to the full.
2. Supply DC 2V ±0.02V through D15 and D16 respectively.
3. Supply 85V between B+ and E.
4. Connect the voltmeter across the B-out and E.
5. Turn the 200 ohms adjustable resistor (R301) clockwise, and fix it when the voltmeter indicates 0V on the dial.

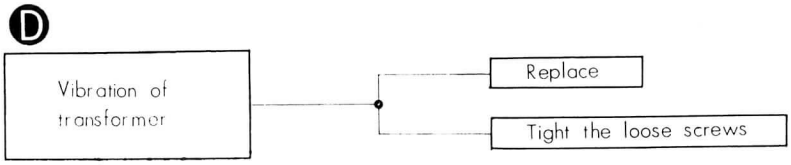
The Other Items for Confirmation :

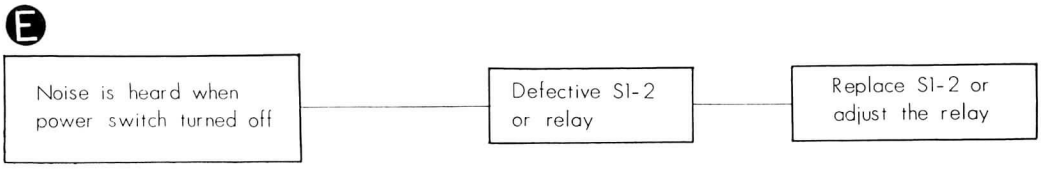
1. The operation time of relay will be less than 15 sec., at first, and the next time it will be less than 10～4 sec. after power switch is on, turned. The difference of time between channel "1" and channel "2" should be less than 10 sec.
2. Phase of both channels must be same.
3. The difference of output level between channel "1" and channel "2" must be less than 2 dB., when the input level control knob set to maximum level position.
4. Output level should be decreased to 0 with the input level control knob.
5. When short circuit of the speaker output, the circuit breaker must work perfectly.

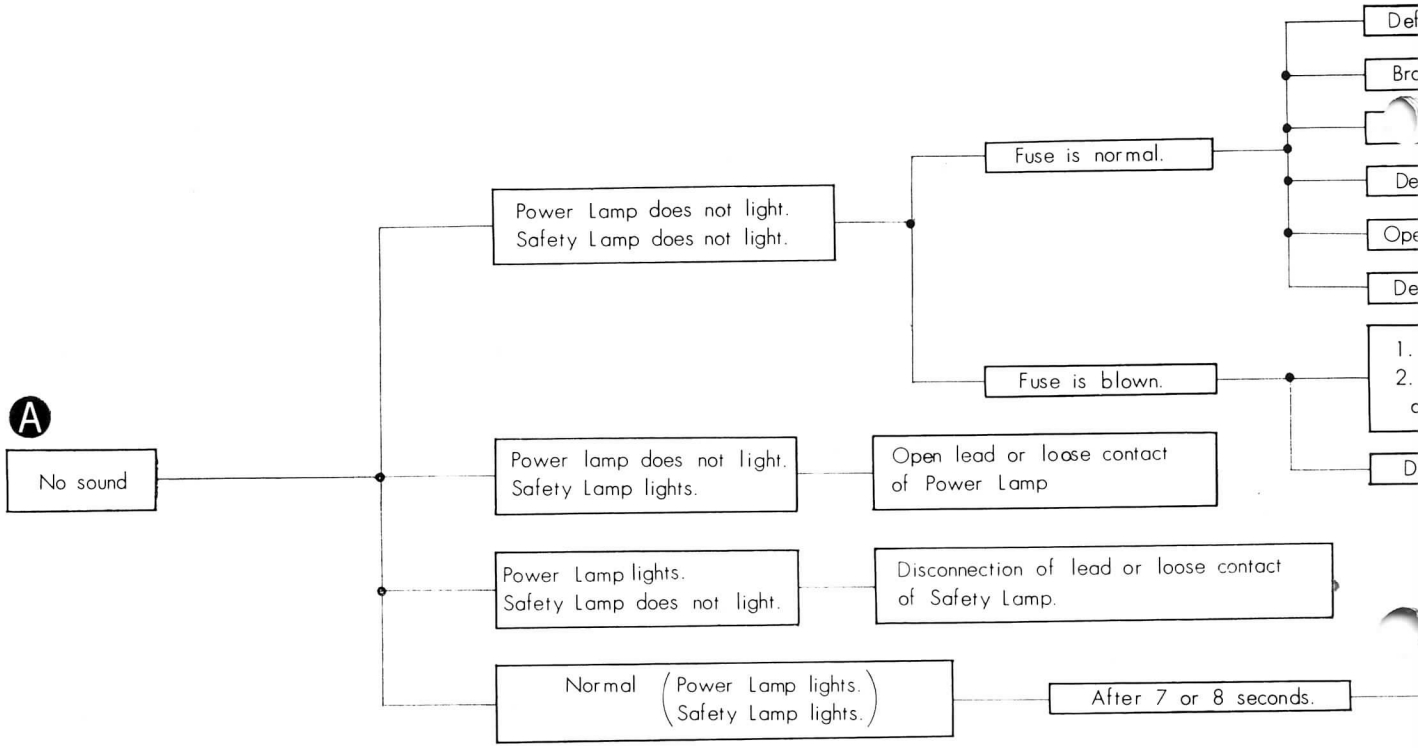

A
No sound
Power Lamp does not light.
Safety Lamp does not light.
Fuse is normal.
Fuse is blown.
Power lamp does not light.
Safety Lamp lights.
Open lead or loose contact
of Power Lamp
Power Lamp lights.
Safety Lamp does not light.
Disconnection of lead or loose contact
of Safety Lamp.
Normal (Power Lamp lights. Safety Lamp lights.)
After 7 or 8 seconds.


B
Excessive
hum noise
DC voltage
normal
DC voltage
less than 80V
Defective C304
AC power line is placed near
input circuit for X101
DS-2M open.


C
Hash noise
Defective X101 or X102
Defective R102, R103, R108 or R104
Excessive Current leak of C103, C104, C105


D
Vibration of
transformer
Replace
Tight the loose screws


E
Noise is heard when
power switch turned off
Defective S1-2
or relay
Replace S1-2 or
adjust the relay


A
No sound
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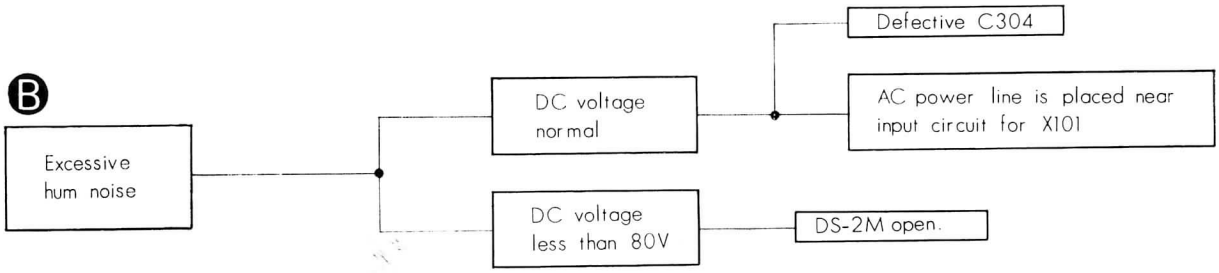
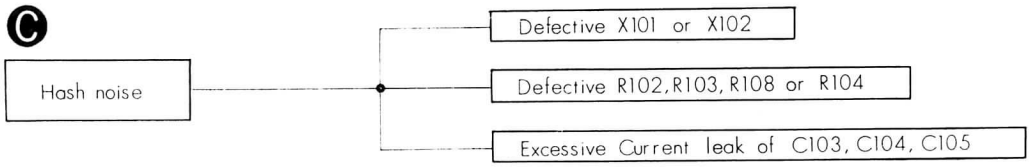
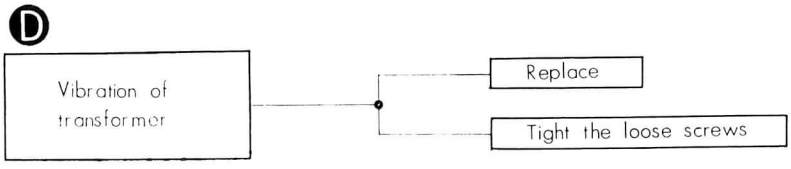
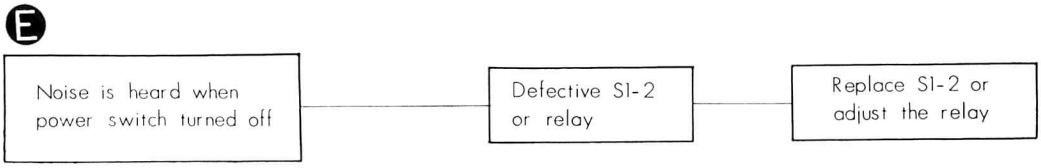
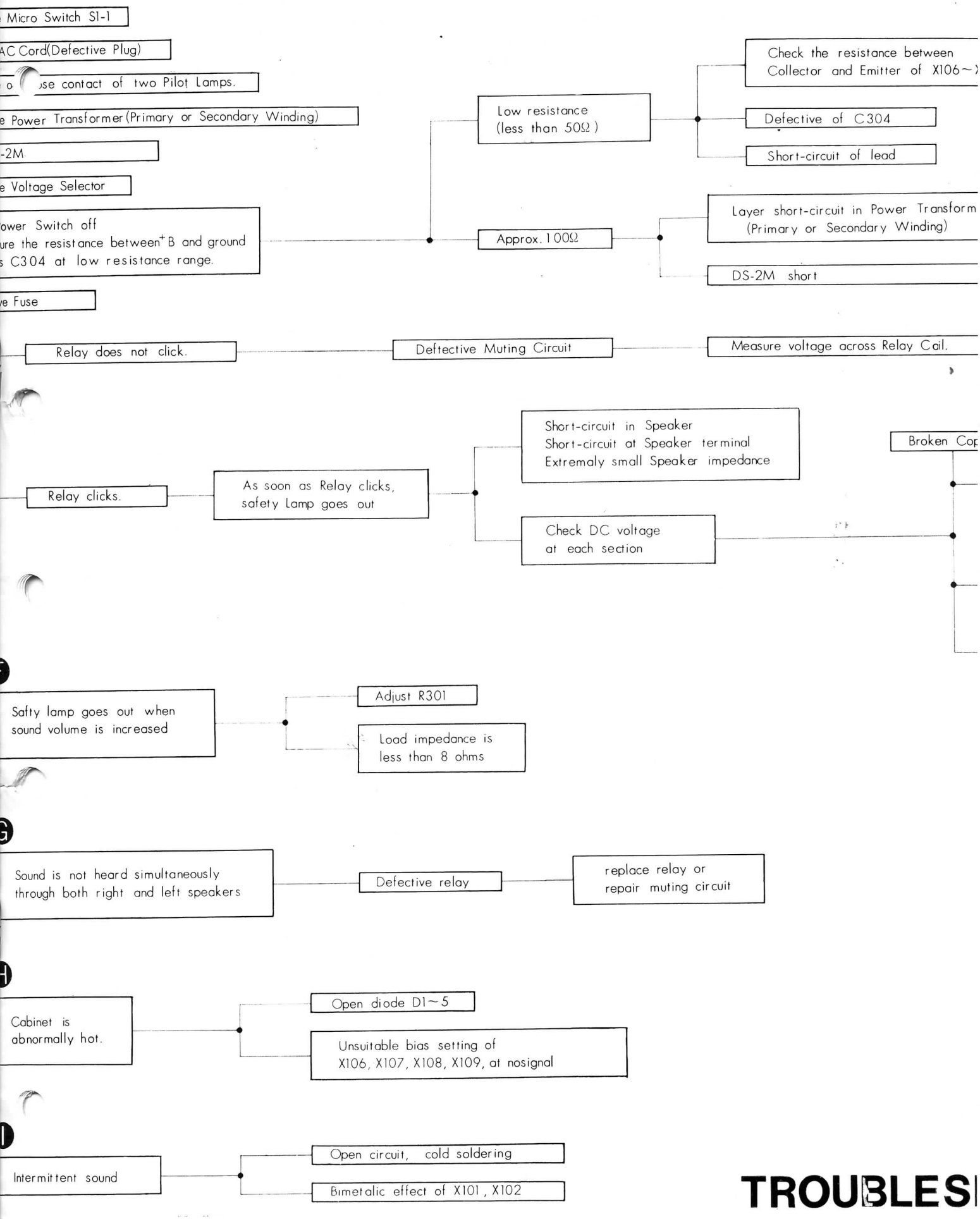
Fuse is blown.
Power lamp does not light.
Safety Lamp lights.
Open lead or loose contact
of Power Lamp
Power Lamp lights.
Safety Lamp does not light.
Disconnection of lead or loose contact
of Safety Lamp.
Normal
Power Lamp lights.
Safety Lamp lights.
After 7 or 8 seconds.


B
Excessive
hum noise
DC voltage
normal
DC voltage
less than 80V
Defective C304
AC power line is placed near
input circuit for X101
DS-2M open.

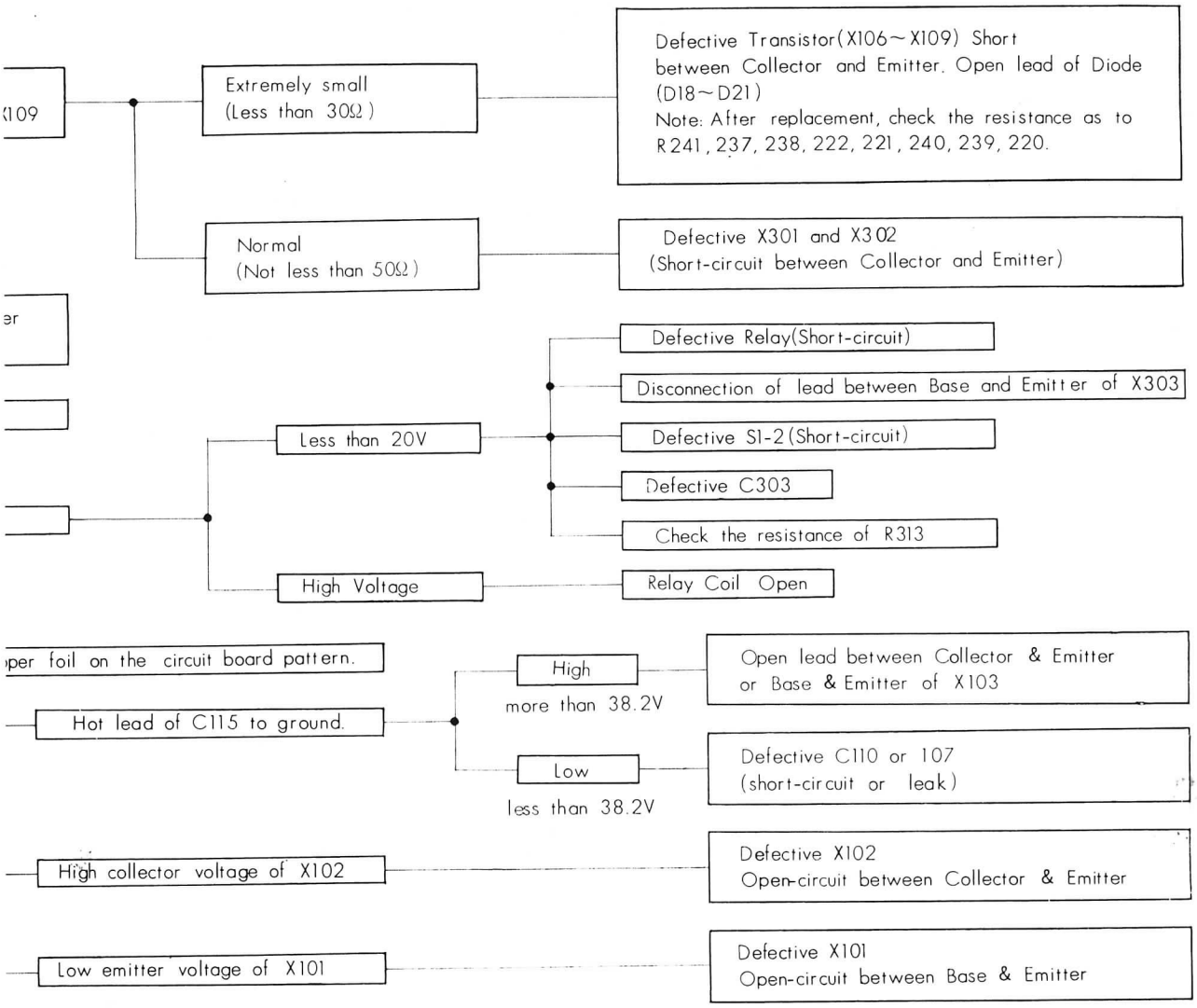

C
Hash noise
Defective X101 or X102
Defective R102, R103, R108 or R104
Excessive Current leak of C103, C104, C105


D
Vibration of
transformer
Replace
Tight the loose screws


E
Noise is heard when
power switch turned off
Defective S1-2
or relay
Replace S1-2 or
adjust the relay


Micro Switch S1-1
AC Cord(Defective Plug)
se contact of two Pilot Lamps.
e Power Transformer(Primary or Secondary Winding)
-2M
e Voltage Selector
ower Switch off
ure the resistance between+B and ground
s C304 at low resistance range.
ve Fuse
Low resistance
(less than 50Ω)
Check the resistance between
Collector and Emitter of X106~)
Defective of C304
Short-circuit of lead
Approx. 100Ω
Layer short-circuit in Power Transform
(Primary or Secondary Winding)
DS-2M short
Relay does not click.
Deftective Muting Circuit
Measure voltage across Relay Cail.
Relay clicks.
As soon as Relay clicks,
safety Lamp goes out
Short-circuit in Speaker
Short-circuit at Speaker terminal
Extremaly small Speaker impedance
Check DC voltage
at each section
Broken Cop
Safty lamp goes out when
sound volume is increased
Adjust R301
Load impedance is
less than 8 ohms
Sound is not heard simultaneously
through both right and left speakers
Defective relay
replace relay or
repair muting circuit
Cabinet is
abnormally hot.
Open diode D1~5
Unsuitable bias setting of
X106, X107, X108, X109, at nosignal
Intermittent sound
Open circuit, cold soldering
Bimetalic effect of X101, X102

TROUBLES



*Remarks

Bimetalic effect is a phenomena which makes the loose contact inside of transistor especially in 2SC401

How to Check : Heat the transistor(X102 or X103) with the blower as shown in Fig. 1, about 212°F (100°C).

If the sound intemitts at the peak volume, that transistor is defective because of bimetalic effect.

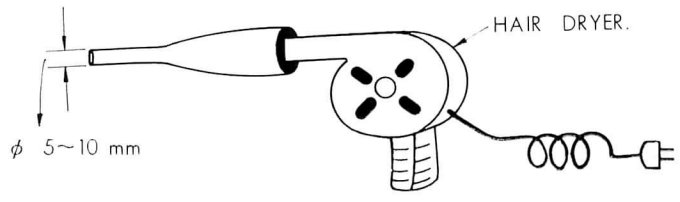
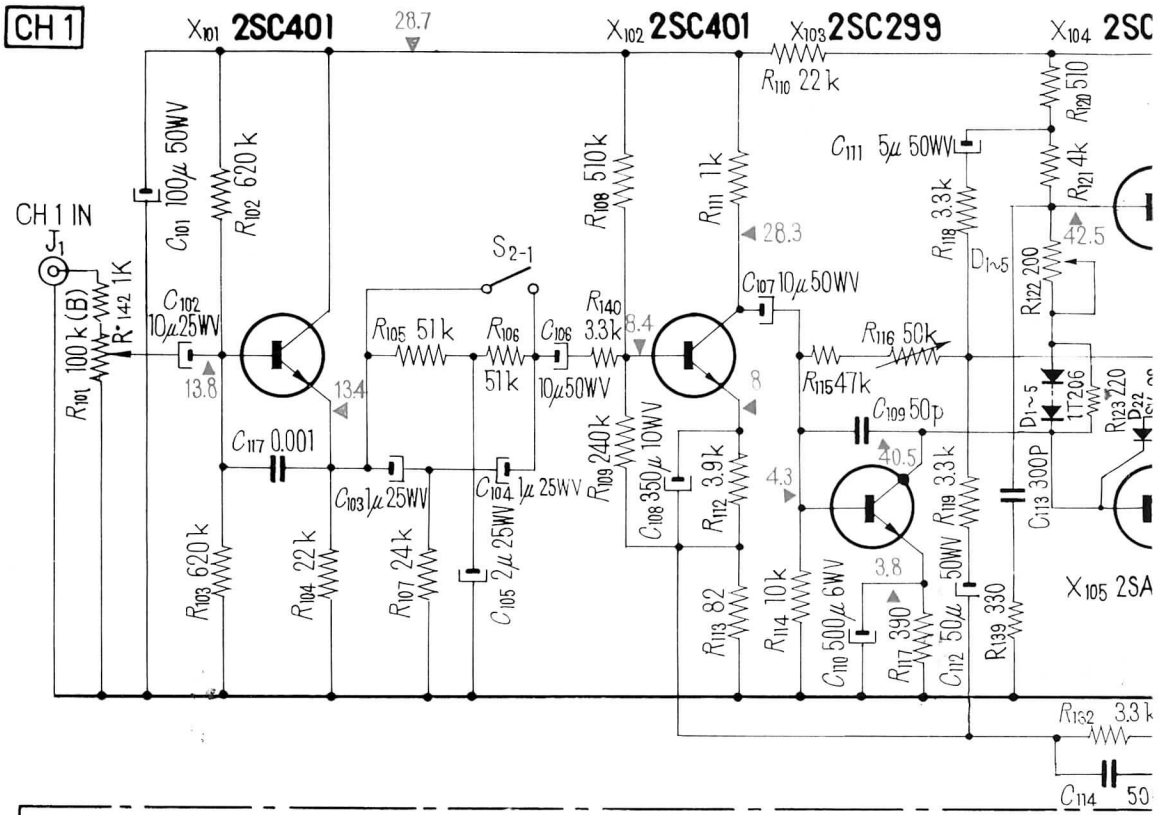


Fig. 1 Blower

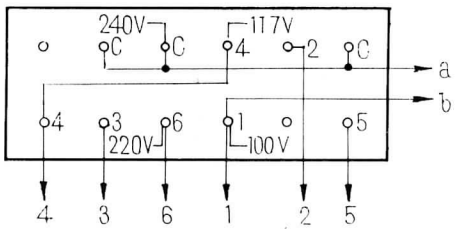
HOOTING CHART FOR TA—3120.

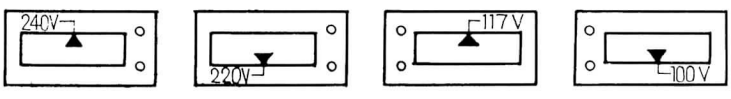
Schematic Diagram of TA—3120

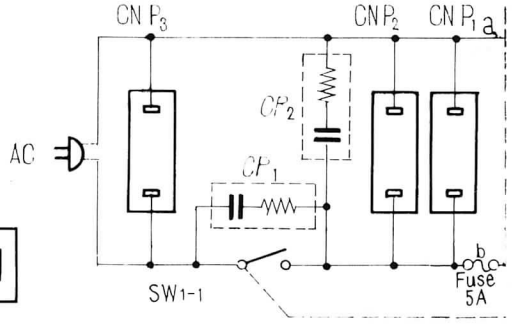


CH 2 (Same as CH1)

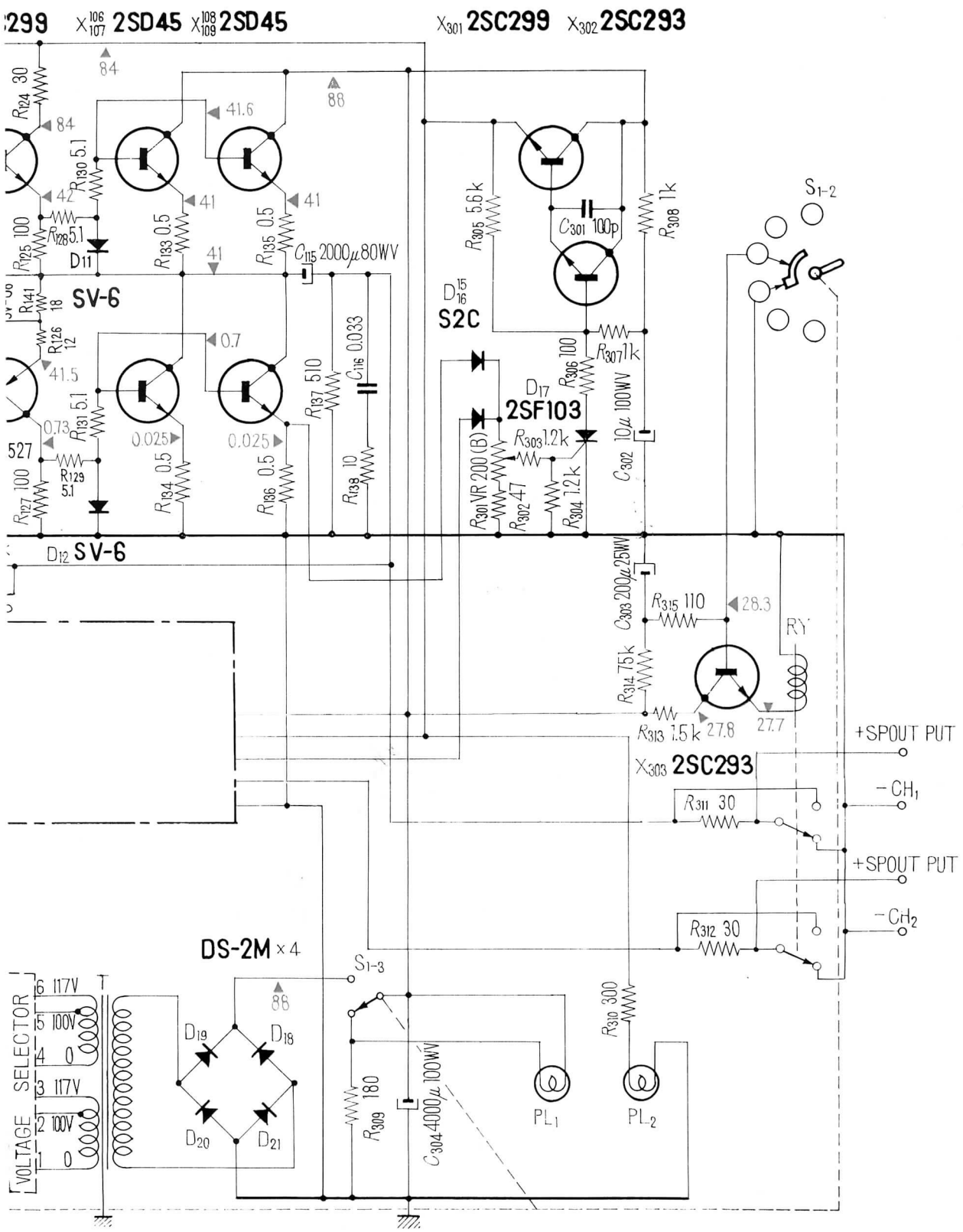
VOLTAGE SELECTOR Connection





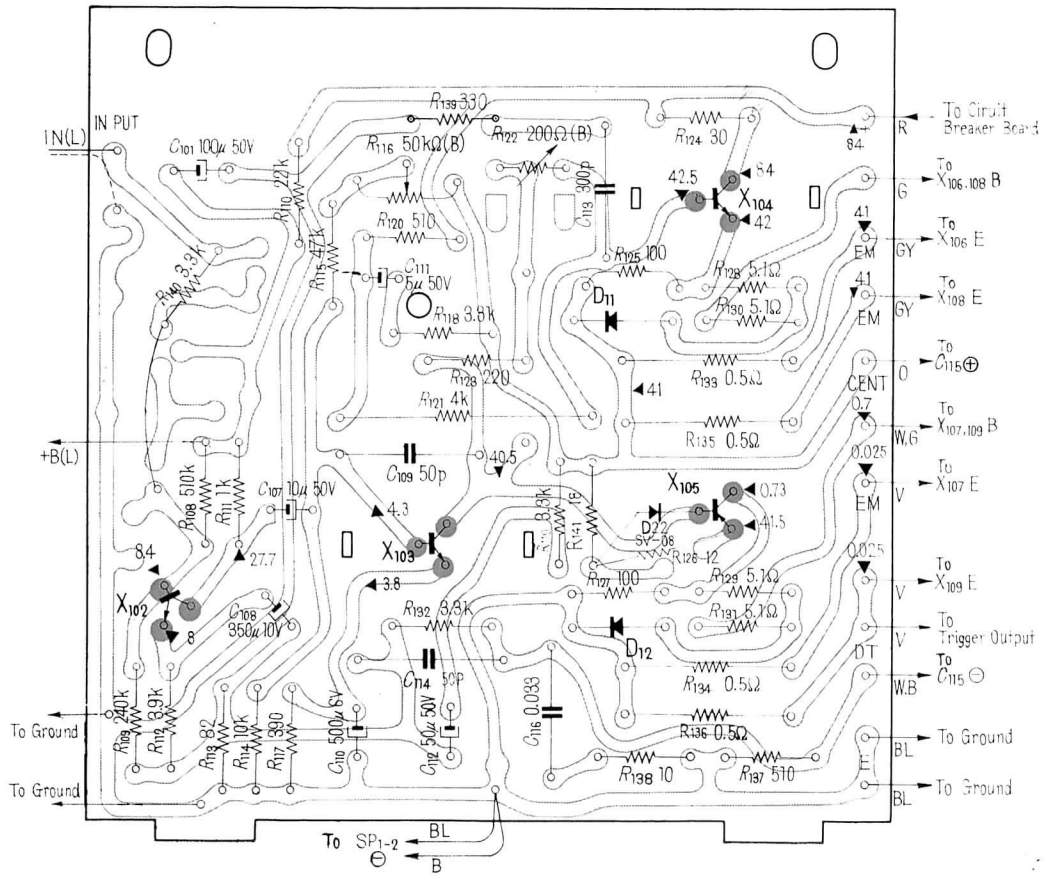


The voltages shown above are at zero signal

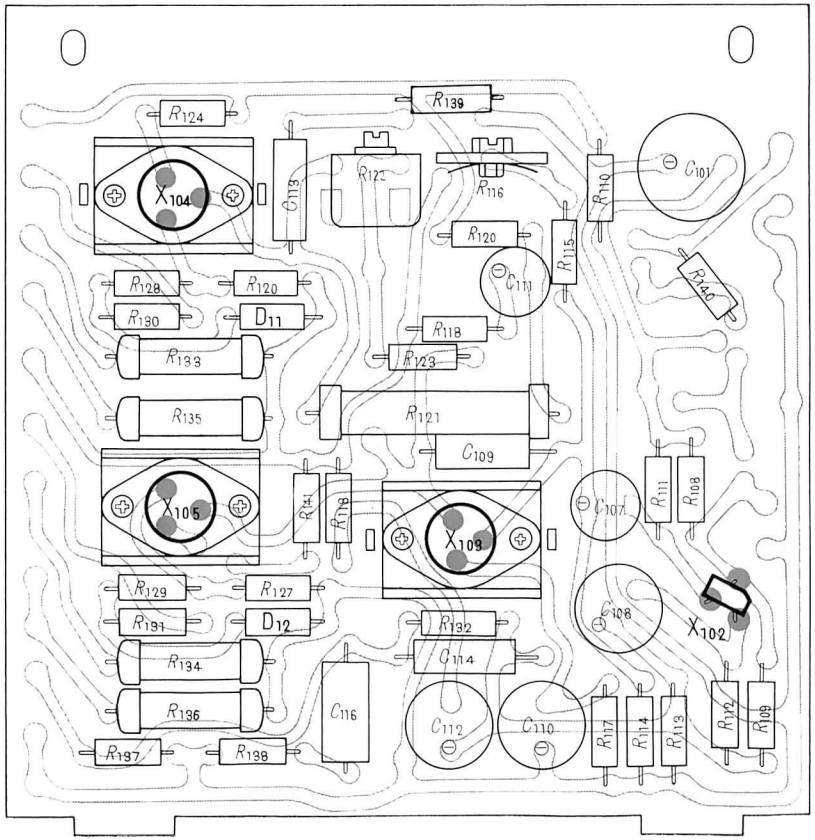

X106/107 2SD45 X108/109 2SD45
X301 2SC299 X302 2SC293
SV-6
SV-6
S2C
2SF103
DS-2M × 4
X303 2SC293
VOLTAGE SELECTOR
117V
100V
0
117V
100V
0
+SPOUT PUT
−CH1
+SPOUT PUT
−CH2
RY
S1-2
S1-3
PL1
PL2

Power Amplifier Section

Conductor Side

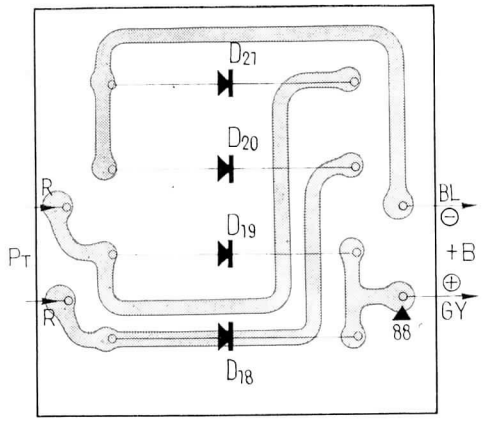


Components Side

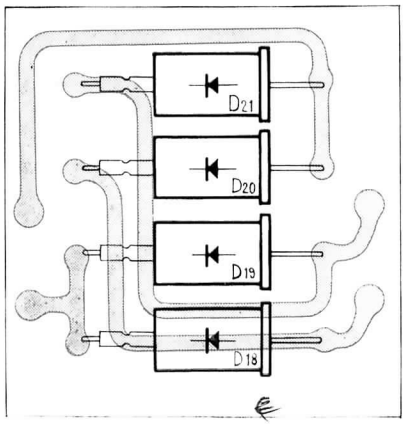


Rectifier Section

—Conductor Side—

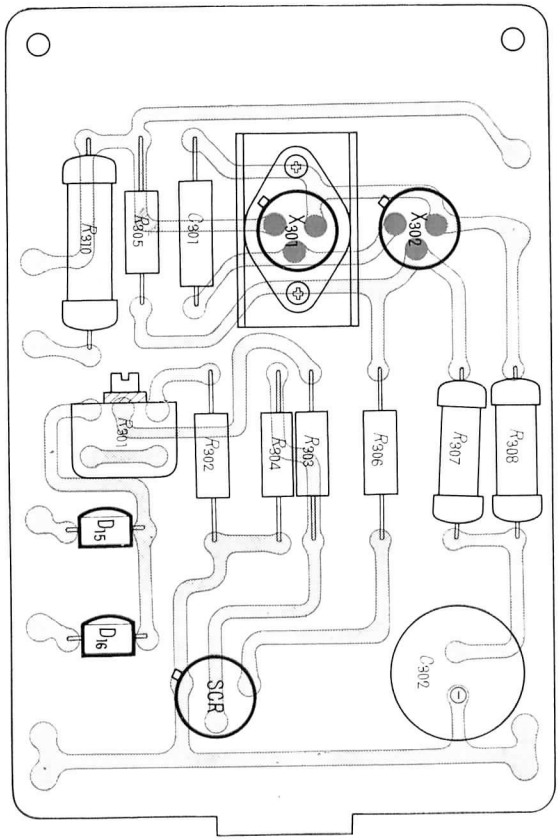


—Components Side—

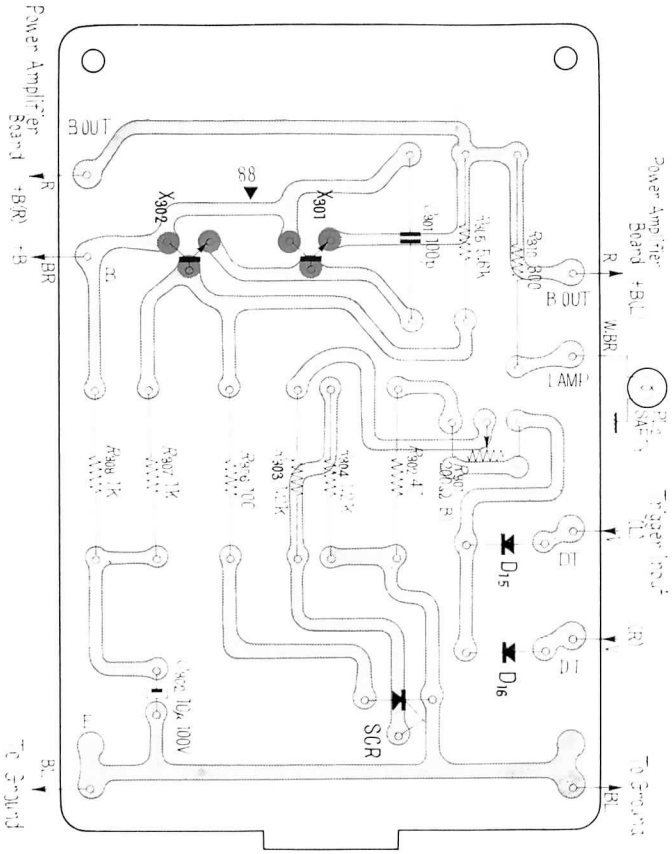


Circuit Breaker Section

—Components Side—



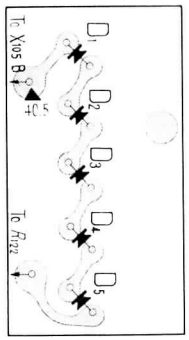
—Conductor Side—



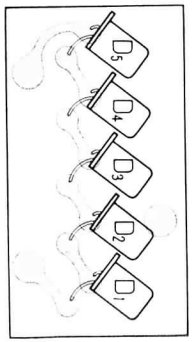
Thermo Compensaton Diodes

Muting and Emitterfollower Section

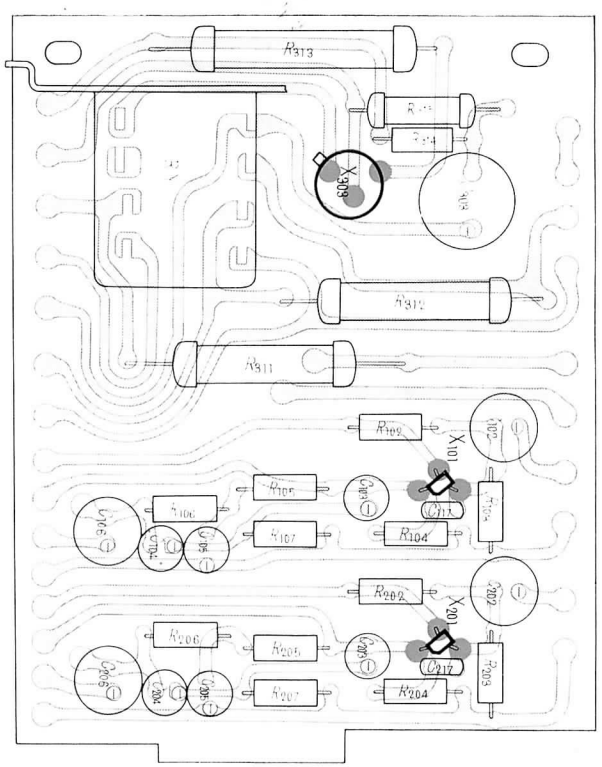
—— Conductor Side ——



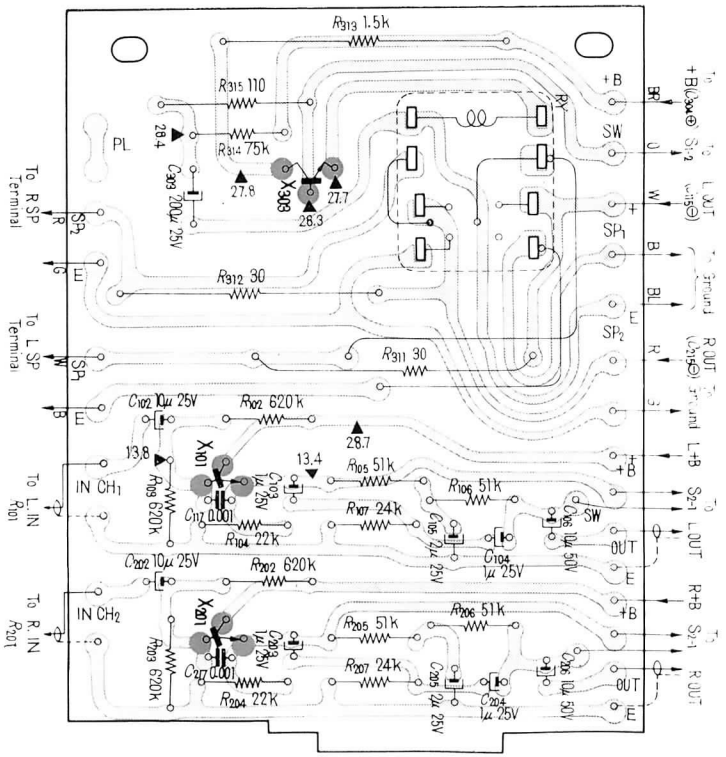
—— Components Side ——



—— Components Side ——



—— Conductor Side ——



Mechanical Ports

Part No.	Description	Q'ty
X 20321 01	Panel Ass'y, chassis; front	1
X 20321 02	Plate Ass'y, chassis; bottom	1
X 20321 03	Panel Ass'y, front	1
2 032 103	Panel, front	(1)
2 031 956	Escutcheon, pilot lamp	(2)
955 01	Lens, pilot lamp; red	(1)
955 02	Lens, pilot lamp; green	(1)
X-20299-05	Terminal Ass'y, speaker output; middle type	4
X 20299-06	Chassis Ass'y, power amplifier	1
X-20319-01	Terminal Ass'y, earth; small type	4
2-032-111-	Cabinet cover; black	1
-112-	Plate, jack	1
-113-	Label, specification (E)	1
-114-	Cushion, styro-foam	2
-116-02	Carton	1
-117-	Plate, control panel protect; PVC	1
2-029-953-	Label, voltage	1
2-029-924-	Plate, relay	1
-925-	Plate, volume control	1
-928-	Heat Sink; aluminium	7
-930-	Screw, cabinet cover	4
-931-	Knob, power on/off; dark brown	1
-933-	Case Cover, relay; white	1
-935-02	Spacer, speaker output; blue	2
-935-12	Rpacer, speaker output; red	2
-936-	Spacer, speaker output; fiber	4
-938-	Plate, printed circuit board	6
-939-	Cover, electrolytic capacitor; large	1
-940-	Cover, electrolytic capacitor; middle	2
-943-	Cushion	1
-950-	Spacer t=0.5	1
-951-	Plate, nut	1

Part No.	Description	Q'ty
0-051-263-	Foot, rubber	4
3-701-030-	Label, serial number	1
3-002-408-05	Spacer, 6 ϕ	2
-408-15	Spacer, 6 ϕ	2
0 041-109-	Bag, polyethylene	1
3-410-032-	Stopper, ac cord; black	1
3-790-707-11	Instruction Manual (E)	1
3-793-009-11	Tag, inspection	1
1-506-105-01	Plug, RCA pin; red	1
02	Plug, RCA pin; black	1
X 44900 02 1	Cloth, polishing	1
2-029-946-	Bag, accessory; polyethylene	1
3-793-041-11	Sheet, check	1
3-701-020-	Bag, polyethylene	1
7-491-001-	Desiccant	1
7-621-261-43	Screw, machine +RF 3 ϕ×6	28
53	〃 , 〃 +RF 3 ϕ×8	8
-63	〃 , 〃 +RF 3 ϕ×10	12
-73	〃 , 〃 +RF 3 ϕ×12	18
7-621-268-53	〃 , 〃 +RF 4 ϕ×8	9
-83	〃 , 〃 +RF' 4 ϕ×14	4
-770-50	〃 , 〃 +B 2.6 ϕ×6	2
-39	〃 , 〃 +B 3 ϕ×8	8
-561-53	〃 , 〃 +K 3 ϕ×8	1
-999-01	〃 , hexagonal head 3 ϕ×8	4
7-623-108-12	Washer, plain 3 ϕ (middle)	33
-22	〃 , 3 ϕ (large)	4
-110-12	〃 , 4 ϕ (middle)	4
-208-24	〃 , spring 3 ϕ	31
-210-24	〃 , spring 4 ϕ	5
-408-04	〃 , lock 3 ϕ	50
7-622-108-02	Nut 3 ϕ	41
-208-02	Nut, lock 3 ϕ	4
7-623-508-01	Lug 3 ϕ	6

Electrical Parts

Part No.	Descriptino	Q'ty
X-20321-53-	Circuit Board, power amplifier: mounted	2
-55-	Circuit Board, muting; mounted	1
-56-	Circuit Board, circuit breaker; mounted	1
-58-	Circuit Board, thermo compensation diode; mounted	2
-57-	Circuit Board, power supply diode; mounted	1
1-441-227-	Transformer, power	1
1-513-293-12	Switch, power on/off	1
-091-	Switch, slide	1
1-515-050-11	Relay	1
1-507-142-	Jack, input; RCA pin	1
1-536-151-	Terminal Strip 4P	1
1-509-015-	Socket, ac	3
1-533-012-	Fuse Post	1
1-532-017-	Fuse 5A	1
1-517-021-11	Socket, pilot lamp	2
1-518-050-12	Lamp, pilot	2
1-534-241-14	Cord, ac power	1
1-526-502-11	Socket, transistor 2SD45	8
-165-11	Socket, voltage selector	1
1-538-348-12	Circuit Board, power amplifier; printed	2
-352-11	Circuit Board, muting; printed	1
-344-11	Circuit Board, circuit breaker; printed	1

Part No.	Description	Q'ty
1-538-345-11	Circuit Board, thermo compensation diode; printed	2
-346-11	Circuit Board, power supply diode printed	1
	Semi-Conductors	
	Power Amplifier Section	
	Transistor 2SC401 X102,202	2
	〃 2SC299 X103,104,203,204	4
	〃 2SA527 X105,205	2
	〃 2SD45 ¥X106-109, X206-209	8
	Varistor SV-6 D11-14	4
	〃 SV-08 D22,23	2
	Muting Section	
	Transistor 2SC293 X303	1
	〃 2SC401 X101, 201	2
	Circuit Breaker Section	
	Transistor 2SC299 (Red Mark) X301	1
	〃 2SC293 (Red Mark) X302	1
	Diode S2C(FR-1U) D15,16	2
	〃 2SF-103 D17	1
	Thermo Compensation Diode Section	
	Diode 1T206 D1~10	10

Part No.	Description	Q'ty
	Power Supply Diode Section	
	Diode DS-2M D18～21	4
	Resistors	
	General Items	
1 221 707	Potentiometer 100K ohms (B) R101,201	2
1 205 100	Enameled 180 ohms 10W R309	1
1 201 021	Composition 1K ohm RC1/2 R142,242	2
	Power Amplifier Section	
	Composition	
1-201-837	510K ohms RC1/2 ±10% R108,208	2
-087	22K 〃 〃 〃 R110,210	2
-843	240K 〃 〃 〃 R109,209	2
-683	82 〃 〃 〃 R113,213	2
-085	3.9K 〃 〃 〃 R112,212	2
-021	1K ohm 〃 〃 R111,211	2
-041	10K ohms 〃 〃 R114,214	2
-472	390 〃 〃 〃 R117,217	2
-054	47K 〃 〃 〃 R115,215	2
-084	3.3K 〃 〃 〃 R118,140,218,240	4
-845	510 〃 〃 〃 R120,137,220,237	4
-100	100 〃 〃 〃 R125,127,225,227	4
-838	30 〃 〃 〃 R124,224	2
-094	1.0 〃 〃 〃 R138,238	2
-081	220 〃 〃 〃 R123,223	2
-794	5.1 〃 〃 〃 R130,128,131 129,230,228, 231,229	8
-082	330 〃 〃 〃 R139,239	2
1-203-058	Carbon 3.3K ohms RD1/4L ±5% R119,132,229,232	4
1-221-334	Adjustable 50K ohms(B) R116,216	2
1-223-010	Adjustable, wire wound 200 ohms(B) R122,222	2
1-209-576	Carbon 4K ohms RD2L ±5% R121,221	2
1-207-151	Wire wound 0.5 ohms 1.5W ±10% R133,134,135,136,233,234,235,236	8
1-203-459	Carbon 18 ohms RD1/4L ±5% R141,241	2
1-204-416	Carbon 12 ohms RD1/4L ±5% R126,226	2
	Muting Section	
1-207-104	Wire wound 30 ohms 4W ±10% R311,312	2
-153	1.5K ohms 4W ±10% R313	1
-152	110 ohms 1.5W ±10% R315	1
1-201-844	Composition 75K ohms RC1/2 ±10% R314	1
-842	620K 〃 〃 〃 R102,103,202, 203	4

Part No.	Description	Q'ty
1-201-087	22K ohms RC1/2 ±10% R104,204	2
282	24K ohms RC1/2 ±10% R107,207	2
283	51K ohms RC1/2 ±10% R105,106, 205,206	4
	Circuit Breaker Section	
	Composition	
1-201-079	47 ohms RC1/2 ±10% R302	1
685	1.2K 〃 〃 〃 R303,304	2
086	5.6K 〃 〃 〃 R305	1
110	100 〃 〃 〃 R306	1
1-223-010	Adjustable, wire wound 200 ohms(B) R301	1
1-207-157	Wire wound 1K ohm 1.5W ±10% R307,308	2
156	300 ohms 3W ±10% R310	1
	Capacitors	
	General	
1-121-323	Electrolytic 4000μF 100WV C304	1
327	〃 2000μF 80WV C115,215	2
1-101-534	Encapsulated Component 120 ohms +0.1μF 500WV	2
	Power Amplifier Section	
1-121-172	Electrolytic 100μF 50WV C101,201	2
143	〃 10μF 50WV C107,207	2
140	〃 350μF 10WV C108,208	2
161	〃 500μF 6WV C110,210	2
163	〃 50μF 50WV C112,212	2
142	〃 5μF 50WV C111,211	2
1-109-001	Mica 50pF 1KV±10% C109,209, 114,214	4
006	〃 300pF 1KV±10% C113,213	2
1-105-679	Mylar 0.033μF 50WV±10% C116,216	2
	Muting Section	
1-121-190	Electrolytic 200μF 25WV C303	1
179	〃 10μF 25WV C102,202	2
324	〃 1μF 25WV C103,104, 203,204	4
325	〃 2μF 25WV C105,205	2
143	〃 10μF 50WV C106,206	2
1-105-661	Mylar 0.001μF 50WV ±10% C117,217	2
	Circuit Breaker Section	
1-121-126	Electrolytic 10μF 100WV C302	1
1-109-002	Mica 100pF 1KV ±10% C301	1

Following parts are added to UL and CSA respectively

Part No.	Description	Q'ty
	UL	
2-032-130	Label, specification	1
3-422-204	Label, caution	1
2-029-955	Plate, ac outlet	1
3-790-707-22	Instruction Manual (UL)	1
2-032-118	Master Carton for 2 sets	1/2
1-534-330-31	Cord, ac power	1
1-513-293-22	Switch, power on/off	1

Part No.	Description	Q'ty
1-209-866	Resistor, carbon 1 ohm 1W R133,233,134,234,135,235,136,236	16
	CSA	
2-032-128	Label, specification	1
2-029-966	Plate, ac outlet	1
3-407-956	Label, caution	1
3-790-707-22	Instruction Manual	1
1-534-330-31	Coard, ac power	1

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