TA-1080

INTEGRATED STEREO AMPLIFIER

Specifications (1)

System :	All Silicon Transistor integrated stereo amplifier
Circuit :	Quasi-complementary symmetry SEPP OTL circuit
	30 transistors, 21 diodes
Transistor :	2SC401 (15) 2SC293 (3) 2SC297 (1) 2SC299 (5) 2SD45 (4) 2SA527 (2)
Diode :	FR-1U (4) DS2M (2) 1T206 (10) SV6 (4) 2SF-103 (SCR) (1)
Power requirement :	AC 100, 117, 220, 240V. 50/60 Hz
Power consumption :	Approx 25W at zero signal
	Approx. 200W at maximum output
Dimensions :	400(W)×145(H)×310 mm(D) (15¾×5¾×12¼″)
Weight :	Approx. 11 kgs. (24 lbs.)

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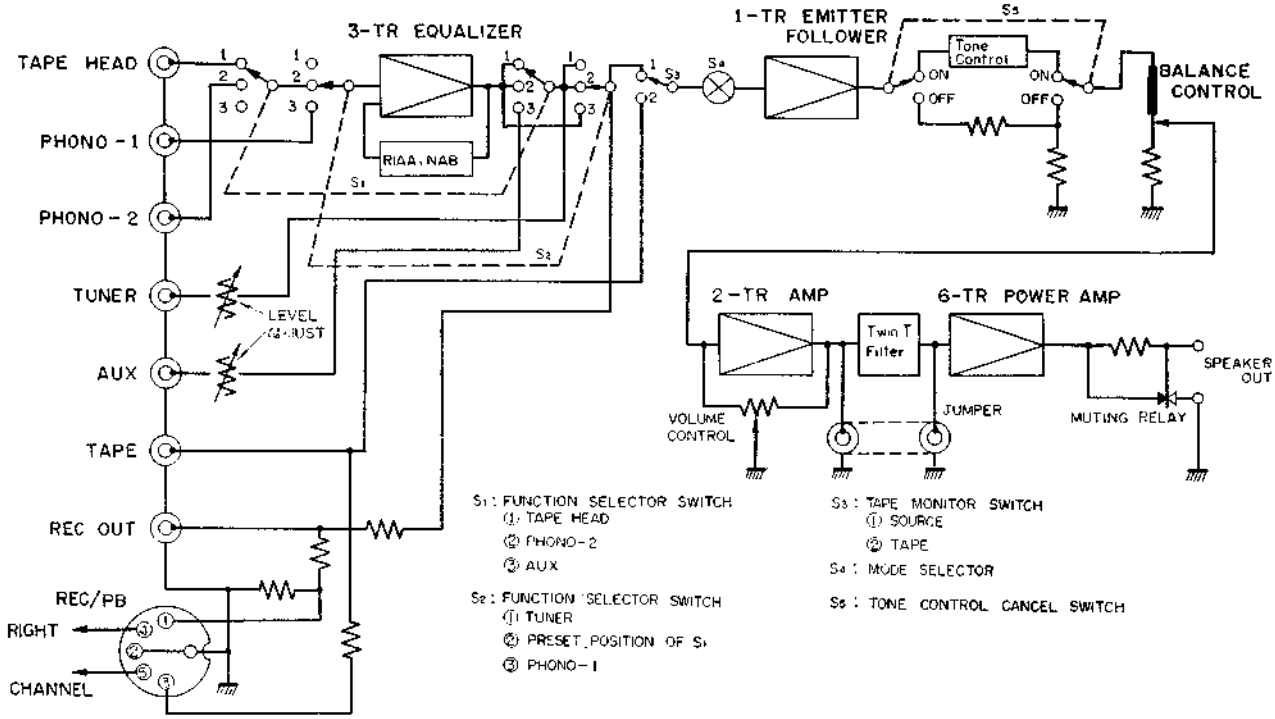
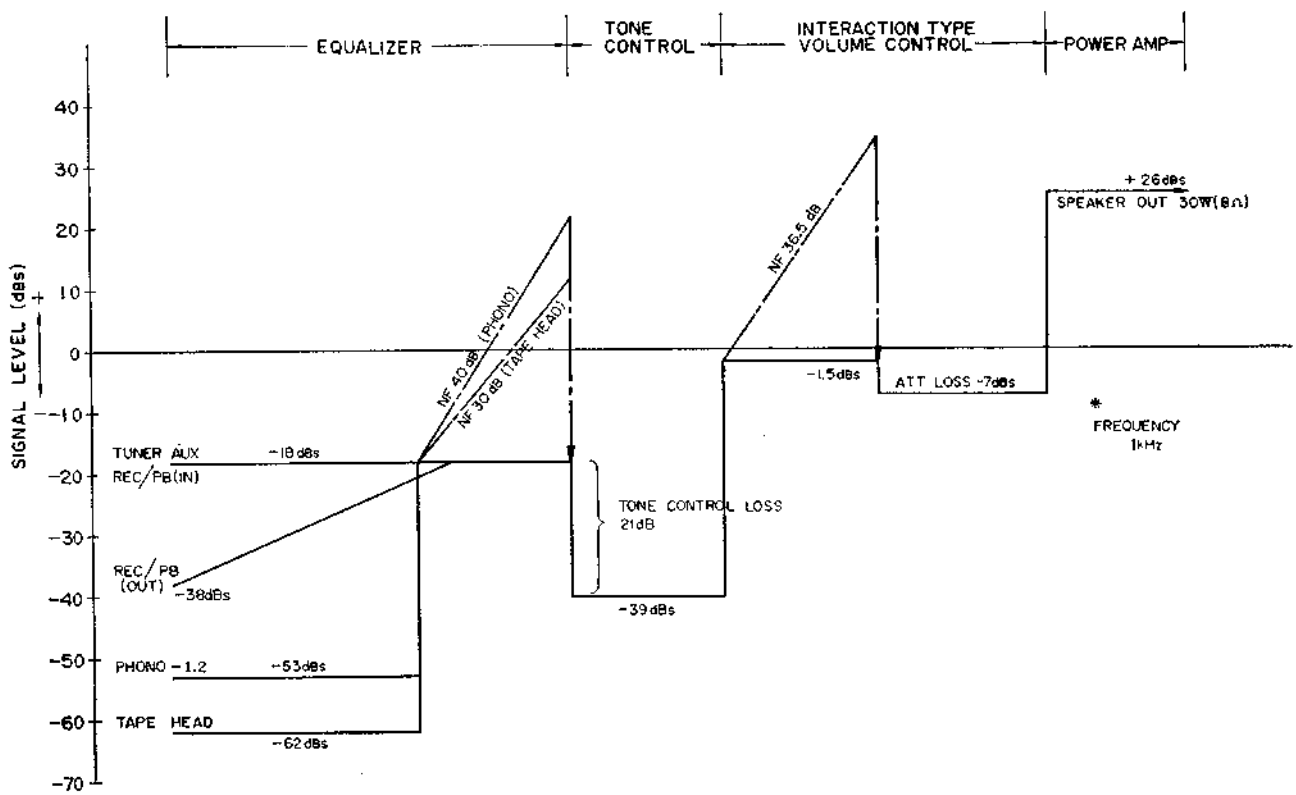
Specifications (2)

Power output :	Non-clip music power 100W both channels (8 ohms)
	Music power (IHFM) 90W both channels (8 ohms)
	Rated output 30W per channel (8 ohms)
	27W per channel (16 ohms)
Harmonic distortion :	Less than 0.15% at rated output (less than 0.1% in power amplifier section)
(IHFM)	Less than 0.1% at 500mW output(less than 0.05% in power amplifier section)
Intermodulation distortion : (SMPTE)	Less than 0.4% at rated output, 70 Hz : 7 KHz=4 : 1
Frequency response :	Power amplifier
	15 Hz~100 KHz $^{+0}_{-1}$ db at rated output
	Tuner, Aux, Tape
	30 Hz~100 KHz $^{+0}_{-2}$ db (twin-T low-cut filter below 30Hz)
	Phono-1, Phono-2
	30 Hz~15,000 Hz ±0.5 db (RIAA)
	Tape head
	30 Hz~15,000 Hz ±0.5 db (NAB)
Damping factor :	More than 40 at 8 ohm load
Residual noise :	Less than 0.05μW at 8 ohm load
S/N ratio :	Aux, Tuner (closed circuit) more than 80 db
(IHFM)	Phono-1 (〃) morn than 70 db
	Phono-2 (〃) more than 70 db
	Tape head (〃) more than 60 db
Inputs :	Tape head (NAB, 19cms), Phono-1 (RIAA)
	Phono-2 (RIAA), Tuner, Aux, Tape
Outputs :	Rec out (output level 120mV), Speaker out
Integrated record/playback	Input level 500mV
Connector :	Output level 12mV
Input sensitivity :	Tape head 0.7mV, Impedance : more than 100k ohms at 1 KHz
	more than 200k ohms at 10 KHz
	Phono-1, Phono-2 2.3mV, Impedance : approx. 47k ohms
	Tuner, Aux 120mV (adjustable). Impedance : more than 100k ohms
	Tape 120mV, Impedance : more than 100k ohms
AC outlet :	Switched 2, unswitched 1
	300W in total
Tone control :	Bass ±10 db at 100 Hz
	Treble ±10 db at 10 KHz

TA-1080 BLOCK DIAGRAM



TA-1080 LEVEL DIAGRAM



Warm-up Time for TA-1080

Integrated Stereo Amplifier TA−1080 which has 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 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 does 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" is described. Channel "2" is identical.

Method of disassembling the set

(1) Removal of power amplifier and power supply section.

(a) Remove four machine screws from both side of chassis cover to take it off.

(b) Remove five screws (RF3×6) from bottom of chassis to release the back panel section as in Fig. 1.

(c) Unsolder the mylar capacitor C310 (0.01μF) from muting circuit board, then remove two screws (RF3×8)

(d) Remove the five screws (RF4×10) from heat sink and unsolder the power amplifier input shield wire, now you can turn that section to make the circuit board up as shown in Fig. 2 and Fig. 3.

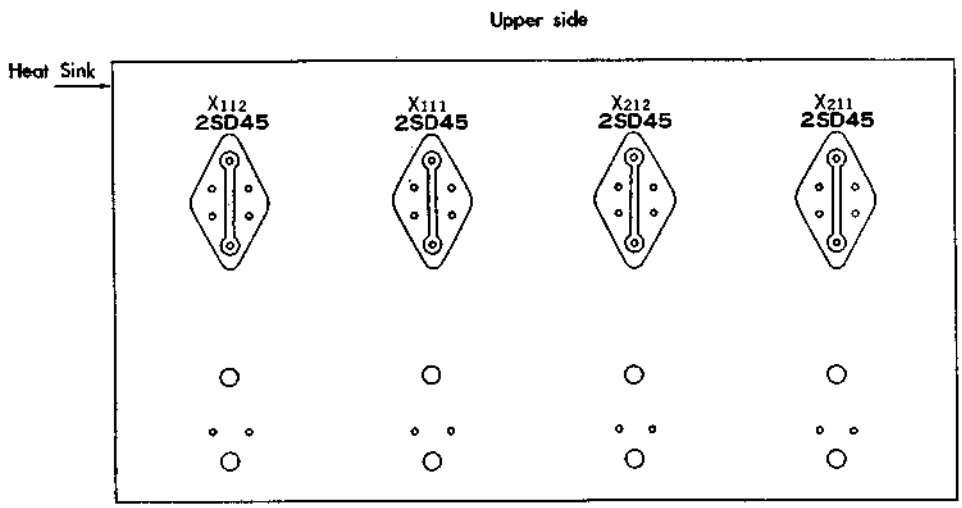
(2) Removal of preamplifier section and control panel.

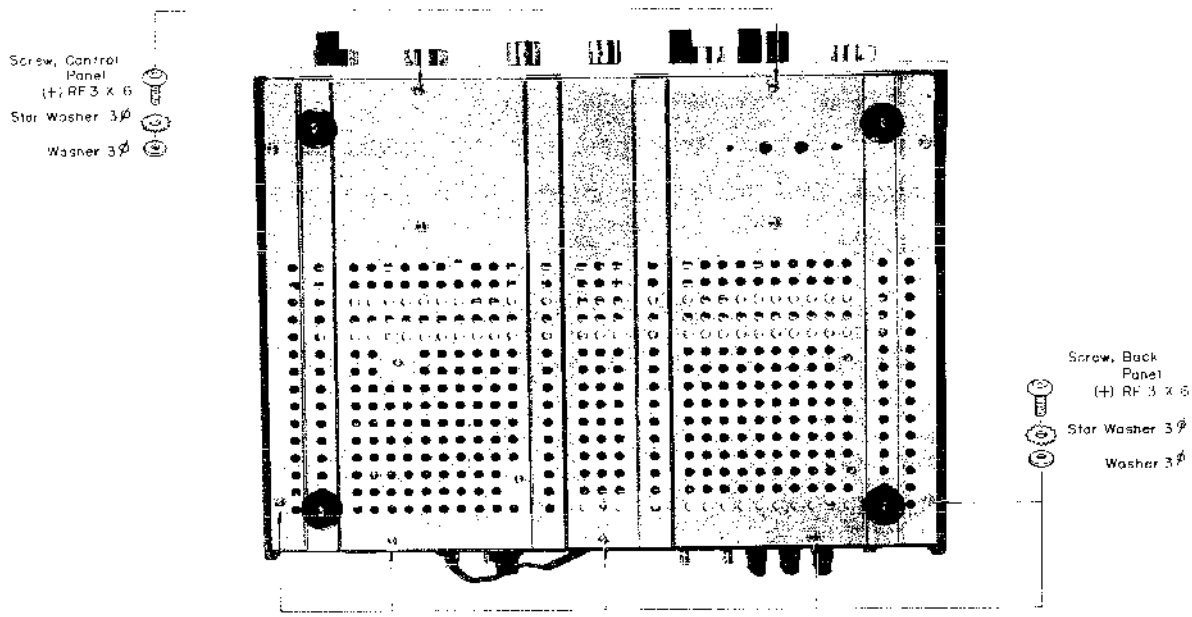
(a) After taking off the chassis cover, remove the two screws (RF3×6) from front side of bottom plate as shown in Fig. 1.

(b) Remove the four screws (RF3×6) from both side of the chassis as shown in Fig. 3. and control panel will come free.

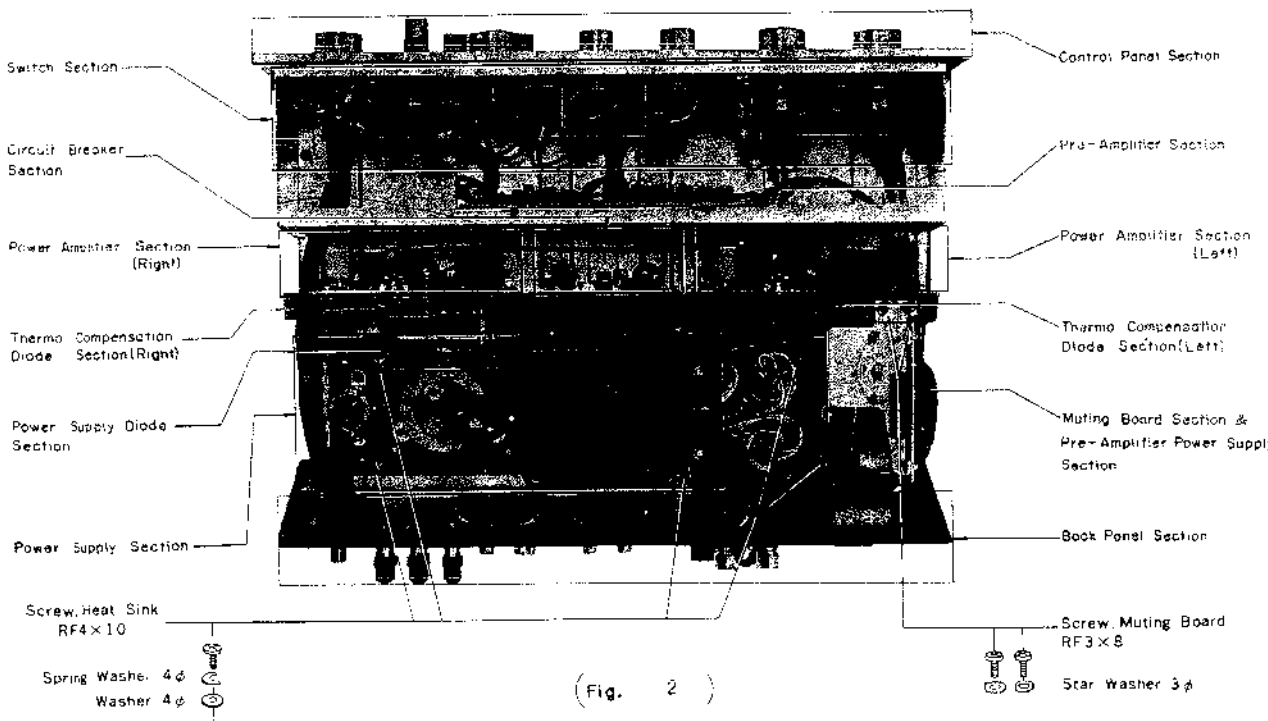
(c) The service will be easily done after following above procedures as shown in Fig. 4.

Location of Power Transistor

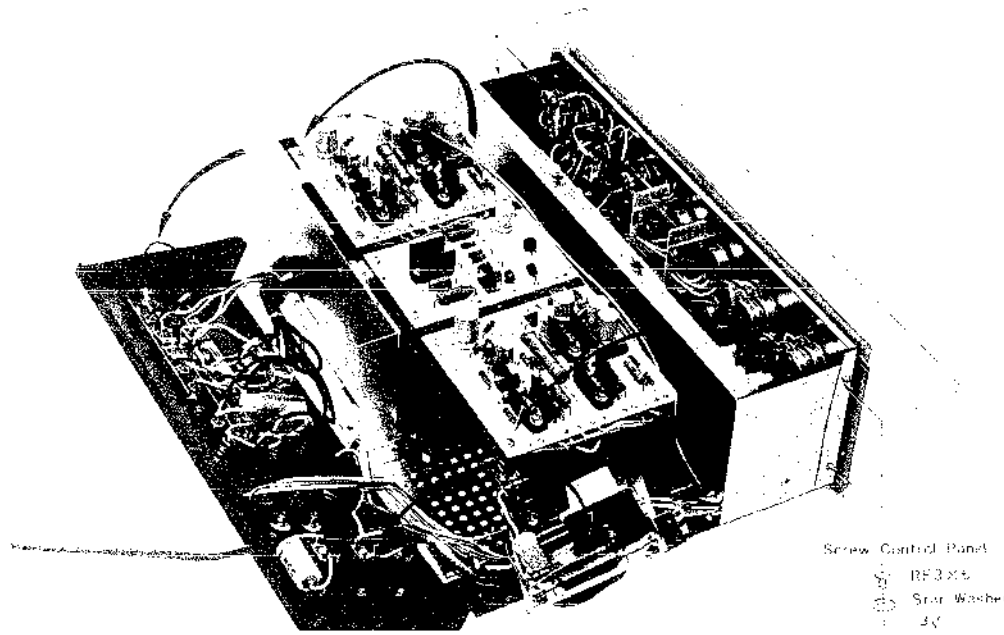



Screw, Control Panel (+) RF 3 x 6
Star Washer 3φ
Washer 3φ
Screw, Back Panel (+) RF 3 x 6
Star Washer 3φ
Washer 3φ

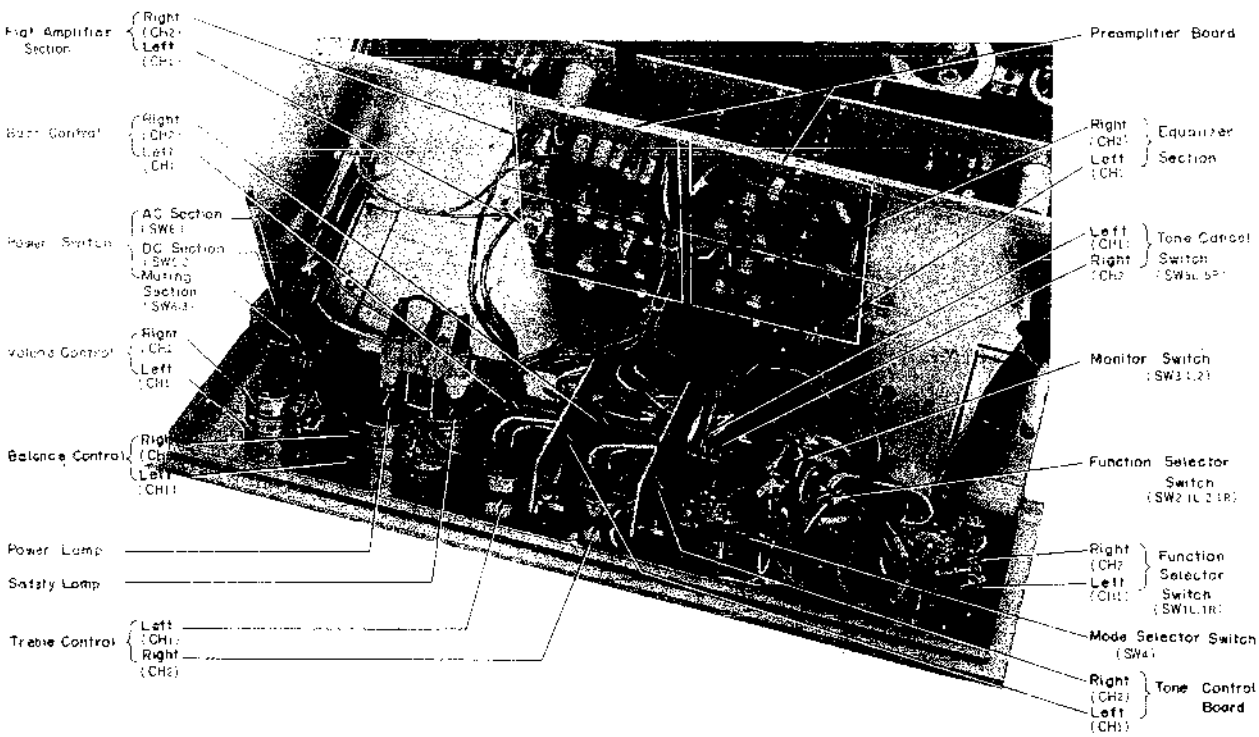
(Fig. 1)


Switch Section
Circuit Breaker Section
Power Amplifier Section (Right)
Thermo Compensation Diode Section (Right)
Power Supply Diode Section
Power Supply Section
Screw, Heat Sink RF4×10
Spring Washer 4φ
Washer 4φ
Control Panel Section
Pre-Amplifier Section
Power Amplifier Section (Left)
Thermo Compensation Diode Section (Left)
Muting Board Section & Pre-Amplifier Power Supply Section
Back Panel Section
Screw, Muting Board RF3×8
Star Washer 3φ

(Fig. 2)


Screw Control Panel
Star Washer

(Fig. 3)


Final Amplifier Section
Right (CH2)
Left (CH1)
Bass Control
Power Switch
AC Section (SW6)
DC Section (SW5)
Muting Section (SW4)
Volume Control
Balance Control
Power Lamp
Safety Lamp
Treble Control
Preamplifier Board
Equalizer Section
Tone Cancel Switch (SW3L,3R)
Monitor Switch (SW3L,2)
Function Selector Switch (SW2L,2R)
Function Selector Switch (SW1L,1R)
Mode Selector Switch (SW4)
Tone Control Board

(Fig. 4)

ADJUSTMENT

Preparation

* AC Line Voltage Selector Plug ;	Insert the plug so that the top arrow of the plug points to the proper voltage.
* AC Balance Control ;	Turn adjustable resistor (R163), (R263) clockwise to the full.
* Temperature Compensation Diode ;	Check the Diodes being attached to heat sink. (Main Amplifier)
* Output Load ;	Connect an 8 ohms resistor instead of speaker.
* Fuse ;	Insert a 5A fuse.

(A) Circuit Breaker Block Adjustment

Please make it a rule to adjust the circuit breaker block before fix it to the chassis.

1) Turn the adjustable resistor 200 ohms, (R309), counterclockwise to the full.
2) Feed DC. 3.5V between Diode D303 or D304 and earth. Then make the power switch on.
   Confirm the voltage between +B line and earth is nearly 85V.
3) Connect the voltmeter between +B line of the first stage of Main Amplifer and earth. Turn the adjustable resistor R309 clockwise and fix it when the voltmeter comes to zero on dial which shows the circuit breaker is operating.
4) Confirm the circuit breaker operates by each signal through diode D303 and D304 respectively.

(B) AC Balance Adjustment of Main Amplifier block.

1) Connect VTVM and Oscilloscope across 8 ohms load resistor.
2) Supply 1 KHz signal to the input terminal (X_{107} or $_{207}$ Base) through attenuator and 50μF capacitor as shown in Fig. 1.

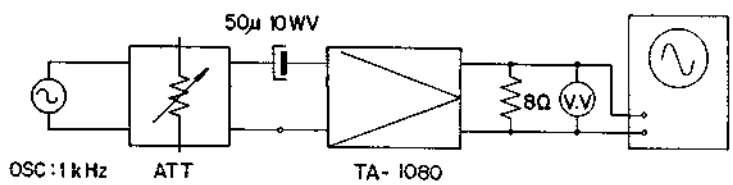


Fig. 1

3) Increase the signal gradually and turn the adjustable resistor (50KΩ, R160, R260) to get the both upper and lower side of wave form are clipped at the same time as shown in Fig. 2.

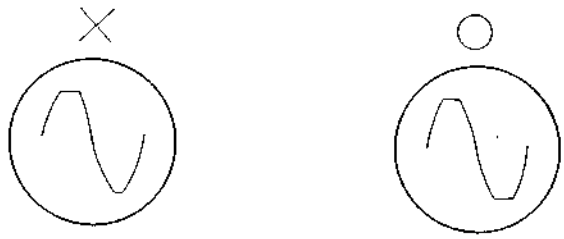


Fig. 2

(C) DC. Balance Adjustment of Main Amplifier block.

1) Connect a VTVM (d-c 0.1V full scale) between R176 (R276) and earth.

2) Decrease the input signal level down to 50dBs by attenuator.

3) Turn the bias adjustment resistor R136 (R236) to obtain 25mV reading on VTVM.

Remarks : Repeat procedure (B), (C) two or three times.

(D) The other Items.

1) Relay operation time will be within 15sec. after power switch turned on at first. Operation time becomes 10~4sec. after switched on and off two or three times. The difference of time between channel "1" and "2" should be less than 10 sec.

2) Phase of both channels must be same.

3) The difference of level between channel 1 and 2 must be less than 2 dB when the input level control is at maximum position.

4) Output level should be decreased to zero by adjusting input level control.

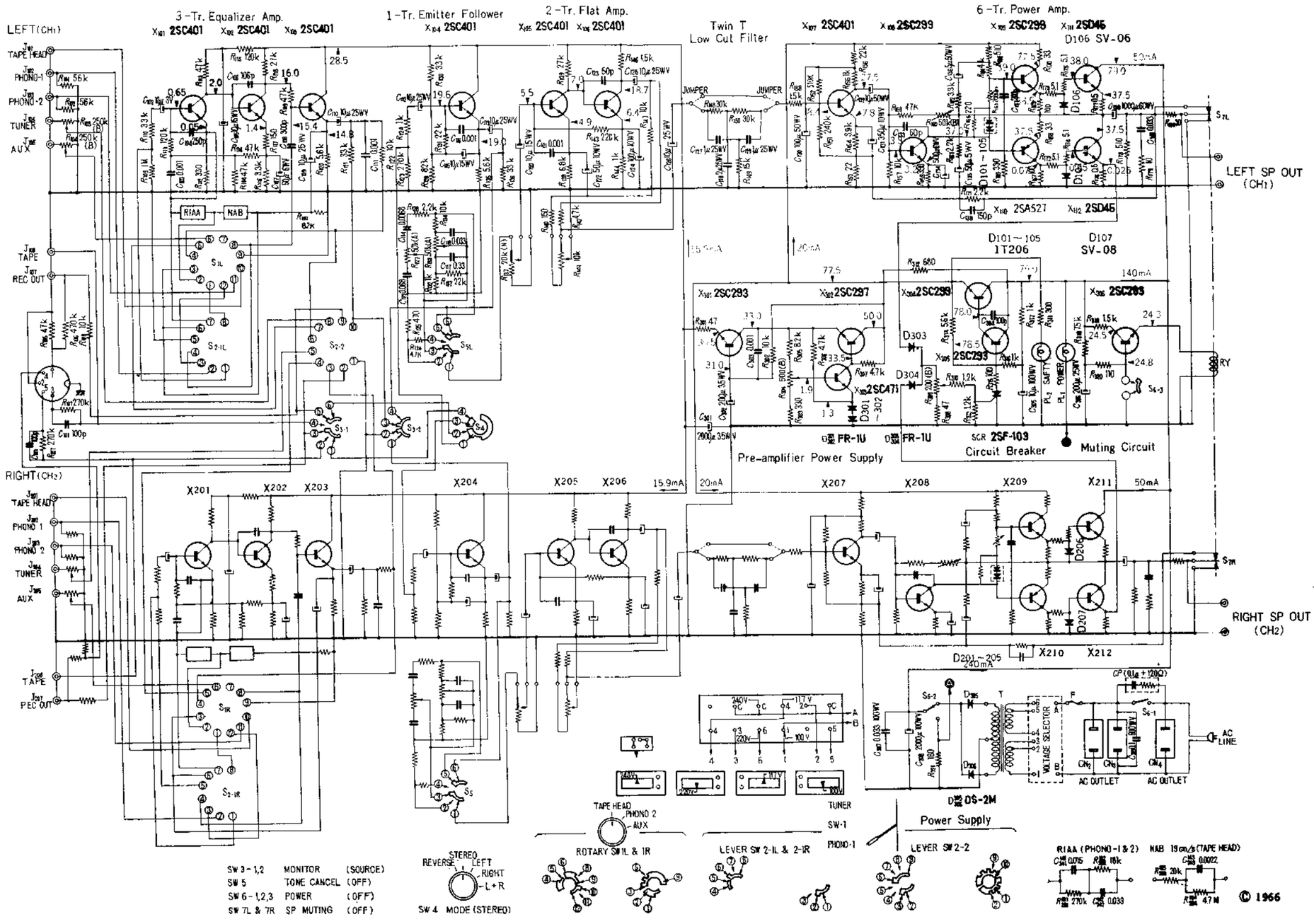
5) When make the short circuit of the speaker output, the circuit breaker must be work perfectly.

TA-1080 TROUBLE SHOOTING CHART

To avoid the transistor damage by accident, please make it a rule to increase the input AC line voltage gradually by variable transformer, while checking the total current of preamplifier or power amplifier respectively.

SYMPTOM	TROUBLE	REMEDY
POWER SUPPLY		
Power lamp fails to light and no sound	No AC line voltage	Trace the line failure
	Defective fuse	Replace fuse
	Defective power transformer	Replace transformer
Fuse "F" blows as AC Power switch turned on	Shorted AC line cable on the primaly side of the power transformer	Repair the short circuit or replace
	Defective filter capacitors	Check C308, C307, replace if bad
	Short +B line	Trace the line failure
	Defective power transformer	Replace transformer
MUTING CIRCUIT		
Click sound is heard as power switch turned on	Muting relay fails to work	Ceck relay "RY", X306, switch "S6-3"
Sound itermittent	Defective relay contact point	Repair or replace
No sound	Defective C, R, components	Check R318(75K), C306(200μF) replace if bad
CIRCUIT BREAKER		
Safety lamp fails to light, no sound	Speaker output short	Repair the short circuit
	Thermal run away of power transistors	Check no signal DC bias current, (50mA), of power transistor * See power Amp.
	Defective SCR	Check 2SF-103, replace if bad
	Defective R316	Check. Replace if necessary
	Defective X304, X305	Check. Replace if necessary
POWER AMPLIFIER		
Safety lamp fails to light, no sound Heat sink becomes abnormally hot	Thermal run away of power transistor	Check no signal DC bias current of power transistor X111, X112, (50mA) X109, X110, and X304 Replace if bad
* If thermal run away accident occured, all power transistors (X111, X112, X109 and X110) should be checked whether it is good or not. Caution : In checking the forward and reverse resistance between each lead (Emitter, Base, and Collector) of power transistor by VOM, be sure using low range of ohm meter. * AC and DC balance adjustment should be done, after replacing the power transistors.		
POWER AMPLIFIER		
No sound	Defective transistor	Check X109, X110 Replace if necessary
Too much hum	Defective filter capacitor	Check C308, C309

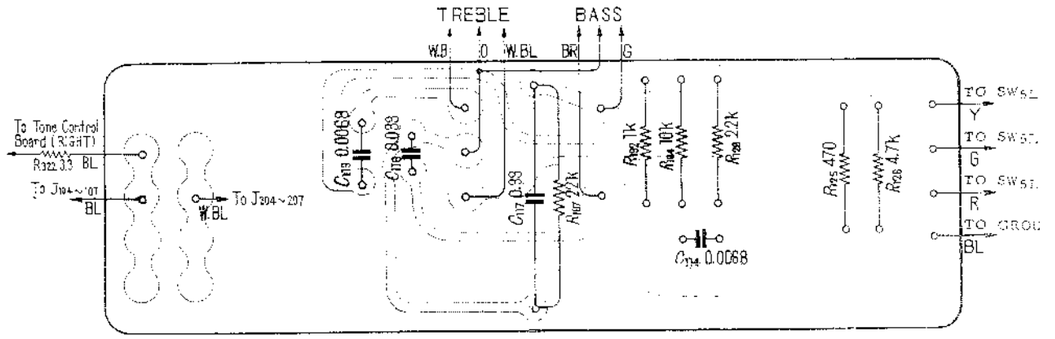
TA-1080 SCHEMATIC DIAGRAM



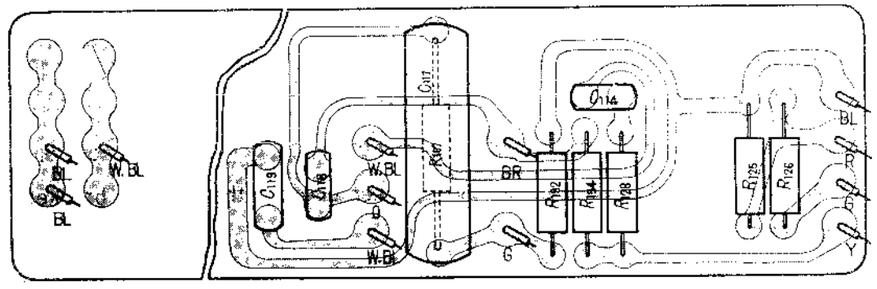
SYMPTOM	TROUBLE	REMEDY
POWER AMPLIFIER		
Noise is heard even volume control set at minimum position	Defective transistor	Check X107, X108, X109, X110 Replace the defective transistor
Sound distorted	One of X109-110 defective	Replace the defective transistor
* To find out the defective part of amplifier, signal injector or audio signal generator is useful going through each stage one by one.		
REGULATED POWER SUPPLY		
Power amplifier works but preamplifier dose not work.	No DC input voltage Transistor defective	Check the +B line Check X301, X302, X303 Replace if bad
	Defective filter capacitor C301 (200μF)	Replace
Excessive high DC output	FR-1U (D301, D302)	Replace
Oscillation in power supply	Defective X302	Replace
INTERACTION TYPE VOLUME CONTROL CIRCUIT (FLAT AMPLIFIER)		
No sound or intermittent sound Defective volume control	Defective transistor Defective potentiometer R141 (10K)	Check X105, X106 Replace
Noise is heard at volume control full, balance control minimum	Coupling capacitor leak Defective transistor	Check C125, C126, C120 Replace if bad Check X105, X106
EMITTER FOLLOWER		
Hash noise is heard at volume control set maximum position, but stops when input terminal shorted	Defective transistor or coupling capacitor Defective X104	Check X104, C119 Replace if bad Replace
3-TR EQUALIZING AMPLIFIER		
No sound or hash noise is heard even input terminal shorted, at volume control set maximum position	Defective transistor	Check X101, X102, X103 Replace if bad
MODE SWITCH		
Large click sound is heard as turning the mode switch Phono 1, 2 to Tape head Phono 2 to Tape head Tuner to Aux	Defective C109 Defective S1L, S2L Defective C102	Replace Repair or replace Replace
* To simplify the discussions, only channel "1" (left), and its related circuitry was descrived. Channel "2" (Right) is identical except tor reference symbol numbers.		

TONE CONTROL BOARD

—Conductor Side—

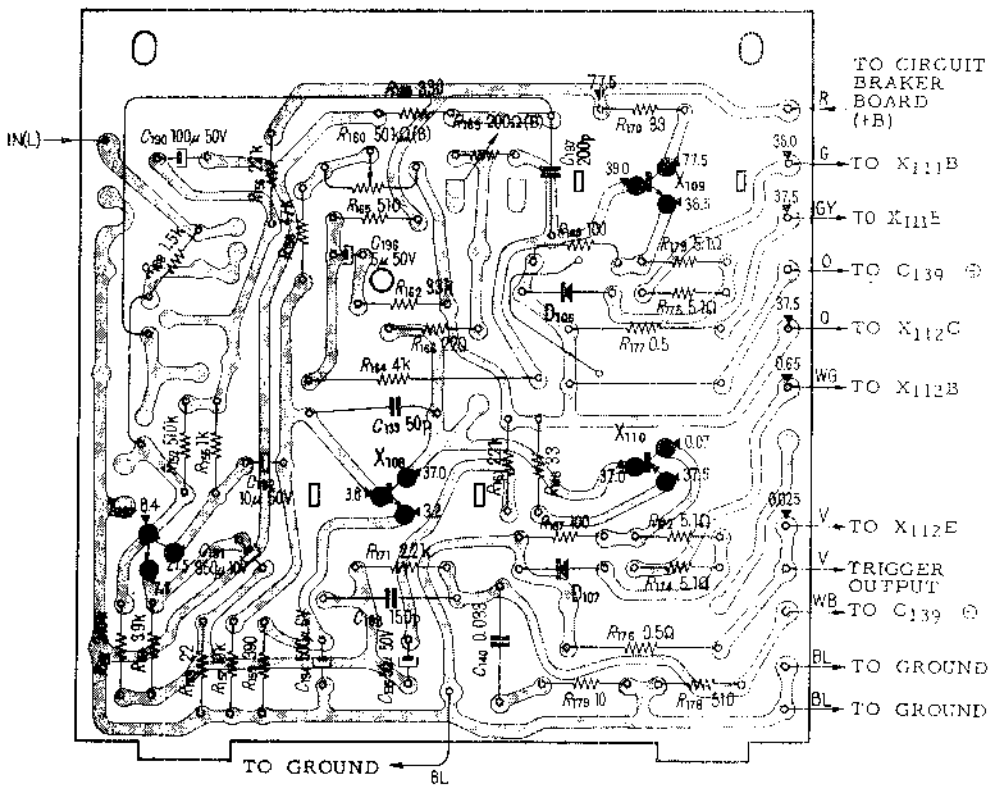


—Component Side—

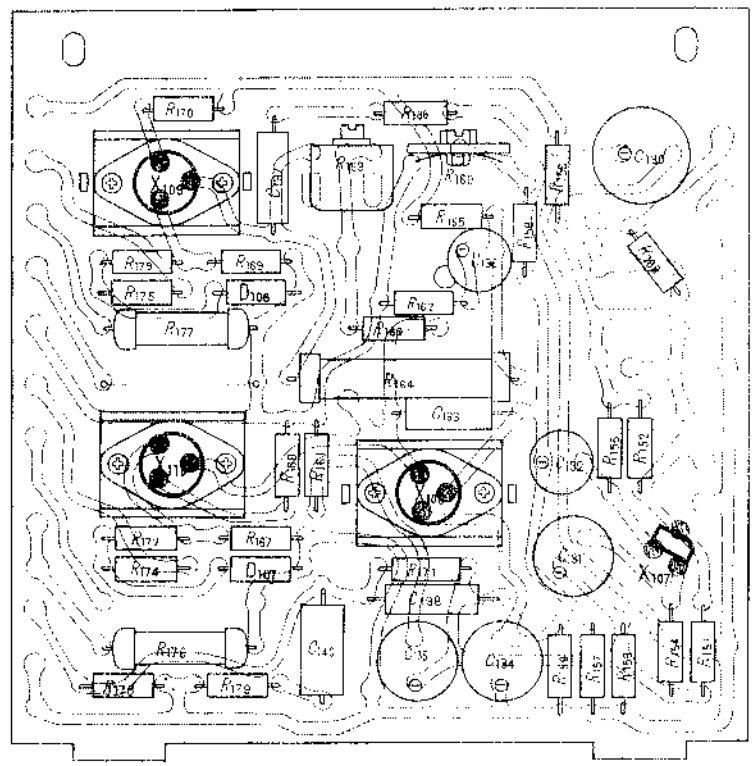


POWER AMPLIFIER BOARD

—Conductor Side—

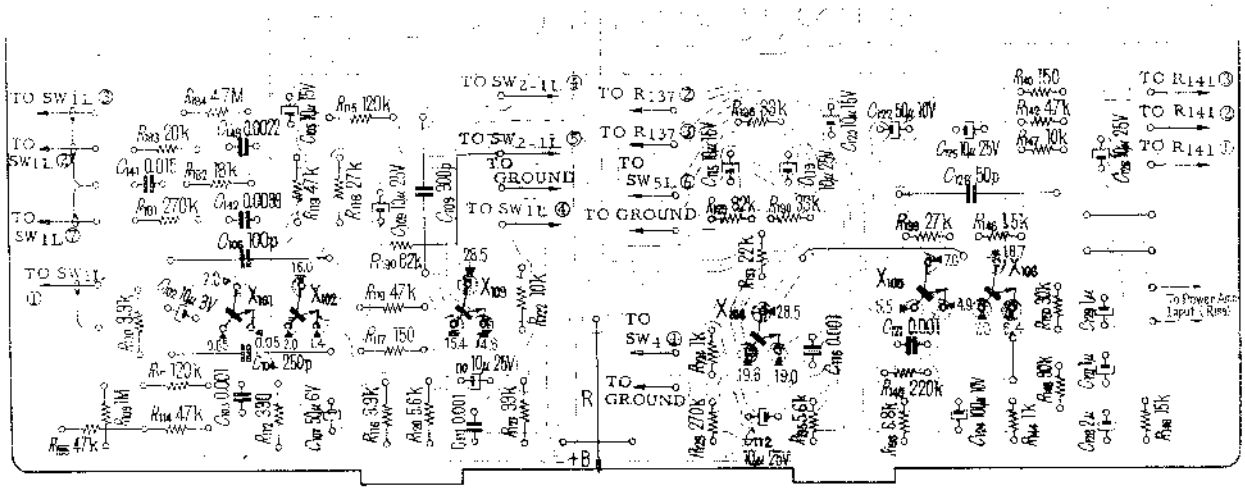


—Components Side—

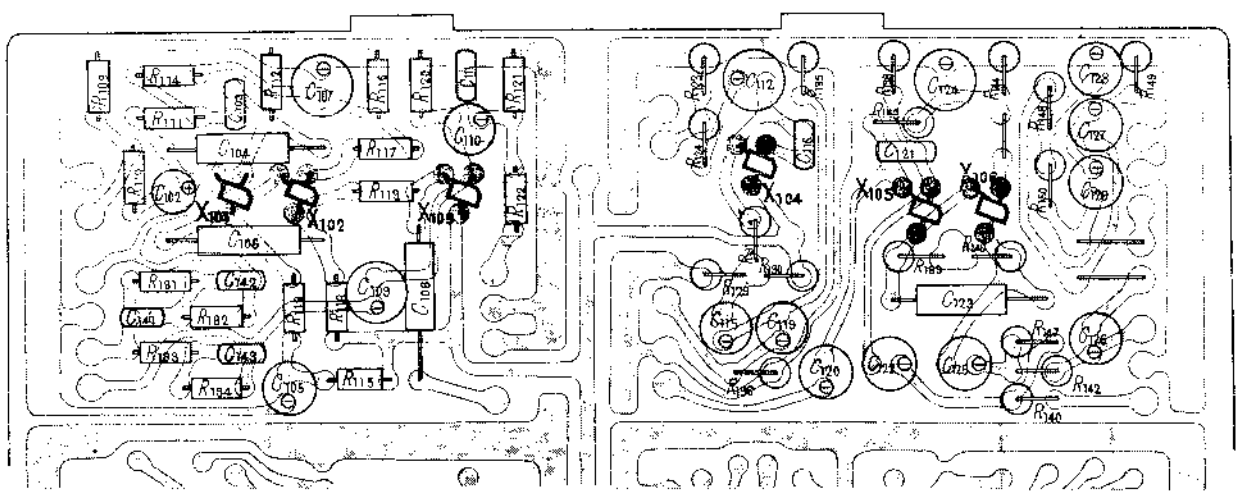


PRE-AMPLIFIER BOARD(L)

— Conductor Side —

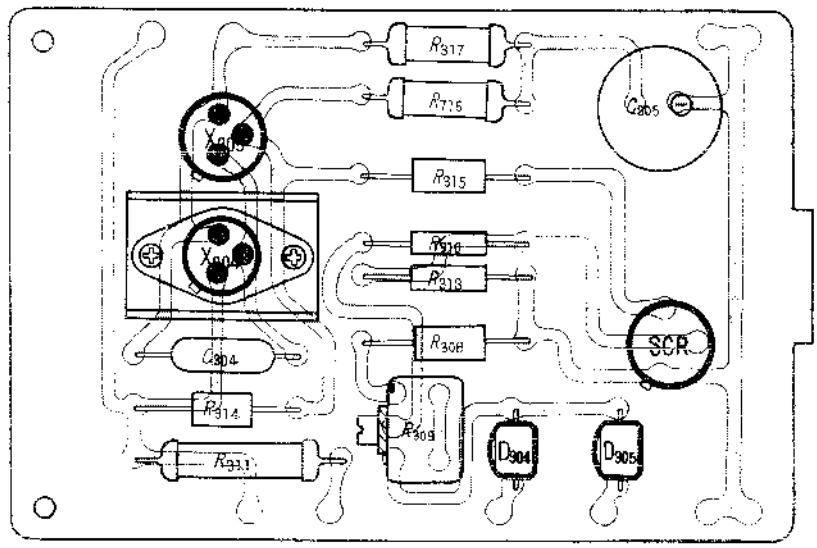


— Components Side —

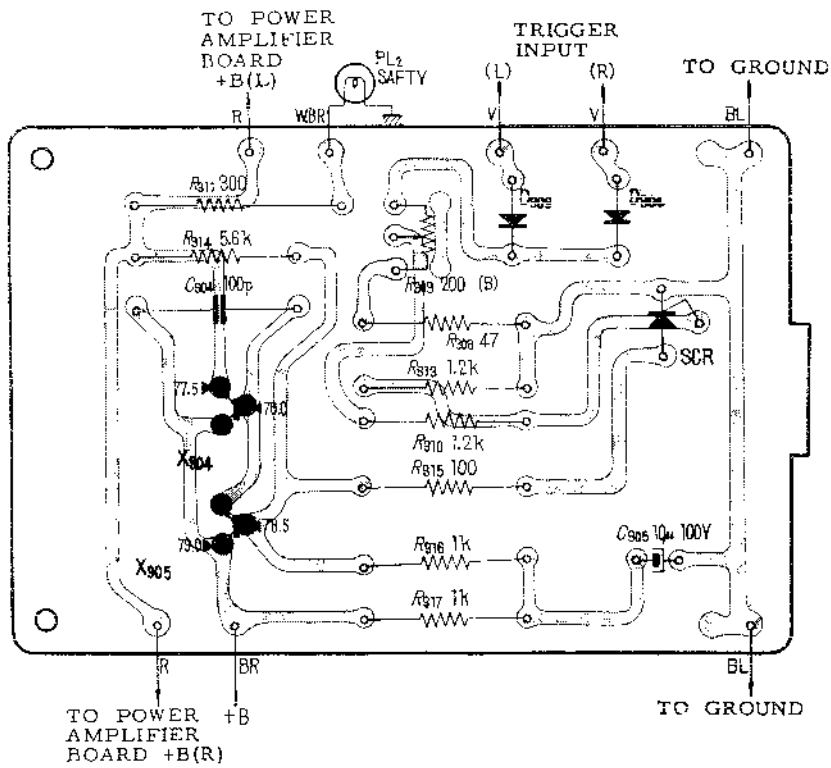


CIRCUIT BREAKER BOARD

—Components Side—

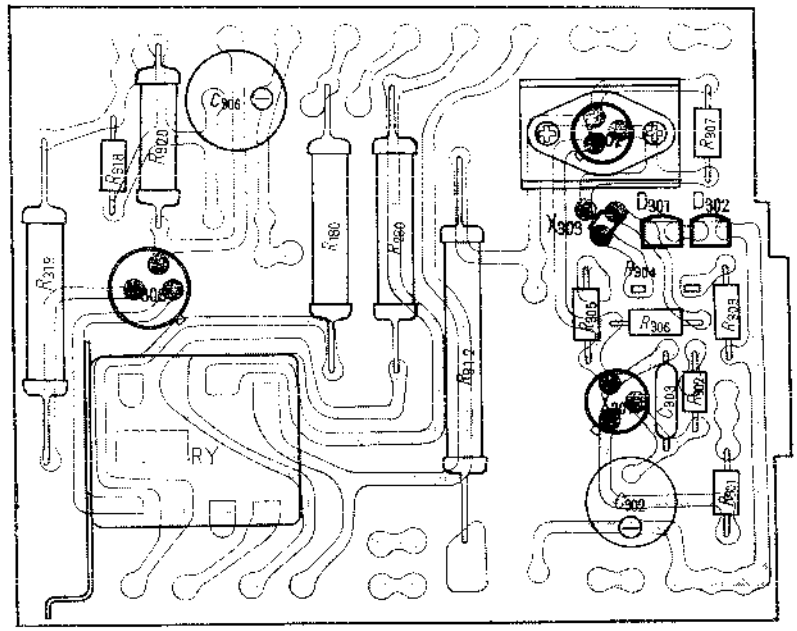


—Conductor Side—

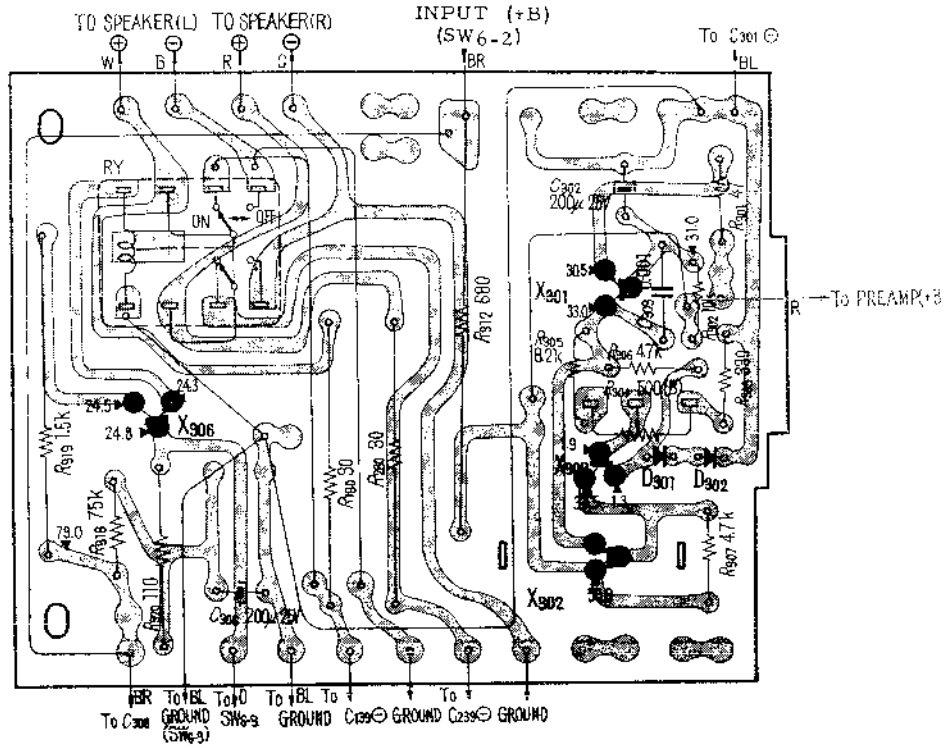


MUTING BOARD

—Components Side—

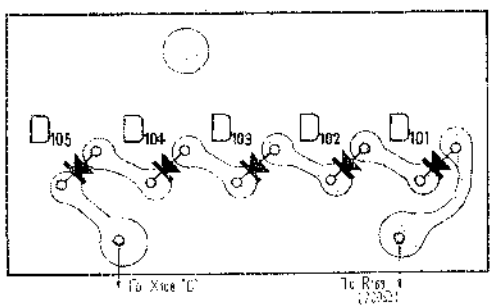


—Conductor Side—

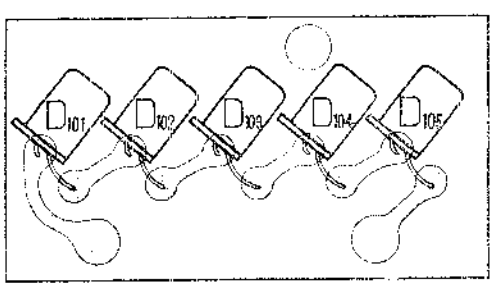


THERMO COMPENSATION DIODE BOARD

—Conductor Side—

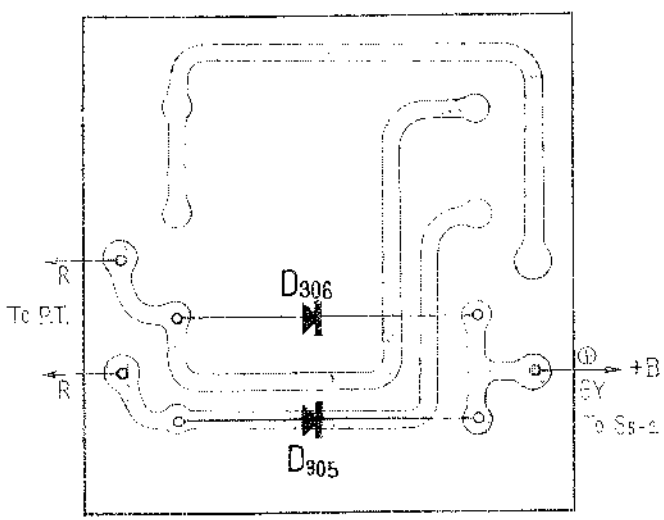


—Components Side—

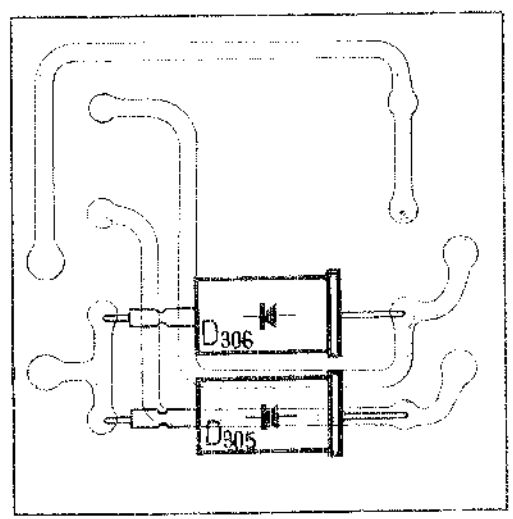


POWER SUPPLY DIODE BOARD

—Conductor Side—



—Component Side—



Parts List

Part No.	Description	Q'ty
X-20320-01	Panel Ass'y, control	1
2-032-001-	Panel, control	(1)
2-031-956-	Escutcheon, pilot lamp	(2)
-955-01	Lens, pilot lamp; red	(1)
-955-02	Lens, pilot lamp; green	(1)
X-20320-02-	Panel Ass'y, chassis; front	1
-03-	Knob Ass'y, control; small	4
2-032-004-	Knob, control; small	(1)
7-621-713-48	Screw, set 3×6	(1)
X-20299-02-	Plate Ass'y, chassis; bottom	1
-04-	Knob Ass'y, control; large	4
2-029-911-	Knob, control; large	(1)
7-621-715-40	Screw, set 4×8; control knob	(2)
X-20299-05-	Terminal Ass'y, speaker output; middle type	4
-06-	Chassis Ass'y, power amplifier	1
X-20319-01-	Terminal Ass'y, earth; small type	1
2-032-021-	Panel, back	1
-022-	Label, specification	1
-023-	Plate, printed circuit board	4
2-029-952-	Wire retainer	4
-921-	Cover, cabinet; black	1
-923-	Chassis, pre-amplifier	1
-924-	Plate, relay	1
-925-	Plate, volume control	1
-927-	Plate, hum shield	1
-928-	Heat Sink, 2SC299	8
-930-	Screw, cabinet cover	4
-931-	Knob, power on/off, tone & monitor; dark brown	3
-932-	Knob, function; dark brown	1
-933-	Case Cover, relay; white	1

Part No.	Description	Q'ty
2-029-935-02	Spacer, speaker output; blue	2
-12	Spacer, speaker output; red	2
-936-	Spacer, speaker output; fiber	4
-937-	Plate, phono jack mounting plate reinforcing	2
-938-	Plate, printed circuit board	6
-944-	Cushion styro-foam	2
-945-	Carton	1
-942-	Bracket, wire retainer	1
-943-	Cushion	1
-949-	Felt, vibration absorber; white	1
-950-	Spacer t=0.5	1
-951-	Plate, nut	1
0-051-263-	Foot, rubber	4
3-002-408-05	Spacer 6ϕ	2
-408-15	Spacer 6ϕ	2
3-413-100-	Bag, polyethylene	1
3-410-032-	Stopper, cord	1
3-701-030-	Label, serial No.	1
2-029-953-	Label, voltage	1
3-790-706-11	Instruction Manual	1
3-793-009-11	Card, inspection	1
1-506-113-11	Plug, phono; black	6
1-506-105-01	Plug, phono; red	7
-02	Plug, phono; black	7
1-532-017-12	Fuse, 5A	1
X-44900-02-	Cloth, polishing	1
2-029-946-	Bag, accessory	1
3-793-042-11	Sheet, check	1
3-701-020-	Bag, polyethylene	1
7-491-001-	Desiccant	1

Part No.	Description	Q'ty
X-20320-54-	Circuit Board pre-amplifier; mounted	1
-55-	power amplifier; mounted	2
-56-	muting; mounted	1
-57-	circuit breaker; mounted	1
-58-	tone control capacitor; mounted	2
-59-	thermo compensation diode; mounted	2
-60-	power supply diode; mounted	1
1-538-383-	pre-amplifier; printed	1
-348-	power amplifier; printed	2
-343-	muting; printed	1
-344-	circuit breaker; printed	1
-382-	tone control capacitor; printed	2
-345-	thermo compensation diode; printed	2
-346-	power supply diode; printed	1
1-515-050-	Relay	1
1-513-299-	Switch, function; rotary S1	1
-295-	" , mode; rotary S4	1
-300-	" , function; lever action S2	1
-292-	" , monitor; lever action S3	1
-291-	" , low cut, high cut and cancel; lever action S5	1
-293-	" , power on/off; micro S6	1
1-507-163-	Jack, rec. output and monitor; phono J106, 107, 206, 207	1

Part No.	Description	Q'ty
1-507-162-	Jack, tape head, phono 1, phono 2, tuner and auxiliary; phono J101-105, 201-205	1
1-509-029-	Connector, rec./p.b.	1
1-526-165-	Socket, voltage adaptor; special	1
1-441-231-	Transformer, power	1
1-517-021-	Socket, pilot lamp	2
1-518-050-	Lamp, pilot	2
1-509-015-	Socket, AC	3
1-526-502-	Socket, transistor 2SD45	4
1-536-146-	Terminal board, 1L2P	2
1-533-012-	Fuse Post	1
1-534-241-	Cord, AC power	1
	Semi-Conductors	
	Pre-Amplifier Section	
	Transistor 2SC401-5 X104-106, X204-206	6
	2SC401-6 (White Mark) X101-103, 201-293	6
	Power Amplifier Section	
	Transistor 2SD45-5,6 X111-112, 211-212	4
	2SA527 X110,210	2
	2SC401-5 X107,207	2

Parts List

Part No.	Description	Q'ty
	Transistor 2SC299-40 X108,208,109, 209	4
	Varistor SV-06 D106,206	2
	SV-08 D107,207	2
	Muting Section	
	Transistor 2SC293-40 X301	1
	2SC293-30 X306	1
	2SC297-03 X302	1
	2SC401-5 X303	1
	Diode FR-1U D301,302	2
	Circuit Board Section	
	Transistor 2SC299-30 X304	1
	2SC293-30 X305	1
	Diode 2SF-103	1
	FR-1U D303,304	2
	Thermo Compensation Diode Section	
	Diode 1T206 D101-105 D201-205	10
	Power Supply Diode Section	
	Diode DS-2M D305, 306	2
	Resistors	
	General Items	
1-221-773-	Potentiometer, dual ; 10K ohms R141,241	1
-716-	gang ; 20K ohms (M)	
	〃 20K ohms (N) R137,237	1
-705-	〃 250K ohms (B) R103,104,203, 204	2
-714-	50K ohms (D) R127,133,227, 233	4
1-201-597-	Composition, 470K ohms ±10% RC1/2 R106,206	2
-814-	3.3 〃 〃 〃 R322	1
1-201-041-	10K 〃 〃 〃 R108,208	2
-054-	47K 〃 〃 〃 R105,205	2
-598-	270K 〃 〃 〃 R107,207	2
1-203-967-	Carbon (Noiseless) 56K ohms ±5% RD1/4 R101,102, 201,202	4
1-205-100-	Enameled 180 ohms 10W R321	1
	Pre-amplifier Section	
1-201-021-	Composition 1K ohms ±10% RC1/2 R124,144, 224,244	4
-654-	1.5K 〃 〃 R146,246	2
-089-	4.7K 〃 〃 R142,242	2
-086-	5.6K 〃 〃 R135,235	2
-090-	6.8K 〃 〃 R138,238	2
-496-	15K 〃 〃 R149,249	2
-087-	22K 〃 〃 R131,231	2
-687-	27K 〃 〃 R139,239	2
-663-	30K 〃 〃 R148,150,248, 250	4
-049-	33K 〃 〃 R136,130,236, 230	4
-591-	82K 〃 〃 R129,229	2
-802-	220K 〃 〃 R143,243	2
-598-	270K 〃 〃 R123,223	2
1-242-653-	Carbon 150 ohms ±5% RD1/4UR R140,240	2
-697-	10K 〃 〃 〃 R147,247	2
1-203-065-	5.6K 〃 ±5% RD1/4L R120,220	2
-069-	10K 〃 〃 〃 R122,222	2
1-203-089-	33K ohms ±5% RD1/4L R121,221	2
-123-	120K 〃 〃 〃 R115,215	2
1-209-904-	150 〃 〃 〃 R117,217	2
-990-	330 〃 〃 〃 R112,212	2
1-203-973-	3.3K 〃 〃 〃 R110,116,210, 216	4
1-204-906-	18K 〃 〃 〃 R182,282	2
1-209-907-	20K 〃 〃 〃 R183,283	2
1-203-953-	27K 〃 〃 〃 R118,218	2
-934-	47K 〃 〃 〃 R113,114,158, 258,213,214, 219,119,186, 286	10
-908-	120K 〃 〃 〃 R111,211	2
1-209-910-	270K 〃 〃 〃 R181,281	2
1-203-911-	4.7M 〃 〃 〃 R184,284	2
1-204-910-	1M 〃 〃 〃 R109,209	2
1-204-898-	82K 〃 ±10% 〃 R190,290	2
	Power Amplifier Section	
1-223-010-	Adjustable, wire wound 200 ohms(B) R163,263	2
1-221-334-	Adjustable, 50K ohms (B) R160,260	2
1-201-081-	Composition 220 ohms ±10% RC1/2 R166,266	2
-794-	5.1 〃 〃 〃 R172-175, 272-275	8
-094-	10 〃 〃 〃 R179,279	2
-689-	33 〃 〃 〃 R168,268,170, 270	4
-100-	100 〃 〃 〃 R167,267,169, 269	4
-082-	330 〃 〃 〃 R189,289	2
-472-	390 〃 〃 〃 R159,259	2
-845-	510 〃 〃 〃 R165,265 178,278	4
-021-	1K 〃 〃 〃 R155,255	2
-654-	1.5K 〃 〃 〃 R188,288	2
-084-	3.3K 〃 〃 〃 R162,262	2
-085-	3.9K 〃 〃 〃 R154,254	2
-041-	10K 〃 〃 〃 R157,257	2
-087-	22K 〃 〃 〃 R156,256	2
-843-	240K 〃 〃 〃 R151,251	2
-837-	510K 〃 〃 〃 R152,252	2
1-207-151-	Wire wound 0.5 ohms 1.5W R176,276, 177,277	4
1-203-049-	Carbon 2.2K ±5% RD1/4L R161,261,171, 271	4
1-209-576-	4K ohms ±5% RD2L R164,264	2
1-203-005-	22 ohms ±5% RD1/4L R153,253	2
	Muting Section	
1-221-427-	Adjustable 500 ohms (B) R304	1
1-201-079-	Composition 47 ohms ±10%RC1/2 R301	1
-082-	Composition 330 ohms ±10% RC1/2 R303	1
-089-	4.7K 〃 〃 〃 R306,307	2
-041-	10K 〃 〃 〃 R302	1
-844-	75K 〃 〃 〃 R318	1
-459-	8.2K 〃 〃 〃 R305	1
1-207-152-	Wire Wound 110 〃 1.5W R320	1
-104-	30 〃 4W R180,280	2
-153-	1.5K 〃 4W R319	1
-154-	680 〃 5W R312	1
	Ciruit Braker Section	
1-201-079-	Composition 47 ohms ±10% RC1/2 R308	1

Part No.	Description	Q'ty
	Composition	
1-201-100-	100 ohms ±10% RC1/2 R315	1
-685-	1.2K " " " R310,313	2
-086-	5.6K " " " R314	1
1-223-010-	Adjustable, wire wound 200ohms(B)R309	1
1-207-157-	Wire Wound	
	1K ohm 1.5W R316,317	2
-156-	300 ohms 3W R311	1
	Tone Control Capacitor Section	
1-201-021-	Composition	
	1K ohms ±10% RC1/2 R132,232	2
-304-	2.2K " " " R128,228	2
-041-	10K " " " R134,234	2
-087-	22K " " " R187,287	2
1-242-665-	Carbon	
	470 " ±5% RD1/4UR R125,225	2
-689-	4.7K " " " R126,226	2
	Capacitors	
	General Items	
1-101-534-	Encapsulated Component	
	0.1μF +120 ohms 50WV	1
1-105-067-	Mylar 0.01μF ±10% 50WV C310	1
1-115-045-	Oil Tubular 0.1μF ±20% 600WV C309	1
1-105-879-	Mylar 0.033μF ±20% 100WV C307	1
1-109-002-	Mica 100pF ±10% 1KV C101,201	2
1-121-330-	Electrolytic 1000μF 60WV C139,239	2
-328-	" 2000μF 35WV C301	1
-331-	" 2000μF 100WV C308	1
	Pre-Amplifier Section	
1-105-665-	Mylar	
	0.0022μF ±5% 50WV C143,243	2
-668-	0.0039μF ±5%50WV C142,242	2
-821-	0.001μF ±20% 50WV C103,203,111, 211,116,216, 121,221	8
-675-	0.015μF ±5% 50WV C141,241	2
1-121-324-	Electrolytic	
	1μF ±20% 25WV C127,227,129, 229	4
1-131-029-	Tantalum	
	10μF ±20% 3WV C102,202	2

Part No.	Description	Q'ty
1-121-325-	Electrolytic	
	2μF 25WV C128,228	2
-192-	10μF 15WV C105,205,115,215 120,220	6
-179-	10μF 25WV C109,209,110,210 112,212,119 219 126,226,125,225	12
-128-	50μF 10WV C107,207,122,222	4
-159-	100μF 10WV C124,224	2
1-109-005-	Mica	2
	250pF ±10% C104,204	2
-006-	300pF ±10% C108,208	2
-002-	100pF ±10% C106,206	2
-001-	50pF ±10% C123,223	2
	Power Amplifier Section	
1-105-679-	Mylar	
	0.033μF ±10% C140,240	2
1-121-142-	Electrolytic	
	5μF 50WV C136,236	2
-143-	10μF 50WV C132,232	2
-163-	50μF 50WV C135,235	2
-172-	100μF 50WV C130,230	2
-140-	350μF 10WV C131,231	2
-161-	500μF 6WV C134,234	2
1-109-001-	Mica	
	50pF ±10% C133,233	2
-004-	200pF ±10% C137,237	2
-040-	150pF ±10% C138,238	2
	Muting Section	
1-121-190-	Electrolytic	
	200μF 25WV C306	1
-261-	200μF 35WV C302	1
1-105-661-	Mylar	
	0.001μF ±10% 50WV C303	1
	Circuit Breaker Section	
1-121-126-	Electrolytic	
	10μF 100WV C305	1
1-109-002-	Mica	
	100pF ±10% 1KV C304	1
	Tone Control Capacitor Section	
1-105-671-	Mylar	
	0.0068μF ±10% 50WV C114,214	2
-679-	0.033μF ±10% 50WV C118,218	2
-683-	0.068μF ±10% 50WV C113,213	2
1-113-134-	0.33μF ±10% 35WV C117,217	2

Following parts are added to UL and CSA model respectively

Part No.	Description	Q'ty
	UL	
2-032-031-	Label, specification	1
3-422-204-	Label, caution	1
2-029-955-	Label, AC outlet	1
2-032-025-02	Carton for 2sets	1/2
3-790-706-22	Instruction Manual	1
3-994-399-11	Card, warranty	1
1-534-330-31	Cord, power	1
1-513-293-22	Switch, power on/off ; micro S6	1
1-209-866-	Resistor, carbon 1 ohm 1W R176, 177, 276, 277	8

Part No.	Description	Q'ty
	CSA	
2-032-035-	Label, specification	1
2-029-966-	Label, AC outlet	1
3-407-956-	Label, caution	1
3-790-706-22	Instruction Manual	1
1-534-330-31	Cord, power	1