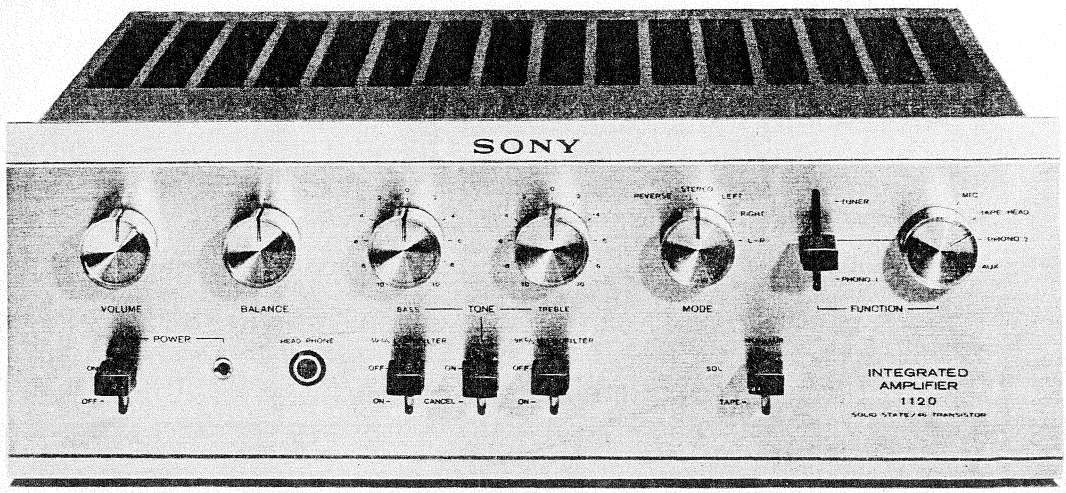
TA-1120A

General Export Model ; 51011 and after
UL Model ; 80001 and after
SEMKO Model ; 60001 and after
CSA Model ; 70031 and after



Specifications (1)

System : All silicon transistor integrated Stereo Control Amplifier.

Circuit : Quasi-complementary symmetry SEPP OTL Circuit.

Semiconductor : 44-transistors, 25-diodes and 2-Thermistors.

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

Power consumption : Approx. 40W at no signal.
Approx. 260W at maximum output.

Dimentions : 15¾×5¾×12¼ inches (w, h, d) including knobs.
(400mm×145mm×310mm)

Weight : Approx. 11Kgs. (24 lbs)

SONY®
SERVICE MANUAL

Specifications (2)

Power Amplifier Section

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

Frequency response : 5 Hz~200 KHz $^{+0}_{-2}$ db at rated output.

Harmonic distortion : (IHFM) Less than 0.05% at rated output. (At 1 KHz)
〃 0.01% at 10W output. (〃)
〃 0.1% at rated output. (Through 20 Hz~15 KHz)
〃 0.06% at 25W 〃 (〃)
〃 0.03% at 0.5W 〃 (〃)

Signal-to-noise ratio : 110 db (Closed Circuit, IHFM)
*Through weighted network as IHF-A-201.

Input impedance : 100 K ohms or more.

Damping factor : More than 180 (8 ohms) at 1 KHz.
〃 360 (16 ohms) 〃

Sensitivity : 1V for rated output (50 W/8 ohms)

Preamplifier Section

Output level : Preamp rated output (2 V)
Rec output (0.15 V)
Head phone output (6 V)

Frequency response : Tuner, Aux Tape : 10 Hz~100 KHz $^{+0}_{-2}$ db
Phono-1, Phono-2 : 30 Hz~15 KHz±0.5 db (RIAA EQ. curve)
Tape head : 〃 〃 (Adjustable±3 db at 10 KHz) (NAB EQ. curve)
Mic input : 30 Hz~50 KHz $^{+0}_{-2}$ db

Input sensitivity :

Tuner, Aux	: 0.15 V (adjustable)	Impedance 100 Kohms
Phono-1	: 1.2 mV	47 〃
Phono-2	: 1.2 mV	47 〃
Tape Head	: 1.2 mV	500 〃
Mic	: 1.2 mV	500 〃
Tape	: 0.15 V	100 〃
Amplifier in	: 1 V	100 〃

Inputs : Tuner, Aux, Phono-1, Phono-2, Tape Head, Mic, Tape, Amplifier in,

Outputs : Rec Out (0.15 V) Headphone (6 V) Preamp out (2 V)

Integrated record input sensitivity : 0.5 V

playback connection : Output level 25 mV

Tone controls : Bass 100 Hz±10 db 2 db/step
Treble 10 KHz±10 db 2 db/step

Filters : High filter 12 db/oct above 9 KHz
Low filter 〃 below 50 Hz

S/N ratio :

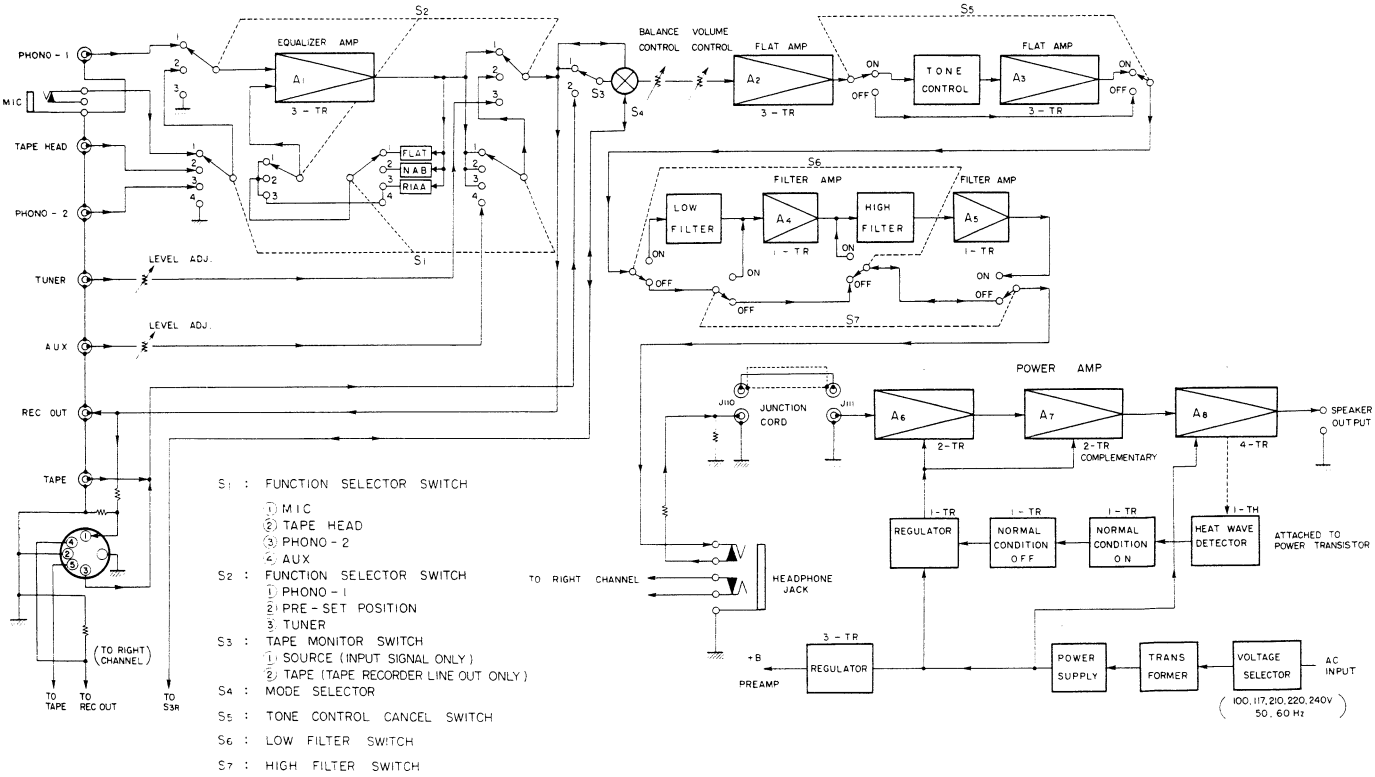
Aux, Tuner	(closed circuit)	more than 90 db
Phono-1	(〃 〃) 〃	70 db
Phono-2	(〃 〃) 〃	70 db
Tape head	(〃 〃) 〃	70 db
Mic	(〃 〃) 〃	65 db

*Through weighted network as per IHF-A-201

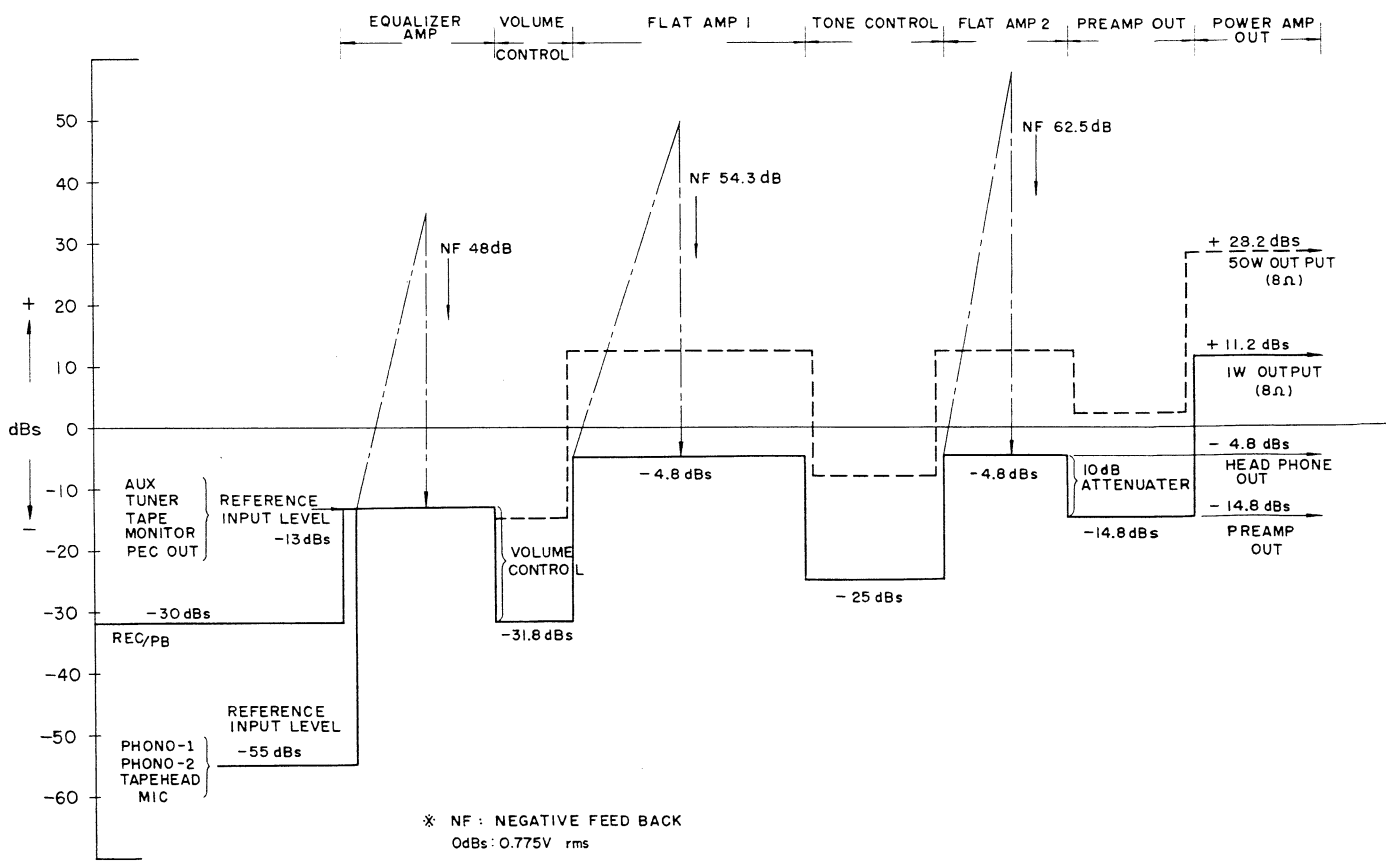
AC Outlets : Switched-2
Unswitched-1

Accessories : Connection Cord, short plug, pin plug, fuse (5 A)

TA-1120A BLOCK DIAGRAM



TA-1120A LEVEL DIAGRAM



Section 1 Method of Disassembling the Set

(1) Removal of Power Amplifier and Power Supply Section.

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

(b) Remove five screws (+RF 3×6) from bottom of chassis to release the back panel section as shown in Fig. 1-1.

(c) Remove two screws (+RF 3×6) from regulated power supply section and push the top of it outer side of chassis.

(d) Remove the five screws (+RF 4×10) from the heat sink.

Facing the back panel, lift up leftest side of heat sink.

Paying attention to the harnesses of wire around regulated power supply board, turn the heat sink toward you to make the circuit boards up then place it down. See Fig. 1-3.

Now the power and protection board are placed on convenient position for repairing.

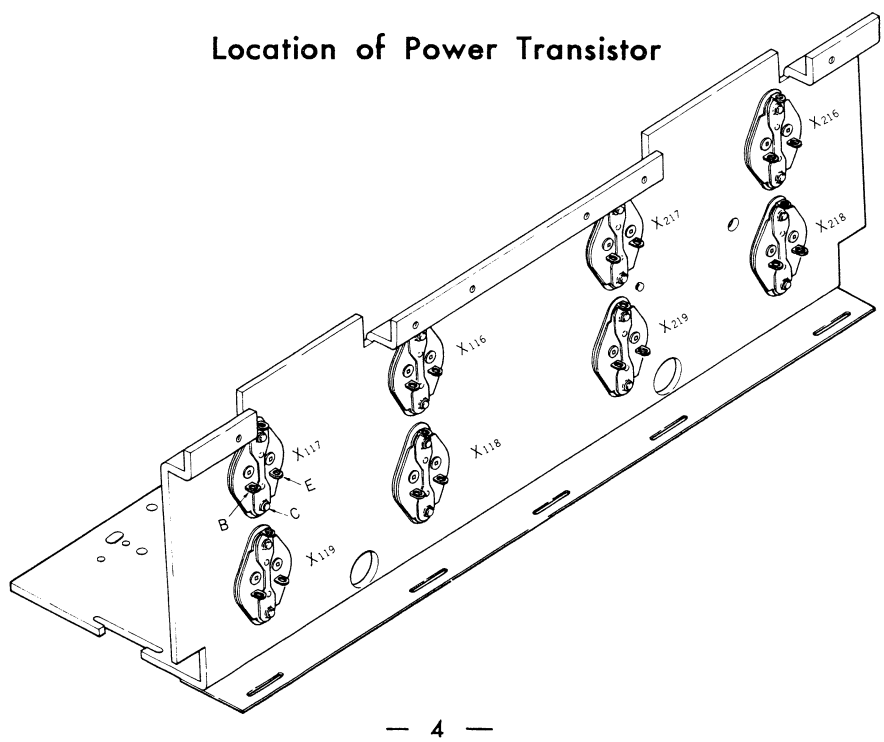
(2) Removal of Preamplifier Section and Control Panel.

(a) After taking the chassis cover off, remove the two screws (+RF 3×6) from bottom of the chassis as shown in Fig. 1-1.

(b) Remove the four screws (+RF 3×6) from both side of the chassis as shown in Fig. 1-3 and control panel will now come free.

(c) The service will be easily done after above procedures as shown in Fig. 1-4.

Location of Power Transistor



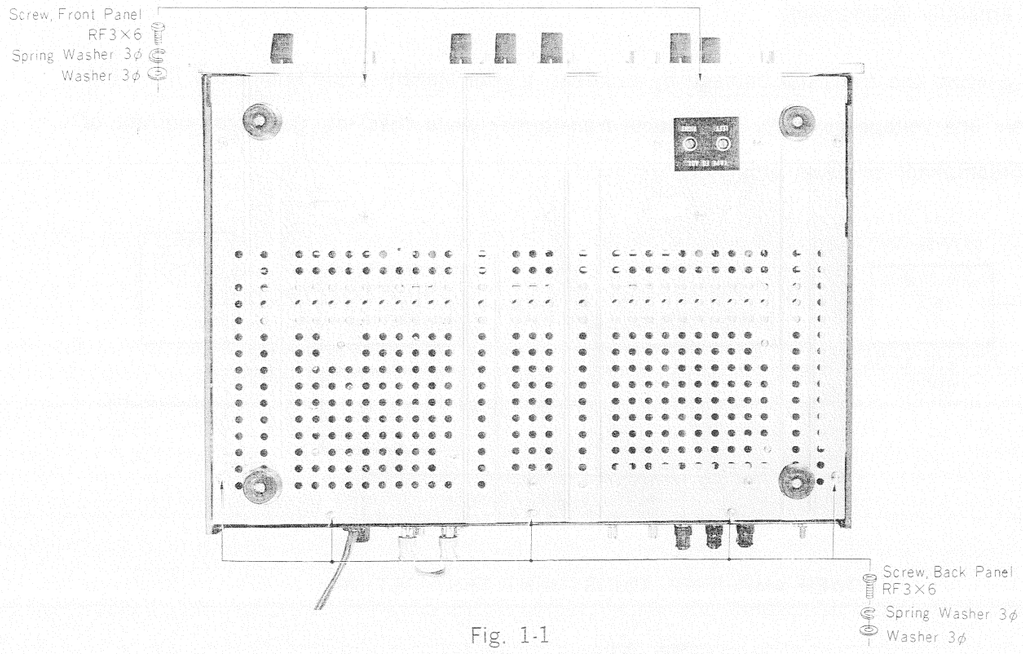


Fig. 1-1

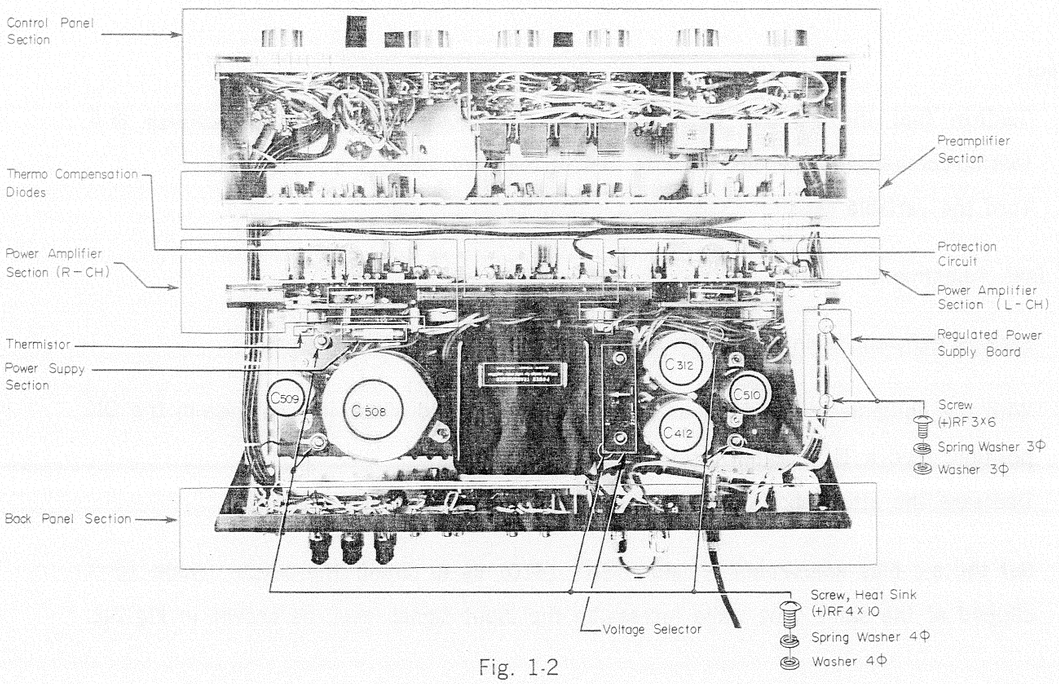


Fig. 1-2

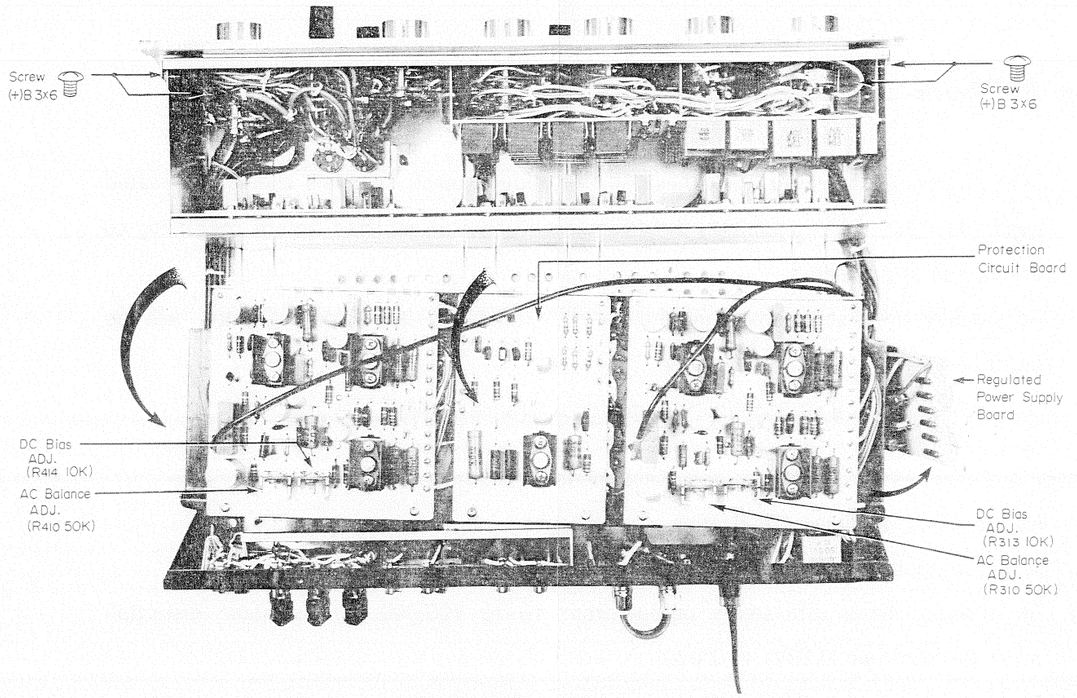


Fig. 1-3

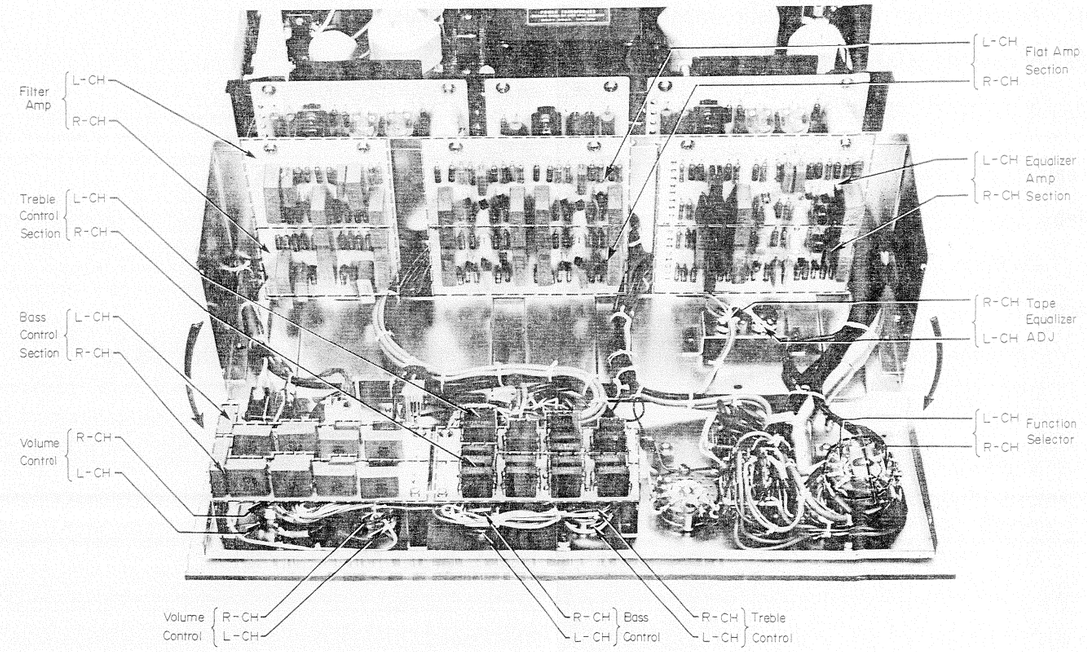


Fig. 1-4

Section 2 Check-out and Adjustment

General : In the following check out and adjustment procedures each channels should be treated separately but both channels should be checked and adjusted before continuing to the following procedure.

To simplify the discussions, only channel "1" (left) and its related circuitry will be described.

Channel "2" (right) is identical except for reference symbol numbers.

(1) Equipment requires for check out and adjustment procedures consists of :

(a) An a-c VTVM capable of indicating rms voltages.

(b) A d-c voltmeter capable of indicating 100mv full scale or less.

(c) An Audio oscillator with stable output from 10 to 100,000 Hz, Harmonic distortion must be less than 0.03% at 1kHz.

(d) 8 ohms 50W dummy load and speaker for aural monitoring.

(e) An oscilloscope for monitoring.

(f) An attenuator (characteristic impedance 600 ohms), unbalanced

(g) A resistor (600 ohms 1/4 W)

(h) A variable transformer.

(1) Preamplifier Power Supply Adjustment

Step : 1

Connect the d-c voltmeter across electrolytic capacitor C510, (1000μF).

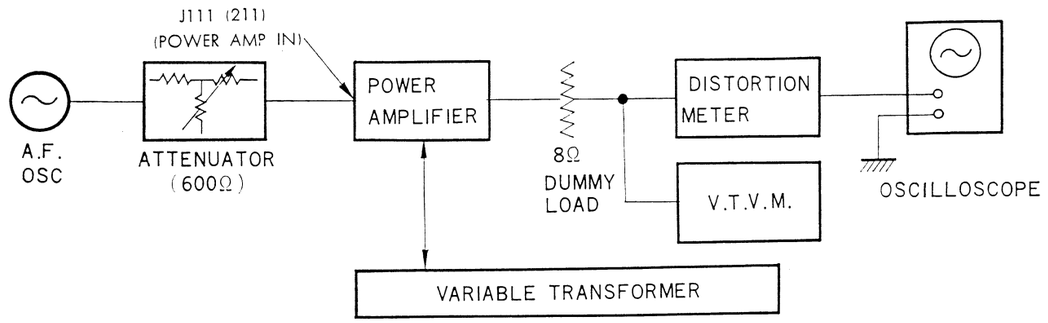
Step : 2

Turn the power switch on and confirm that the d-c voltmeter reading is within 48 to 53V (when no signal is applied). If not, follow the next procedure.

Voltmeter Reading	Remedy
Below 48V	Solder a jumper lead between R520 and R518.
Over 53V	Solder a jumper lead between R519 and R517.

(2) Power Amplifier Adjustment

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



POWER AMPLIFIER ADJUSTMENT TEST SET-UP

Fig. 2-1.

Power Amplifier Adjustment Test Set-Up

Preparation :

(a) Confirm that the a-c line voltage selector plug points to the proper voltage and thermo-compensation diodes are attached to the heat sink.

(b) Turn the variable resistor R310, (410) clockwise to the full.

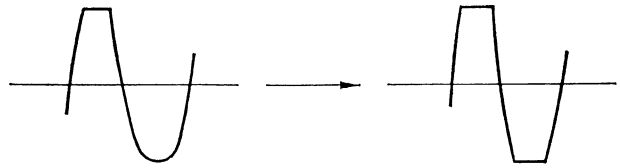
(a) A-C Bias Adjustment

Note : Serious deficiencies in performance will result if bias is set improperly.

Step 1 ; With the equipment connected as shown in Fig. 2-1 and all power switches in the ON position, feed a 1kHz signal through attenuator.

Decrease the attenuation until the output wave form is slightly clipped.

Step 2 : Set the a-c bias adjustment resistor R310, (410) as to obtain the output wave form clipped at the same time while increasing the input signal level, as shown in Fig. 2-2.



A-C BIAS ADJUSTMENT

Fig. 2-2

(b) D-C Bias Adjustment

Note : Serious deficiencies in performance such as thermal run away of power transistor will result if d-c bias is set improperly.

Step 1 : Connect the d-c voltmeter across R328 or R330. Set the input signal level to −50dBs by attenuator.

Step 2 : Turn the d-c bias adjustment resistor R314, (414) to obtain 25 ±5mV reading on d-c voltmeter. See Fig. 2-3.

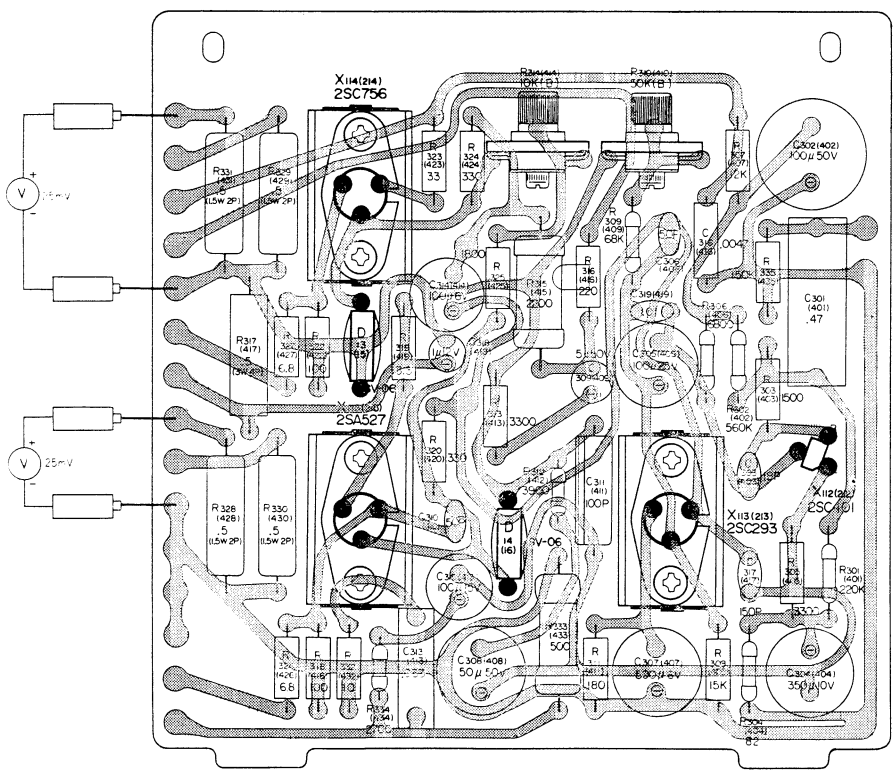


Fig. 2-3.

(3) Protection Circuit Checkout

(a) General : In transistorized OTL amplifiers, protection circuit has to be employed to prevent the excessive current in power transistors.

The break down of power transistor occurs when input signal is applied to the power amplifier while its output terminal is kept shorting to ground.

In TA-1120A, +B for driver stage (X113, X213) is shut off by electronic switch when the excessive current makes the power transistors overheat.

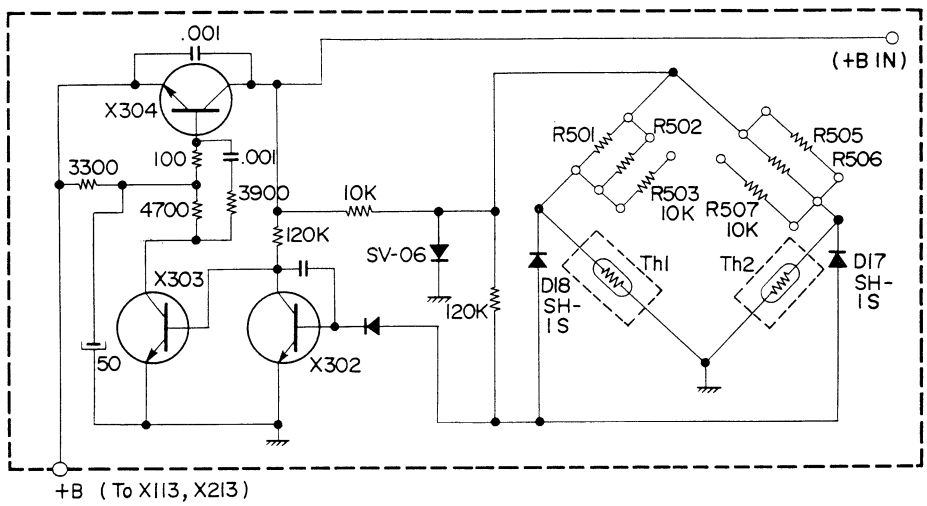


Fig. 2-4

(b) Circuit Description

The ptotection circuit operates as follow. Please refer to the Fig. 2-4.

(1) At normal condition, bridged configuration of resistors and thermistors are arranged to place a forward bias on X302, that is X302 is "ON".

As X302 is coupled to X303 and X303 collector is connected to X304 directly, X303 becomes off and X304 becomes "ON".

(2) When output terminal of the power amplifier is shorted, excessive current flows in the power transistors in each input cycle.

That makes the power transistor over heat.

(3) The heat wave of the power transistors are sensed by thermistors which are attached to it.

The resistance of the thermistor decreases when temperature rises.

As a result, bias of X302 decreases and X302 is turned off, that makes X303 "ON".

(4) Thus X304 is off and reduce the +B to the driver stage nearly zero.
Now the X113 or X213 can not drive the power transistor, no excessive current will flow.
In this way the power transistors are protected.

(c) Adjustment

Step 1: With the equipment connected as shown in Fig. 2-1. Feed a 1 KHz signal to the TUNER or AUX input jack through attenuator.

Step 2: Increase signal level to obtain 500 mW (2.0 V r. m. s. at 8 ohms load) output.

Step 3: Insert a thermometer between power transistor and thermistor then heat the thermistor and transistor gradually by heat blower, as shown in Fig. 2-5. Conventional hair dryer (blower) is available.

Step 4: Confirm the output of the amplifier goes off when temperature becomes 148±9°F.

Step 5: If the protection circuit does not operate properly, follow the next procedures according to the symptoms.

(1) In case the output goes off at below 139°F
Solder a jumper lead between R502 (R506) and R503 (R507) on conductor side of protection circuit board as shown. in Fig. 2-6.

(2) In case the output does not go off at above 157°F.
Check thermistors and X302 and replace as required.
After applying the remedy, repeat foregoing procedures.

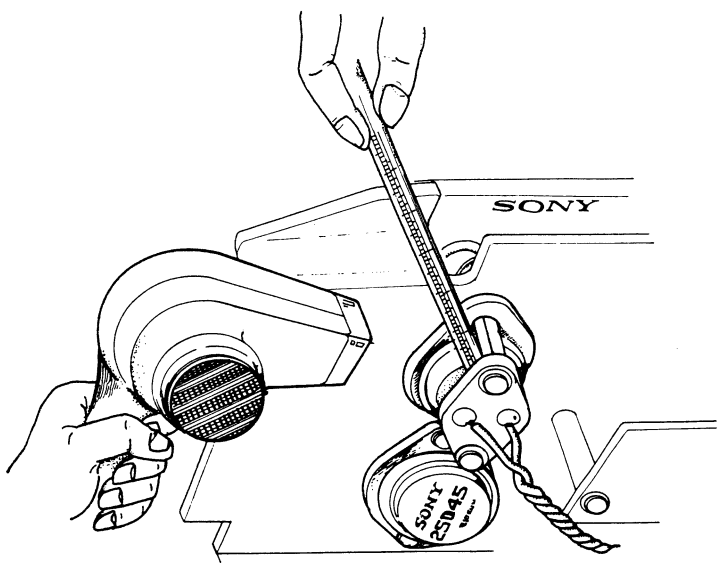


Fig. 2-5.

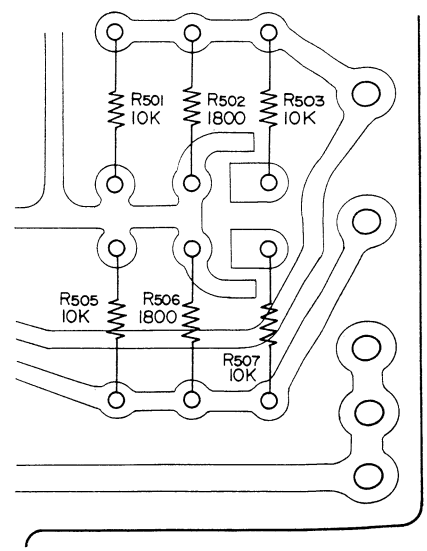


Fig. 2-6.

Section 3 Trouble shooting Chart

General : A running through of the alignment and performance checks for the defective circuit will further isolate the trouble or may rectify it, and the faulty component then should be identified easily.

Using a VTVM or oscilloscope, and check the circuit from the output toward the input. Check at the collector, base, and emitter of each stage until the point at which a signal is indicated on the VTVM or oscilloscope.

The trouble then is probably in the stage immediately following that point.

When the faulty stage is located, the individual components can be isolated by a check of resistances and voltages.

Typical voltage values are shown on the schematic diagram and mounting diagrams.

After the completion of any trouble shooting procedures, check the amplifier response to insure the electrical specifications.

TA-1120(A) TROUBLE SHOOTIG CHART

To avoid the transistor damage by accident, please make it a rule to increase the input a-c 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 a-c line voltage Defective fuse Defective power transformer	Trace the line failure Replace transformer
Fuse "F" blows as a-c power switch turned on	Shorted a-c. line cable on the primaly side of the power transformer	Repair the short circuit or replace a-c line cable
	Defective filter capacitors	Check C508, C512, replace if bad.
	Defective power transformer	Replace transformer
Sound distorted and voltage across C508 is relatively low	One of D19-22 defective	Replace the defective diode
	MUTING CIRCUIT	
Click sound is heard as power switch turned on	Defective capacitor	Check C502 Replace if bad

POWER AMPLIFIER

No sound and heat sink becomes abnormally hot	Thermal run away of power transistor Speaker terminal is shorted to ground	Check d-c bias current at no signal of power transistor X116-119(50mA). Repair the short

*If one of power transistors (X116, 117, 118, 119) is damaged, replace the all power transistors by new selected two pair of power transistors, to keep the electric balance.

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, for example X10 range.

＊a-c and d-c bias adjustment should be done, after replacing the power transistors.

No sound	Defective transistor	Check X114, X115 Replace if necessary
Too much hum	Defective filter capacitor	Check C508 Replace if bad
Noise is heard even when volume control set at minimum sound volume position	Defective transistor	Check X112, 113, 114 and X115, replace the defective transistor.
Sound distorted	One of X114 and X115 defective	Replace the defective transistor

＊To find out the defective part of amplifier, signal injector or audio signal generator is useful to going through each stage one by one.

REGULATED POWER SUPPLY FOR PREAMPLIFIER

Power amplifier works but preamplifier dose not work	No d-c input voltage Transistor defective Defective filter capacitor	Check the +B line Check X306, 307 and X308, replace if bad. Check C509, C510 and C511, replace if bad
Excessive high d-c output	1S332, (D23) open	Replace
Oscillation in power supply	Defective X307	Replace
Hum is heard even when volume control set at minimum sound volume position	Defective filter capacitor	Check C509, replace if bad
Hum is heard regardless of volume control position	Defective filter capacitor	Check C509, replace if bad
Hum is heard only volume control set at the maximum sound volume position	Defective filter capacitor	Check C510, replace if bad

2-TR FILTER AMPLIFIER

Noise is heard when low or high filter switch turned on	Defective transistor	Check X110 and X111, replace if bad

3-TR FLAT AMPLIFIER (2)

No Sound Hash noise is heard when volume control set at maximum sound volume position but stops when input terminal is short-circuited.	Defective transistor	Check X107, 108, and X109 Replace if bad.

REGULATED POWER SUPPLY FOR PREAMPLIFIER		
Power amplifier works but preamplifier dose not work	No d-c input voltage Transistor defective Defective filter capacitor	Check the +B line Check X306, 307 and X308, replace if bad. Check C509, C510 and C511, replace if bad
Excessive high d-c output	1S332, (D23) open	Replace
Oscillation in power supply	Defective X307	Replace
Hum is heard even when volume control set at minimum sound volume position	Defective filter capacitor	Check C509, replace if bad
Hum is heard regardless of volume control position	Defective filter capacitor	Check C509, replace if bad
Hum is heard only volume control set at the maximum sound volume position	Defective filter capacitor	Check C510, replace if bad
2-TR FILTER AMPLIFIER		
Noise is heard when low or high filter switch turned on	Defective transistor	Check X110 and X111, replace if bad
3-TR FLAT AMPLIFIER (2)		
No Sound Hash noise is heard when volume control set at maximum sound volume position but stops when input terminal is short-circuited.	Defective transistor	Check X107, 108, and X109 Replace if bad.

3-TR FLAT AMPLIFIER (1)		
No sound Hash noise is heard when volume control set at maximum sound volume position and stops when input terminal is shorted	Defective transistor	Check X104, 105 and X106 replace if bad
3-TR EQUALIZING AMPLIFIER		
No sound or hash noise is heard even when input terminal is short-circuited with volume control set at maximum sound volume position	Defective transistor	Check X101, 102 and X103 replace if bad
FUNCTION SWITCH		
Large click sound is heard as turning the mode switch from, Phono 1, 2 to Tape head Phono 2 to Tape head	 Defective C103 Defective function switch S1	 Replace Repair or replace

* To simplify the discussion, only cannel "1" (left) and its related circuitry were described.
Channel : 2" (right) is identical except for reference symbol numbers.

Ordering Parts : The purpose of the parts list is to aid the user of SONY equipment in obtaining replacement parts.

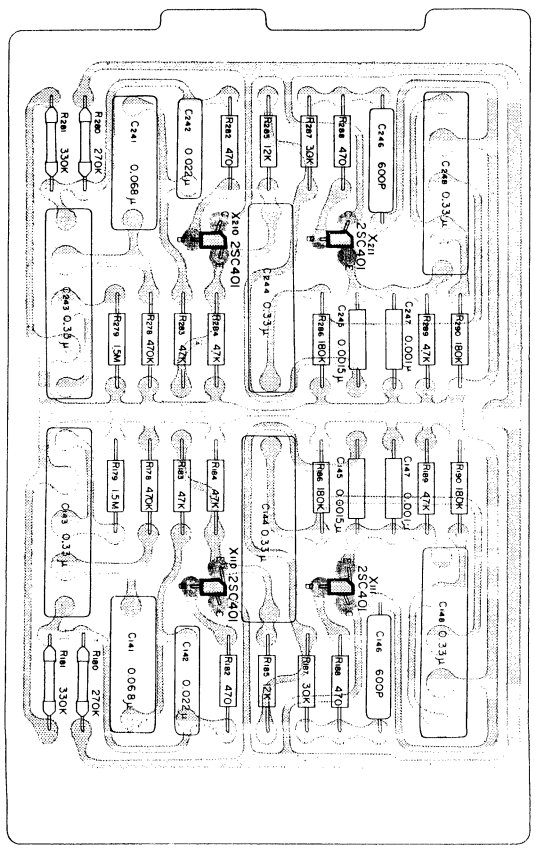
SONY franchised dealers can offer the most convenient service in providing normally replaceable parts when proper information is furnished.

Parts are listed according to the schematic reference symbol.

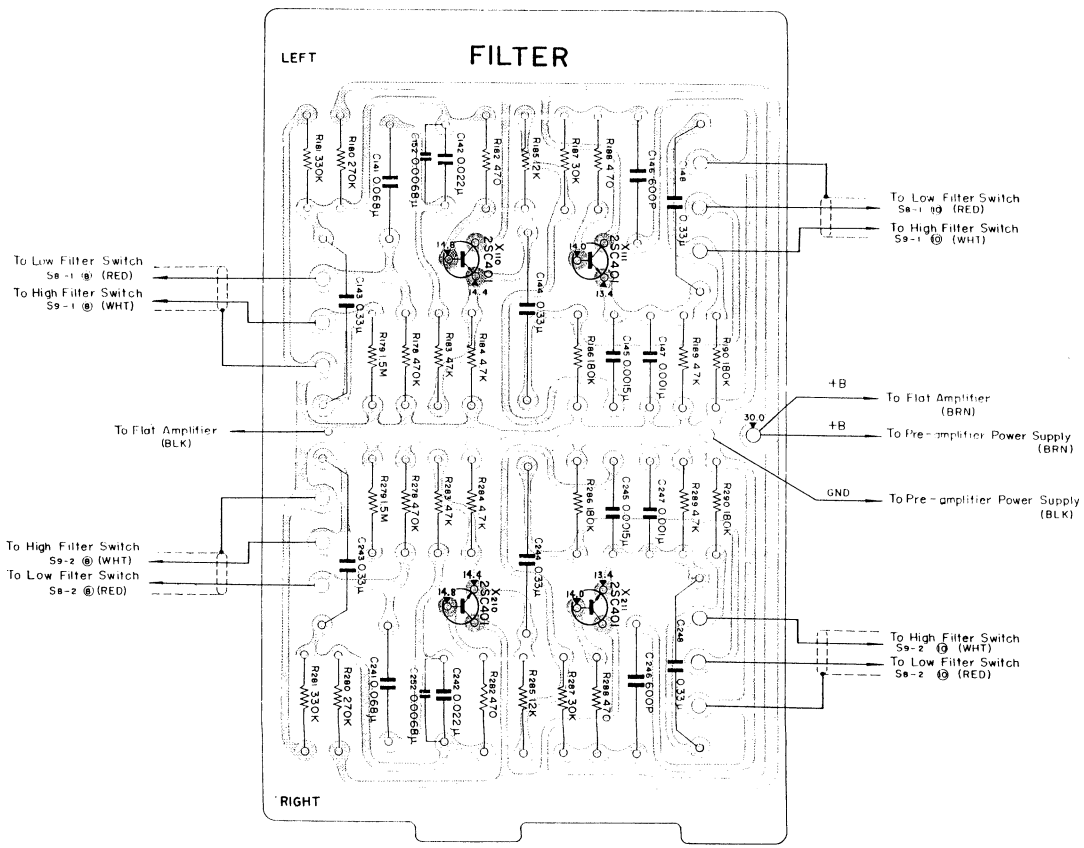
SONY part numbers are the exact designation for all parts used in SONY equipment.

Filter Amplifier

— Components Side —



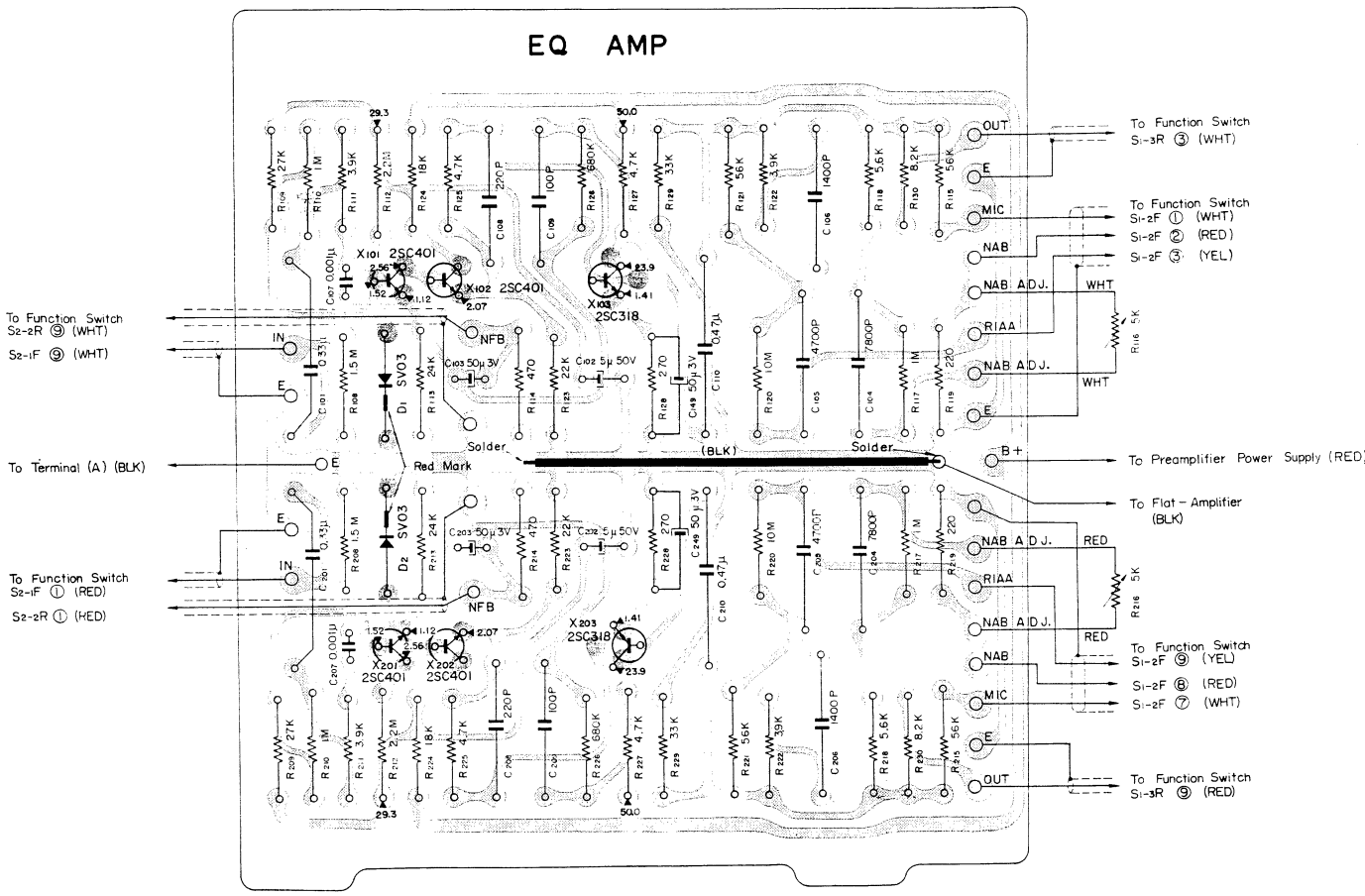
— Conductor Side —



C152,252 are mounted on conductor side.

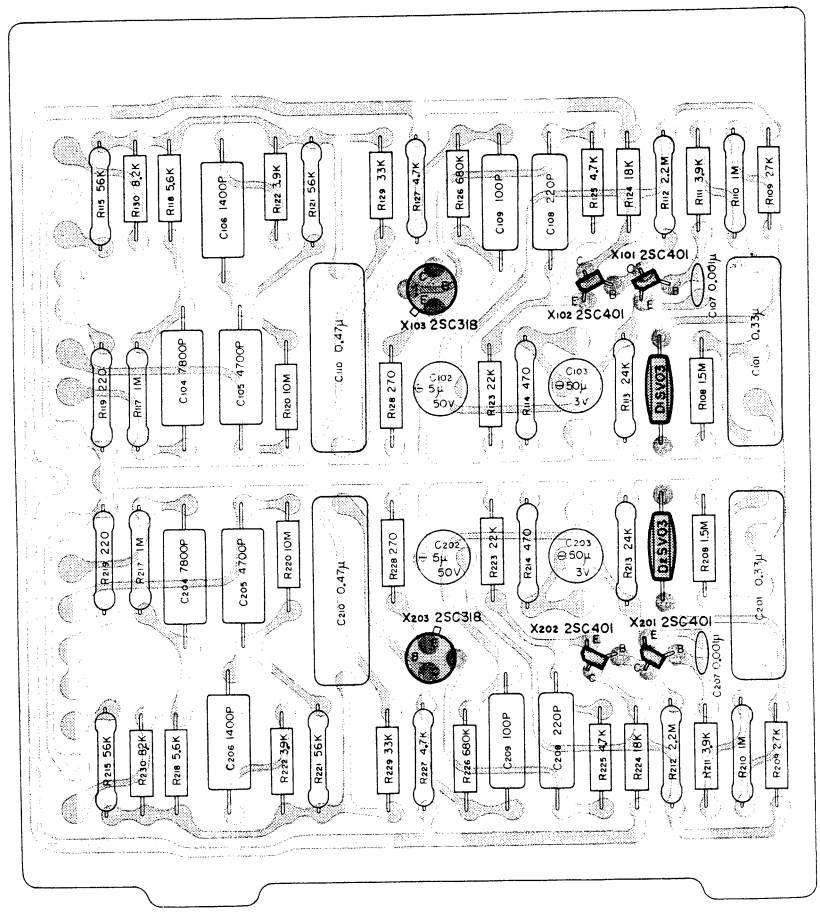
Equalizer Amplifier

— Conductor Side —



C149, 249 are mounted on conductor side.

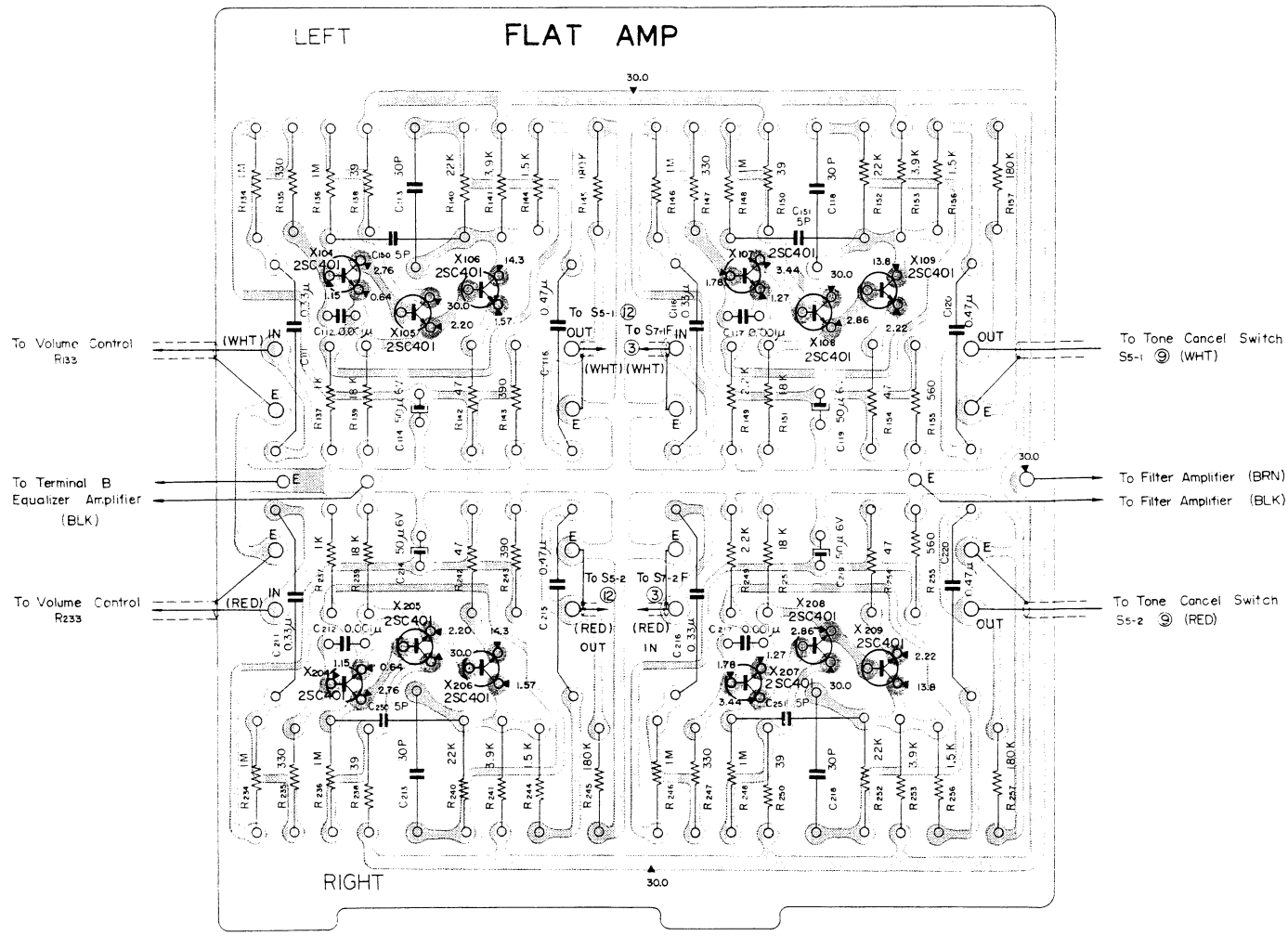
— Components Side —



Flat Amplifier

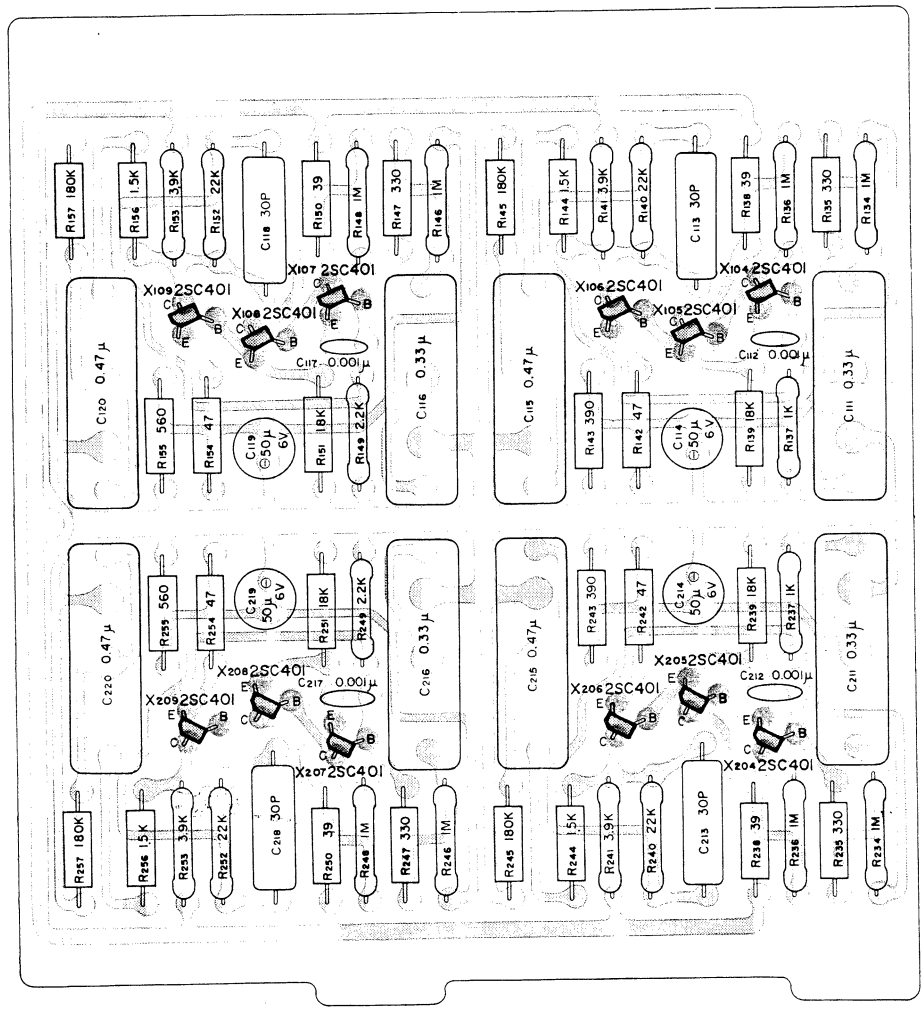
1-20299-20

— Conductor Side —



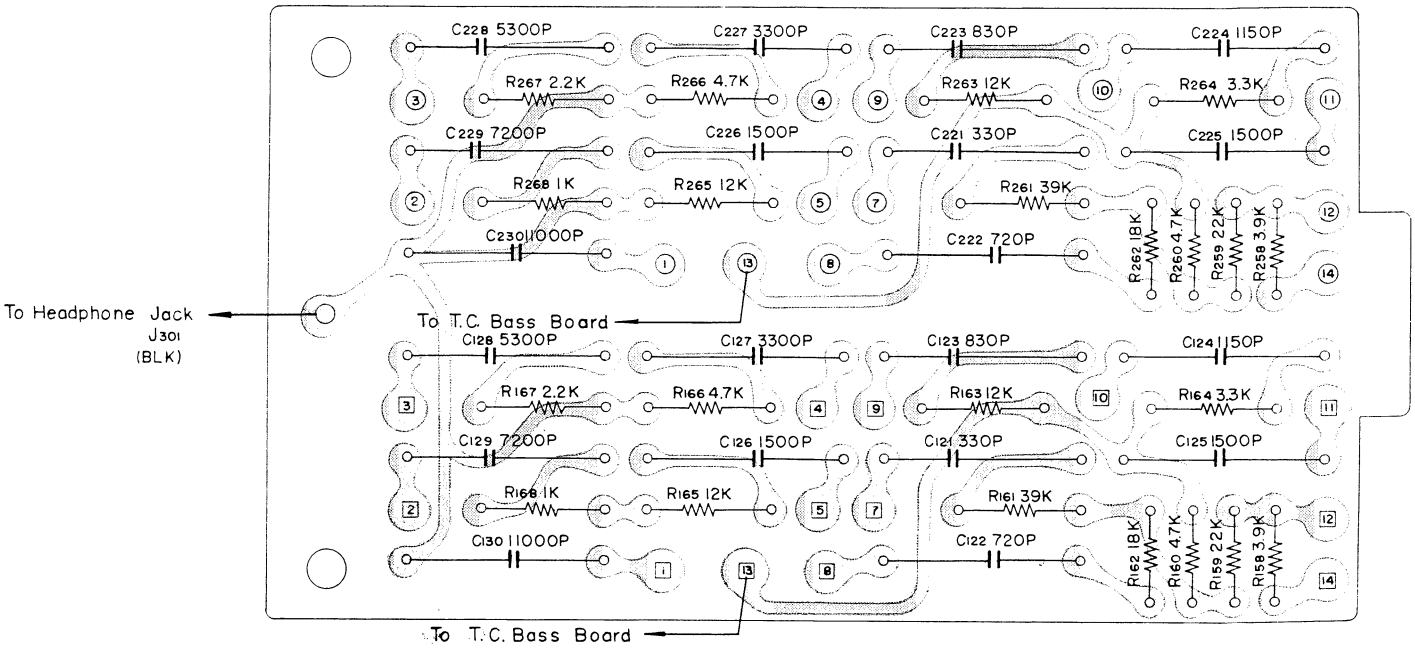
C150, 151, 250 & 251 are mounted on conductor side

— Components Side —



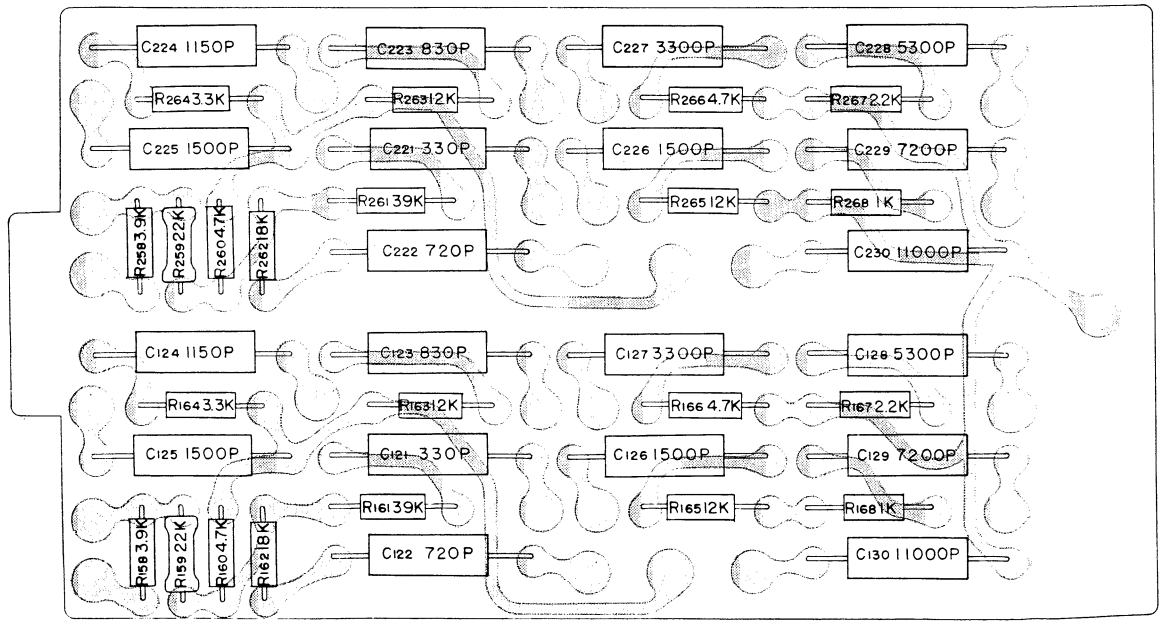
Tone Control - Treble -

— Conductor Side —



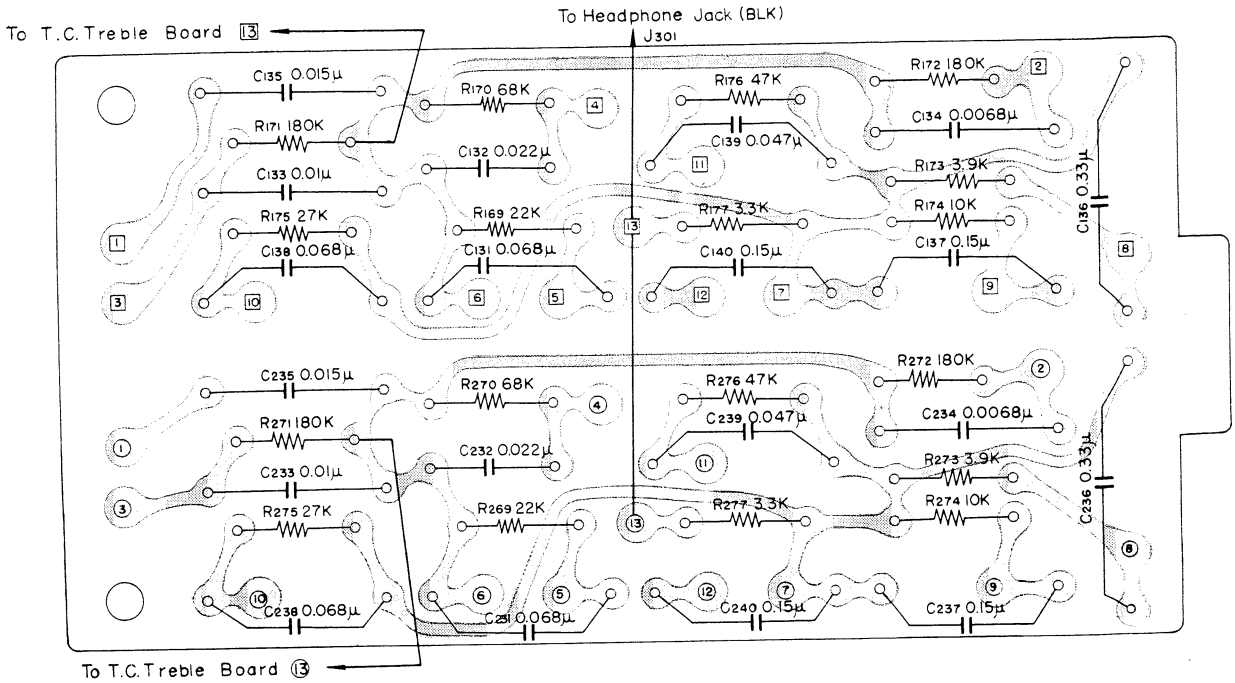
No	Connecting to	Color	No	Connecting to	Color
①	S6 - 2F ①	GRAY	1	S6 - 1F ①	GRAY
②	〃 ②	WHT/BLK	2	〃 ②	WHT/BLK
③	〃 ③	RED	3	〃 ③	RED
④	〃 ④	VIOL	4	〃 ④	VIOL
⑤	〃 ⑤	ORG	5	〃 ⑤	ORG
⑦	S6 - 2R ⑦	BRN	7	S6 - 1R ⑦	BRN
⑧	〃 ⑧	YEL	8	〃 ⑧	YEL
⑨	〃 ⑨	WHT/VIOL	9	〃 ⑨	WHT/VIOL
⑩	〃 ⑩	WHT	10	〃 ⑩	WHT
⑪	〃 ⑪	GRN	11	〃 ⑪	GRN
⑫	S6 - 2F ⑫	BLU	12	S6 - 1F ⑫	BLU
⑬	T.C. Bass Board	WHT/BRN	13	T.C. Bass Board	BRN
⑭	S6 - 2F ⑥	WHT/BLU	14	S6 - 1R ⑥	WHT/BLU

— Components Side —



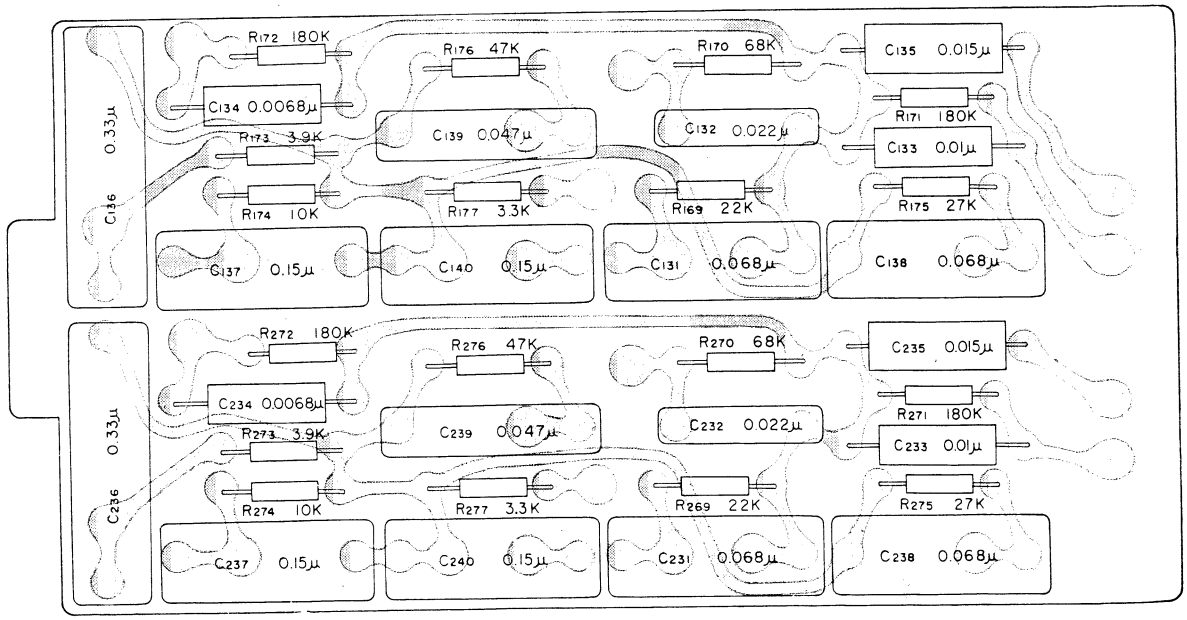
Tone Control - Bass -

— Conductor Side —



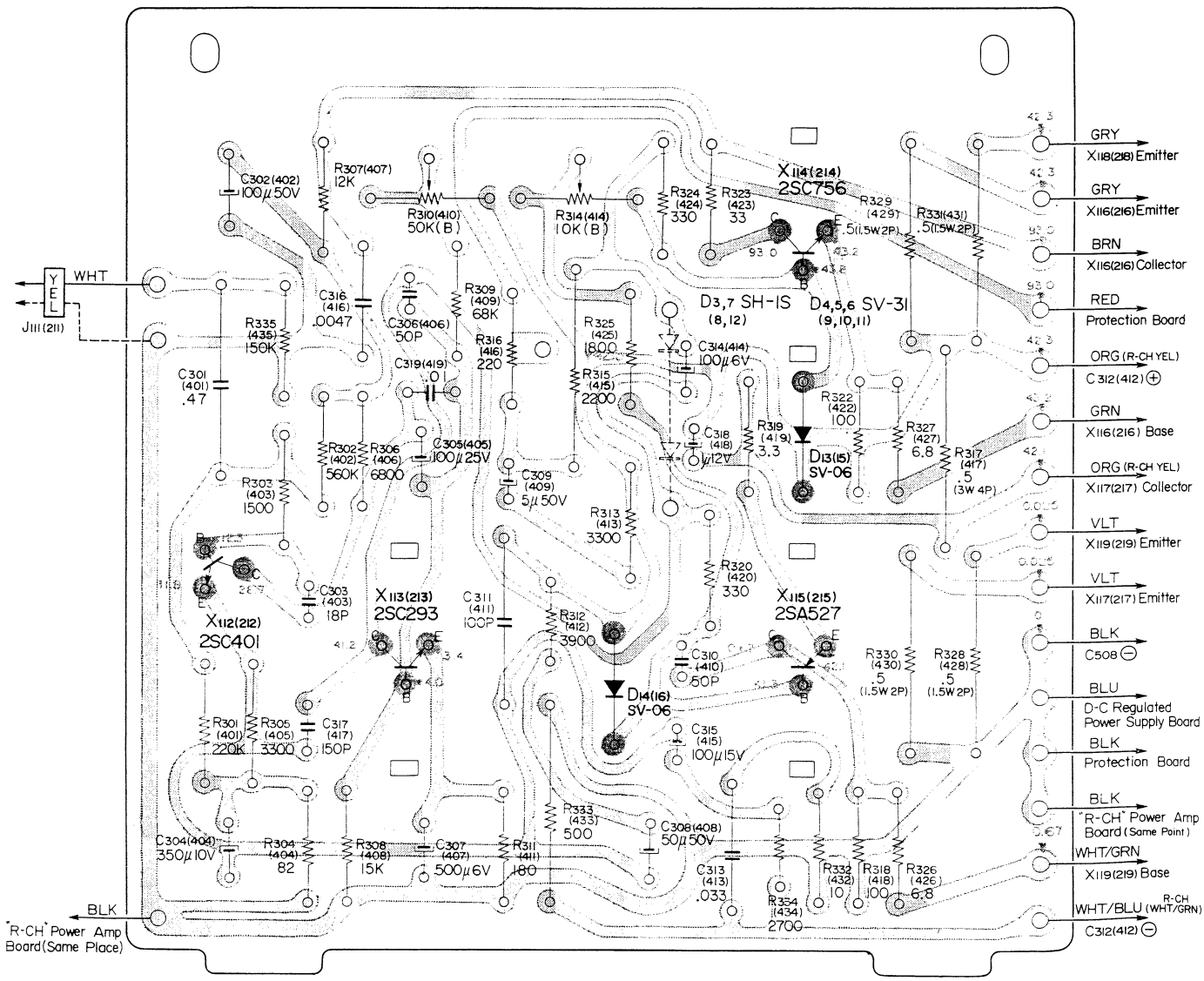
No	Connecting to	Color	No	Connecting to	Color
①	S7 - 2F ④	GRAY	1	S7 - 1F ④	GRAY
②	〃 ⑤	WHT/BLK	2	〃 ⑤	WHT/BLK
③	〃 ⑥	RED	3	〃 ⑥	RED
④	〃 ⑦	VIOL	4	〃 ⑦	VIOL
⑤	〃 ⑧	ORG	5	〃 ⑧	ORG
⑥	〃 ⑨	BLU	6	〃 ⑨	BLU
⑦	S7 - 2R ⑨	WHT/BLU	7	S7 - 1R ⑨	WHT/BLU
⑧	〃 ⑩	BRN	8	〃 ⑩	BRN
⑨	〃 ⑪	YEL	9	〃 ⑪	YEL
⑩	〃 ⑫	WHT/VIOL	10	〃 ⑫	WHT/VIOL
⑪	〃 ①	WHT	11	〃 ①	WHT
⑫	〃 ②	GRN	12	〃 ②	GRN
⑬	13	BLK	13	J301	BLK

— Components Side —



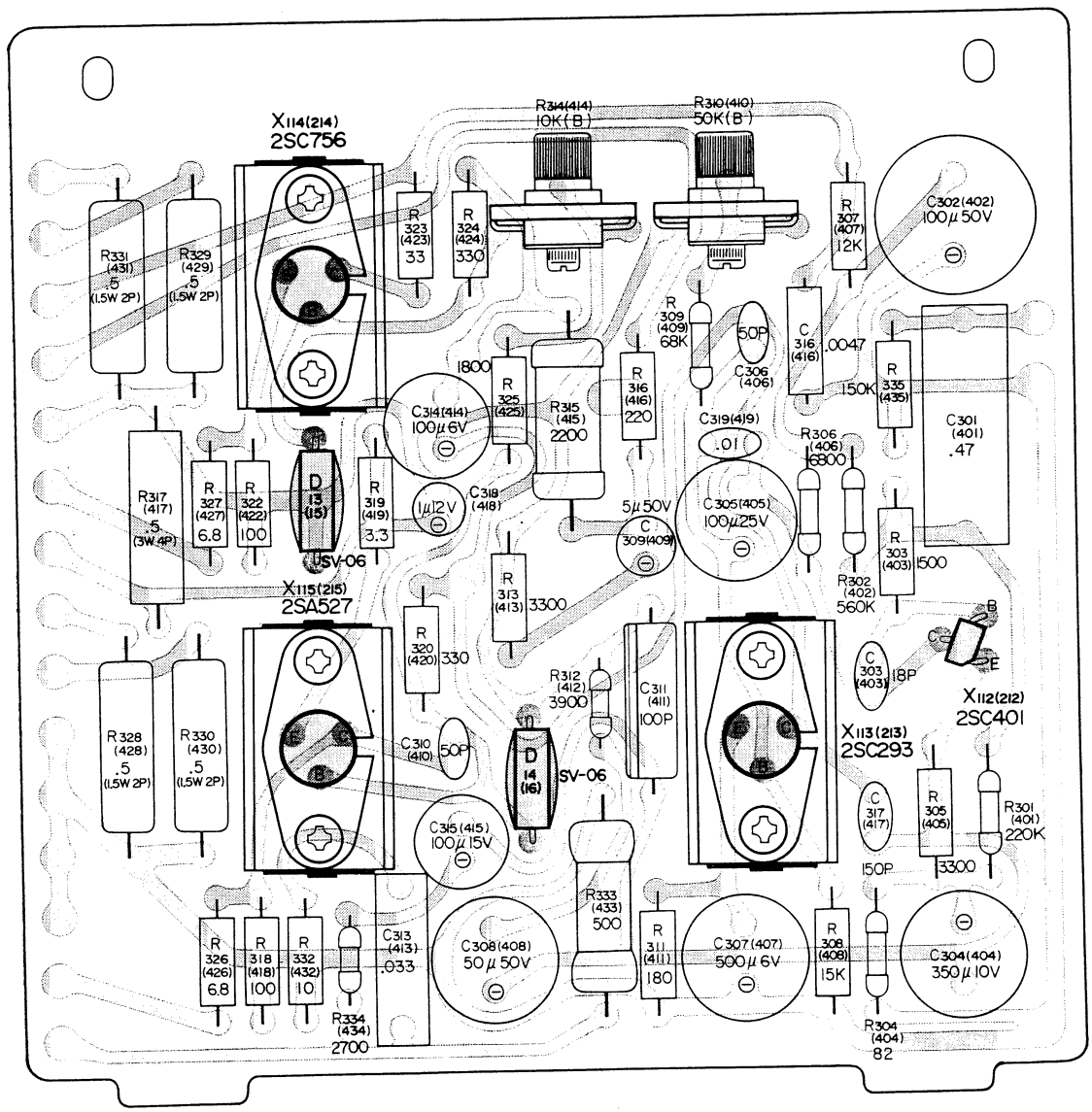
Power Amplifier

—Conductor Side—



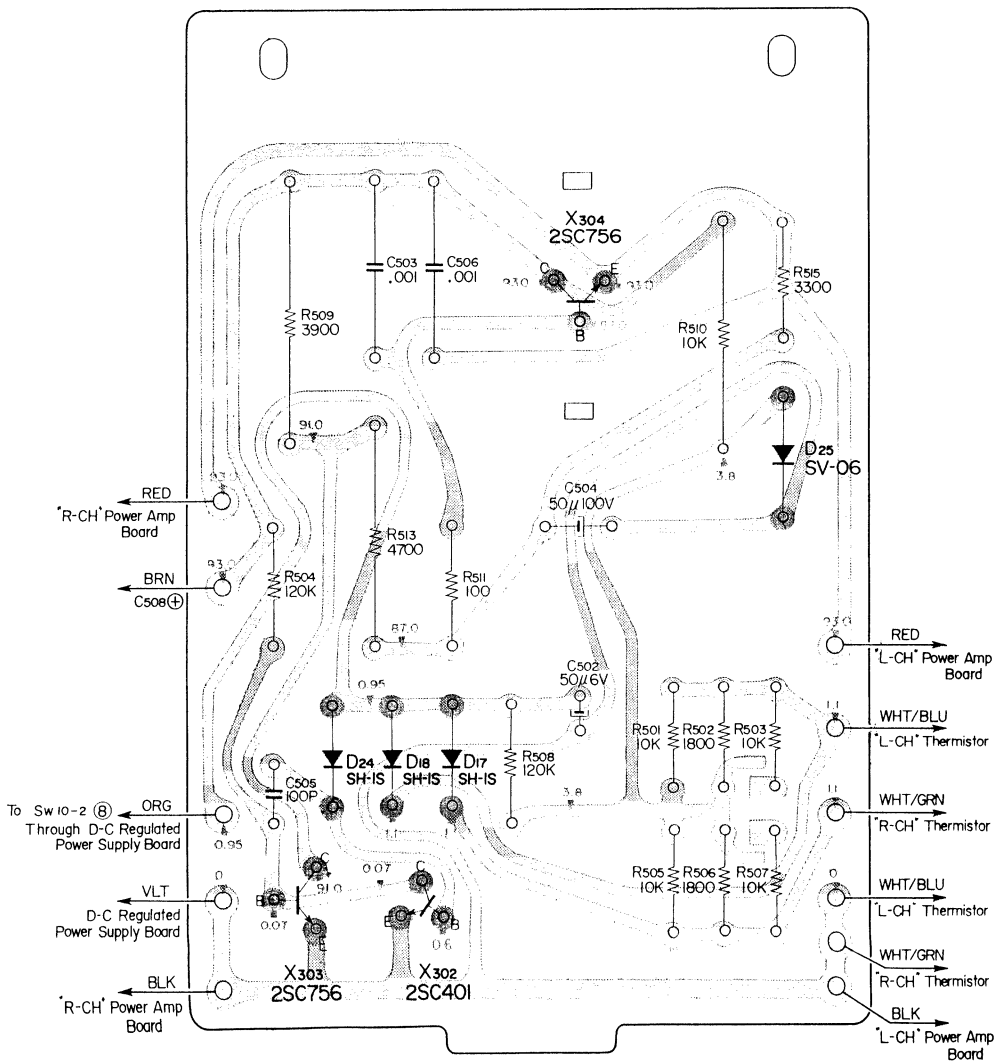
D_3 and D_7 (D_8 and D_{12}) are mounted on conductor side

—Components Side—

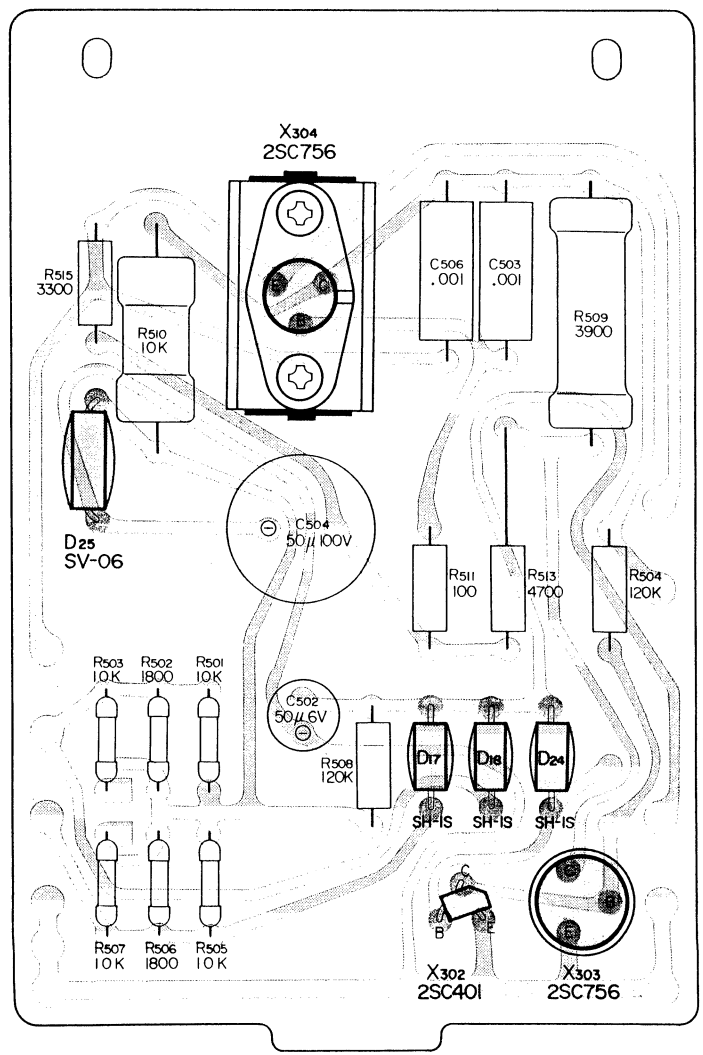


Protection Circuit

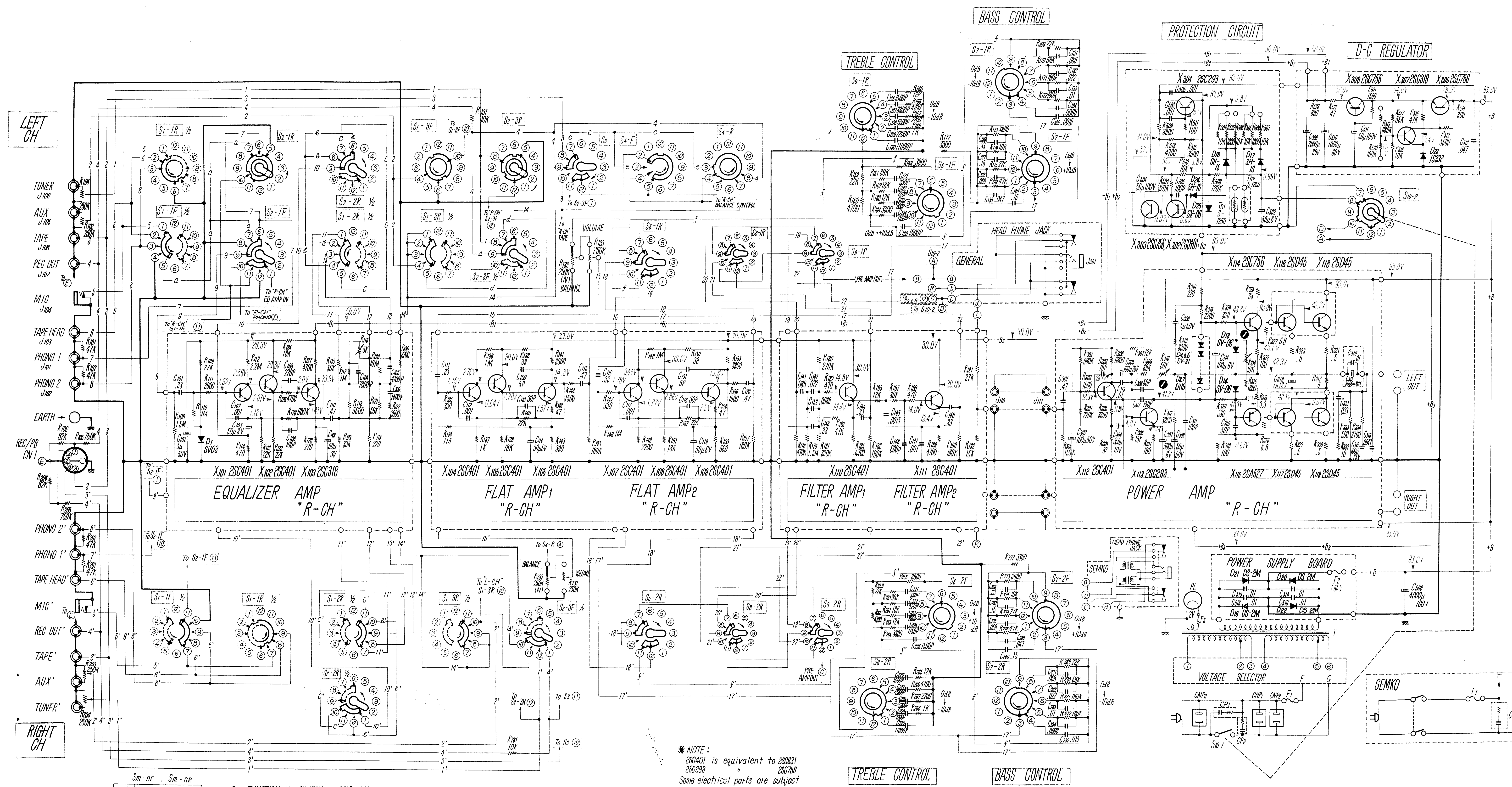
—Conductor Side—



—Components Side—



TA-1120 (A) SCHEMATIC DIAGRAM



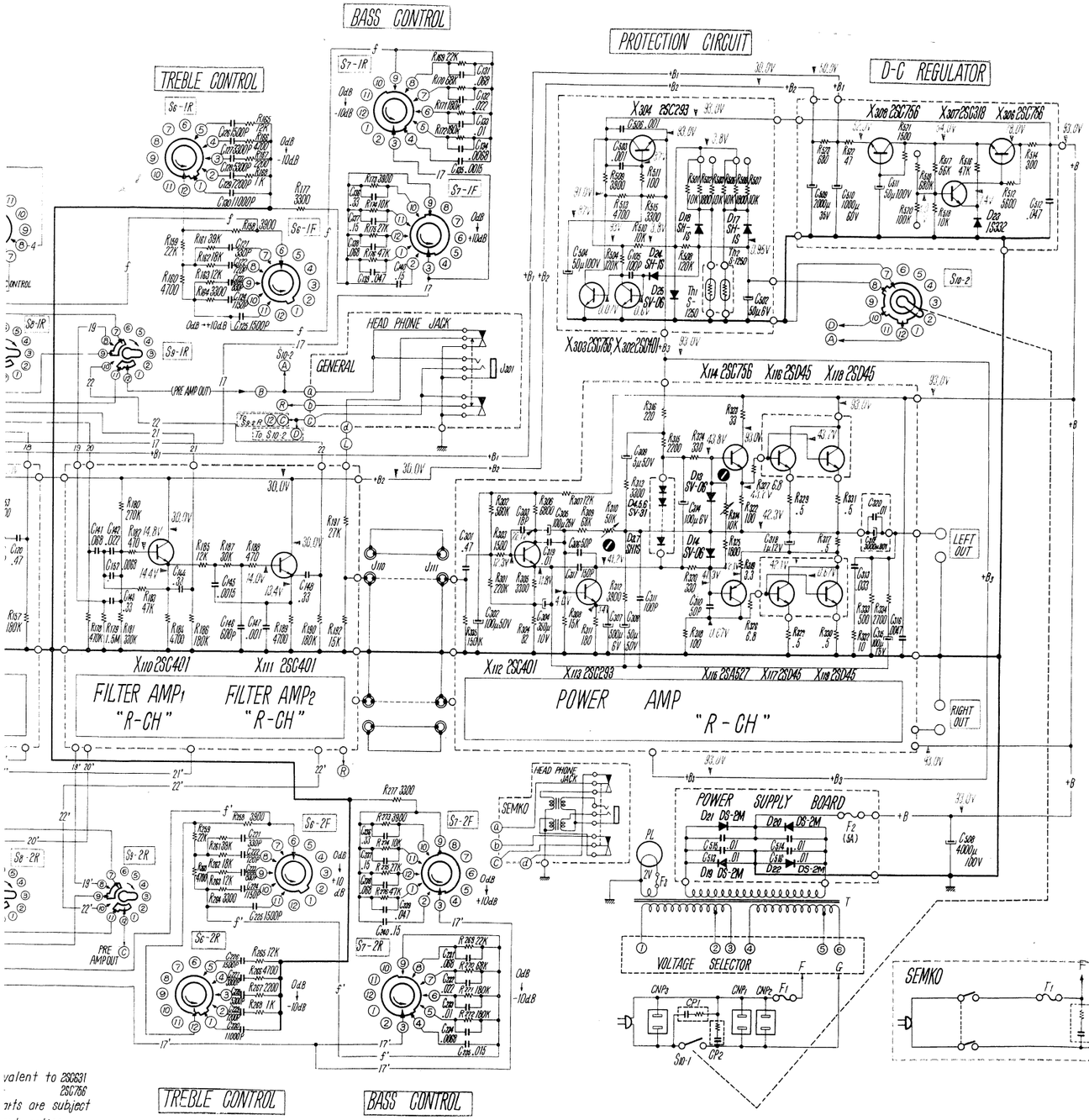
Sm-nF , Sm-nR	
M	SWITCH NUMBER
N	WAFER NUMBER
F	FRONT WAFER
R	REAR WAFER

S1 FUNCTION (1) SWITCH MIC POSITION
S2 FUNCTION (2) SWITCH PHONO 1 POSITION
S3 MONITOR SWITCH SOURCE POSITION
S4 MODE SWITCH REVERSE POSITION
S5 TONE CONTROL CANCEL SWITCH "**ON**" POSITION

S6 TREBLE CONTROL SWITCH -10dB POSITION
S7 BASS CONTROL SWITCH -10dB POSITION
S8 LOW FILTER SWITCH OFF POSITION
S9 HIGH FILTER SWITCH OFF POSITION
S10 POWER SWITCH OFF POSITION

※ NOTE;
2SC401 is equivalent to 2SC631
2SC293 " 2SC756
Some electrical parts are subject to change without notice.

※ All Voltages shown above were measured by VTVM at no signal. © 1968



valent to 2SC631
2SC786
arts are subject
out notice.

* All Voltages shown above were measured by VTVM at no signal. © 1968

Rotary Action Switch

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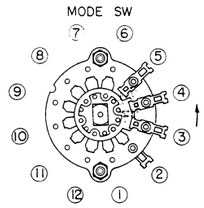
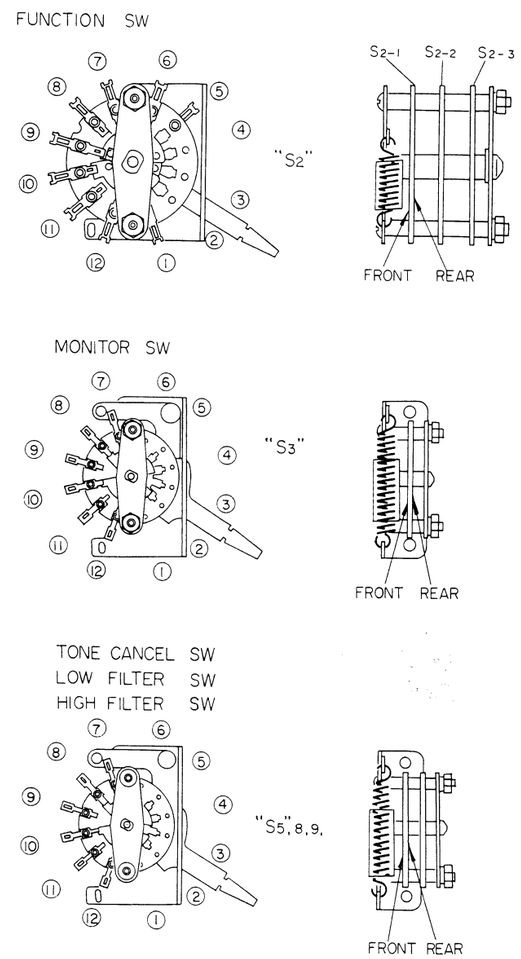


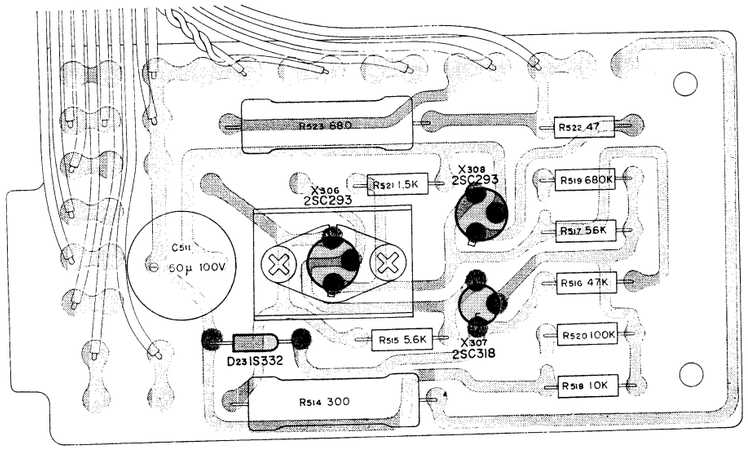
Lever Action Switch

Index

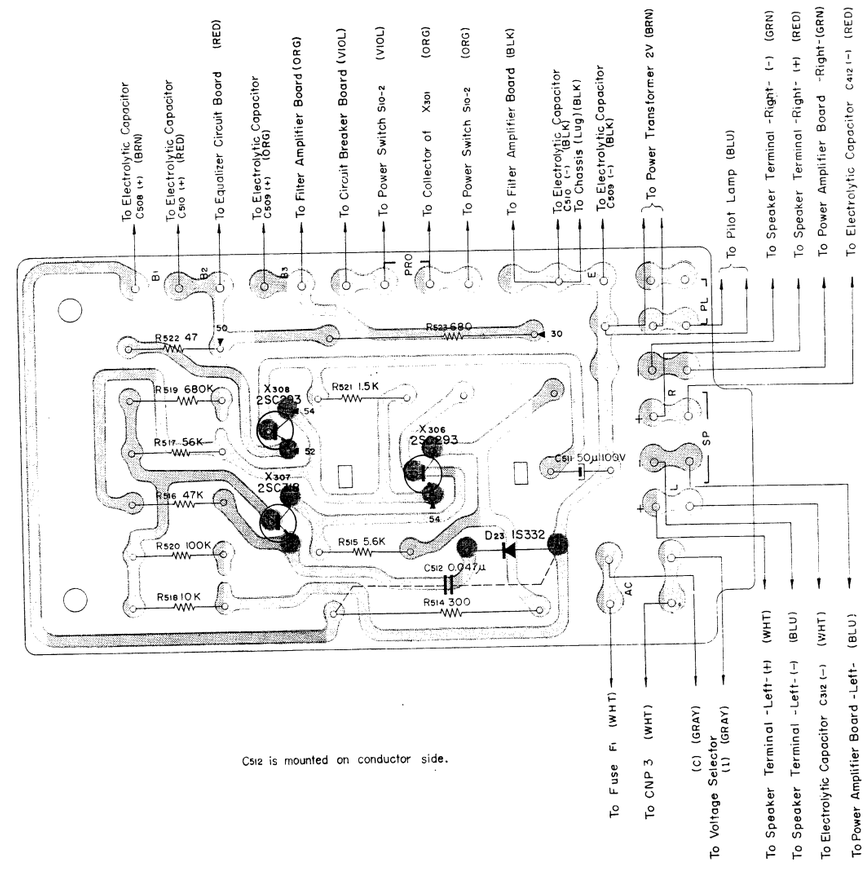


Regulated Power Supply

—Components Side—



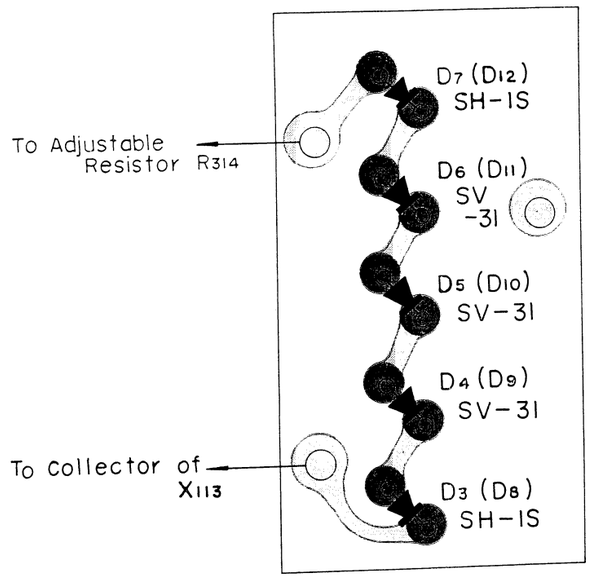
—Conductor Side—



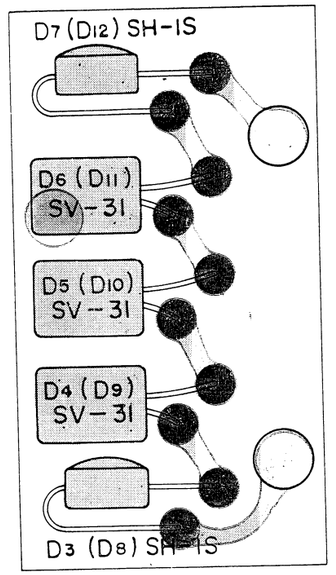
C512 is mounted on conductor side.

Thermo Compensation Diode

—Conductor Side—



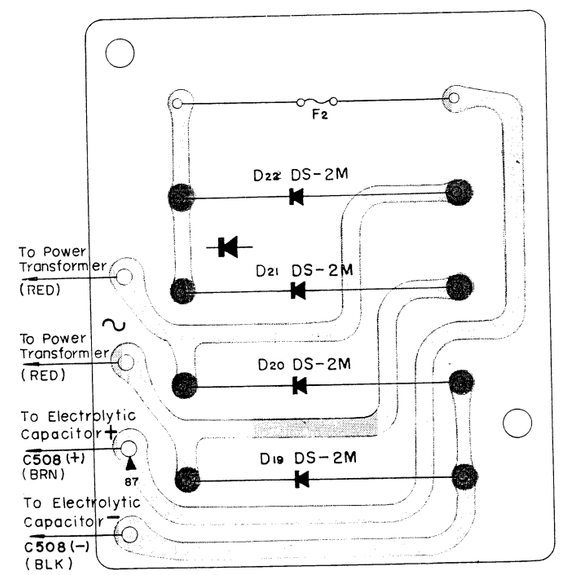
—Components Side—



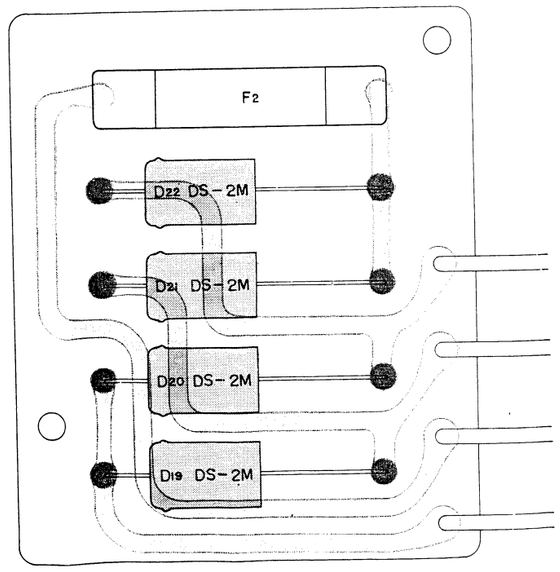
D3～7: Left Channel (CH1)
D8～12: Right Channel (CH2)

Power Supply Diode

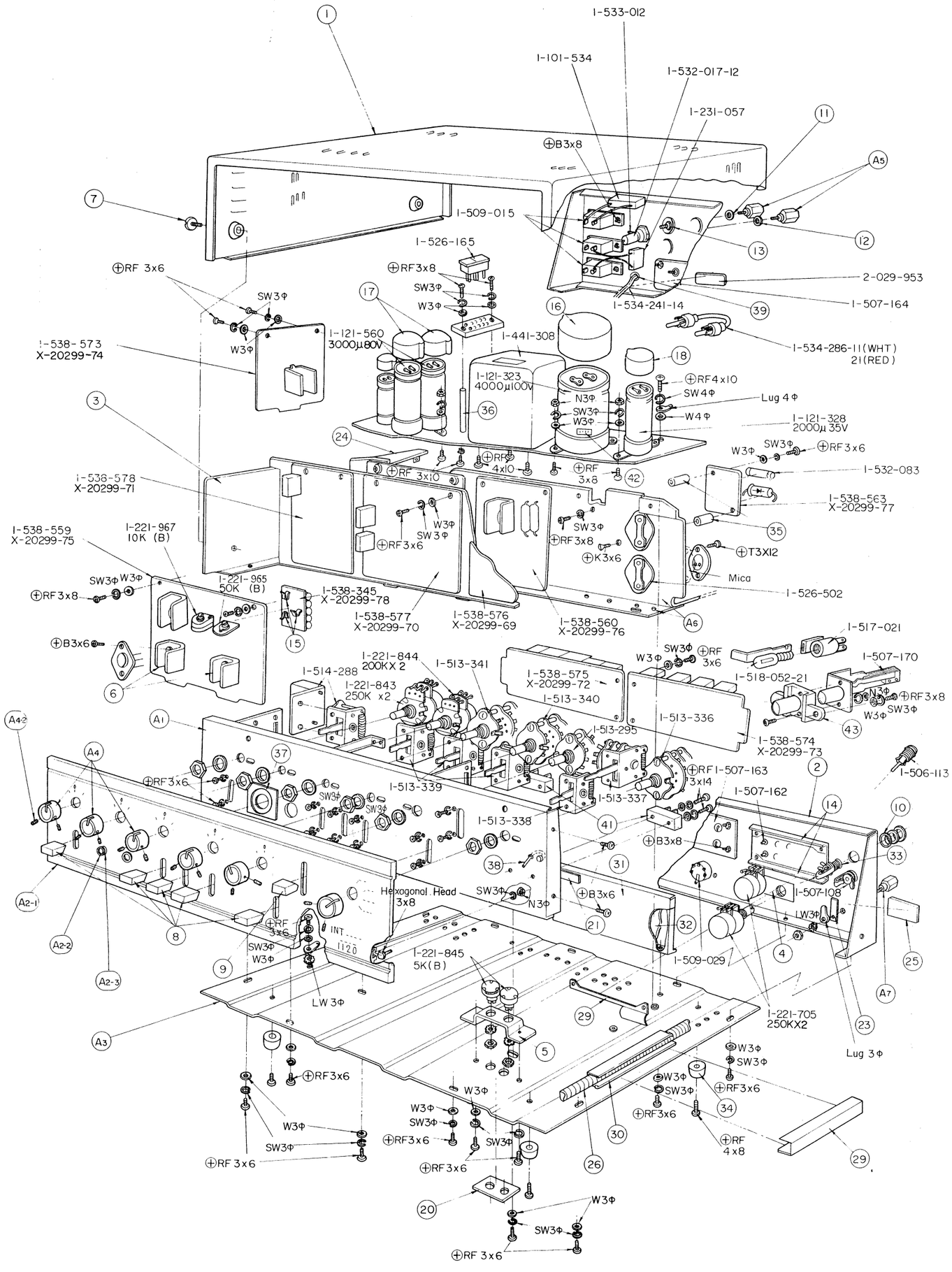
—Conductor Side—



—Components Side—



Exploded Diagram



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