

HiFi ENGINE®

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TA-4650

USA Model
(former and new types)

E Model

AEP Model



INTEGRATED STEREO AMPLIFIER

SPECIFICATIONS

GENERAL

System:	Power amplifier section: direct-coupled pure complementary symmetry circuitry Preamplifier: direct-coupled two-stage phono, flat and negative feed-back control circuitry
Power Requirements:	120 V ac, 60 Hz (USA model) 110, 127, 220 or 240 V ac, 50/60 Hz, adjustable (AEP, model) 100, 120, 220 or 240 V ac, 50/60 Hz, adjustable (E model)
Power Consumption:	270 W (by IEC Standard)
Dimensions:	approx. 460(w) x 168(h) x 323(d) mm, 18 ¹ / ₈ x 6 ⁵ / ₈ x 12 ³ / ₄ inches (AEP model) 430(w) x 168(h) x 323(d) mm, 16 ⁷ / ₈ x 6 ⁵ / ₈ x 12 ³ / ₄ inches (E, USA model) including projecting parts and controls
Weight:	approx. 12.4 kg, 27 lb 5 oz (AEP model) in net 11.5 kg, 25 lb 6 oz (E, USA model) 15.2 kg, 33 lb 8 oz with shipping carton (AEP model) 13.6 kg, 30 lb (E, USA model)

Dynamic Power Output: (IHF constant power supply method)	100 W (8 Ω) 90 W (4 Ω)
Power Bandwidth (IHF):	5 Hz – 70 kHz
Harmonic Distortion:	less than 0.1% at rated output less than 0.05% at 1 W output
Intermodulation (IM) Distortion: (60 Hz: 7 kHz = 4:1)	less than 0.1% at rated output less than 0.05% at 1 W output
Frequency Response: (at 1 W output)	2 Hz – 100 kHz \pm 2 dB
S/N ratio:	greater than 110 dB, short-circuited input
Residual Noise:	less than 0.005 μ W (8 Ω)
Damping Factor:	45 (8 Ω , at 1 kHz)
Inputs:	POWER INPUT sensitivity 1 V RMS (for rated output) impedance 50 k Ω
Outputs:	SPEAKER terminals A, B accept speakers of 4 Ω or more HEADPHONE jack accepts low-and high-impedance stereo headphones

POWER AMPLIFIER SECTION

Continuous RMS Power Output: (less than 0.1% THD, both channels driven simultaneously)	at 1 kHz 35 + 35 W (8 Ω) 30 + 30 W (4 Ω) at 20 – 20,000 Hz 30 + 30 W (8 Ω) according to DIN 45500 35 + 35 W
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(Continued on next page.)

SONY[®]

SERVICE MANUAL

PREAMPLIFIER SECTION

Harmonic Distortion: less than 0.05 % at rated output
Intermodulation (IM) Distortion: less than 0.05 % at rated output
 (60 Hz: 7 kHz = 4:1)
Frequency response: PHONO 1, 2 RIAA equalization ± 0.5 dB
 TUNER
 AUX 1, 2
 TAPE 1, 2
 REC/PB (input)
 EXT ADPT 1, 2 (input) } 10 Hz - 100 kHz $\begin{matrix} +0 \\ -2 \end{matrix}$ dB
Tone Controls: BASS:
 ± 10 dB at 50 Hz (TURNOVER 250 Hz)
 ± 10 dB at 100 Hz (TURNOVER 500 Hz)
 TREBLE:
 ± 10 dB at 10 kHz (TURNOVER 2.5 kHz)
 ± 10 dB at 20 kHz (TURNOVER 5 kHz)
Filters: LOW:
 6 dB/octave attenuation below 35 Hz
 HIGH:
 6 dB/octave attenuation above 6 kHz
Loudness Switch: +10 dB at 50 Hz
 (att. 30 dB) +3 dB at 10 kHz

Inputs

	Sensitivity	Impedance	Maximum input capability*	S/N (weighting network)
PHONO 1, 2	2.5 mV	50 k Ω	300 mV	greater than 70 dB (B)
AUX 1, 2 TAPE 1, 2 REC/PB (input) EXT ADPT 1, 2 (input)	150 mV	100 k Ω		greater than 90 dB (A)

* The maximum input capability is measured at a 0.05 % harmonic distortion.

Outputs

	Output voltage	Impedance
REC OUT 1, 2	150 mV	4.7 k Ω
PRE OUTPUT	1 V	3 k Ω
REC/PB	17 mV	82 k Ω
EXT ADPT 1, 2	150 mV	4.7 k Ω

Specification Label:

USA model

SONY®	INTEGRATED STEREO AMPLIFIER
	MODEL NO. TA-4650
	AC 120V 60Hz 130W
	SERIAL NO. _____
	MADE IN JAPAN

AEP model

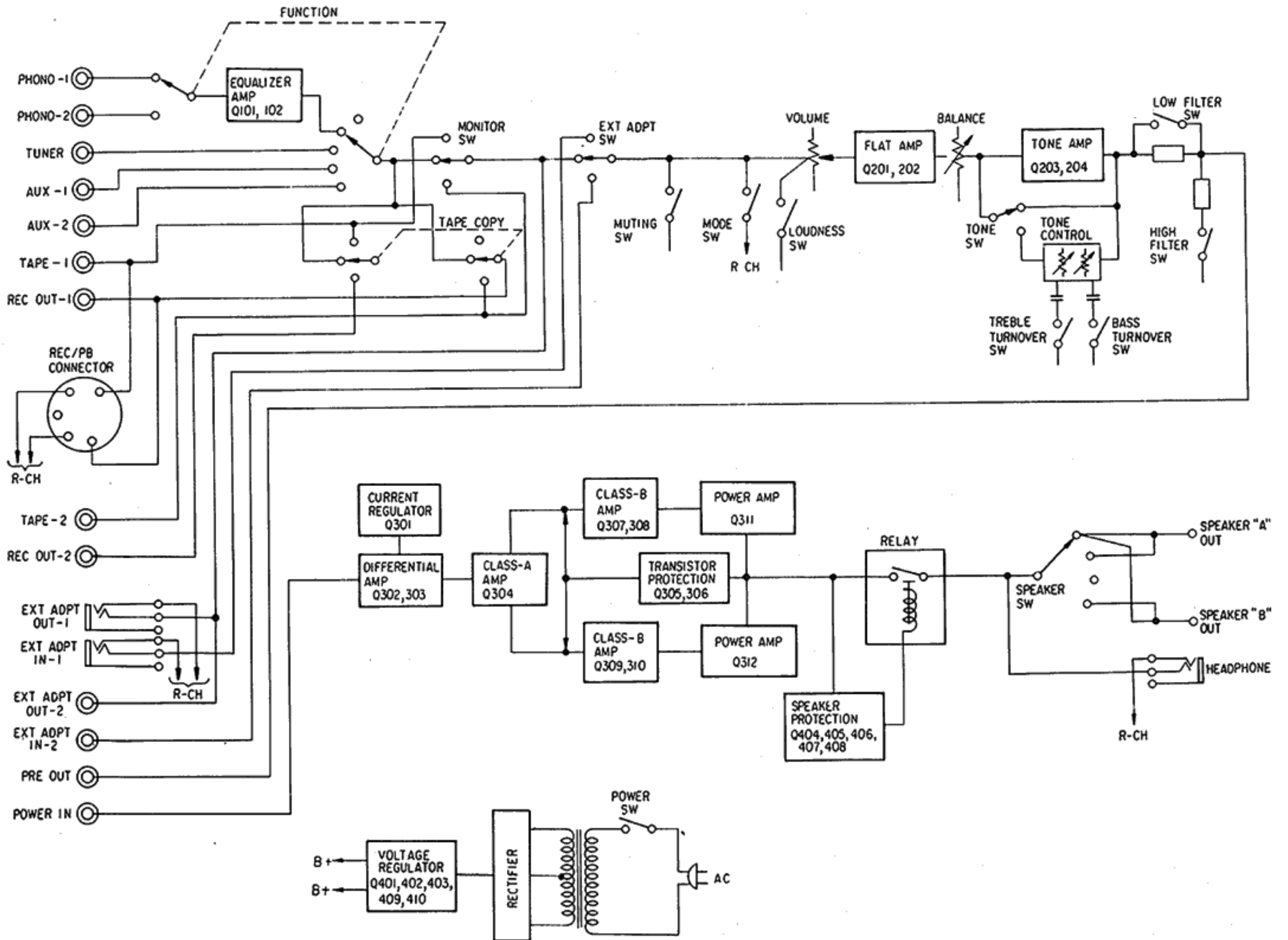
SONY®	INTEGRATED STEREO AMPLIFIER
	MODEL NO. TA-4650
	AC 110.127.220.240V~ 50/60Hz 270W
	SERIAL NO. _____
	MADE IN JAPAN

E model

SONY®	INTEGRATED STEREO AMPLIFIER
	MODEL NO. TA-4650
	AC 100.120.220.240V 50/60Hz 270W
	SERIAL NO. _____
	MADE IN JAPAN

SECTION 1 OUTLINE

1-1. BLOCK DIAGRAM



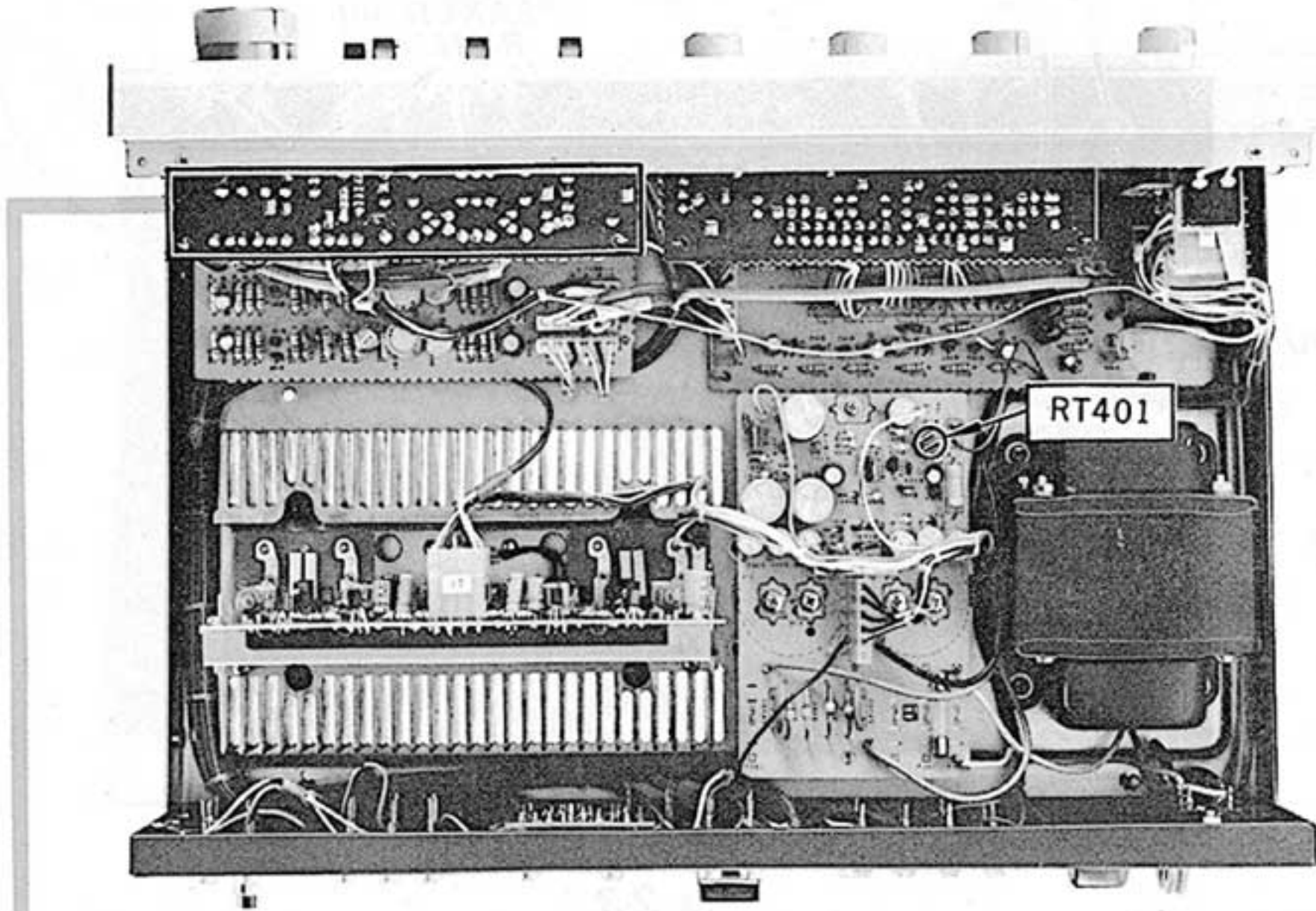
SECTION 2 ADJUSTMENTS

Note: Turn POWER on and allow about three minutes for warm-up.

2-1. POWER SUPPLY VOLTAGE ADJUSTMENT

See Fig. 2-1 and 2-2.

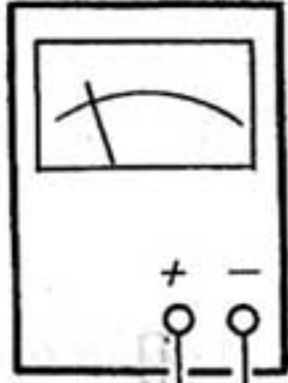
*B (volume control)
board*



Adjust RT401 for
20 V reading on the
meter with no signal
input.

Fig. 2-1.

dc voltmeter



To ground of amp (TA-4650)

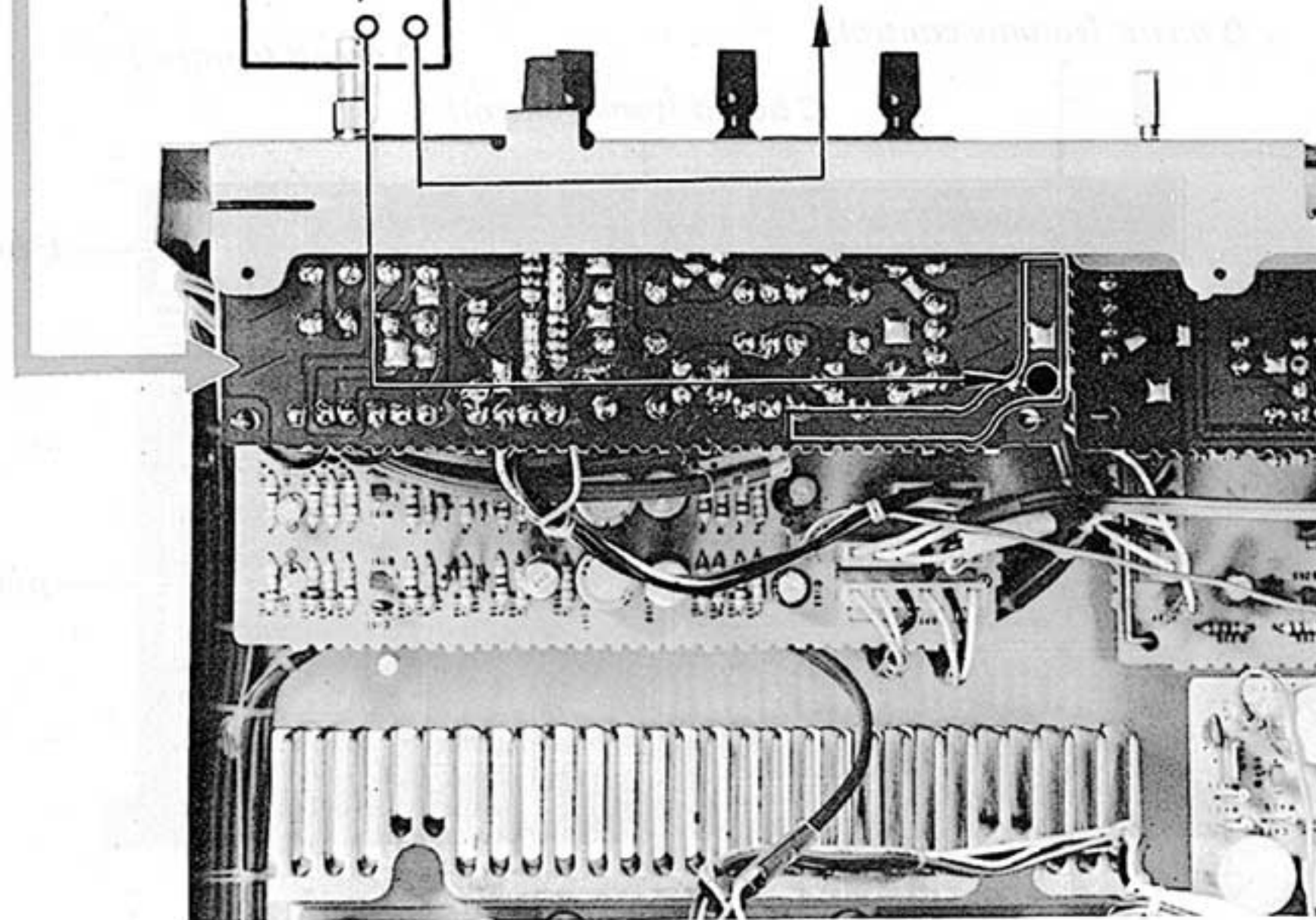


Fig. 2-2.

2-2. DC BIAS ADJUSTMENT

Adjust RT301 and RT351 for 75 mV reading on the meter with no signal input.

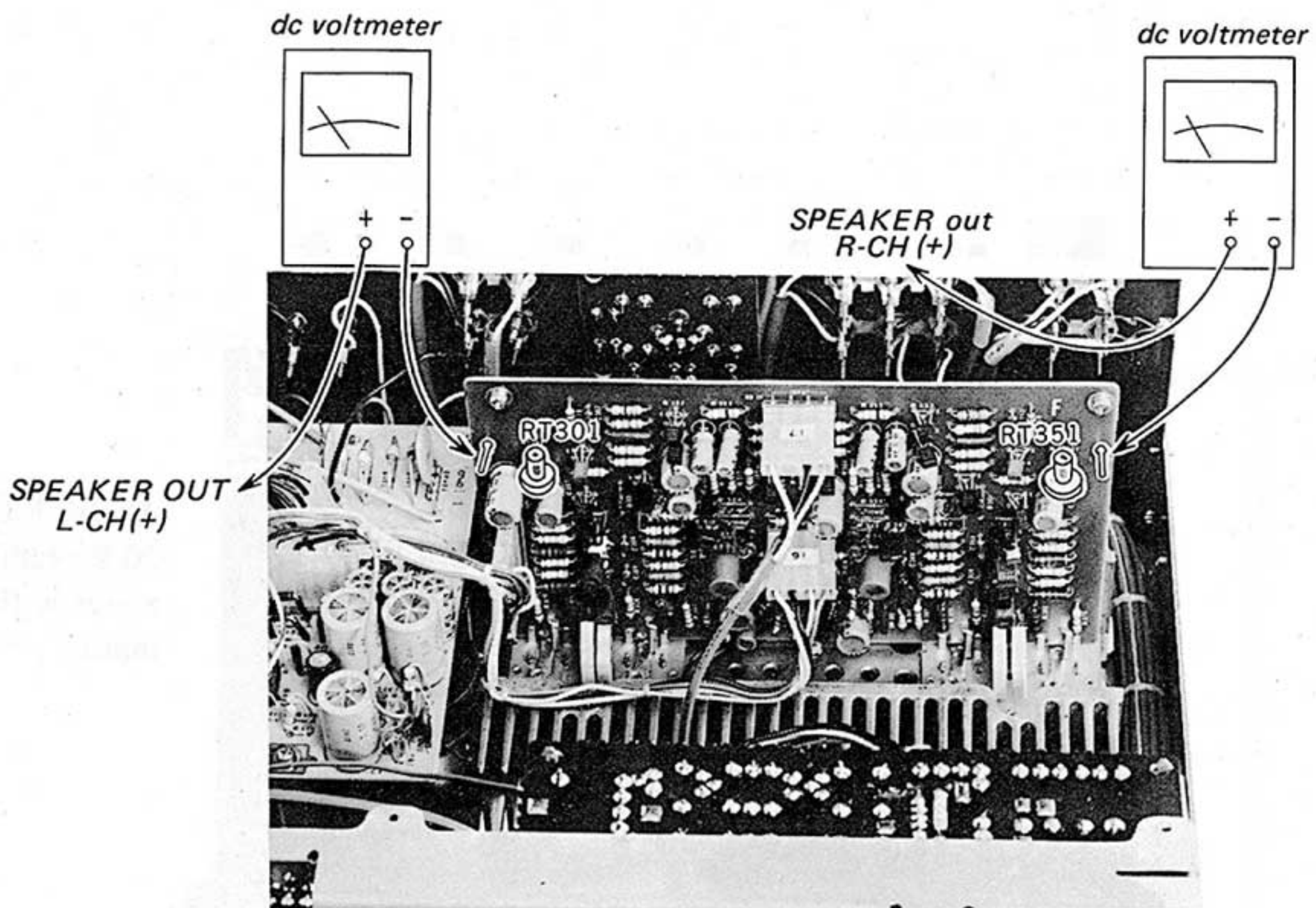
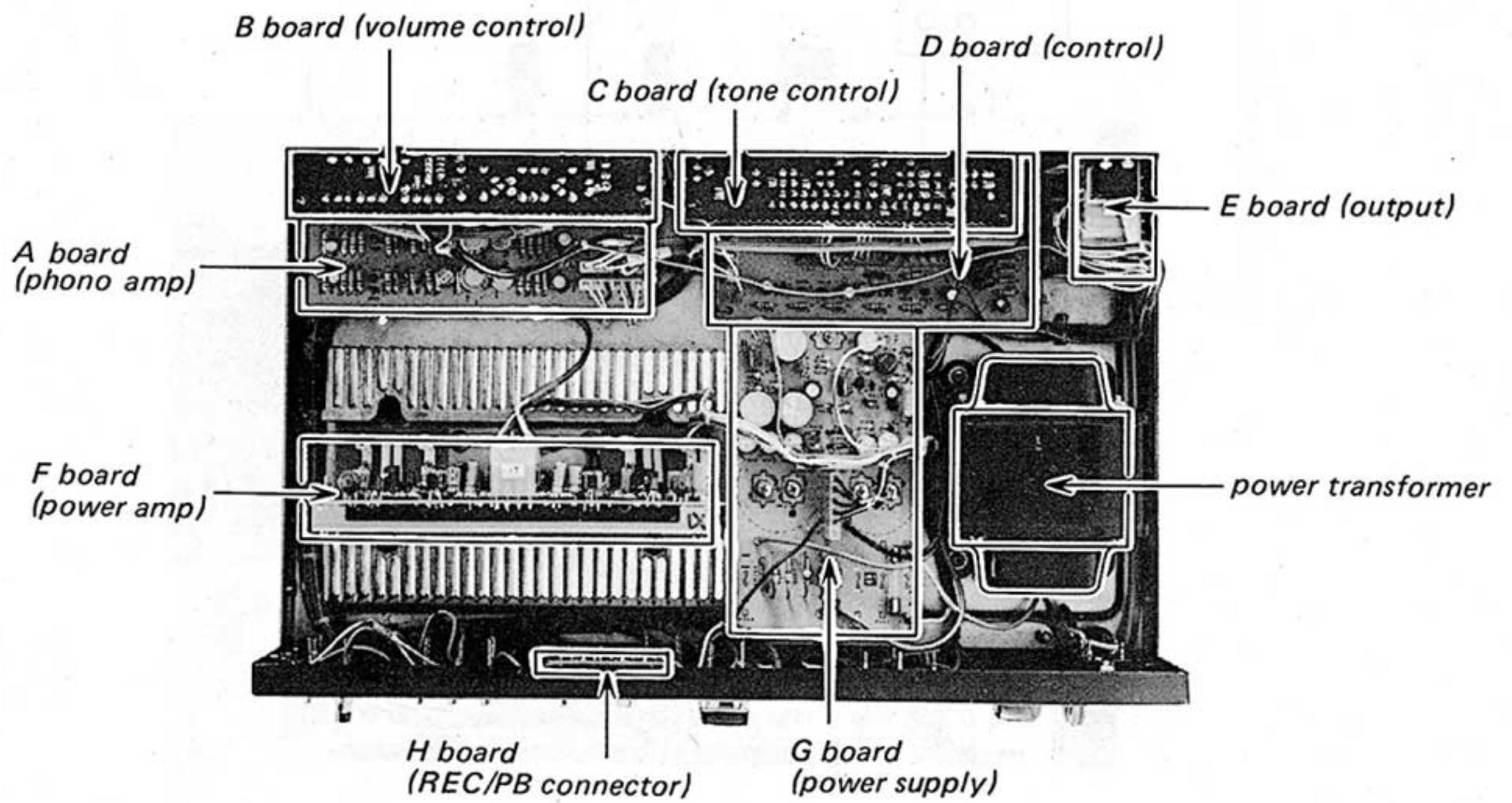


Fig. 2-3.

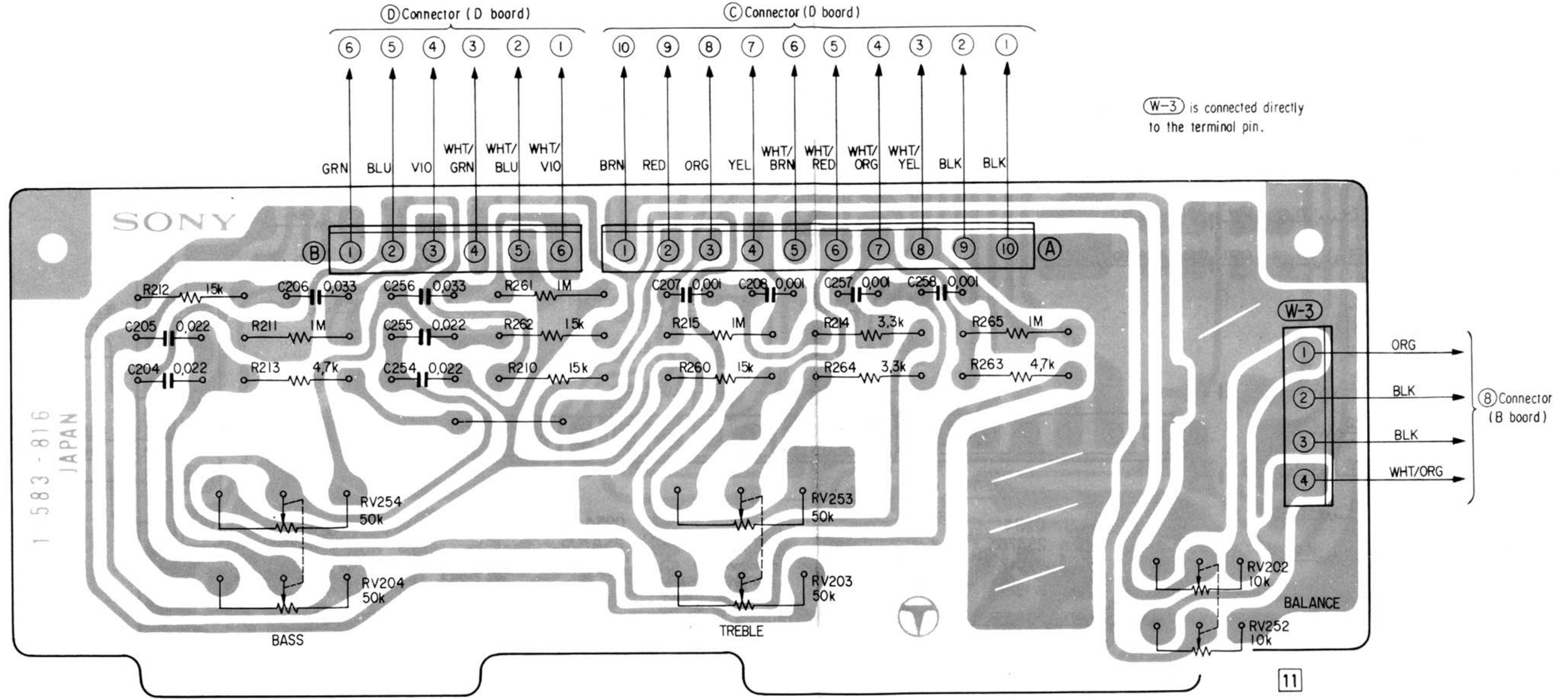
2-3. CHASSIS LAYOUT



MEMO

SECTION 3 DIAGRAMS

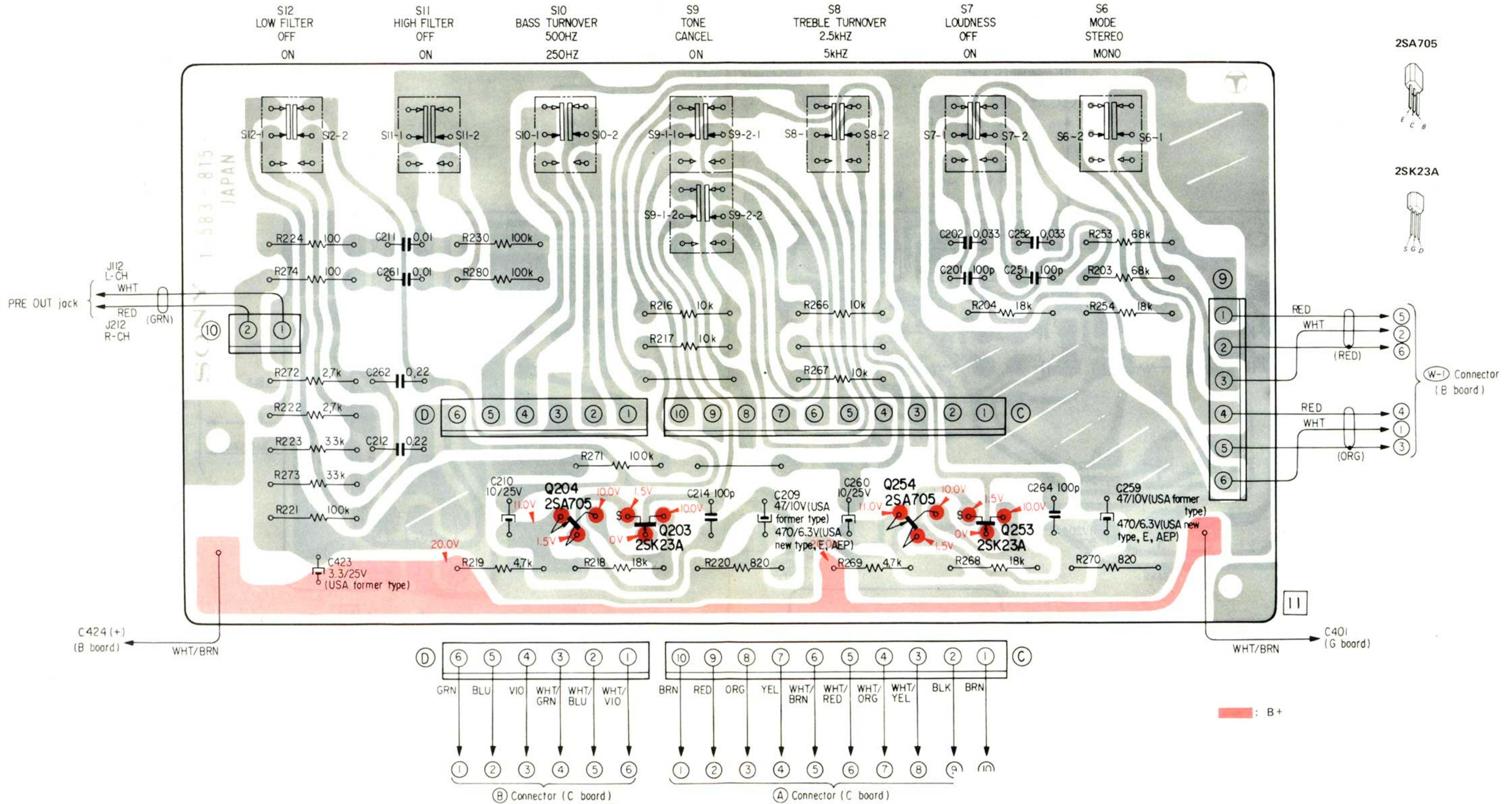
3-1. MOUNTING DIAGRAM – C Board (tone control) –



Note: The lead wires of connector (W-3) should wire-wrap the terminal pins of connector (8) on B board.

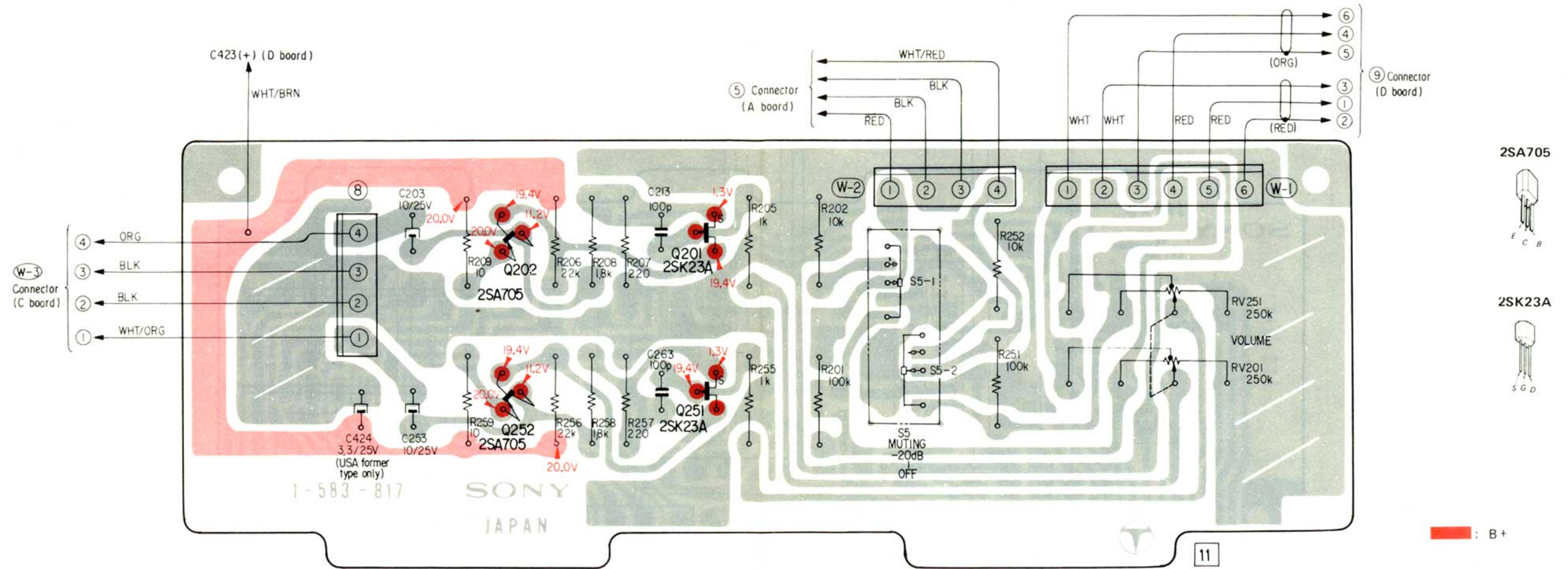
3-2. MOUNTING DIAGRAM - D Board (control) -

- Conductor Side -



3-3. MOUNTING DIAGRAM – B Board (volume control) –

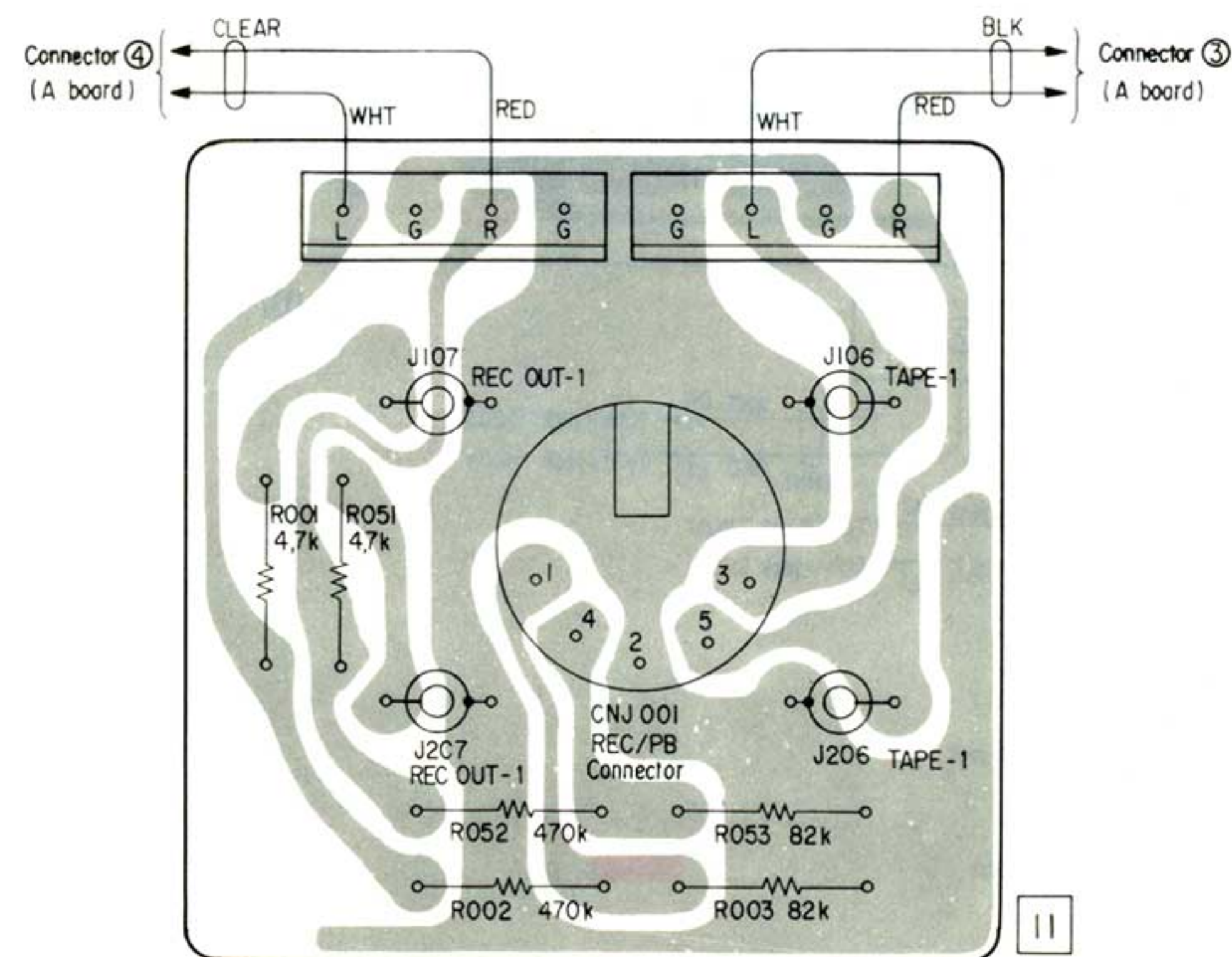
– Conductor Side –



Note: The lead wires of connectors (W-1) - (W-2) should wire-wrap the terminal pins of connectors (5) (A board) and (9) (D board), respectively.

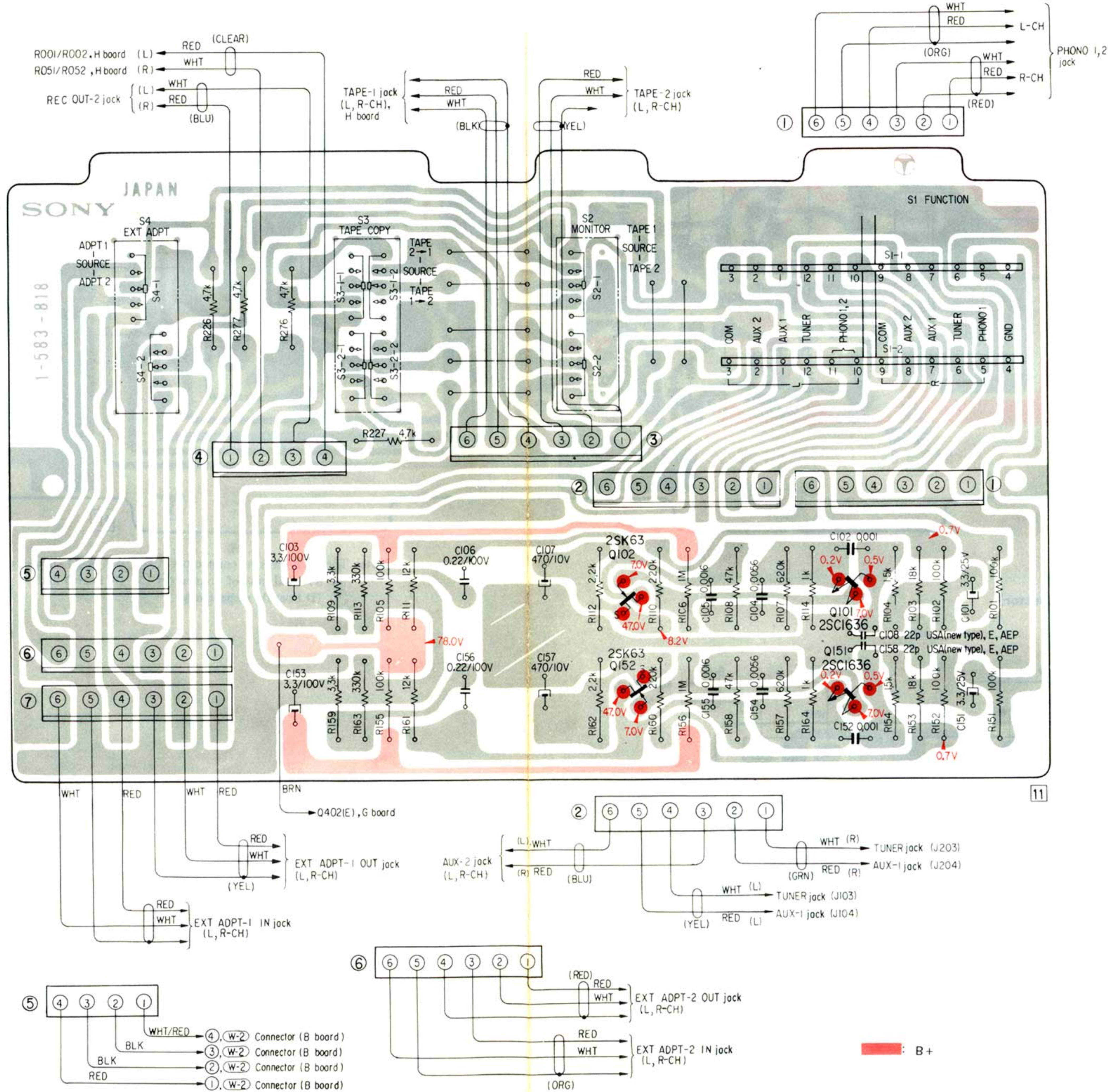
3-4. MOUNTING DIAGRAM – H Board (REC/PB connector)

– Conductor Side –

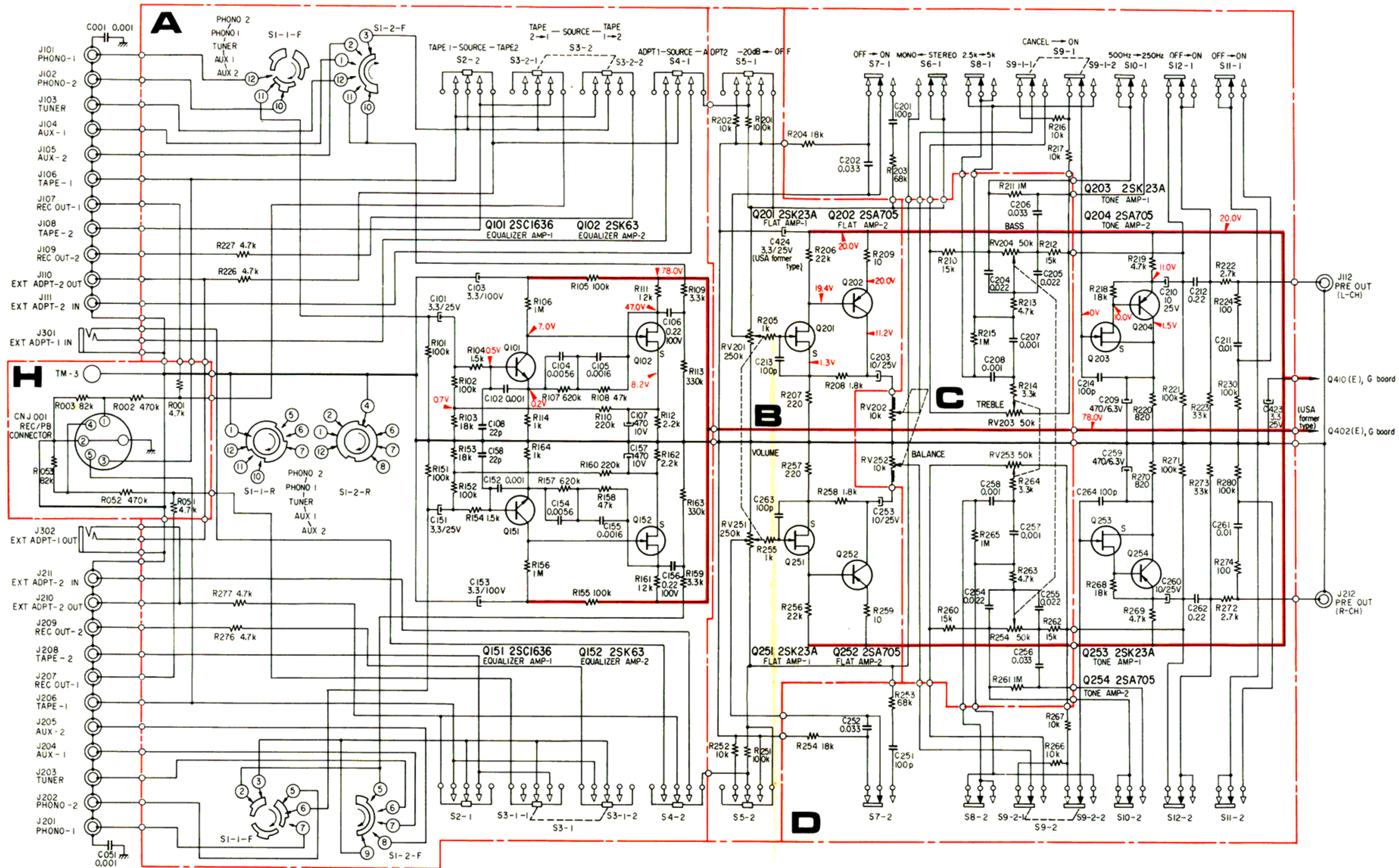


3-5. MOUNTING DIAGRAM — A Board (phono amp) —

— Conductor Side —



3-6. SCHEMATIC DIAGRAM — Preamplifier Section —

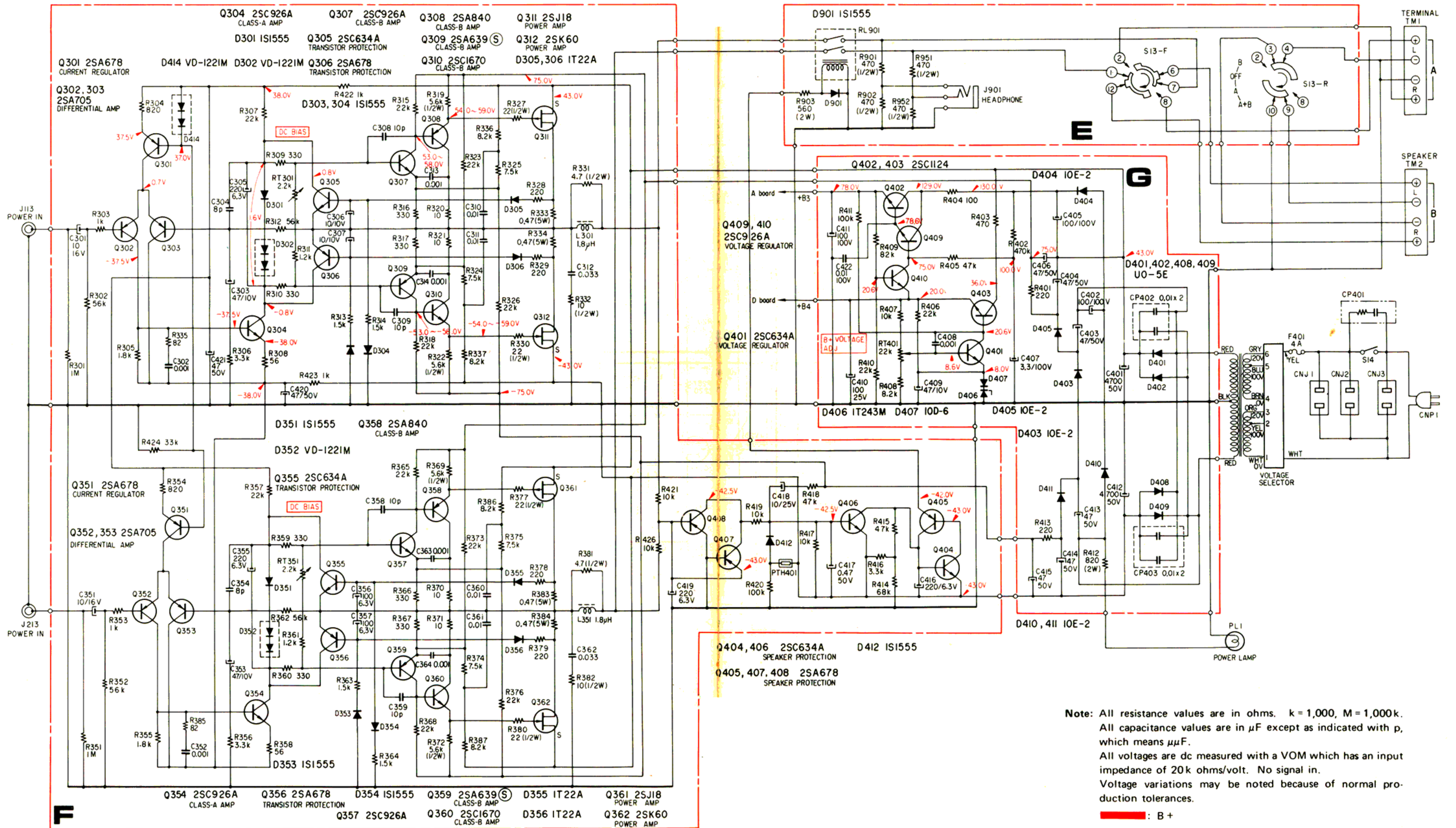


- | | |
|--------------------------------|------------------------------|
| S1--- FUNCTION (PHONO - 2) | S9--- TONE (CANCEL) |
| S2--- MONITOR (SOURCE) | S10--- BASS TURNOVER (500Hz) |
| S3--- TAPE COPY (SOURCE) | S11--- HIGH FILTER (OFF) |
| S4--- EXT ADPT (SOURCE) | S12--- LOW FILTER (OFF) |
| S5--- MUTING (OFF) | |
| S6--- MODE (STEREO) | |
| S7--- LOUDNESS (OFF) | |
| S8--- TREBLE TURNOVER (2.5kHz) | |

Note: All resistance values are in ohms. k = 1,000, M = 1,000k.
 All capacitance values are in μ F except as indicated with p, which means μ F.
 All voltages are dc measured with a VOM which has an input impedance of 20k ohms/volt. No signal in.
 Voltage variations may be noted because of normal production tolerances.

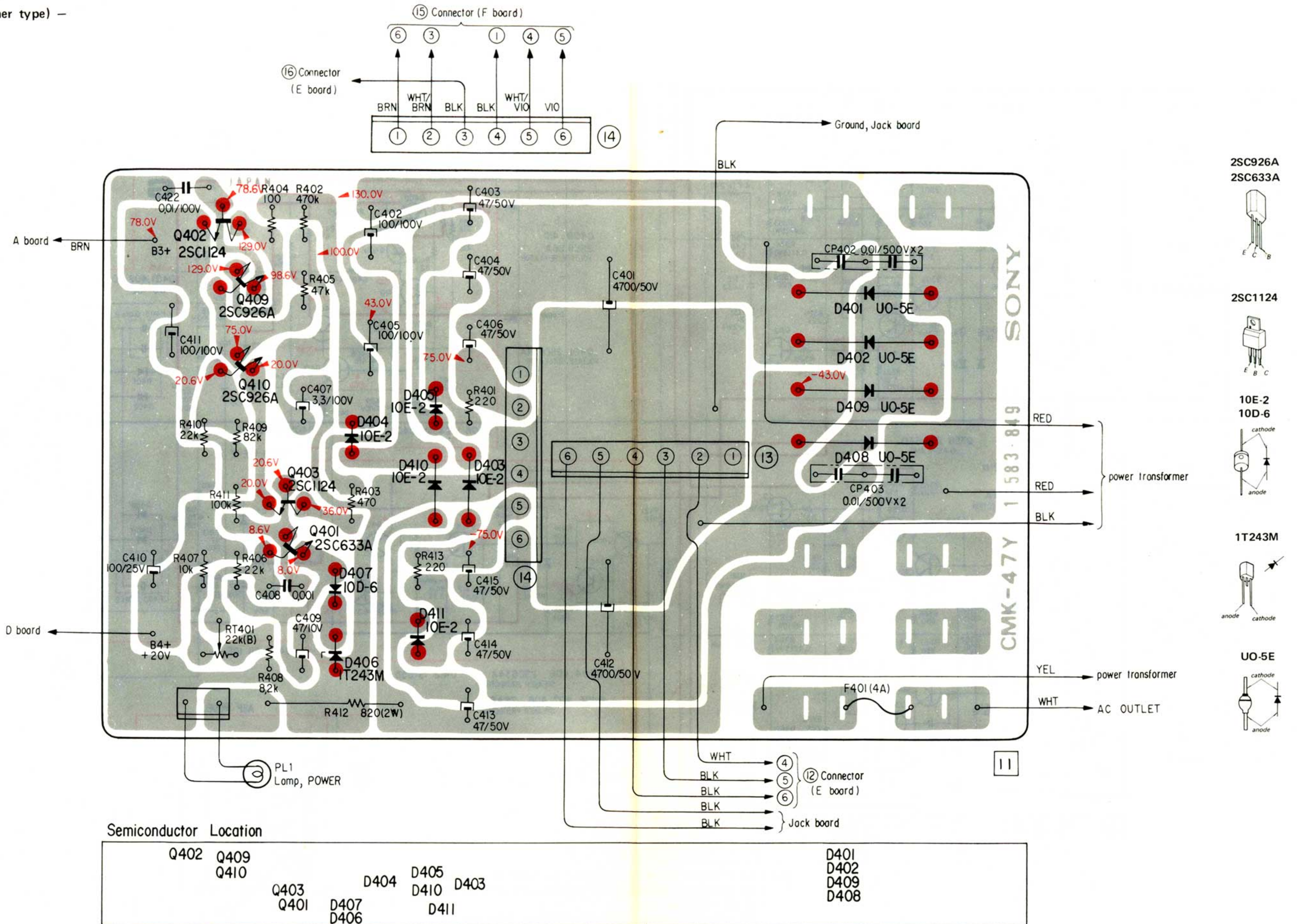
■ : B +

3-7. SCHEMATIC DIAGRAM – Power Amplifier Section –
– USA model (former type) –

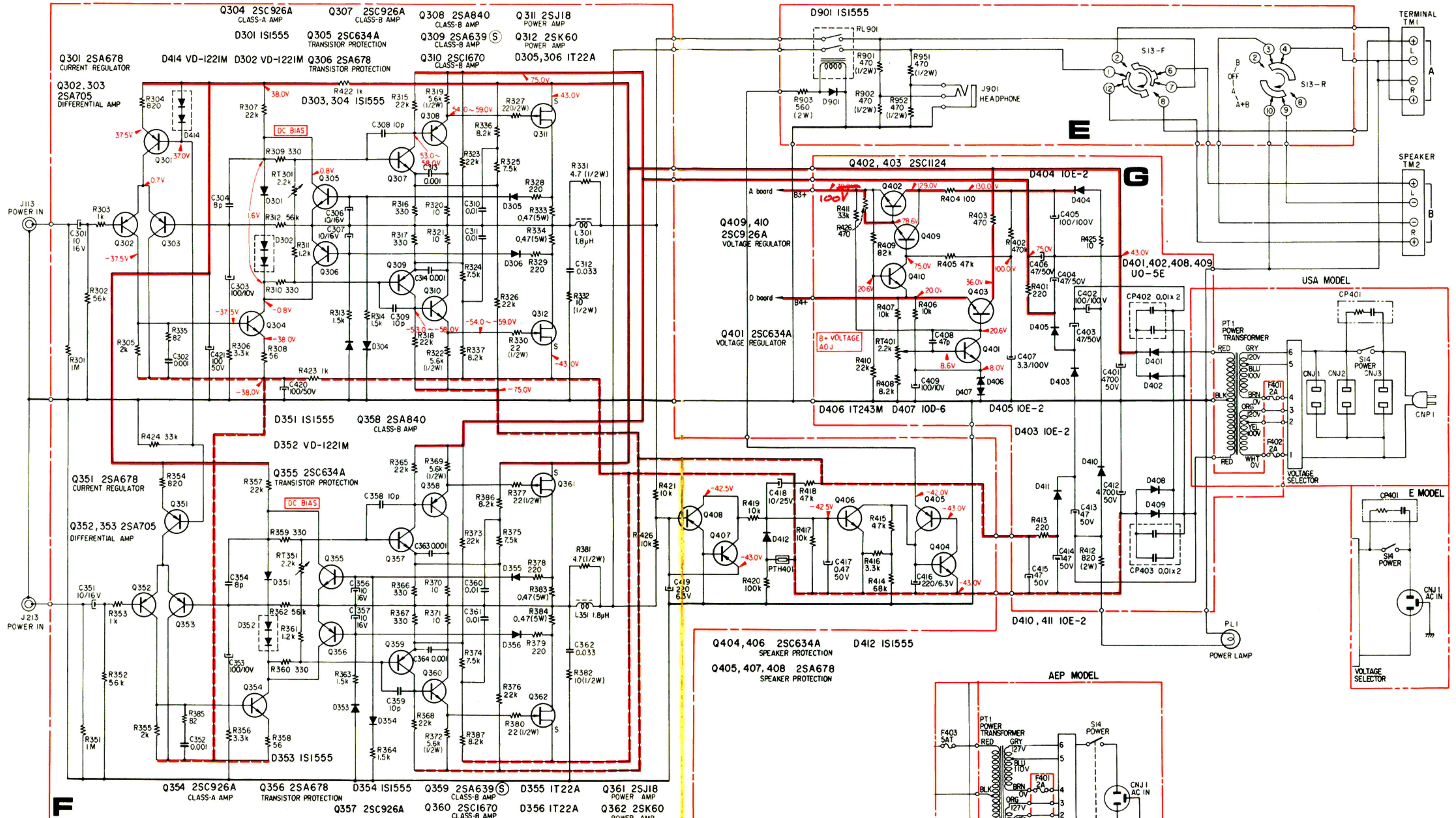


3-8. MOUNTING DIAGRAM - G Board (power supply) -

- Conductor Side -
- USA model (former type) -

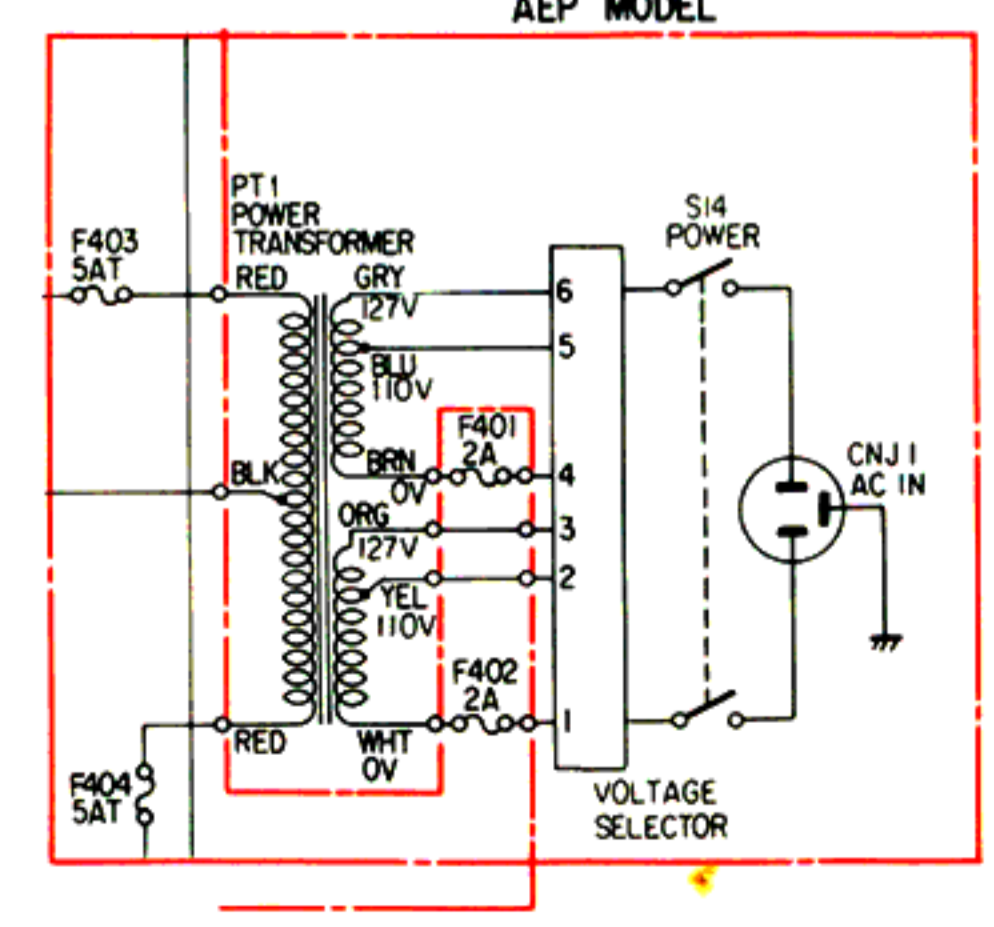


3-9. SCHEMATIC DIAGRAM – Power Amplifier Section –
 – USA (new type), E, AEP model –



Note: All resistance values are in ohms. k = 1,000, M = 1,000k.
 All capacitance values are in μF except as indicated with p, which means μF .
 All voltages are dc measured with a VOM which has an input impedance of 20k ohms/volt. No signal in.
 Voltage variations may be noted because of normal production tolerances.

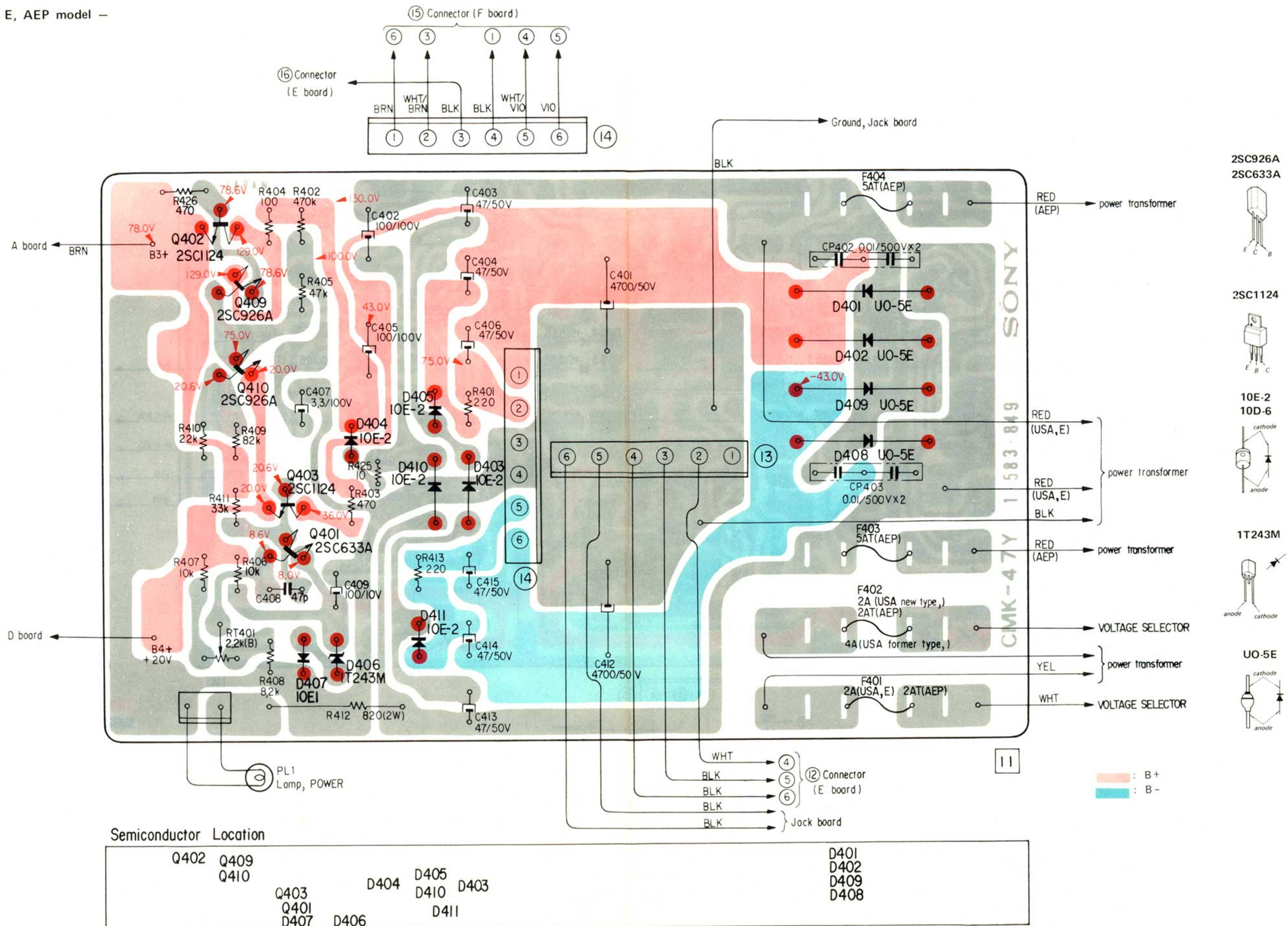
— : B+ — : B- —



3-10. MOUNTING DIAGRAM - G Board (power supply) -

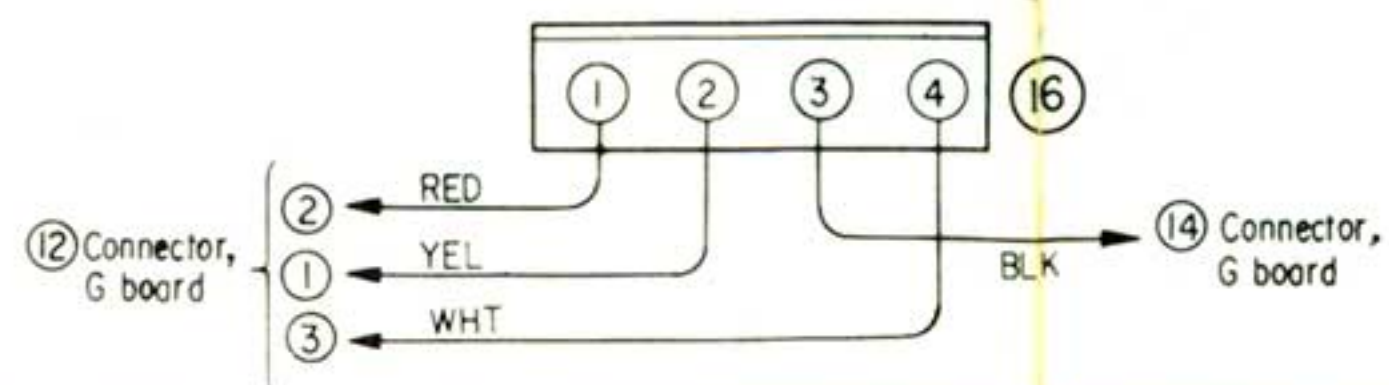
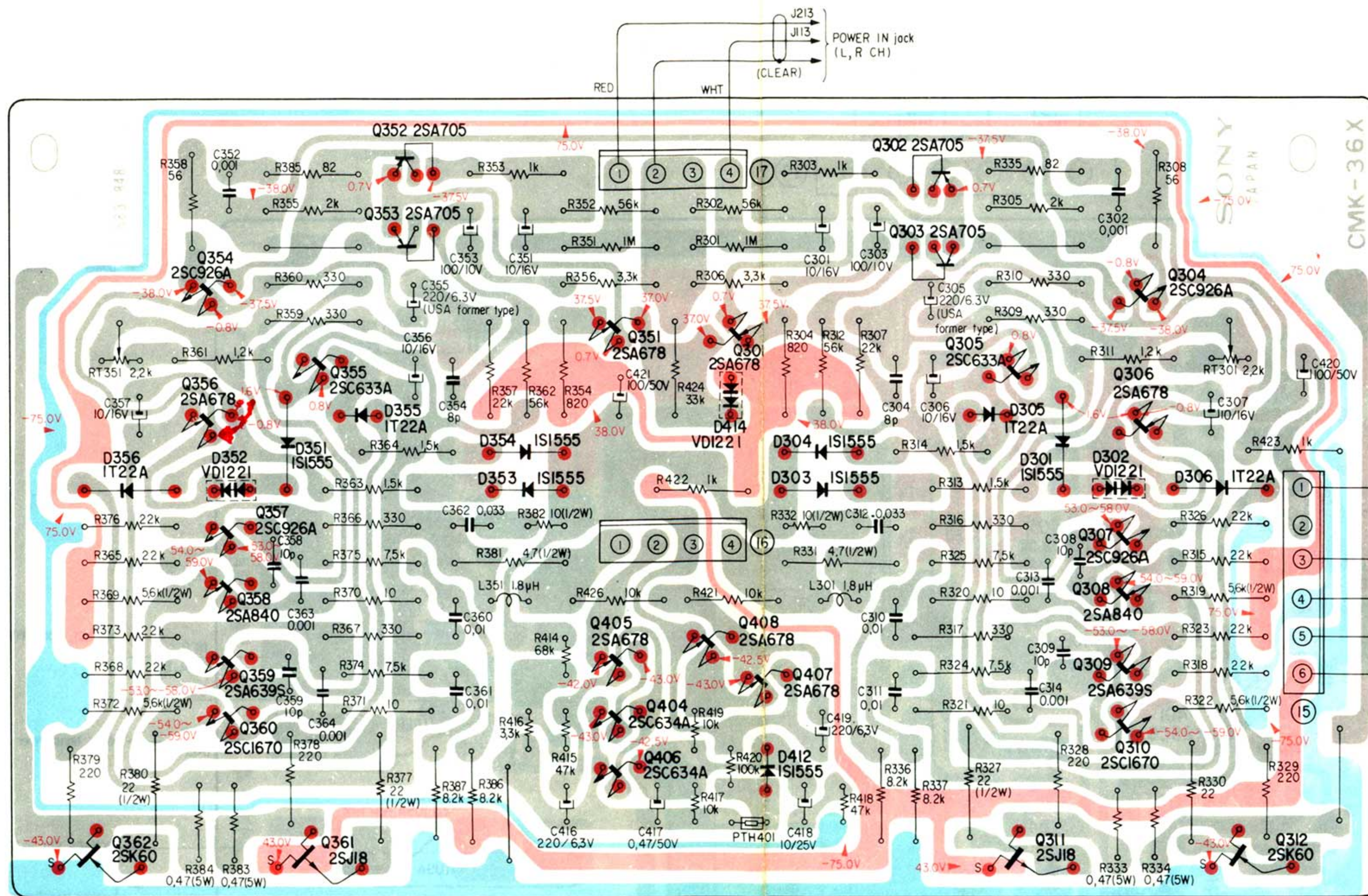
Conductor Side -

- USA (new type), E, AEP model -



3-11. MOUNTING DIAGRAM - F Board (power amp) -

- Conductor Side -



Red : B+
Blue : B-

Q	Q352 Q353	Q354 Q355 Q356 Q357 Q358 Q359 Q360	Q355 Q361	Q352 Q353	Q351 Q405 Q404 Q406	Q301 Q408 Q407	Q302 Q303	Q305 Q311	Q304 Q306 Q307 Q308 Q309 Q310	Q312	Q
D	D356	D352 D351	D355	D354	D414 D412	D304 D303	D305 D301	D302	D306		D

2SA678
2SA705



2SC1670



2SA840
2SA639S



2SC926A
2SC633A
2SC634A



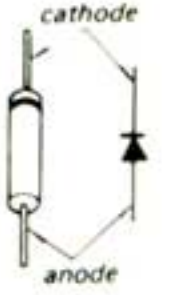
2SK60



2SJ18



1T22A
1S1555

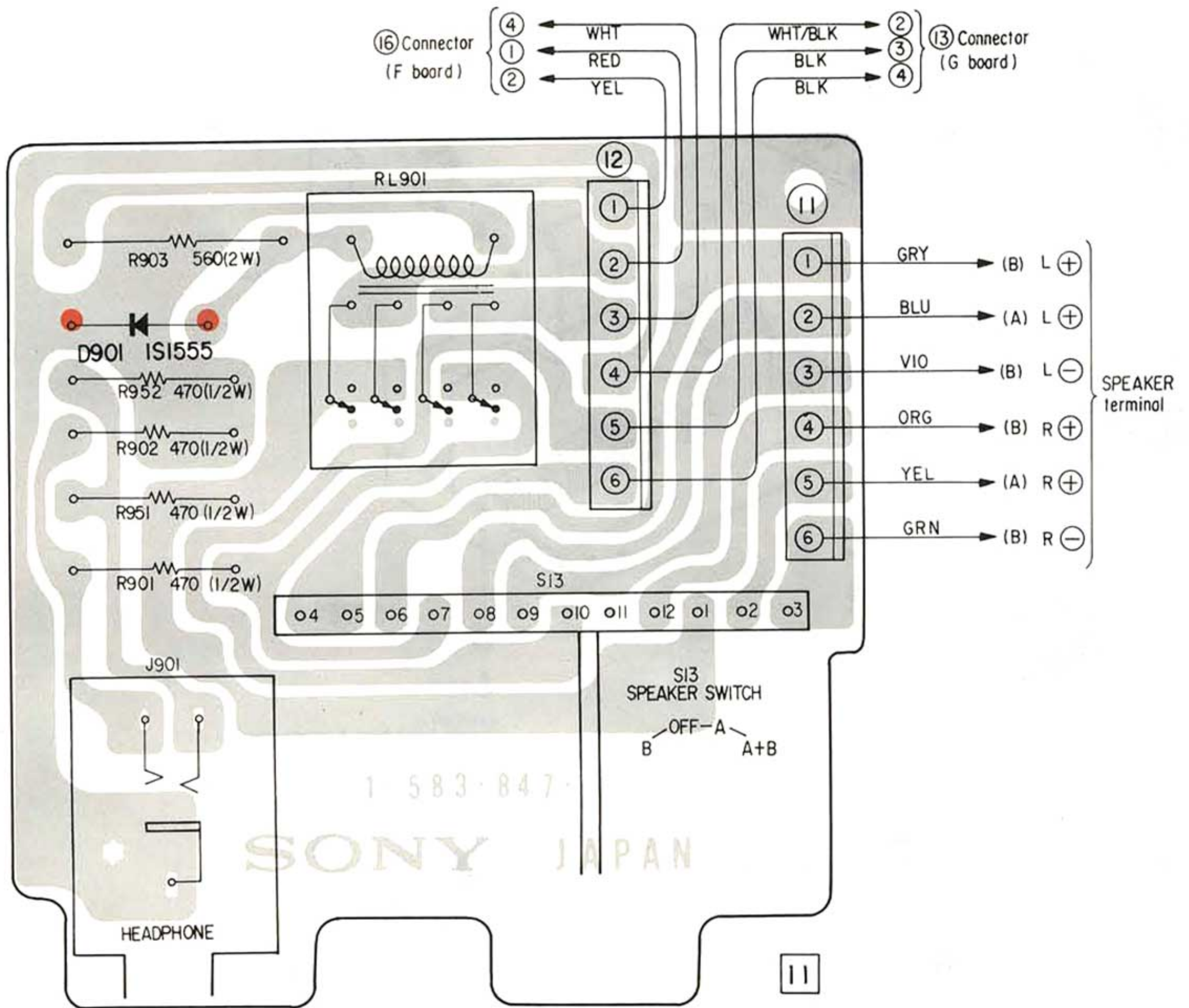


VD1221



3-12. MOUNTING DIAGRAM – E Board (output) –

– Conductor Side –



1S1555

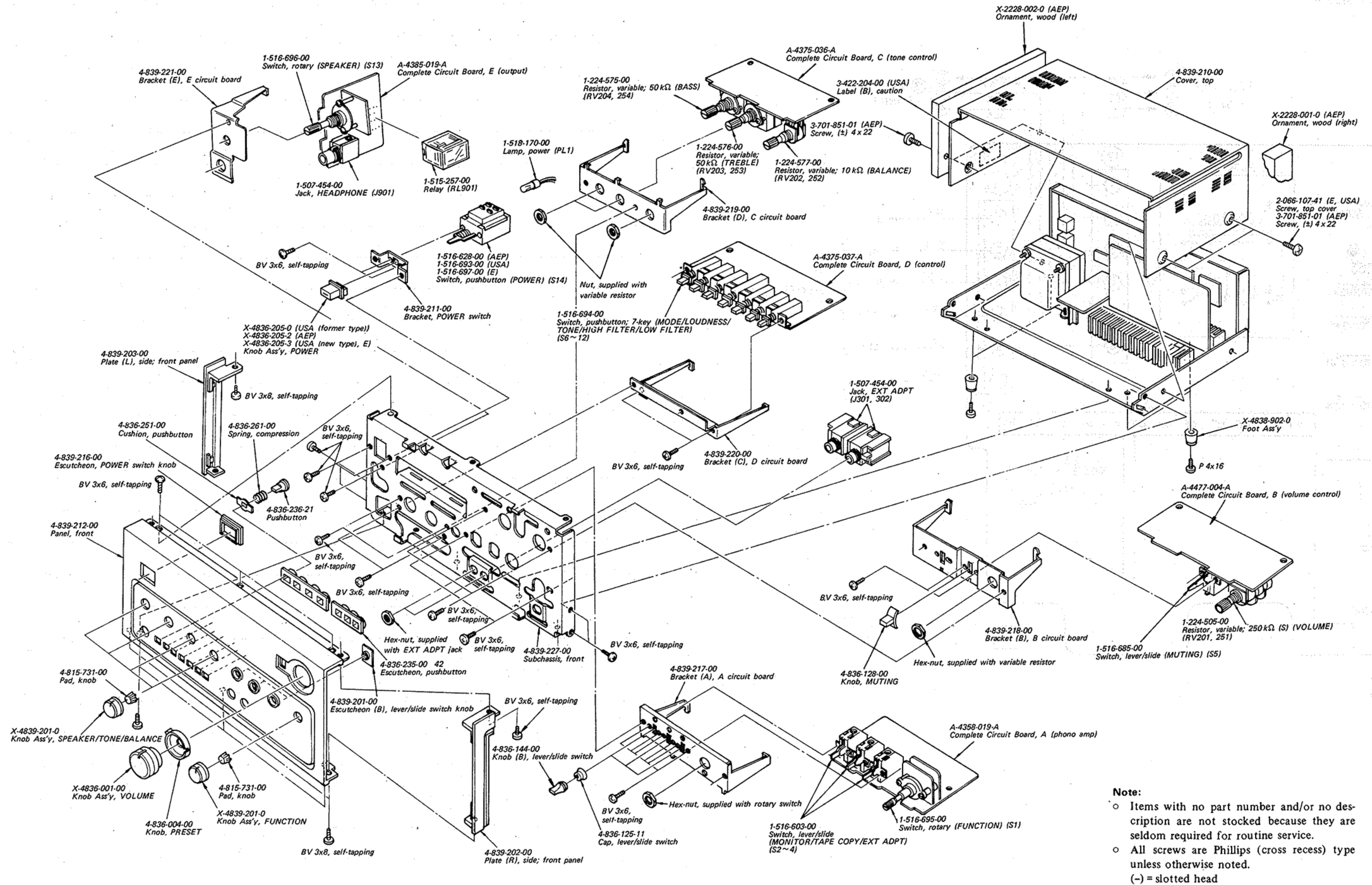


MEMO

A series of horizontal dotted lines for writing.

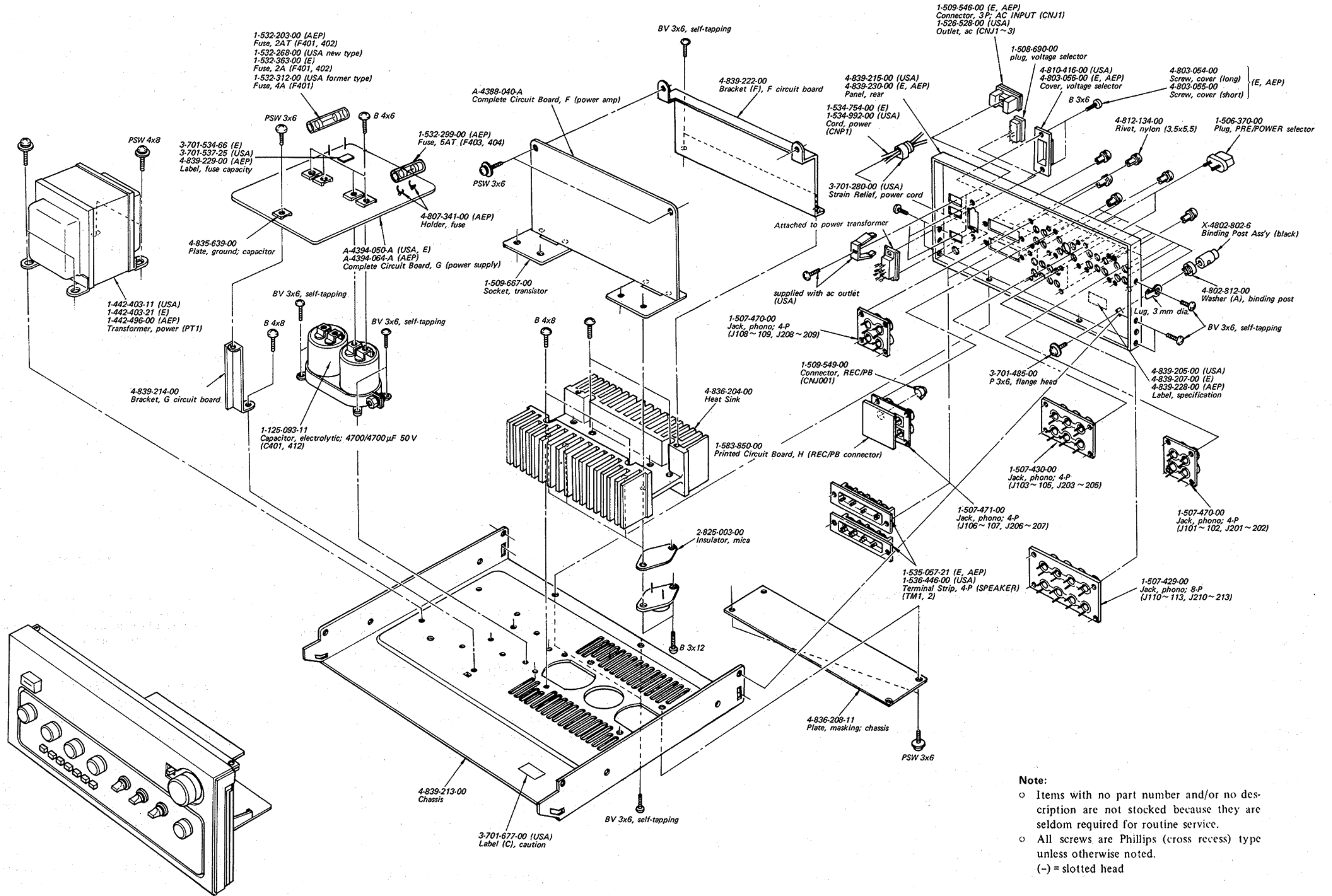
SECTION 4 EXPLODED VIEWS

4-1.



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head



Note:

- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
- (-) = slotted head

SECTION 5 ELECTRICAL PARTS LIST

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>	<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
CIRCUIT BOARDS					
<p>Note: For USA model, former and new B, D, F and G boards are interchangeable respectively.</p>			Q404	2SC634A	
	A-4358-019-A	A (phono amp), complete	Q405	2SA678	
	A-4477-004-A	B (volume control), complete	Q406	2SC634A	
	A-4375-036-A	C (tone control), complete	Q407,Q408	2SA678	
	A-4375-037-A	D (control), complete	Q409,Q410	2SC926A	
	A-4385-019-A	E (output), complete			Diodes
	A-4388-040-A	F (power amp), complete	D301(D351)	1S1555	
	A-4394-050-A	G (power supply), complete (USA, E model)	D302(D352)	VD1221M	
	A-4394-064-A	G (power supply), complete (AEP model)	D303(D353)	1S1555	
	1-583-850-00	H (REC/PB connector)	D304(D354)	1S1555	
			D305(D355)	1T22A	
			D306(D356)	1T22A	
SEMICONDUCTORS					
Transistors			D401,D402	UO-5E	
	Q101(Q151)	2SC1636	D403~D405	10E-2	
	Q102(Q152)	2SK63 (FET)	D406	1T243M	
	Q201(Q251)	2SK23A (FET)	D407	10D-6	
	Q202(Q252)	2SA705	D408,D409	UO-5E	
	Q203(Q253)	2SK23A (FET)	D410,D411	10E-2	
	Q204(Q254)	2SA705	D412,D413	1S1555	
	Q301(Q351)	2SA678	D414	VD1221	
	Q302(Q352)	2SA705	D901	1S1555	
	Q303(Q353)	2SA705			
	Q304(Q354)	2SC926A			
	Q305(Q355)	2SC634A			
	Q306(Q356)	2SA678			
	Q307(Q357)	2SC926A			
	Q308(Q358)	2SA840			
	Q309(Q359)	2SA639S			
	Q310(Q360)	2SC1670			
	Q311(Q361)	2SJ18 (FET)			
	Q312(Q362)	2SK60 (FET)			
	Q401	2SC634A			
	Q402,Q403	2SC1124			
					TRANSFORMER AND INDUCTORS
			L301(L351)	1-407-592-00	Microinductor, 1.8 μH
			PT1	1-442-403-11	Transformer, power (USA model)
				1-442-403-21	Transformer, power (E model)
				1-442-496-00	Transformer, power (AEP model)
					CAPACITORS
					Capacitors are in μF, electrolytic type unless otherwise noted. (p=μμ) The working voltage of 50 volts or less are omitted except for electrolytic type.
			C001(C051)	1-102-074-11	0.001 ceramic
			C101(C151)	1-121-913-11	3.3 25 V
			C102(C152)	1-105-661-12	0.001 mylar

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
C104(C154)	1-105-510-12	0.0056 mylar
C105(C155)	1-106-006-12	0.0016 mylar
C106(C156)	1-105-729-12	0.22 100 V mylar
C107(C157)	1-121-425-11	470 10 V
C201(C251)	1-102-973-11	100 p ceramic
C202(C252)	1-105-679-12	0.033 mylar
C203(C253)	1-121-748-11	10 25 V
C204(C254)	1-105-677-12	0.022 mylar
C205(C255)	1-105-677-12	0.022 mylar
C206(C256)	1-105-679-12	0.033 mylar
C207(C257)	1-105-661-12	0.001 mylar
C208(C258)	1-105-661-12	0.001 mylar
C209(C259)	{1-121-352-11 1-121-424-11	{47 10 V (USA (former type)) 470 6.3 V (USA (new type), E, AEP model)
C210(C260)	1-121-748-11	10 25 V
C211(C261)	1-105-673-12	0.01 mylar
C212(C262)	1-105-689-12	0.22 mylar
C213(C263)	1-102-973-11	100 p ceramic
C214(C264)	1-102-973-11	100 p ceramic
C301(C351)	1-121-916-11	10 16 V
C302(C352)	1-105-661-12	0.001 mylar
C303(C353)	{1-121-352-11 1-121-414-11	{47 10 V (USA (former type)) 100 10 V (USA (new type), E, AEP model)
C304(C354)	1-102-945-11	8 p ceramic
C305(C355)	1-121-419-11	220 6.3 V (USA (former type))
C306(C356)	{1-121-413-11 1-121-651-11	{100 6.3 V (USA (former type)) 10 16 V (USA (new type), E, AEP model)
C307(C357)	{1-121-413-11 1-121-651-11	{100 6.3 V (USA (former type)) 10 16 V (USA (new type), E, AEP model)
C308(C358)	1-102-947-11	10 p ceramic
C309(C359)	1-102-947-11	10 p ceramic
C310(C360)	1-105-673-12	0.01 mylar
C311(C361)	1-105-673-12	0.01 mylar
C312(C362)	1-105-679-12	0.033 mylar
C313(C363)	1-105-661-12	0.001 mylar
C314(C364)	1-105-661-12	0.001 mylar
C401	1-125-093-11	4700 50 V

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
C402	1-123-084-11	100 100 V
C403,C404	1-123-058-11	47 50 V
C405	1-123-084-11	100 100 V
C406	1-123-058-11	47 50 V
C407	1-121-995-11	3.3 100 V
C408	{1-105-661-12 1-101-881-11	{0.001 mylar (USA (former type)) 47 p (USA (new type), E, AEP model)
C409	{1-121-352-11 1-121-414-11	{47 10 V (USA (former type)) 100 10 V (USA (new type), E, AEP model)
C410	1-121-935-11	100 25 V (USA (former type))
C411	1-123-084-11	100 100 V (USA (former type))
C412	1-125-093-11	4700 50 V
C413~C415	1-123-058-11	47 50 V
C416	1-121-419-11	220 6.3 V
C417	1-121-726-11	0.47 50 V
C418	1-121-398-11	10 25 V
C419	1-121-419-11	220 6.3 V
C420,C421	{1-121-411-11 1-121-417-00	{47 50 V (USA (former type)) 100 50 V (USA (new type), E, AEP model)
C423,C424	1-121-392-11	3.3 25 V (USA (former type))

RESISTORS

All resistors are in Ω . $\frac{1}{4}W$, $\pm 5\%$, carbon resistors (except special type) are omitted. Check schematic diagram for the resistance values. (k = 1,000, M = 1,000 k)

R331(R381)	1-202-517-11	4.7	$\frac{1}{2}W$	composition
R332(R382)	1-202-525-11	10	$\frac{1}{2}W$	composition
R333(R383)	1-217-158-11	0.47	5 W	metal
R334(R384)	1-217-158-11	0.47	5 W	metal
R412	1-206-662-11	820	2 W	metal-oxide
R901(R951)	1-202-565-11	470	$\frac{1}{2}W$	composition
R902(R952)	1-202-565-11	470	$\frac{1}{2}W$	composition
R903	1-206-658-11	560	2 W	metal-oxide
RT301 (RT351)	1-224-489-00	2.2 k	adjustable (dc bias adj.)	

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
RT401	1-224-250-00	2.2k, adjustable (power voltage adj.)
RV201 (RV251)	1-224-505-00	250k(S), variable (VOLUME)
RV202 (RV252)	1-224-577-00	10k, variable (BALANCE)
RV203 (RV253)	1-224-576-00	50k, variable (TREBLE)
RV204 (RV254)	1-224-575-00	50k, variable (BASS)

SWITCHES

S1	1-516-695-00	Rotary (FUNCTION)
S2~S4	1-516-603-00	Lever/Slide (MONITOR, TAPE COPY, EXT ADPT)
S5	1-516-685-00	Lever/Slide (MUTING)
S6~S12	1-516-694-00	Pushbutton, 7-key (MODE, LOUDNESS, TONE, HIGH FILTER, LOW FILTER)
S13	1-516-696-00	Rotary (SPEAKER)
S14	1-516-628-00	Pushbutton (POWER) (AEP model)
	1-516-693-00	Pushbutton (POWER) (USA model)
	1-516-697-00	Pushbutton (POWER) (E model)

JACKS

J101,J102 (J201,J202)	1-507-470-00	Phono, 4-P
J103~J105 (J203~J205)	1-507-430-00	Phono, 6-P
J106,J107 (J206,J207)	1-507-471-00	Phono, 4-P
J108,J109 (J208,J209)	1-507-470-00	Phono, 4-P
J110~J113 (J210~J213)	1-507-429-00	Phono, 8-P
J301,J302	1-507-454-00	EXT ADPT
J901	1-507-454-00	HEADPHONE

MISCELLANEOUS

CNJ001	1-509-549-00	Connector, REC/PB
CNJ1	1-509-546-00	Connector, 3-P; AC INPUT (E, AEP model)

<u>Ref. No.</u>	<u>Part No.</u>	<u>Description</u>
CNJ1~CNJ3	1-526-528-00	Outlet, ac (USA model)
CNP1	1-534-754-00	Cord, power (E model)
	1-534-992-00	Cord, power (USA model)
CP401	1-231-057-31	Encapsulated Component (USA, E model)
CP402 CP403	1-102-355-11	Capacitor, ceramic 0.01 μ F 500 V
F401,F402	1-532-203-00	Fuse, 2AT (AEP model)
	1-532-268-00	Fuse, 2A (USA model (new type))
	1-532-363-00	Fuse, 2A (E model)
F401	1-532-312-00	Fuse, 4A (USA model (former type))
F403,F404	1-532-299-00	Fuse, 5AT (AEP model)
PL1	1-518-170-00	Lamp, power
Pth401	1-800-340-00	Thermistor (positive)
RL901	1-515-257-00	Relay
TM1,TM2	1-535-057-21	Terminal Strip, 4-P (SPEAKER) (E, AEP model)
	1-536-446-00	Terminal Strip, 4-P (SPEAKER) (USA model)
	1-506-370-00	Plug, PRE/POWER selector
	1-508-690-00	Plug, voltage selector (USA model)
	1-509-667-00	Socket, transistor
	1-536-354-00	Pin, terminal

ACCESSORIES AND PACKING MATERIALS

<u>Part No.</u>	<u>Description</u>
X-3701-029-0	Card Ass'y, warranty
1-506-113-00	Plug, shorting
3-429-126-00	Bag, polyethylene; unit
3-701-020-00	Bag, polyethylene; instruction manual
3-701-730-00	Bag, polyethylene; IBM card
3-701-742-00	Card, IBM
3-780-508-21	Manual, instruction (USA model)
3-780-508-11	Manual, instruction (AEP model)
	Manual, instruction (E model)
3-793-807-11	Schematic Diagram
4-839-225-00	Carton
4-839-226-00	Cushion

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