

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:	270W (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)	100W (8 Ω) 90W (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

(Continued on next page.)

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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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 ± 2 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

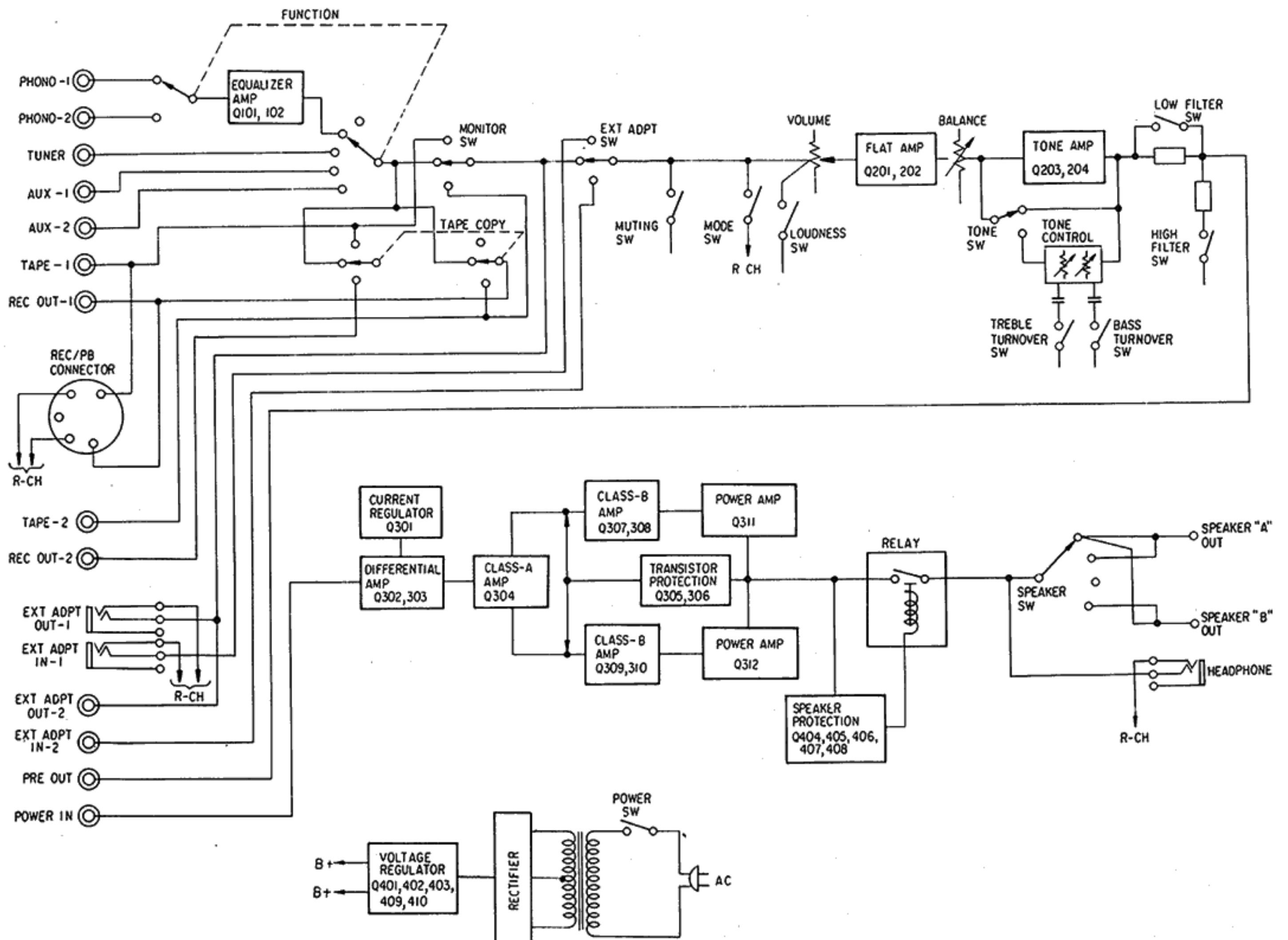
SONY®	INTEGRATED STEREO AMPLIFIER
	MODEL NO. TA-4650
	AC 110.127.220.240V~ 50/60Hz 270W
	SERIAL NO. _____
MADE IN JAPAN	

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



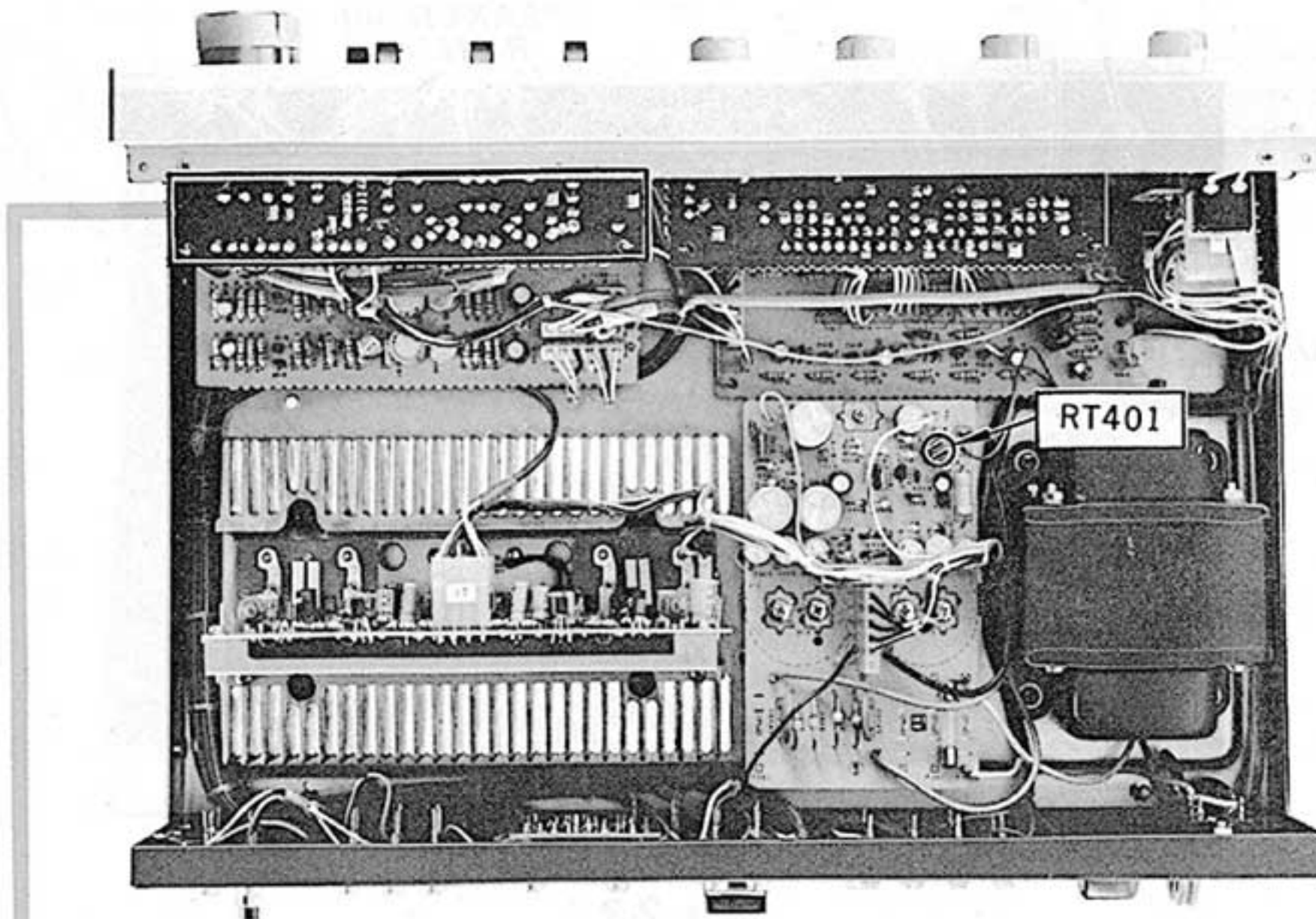
SECTION 2 ADJUSTMENTS

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.

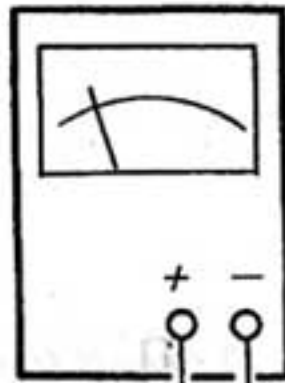
*B (volume control)
board*



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

Fig. 2-1.

dc voltmeter



To ground of amp (TA-4650)

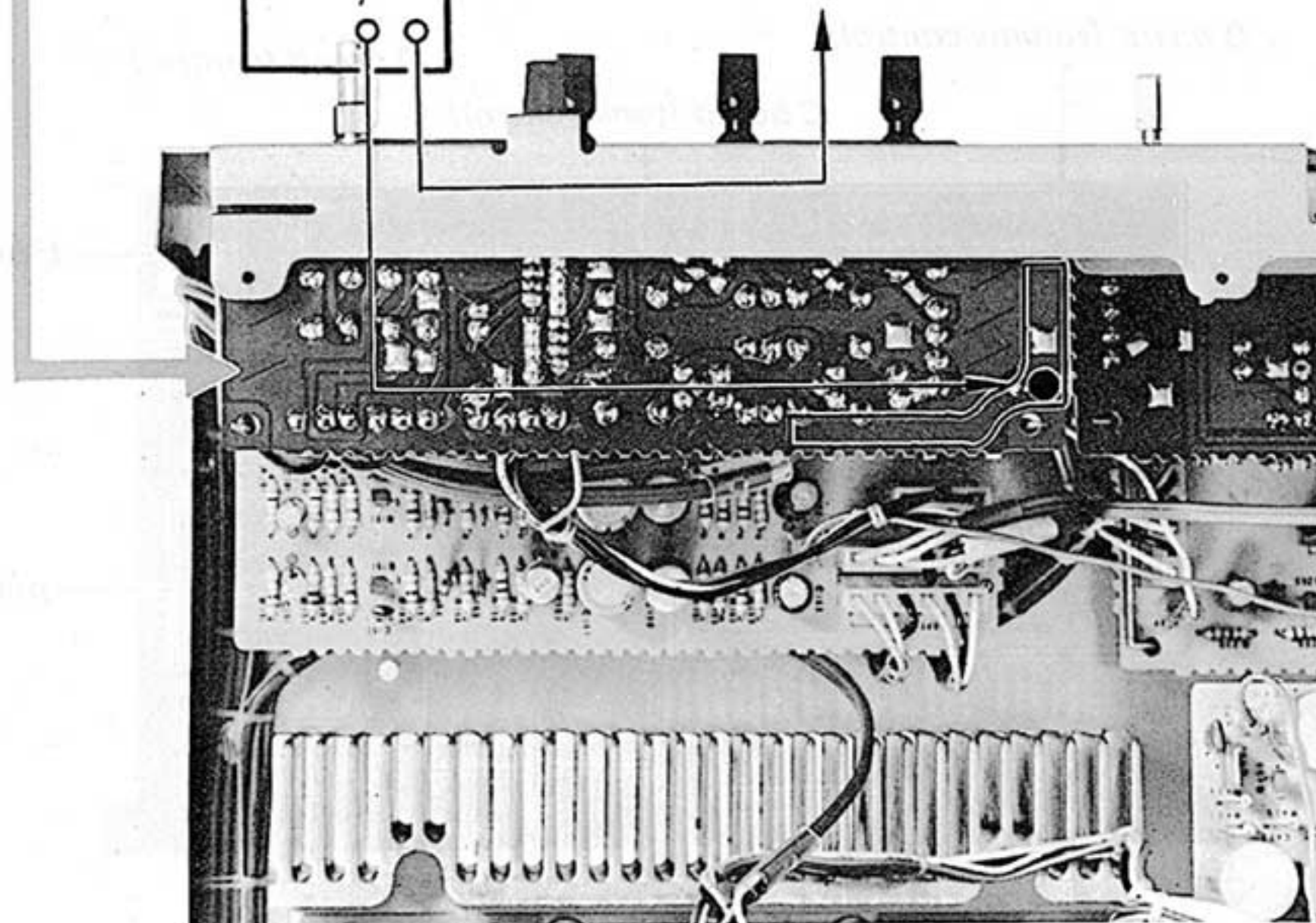


Fig. 2-2.

2-2. DC BIAS ADJUSTMENT

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

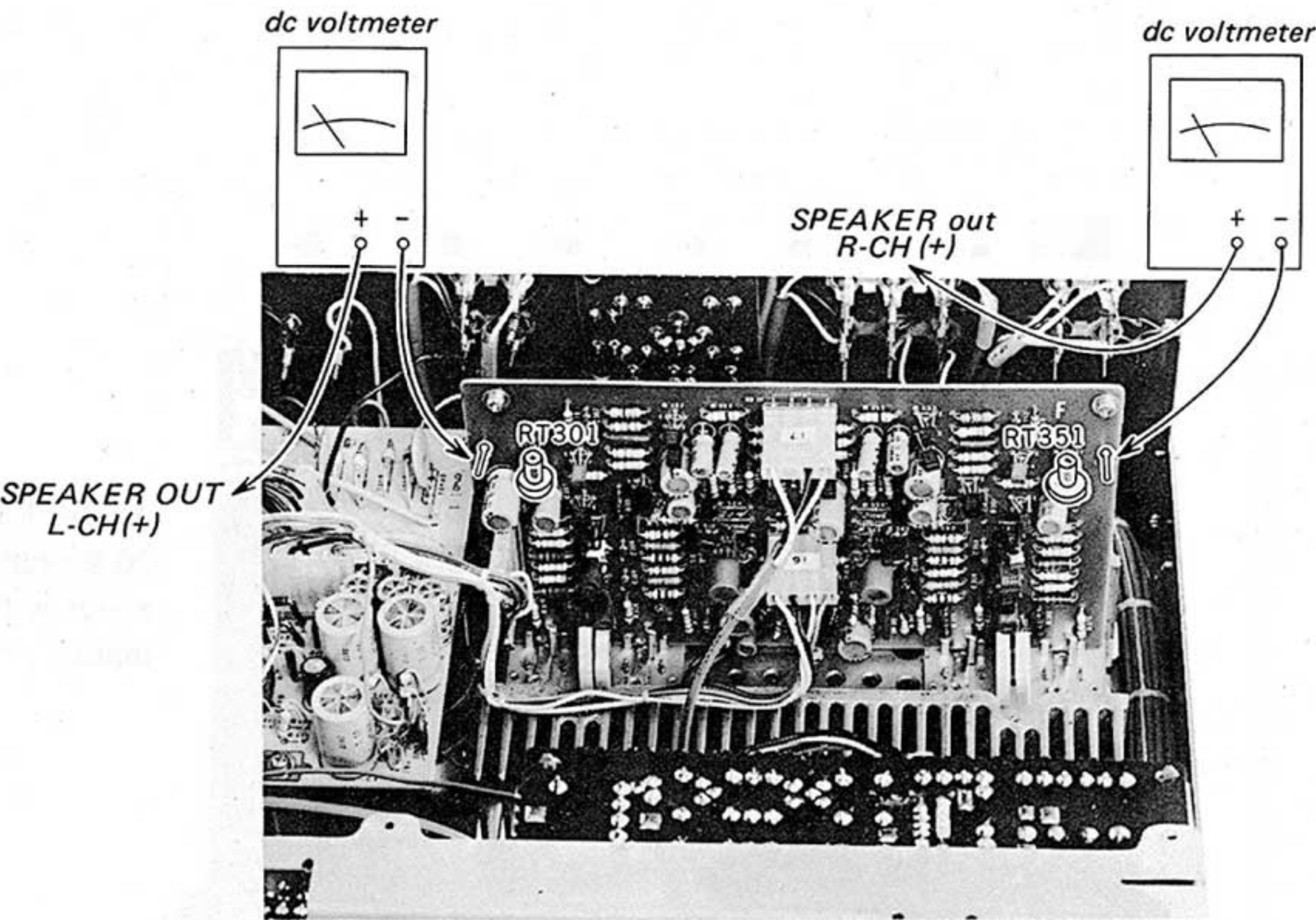
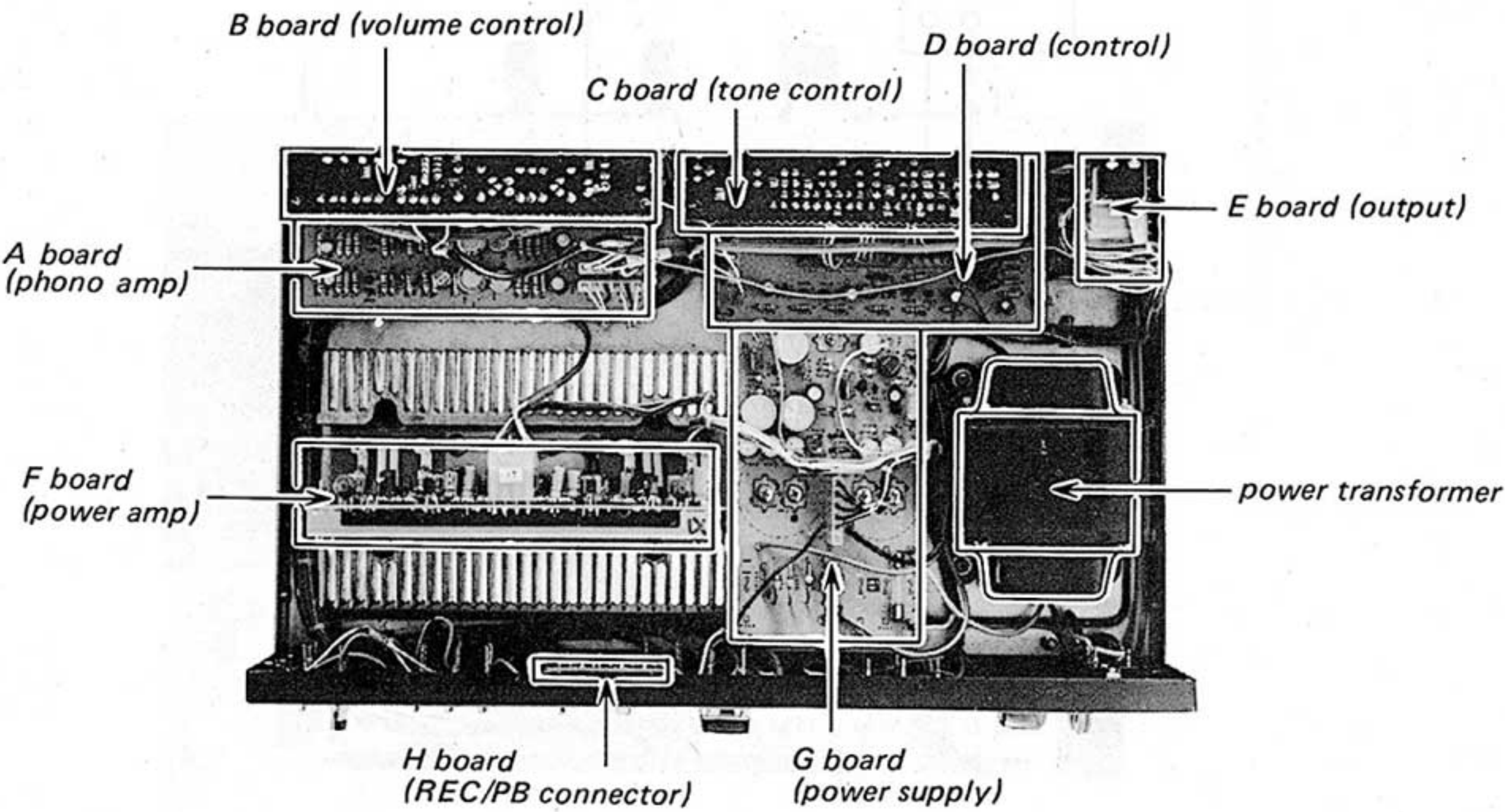


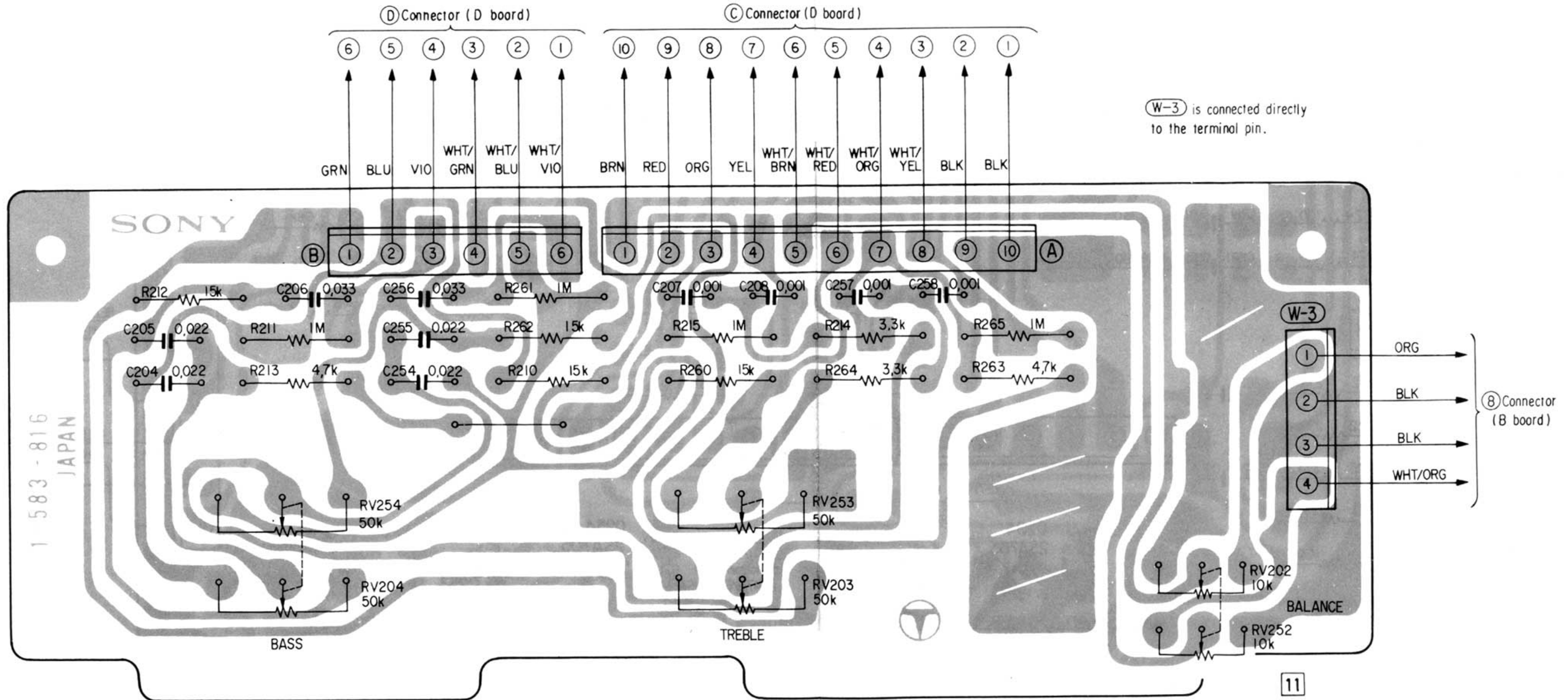
Fig. 2-3.

2-3. CHASSIS LAYOUT



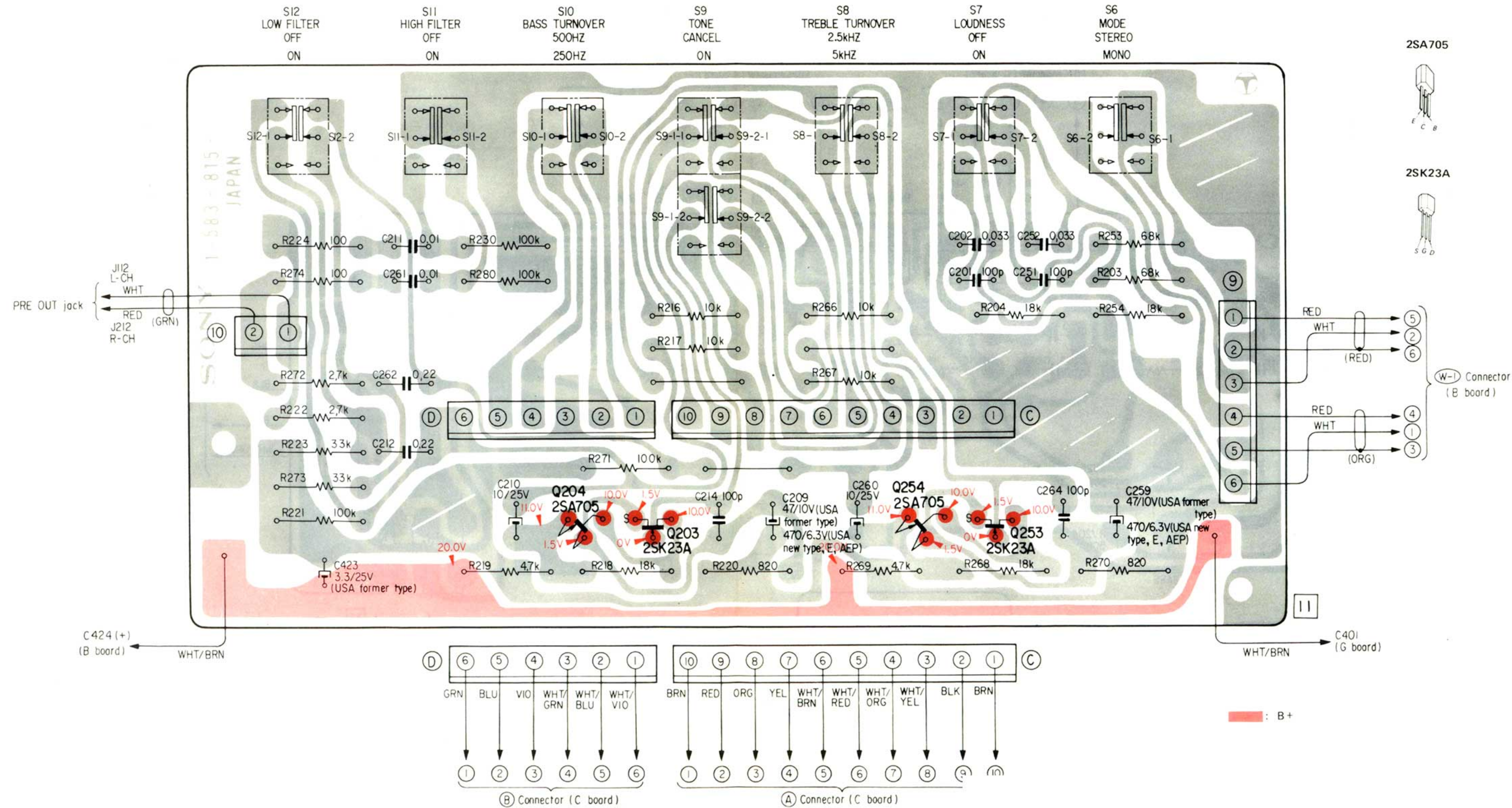
SECTION 3 DIAGRAMS

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



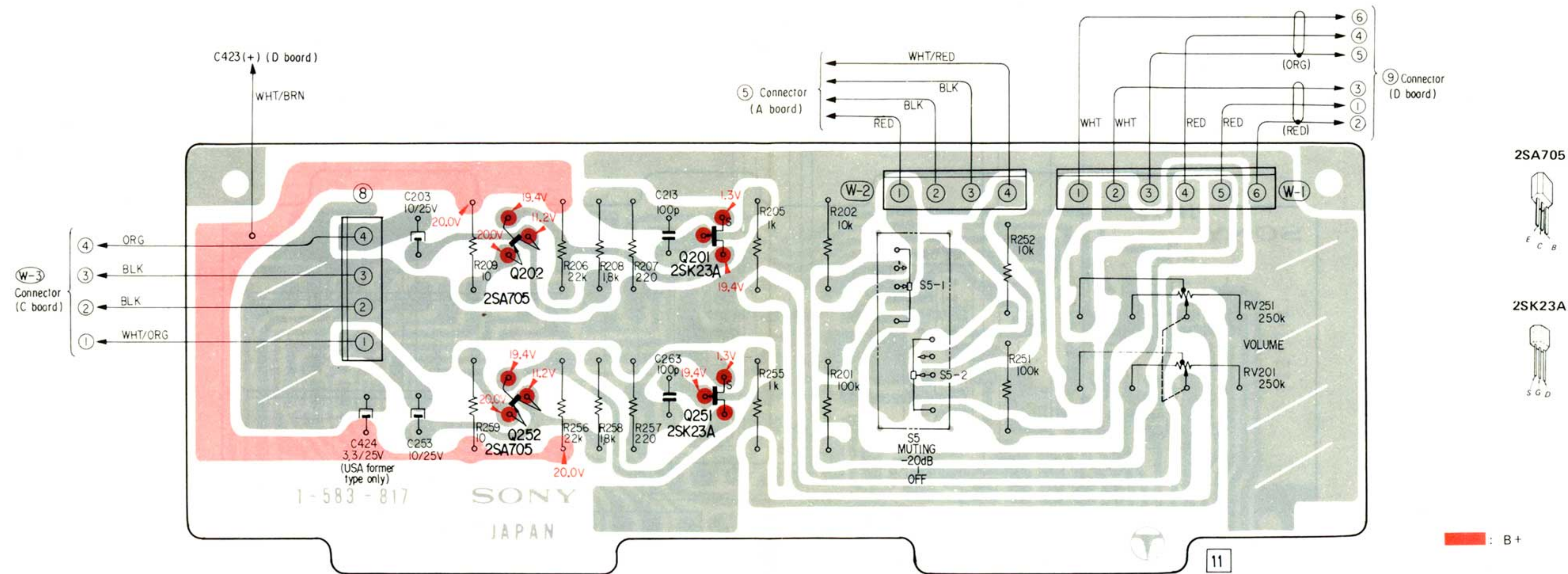
Note: The lead wires of connector (W-3) should wire-wrap the terminal pins of connector (8) on B board.

3-2. MOUNTING DIAGRAM — D Board (control) —
— Conductor Side —



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

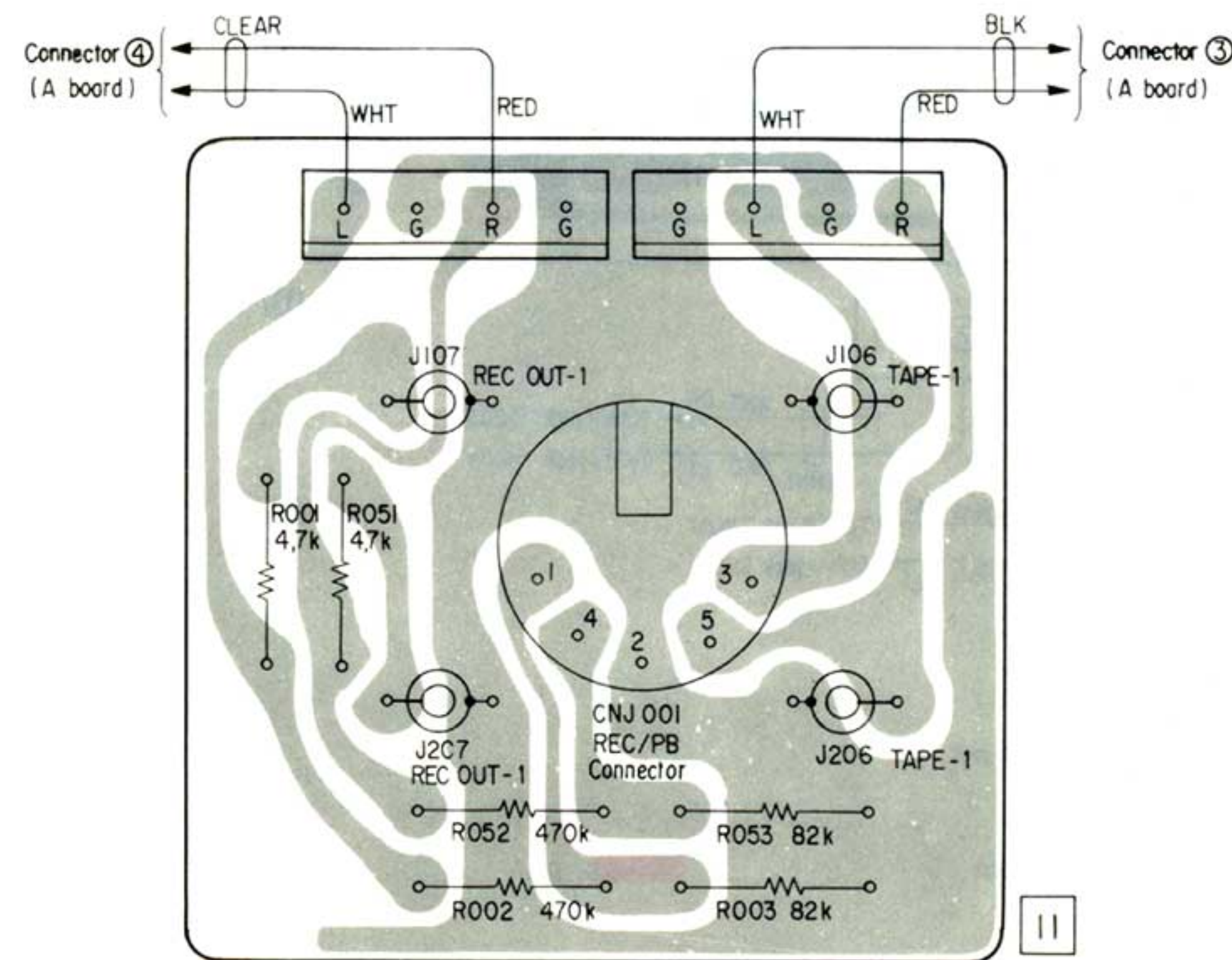
— Conductor Side —



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.

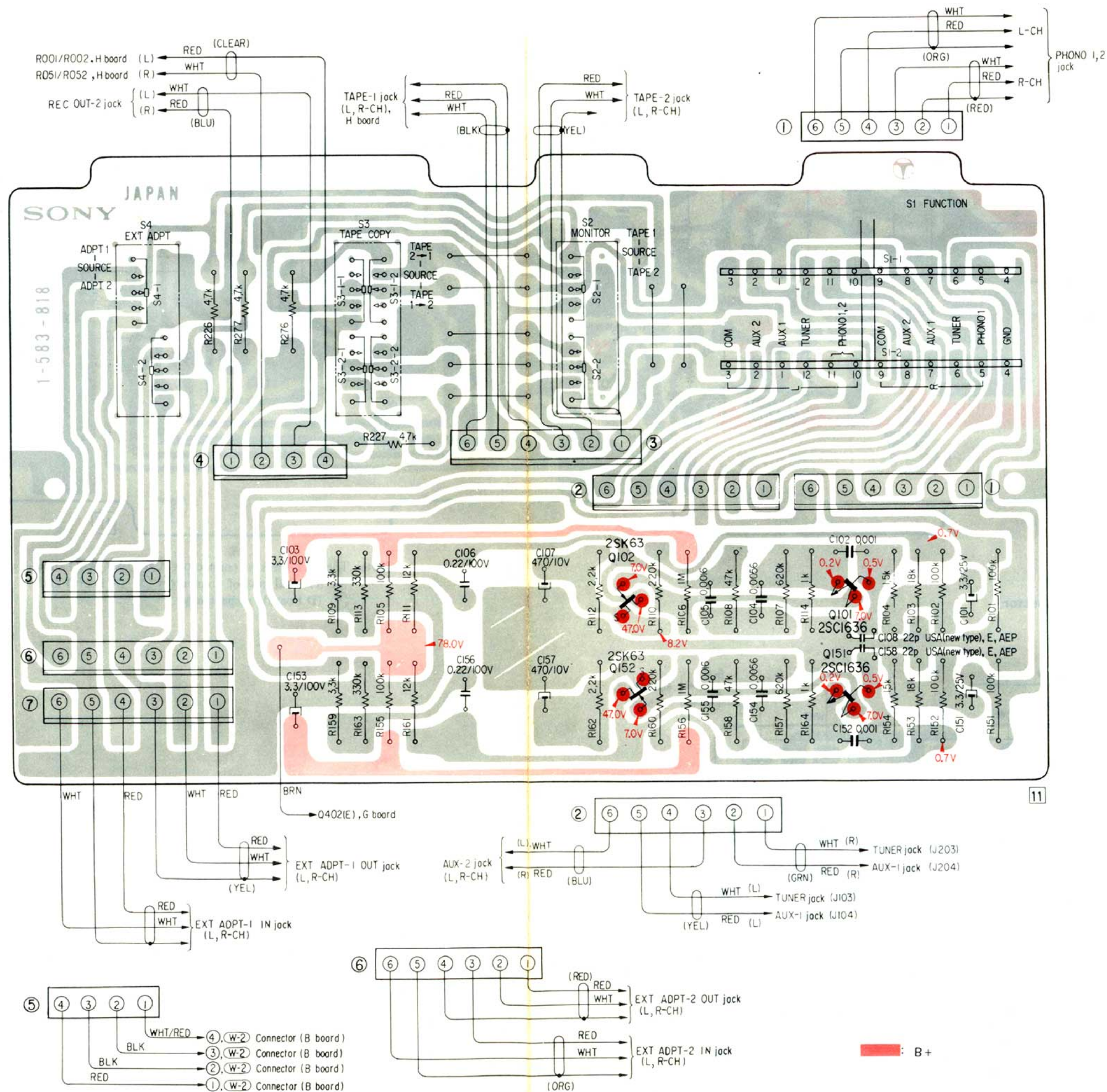
3-4. MOUNTING DIAGRAM — H Board (REC/PB connector) —

— Conductor Side —



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

— Conductor Side —



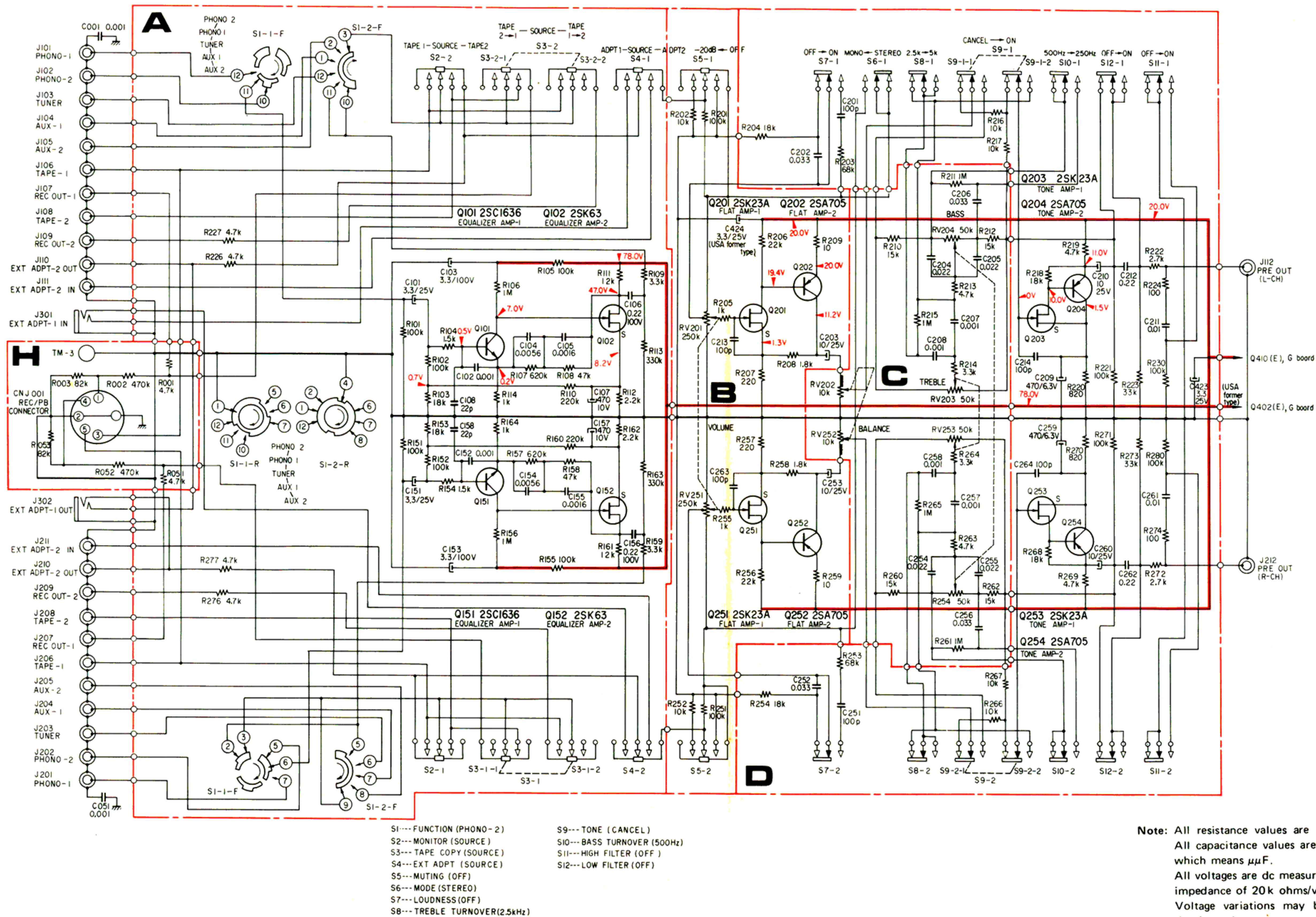
2SK63



2SC1636



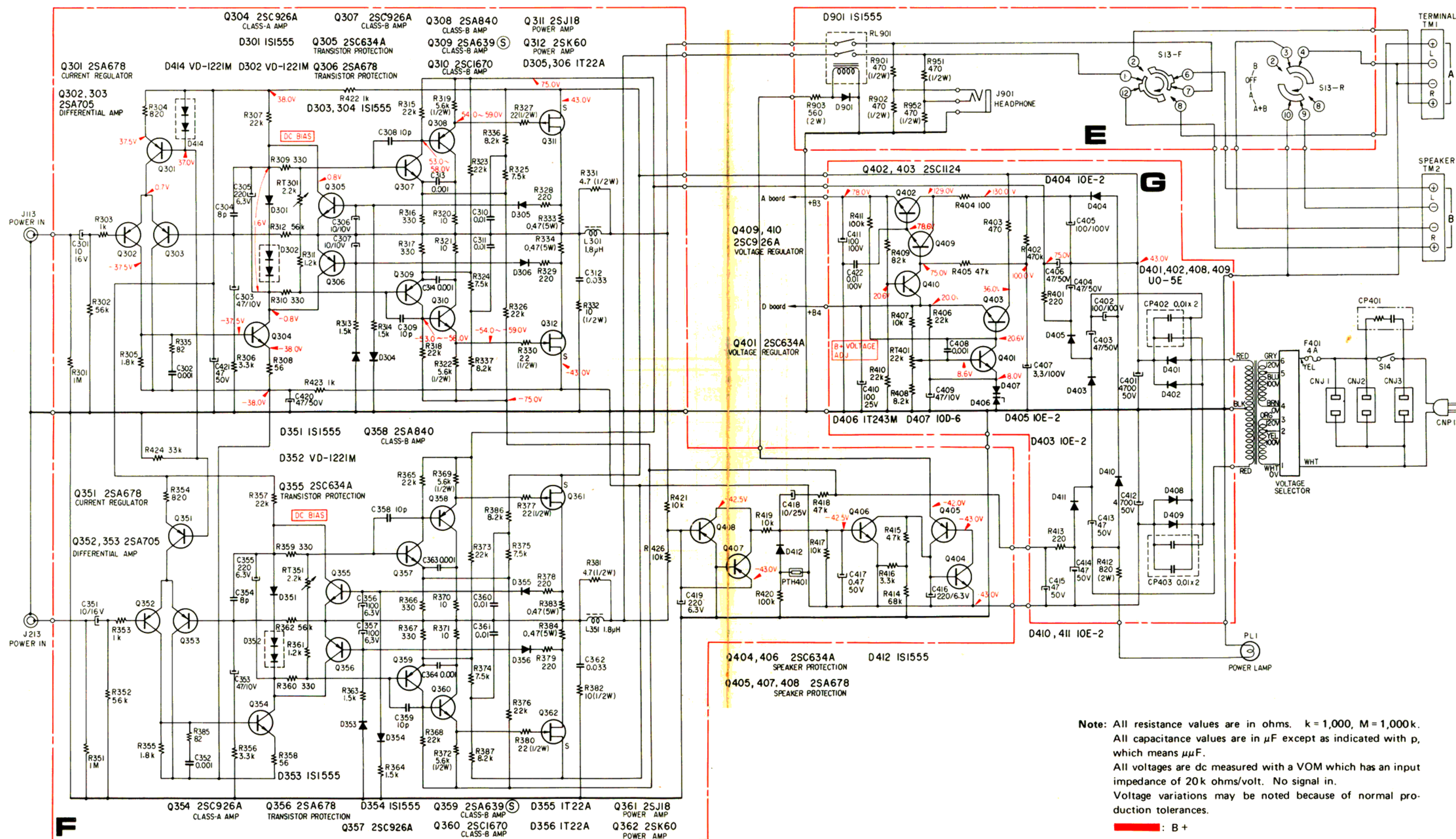
3-6. SCHEMATIC DIAGRAM — Preamplifier Section —



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.

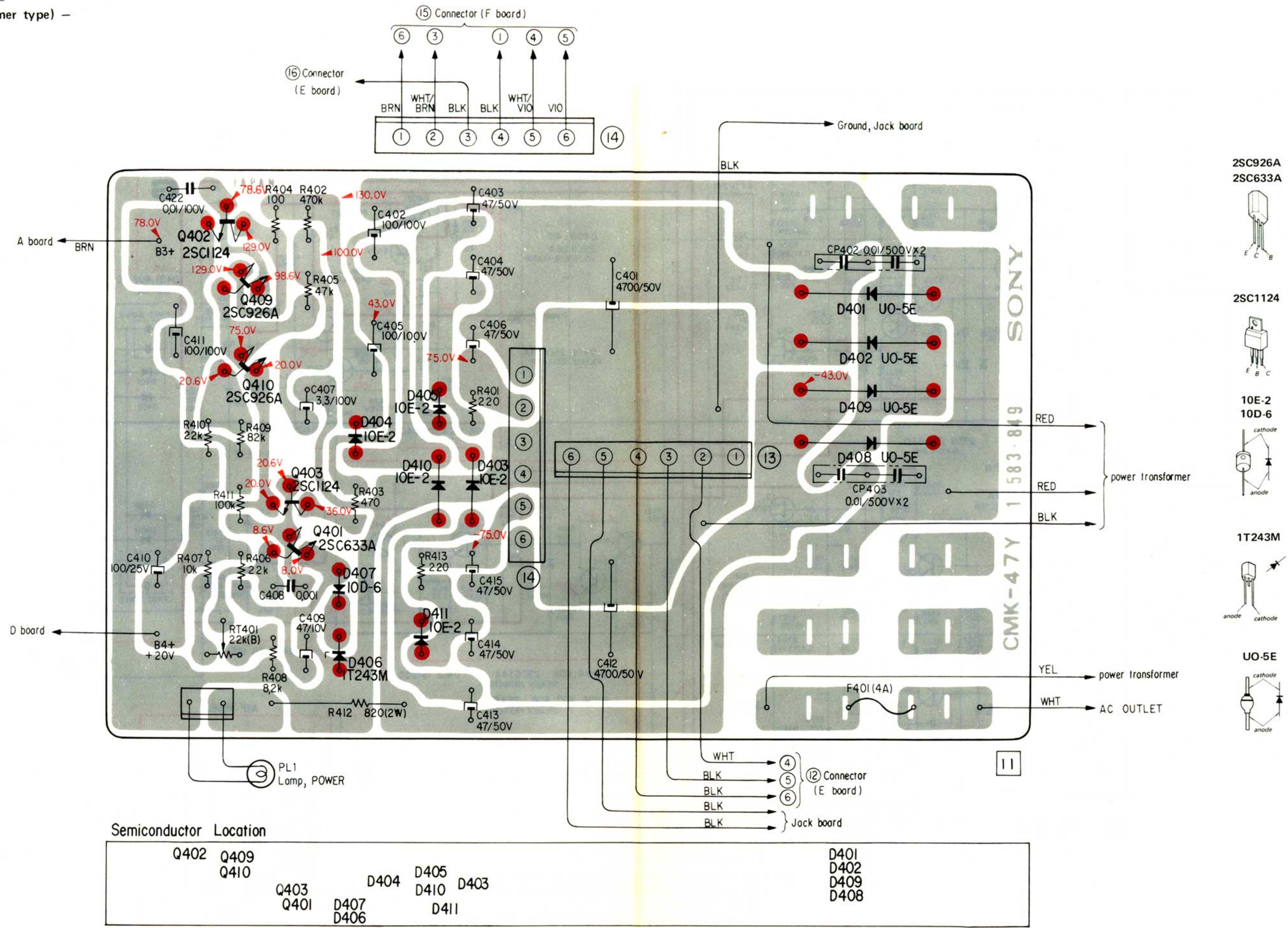
— B +

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

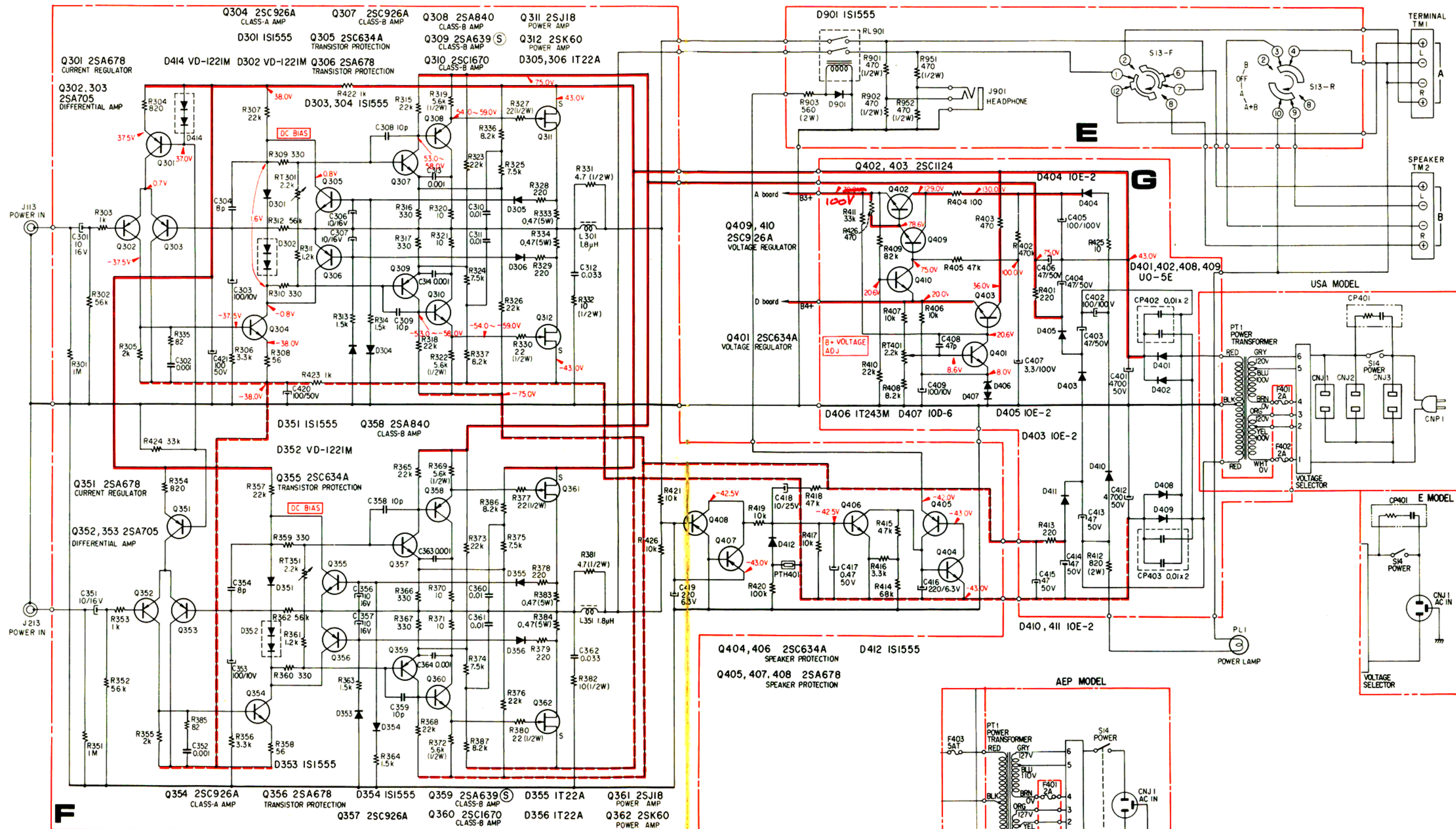


3-8. MOUNTING DIAGRAM — G Board (power supply) —

- 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.

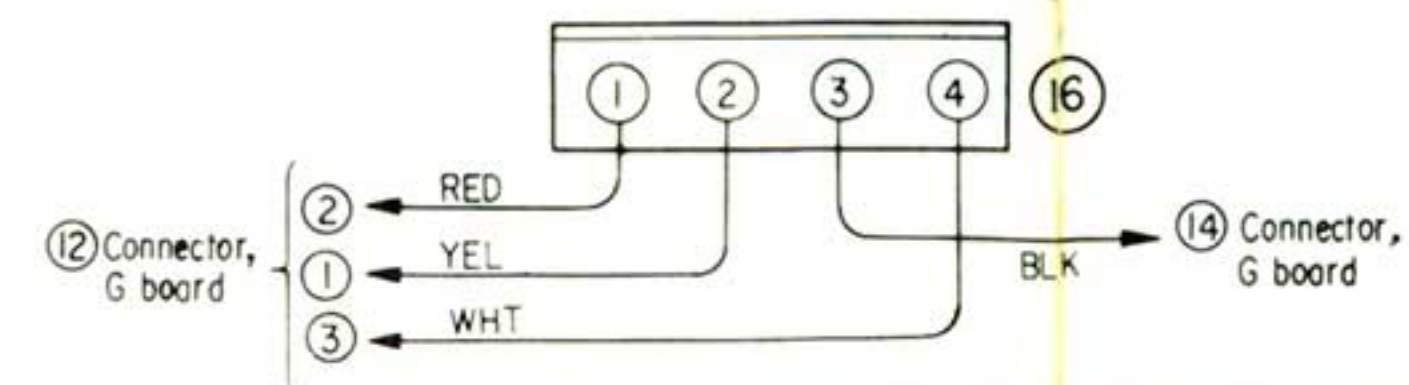
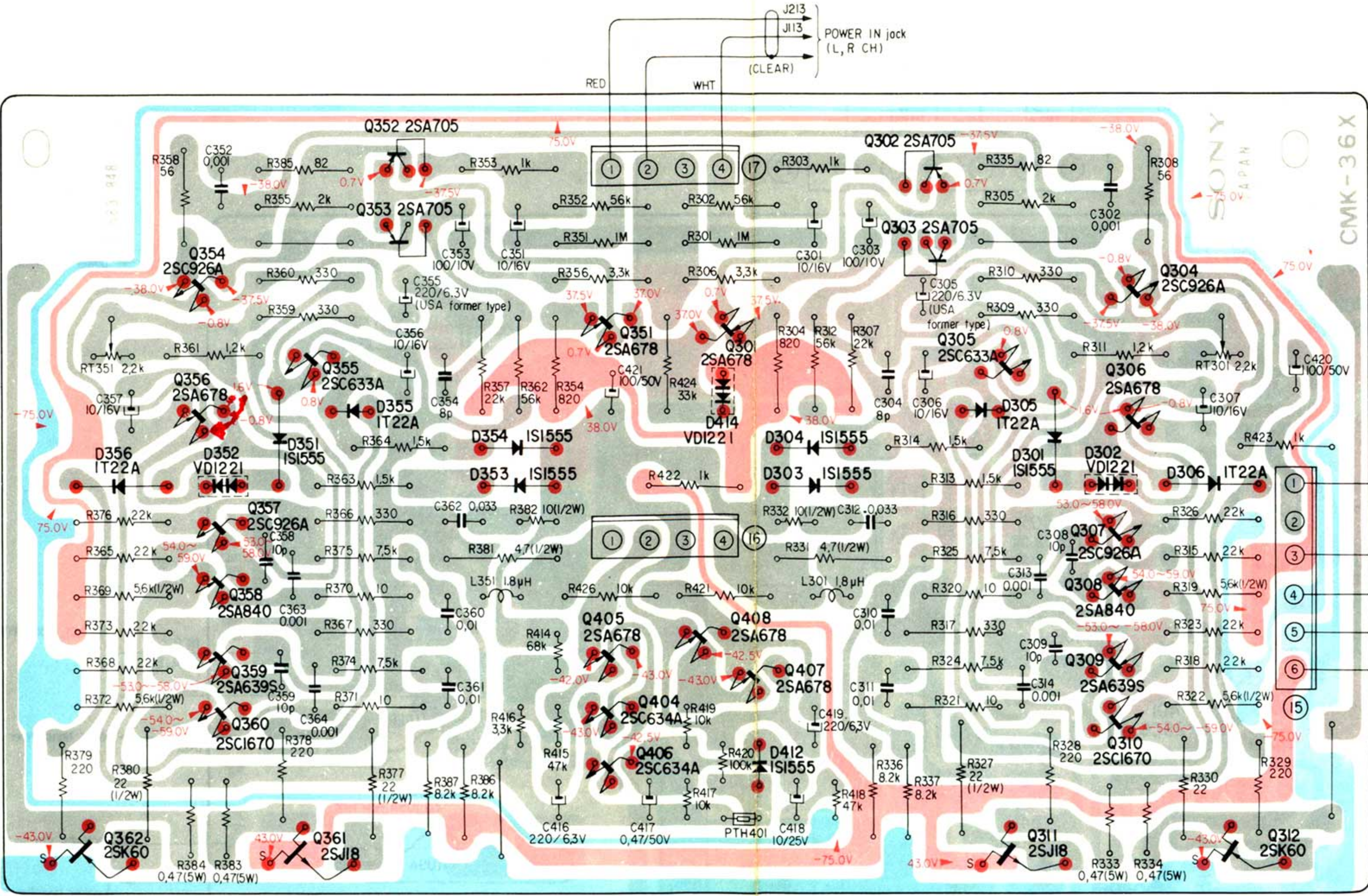
— B +

— B -

Conductor Side –
– USA (new type), E, AEP model –



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

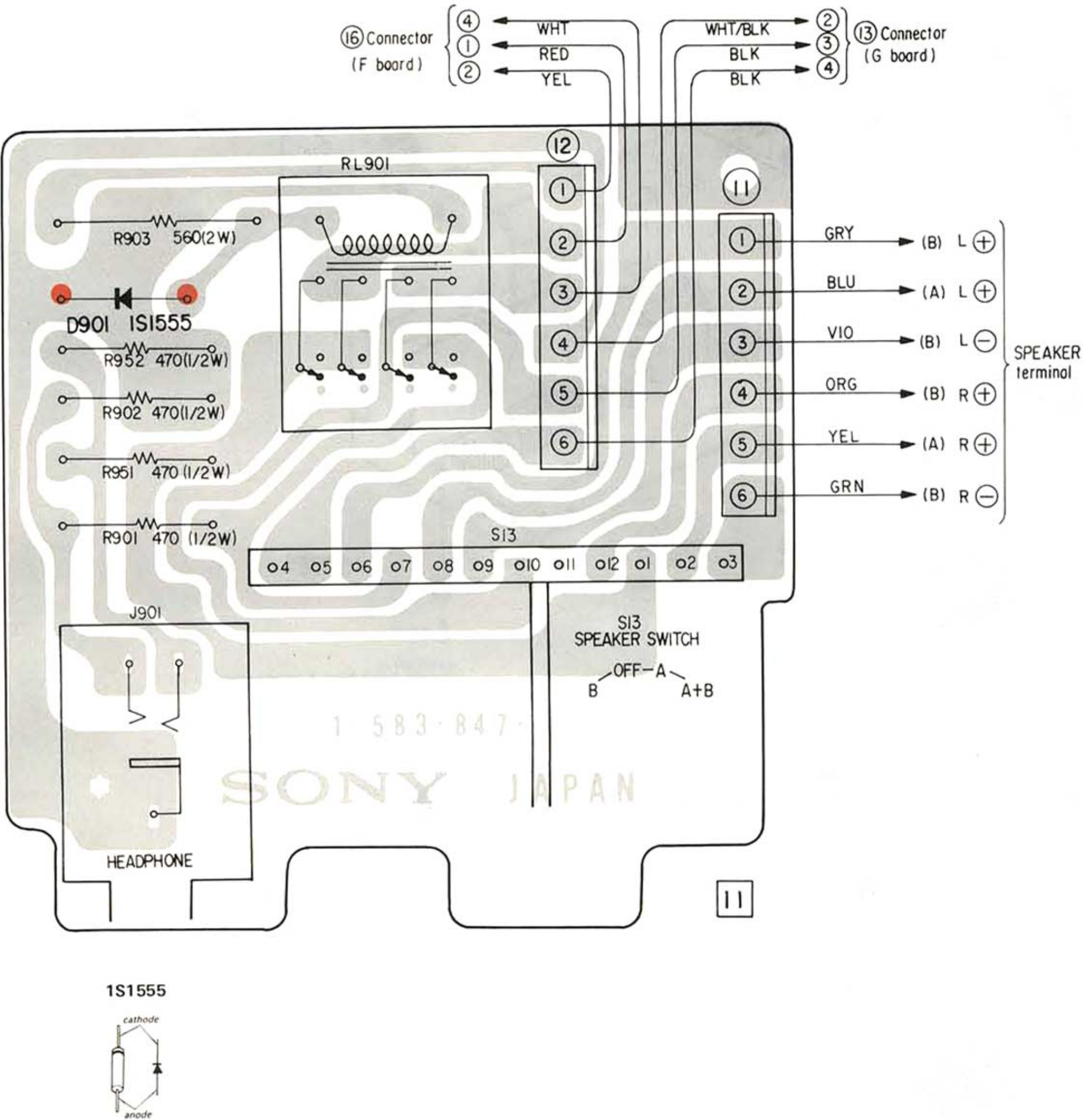


RED : B+
WHT : B-

Q	Q352 2SA705										Q
	Q354 2SC926A	Q355 2SC633A	Q353 2SA705	Q351 2SA678	Q301 2SA705	Q302 2SA705	Q303 2SA705	Q305 2SC633A	Q304 2SC926A	Q306 2SA678	
D	D356 1T22A	D352 VD1221	D351 1S1555	D355 1T22A	D354 1S1555	D304 1S1555	D303 1S1555	D305 1T22A	D302 VD1221	D306 1T22A	D
	D362 2SK60	D357 2SC926A	D358 2SA639S	D359 2SC1670	D361 2SJ18	D414 2SA678	D307 2SC926A	D308 2SA840	D309 2SA639S	D310 2SC1670	

- 2SA678
- 2SA705
- 2SC1670
- 2SA840
- 2SA639S
- 2SC926A
- 2SC633A
- 2SC634A
- 2SK60
- 2SJ18
- 1T22A
- 1S1555
- VD1221

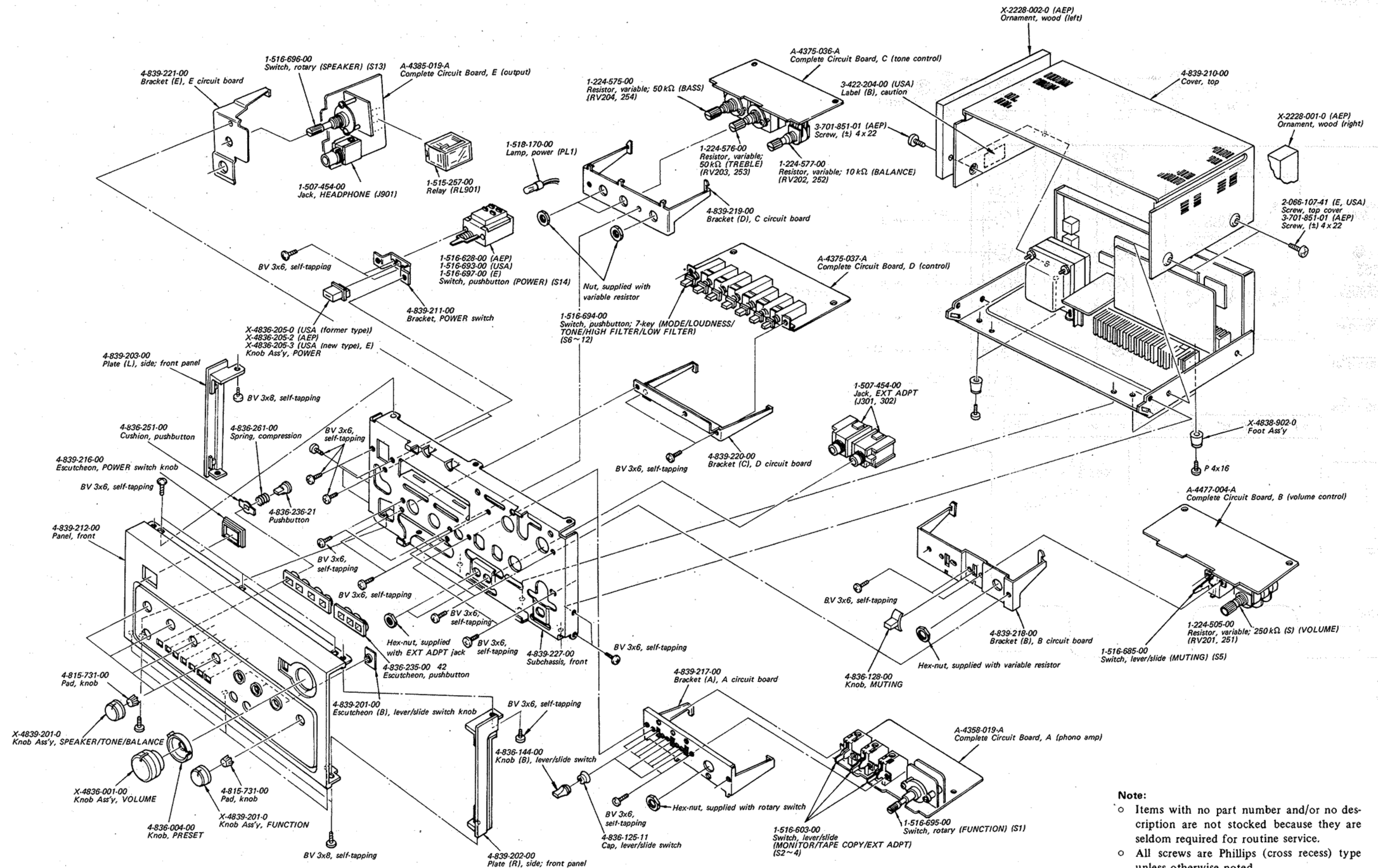
3-12. MOUNTING DIAGRAM — E Board (output) —
 — Conductor Side —



[illegible]

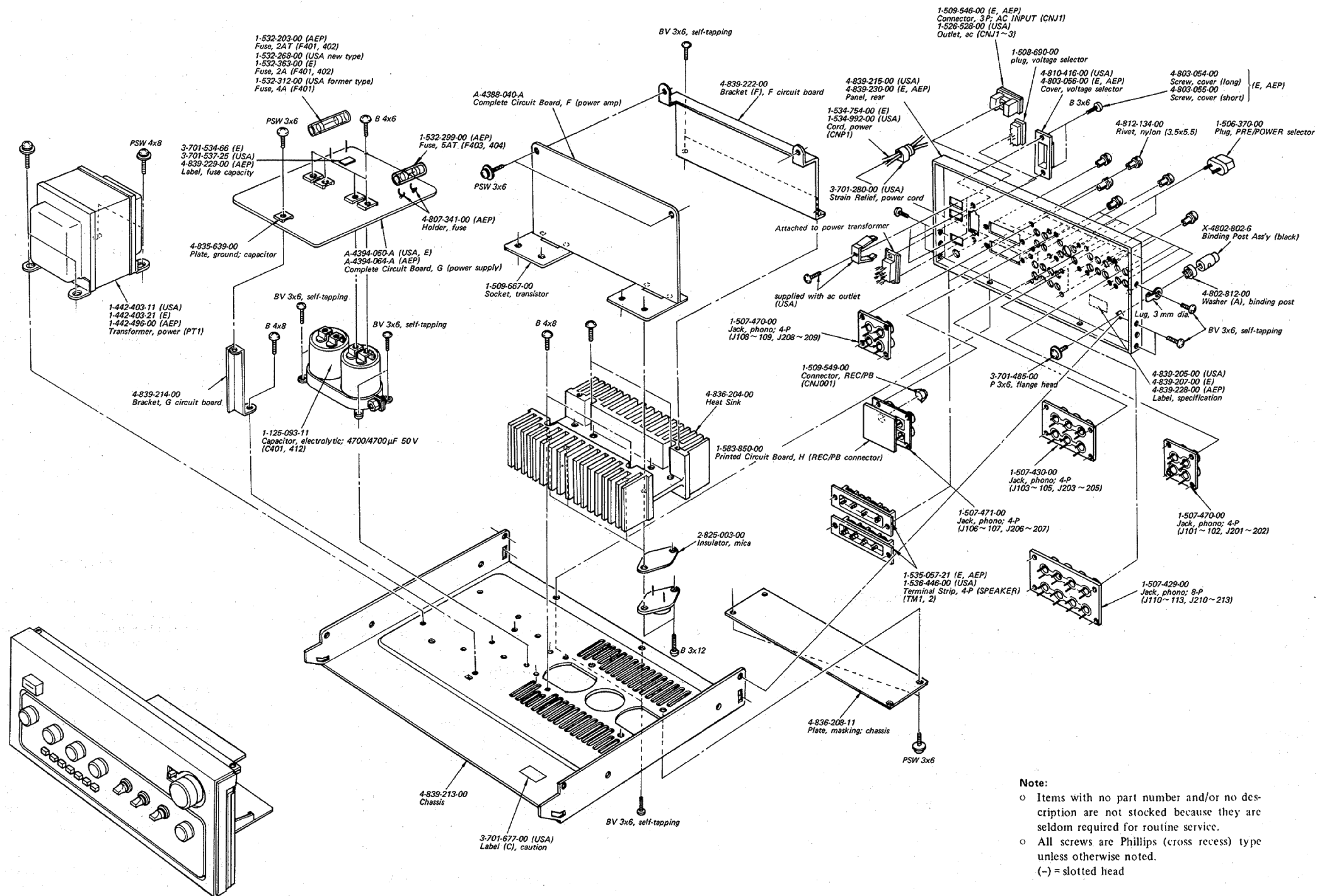
SECTION 4 EXPLODED VIEWS

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



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					
Note: For USA model, former and new B, D, F and G boards are interchangeable respectively.					
A-4358-019-A	A	(phono amp), complete	Q404	2SC634A	
A-4477-004-A	B	(volume control), complete	Q405	2SA678	
A-4375-036-A	C	(tone control), complete	Q406	2SC634A	
A-4375-037-A	D	(control), complete	Q407,Q408	2SA678	
A-4385-019-A	E	(output), complete	Q409,Q410	2SC926A	
A-4388-040-A	F	(power amp), complete	Diodes		
A-4394-050-A	G	(power supply), complete (USA, E model)	D301(D351)	1S1555	
A-4394-064-A	G	(power supply), complete (AEP model)	D302(D352)	VD1221M	
1-583-850-00	H	(REC/PB connector)	D303(D353)	1S1555	
SEMICONDUCTORS			D304(D354)	1S1555	
Transistors			D305(D355)	1T22A	
Q101(Q151)	2SC1636		D306(D356)	1T22A	
Q102(Q152)	2SK63 (FET)		D401,D402	UO-5E	
Q201(Q251)	2SK23A (FET)		D403~D405	10E-2	
Q202(Q252)	2SA705		D406	1T243M	
Q203(Q253)	2SK23A (FET)		D407	10D-6	
Q204(Q254)	2SA705		D408,D409	UO-5E	
Q301(Q351)	2SA678		D410,D411	10E-2	
Q302(Q352)	2SA705		D412,D413	1S1555	
Q303(Q353)	2SA705		D414	VD1221	
Q304(Q354)	2SC926A		D901	1S1555	
Q305(Q355)	2SC634A		TRANSFORMER AND INDUCTORS		
Q306(Q356)	2SA678		L301(L351)	1-407-592-00	Microinductor, 1.8 μ H
Q307(Q357)	2SC926A		PT1	1-442-403-11	Transformer, power (USA model)
Q308(Q358)	2SA840			1-442-403-21	Transformer, power (E model)
Q309(Q359)	2SA639S			1-442-496-00	Transformer, power (AEP model)
Q310(Q360)	2SC1670		CAPACITORS		
Q311(Q361)	2SJ18 (FET)		Capacitors are in μ F, electrolytic type unless otherwise noted. (p= μ μ) The working voltage of 50 volts or less are omitted except for electrolytic type.		
Q312(Q362)	2SK60 (FET)		C001(C051)	1-102-074-11	0.001 ceramic
Q401	2SC634A		C101(C151)	1-121-913-11	3.3 25 V
Q402,Q403	2SC1124		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	47	10 V (USA (former type))
	1-121-424-11	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	47	10 V (USA (former type))
	1-121-414-11	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	100	6.3 V (USA (former type))
	1-121-651-11	10	16 V (USA (new type), E, AEP model)
C307(C357)	1-121-413-11	100	6.3 V (USA (former type))
	1-121-651-11	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	0.001	mylar (USA (former type))
	1-101-881-11	47 p	(USA (new type), E, AEP model)
C409	1-121-352-11	47	10 V (USA (former type))
	1-121-414-11	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	47	50 V (USA (former type))
	1-121-417-00	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	2.2 k, adjustable (power voltage adj.)
RV201 (RV251)	1-224-505-00	250 k(S), variable (VOLUME)
RV202 (RV252)	1-224-577-00	10 k, variable (BALANCE)
RV203 (RV253)	1-224-576-00	50 k, variable (TREBLE)
RV204 (RV254)	1-224-575-00	50 k, 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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