TA-F7/TA-F7B

UK Model
AEP Model

TA-F7: silver panel
TA-F7B: black panel

TA-F7

INTEGRATED STEREO AMPLIFIER

SPECIFICATIONS

GENERAL

Power Requirements: 220 V, 50/60 Hz (AEP model)
240 V, 50/60 Hz (UK model)

Power Consumption: 400 W (AEP model)
410 W (UK model)

Dimensions: Approx. 430 (w) x 170 (h) x 420 (d) mm
17 (w) x 6 3/4 (h) x 16 5/8 (d) inches
Including projecting parts and controls

Weight: Approx. 20.3 kg, 44 lb 12 oz (net)
Approx. 24.3 kg, 53 lb 9 oz (with shipping carton)

PREAMPLIFIER SECTION

Harmonic Distortion: Less than 0.015% at rated output (AEP model)
Less than 0.015% at 1 W (UK model)

IM Distortion: (60 Hz:7 kHz = 4:1)
Less than 0.015% at rated output (AEP model)
Less than 0.015% at 1 W (UK model)

Frequency Response:
PHONO 1, 2 RIAA equalization curve ± 0.2 dB
TUNER, AUX 1, 2, TAPE 1, 2: 5–100,000 Hz $\pm^{0}_{1}$ dB

Tone Controls:
BASS ± 10 dB at 30 Hz (TURNOVER FREQ 150 Hz)
± 10 dB at 60 Hz (TURNOVER FREQ 300 Hz)
TREBLE ± 10 dB at 20 kHz (TURNOVER FREQ 4 kHz)
± 10 dB at 40 kHz (TURNOVER FREQ 8 kHz)

Filters: LOW 12 dB/oct. below 30 Hz
HIGH 12 dB/oct. above 9 kHz

— Continued on next page —

SAFETY-RELATED COMPONENT WARNING !!

COMPONENTS IDENTIFIED BY SHADING AND ⚠ MARK ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

SONY®
SERVICE MANUAL

Inputs:

	Sensitivity	Impedance	Maximum Input Capability (THD 0.015% at 1 kHz)	S/N (weighting network, input level)
PHONO 1 PHONO 2	2.5 mV (-50 dB)	50 kΩ	250 mV (-10 dB)	75 dB (A, 2.5 mV)
TUNER AUX 1, 2 TAPE 1, 2	150 mV (-14.5 dB)	50 kΩ	———	95 dB (A, 150 mV)

Outputs:

	Output Level	Impedance
REC OUT 1,2	150 mV	10 kΩ
PRE OUTPUT	1 V	1.5 kΩ

POWER AMPLIFIER SECTION

Continuous RMS Power Output: (rated output) (Less than 0.015% harmonic distortion)
Both channels driven simultaneously
At 20–20,000 Hz
70 + 70W (8Ω)
According to DIN 45500
70 + 70W (8Ω)

Power Bandwidth: 5–40,000 Hz, IHF (8Ω, 0.015 THD)
Damping Factor: 60 (8Ω, 1 kHz)
Harmonic Distortion: Less than 0.015% at rated output
Less than 0.015% at 1W output
IM Distortion: (60 Hz:7 kHz = 4:1) Less than 0.015% at rated output
Less than 0.015% at 1W output
Frequency Response: dc-100,000 Hz $^{0}_{-1}$ dB (1W)
S/N Ratio: Greather than 110 dB, short-circuited input
Residual Noise: Less than 0.12 mV
Inputs: POWER INPUT
Sensitivity 1V (for rated output)
Impedance 100 kΩ
Outputs: SPEAKER A, B
Accept speakers of 8Ω or more
HEADPHONES
Accepts low- and high-impedance stereo headphones

0 dB = 0.775 V

MODEL IDENTIFICATION

— Specification Label —

UK model

SONY®
INTEGRATED STEREO AMPLIFIER
MODEL NO. TA-F7
AC 240V ~ 50/60Hz 410W
SERIAL NO.
MADE IN JAPAN

SONY®
INTEGRATED STEREO AMPLIFIER
MODEL NO. TA-F7B
AC 240V ~ 50/60Hz 410W
SERIAL NO.
MADE IN JAPAN

AEP model

SONY®
INTEGRATED STEREO AMPLIFIER
MODEL NO. TA-F7
AC 220V ~ 50/60Hz 400W
SERIAL NO.
MADE IN JAPAN

SONY®
INTEGRATED STEREO AMPLIFIER
MODEL NO. TA-F7B
AC 220V ~ 50/60Hz 400W
SERIAL NO.
MADE IN JAPAN

SECTION 1
OUTLINE

1-1. CIRCUIT DESCRIPTION

1-1-1. Equalizing Amplifier

Refer to Fig. 1-1. The input signal from PHONO 1 or PHONO 2 goes to the gate G1 of the dual-FET differential amplifier Q101 and the feedback signal from the output goes to the gate G2. Q101 amplifies these two input signals, and its output signals at the drains D1 and D2 are in reversed phase. Q106 and D101 are the load of the differential amplifier and compose a current-mirror circuit. This current mirror makes the diffential amplifier have more gain and less distortion by re-using the output current in other than the load of the differential amplifier and making it a load current. The output signal appeared in the drain D1 next goes to the base of Q107.

Q107 and Q108 compose a darlington circuit, and this circuit has a proper gain by having a constant-current source Q109. Q102 in the source return of the differential amplifier Q101 is a constant-current source and serves as an infinite impedance against the input signal to the differential amplifier. Transistor Q102 is used instead of a large resistor in this stage, because the dual FET Q101 is drawing a relatively large current from the limitted B+ voltage to improve audio quality.

Q103 and Q104 compose a voltage regulator and the voltage V_0, namely the base-bias of Q102, is maintained constant to make Q102 stable. The current I_1 which flows through the constant-current source Q102 is expressed as

$$I_1 \fallingdotseq \frac{V_0 - V_{BE1}}{R106}$$

where $V_0 = V_{BE2} + V_1$

V_1 is determined by I_0 which flows through R112 by V_{BE2}

So, I_1 is determined by V_{BE1} and V_{BE2} and is independent upon B+ and B- voltages, namely I_1 is constant.

Furthermore, this equalizing amplifier is stabilized dc-current-wise by utilizing a dc feedback circuit of Q105 as well as the dependent feedback circuit to produce the RIAA deemphasis curve. Here, Q105 serves as a voltage follower and its dc gain G is determined as

$$G \fallingdotseq \frac{R110}{R107} \fallingdotseq 30\,dB$$

The lower-side cutoff frequency is determined by R116 and C107 in the gate circuit of Q105.

The RIAA curve to be used as a record amplifier is produced by the feedback components C105, C106, R108, R109, R120 and C109. And the output signal is fed back to the gate G2 of Q101, thus making a voltage feedback loop.

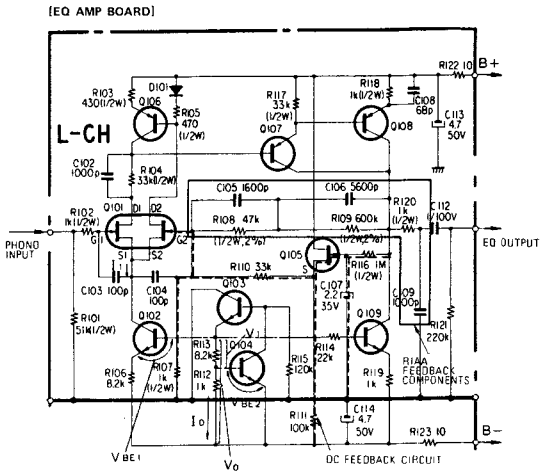


Fig. 1-1.

1-1-2. Power Amplifier

(1) Class-A Amplifier

Refer to Fig. 1-2 and Fig. 1-3. The output signal from the preamplifier section goes to the gate G1 of the dual-FET differential amplifier Q605. The output signal of the class-B amplifier is fed through a feedback route back to the other gate G2 of Q605. These two input signals are amplified in Q605 and mutually reversed-phase output signals are obtained at its drains D1 and D2. Q603, Q604 and Q605 are composing a cascoded differential amplifier, and Q601 and Q602 are its load. Q601 and Q602 also compose a current-mirror circuit and of a push-pull configuration. By utilizing this current-mirror circuit, two outputs are compounded resulting in a high amplification with less distortion.

Due to the high-gain operation of the first stage, Q603 and Q604 lock the drain voltage V_D of Q605 and shift the level, and thus reducing noise component produced by the drain current. The locked drain voltage V_D is expressed as

$$V_D \fallingdotseq V_{CC} \times \frac{R604}{R603 + R604} \fallingdotseq 15\,V$$

The output signal at the drain of Q603 next goes to the class-A cascoded amplifier composed of Q607 and Q608 which has a constant-current load Q611. And its output signal is next applied to and voltage amplified by the following class-B amplifier.

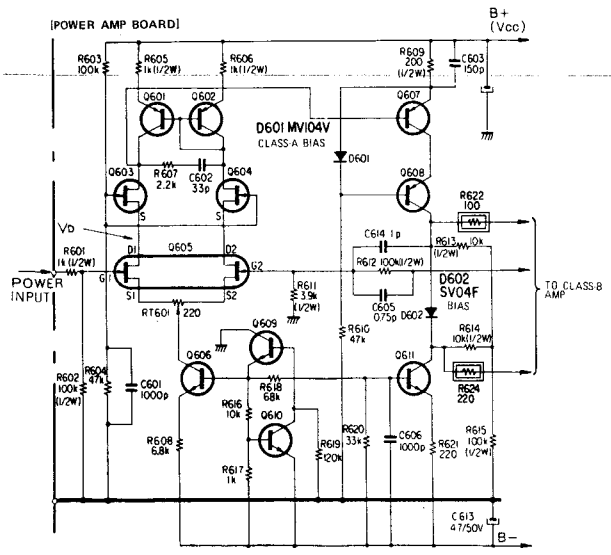


Fig. 1-2.

These two cascoded amplifiers composed of Q603 to Q605, and of Q607 and Q608 are the combination of the common emitter (or source) and common base (or gate) circuits. In these amplifiers, the mirror effect due to the feedback capacitor from the output side does not present, so they are increasing the transmission capability of high-frequency component. Furthermore, R607 and C602 are connected inbetween the drains of Q603 and Q604 of the first-stage cascoded differential amplifier to make the load impedance low at high frequency, and thus reducing the fluctuation of the amplifier gain.

(B) Class-B Amplifier

Refer to Fig. 1-3. These class-B amplifiers are cascode-type amplifiers utilizing features of the bipolar transistors and V-FETs, and they are improving the signal-transmission characteristics.

Q616 is a class-B driver and emitter follower followed by the final-stage power amplifier. The final-stage power amplifier is a pure-complementary circuit composed of cascode configuration of Q618, Q619 and Q901 to Q903.

When the bipolar transistors and V-FETs are connected in a cascode configuration, V_{CE} of the bipolar transistors Q618 and Q619 becomes the reversed bias of the gate of V-FET and this bias prevents V-FET from damaging, otherwise V-FET may be damaged by a huge current equivalent to I_{DSS}. This reversed bias of V-FET provides a good rejection characteristis against the fluctuation of the power supply voltage. In this configuration, the voltage applied to the bipolar transistor becomes as low as around 15 V and bipolar transistors with a high transition frequency f_T can be combined.

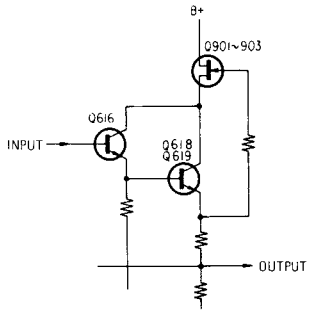


Fig. 1-3.

1-1-3. Power Supply

Refer to Fig. 1-4. This regulated power supply provides a power for the class-B amplifier. This voltage regulator uses a constant-current circuit Q706 in the base-bias circuit of the control transistors Q704 and Q705. And this voltage regulator provides a high input impedance, low output impedance and a good regulation against the fluctuation in the input voltage.

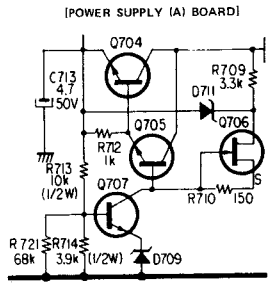


Fig. 1-4.

Fig. 1-5 shows the basic voltage-regulating circuit.

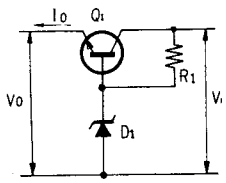


Fig. 1-5.

The voltage regulation factor is expressed as

$$\frac{\Delta V_o}{\Delta V_i} \fallingdotseq \frac{Rd}{R1 + Rd}$$

where, ΔV_o = fluctuation of output voltage
ΔV_i = fluctuation of input voltage
Rd_1 = active resistance of D1

Accordingly, on a constant Rd_1, the larger R1 the better a voltage regulation. In the circuit in Fig. 1-4, a good voltage regulation is obtained by utilizing an FET-type constant-current source and a large R1.

The output impedance of the circuit in Fig. 1-5 is expressed as

$$R_o \fallingdotseq \frac{\Delta V_o}{\Delta I_o}$$

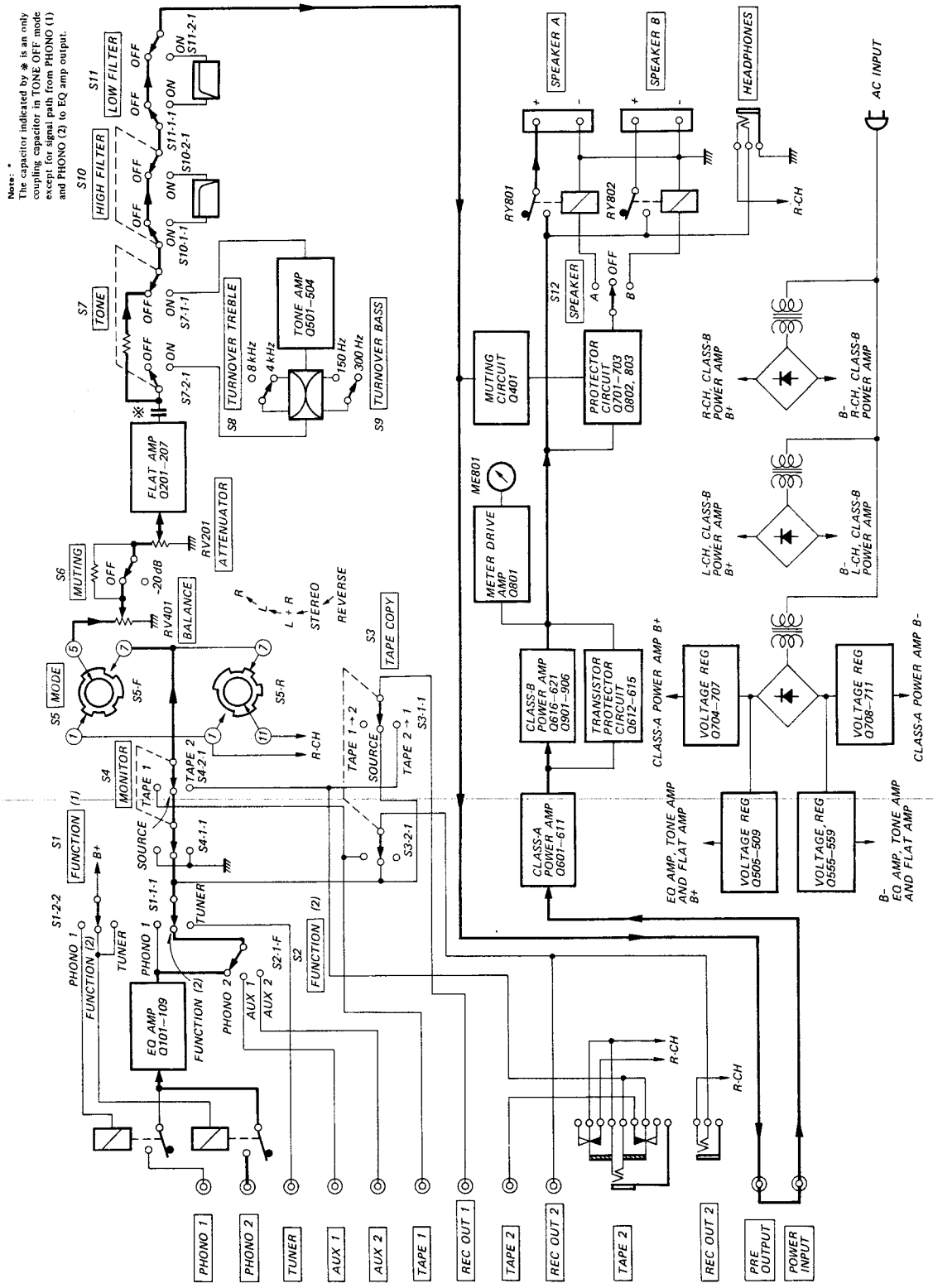
$$\fallingdotseq \frac{Rb + Rd}{1 + h_{FE}}$$

where, Rb = base resistance of Q1
h_{FE} = current amplification factor of Q1

Therefore, a low output impedance is obtainable with a transistor having a large h_{FE}. So in the actual circuit in Fig. 1-4, a darlington configuration is used in the place of Q1 in Fig. 1-5 together with a large resistance R1.

To obtain a good rejection factor against the ripple component, a bootstrap circuit composed of R709 and D711 is used.

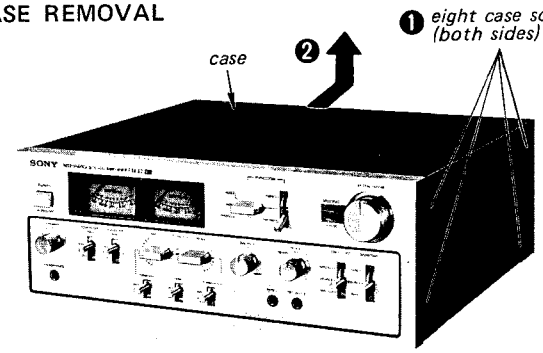
1-2. BLOCK DIAGRAM



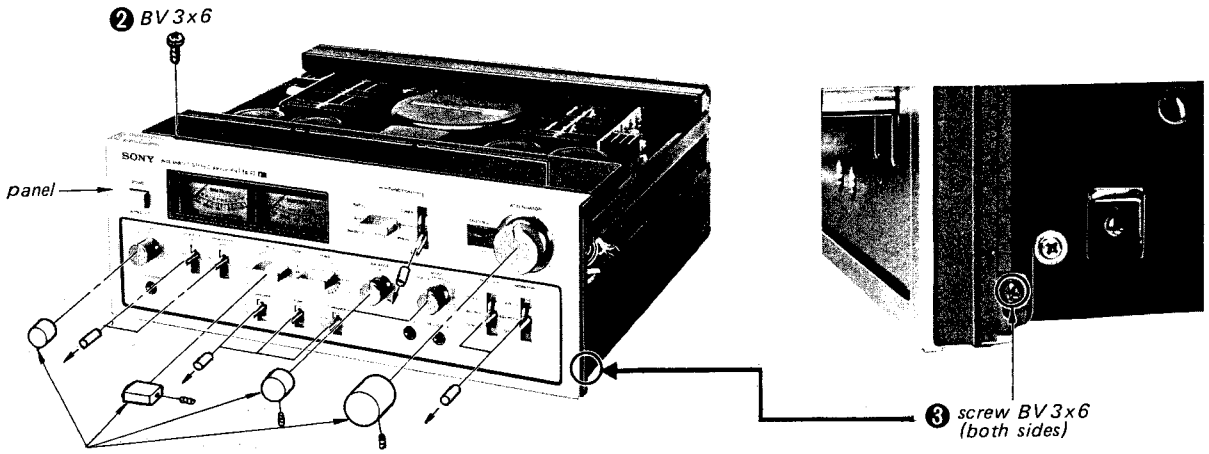
SECTION 2
DISASSEMBLY

Note: Remove in the numerical order.

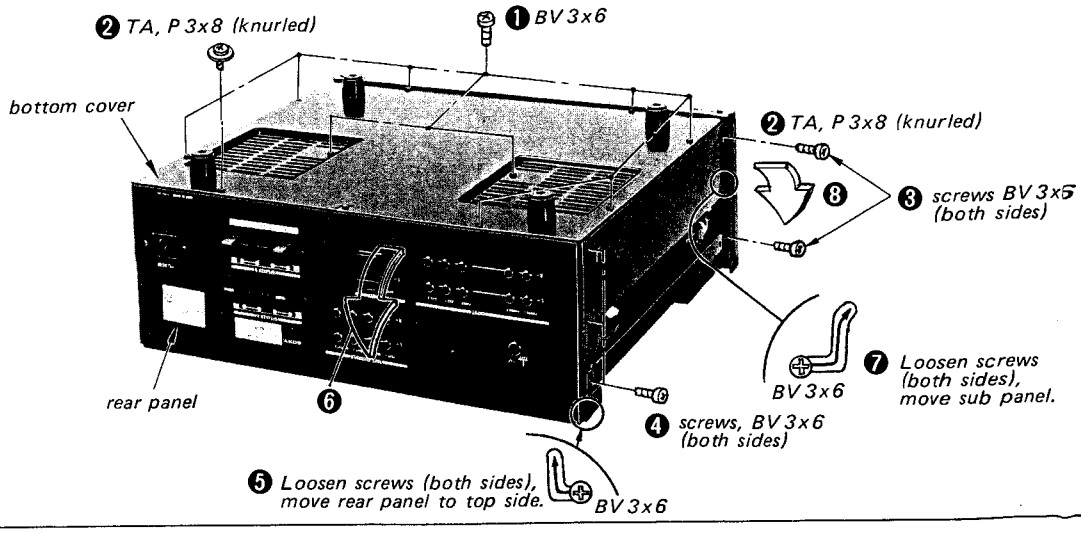
CASE REMOVAL



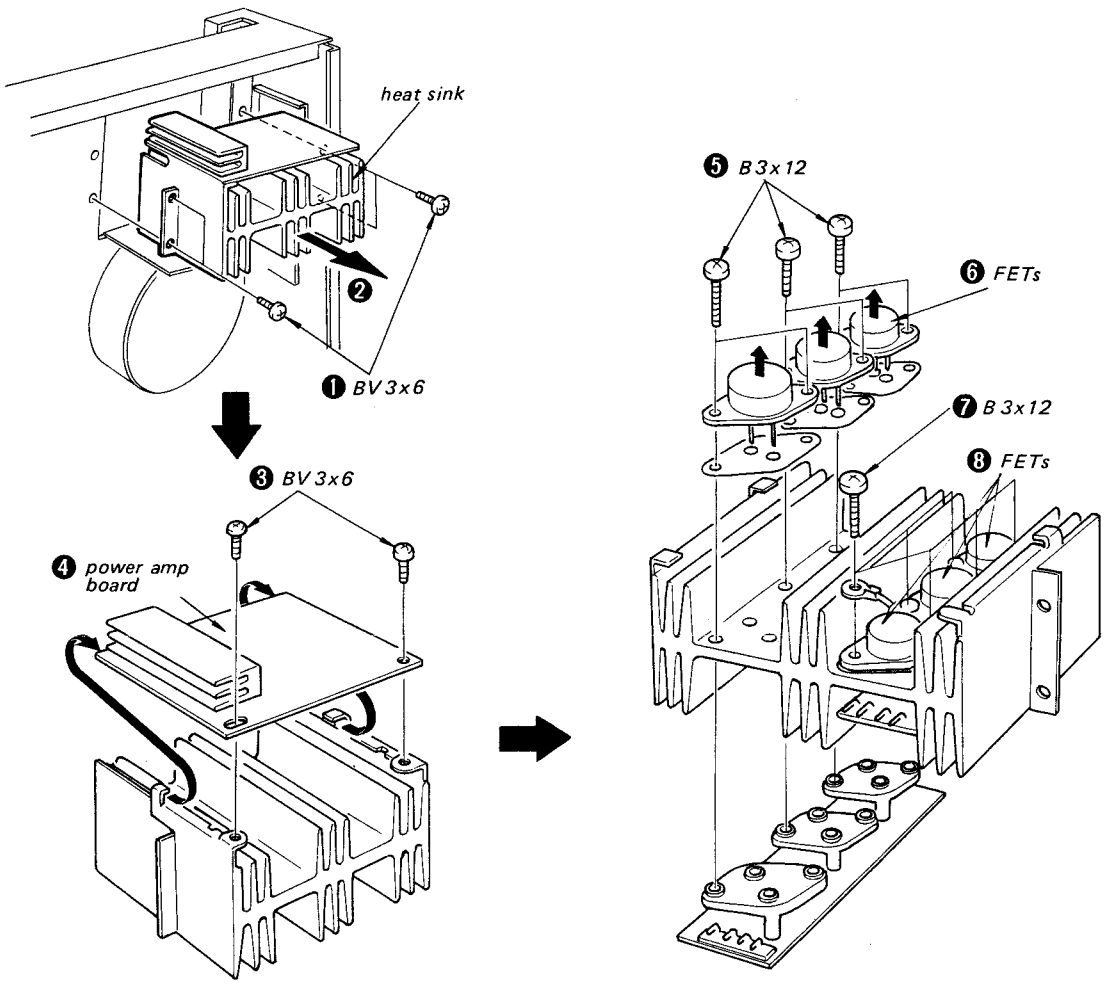
PANEL REMOVAL



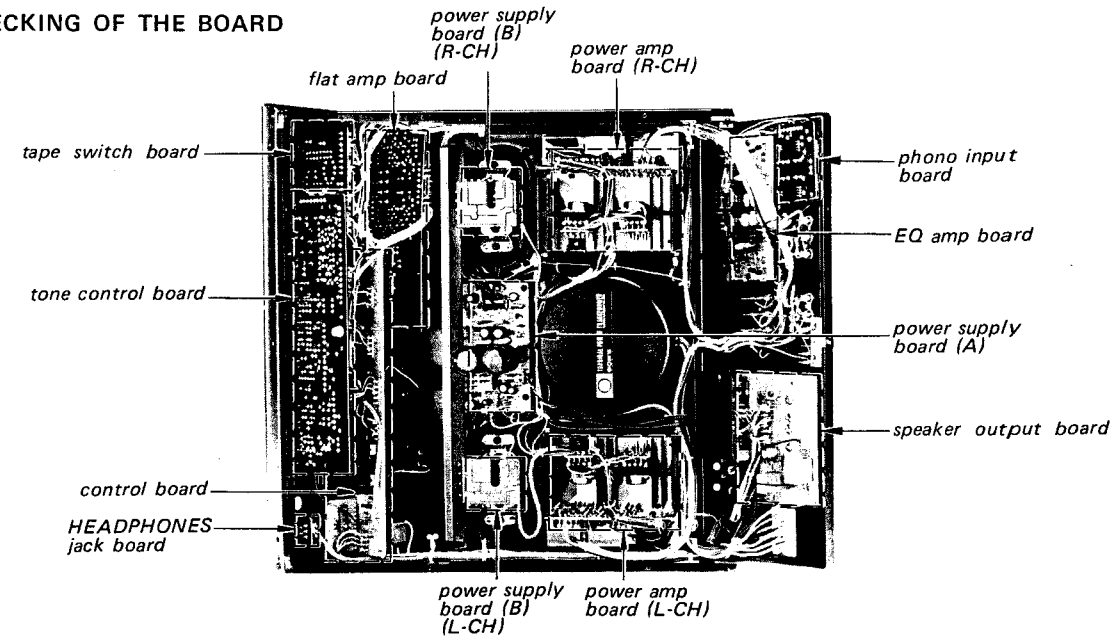
BOTTOM COVER REMOVAL AND PANEL OVERTURNING



POWER V-FET REPLACEMENT



CHECKING OF THE BOARD



SECTION 3
ADJUSTMENT

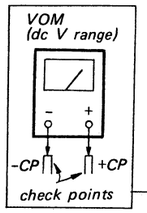
Note: 1. As outlined in the circuit description, this set uses bipolar transistors and V-FETs in cascode circuit to maintain stable biasing. When replacing the three P-channel V-FETs 2SK60 and/or the three N-channel V-FETs 2SJ18 in each channel, use three matched ones which have the same Vp (pinch-off voltage)-rank figure printed on them as shown below. The fluctuation of the Vp rank of the three can be acceptable on one-rank-difference basis.

Vp (pinch-off voltage) rank

2. When the power transistors are replaced, be sure to perform the DC BIAS and DC BALANCE adjustments again.
3. Perform DC BIAS and DC BALANCE adjustments a few minutes passed after POWER switch turned ON.
4. Repeat DC BIAS and DC BALANCE adjustments a few times because they affect each other.

DC Balance Adjustment

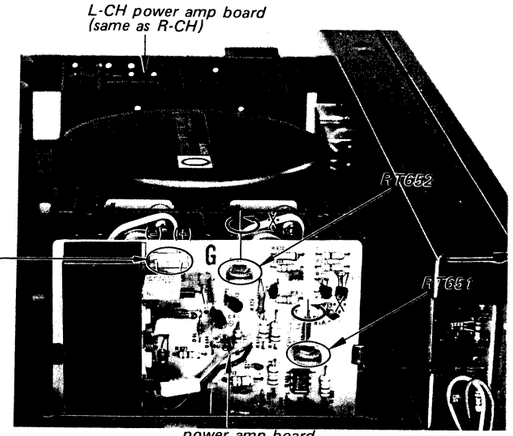
1. Connect a dc millivoltmeter to SPEAKER terminals.
2. Turn POWER switch ON. Adjust RT601 (L-CH) and RT651 (R-CH) for 0V reading on the millivoltmeter.



Note:
When the controls are turned in the arrowed direction ※ , voltage reading increases.
Same power-amp circuit boards are used in both L- and R-channels. Component reference numbers printed on the circuit board are different from the circuit and mounting diagrams.

DC Bias Adjustment

1. Connect a VOM to the dc-bias check points.
2. With no input signal, adjust RT602 (L-CH) and RT652 (R-CH) for 12 mV reading on VOM.



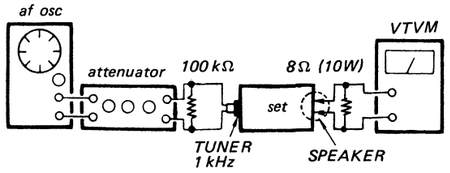
Power Meter Adjustment

Setting:

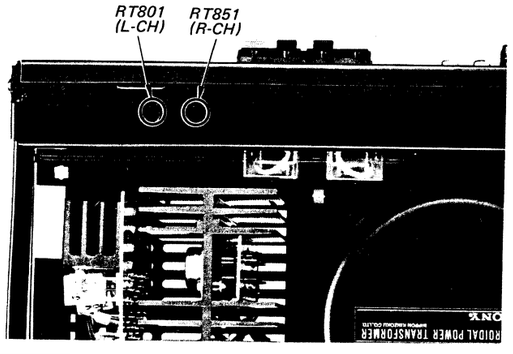
ATTENUATOR control:	maximum		
HIGH FILTER switch:	OFF	TONE controls:	mechanical mid
LOW FILTER switch:	OFF	BALANCE control:	mechanical mid
MONITOR switch:	SOURCE	MUTING switch:	OFF
FUNCTION switch:	TUNER		

Procedure:

1.



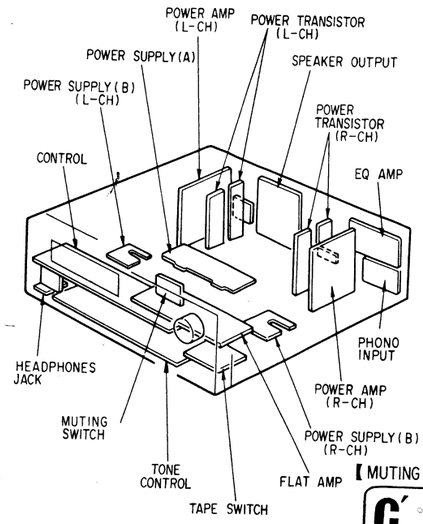
2. Adjust attenuator for 8.9V (10W) reading on VTVM.
3. Adjust RT801 (L-CH) and RT851 (R-CH) so that power meters indicate 10W.

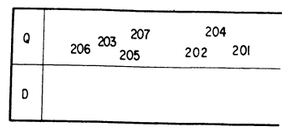


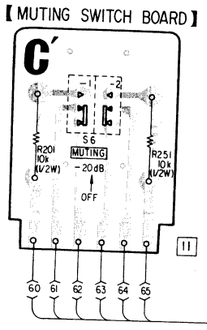
SECTION 4
DIAGRAMS

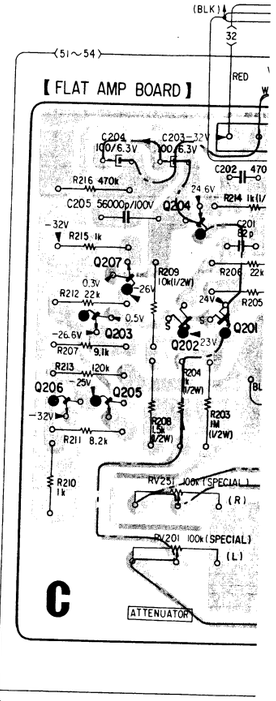
4-1. MOUNTING DIAGRAM (1) — Preamplifier Section —

CIRCUIT BOARD LOCATION







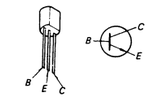


Replacement Semiconductors

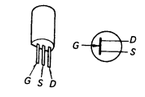
For replacement, use semiconductors except in ( ).

Q101, 151: 2SK97

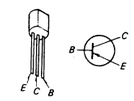
Q102–104, Q152–154, Q203, 205, 206, Q253, 255, 256: 2SC1128



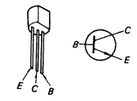
Q105, 155: 2SK43-2 (2SK43)
Q201, 202, Q251, 252: 2SK43-3A (2SK43)



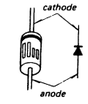
Q106, 107, Q156, 157, Q108, 158, Q204, 254: 2SA639S / 2SA896



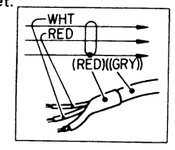
Q109, 159, Q207, 257: 2SC1811



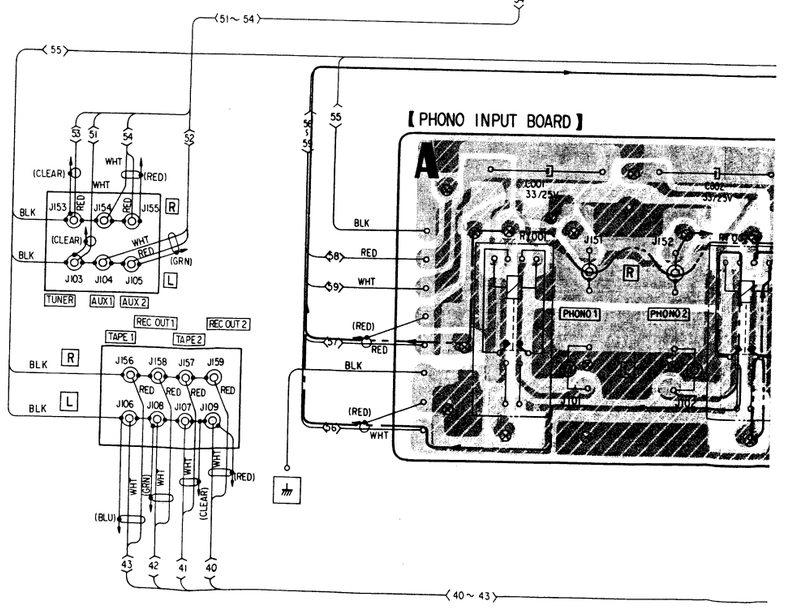
D101, 151: 1S1555



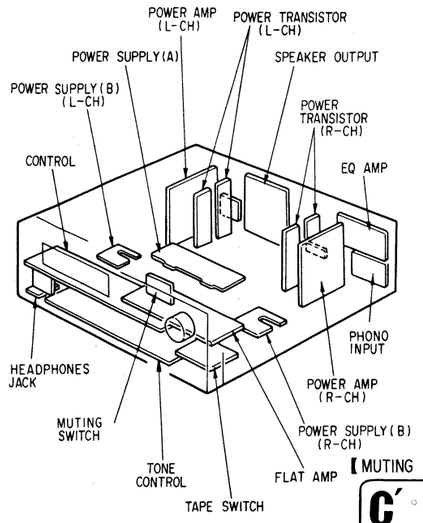
Note:
- Color code of sleeving over the end of the jacket.

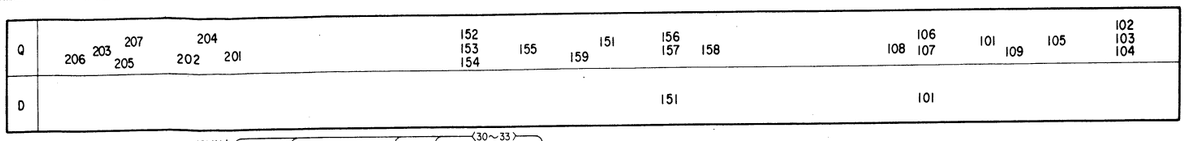


- ⊗ : Through hole.
- ▨ : component-side pattern.
- ▩ : B+ pattern.
- ▩ : B- pattern.



CIRCUIT BOARD LOCATION





Replacement Semiconductors

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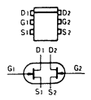
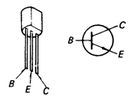
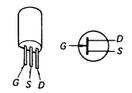
Q101, 151: 2SK97



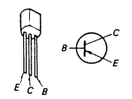
Q102–104, Q152–154, Q203, 205, 206, Q253, 255, 256: 2SC1128



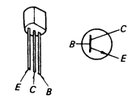
Q105, 155: 2SK43-2 (2SK43)
Q201, 202, Q251, 252: 2SK43-3A (2SK43)



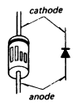
Q106, 107, Q156, 157: 2SA639S
Q108, 158, Q204, 254: 2SA896



Q109, 159, Q207, 257: 2SC1811

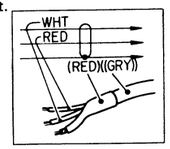


D101, 151: 1S1555



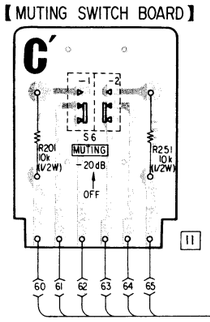
Note:

- Color code of sleeving over the end of the jacket.

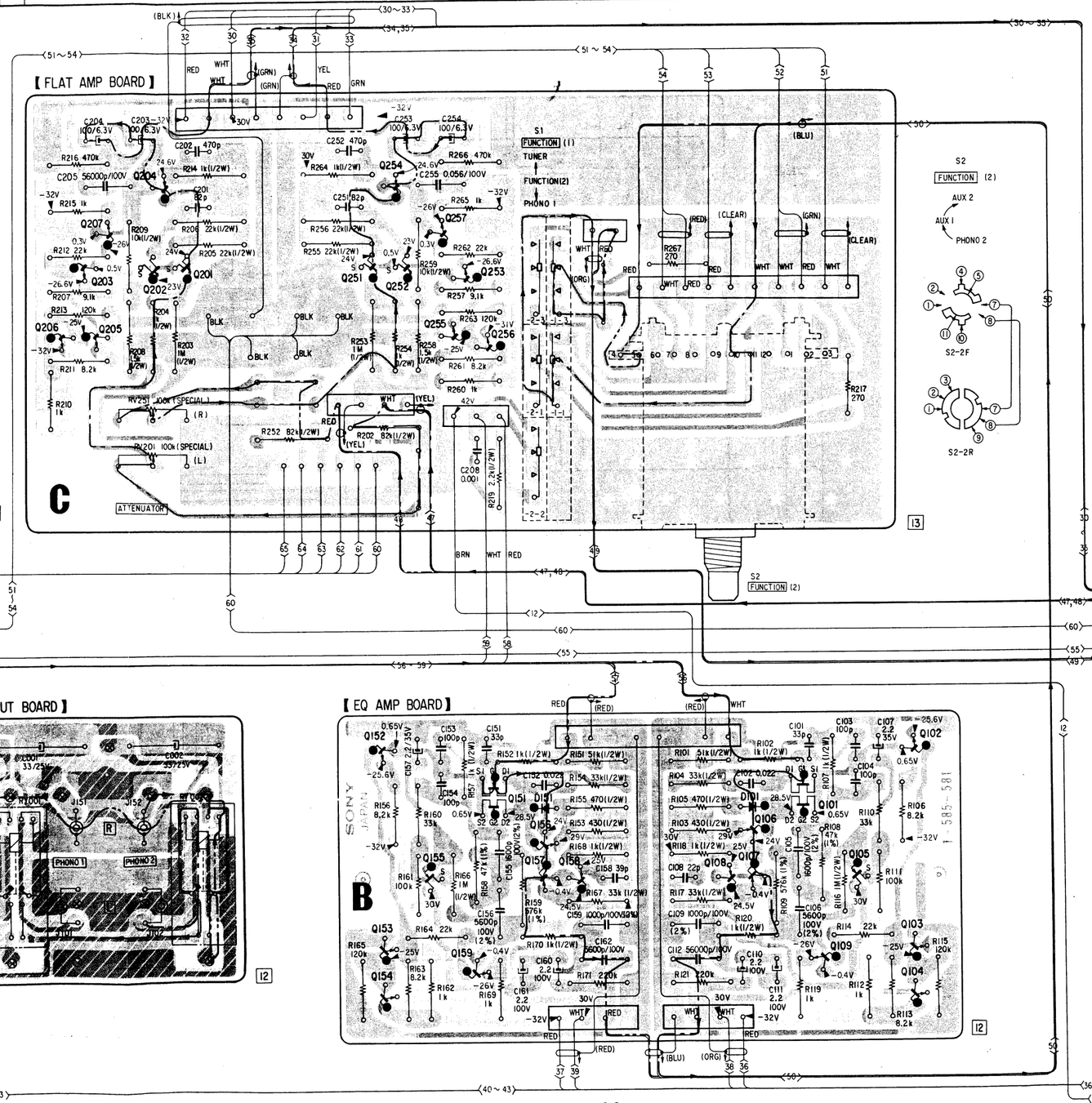


- ⊗ : Through hole.
- ▨ : component-side pattern.
- ▬ : B+ pattern.
- ▬ : B– pattern.

【MUTING SWITCH BOARD】

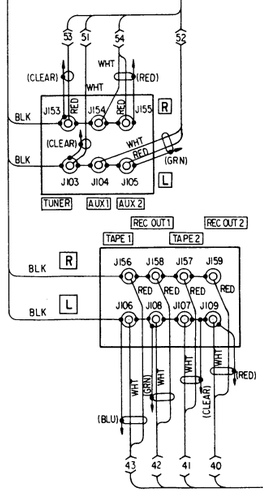


【FLAT AMP BOARD】



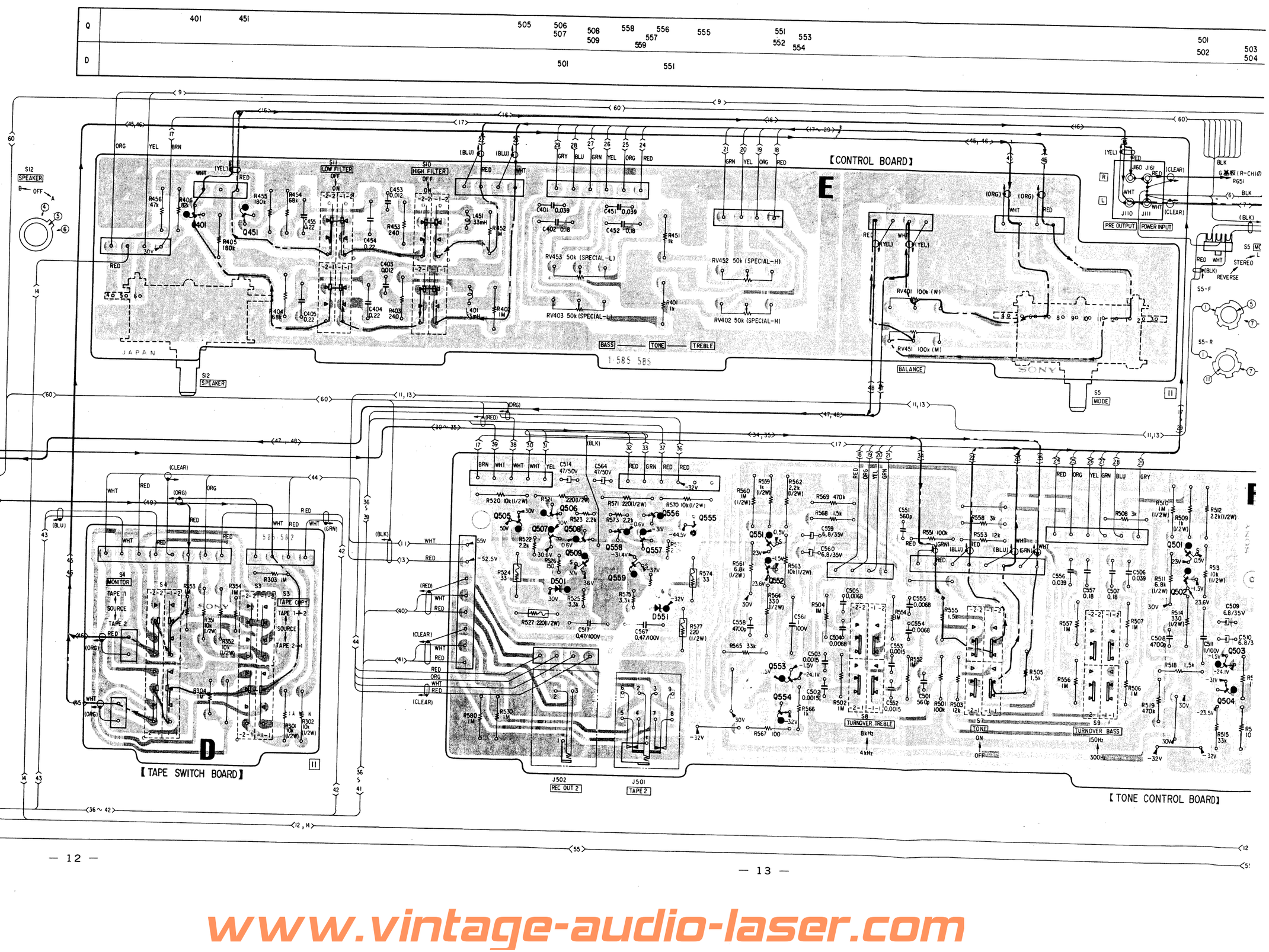
【PHONO INPUT BOARD】

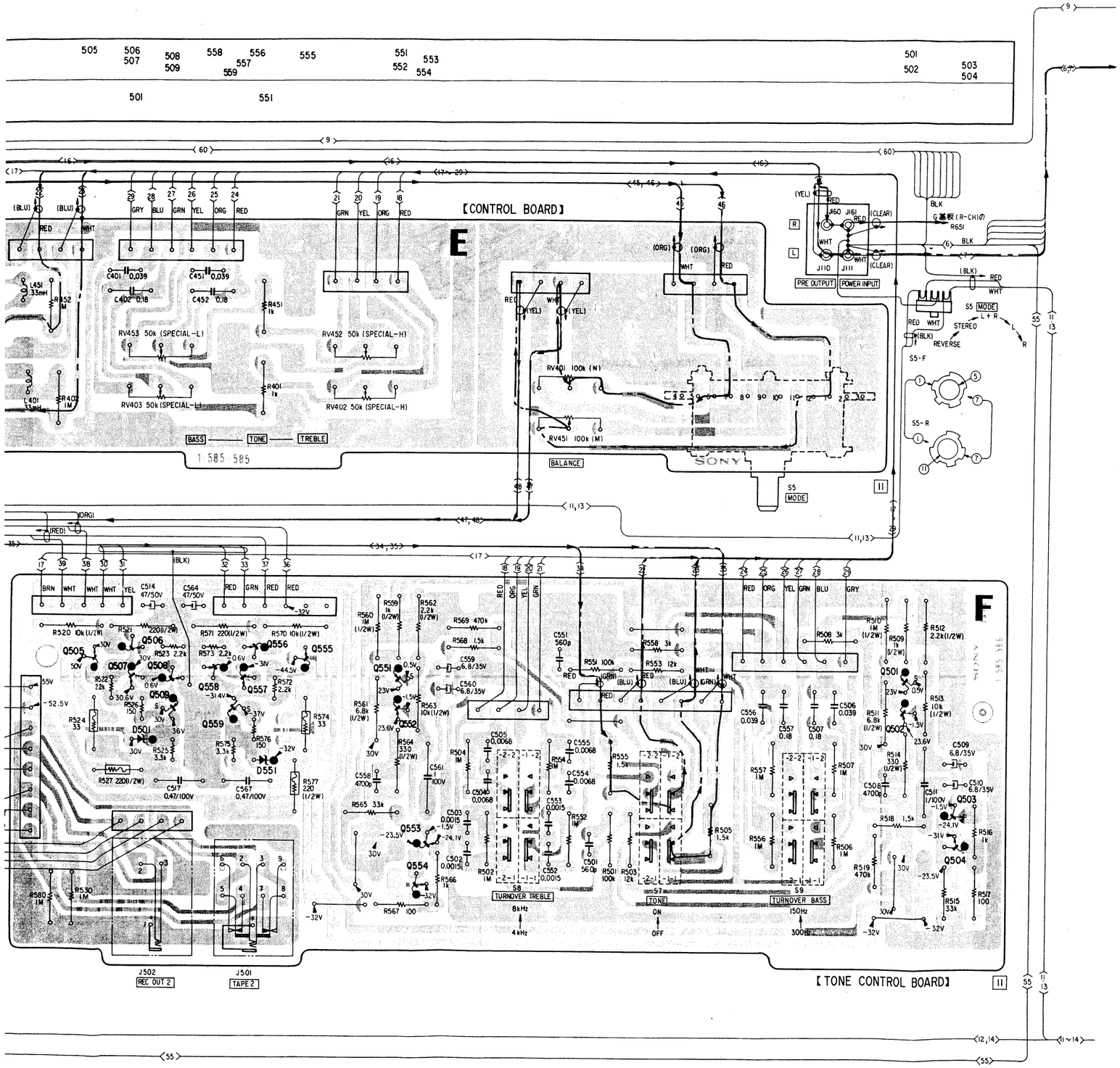
【EQ AMP BOARD】



4-2. MOUNTING DIAGRAM (2) – Control Amplifier Section – *– Conductor Side –*

TA-F7/TA-F7B TA-F7/T

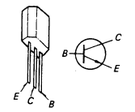




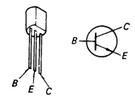
Replacement Semiconductors

For replacement, use semiconductors except in ( ).

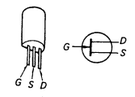
Q401, 451: 2SC1636



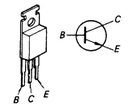
Q504, 554: 2SC1128



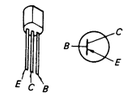
Q501, 551: 2SK43-3A (2SK43)



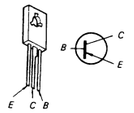
Q505: 2SC1061



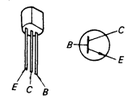
Q502, 552: 2SA896



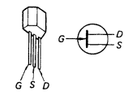
Q507, 556, 558: 2SA899



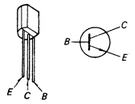
Q503, 553: 2SC1811



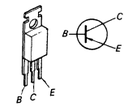
Q509, 559: 2SK42-2 (2SK42)



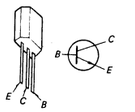
Q506, 508, 557: (2SC945)



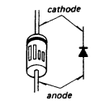
Q555: 2SA671



Q506, 508, 557: 2SC634A

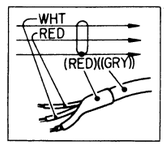


D501, 551: EQA01-07

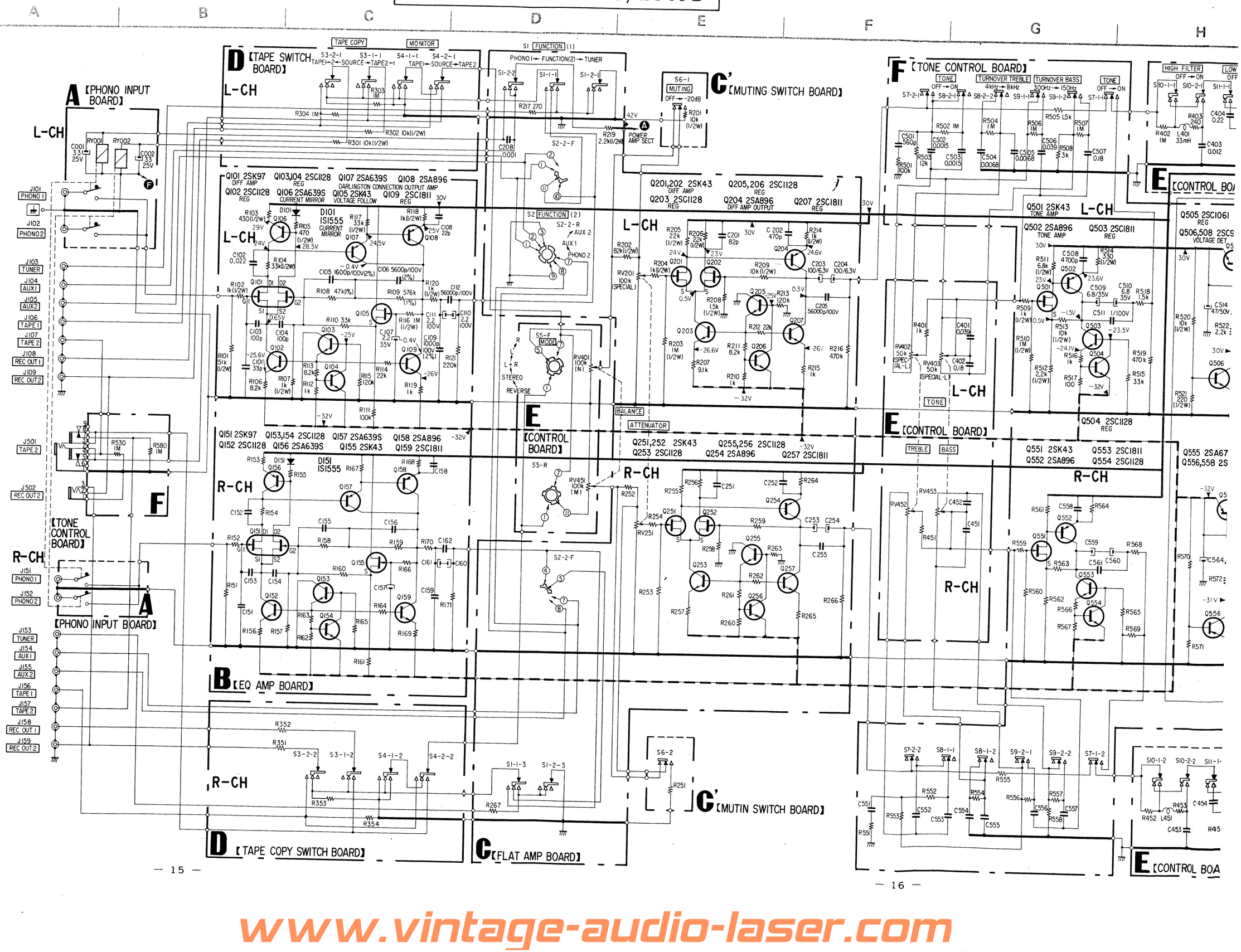


Note:

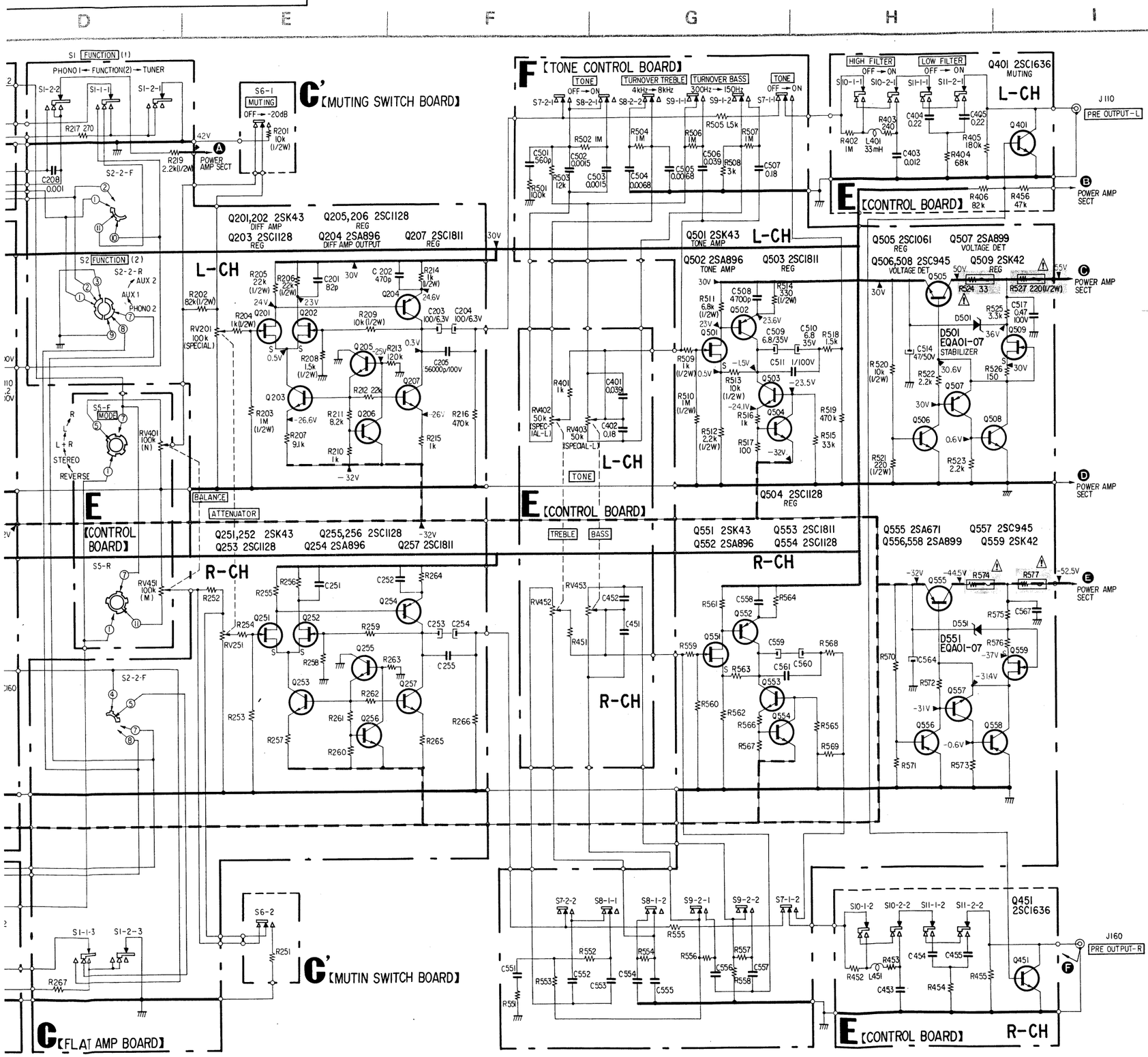
- Color code of sleeving over the end of the jacket.



- ▬ : B+ pattern.
- ▬ : B- pattern.



TA-F7/TA-F7B



Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note:

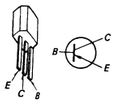
- Components for right channel have same values as for left channel. Reference numbers are coded from.
- All capacitors are in μF unless otherwise noted. pF = μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ = 1000Ω, MΩ = 1000kΩ
- ⏦ : fusible resistor.
- 0% indicates component tolerance.
- ▬ : B+ bus.
- ▬▬▬ : B- bus.
- ▭ : panel designation.
- Readings are taken under no signal conditions with a VOM (20kΩ/V).
- Switch

Ref. No.	Switch	Position
S1	FUNCTION (1)	FUNCTION (2)
S2	FUNCTION (2)	PHONO 2
S3	TAPE COPY	SOURCE
S4	MONITOR	SOURCE
S5	MODE	REVERSE
S6	MUTING	OFF
S7	TONE	OFF
S8	TURNOVER TREBLE	4 kHz
S9	TURNOVER BASS	300 Hz
S10	HIGH FILTER	OFF
S11	LOW FILTER	OFF

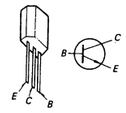
Replacement Semiconductors

For replacement, use semiconductors except in ( ).

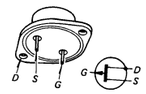
Q601, 602
Q651, 652
Q612, 615
Q662, 665
Q702, 802
Q803 : 2SA678



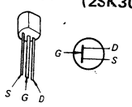
Q613, 614
Q663, 664
Q701, 703
Q801, 851 : 2SC634A



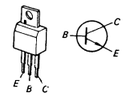
Q904–906
Q954–956 : 2SJ18



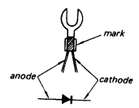
Q603, 604
Q653, 654 : 2SK30A-GR (2SK30A)



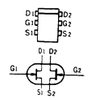
Q616, 666: 2SC1124



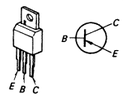
D601, 651: (MV104V)



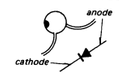
Q605, 655: 2SK97



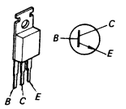
Q617, 667: 2SA706



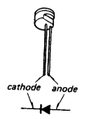
D601, 651: KB462S



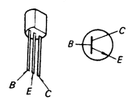
Q704: 2SC1061
Q618, 619
Q668, 669 : 2SC1173



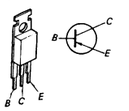
D602, 652: SV04F



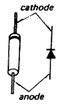
Q606, 609
Q610, 656
Q659, 660 : 2SC1128



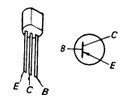
Q710: 2SA671
Q620, 621
Q670, 671 : 2SA473



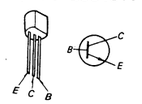
D603–606
D653–656
D707 : 1S1555
D701–706: 10E2
D708: 10E2 (10E1)
D801, 802
D851, 852 : 1T22A



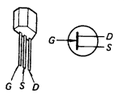
Q607, 657: 2SA639S
Q608, 658: 2SA896



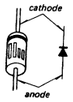
Q611, 661: 2SC1811



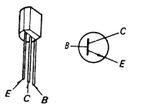
Q706, 711: 2SK42-2 (2SK42)



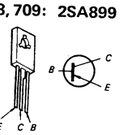
D709, 710: EQB01-11Z (EQA01-11R
D711, 712: EQB01-07 (EQA01-07)



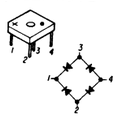
Q705, 707: (2SC945)



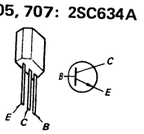
Q708, 709: 2SA899



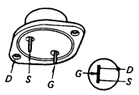
D751, 752: S5VB



Q705, 707: 2SC634A

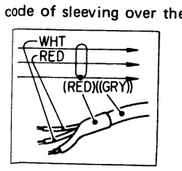


Q901–903
Q951–953 : 2SK60

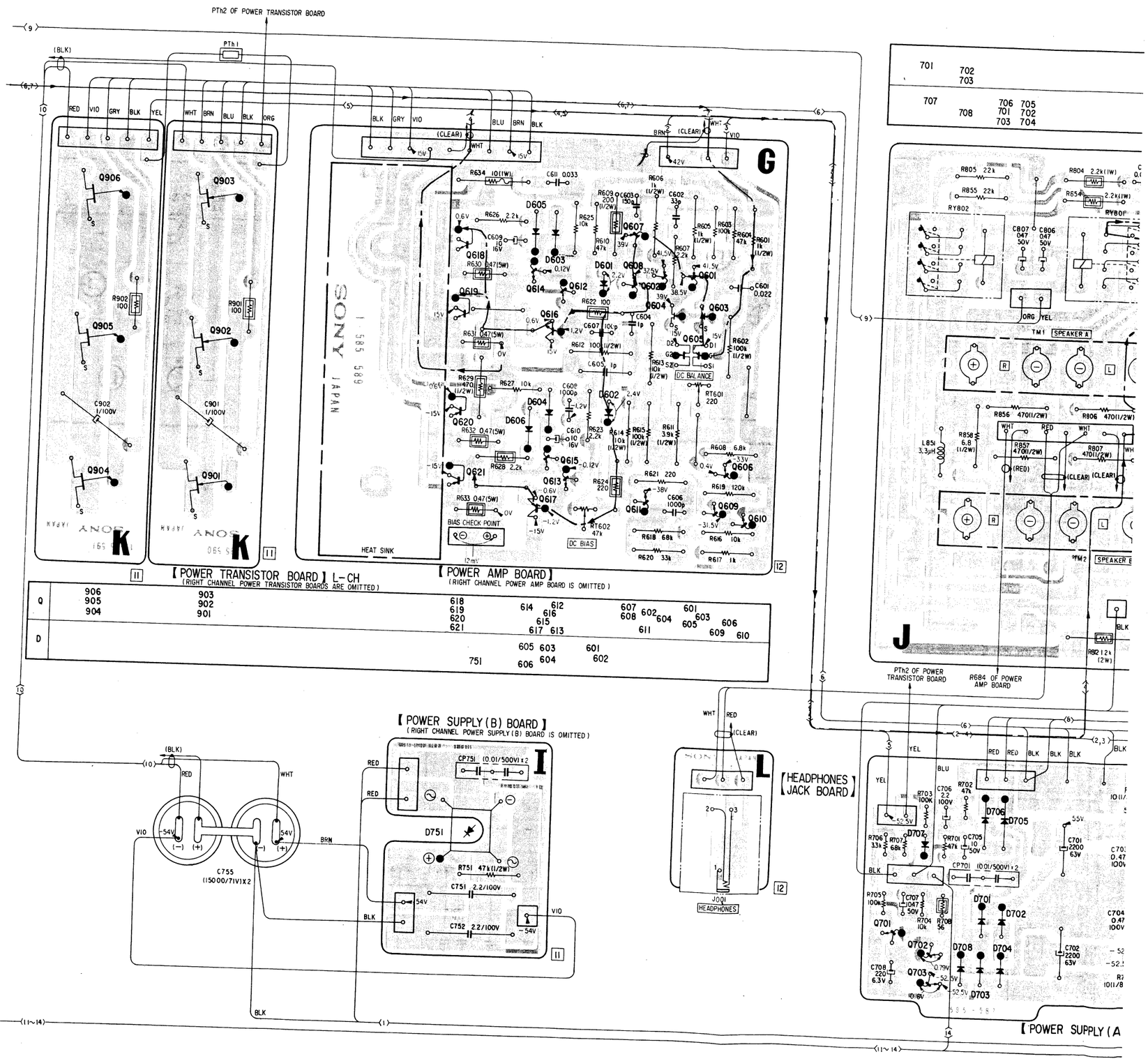


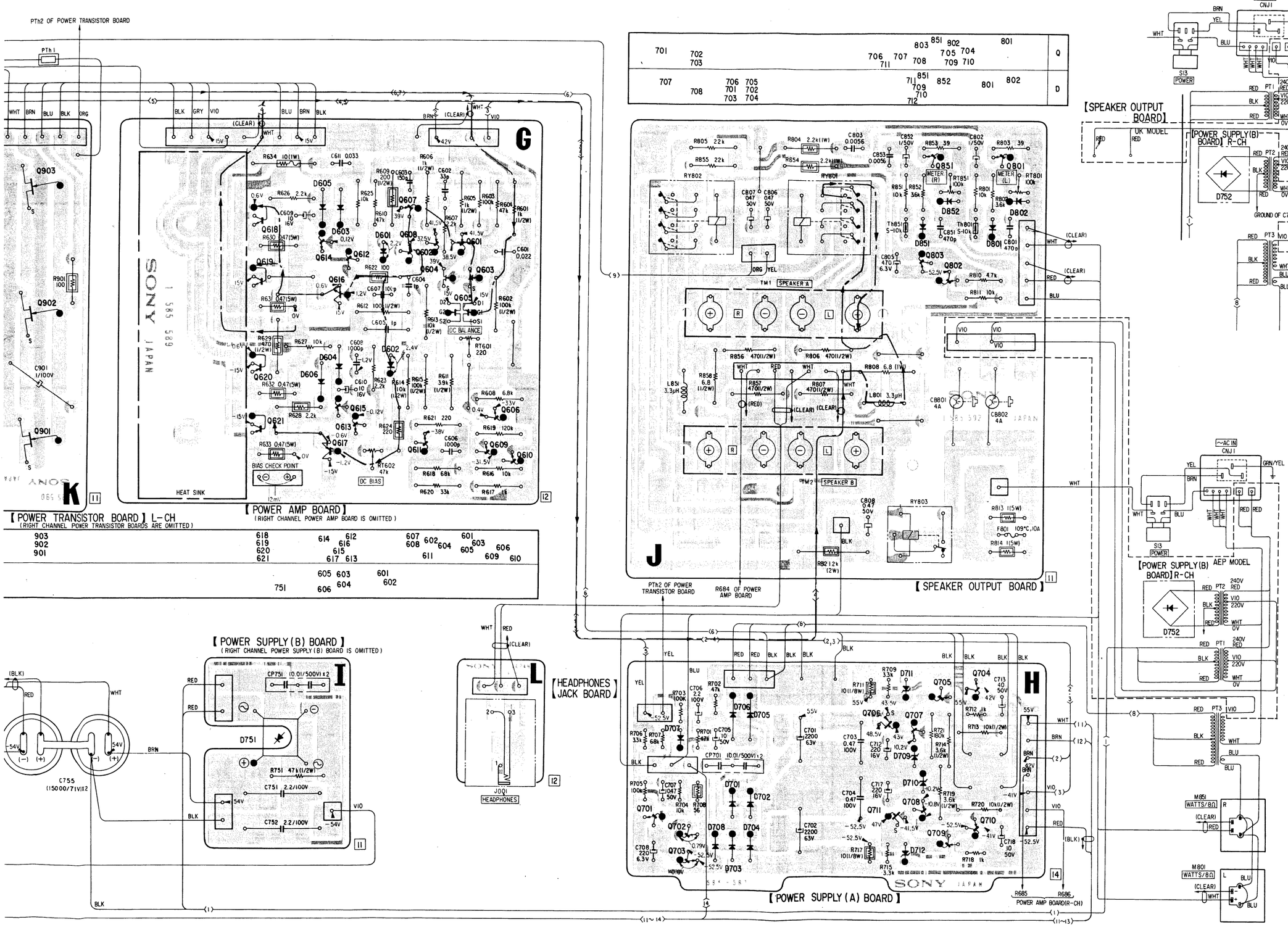
Note:

- Color code of sleeving over the end of the jacket.

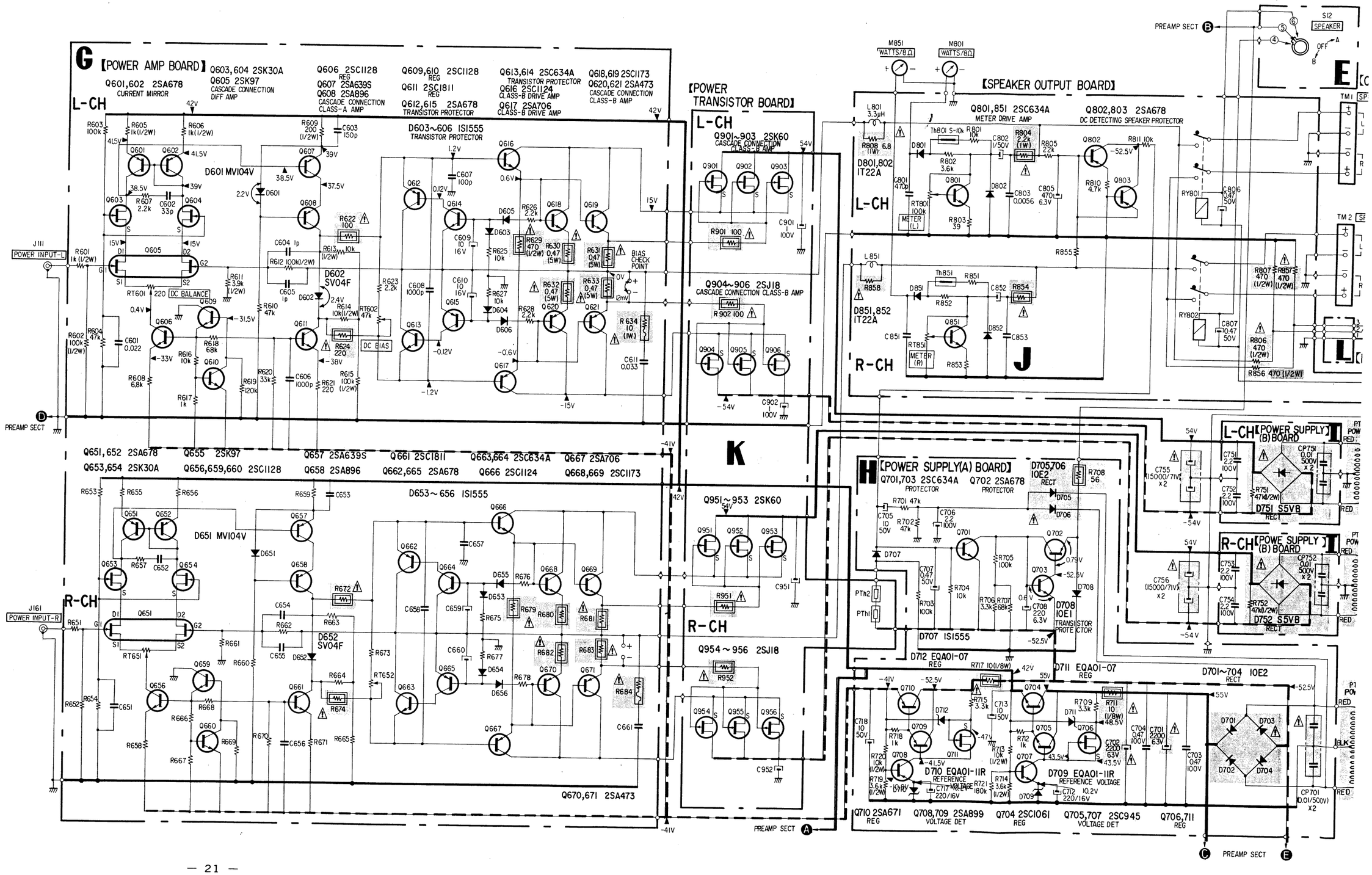


- ■ : B+ pattern.
- ■ : B– pattern.

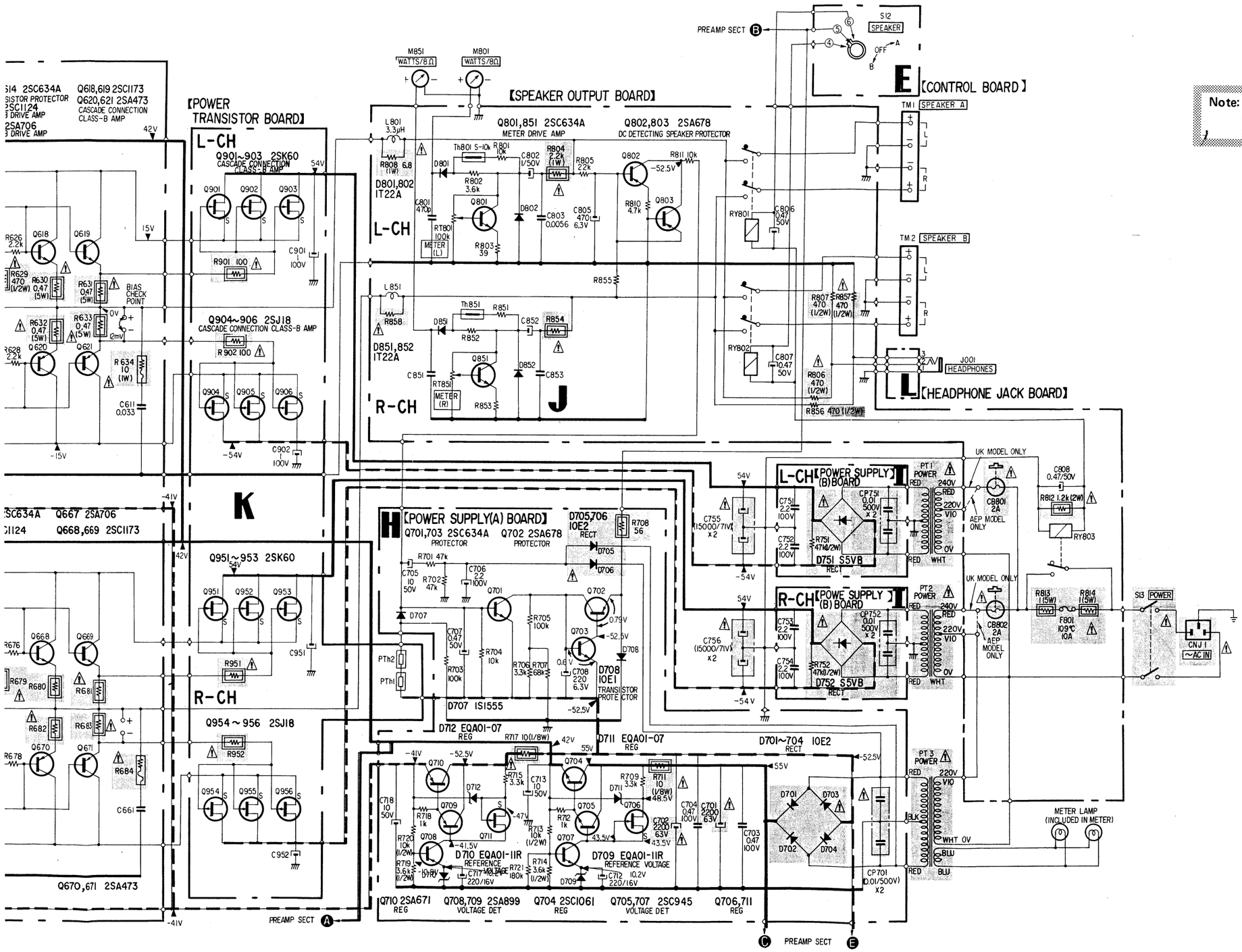




4-5. SCHEMATIC DIAGRAM — Power Amplifier and Power Supply Sections —



TA-F7/TA-F7B



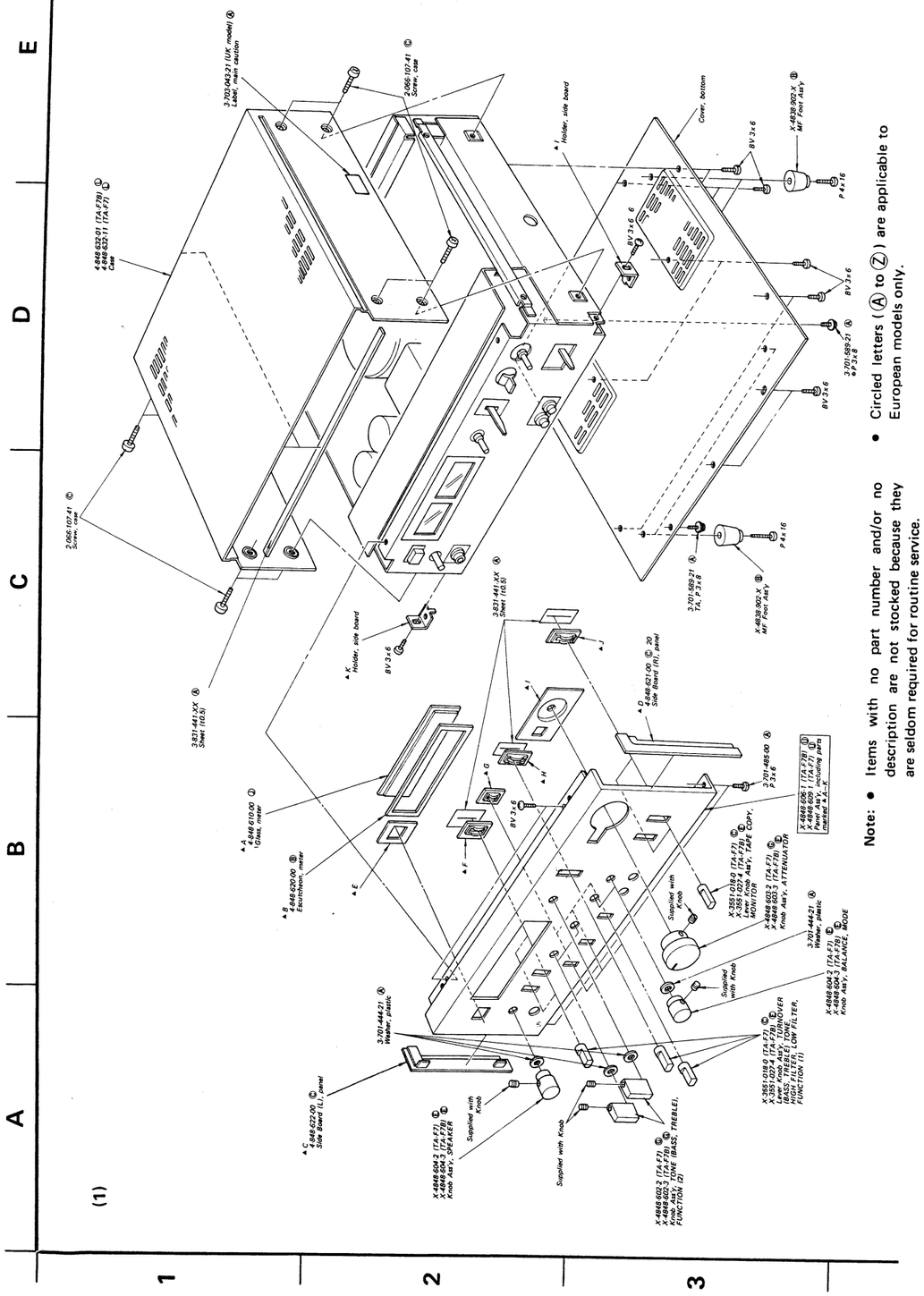
Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note:

- Components for right channel have same values as for left channel. Reference numbers are coded from.
- All capacitors are in μF unless otherwise noted. pF = μμF 50WV or less are not indicated except for electrolytics.
- All resistors are in ohms, ¼W unless otherwise noted. kΩ = 1000Ω, MΩ = 1000 kΩ
- : nonflammable resistor.
- : fusible resistor.
- : B+ bus.
- : B- bus.
- : panel designation.
- : adjustment for repair.
- Readings are taken under no signal conditions with a VOM (20 kΩ/V).
- Switch

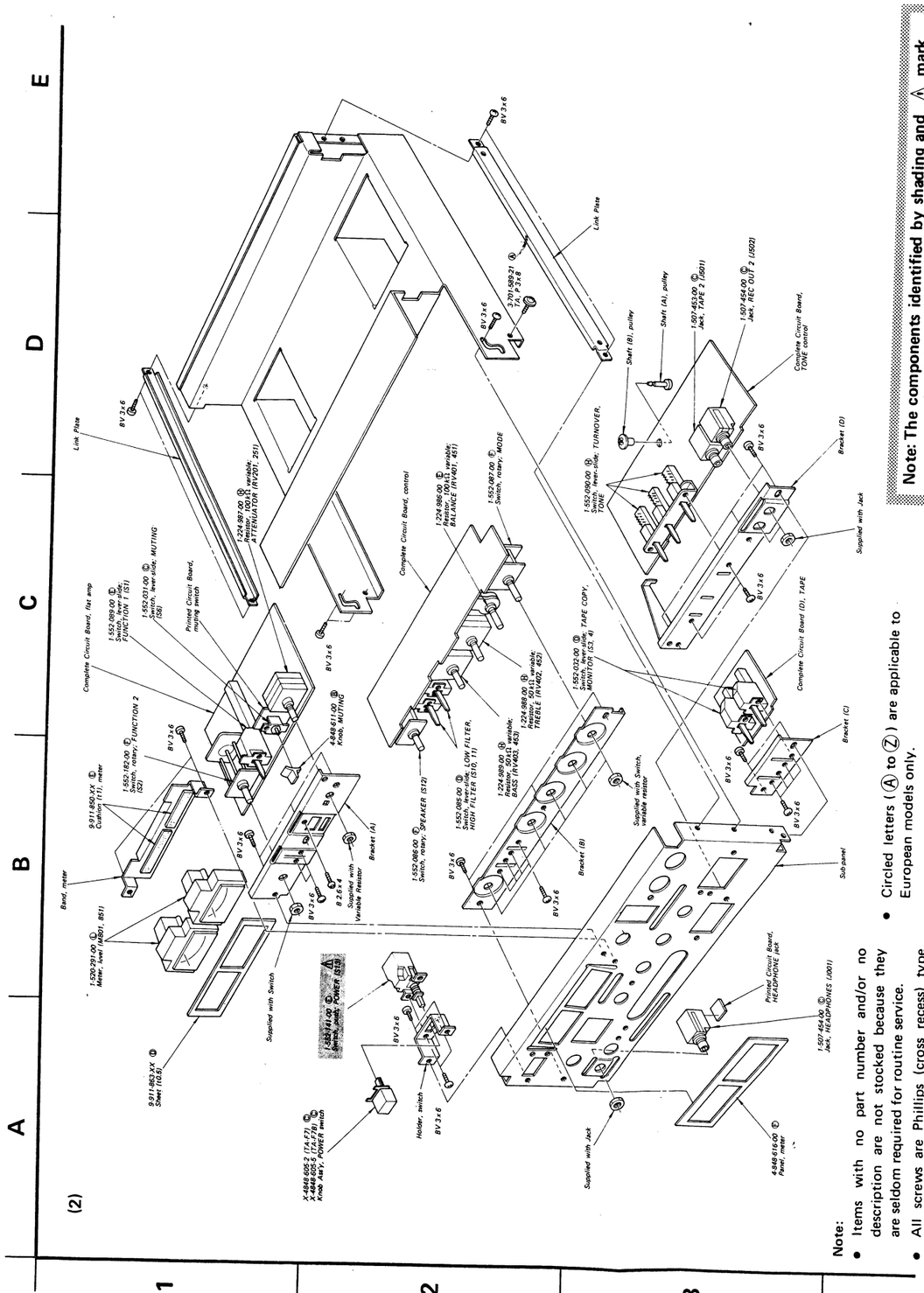
Ref. No.	Switch	Position
S12	SPEAKER	OFF
S13	POWER	OFF

SECTION 5
EXPLODED VIEWS

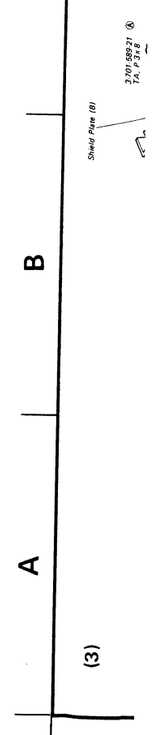


Note:
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (—) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

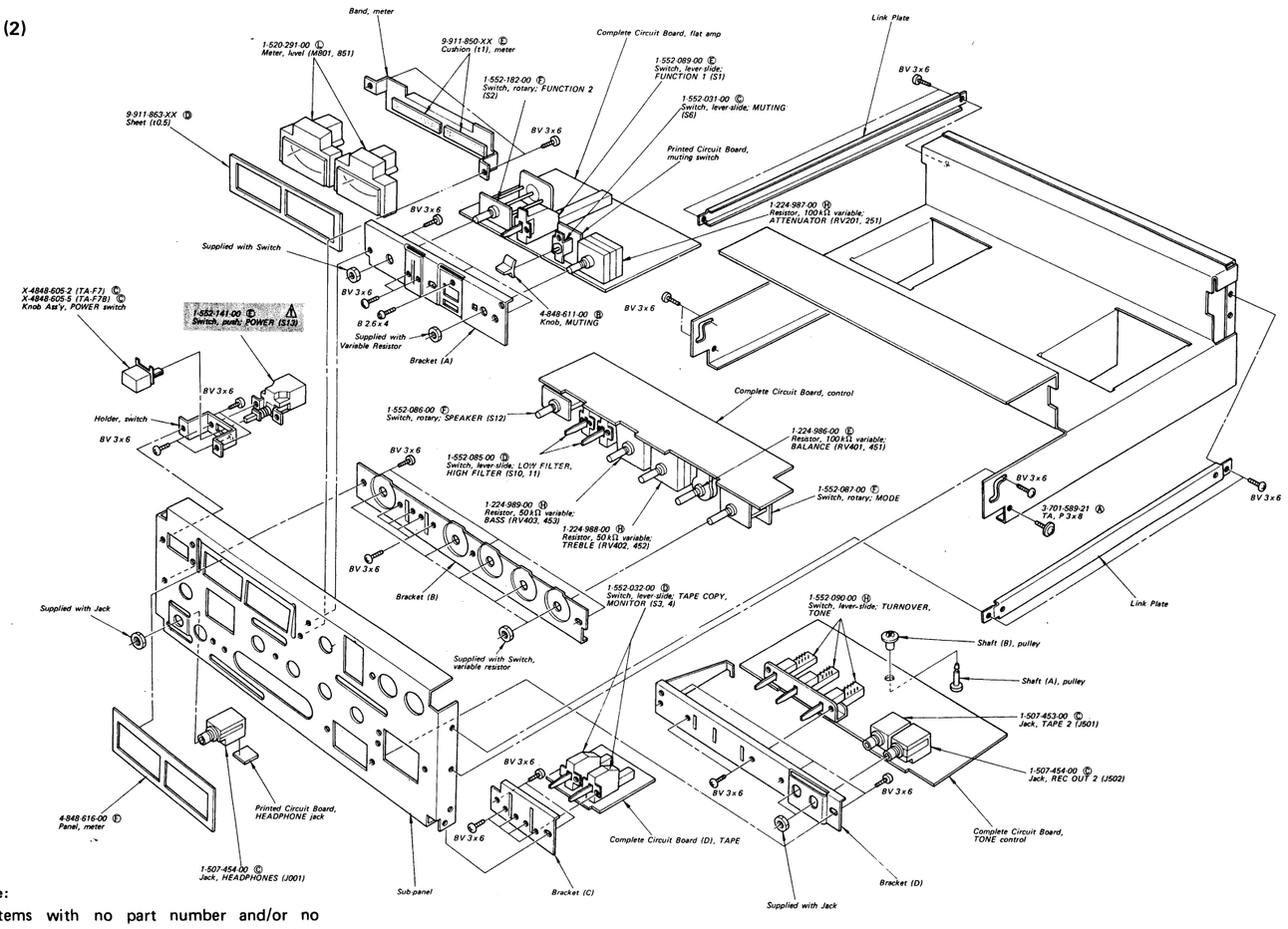


Note:
- Items with no part number and/or no description are not stocked because they are seldom required for routine service.
- All screws are Phillips (cross recess) type unless otherwise noted.
  (—) = slotted head
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.



(–) = slotted head

(2)

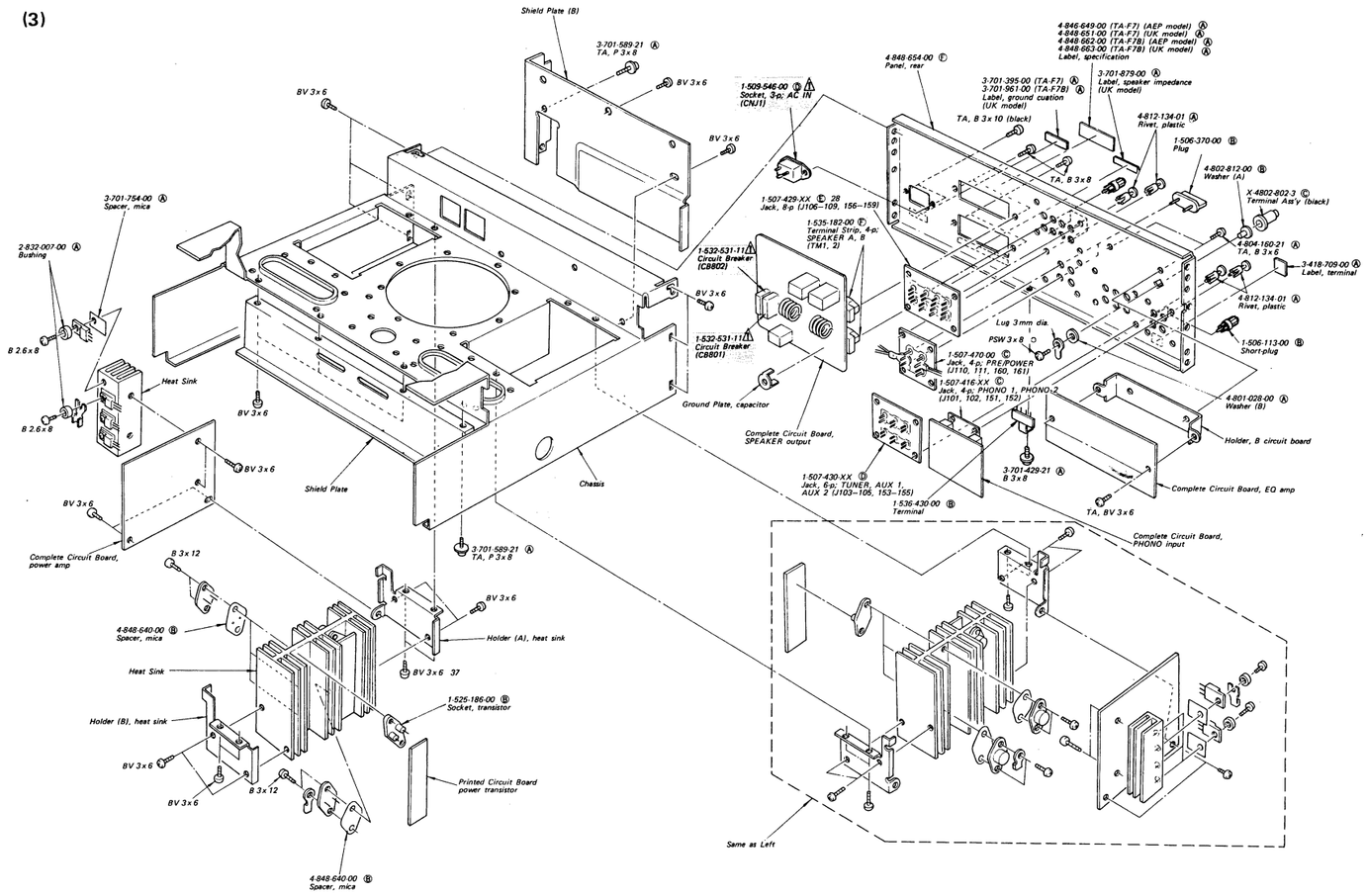


Note:

- 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
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

(3)

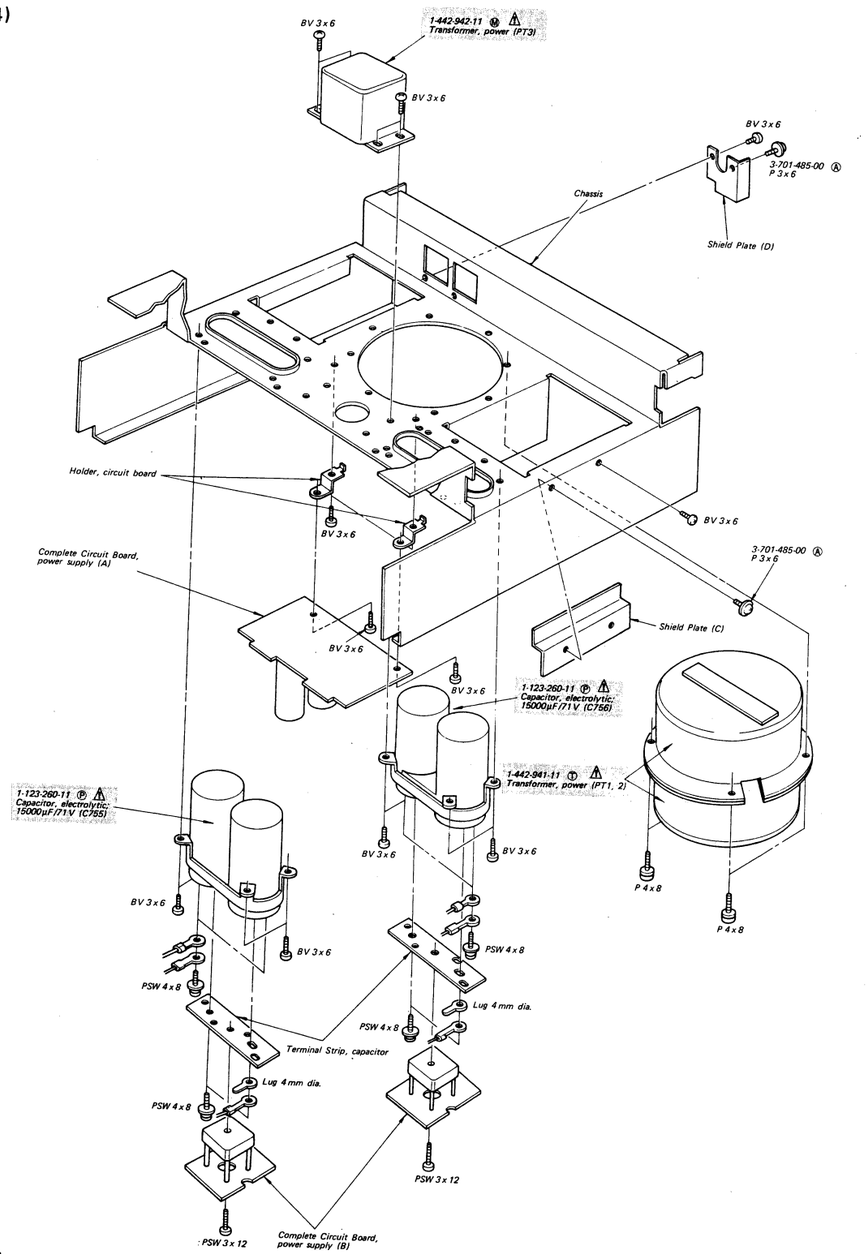


Note:

- 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
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

(4)



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
- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

SECTION 6
ELECTRICAL PARTS LIST

- Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	Part No.	Description
		PRINTED CIRCUIT BOARD
	1-585-589-12	Ⓔ Power Amp
		SEMICONDUCTORS
		Transistors
Q101,151		Ⓕ 2SK97
Q102–104		Ⓒ 2SC1128
Q152–154		
⇒ Q105,155		Ⓒ 2SK43-2
Q106,107		Ⓒ 2SA639S
Q156,157		
Q108,158		Ⓒ 2SA896
Q109,159		Ⓒ 2SC1811
Q201,202		Ⓕ 2SK43-3A
Q251,252		
Q203,253		Ⓒ 2SC1128
Q204,254		Ⓒ 2SA896
Q205,206		Ⓒ 2SC1128
Q255,256		
Q207,257		Ⓒ 2SC1811
Q401,451		Ⓑ 2SC1636
⇒ Q501,551		Ⓕ 2SK43-3A
Q502,552		Ⓒ 2SA896
Q503,553		Ⓒ 2SC1811
Q504,554		Ⓒ 2SC1128
Q505		Ⓓ 2SC1061
Q555		Ⓔ 2SA671
⇒ Q506		Ⓑ 2SC634A
Q556		Ⓒ 2SA899
Q507		Ⓒ 2SA899
⇒ Q557		Ⓑ 2SC634A
⇒ Q508		Ⓑ 2SC634A
Q558		Ⓒ 2SA899
⇒ Q509,559		Ⓒ 2SK42-2
Q601,602		Ⓒ 2SA678
Q651,652		

- ⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Ref. No.	Part No.	Description
⇒ Q603,604		Ⓑ 2SK30A-GR
⇒ Q653,654		
Q605,655		Ⓕ 2SK97
Q606,656		Ⓒ 2SC1128
Q607,657		Ⓒ 2SA639S
Q608,658		Ⓒ 2SA896
Q609,659		Ⓒ 2SC1128
Q610,660		
Q611,661		Ⓒ 2SC1811
Q612,662		Ⓒ 2SA678
Q613,663		Ⓑ 2SC634A
Q614,664		
Q615,665		Ⓒ 2SA678
Q616,666		Ⓒ 2SC1124
Q617,667		Ⓓ 2SA706
Q618,668		Ⓒ 2SC1173
Q619,669		
Q620,670		Ⓒ 2SA473
Q621,671		
Q701		Ⓑ 2SC634A
Q702		Ⓒ 2SA678
Q703		Ⓑ 2SC634A
Q704		Ⓓ 2SC1061
⇒ Q705		Ⓑ 2SC634A
⇒ Q706		Ⓒ 2SK42-2
Q707		Ⓑ 2SC634A
Q708,709		Ⓒ 2SA899
Q710		Ⓔ 2SA671
⇒ Q711		Ⓒ 2SK42-2
Q801,851		Ⓑ 2SC634A
Q802,803		Ⓒ 2SA678
Q901–903		Ⓙ 2SK60
Q951–953		
Q904–906		Ⓚ 2SJ18
Q954–956		
		Diodes
D101,151		Ⓑ 1S1555

SECTION 6
ELECTRICAL PARTS LIST

• Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	Part No.	Description
		PRINTED CIRCUIT BOARD
	1-585-589-12	Ⓔ Power Amp
		SEMICONDUCTORS
		Transistors
Q101,151		Ⓕ 2SK97
Q102–104, Q152–154		Ⓒ 2SC1128
⇒ Q105,155		Ⓒ 2SK43-2
Q106,107, Q156,157		Ⓒ 2SA639S
Q108,158		Ⓒ 2SA896
Q109,159		Ⓒ 2SC1811
Q201,202, Q251,252		Ⓕ 2SK43-3A
Q203,253		Ⓒ 2SC1128
Q204,254		Ⓒ 2SA896
Q205,206, Q255,256		Ⓒ 2SC1128
Q207,257		Ⓒ 2SC1811
Q401,451		Ⓑ 2SC1636
⇒ Q501,551		Ⓕ 2SK43-3A
Q502,552		Ⓒ 2SA896
Q503,553		Ⓒ 2SC1811
Q504,554		Ⓒ 2SC1128
Q505		Ⓓ 2SC1061
Q555		Ⓔ 2SA671
⇒ Q506		Ⓑ 2SC634A
Q556		Ⓒ 2SA899
Q507		Ⓒ 2SA899
⇒ Q557		Ⓑ 2SC634A
⇒ Q508		Ⓑ 2SC634A
Q558		Ⓒ 2SA899
⇒ Q509,559		Ⓒ 2SK42-2
Q601,602, Q651,652		Ⓒ 2SA678
⇒ Q603,604, ⇒ Q653,654		Ⓑ 2SK30A-GR
Q605,655		Ⓕ 2SK97
Q606,656		Ⓒ 2SC1128
Q607,657		Ⓒ 2SA639S
Q608,658		Ⓒ 2SA896
Q609,659, Q610,660		Ⓒ 2SC1128
Q611,661		Ⓒ 2SC1811
Q612,662		Ⓒ 2SA678
Q613,663, Q614,664		Ⓑ 2SC634A
Q615,665		Ⓒ 2SA678
Q616,666		Ⓒ 2SC1124
Q617,667		Ⓓ 2SA706
Q618,668, Q619,669		Ⓒ 2SC1173
Q620,670, Q621,671		Ⓒ 2SA473
Q701		Ⓑ 2SC634A
Q702		Ⓒ 2SA678
Q703		Ⓑ 2SC634A
Q704		Ⓓ 2SC1061
⇒ Q705		Ⓑ 2SC634A
⇒ Q706		Ⓒ 2SK42-2
Q707		Ⓑ 2SC634A
Q708,709		Ⓒ 2SA899
Q710		Ⓔ 2SA671
⇒ Q711		Ⓒ 2SK42-2
Q801,851		Ⓑ 2SC634A
Q802,803		Ⓒ 2SA678
Q901–903, Q951–953		Ⓙ 2SK60
Q904–906, Q954–956		Ⓚ 2SJ18
		Diodes
D101,151		Ⓑ 1S1555
⇒ D501,551		Ⓑ EQB01-07
⇒ D601,651		Ⓒ KB462S
D602,652		Ⓒ SV04S
D603–606, D653–656		Ⓑ 1S1555
D701–706 ⚠		Ⓑ 10E2
D707		Ⓑ 1S1555
⇒ D708		Ⓑ 10E2
⇒ D709,710		Ⓑ EQB01-11Z
⇒ D711,712		Ⓑ EQB01-07
D751,752 ⚠		Ⓕ S5VB20
D801,851, D802,852		Ⓑ 1T22M
		THERMISTORS
Th801,851	1-800-202-XX	Ⓐ Thermistor, S-10K
PTh1,2	1-800-427-00	Ⓑ Thermistor
		COILS
L401,451	1-407-879-00	Ⓑ 33 mH, microinductor
L801,851	1-420-879-00	Ⓑ Coil
		TRANSFORMERS
PT1,2 ⚠	1-442-941-11	Ⓣ Power
PT3 ⚠	1-442-942-11	Ⓜ Power
		CAPACITORS

All capacitors are in μF and ceramic unless otherwise noted.
50WV or less are not indicated except for electrolytics. pF = μμF, elect = electrolytic

Ref. No.	Part No.	Description
C001,002	1-119-216-11	Ⓑ 33 25V elect
C101,151	1-102-963-11	Ⓐ 33p
C102,152	1-101-005-11	Ⓐ 0.022
C103,153, C104,154	1-102-973-11	Ⓐ 100p
C105,155	1-130-131-11	Ⓑ 1600p 100V polyethylene
C106,156	1-130-132-11	Ⓑ 5600p 100V polyethylene
C107,157	1-131-217-11	Ⓑ 2.2 35V tantalum
C108,158	1-102-959-11	Ⓐ 22p
C109,159	1-130-122-11	Ⓑ 1000p 100V polyethylene
C110,160, C111,161	1-123-250-11	Ⓑ 2.2 100V elect
C112,162	1-130-133-11	Ⓑ 56000p 100V polyethylene
C201,251	1-102-971-11	Ⓐ 82p
C202,252	1-102-824-11	Ⓐ 470p
C203,253, C204,254	1-131-295-11	Ⓒ 100 6.3V tantalum
C205,255	1-130-133-11	Ⓑ 56000p 100V polyethylene
C208	1-108-227-12	Ⓐ 0.001 mylar
C401,451	1-108-360-12	Ⓐ 0.039 mylar
C402,452	1-108-364-12	Ⓑ 0.18 mylar
C403,453	1-108-581-12	Ⓑ 0.012 mylar
C404,454, C405,455	1-108-254-12	Ⓑ 0.22 mylar
C501,551	1-102-115-11	Ⓐ 560p
C502,552, C503,553	1-108-228-12	Ⓐ 0.0015 mylar
C504,554, C505,555	1-108-237-12	Ⓐ 0.0068 mylar
C506,556	1-108-360-12	Ⓐ 0.039 mylar
C507,557	1-108-364-12	Ⓑ 0.18
C508,558	1-102-125-11	Ⓐ 4700p
C509,559, C510,560	1-131-239-11	Ⓑ 6.8 35V tantalum
C511,561	1-130-083-11	Ⓒ 1 100V polyethylene
C514,564	1-121-411-11	Ⓑ 47 50V elect
C517,567	1-130-086-11	Ⓑ 0.47 100V polyethylene
C601,651	1-101-005-11	Ⓐ 0.022
C602,652	1-102-963-11	Ⓐ 33p
C603,653	1-101-361-11	Ⓐ 150p
C604,654, C605,655	1-102-934-11	Ⓐ 1p

• ⇒: Due to standardization, interchangeable replacements may be substituted for parts specified in the diagrams.

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Ref. No.	Part No.		Description		
C606,656	1-101-001-11	Ⓐ	1000p		
C607,657	1-102-973-11	Ⓐ	100p		
C608,658	1-101-001-11	Ⓐ	1000p		
C609,659 C610,660	1-121-651-11	Ⓐ	10	16V	elect
C611,661	1-108-244-12	Ⓐ	0.033		mylar
C701,702 ⚠	1-123-261-11	Ⓔ	2200	63V	elect
C703,704	1-130-086-11	Ⓑ	0.47	100V	polyethylene
C705	1-123-183-11	Ⓐ	10	50V	elect
C706	1-123-250-11	Ⓑ	2.2	100V	elect
C707	1-121-726-11	Ⓐ	0.47	50V	elect
C708	1-121-419-11	Ⓑ	220	6.3V	elect
C712,717	1-121-421-11	Ⓑ	220	16V	elect
C713,718	1-121-738-11	Ⓑ	10	50V	elect
C751–754	1-130-084-11	Ⓓ	2.2	100V	polyethylene
C755,756 ⚠	1-123-260-11	Ⓟ	15000	71V	elect
C801,851	1-102-824-11	Ⓐ	470p		
C802,852	1-121-391-11	Ⓐ	1	50V	elect
C803,853	1-108-355-12	Ⓐ	0.0056		mylar
C805	1-121-424-11	Ⓑ	470	6.3V	elect
C806–808	1-121-726-11	Ⓐ	0.47	50V	elect
C901,951 C902,952	1-119-372-11		1	100V	elect

RESISTORS

All resistors are in ohms. Common ¼W carbon resistors are omitted.
Check schematic diagram for values.

R101,151	1-244-914-11	Ⓐ	51k	½W	
R102,152	1-244-873-11	Ⓐ	1k	½W	
R103,153	1-244-864-11	Ⓐ	430	½W	
R104,154	1-244-909-11	Ⓐ	33k	½W	
R105,155	1-244-865-11	Ⓐ	470	½W	
R107,157	1-244-873-11	Ⓐ	1k	½W	
R108,158	1-214-172-11	Ⓑ	47k	¼W	metal oxide
R109,159	1-214-473-11	Ⓑ	576k	½W	metal oxide
R116,166	1-244-945-11	Ⓐ	1M	½W	
R117,167	1-244-909-11	Ⓐ	33k	½W	
R118,168	1-244-873-11	Ⓐ	1k	½W	

Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	Part No.		Description		
R120,170	1-244-873-11	Ⓐ	1k	½W	
R202,252	1-244-919-11	Ⓐ	2k	½W	
R203,253	1-244-945-11	Ⓐ	1M	½W	
R204,254	1-244-873-11	Ⓐ	1k	½W	
R205,255 R206,256	1-244-905-11	Ⓐ	22k	½W	
R208,258	1-244-877-11	Ⓐ	1.5k	½W	
R209,259	1-244-897-11	Ⓐ	10k	½W	
R214,264	1-244-873-11	Ⓐ	1k	½W	
R219	1-244-881-11	Ⓐ	2.2k	½W	
R301,351 R302,352	1-244-897-11	Ⓐ	10k	½W	
R509,559	1-244-873-11	Ⓐ	1k	½W	
R510,560	1-244-945-11	Ⓐ	1M	½W	
R511,561	1-244-893-11	Ⓐ	6.8k	½W	
R512,562	1-244-881-11	Ⓐ	2.2k	½W	
R513,563	1-244-897-11	Ⓐ	10k	½W	
R514,564	1-244-861-11	Ⓐ	330	½W	
R520,570	1-244-897-11	Ⓐ	10k	½W	
R521,571	1-244-856-11	Ⓐ	200	½W	
R524,574 ⚠	1-212-869-11	Ⓐ	33	¼W	fusible
R527,577 ⚠	1-212-990-11	Ⓐ	220	½W	fusible
R601,651	1-244-873-11	Ⓐ	1k	½W	
R602,652	1-244-921-11	Ⓐ	100k	½W	
R605,655 R606,656	1-244-873-11	Ⓐ	1k	½W	
R611,661	1-244-887-11	Ⓐ	3.9k	½W	
R612,662	1-244-921-11	Ⓐ	100k	½W	
R613,663 R614,664	1-244-897-11	Ⓐ	10k	½W	
R615,665	1-244-921-11	Ⓐ	100k	½W	
R622,672 ⚠	1-211-522-11	Ⓐ	100	¼W	
R624,674 ⚠	1-211-530-11	Ⓐ	220	¼W	
R629,679 ⚠	1-211-630-11	Ⓐ	470	½W	
R630–633 R680–683	⚠1-217-158-11	Ⓐ	0.47	5W	metal oxide
R634,684 ⚠	1-217-481-11	Ⓑ	10	1W	fusible
R708	⚠1-211-516-11	Ⓐ	56	¼W	

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	Part No.		Description		
R711,717	⚠1-211-409-11	Ⓐ	10	1/8W	
R713,720	1-244-897-11	Ⓐ	10k	½W	
R714,719	1-244-886-11	Ⓐ	3.6k	½W	
R751,752	⚠1-244-913-11	Ⓐ	47k	½W	
R804,854	⚠1-213-147-11	Ⓐ	2.2k	1W	metal oxide
R806,856 R807,857	⚠1-244-865-11	Ⓐ	470	½W	
R808,858	⚠1-212-370-11	Ⓐ	6.8	1W	
R812	⚠1-206-666-11	Ⓐ	1.2k	2W	metal oxide
R813,814	⚠1-217-160-11	Ⓐ	1	5W	metal oxide
R901,951 R902,952	⚠1-211-522-11	Ⓐ	100	¼W	
RT601,651	1-224-487-00	Ⓑ	220		adjustable
RT602,652	1-224-661-00	Ⓑ	47k		adjustable
RT801,851	1-224-492-00	Ⓑ	100k		adjustable
RV201,251	2-224-987-00	Ⓗ	100k, variable; ATTENUATOR		
RV401,451	1-224-986-00	Ⓔ	100k, variable; BALANCE		
RV402,452	1-224-988-00	Ⓗ	50k, variable; TREBLE		
RV403,453	1-224-989-00	Ⓗ	51k, variable; BASS		

SWITCHES

S1	1-552-089-00	Ⓔ	Lever Slide, FUNCTION (1)
S2	1-552-182-00	Ⓕ	Rotary Slide, FUNCTION (2)
S3,4	1-552-032-00	Ⓓ	Lever Slide, TAPE COPY, MONITOR
S5	1-552-087-00	Ⓕ	Rotary, MODE
S6	1-552-031-00	Ⓒ	Lever Slide, MUTING
S7–9	1-552-090-00	Ⓗ	Lever Slide, TURNOVER (BASS, TREBLE)/TONE
S10,11	1-552-085-00	Ⓓ	Lever Slide, LOW FILTER, HIGH FILTER
S12	1-552-086-00	Ⓕ	Rotary, SPEAKER
S13	⚠1-552-141-00	Ⓔ	Pushbutton, POWER

JACKS

J001	1-507-454-00	Ⓒ	HEADPHONES
J101,151 J102,152	1-507-416-XX	Ⓒ	4p, PHONO 1, PHONO 2
J103–105 J153–155	1-507-430-XX	Ⓓ	6p, TUNER, AUX 1, AUX 2
J106–109 J156–159	1-507-429-XX	Ⓔ	8p, TAPE 1, TAPE 2 REC OUT 1, REC OUT 2
J110,160 J111,161	1-507-470-00	Ⓒ	4p, PRE/POWER
J501	1-507-453-00	Ⓒ	TAPE 2
J502	1-507-454-00	Ⓒ	REC OUT 2
CNJ	⚠1-509-546-00	Ⓓ	3p, socket; AC IN

MISCELLANEOUS

CB801,802	⚠1-532-531-11	Ⓒ	Circuit Breaker, 2A
CP701 CP751,752	⚠1-102-355-11	Ⓑ	Encapsulated Component
F801	⚠1-532-496-11	Ⓒ	Fuse 10A
M801,851	1-520-291-00	Ⓛ	Meter, level
RY001,002	1-515-277-00	Ⓕ	Relay
RY801,802	1-515-257-00	Ⓗ	Relay (TA-F7)
	1-515-293-00	Ⓗ	Relay (TA-F7B)
RY803	1-515-278-00	Ⓕ	Relay
TM1,2	1-535-182-00	Ⓕ	Terminal Strip, 4p; SPEAKER A, B
	1-506-370-00	Ⓑ	Plug
	1-525-186-00	Ⓑ	Socket, transistor
	1-536-430-12	Ⓑ	Terminal Strip

ACCESSORIES & PACKING MATERIALS

Part No.	Description
1-506-113-00	Ⓑ Short Plug
1-534-819-12	Ⓖ Cord, power (UK model)
3-701-020-00	Ⓐ Bag, SS check sheet
3-701-622-00	Ⓐ Bag, plastic (UK model)
3-770-394-11	Ⓚ Manual, instruction
4-848-648-00	Ⓑ Bag, protection
4-848-659-00	Ⓗ Carton (TA-F7)
4-848-664-00	Ⓗ Carton (TA-F7B)
4-848-660-00	Ⓓ Frame
4-848-661-00	Ⓒ Cushion, lower
4-848-658-00	Ⓒ Cushion, upper

Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

9-958-464

Note: Circled letters (Ⓐ to Ⓩ) are applicable to European models only.

Ref. No.	Part No.		Description		
R711,717	⚠1-211-409-11	Ⓐ	10	1/8W	
R713,720	1-244-897-11	Ⓐ	10 k	½W	
R714,719	1-244-886-11	Ⓐ	3.6 k	½W	
R751,752	⚠1-244-913-11	Ⓐ	47 k	½W	
R804,854	⚠1-213-147-11	Ⓐ	2.2 k	1W	metal oxide
R806,856 R807,857	⚠1-244-865-11	Ⓐ	470	½W	
R808,858	⚠1-212-370-11	Ⓐ	6.8	1W	
R812	⚠1-206-666-11	Ⓐ	1.2 k	2W	metal oxide
R813,814	⚠1-217-160-11	Ⓐ	1	5W	metal oxide
R901,951 R902,952	⚠1-211-522-11	Ⓐ	100	¼W	
RT601,651	1-224-487-00	Ⓑ	220		adjustable
RT602,652	1-224-661-00	Ⓑ	47 k		adjustable
RT801,851	1-224-492-00	Ⓑ	100 k		adjustable
RV201,251	2-224-987-00	Ⓗ	100 k, variable; ATTENUATOR		
RV401,451	1-224-986-00	Ⓔ	100 k, variable; BALANCE		
RV402,452	1-224-988-00	Ⓗ	50 k, variable; TREBLE		
RV403,453	1-224-989-00	Ⓗ	51 k, variable; BASS		

SWITCHES

S1	1-552-089-00	Ⓔ Lever Slide, FUNCTION (1)
S2	1-552-182-00	Ⓕ Rotary Slide, FUNCTION (2)
S3,4	1-552-032-00	Ⓓ Lever Slide, TAPE COPY, MONITOR
S5	1-552-087-00	Ⓕ Rotary, MODE
S6	1-552-031-00	Ⓒ Lever Slide, MUTING
S7–9	1-552-090-00	Ⓗ Lever Slide, TURNOVER (BASS, TREBLE)/TONE
S10,11	1-552-085-00	Ⓓ Lever Slide, LOW FILTER, HIGH FILTER
S12	1-552-086-00	Ⓕ Rotary, SPEAKER
S13	⚠1-552-141-00	Ⓔ Pushbutton, POWER

JACKS

J001	1-507-454-00	Ⓒ HEADPHONES
J101,151 J102,152	1-507-416-XX	Ⓒ 4p, PHONO 1, PHONO 2
J103–105 J153–155	1-507-430-XX	Ⓓ 6p, TUNER, AUX 1, AUX 2
J106–109 J156–159	1-507-429-XX	Ⓔ 8p, TAPE 1, TAPE 2 REC OUT 1, REC OUT 2
J110,160 J111,161	1-507-470-00	Ⓒ 4p, PRE/POWER
J501	1-507-453-00	Ⓒ TAPE 2
J502	1-507-454-00	Ⓒ REC OUT 2
CNJ	⚠1-509-546-00	Ⓓ 3p, socket; AC IN

MISCELLANEOUS

CB801,802	⚠1-532-531-11	Ⓒ Circuit Breaker, 2A
CP701 CP751,752	⚠1-102-355-11	Ⓑ Encapsulated Component
F801	⚠1-532-496-11	Ⓒ Fuse 10A
M801,851	1-520-291-00	Ⓛ Meter, level
RY001,002	1-515-277-00	Ⓕ Relay
RY801,802	1-515-257-00	Ⓗ Relay (TA-F7)
	1-515-293-00	Ⓗ Relay (TA-F7B)
RY803	1-515-278-00	Ⓕ Relay
TM1,2	1-535-182-00	Ⓕ Terminal Strip, 4p; SPEAKER A, B
	1-506-370-00	Ⓑ Plug
	1-525-186-00	Ⓑ Socket, transistor
	1-536-430-12	Ⓑ Terminal Strip

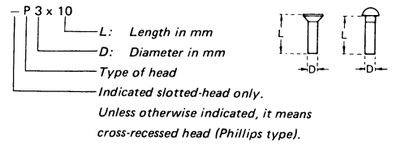
ACCESSORIES & PACKING MATERIALS

Part No.	Description
1-506-113-00	Ⓑ Short Plug
1-534-819-12	Ⓖ Cord, power (UK model)
3-701-020-00	Ⓐ Bag, SS check sheet
3-701-622-00	Ⓐ Bag, plastic (UK model)
3-770-394-11	Ⓚ Manual, instruction
4-848-648-00	Ⓑ Bag, protection
4-848-659-00	Ⓗ Carton (TA-F7)
4-848-664-00	Ⓗ Carton (TA-F7B)
4-848-660-00	Ⓓ Frame
4-848-661-00	Ⓒ Cushion, lower
4-848-658-00	Ⓒ Cushion, upper

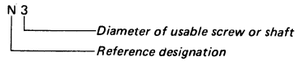
Note: The components identified by shading and ⚠ mark are critical for safety. Replace only with part number specified.

HARDWARE NOMENCLATURE

Screw:



Nut, Washer, Retaining ring:



Reference Designation	Shape	Description	Remarks
SCREWS			
P		pan-head screw	binding-head (B) screw for replacement
PWH		pan-head screw with washer face	binding-head (B) screw and flat washer for replacement
PS PSP		pan-head screw with spring washer	binding-head (B) screw and spring washer for replacement
PSW PSPW		pan-head screw with spring and flat washers	binding-head (B) screw and spring and flat washers for replacement
R		round-head screw	binding-head (B) screw for replacement
K		flat-countersunk-head screw	
RK		oval-countersunk-head screw	
B		binding-head screw	
T		truss-head screw	binding-head (B) screw for replacement
F		flat-fillister-head screw	
RF		fillister-head screw	
BV		braizer-head screw	

Reference Designation	Shape	Description	Remarks
SELF-TAPPING SCREWS			
TA		self-tapping screw	ex: TA, P 3 x 10
PTP		pan-head self-tapping screw	binding-head self-tapping (TA, B) screw for replacement
PTPWH		pan-head self-tapping screw with washer face	binding-head self tapping (TA, B) screw and flat washer for replacement
PTTWH		pan-head thread-rolling screw with washer face	binding-head (B) screw and flat washer for replacement
SET SCREWS			
SC		set screw	
SC		hexagon-socket set screw	ex: SC 2.6 x 4, hexagon socket
NUT			
N		nut	
WASHERS			
W		flat washer	
SW		spring washer	
LW		internal-tooth lock washer	ex: LW3, internal
LW		external-tooth lock washer	ex: LW3, external
RETAINING RINGS			
E		retaining ring	
G		grip-type retaining ring	

1/4 WATT CARBON RESISTORS Ⓐ

Note: Circled letter Ⓐ is appricable to European model only.

Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.	Ω	Part No.
1.0	1-244-601-11	10	1-244-625-11	100	1-244-649-11	1.0k	1-244-673-11	10 k	1-244-697-11	100k	1-244-721-11	1.0M	1-244-745-11
1.1	1-244-602-11	11	1-244-626-11	110	1-244-650-11	1.1k	1-244-674-11	11 k	1-244-698-11	110k	1-244-722-11	1.1M	1-244-746-11
1.2	1-244-603-11	12	1-244-627-11	120	1-244-651-11	1.2k	1-244-675-11	12 k	1-244-699-11	120k	1-244-723-11	1.2M	1-244-747-11
1.3	1-244-604-11	13	1-244-628-11	130	1-244-652-11	1.3k	1-244-676-11	13 k	1-244-700-11	130k	1-244-724-11	1.3M	1-244-748-11
1.5	1-244-605-11	15	1-244-629-11	150	1-244-653-11	1.5k	1-244-677-11	15 k	1-244-701-11	150k	1-244-725-11	1.5M	1-244-749-11
1.6	1-244-606-11	16	1-244-630-11	160	1-244-654-11	1.6k	1-244-678-11	16 k	1-244-702-11	160k	1-244-726-11	1.6M	1-244-750-11
1.8	1-244-607-11	18	1-244-631-11	180	1-244-655-11	1.8k	1-244-679-11	18 k	1-244-703-11	180k	1-244-737-11	1.8M	1-244-751-11
2.0	1-244-608-11	20	1-244-632-11	200	1-244-656-11	2.0k	1-244-680-11	20 k	1-244-704-11	200k	1-244-728-11	2.0M	1-244-752-11
2.2	1-244-609-11	22	1-244-633-11	220	1-244-657-11	2.2k	1-244-681-11	22 k	1-244-705-11	220k	1-244-729-11	2.2M	1-244-753-11
2.4	1-244-610-11	24	1-244-634-11	240	1-244-658-11	2.4k	1-244-682-11	24 k	1-244-706-11	240k	1-244-730-11	2.4M	1-244-754-11
2.7	1-244-611-11	27	1-244-635-11	270	1-244-659-11	2.7k	1-244-683-11	27 k	1-244-707-11	270k	1-244-731-11	2.7M	1-244-755-11
3.0	1-244-612-11	30	1-244-636-11	300	1-244-660-11	3.0k	1-244-684-11	30 k	1-244-708-11	300k	1-244-732-11	3.0M	1-244-756-11
3.3	1-244-613-11	33	1-244-637-11	330	1-244-661-11	3.3k	1-244-685-11	33 k	1-244-709-11	330k	1-244-733-11	3.3M	1-244-757-11
3.6	1-244-614-11	36	1-244-638-11	360	1-244-662-11	3.6k	1-244-686-11	36 k	1-244-710-11	360k	1-244-734-11	3.6M	1-244-758-11
3.9	1-244-615-11	39	1-244-639-11	390	1-244-663-11	3.9k	1-244-687-11	39 k	1-244-711-11	390k	1-244-735-11	3.9M	1-244-759-11
4.3	1-244-616-11	43	1-244-640-11	430	1-244-664-11	4.3k	1-244-688-11	43 k	1-244-712-11	430k	1-244-736-11	4.3M	1-244-760-11
4.7	1-244-617-11	47	1-244-641-11	470	1-244-665-11	4.7k	1-244-689-11	47 k	1-244-713-11	470k	1-244-737-11	4.7M	1-244-761-11
5.1	1-244-618-11	51	1-244-642-11	510	1-244-666-11	5.1k	1-244-690-11	51 k	1-244-714-11	510k	1-244-738-11	5.1M	1-244-762-11
5.6	1-244-619-11	56	1-244-643-11	560	1-244-667-11	5.6k	1-244-691-11	56 k	1-244-715-11	560k	1-244-739-11		
6.2	1-244-620-11	62	1-244-644-11	620	1-244-668-11	6.2k	1-244-692-11	62 k	1-244-716-11	620k	1-244-740-11		
6.8	1-244-621-11	68	1-244-645-11	680	1-244-669-11	6.8k	1-244-693-11	68 k	1-244-717-11	680k	1-244-741-11		
7.5	1-244-622-11	75	1-244-646-11	750	1-244-670-11	7.5k	1-244-694-11	75 k	1-244-718-11	750k	1-244-742-11		
8.2	1-244-623-11	82	1-244-647-11	820	1-244-671-11	8.2k	1-244-695-11	82 k	1-244-719-11	820k	1-244-743-11		
9.1	1-244-624-11	91	1-244-648-11	910	1-244-672-11	9.1k	1-244-696-11	91 k	1-244-720-11	910k	1-244-744-11		

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