ORDER NO. SD8006-1759

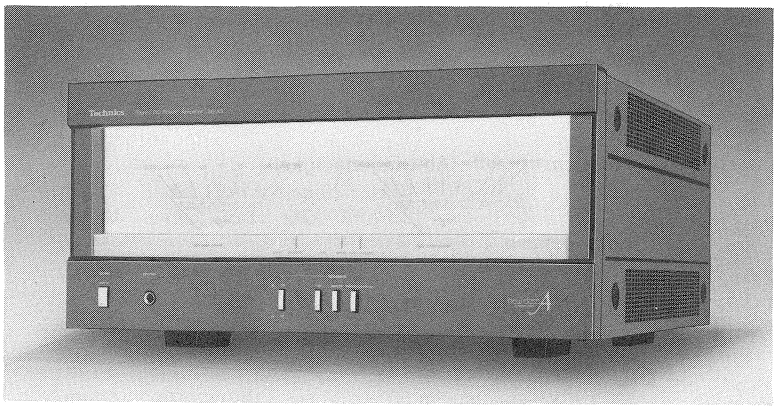
Service Manual

Stereo DC Power Amplifier

OD503A-Q [82 + 320

SE-A3K

[D], [DG], [EB], [XE], [XSW], [XGH], [XGF], [X], [XA]



Areas

* [D] and [DG] are available in Scandinavia and European except Belgium, United Kingdom, Switzerland, Holland and France.
* [EB] is available in Belgium.
* [XE] is available in United Kingdom.
* [XSW] is available in Switzerland.
* [XGH] is available in Holland.
* [XGF] is available in France.
* [X] and [XA] are available in Asia, Latin America, Middle East and Africa.

TECHNNICAL SPECIFICATIONS Specifications are subject to change without notice for further improvement.

(DIN 45 500)

■ AMPLIFIER SECTION

20 Hz~20 kHz continuous power output	
both channels driven	2 × 320W (4Ω)
	2 × 200W (8Ω)
40 Hz~16 kHz continuous power output	
both channels driven	2 × 320W (4Ω)
	2 × 200W (8Ω)
1 kHz continuous power output	
both channels driven	2 × 350W (4Ω)
	2 × 220W (8Ω)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.003% (4Ω)
	0.002% (8Ω)
rated power at 40 Hz~16 kHz	0.003% (4Ω)
	0.002% (8Ω)
rated power at 1 kHz	0.003% (4Ω)
	0.001% (8Ω)
half power at 20 Hz~20 kHz	0.002% (4Ω)
	0.001% (8Ω)
half power at 1 kHz	0.0005% (4Ω)
	0.0003% (8Ω)
−26 dB power at 1 kHz	0.001% (4Ω)
50 mW power at 1 kHz	0.001% (4Ω)
Intermodulation distortion	
rated power at 250 Hz: 8 kHz=4:1, 4Ω	0.003%
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.002%
TIM (Transient Intermodulation Distortion)	unmeasurably small
Power bandwidth	
both channels driven, −3 dB THD 0.008%	
	5 Hz~75 kHz (4Ω)
	5 Hz~100 kHz (8Ω)
Residual hum and noise	0.1 mV
Damping factor	100 (4Ω), 200 (8Ω)
Input sensitivity and impedance	1 V/47kΩ
S/N	110 dB (123 dB, IHF, A)
Frequency response	+0 dB, −0.1 dB (DC~20 kHz)
	DC~300 kHz, (+0 dB, −3 dB)
Channel balance, 250 Hz~6,300 Hz	±0.5 dB
Channel separation, 1 kHz	70 dB
Headphones output level and impedance	950 mV/330Ω
Load impedance	
MAIN or REMOTE	4Ω~16Ω
MAIN and REMOTE	8Ω~16Ω
Meter	
reading range	0.0001 W~300 W (8Ω)
	−60 dB~+5 dB
	(logarithmic compression)
frequency response (reading accuracy)	
	10 Hz~20 kHz ±1 dB (more than −40 dB)
	10 Hz~10 kHz ±1 dB (less than −40 dB)
attack time	50 μsec.
recovery time	750 msec. (0 dB~−20 dB)

■ GENERAL

Power consumption	2200W
Power supply	AC 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (W×H×D)	430 × 208 × 507 mm
	(16-15/16" × 8-3/16" × 19-31/32")
Weight	36.5 kg
	(80.5 lb.)

Note:
Total harmonic distortion is measured by the digital spectrum analyzer (H.P. 3045 system).

Technics

Matsushita Electric Trading Co., Ltd.
P.O. Box 288, Central Osaka Japan

TECHNISCHE DATEN Spezifikationen können infolge von verbesserungen ohne Ankündigung geändert werden.

(DIN 45 500)

■ VERSTÄRKERTEIL

Dauerton-Ausgangsleistung bei 20 Hz ~ 20 kHz
beide Kanäle ausgesteuert 2 × 320W (4 Ω)
2 × 200W (8 Ω)

Dauerton-Ausgangsleistung bei 40 Hz ~ 16 kHz
beide Kanäle ausgesteuert 2 × 320W (4 Ω)
2 × 200W (8 Ω)

Dauerton-Ausgangsleistung bei 1 kHz
beide Kanäle ausgesteuert 2 × 350W (4 Ω)
2 × 220W (8 Ω)

Gesamtklirrfaktor
Nennleistung bei 20 Hz ~ 20 kHz 0,003% (4 Ω)
0,002% (8 Ω)
Nennleistung bei 40 Hz ~ 16 kHz 0,003% (4 Ω)
0,002% (8 Ω)
Nennleistung bei 1 kHz 0,003% (4 Ω)
0,001% (8 Ω)
halbe Nennleistung bei 20 Hz ~ 20 kHz 0,002% (4 Ω)
0,001% (8 Ω)
halbe Nennleistung bei 1 kHz 0,0005% (4 Ω)
0,0003% (8 Ω)
−26 dB Leistung bei 1 kHz 0,001% (4 Ω)
50 mW Leistung bei 1 kHz 0,001% (4 Ω)

Intermodulationsfaktor
Nennleistung bei 250 Hz: 8 kHz = 4:1, 4 Ω 0,003%
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω 0,002%

TIM (Intermodulationsverzerrung) unmeßbar

Leistungsbandbreite
beide Kanäle ausgesteuert bei
−3 dB THD 0,008% 5 Hz ~ 75 kHz (4 Ω)
5 Hz ~ 100 kHz (8 Ω)

Restbrumm und Geräusch 0,1 mV
Dämpfungsfaktor 100 (4 Ω), 200 (8 Ω)
Eingangsempfindlichkeit und -impedanz 1 V/47 kΩ
Geräuschabstand 110 dB (123 dB nach IHF, A)
Frequenzgang +0 dB, −0,1 dB (Gleichstrom~20 kHz)
Gleichstrom ~ 300 kHz (+0 dB, −3 dB)
Kanalabweichung (250 Hz ~ 6300 Hz) ±0,5 dB
Übersprechdämpfung (1 kHz) 70 dB
Kopfhörerpegel und -impedanz 950 mV/330 Ω
Lautsprecherimpedanz
MAIN oder REMOTE 4 Ω ~ 16 Ω
MAIN und REMOTE 8 Ω ~ 16 Ω
Instrument
Anzeigebereich 0,0001 W~300 W (8Ω)
−60 dB~+5 dB
(logarithmisch)
Frequenzbereich (Ablesegenauigkeit)
10 Hz~20 kHz ±1 dB (über −40 dB)
10 Hz~10 kHz ±1 dB (unter −40 dB)
Ansprechzeit 50 μs
Rückkehrzeit 750 ms (0 dB~−20 dB)

■ ALLGEMEINE DATEN

Leistungsaufnahme 2200 W
Netzspannung
Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V
Abmessungen (B×H×T) 430 × 208 × 507 mm
Gewicht 36,5 kg

Bemerkung:
Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

DONNEES TECHNIQUES Sujet à changment sans préaris.

(DIN 45 500)

■ SECTION AMPLIFICATEUR

Puissance de sortie continue de 20 Hz~20 kHz,
les deux canaux en circuit 2 × 320W (4Ω)
2 × 200W (8Ω)

Puissance de sortie continue de 40 Hz~16 kHz,
les deux canaux en circuit 2 × 320W (4Ω)
2 × 200W (8Ω)

Puissance de sortie continue à 1 kHz
les deux canaux en circuit 2 × 350W (4Ω)
2 × 220W (8Ω)

Distorsion harmonique totale
à puissance nominale (20 Hz~20 kHz) 0,003% (4Ω)
0,002% (8Ω)
à puissance nominale (40 Hz~16 kHz) 0,003% (4Ω)
0,002% (8Ω)
à puissance nominale (1 kHz) 0,003% (4Ω)
0,001% (8Ω)
à demi-puissance (20 Hz~20 kHz) 0,002% (4Ω)
0,001% (8Ω)
à demi-puissance (1 kHz) 0,0005% (4Ω)
0,0003% (8Ω)
puissance de −26 dB à 1 kHz 0,001% (4Ω)
puissance de 50 mW à 1 kHz 0,001% (4Ω)

Distorsion d'intermodulation
à puissance nominale à 250 Hz: 8 kHz=4:1, 4Ω 0,003%
à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω 0,002%

TIM (distorsion d'intermodulation transitoire) infiniment petite

Réponse de fréquences
les deux canaux en circuit, −3 dB THD 0,008%
5 Hz~75 kHz (4Ω)
5 Hz~100 kHz (8Ω)

Bruit et ronflement résiduels 0,1 mV
Coefficient d'amortissement 100 (4Ω), 200 (8Ω)
Sensibilité et impédance d'entrée 1 V/47kΩ
Signal/Bruit 110 dB (123 dB, IHF, A)
Réponse de fréquence +0 dB, −0,1 dB (CC~20 kHz)
CC~300 kHz, (+0 dB, −3 dB)
Equilibrage des canaux, 250 Hz~6,300 Hz ±0,5 dB
Séparation des canaux, 1 kHz 70 dB
Niveau de sortie des casques et impédance 950 mV/330Ω
Impédance de charge
PRINCIPALE ou AUXILIAIRE (MAIN or REMOTE)
4Ω~16Ω
PRINCIPALE et AUXILIAIRE (MAIN and REMOTE)
8Ω~16Ω
Indicateur
gamme de lecture 0,0001 W~300 W (8Ω)
−60 dB~+5 dB
(compression logarithmique)
réponse de fréquence (précision de lecture)
10 Hz~20 kHz ±1 dB (plus que −40 dB)
10 Hz~10 kHz ±1 dB (moins que −40 dB)
temps d'attaque 50 μsec.
durée de rétablissement 750 msec. (0 dB~−20 dB)

■ DIVERS

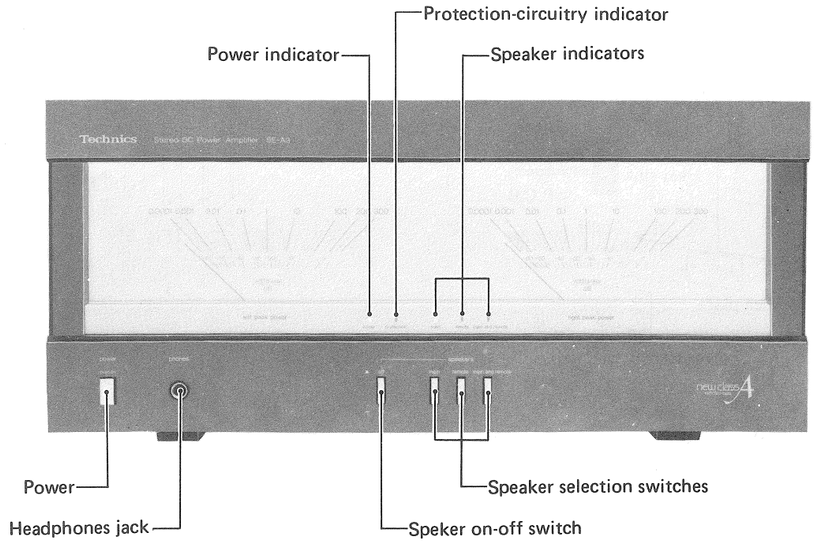
Consommation 2200W
Alimentation CA 50 Hz/60 Hz, 110V/120V/220V/240V
Dimensions (L×H×Pr) 430 × 208 × 507 mm
Poids 36,5 kg

Remarque:
On mesure la distorsion harmonique totale au moyen d'un analyseur de spectre digital (Système H.P. 3045).

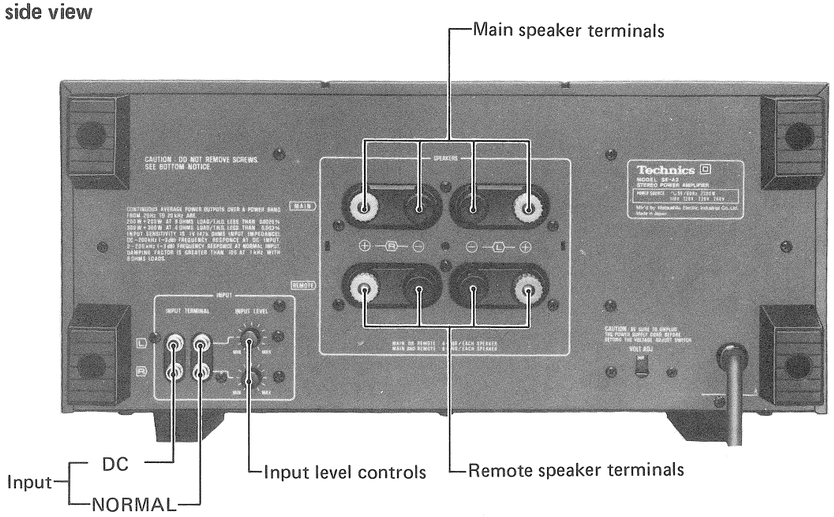
■ CONTENTS

■ LOCATION OF CONTROLS

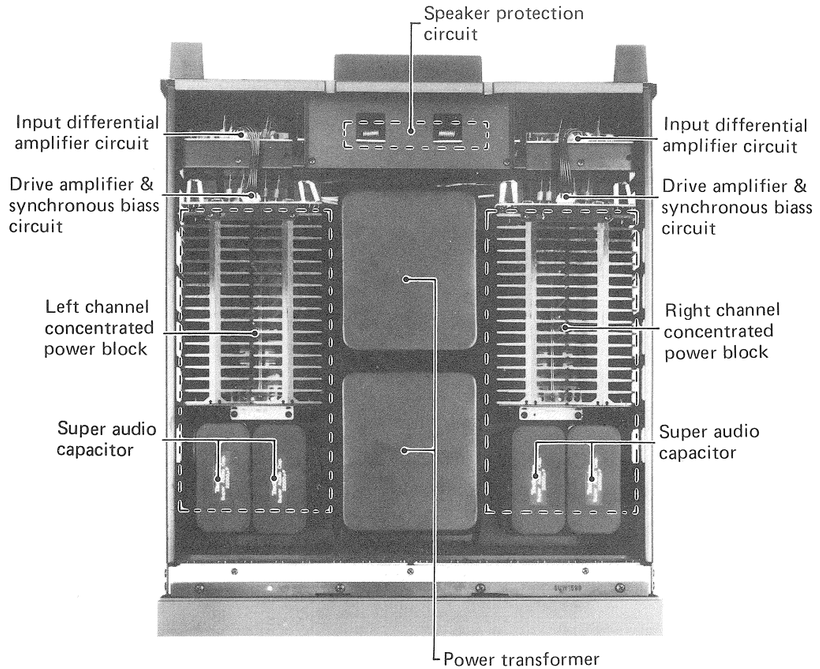
• **Front side view**



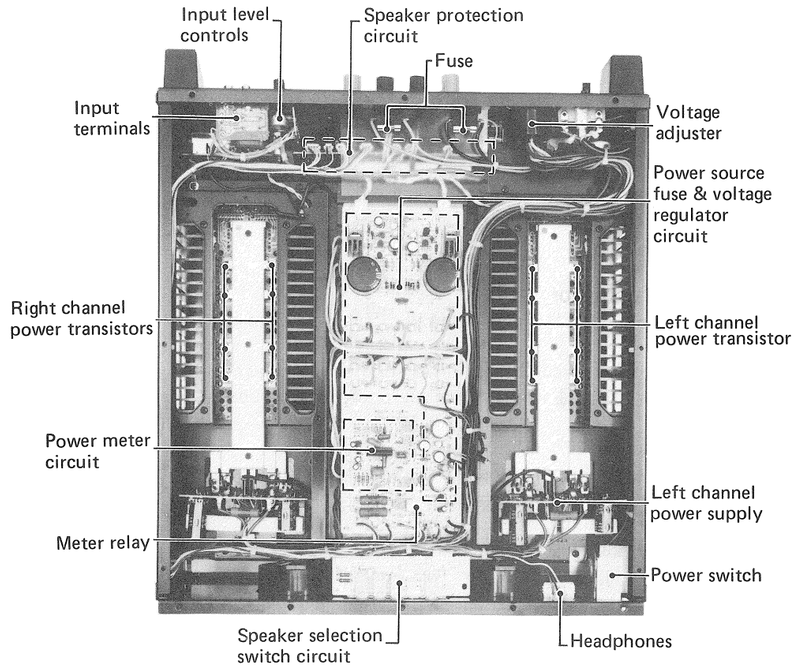
• **Rear side view**



• **Top view**



• **Bottom view**



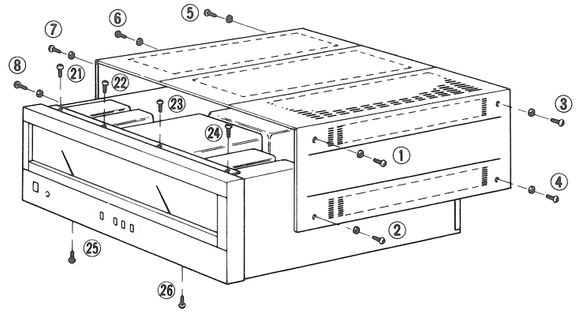
■ DISASSEMBLY INSTRUCTIONS

• How to remove the cabinet

Remove the 8 setscrews (① ~ ⑧ in Fig. 1) on the side of the cabinet, and then the cabinet can be removed.

• How to remove the bottom board

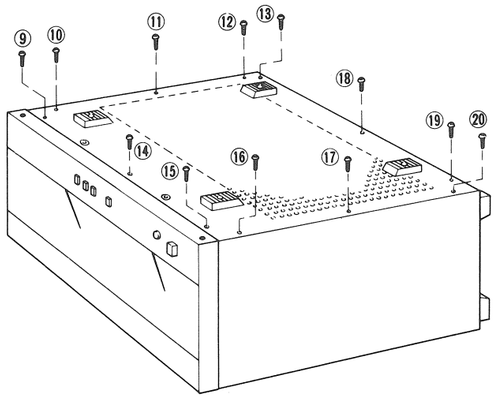
Remove the 12 setscrews (⑨ ~ ⑳ in Fig. 2) to remove the bottom board.



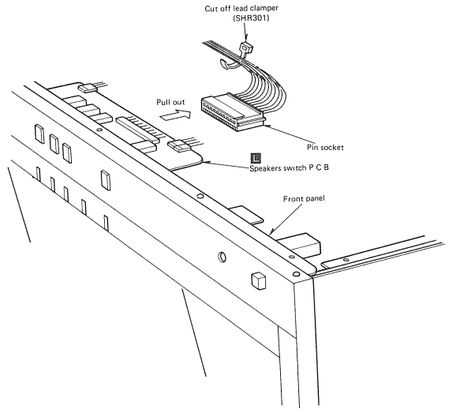
[Fig. 1]

• How to remove the front panel

1. Remove the cabinet and bottom board. (Refer to "How to remove the cabinet" and "How to remove the bottom board".)
2. Pull out the pin socket of L printed circuit board (Speaker selection switch and indicator circuits). [Fig. 3].
3. Remove the 6 setscrews (㉑ ~ ㉖ in Fig. 1) of the front panel.



[Fig. 2]

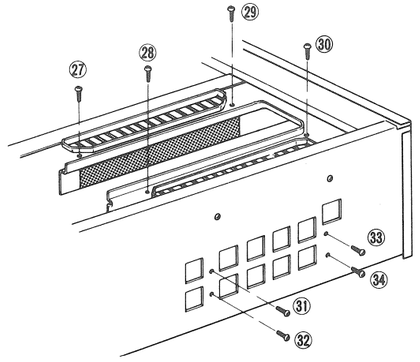


[Fig. 3]

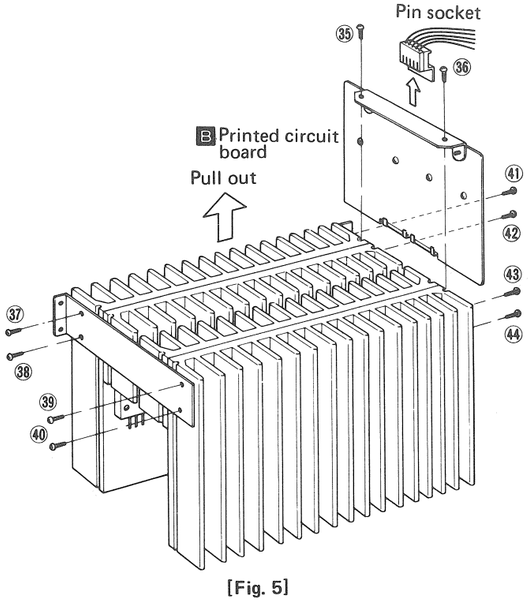
• How to remove the power transistor

1. Remove the cabinet and bottom board. (Refer to "How to remove the cabinet" and "How to remove the bottom board".)
2. Pull out the pin socket of B printed circuit board (driver stage, synchro bias circuit). Next, remove the 2 setscrews (㉟, ㊱ in Fig. 5) of the printed circuit board. Then remove the printed circuit board by lifting it upward.
3. Unsolder the 4 power transistors (Q125 ~ Q128).
4. Remove the 4 setscrews (㉗ ~ ㉚ in Fig. 4) which secure the heat sink from the power block chassis bottom.
5. Remove the 4 setscrews (㉛ ~ ㉞ in Fig. 4) which secure the heat sink from the side of the set.
6. Remove the heat sink from the chassis by lifting it upward.
7. Remove the 8 setscrews (㊲ ~ ㊹ in Fig. 5) which secure the heat sink connector.
8. Remove the 2 setscrews (㊺, ㊻ in Fig. 6) to remove the power transistor.
9. When installing the power transistor, apply silicone compound (or equivalent heat diffuser) to the back and the mica plate (heat sink side) of the power transistor, and then reverse the procedure 1 ~ 8.

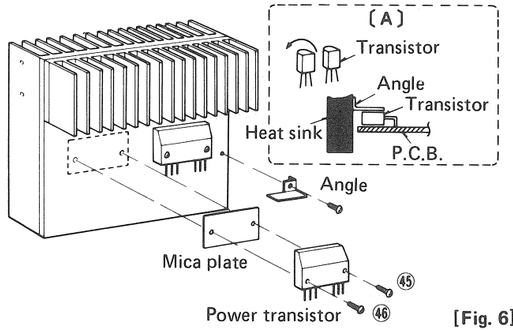
Note: 1. When the temperature compensating transistors (Q113, Q114 – Q119, Q120) are replaced, install the transistors at an angle of 90° as in Fig. 6 (A).
2. When installing the temperature compensating transistor holders, apply silicone compound (or equivalent heat diffuser) to them.



[Fig. 4]



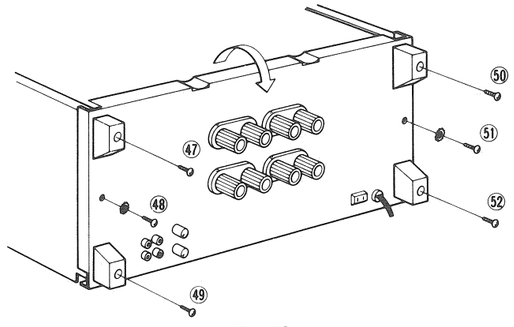
[Fig. 5]



[Fig. 6]

• How to remove the speaker protection circuit printed board

1. Remove the cabinet and bottom board. (Refer to "How to remove the cabinet" and "How to remove the bottom board".)
2. Remove the 6 setscrews (㊼ ~ ㊿ in Fig. 7) of the rear panel. Then open the rear panel in the direction of the arrow.
3. Unsolder the speaker terminals. (8 portions)
4. Remove the 4 setscrews of the printed circuit board and then the board can be removed.



[Fig. 7]

• Before starting the repairing

Before adjusting or repairing, bu sure to short-circuit opposite poles of the 22000μF capacitors (C3, 4) with a resistor approximately of 10Ω, 10W" for discharging the charged voltage.
Short-circuiting with a screw driver and the like is not only dangerous, but may destroy transistors and diodes, and should therefore be avoided.

■ ADJUSTING INSTRUCTIONS ENGLISH

When adjusting and measuring this set, perform ageing of the set in normal position for about 10 minutes beforehand.

• Setting of controls and instruments to be used

1. Speakers on/off switch . . . . . .on
2. Speaker switch . . . . . .main
3. Input Level volume (rear side) . . . . .MIN
4. DC voltmeter (capable to measure 5mV)
5. Oscilloscope
6. Oscillator
7. Distortion analyser
8. AC electronic voltmeter
9. 8-ohm load resistor

1. Adjustment of Voltage regulator and DC balance

Adjustments	DC Voltmeter Connections	Adjusting Point	Adjustment Procedure
Voltage regulator	Between TP 5 and TP4 (minus probe)	VR201	*Turn voltage regulator semi-fixed resistor VR201 to minimum. (counterclockwise direction) *Adjust VR201 so that voltage is 85.5V.
DC balance	Main Speaker terminals (L & R channels)	VR103 (L & R channels)	*Adjust it to 0mV with DC voltmeter set to 30mV range. *Cut off the jumper wire if adjustment is not posible.

2. Adjustment of Clamp Voltage and Icq

1) Set the clamp voltage semi-fixed resistor VR105 to minimum.
2) Apply 20kHz sine wave to INPUT DC terminals.
3) Set the input level control volume to MAX.
4) Connect the distortion analyser to the speaker terminals and connect the output from the distortion analyser to the vertical input of the oscilloscope.
5) Turn the oscillator attenuater so that the output of the speaker terminal is 28.28V.
6) Turn the Icq semi-fixed resistor VR104 so that the distorted waveform is minimized.
7) Furthermore, turn the clamp voltage semi-fixed resistor VR105 so that the distorted waveform is minimized.

3. Adjustment of Peak power meter

1) Connect the oscillator to INPUT DC terminal, and the AC electronic voltmeter to the speaker terminals in parallel with the load resistor.
2) Set the input level control volume to MAX.
3) Apply 1kHz signal from the oscillator, and turn the attenuator of the oscillator so that the AC electronic voltmeter indicates 0.894V.
4) Adjust VR401 (left channel) so that the power meter indicates 0.1W.
5) Similarly, make the adjustment of VR402 (right channel).
6) Apply 1kHz signal from the oscillator, and turn the attenuator of the oscillator so that the AC electronic voltmeter indicates 28.28V.
7) Adjust VR403 (left channel) so that the power meter indicates 100W.
8) Similarly, make the adjustment of VR404 (right channel).
9) Preform the adjustments, repeating the procedure (3) ~ (8) in order.

■ EINSTELLUNGSANWEISUNGEN — DEUTSCH

Das Gerät sollte zum Erwärmen ca. 10 Minuten vor dem Durchführen der Einstellungen und Messungen eingeschaltet werden.

• Gerätrezustand und verwendete Instrumente

1. Lautsprecher-Ein/Aus-Schalter. . . . . on
2. Lautsprecherschalter. . . . . .main
3. Eingangsregler (Rückseite). . . . . MIN
4. Gleichstrom-Voltmeter (zum Messen von 5mV geeignet)
5. Oszillator
6. Verzerrungsmesser
7. Oszilloskop
8. Wechselstrom-Voltmeter
9. Belastungswiderstand (8Ω, 250W)

1. Abgleichen des Stromversorgungsteils mit konstanter Spannung sowie der Gleichstrom-Balance.

Abgleichung	Anschlüses des Gleichstrom-Voltmeters	Abgleichpunkt	Abgleichungs-anweisung
Stromversorgung mit konstanter Spannung	Zwischen TP 5 und TP4 (minustest)	VR201	* Regler für konstante Spannung VR201 auf min drehen (entgegen dem Uhrzeigersinn). * VR201 so abgleichen daß Spannung 85.5V beträgt.
Gleichstrom-Balance	Hauptlautsprecheranschlüsse (L und R Kanal)	VR103 (L und R Kanal)	* Auf 0mV abgleichen. Gleichstrom-Voltmeter auf 30mV-Bereich eingestellt. * Falls Abgleichung unmöglich, Kurzschlußdraht trennen.

2. Abgleichen der Klemmspannung und Icq

1) Den Klemmspannungsregler VR105 auf min. einstellen.
2) 20kHz Sinuswellensignal an INPUT DC Anschluß einspeisen.
3) Eingangspegelregler-VR auf Max. einstellen.
4) Verzerrungsmesser an den Lautsprecheranschluß anschließen, und das Ausgangssignal dem Oszilloskop einspeisen.
5) Den Dämpfungswiderstand drehen, bis der Ausgang vom Lautsprecheranschluß 28.28V beträgt.
6) Den Icq-Regler VR104 drehen, bis die verzerrte Wellenform minimal ist.
7) Anschlie end den Klemmspannungsregler VR105 so abgleichen, daß die verzerrte Wellenform minimal wird.

3. Abgleichen des Spitzenwert-Meß instrumentes

1) Den Niederfrequenz-Oszillator an INPUT anschließen. Den Gleichstromeingang (DC) und das Wechselstrom-Voltmeter in Parallelschaltung mit dem Belastungswiderstand an die Lautsprecheranschlüsse anschließen.
2) Eingangspegelregler VR auf MAX. einstellen.
3) 1kHz-Signal vom Oszillator einspeisen, und den Dämpfungswiderstand des Oszillators drehen, so daß das Wechselstrom-Voltmeter 0.894V anzeigt.
4) VR401 (linker Kanal) abgleichen, so daß das Leistungsmeßinstrument 0.1W anzeigt.
5) VR402 (rechter Kanal) auf gleiche Weise abgleichen.
6) 1kHz-Signal vom Oszillator einspeisen, und den Dämpfungswiderstand das Oszillators drehen, so daß das Wechselstrom-Voltmeter 28.28V anzeigt.
7) VR403 (linker Kanal) abgleichen, so daß das Leistungsmeßinstrument 100W anzeigt.
8) VR404 (rechter Kanal) auf gleiche Weise abgleichen.
9) Die Abgleichung, unter Wiederholung der Punkte 3 ~ 8 in der richtigen Reihenfolge, durchführen.

■ INSTRUCTIONS DE REGLAGE — FRANÇAUS

Lorsqu'on régle et qu'on mesure cet appareil, réaliser préalablement un test de vieillissement du dit appareil en position de repos, pendant à peu près 10 minutes.

• Conditions de l'appareil et de l'équipement utilisé

1. Commutateur marche/arrêt du haut-parleur. . .marche
2. Commutateur du haut-parleur. . . . . ligne principale
3. Régulateur de tension (VR) du réglage du circuit d'entrée (côté arrière). . . . . MIN
4. Voltmètre C.C. (capable de mesurer 5mV)
5. Oscillateur
6. Distorsiomètre
7. Oscilloscope
8. Voltmètre C.A.
9. Résistance de charge (8Ω, 250W)

1. Mise au point de la source d'énergie de la tension constante et de l'équilibrage C.C.

Mise au point	Connexions du voltmètre C.C.	Point de réglage	Mode opératoire du réglage
Source d'énergie de la tension constante.	Entre TP5 et TP4 (sonde au moins)	VR201	* Tourner la commande de tension constante VR201 sur "min", (dans le sens inverse des aiguilles d'une montre). * Régler VR201 de façon à ce que la tension soit de 85.5V.
Equilibrage de C.C.	.Bornes du haut-parleur principal (canaux gauche et droit).	VR103 (canaux gauche et droit)	* L'ajuster avec un voltmètre C.C. de 0mV réglé sur une plage de 30mV. * Si la mise au point est impossible, couper le fil d'interconnexion.

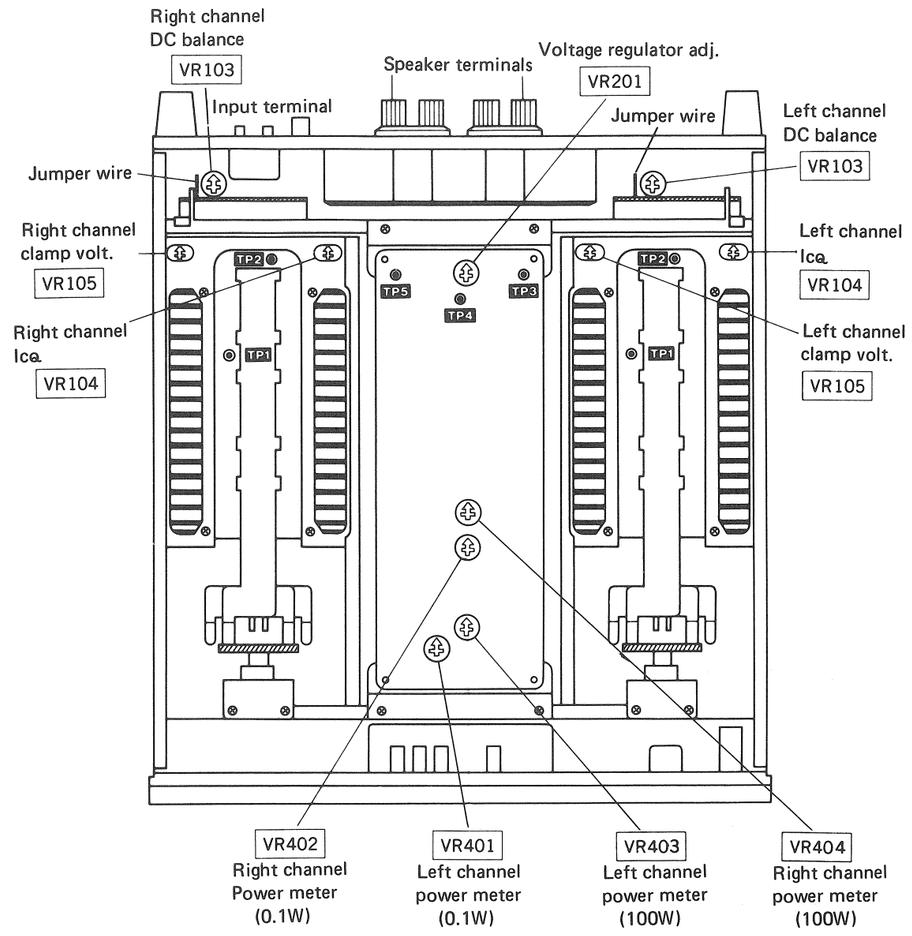
2. Mise au point de la tension de stabilisation et de I_{CQ}

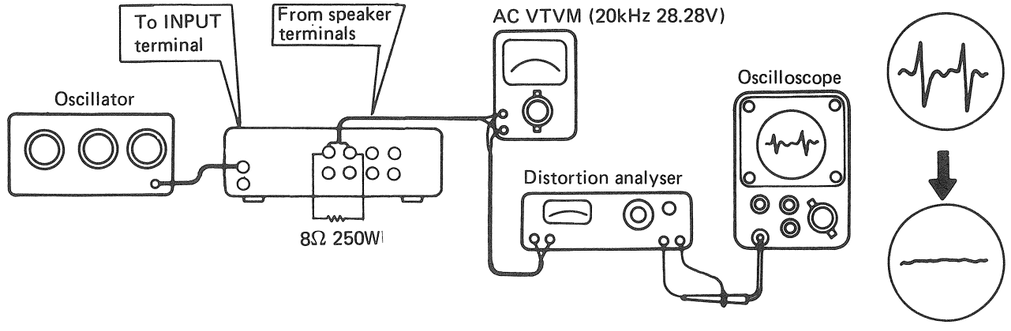
1) Régler la commande de tension de stabilisation VR105 sur "min".
2) Appliquer une onde sinusoidale de 20kHz à la borne d'ENTREE C.C.
3) Régler le régulateur de tension (VR) de réglage du niveau d'entrée sur "MAX".
4) Brancher le distorsiomètre à la borne du haut-parleur et appliquer la puissance de sortie du distorsiomètre à l'oscilloscope.
5) Tourner l'atténuateur, de facon à ce que la sortie de la borne du haut-parleur soit de 28.28V.
6) Tourner la commande I_{CQ} de VR104, de façon à ce que la forme d'onde déformée soit réduite au minimum.
7) En outre, tourner la commande VR105 de la tension de stabilisation, de façon à ce que la forme d'onde dèformée soit réduite au minimum.

3. Mise au point du wattmétre de crête

1) Brancher l'oscillateur à basse fréquence à la borne d'ENTREE C.C., et le voltmètre C.A. aux bornes du haut-parleur, parallèlement à la résistance de charge.
2) Régler le régulateur de tension (VR) de réglage du niveau d'entrée sur "MAX".
3) Appliquer un signal de 1kHz à partir de l'oscillateur, et tourner l'atténuateur de l'oscillateur de facon à ce que le voltmètre C.A. indique 0.894V.
4) Régler VR401 (canal gauche), de façon à ce que le wattmètre indique 0.1W.
5) De même, régler VR402 (canal droit).
6) Appliquer un signal de 1kHz à partir de l'oscillateur, et tourner l'atténuateur de l'oscillateur, de façon à ce que le voltmètre C.A. indique 28.28V.
7) Régler VR403 (canal gauche), de facon à ce que le wattmètre indique 100W.
8) De même, régler VR404 (canal droit).
9) Effectuer les mises au point, en répétant dans l'ordre le mode opératoire de 3 à 8.

■ ADJUSTING POINTS





(I_{CQ} adjustment with the oscilloscope and the distortion analyser)
(I_{CQ}-Einstellung mit Oszilloskop und Verzerrungsanalyser)
(Réglage de I_{CQ} à l'aide de l'oscilloscope et de l'analyseur de distorsion.)

■ PROTECTION CIRCUITRY INDICATOR

The indicator lights up when a trouble occurs in this unit.
With the power switch set to "on", the indicator lights up, and it goes out when the unit is in normal operation (about 7 sec. later). If abnormality takes place during operation, the indicator lights up or blinks. In that case, set the power switch to "off" and check the cause according to the following procedure.

• When the indicator lights up:

(Cause)

1. Due to troubles in other equipment (preamp, etc.), direct current is applied to the input, causing the protection circuit to operate.
2. This unit is in trouble, causing the protective circuit to operate.

(Check of the cause)

Set the power switch of this unit to "off", shift the input terminal connection on the back side from "DC" to "NORMAL", and then set the power switch to "on".

1. Indicator does not light up . . . . .

Equipment (preamp side) other than this unit is abnormal.

2. Indicator lights up . . . . .

This unit is abnormal. Then check the following points.

1) Middle point potential detection circuit (* Refer to "Adjustment") → Constant voltage power source circuit (Q201 ~ Q208, D203 ~ D206, F3, F4); Adjustment of DC balance
2) Overcurrent detection circuit → Temperature compensation circuit (Q113, Q114, Q119, Q120)
3) Power ON/OFF detection circuit → Muting circuit (R309 ~ R311, C304, D301)
4) Over-load limit circuit → Current limiter circuit (Q305, D311)

• When the indicator blinks:

(Cause)

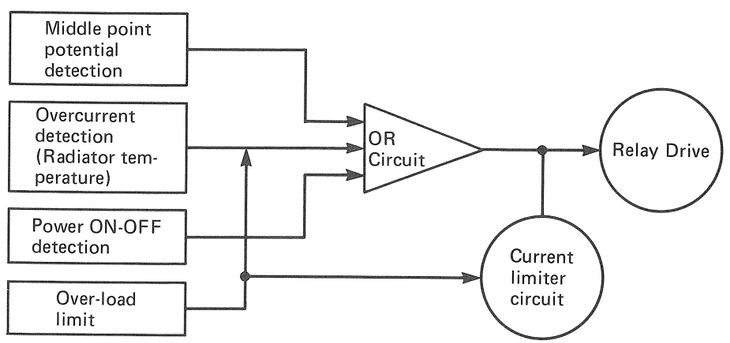
The speaker terminals or the power cord cable (positive and negative) are short-circuited, causing the protection circuit to operate.

(Check of the cause)

Set the power switch of this unit to "off", check the speaker terminal and the cord, and then set the power switch to "on".

1. Indicator does not blink . . . . . .Speaker terminal and cord connections are correct and normal.
2. Indicator blinks. . . . . .Speaker terminal or cord cable short-circuit trouble is possible. In this case, take proper measures, replacing the cord, etc., and check for trouble again.

• The block diagram of the protection circuit is shown below



* If the speaker impedance is too (low less than 4Ω), the limiter circuit operates and power is extremely reduced. (Relay does not operate.)

■ REPLACEMENT PARTS LIST (Electric Parts)

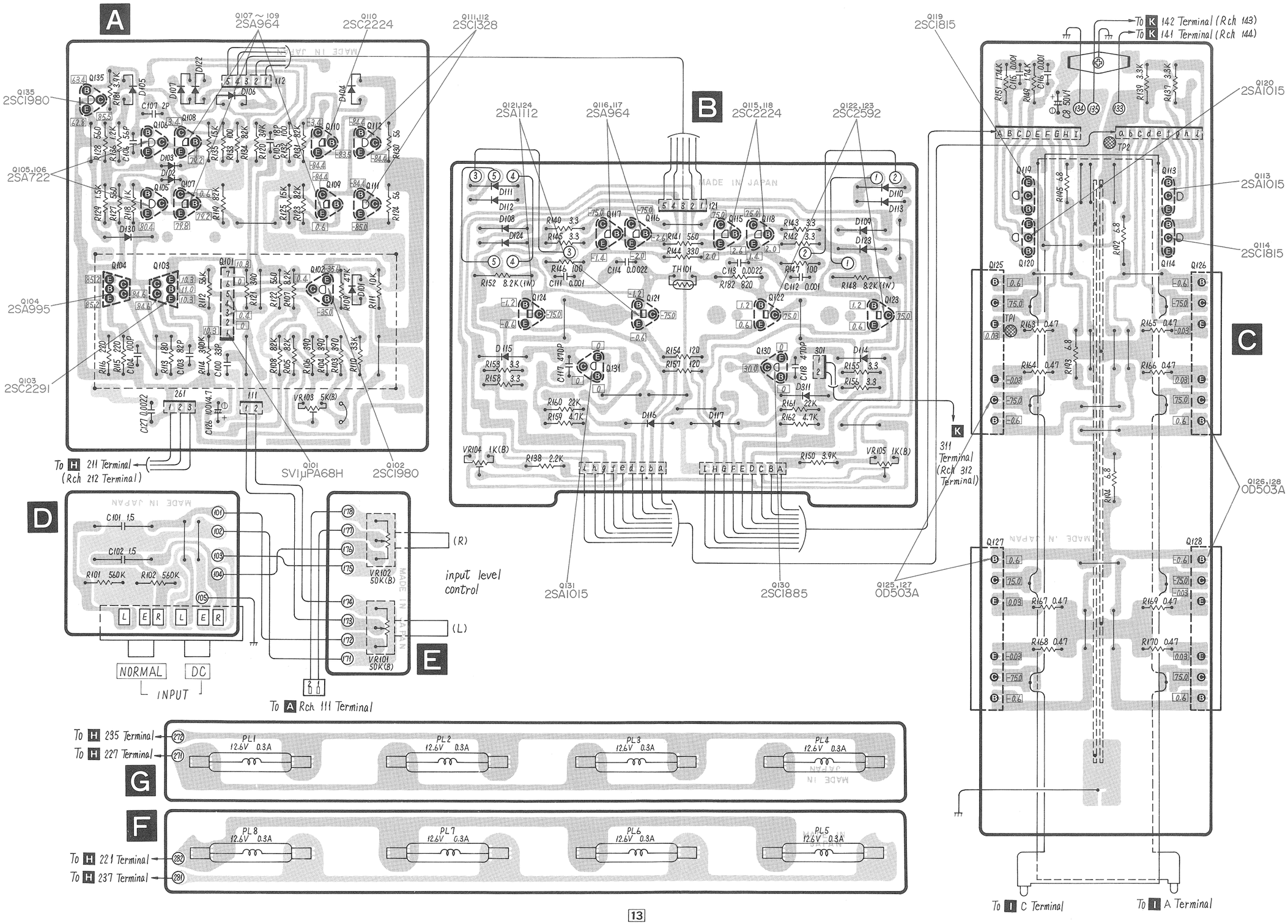
Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. ⚠ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.		Part No.	Part Name & Description
INTEGRATED CIRCUIT			
IC301		SVITA7317P	IC, Speaker Protection Operation Amplifier
IC401, 403		SVITA7318P	IC, Logrithm Amplifier
IC402		AN6552F	IC, Power Meter Operation Amplifier
TRANSISTORS			
Q101 (X2)		SVIUPA68H–M	Transistor, Input Differential Amplifier (Use in ranks L or M) [FET]
Q102 (X2) 135 (X2)		2SC1980–T	Transistor, Current Stabilizer (Use in ranks R, S or T)
Q103 (X2)		2SC2291N–G	Transistor, Current Stabilizer (Use in ranks F or G)
Q104 (X2)		2SA995N–G	Transistor, Current Mirror (Use in ranks F or G)
Q105 (X2) 106 (X2)		**2SA902S–F**	Transistor, Differential Amplifier (Product Part No. 2SA722–S, T or U)
Q107 ~ 109 (X2)		2SA964–Q	Transistor, Current Stabilizer (Use in ranks P, Q or R)
Q110 (X2)		2SC2224–Q	Transistor, Drive Amplifier (Use in ranks P, Q or R)
Q111 (X2) 112 (X2)		**2SC1328–T**	Transistor, Current Mirror (Use in ranks S, T or U)
Q113 (X2) 120 (X2)		2SA1015–Y	Transistor,Temperature Detection (Use in ranks Y or O) — Use in pair ranks as same as Q113 ~ Q119 and Q120.
Q114 (X2) 119 (X2)		2SC1815–Y	Transistor,Temperature Detection (Use in ranks Y or O) — Use in pair ranks as same as Q113 ~ Q119 and Q120.
Q115 (X2) 118 (X2)		2SC2224–Q	Transistor, Drive Amp. (Use in ranks P, Q or R) — Use in pair ranks as same as Q115 ~Q117 and Q118.
Q116 (X2) 117 (X2)		2SA964–Q	Transistor, Drive Amp. (Use in ranks P, Q or R) — Use in pair ranks as same as Q115 ~Q117 and Q118.
Q121 (X2) 124 (X2)		2SA1112–R	Transistor Drive Amp. (Use in ranks Q, R or S) — Use in pair ranks as same as Q121 ~Q123 and Q124.
Q122 (X2) 123 (X2)		2SC2592–R	Transistor, Drive Amp. (Use in ranks Q, R or S) — Use in pair ranks as same as Q121 ~Q123 and Q124.
Q125 ~ 128 (X2)		OD503A–P	Transistor, Power Amplifier (Use in ranks O, P or Q)
Q130 (X2)		2SC1885–R	Transistor, Bias Supply & Current Limiter (Use in ranks Q, R or S)
Q131 (X2)		2SA1015–Y	Transistor, Bias Supply & Current Limiter (Use in ranks Y or O)
Q201		2SA921–T	Transistor, Voltage Stabilizer (Use in ranks R, S or T)
Q202		2SC1980–T	Transistor, Voltage Stabilizer (Use in ranks R, S or T)
Q203, 207		2SC1885–R	Transistor, Voltage Stabilizer (Use in ranks Q, R or S)
Q204, 208		2SA912–R	Transistor, Voltage Stabilizer (Use in ranks Q, R or S)
Q205		2SD381A–L9	Transistor, Voltage Stabilizer (Porduct Part No. 2SD381–K, L or M)
Q206		2SB536A–L9	Transistor, Voltage Stabilizer (Product Part No. 2SB536–K, K or M)
Q209		2SC1509F–R	Transistor, Voltage Stabilizer (Product Part No. 2SC1509–P, Q or R)
Q301, 302		2SA777–Q	Transistor, Relay Driver (Use in ranks Q or R)
Q303, 304		2SC1815–Y	Transistor, Relay Driver (Use in ranks Y or O)
Q305		2SA921–T	Transistor, Protection Circuit (Use in ranks R, S or T)
DIODES			
D101 (X2) 105 (X2)		**MA27A1**	Diode, Bias Supply
D102, 103, 104 106, 107, 122 (X2)		**MA27A2**	Diode, Bias Supply
D108, 109, 114 ~ 117, 123 124, 130, 311 (X2)		**MA162A**	Diode, Bias Supply & Current Limiter Circuit
D110 ~ 113 (X2)		**20A90**	Diode, Synchronous Bias Switching
D201 (X2)	⚠	SVDS10VB20	Rectifier
D203 ~ 206,210, 211	⚠	**SVDSR1K2**	Rectifier
D207, 208		**MA27A2**	Diode
D209		SVDMZ333A	Diode, 33V Zener
D212, 213		SVDMZ310B	Diode, 10V Zener
D215		SVDMZ324A	Diode, 24V Zener
D301, 307		**MA162A**	Diode, Protection Circuit
D302, 303 305, 306		**SVDSR1K2**	Diode, Pulse Cancel
D401 ~ 404		**MA162A**	Diode, Power Meter Circuit
D405, 406		**20A90**	Diode, Power Meter Circuit
VARIABLE RESISTORS			
VR101, 102		EVH6UA524B54	Input Level Control, 50kΩ (B)
VR103 (X2)		EVMH8GA00B53	DC Unbalance Adjustment, 5kΩ (B)
VR104 (X2) 105 (X2)		EVMH8GA00B13	Power Amp. Idring Current Adjustment & Clamp Voltage Adjustment, 1kΩ (B)
VR201		EVMH9GA00B53	Voltage Control Adjustment, 5kΩ (B)
VR401 ~ 404		EVMH9GA00B33	Power Meter Adjustment, 3kΩ (B)
THERMISTERS			
TH101 (X2) 401, 402		ERTD2FHL103S	Thermister, Thermal Compensation, 10kΩ
RELAYS			
RLY301 ~ 303		SSY47	Relay, Speaker Output
RLY305		SSY31	Relay, Meter Output
RLY501, 502	⚠	SSY77	Relay, Protection
METER			
		SSM153–N	Meter, Peak Power
COMPONENT COMBINATIONS			
Z201 (X2) 203		EXRFS203ZS	Component Combination, 0.01μF (X2)
FUSES			
F1, 2, 7, 8, 9, 10	⚠	XBA2C40TRO	Fuse, T4.0A (250V)
F3, 4	⚠	XBA2C05TRO	Fuse, T500mA (250V)
F5, 6	⚠	XBA2C20TRO	Fuse, T2.0A (250V)
SWITCHES			
S1 ~ S4		SSH429	Switch, Speaker Selection
S5	⚠	ESB9997S	Switch, Power Source
S6	⚠	ESE37200	Switch, Voltage Adjuster
LAMPS			
PL1 ~ 8	⚠	XAM43P	Lamp, Peak Power Meter
PL9 ~ 13	⚠	**XAMR48T250**	Lamp, Speaker Indicator
COILS and TRANSFORMER			
L101, 102		SLQY07G–10	Coil, Power Amplifier Output Choke
T1	⚠	SLT5S43	Transformer, Power Source
T2	⚠	SLT5S43–1	Transformer, Power Source

■ PRINTED CIRCUIT BOARD

(A 1st Differential amplifier circuit, B Drive amplifier & synchronous biass circuits, C Power amplifier,
D Input terminals, E Input level controls, F · G Peak-power meter lamps)

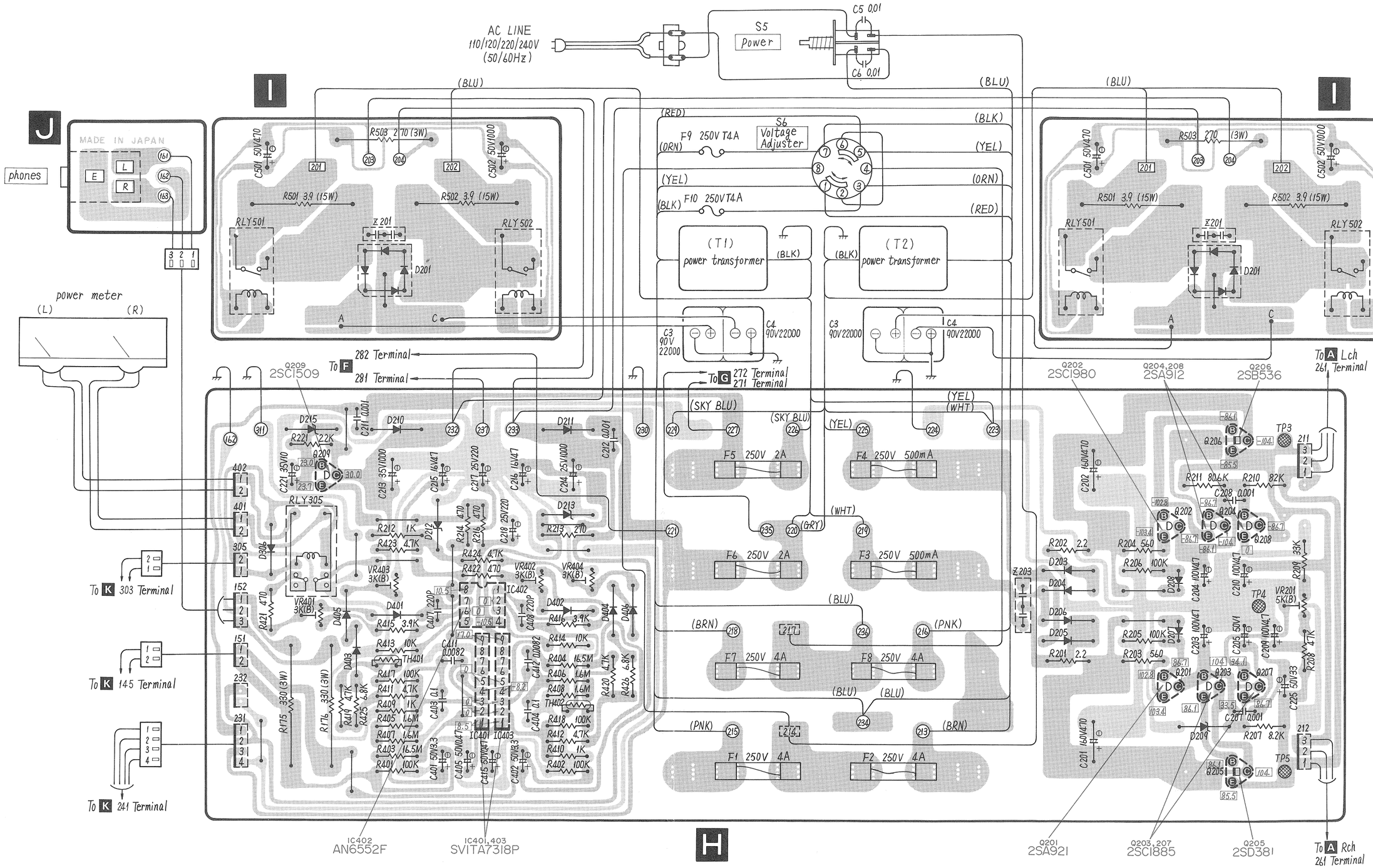
Ground (Earth) circuit



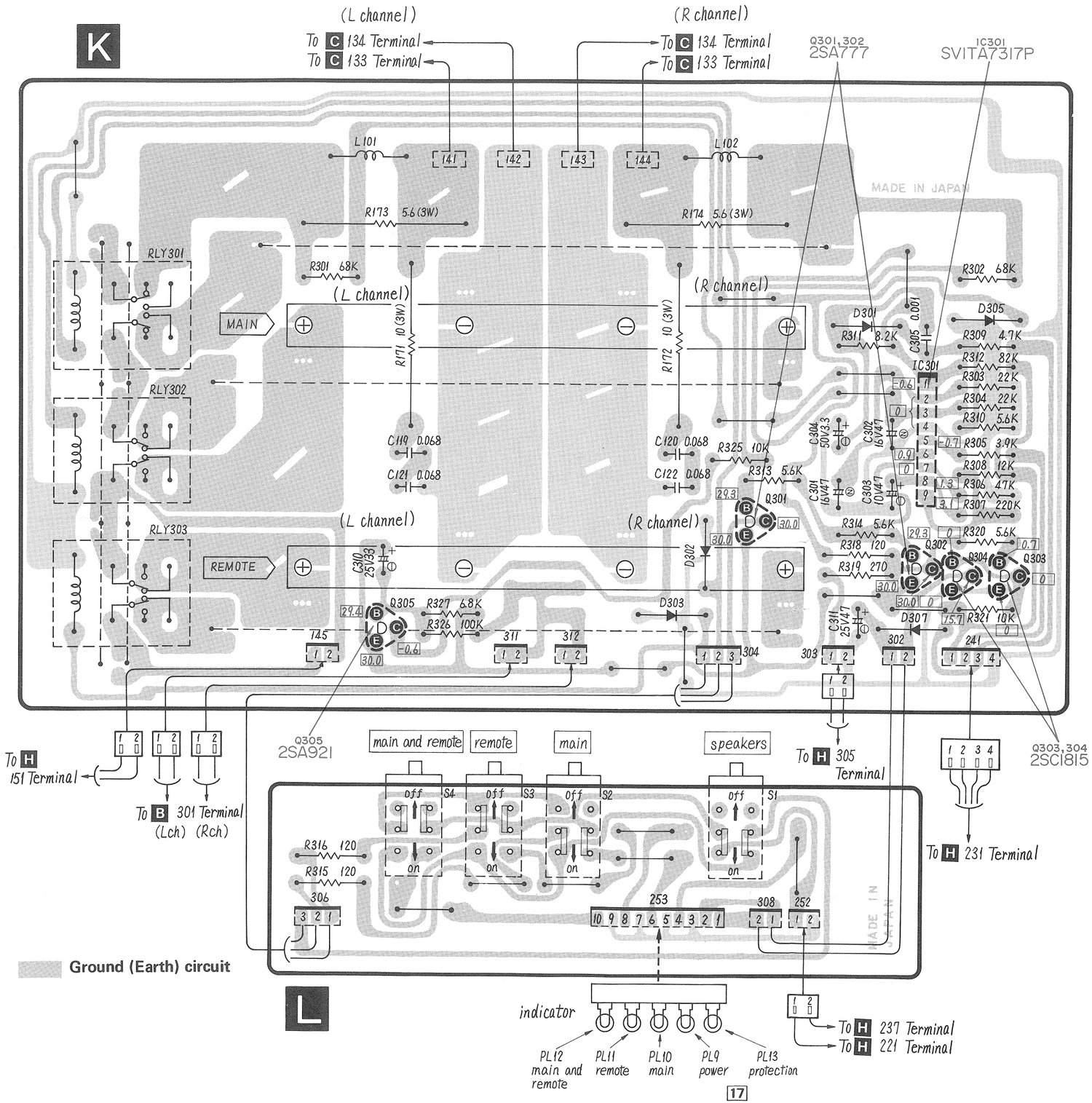
■ PRINTED CIRCUIT BOARD

(H Power source fuse, Voltage regulator & meter circuits, I Power supply, J Headphone circuit)

Ground (Earth) circuit

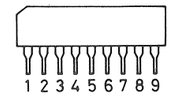


PRINTED CIRCUIT BOARD (K Speakers protection, L Speaker selection switches & speaker indicators)

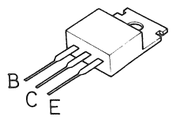


■ TERMINAL GUIDE OF TRANSISTORS AND IC'S

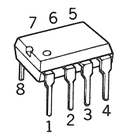
SVITA7317P
SVITA7318P



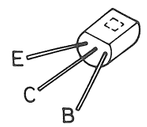
2SA1112, 2SC2592



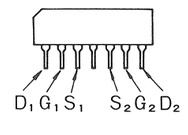
AN6552



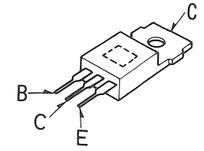
2SA722, 2SC1328
2SA777, 2SC1509
2SA912, 2SC1815
2SA921, 2SC1885
2SA1015, 2SC1980



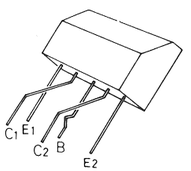
SVIμPA68H



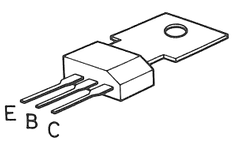
2SB536, 2SD381



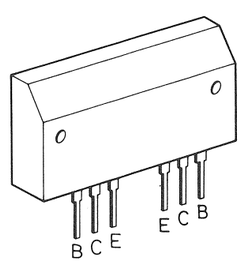
2SA995, 2SC2291



2SA964, 2SC2224



OD503A

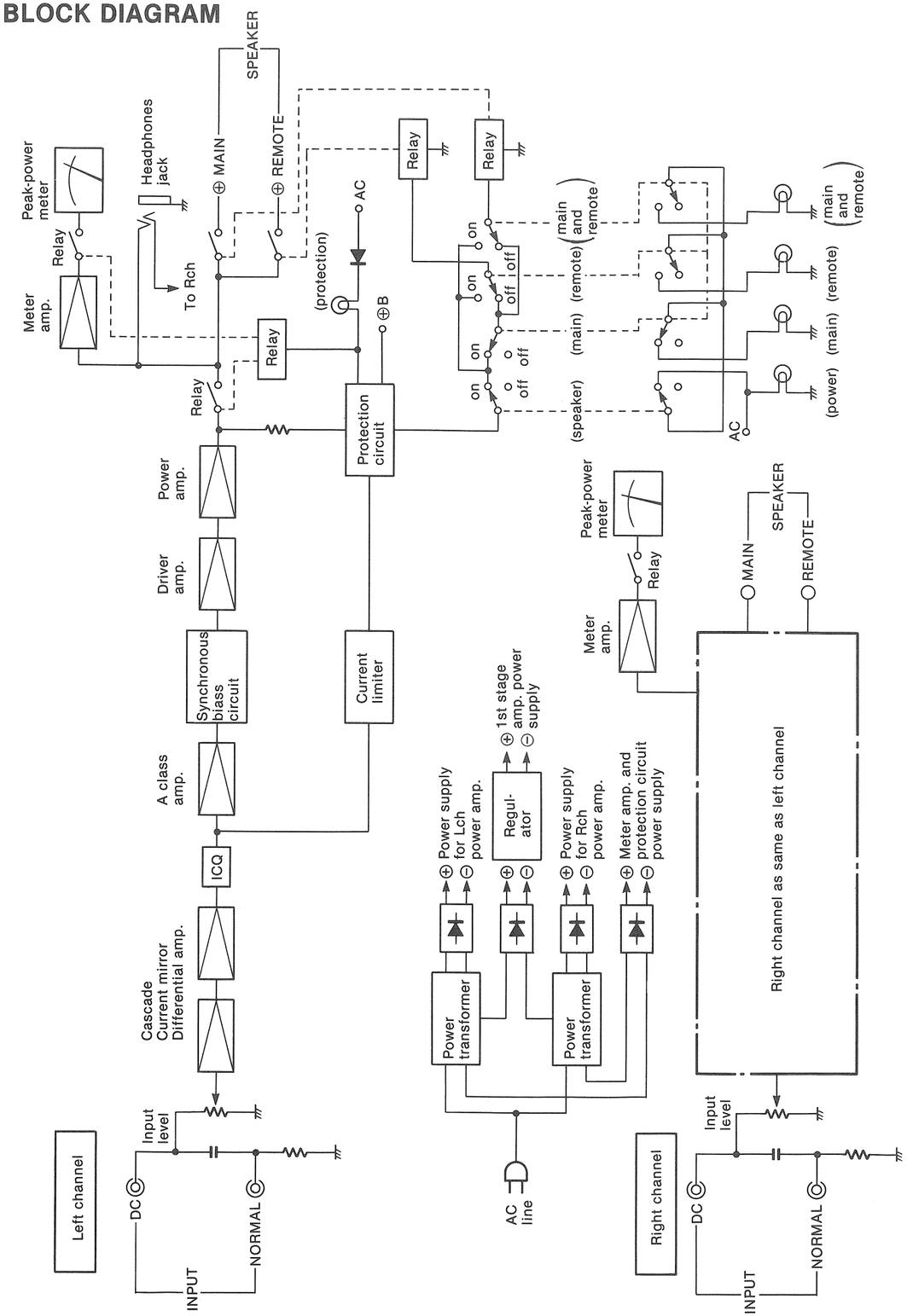


■ RESISTOR AND CAPACITOR PARTS LIST

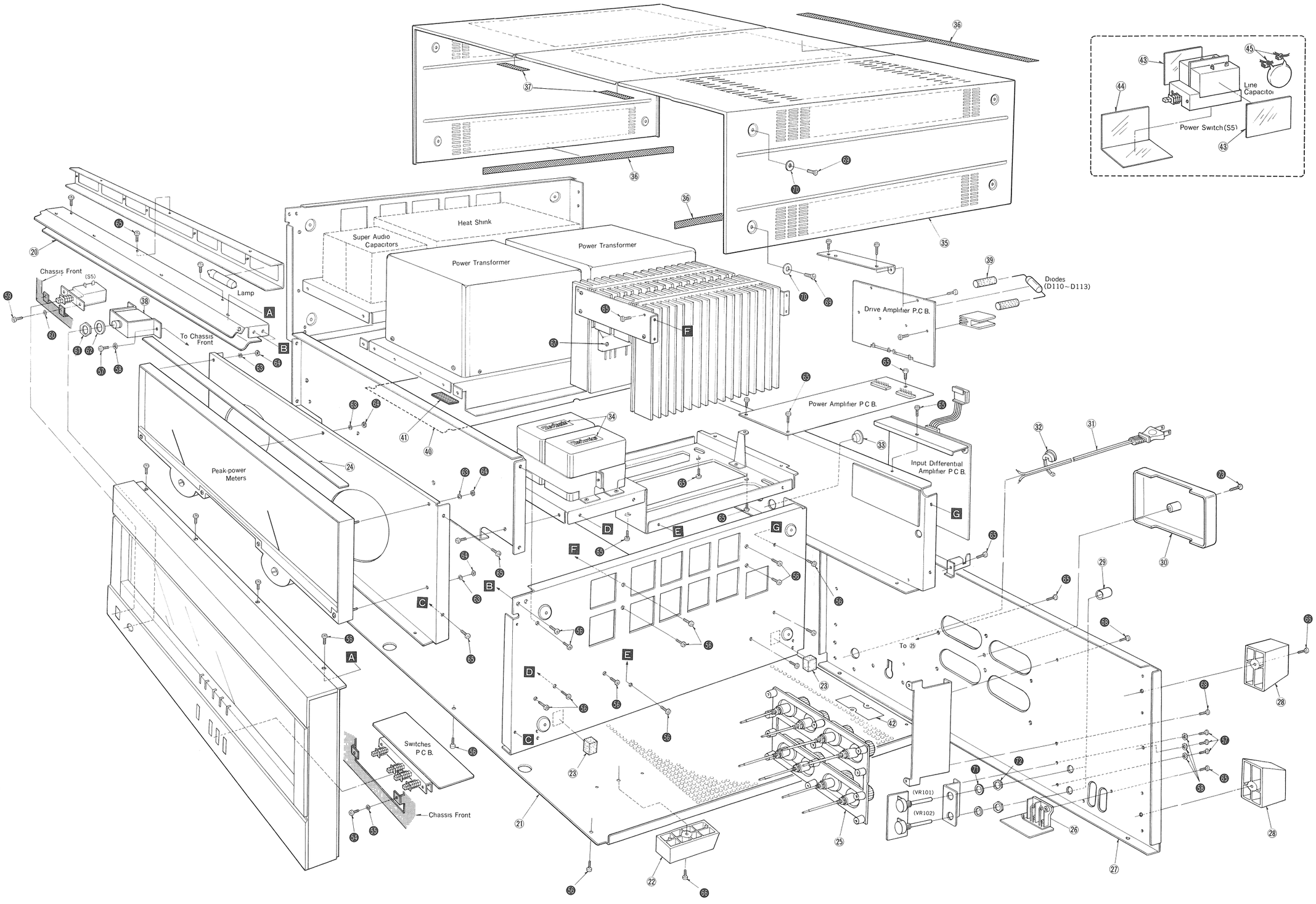
Note: ⚠ indicates that only parts specified by the manufacturer be used for safety.

Ref. No.		Part No.	Part Name & Description
RESISTOR			
R101, 102		**ERO25CKF5603**	Metal Film, 560kΩ, 1/4W, ± 1%
R(103, 104) X2		**ERO25CKF3900**	Metal Film, 390Ω, 1/4W, ± 1%
R(105) X2		**ERO25CKF8202**	Metal Film, 82kΩ, 1/4W, ± 1%
R(106) X2		**ERO25CKF3900**	Metal Film, 390Ω, 1/4W, ± 1%
R(107) X2		**ERO25CKF8201**	Metal Film, 8.2kΩ, 1/4W, ± 1%
R(108) X2		**ERO25CKF8202**	Metal Film, 82kΩ, 1/4W, ± 1%
R(109) X2		**ERO25CKF4702**	Metal Film, 47kΩ, 1/4W, ± 1%
R(110) X2		**ERO25CKF3302**	Metal Film, 33kΩ, 1/4W, ± 1%
R(111) X2		**ERO25CKF1002**	Metal Film, 10kΩ, 1/4W, ± 1%
R(112) X2		**ERO25CKF5602**	Metal Film, 56kΩ, 1/4W, ± 1%
R(113) X2	⚠	**ERD25FJ181**	Carbon, 180Ω, 1/4W, ± 5%
R(114) X2		**ERO25CKF3903**	Metal Film, 390kΩ, 1/4W, ± 1%
R(115, 116) X2	⚠	**ERD25FJ221**	Carbon, 220Ω, 1/4W, ± 5%
R(118) X2	⚠	**ERD25FJ102**	Carbon, 1kΩ, 1/4W, ± 5%
R(119) X2		**ERO25CKF8202**	Metal Film, 82kΩ, 1/4W, ± 1%
R(120) X2		**ERO25CKF3902**	Metal Film, 39kΩ, 1/4W, ± 1%
R(121) X2	⚠	**ERD25FJ391**	Carbon, 390Ω, 1/4W, ± 5%
R(122) X2	⚠	**ERD25FJ561**	Carbon, 560Ω, 1/4W, ± 5%
R(123) X2		**ERO25CKF8202**	Metal Film, 82kΩ, 1/4W, ± 1%
R(124) X2	⚠	**ERD25FJ560**	Carbon, 56Ω, 1/4W, ± 5%
R(125) X2		**ERO25CKF1502**	Metal Film, 15kΩ, 1/4W, ± 1%
R(127, 128) X2	⚠	**ERD25FJ561**	Carbon, 560Ω, 1/4W, ± 5%
R(129) X2	⚠	**ERD25FJ152**	Carbon, 1.5kΩ, 1/4W, ± 5%
R(130) X2	⚠	**ERD25FJ560**	Carbon, 56Ω, 1/4W, ± 5%
R(131) X2		**ERO25CKF8202**	Metal Film, 82kΩ, 1/4W, ± 1%
R(132, 133) X2	⚠	**ERD25FJ101**	Carbon, 100Ω, 1/4W, ± 5%
R(134) X2		**ERO25CKF8202**	Metal Film, 82kΩ, 1/4W, ± 1%
R(135) X2	⚠	**ERD25FJ153**	Carbon, 15kΩ, 1/4W, ± 5%
R(136) X2	⚠	**ERD25FJ122**	Carbon, 1.2kΩ, 1/4W, ± 5%
R(137) X2	⚠	**ERD25FJ332**	Carbon, 3.3kΩ, 1/4W, ± 5%
R(138) X2	⚠	**ERD25FJ222**	Carbon, 2.2kΩ, 1/4W, ± 5%
R(139) X2	⚠	**ERD25FJ332**	Carbon, 3.3kΩ, 1/4W, ± 5%
R(140) X2	⚠	**ERD25FJ3R3**	Carbon, 3.3Ω, 1/4W, ± 5%
R(141) X2	⚠	ERD2FCG561	Fuse Type Carbon, 560Ω, 1/4W, ± 2%
R(142, 143) X2	⚠	**ERD25FJ3R3**	Carbon, 3.3Ω, 1/4W, ± 5%
R(144) X2	⚠	ERD2FCG331	Fuse Type Carbon, 330Ω, 1/4W, ± 2%
R(145) X2	⚠	**ERD25FJ3R3**	Carbon, 3.3Ω, 1/4W, ± 5%
R(146, 147) X2	⚠	ERD2FCG101	Fuse Type Carbon, 100Ω, 1/4W, ± 2%
R(148) X2		**ERG1ANJ822**	Metal Oxide, 8.2kΩ, 1W, ± 5%
R(149) X2		**ERO25CKF1741**	Metal Film, 1.74kΩ, 1/4W, ± 1%
R(150) X2	⚠	**ERD25FJ392**	Carbon, 3.9kΩ, 1/4W, ± 5%
R(151) X2		**ERO25CKF1741**	Metal Film, 1.74kΩ, 1/4W, ± 1%
R(152) X2		**ERG1ANJ822**	Metal Oxide, 8.2kΩ, 1W, ± 5%
R(153) X2	⚠	**ERD25FJ3R3**	Carbon, 3.3Ω, 1/4W, ± 5%
R(154) X2	⚠	ERD2FCG121	Fuse Type Carbon, 120Ω, 1/4W, ± 2%
R(155, 156) X2	⚠	**ERD25FJ3R3**	Carbon, 3.3Ω, 1/4W, ± 5%
R(157) X2	⚠	ERD2FCG121	Fuse Type Carbon, 120Ω, 1/4W, ± 2%
R(158) X2	⚠	**ERD25FJ3R3**	Carbon, 3.3Ω, 1/4W, ± 5%
R(159) X2	⚠	**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R(160, 161) X2		**ERO25CKF2202**	Metal Film, 22kΩ, 1/4W, ± 1%
R(162) X2	⚠	**ERD25FJ472**	Carbon, 4.7kΩ, 1/4W, ± 5%
R(163, 164) X2	⚠	**ERF5RKR47**	Non-Flammable, 0.47Ω, 5W, ±10%
R(165, 166) X2	⚠	**ERF5RKR47**	Non-Flammable, 0.47Ω, 5W, ±10%
R(167, 168) X2	⚠	**ERF5RKR47**	Non-Flammable, 0.47Ω, 5W, ±10%
R(169, 170) X2	⚠	**ERF5RKR47**	Non-Flammable, 0.47Ω, 5W, ±10%
R171, 172		**ERG3ANJ100**	Metal Oxide, 10Ω, 3W, ± 5%
R173, 174		**ERX3ANJ5R6**	Metal Film, 5.6Ω, 3W, ± 5%
R175, 176		**ERG3ANJ331**	Metal Oxide, 330Ω, 3W, ± 5%
R(181) X2	⚠	**ERD25FJ392**	Carbon, 3.9kΩ, 1/4W, ± 5%
R(182) X2	⚠	**ERD25FJ821**	Carbon, 820Ω, 1/4W, ± 5%
R(191, 192) X2	⚠	**ERD50FJ6R8**	Carbon, 6.8Ω, 1/2W, ± 5%
R(193, 194) X2	⚠	**ERD50FJ6R8**	Carbon, 6.8Ω, 1/2W, ± 5%
R201, 202	⚠	**ERD25FAJ2R2**	Carbon, 2.2Ω, 1/4W, ± 5%
R203, 204	⚠	**ERD25FJ561**	Carbon, 560Ω, 1/4W, ± 5%
R205, 206		**ERO25CKF1003**	Metal Film, 100kΩ, 1/4W, ± 1%
R207	⚠	**ERD25FJ822**	Carbon, 8.2kΩ, 1/4W, ± 5%
R208		**ERO25CKF4702**	Metal Film, 47kΩ, 1/4W, ± 1%
R209		**ERO25CKF3302**	Metal Film, 33kΩ, 1/4W, ± 1%
R210		**ERO25CKF8202**	Metal Film, 82kΩ, 1/4W, ± 1%
R211		**ERO25CKF8062**	Metal Film, 80.6kΩ, 1/4W, ± 1%
R212	⚠	**ERD50FJ102**	Carbon, 1kΩ, 1/2W, ± 5%
R213	⚠	**ERD50FJ271**	Carbon 270Ω, 1/2W, ± 5%
R214	⚠	**ERD25FJ471**	Carbon, 470Ω, 1/4W, ± 5%
R216	⚠	**ERD25FJ471**	Carbon, 470Ω, 1/4W, ± 5%
R221		**ERO25CKF2201**	Metal Film, 2.2kΩ, 1/4W, ± 1%
R301, 302		**ERO25CKF6802**	Metal Film, 68kΩ, 1/4W, ± 1%
R303, 304		**ERO25CKF2202**	Metal Film, 22kΩ, 1/4W, ± 1%
R305		**ERO25CKF3901**	Metal Film, 3.9kΩ, 1/4W, ± 1%
R306		**ERO25CKF4702**	Metal Film, 47kΩ, 1/4W, ± 1%
R307		**ERO25CKF2203**	Metal Film, 220kΩ, 1/4W, ± 1%
R308		**ERO25CKF1202**	Metal Film, 12kΩ, 1/4W, ± 1%
R309		**ERO25CKF4701**	Metal Film, 4.7kΩ, 1/4W, ± 1%
R310		**ERO25CKF5601**	Metal Film, 5.6kΩ, 1/4W, ± 1%
R311		**ERO25CKF8201**	Metal Film, 8.2kΩ, 1/4W, ± 1%
R312		**ERO25CKF8202**	Metal Film, 82kΩ, 1/4W, ± 1%
R313, 314		**ERO25CKF5601**	Metal Film, 5.6kΩ, 1/4W, ± 1%
R315, 316	⚠	**ERD50FJ121**	Carbon, 120Ω, 1/2W, ± 5%
R318	⚠	**ERD50FJ121**	Carbon, 120Ω, 1/2W, ± 5%
R319	⚠	**ERD50FJ271**	Carbon, 270Ω, 1/2W, ± 5%
R320		**ERO25CKF5601**	Metal Film, 5.6kΩ, 1/4W, ± 1%
R321		**ERO25CKF1002**	Metal Film, 10kΩ, 1/4W, ± 1%
R325		**ERO25CKF1002**	Metal Film, 10kΩ, 1/4W, ± 1%
R326		**ERO25CKF1003**	Metal Film, 100kΩ, 1/4W, ± 1%
R327		**ERO25CKF6801**	Metal Film, 6.8kΩ, 1/4W, ± 1%
R401, 402		**ERO25CKF1003**	Metal Film, 100kΩ, 1/4W, ± 1%
R403, 404		**ERO25CKF1652**	Metal Film, 16.5kΩ, 1/4W, ± 1%
R405, 406		**ERC14GK165**	Carbon, 1.6MΩ, 1/4W, ±10%
R407, 408		**ERC14GK165**	Carbon, 1.6MΩ, 1/4W, ±10%
R409, 410		**ERO25CKF1001**	Metal Film, 1kΩ, 1/4W, ± 1%
R411, 412		**ERO25CKF4701**	Metal Film, 4.7kΩ, 1/4W, ± 1%
R413, 414		**ERO25CKF1002**	Metal Film, 10kΩ, 1/4W, ± 1%
R415, 416		**ERO25CKF3901**	Metal Film, 3.9kΩ, 1/4W, ± 1%
R417, 418		**ERO25CKF1003**	Metal Film, 100kΩ, 1/4W, ± 1%
R419, 420		**ERO25CKF4701**	Metal Film, 4.7kΩ, 1/4W, ± 1%
R421, 422		**ERO25CKF4700**	Metal Film, 470Ω, 1/4W, ± 1%
R423, 424		**ERO25CKF4701**	Metal Film, 4.7kΩ, 1/4W, ± 1%
R425, 426		**ERO25CKF6801**	Metal Film, 6.8kΩ, 1/4W, ± 1%
R(501, 502) X2	⚠	ERF15ZXK3R9	Non-Flammable, 3.9Ω, 15W, ±10%
R(503) X2		**ERG3ANJ271**	Metal Oxide, 270Ω, 3W, ± 5%
CAPACITORS			
C1, 2 [DG] only	⚠	ECQE2A473MCS	Polyester, 0.047μF, 250V, ± 20%
C(3, 4) X2		ECED90RA223Z	Electrolytic, 22000μF, 90V
C5, 6	⚠	ECKDKC103PF	Ceramic, 0.01μF, 400VAC, +100% −0%
C(100) X2		ECCD1H330K	Ceramic, 33pF, 50V, ± 10%
C101, 102		ECQE1155KZ	Polyester, 1.5μF, 100V, ± 10%
C(103) X2		ECCD1H820K	Ceramic, 82pF, 50V, ± 10%
C(104) X2		ECCD1H101K	Ceramic, 100pF, 50V, ± 10%
C(105) X2		ECCD1H180K	Ceramic, 18pF, 50V, ± 10%
C(106) X2		ECCD1H560K	Ceramic, 56pF, 50V, ± 10%
C(107) X2		ECCD1H020CC	Ceramic, 2pF, 50V, ±0.25pF
C(111, 112) X2		ECQM1H102KZ	Polyester, 0.001μF, 50V, ± 10%
C(113, 114) X2		ECQM1H222KZ	Polyester, 0.0022μF, 50V, ± 10%
C(115, 116) X2		ECKD1H102MD	Ceramic, 0.001μF, 50V, ± 20%
C(117, 118) X2		ECKD1H471KB	Ceramic, 470pF, 50V, ± 10%
C119, 120		ECQM1H683KZ	Polyester, 0.068μF, 50V, ± 10%
C121, 122		ECQM1H683KZ	Polyester, 0.068μF, 50V, ± 10%
C(126) X2		**ECEA2AS4R7**	Electrolytic, 4.7μF, 100V,
C(127) X2		ECKD2H222KB	Ceramic, 0.0022μF, 500V, ± 10%
C(131) X2		**ECEA50Z1**	Electrolytic, 1μF, 50V
C201, 202		ECET2CR471SL	Electrolytic, 470μF, 160V
C203, 204		**ECEA2AS470**	Electrolytic, 47μF, 100V
C205		**ECEA50Z1**	Electrolytic, 1μF, 50V
C207, 208		ECKD1H102MD	Ceramic, 0.001μF, 50V, ± 20%
C209, 210		**ECEA2AS4R7**	Electrolytic, 4.7μF, 100V
C211, 212		ECKD1H102MD	Ceramic, 0.001μF, 50V, ± 20%
C213		**ECEA1VS102**	Electrolytic, 1000μF, 35V
C214		**ECEA1VS102**	Electrolytic, 1000μF, 35V
C215, 216		**ECEA1ES470**	Electrolytic, 47μF, 25V
C217, 218		**ECEA1ES221**	Electrolytic, 220μF, 25V
C221		**ECEA1HS100**	Electrolytic, 10μF, 50V
C225		**ECEA1HS330**	Electrolytic, 33μF, 50V
C301, 302	⚠	**ECEA16N47**	Non-Polar Electrolytic, 47μF, 16V
C303		**ECEA1AS470**	Electrolytic, 47μF, 10V
C304		**ECEA50Z3R3**	Electrolytic, 3.3μF, 50V
C305		ECKD1H102MD	Ceramic, 0.001μF, 50V, ± 20%
C310		**ECEA1VS330**	Electrolytic, 33μF, 35V
C311		**ECEA1HS470**	Electrolytic, 47μF, 50V
C401, 402		ECEA1HN3R3SE	Electrolytic, 3.3μF, 50V
C403, 404		ECQM1H104KZ	Polyester, 0.1μF, 50V, ± 10%
C405		**ECEA50ZR47**	Electrolytic, 0.47μF, 50V,
C407, 408		ECKD1H221KB	Ceramic, 220pF, 50V, ± 10%
C411, 412		ECQP1822FZ	Polypropylene, 0.0082μF, 100V, ± 1%
C415		**ECEA50ZR47**	Electrolytic, 0.47μF, 50V
C(501) X2		**ECEA1HS471**	Electrolytic, 470μF, 50V
C(502) X2		**ECEA1HS102**	Electrolytic, 1000μF, 50V

■ BLOCK DIAGRAM

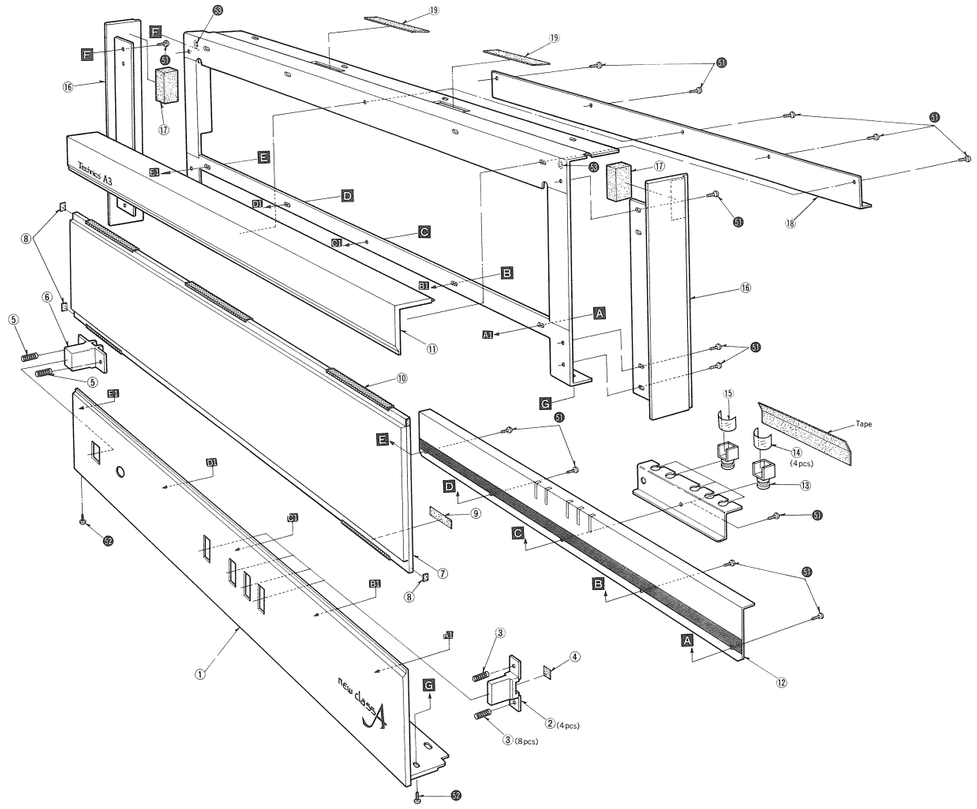


■ EXPLODED VIEWS

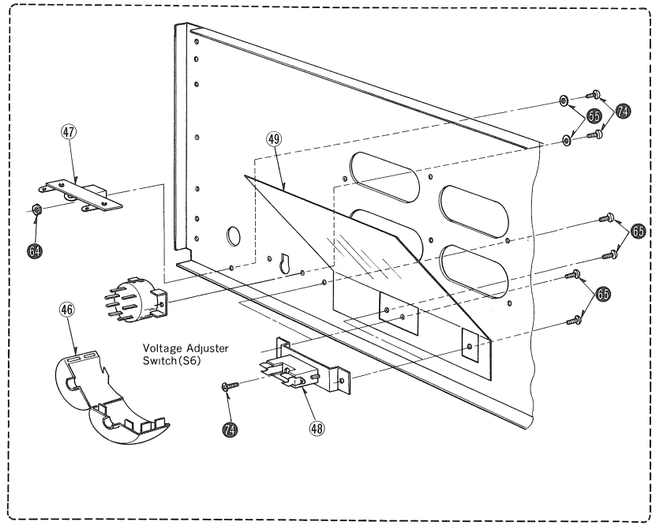


■ EXPLODED VIEWS

● Front Panel



● Rear Panel



■ REPLACEMENT PARTS LIST (Cabinet and Chassis Parts)

Notes: 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
2. ⚠ indicates that only parts specified by the manufacturer be used for safety.
3. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.

Ref. No.		Part No.	Part Name & Description
CABINET and CHASSIS PARTS			
1		SGWEA3N	Panel, Front Ass'y (Bottom)
2		SBC219–1	Button, Push Switches (Speaker)
3		SUS159	Spring, Push Switches (Speaker)
4		SHS6121	Fiber, Push Switches (Speaker)
5		SUS195	Spring, Push Switch (Power)
6		SBC261	Button, Push Switch (Power)
7		SGU145	Glass Plate, Front Panel
8		SHG6123	Rubber, Glass Plate
9		SHR5081	Spacer, Glass Plate
10		SHGA971	Rubber Cushion, Glass Plate
11		SGW2310BC	Panel, Front Panel (Top)
12		SGEEA3N	Ornament, Indicator Board
13		SHG1555	Rubber Bracket, Indicator Lamp
14		SDU39	Filter, Indicator Lamp (Red)
15		SDU41	Filter, Indicator Lamp (Yellow)
16		SGW2350B	Panel, Front Panel (Side)
17		SHGA629	Rubber, Front Panel
18		SUW1651	Reflector Plate
19		SHSA27–1	Fiber, Front Panel
20		SHP39	Paper, Reflector Plate
21		SKU8270	Bottom Board
22		SKL239	Foot, Set Bottom Side
23		SHG1191	Rubber Cushion, Chassis Side
24		SDU35	Filter, Peak-Power Meter
25		SJF4811	Terminal, Speakers
26		SJF3431A	Terminal, Input
27 [D]		SGP2150–2A	Rear Panel
27 [XSW]		SGP2150–3A	Rear Panel
27 [XE, X, XA]		SGPEA3KE	Rear Panel, SGP2150–3A with Name Plate (SGT22770)
27 [EB, DG, XGF, XGH]		SGPEA3KB	Rear Panel, SGP2150–2A with Name Plate (SGT22770)
28		SKL241	Foot, Rear Panel Side
29		SBN613	Knob, Input Level
30		SUV475	Cover, Speaker Terminals
31 [D, DG, EB, XGH, XGF]	⚠	SJA123	AC Cord, Power Source
31 [XSW]	⚠	SJA111	AC Cord, Power Source
31 [XE]	⚠	**QFC1205M**	AC Cord, Power Source
31 [X, XA]	⚠	SJA121	AC Cord, Power Source
32 [D, DG, EB, XGH, XGF]		SHR131	Bushing, AC Cord
32 [XSW, X, XA]		SHR127	Bushing, AC Cord
32 [XE]		SHR129	Bushing, AC Cord
33		RHR110	Bushing, Lead Wire
34		SGK1415	Label, Technics
35		SKC330B	Cabinet
36		SHS1009	Fiber, Cabinet
37		SHG6089	Rubber Cushion, Cabinet
38		XCJ6P21B–A	Jack, Headphones
39		SMX51–3	Spacer, Diodes
40		SMX377	Sheet, Shield
41		SHG6059–1	Rubber Sheet

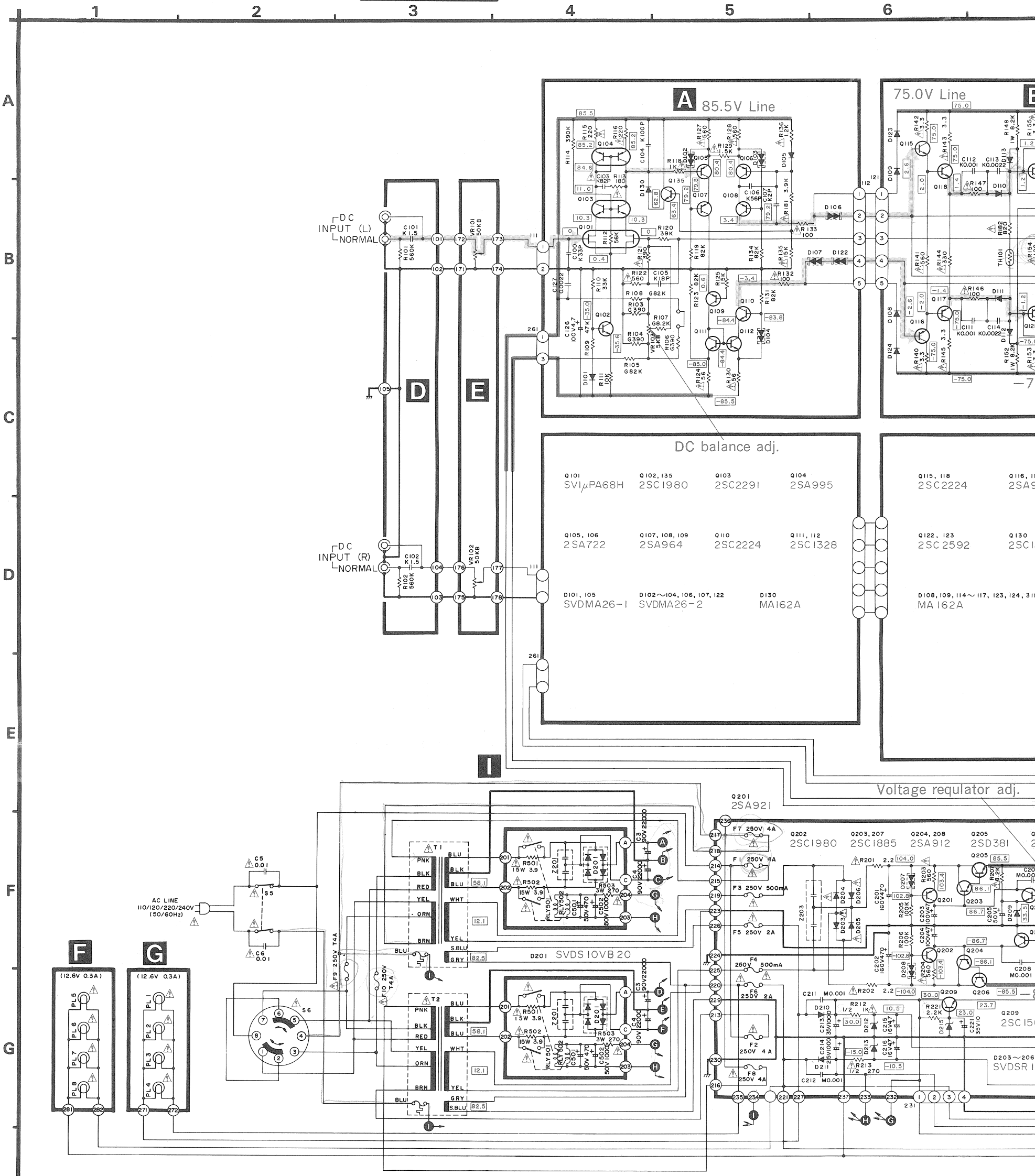
Ref. No.		Part No.	Part Name & Description
42		SMX371	Plate, Buttom Board
43		SMX265	Cover, Power Switch
44		SMX369	Cover, Power Switch
45		SHR301	Clamper, Wire
46		SUV453	Cover, Voltage Adjuster
47		SJR205	Terminal, 2 Pin
48		SJFA5101	Holder, Fuse
49		SMX383	Sheet, Shield
SCREWS, NUTS and WASHERS			
51		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8 (Front Panel)
52		**XTB4+8BFZ**	Screw, Tapping, ⊕ 4 x 8 (Front Panel)
53		**XWE3FZ**	Washer, Plain, ϕ 3
54		**XSN3+6S**	Screw, ⊕ 3 x 6
55		**XWA3B**	Washer, Spring, ϕ 3
56		**XTB4+8BFZ**	Screw, Tapping, ⊕ 4 x 8
57		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
58		**XWC3B**	Washer, Toothed Lock, ϕ 3
59		**XSN3+6S**	Screw, ⊕ 3 x 6
60		**XWA3B**	Washer, Spring, ϕ 3
61		**XNS12**	Nut, M12 (Headphones Jack)
62		SNE59–1	Washer, M12 (Headphones Jack)
63		**XWA3BFZ**	Washer, Spring, ϕ 3 (Meter)
64		**XNG3ES**	Nut, M3
65		**XTB3+8BFZ**	Screw, Tapping, ⊕ 3 x 8
66		**XTB4+12BFZ**	Screw, Tapping, ⊕ 4 x 12
67		**XTB3+16BFZ**	Screw, Tapping, ⊕ 3 x 16
68		**XTB3+6BFZ**	Screw, Tapping, ⊕ 3 x 6
69		XSS5+8FZS	Screw, ⊕ 5 x 8 (Cabinet)
70		SNE4033	Washer (Cabinet)
71		**XWC8B**	Washer, Toothed Lock, ϕ 8
72		**XNS8**	Nut, M8
73		**XTB4+30BFN**	Screw, Tapping, ⊕ 4 x 20
74		**XTN3+8**	Screw, ⊕ 3 x 8
ACCESSORIES			
A1		SJP2237–1	Cord, Stereo Pin-Type Connection
A2 [X, XA] only	⚠	RJP74–1	Plug Adapter, AC Power
A3 [X, XA] only	⚠	RJP75	Plug Adapter, AC Power
PACKING PARTS			
P1		SPH6279	Polyethylene Bag
P2		SPH6281	Polyethylene Bag
P3		SPS2605–1	Pad, Bottom Side
P4		SPS2607	Pad, Top Side
P5		SPS2789	Pad, Rear Side
P6		SPG2697	Carton Box
P6 [XGF] only		SPG2661	Carton Box
P7		SQF10573	Instructiones Book, Printed Metrer

Areas

* [D] and [DG] are available in Scandinavia and European except Belgium, United Kingdom, Switzerland, Holland and France.
* [EB] is available in Belgium.
* [XE] is available in United Kingdom.
* [XSW] is available in Switzerland.
* [XGH] is available in Holland.
* [XGF] is available in France.
* [X] and [XA] are available in Asia, Latin America, Middle East and Africa.

Printed in Japan
8006800Ⓐ A.M.

■ SCHEMATIC DIAGRAM ..... MODEL **SE-A3K** (This schematic diagram may be modified at any time with the developm



Notes:

1. **S1** : Speakers on/off switch in "**on**" position.
2. **S2** : Main speaker switch in "**on**" position.
3. **S3** : Remote speaker switch in "**off**" position.
4. **S4** : Main and Remote speaker switch in "**off**" position.
5. **S5** : Power switch in "**on**" position.
6. **S6** : Voltage adjuster switch in "**240V**" position.
7. ⚠ Indicates that only parts specified by the manufacturer be used fo safety.
8. ▭ Indicated voltage values are the standare values for the DC electronic circuit tester (high impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending of the internal impedance of the DC circuit tester.
9. The left and right channels use the same type of circuit. (schematic diagram A , B and C) The transistors, diodes, resistors, capacitors, etc, used for the right channel (schematic diagram below) are the same as for the left channel.
10. ⟹ Signal lines of left channel.
11. ▬ Positive (+B) voltage lines.

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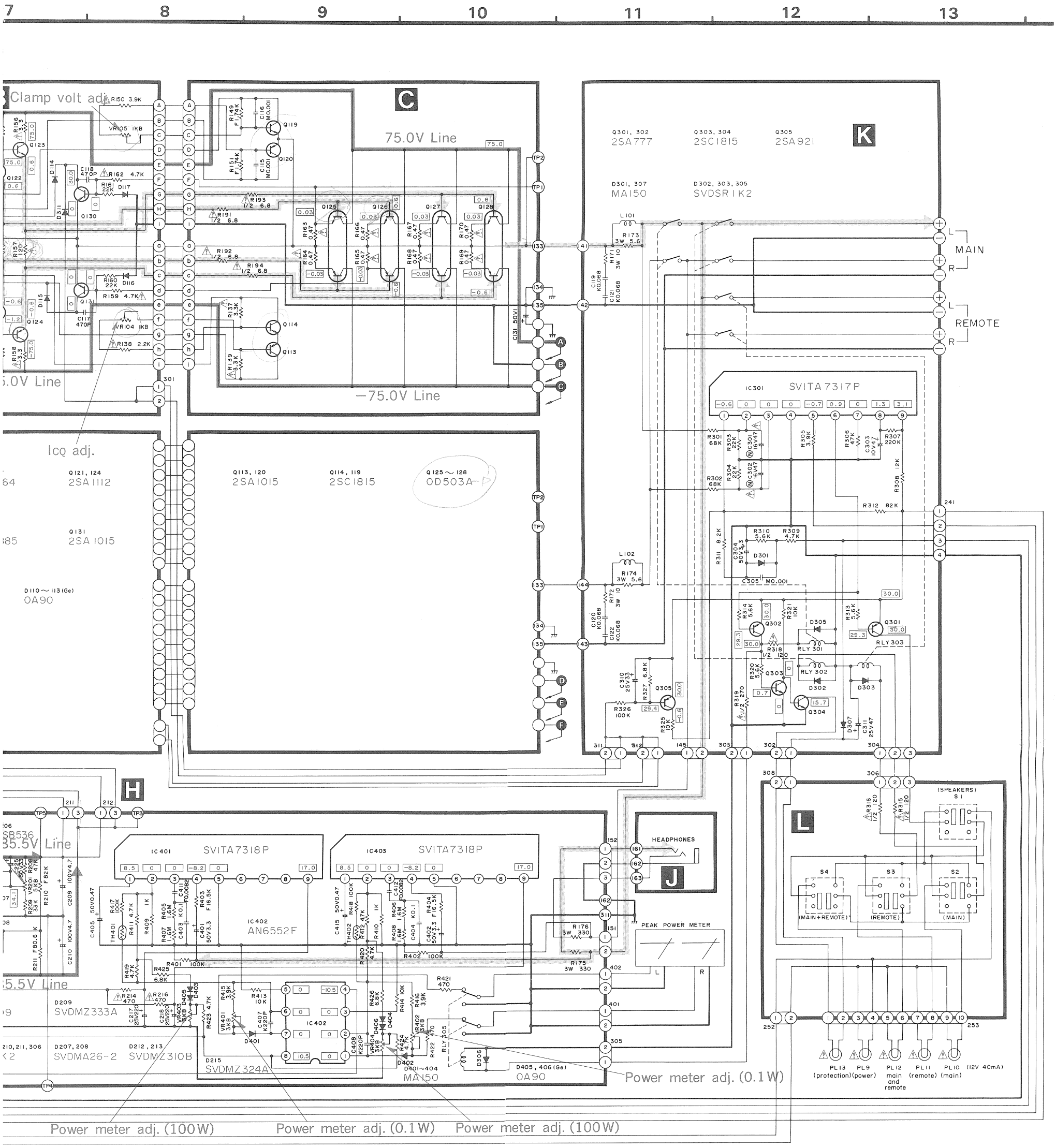
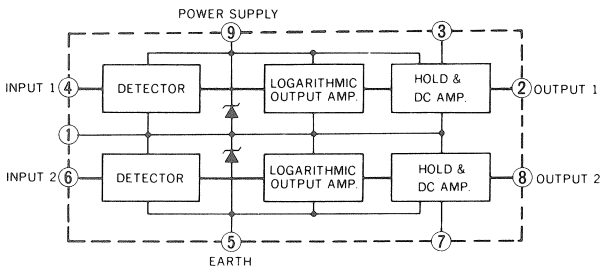
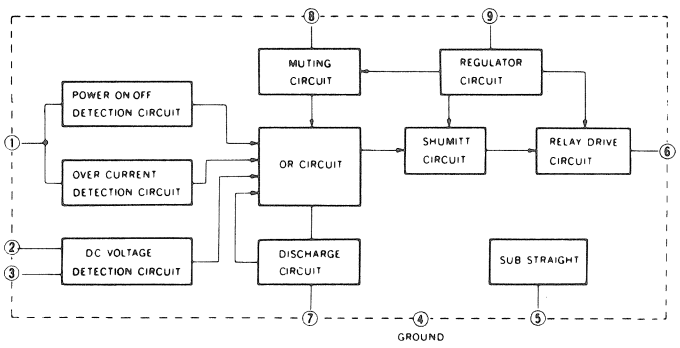


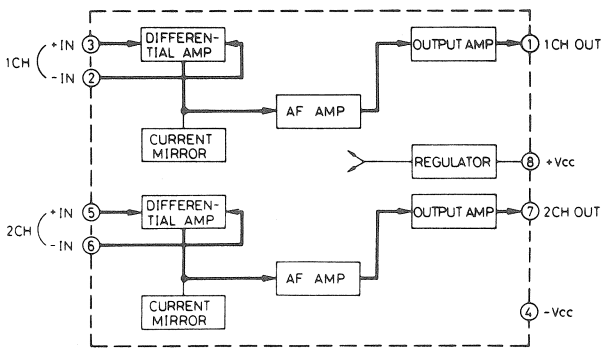
■ BLOCK DIAGRAM OF IC'S



IC401, 403 (SVITA7318P)
Logrithm amplifier



IC301 (SVITA7317P)
Speaker protection



IC402 (AN6552F)
Meter amplifier