

# Service Manual

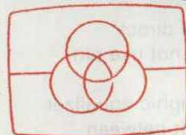
Stereo Integrated Amplifier

## SU-5

[EX],[EGA],[EK],[EF],[EB],  
[EH],[Ei],[XA],[XL],[EW]

## SU-5(K)

[EX],[EGA],[EK],  
[EH],[XA],[EW]



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- \* The cabinet and front panel are available in black color and silver types.
- \* The black type model is provided with (K) in the Service Manual.

### Areas

- \* [EX] is available in Scandinavia.
- \* [EGA] is available in F.R. Germany.
- \* [EK] is available in United Kingdom.
- \* [EF] is available in France.
- \* [EB] is available in Belgium.
- \* [EH] is available in Holland.
- \* [Ei] is available in Italy.
- \* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- \* [XL] is available in Australia.
- \* [EW] is available in Switzerland.

## Specifications (Specifications are subject to change without notice for further improvement.)

### (DIN 45 500)

#### ■ AMPLIFIER SECTION

1 kHz continuous power output both channels driven	2 × 30W (8Ω)
20 Hz~20 kHz continuous power output both channels driven	2 × 25W (8Ω)
Total harmonic distortion	
rated power at 20 Hz~20 kHz	0.03% (8Ω)
rated power at 1 kHz	0.005% (8Ω)
half power at 20 Hz~20 kHz	0.02% (8Ω)
half power at 1 kHz	0.005% (8Ω)
1 kHz continuous power output both channels driven	2 × 20W (4Ω)
Total harmonic distortion	
-26 dB power at 1 kHz	0.01% (4Ω)
50 mW power at 1 kHz	0.01% (4Ω)
Intermodulation distortion	
rated power at 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0.03%
Power bandwidth	
both channels driven, -3 dB	10 Hz~25 kHz (8Ω)
S/N	
rated power (4Ω)	
PHONO	74 dB (IHF, A: 79 dB)
TUNER, AUX, TAPE	84 dB (IHF, A: 93 dB)
-26 dB power (4Ω)	
PHONO	62 dB
TUNER, AUX, TAPE	62 dB
50 mW power (4Ω)	
PHONO	62 dB
TUNER, AUX, TAPE	62 dB

Residual hum and noise	0.8 mV
Damping factor	22 (8Ω)
Input sensitivity and impedance	
PHONO	2.5 mV/47kΩ
TUNER, AUX, TAPE	150 mV/22kΩ
PHONO maximum input voltage (1 kHz, RMS)	150 mV
Frequency response	
PHONO	RIAA standard curve ±0.8 dB (30 Hz~15 kHz) 10 Hz~60 kHz (-3 dB)
TUNER, AUX, TAPE	
Tone controls	
BASS	50 Hz, +10 dB~-10 dB
TREBLE	20 kHz, +10 dB~-10 dB
Output voltage and impedance	REC OUT 150 mV
Channel balance, AUX 250 Hz~6,300 Hz	±1 dB
Channel separation, AUX 1 kHz	45 dB
Headphones output level and impedance	400 mV/330Ω
Load impedance	4Ω~16Ω

#### ■ GENERAL

Power consumption	190W
Power supply	AC 50 Hz/60 Hz, 240V (For United Kingdom and Australia) AC 50 Hz/60 Hz, 220V (For continental Europe) AC 50 Hz/60 Hz, 110V/120V/220V/240V (For others)
Dimensions (W×H×D)	315 × 50 × 290 mm (12-13/32" × 1-31/32" × 11-7/16")
Weight	4 kg (8.8 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

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## REPLACEMENT PARTS LIST

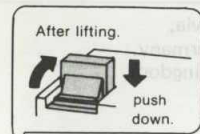
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## FEATURES

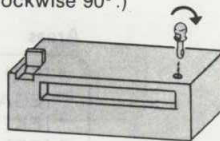
- High power 30W + 30W (1kHz, 8Ω)
- Slide sound volume using bar graph indicator
- "Super bass" circuit that enables the small speaker to ensure excellent performance.
- Direct connection to the tuner and graphic equalizer or cassette deck.

## STANDARD CONNECTION METHOD WITH DIRECT CONNECTOR

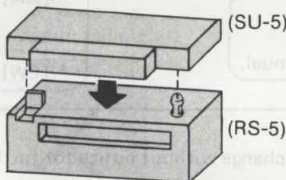
① Lift the direct connector on the tape deck. Push it straight down to lock it into place.



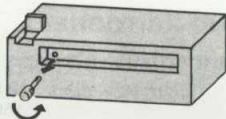
③ Insert the pin into the top panel. (Push in and turn clockwise 90°.)



④ Lower the amplifier onto the tape deck. Line up the direct connector and stabilizing pin properly.



② Remove the stabilizing pin from the back panel. (Turn counter-clockwise 90° and pull.)

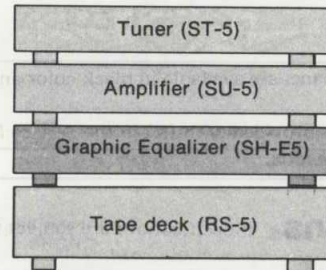


⑤ Connect the tuner to the amplifier the same way as in ① ~ ④.

⑥ Connect the turntable and speakers with their respective accompanying cords.

### Notes:

1. When using the direct connectors, do not use pin cords.
2. When using graphic equalizer (SH-E5), place it between amplifier and tape deck.



3. Position the units in a straight column to avoid twisting and breaking the direct connectors.

## PROTECTION CIRCUITRY

The protection circuitry may have operated if either of the following conditions is noticed:

- No sound is heard when the power is turned on.
- Sound stops during performance.

The function of this circuitry is to prevent circuitry damage if, for example, the positive and negative speaker connection wires are "shorted", or if speaker systems with an impedance less than the indicated rated impedance of the amplifier are used.

If this occurs, follow the procedure outlined below:

1. Turn off the power.
2. Determine the cause of the problem and correct it.
3. Turn on the power once again.

Note: Once the protection circuit operates, the unit is not reset even when there is no abnormality. So, turn off the power supply and, about 60 sec. later, turn it on again.

## BEFORE REPAIR AND ADJUSTMENT

Turn off the power supply and short-circuit both ends of power supply condensers (C401, C402, 5600μF) at resistance (about 10Ω, 5W) in order to discharge the charged voltage. Avoid short-circuit with a screwdriver or the like, otherwise the transistors or diodes may break down.

Before turning on the power supply after completion of repair, slowly apply the primary voltage by using a voltage regulator to make sure that the current consumed is free of abnormality. The current consumed at 60Hz/50Hz in no signal mode is shown below with respect to supply voltage 110/120V/220V/240V.

Power supply voltage		AC110V	AC120V	AC220V	AC240V
Current consumed	50 Hz	135 ~ 300mA	125 ~ 280mA	70 ~ 155mA	65 ~ 145mA
	60 Hz	90 ~ 260mA	90 ~ 260mA	60 ~ 140mA	55 ~ 130mA

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## Stereo Integrated Amplifier

## SU-5

- This booklet contains the specifications and adjusting procedures for SU-5, written Germany, French and Spanish.
- File this manual together with the SU-5 service manual (Order No. SD82062220C8)

## DEUTSCH

## TECHNISCHE DATEN

(Spezifikationen Können infolge von Verbesserungen ohne Ankündigung geändert werden.)

## (DIN 45 500)

### VERSTÄRKERTEIL

<b>Dauerleistung bei 1 kHz</b> beide Kanäle ausgesteuert	2 × 30W (8 Ω)
<b>Dauerleistung bei 20 Hz ~ 20 kHz</b> beide Kanäle ausgesteuert	2 × 25W (8 Ω)
<b>Gesamtklirrfaktor</b>	
Nennleistung bei 20 Hz ~ 20 kHz	0,03% (8 Ω)
Nennleistung bei 1 kHz	0,005% (8 Ω)
halbe Nennleistung bei 20 Hz ~ 20 kHz	0,02% (8 Ω)
halbe Nennleistung bei 1 kHz	0,005% (8 Ω)
<b>Dauerleistung bei 1 kHz</b> beide Kanäle ausgesteuert	2 × 20 W (4 Ω)
<b>Gesamtklirrfaktor</b>	
-26 dB Leistung bei 1 kHz	0,01% (4 Ω)
50 mW Leistung bei 1 kHz	0,01% (4 Ω)
<b>Intermodulationsfaktor</b>	
Nennleistung bei 60 Hz: 7 kHz = 4:1, nach SMPTE, 8 Ω	0,03%
<b>Leistungsbandbreite</b>	
beide Kanäle ausgesteuert bei -3 dB	10 Hz ~ 25 kHz (8 Ω)
<b>Restbrumm und Geräusch</b>	0,8 mV
<b>Dämpfungsfaktor</b>	22 (8 Ω)
<b>Geräuschabstand</b>	
<b>Nennleistung (4 Ω)</b>	
Phono	74 dB (nach IHF, A: 79 dB)
Tuner, Aux, Tape	84 dB (nach IHF, A: 93 dB)
<b>-26 dB Leistung (4 Ω)</b>	
Phono	62 dB
Tuner, Aux, Tape	62 dB
<b>50 mW Leistung (4 Ω)</b>	
Phono	62 dB
Tuner, Aux, Tape	62 dB

### Eingangsempfindlichkeit und -impedanz

Phono	2,5 mV/47 kΩ
Tuner, Aux, Tape	150 mV/22 kΩ
<b>Maximale TA-Eingangsspannung (1 kHz, eff.)</b>	150 mV
<b>Frequenzgang</b>	
Phono	RIAA-Standardkurve
	±0,8 dB (30 Hz ~ 15 kHz)
Tuner, Aux, Tape	10 Hz ~ 60 kHz (-3 dB)
<b>Klangregler</b>	
Baßregler (BASS)	50 Hz, +10 dB ~ -10 dB
Höhenregler (TREBLE)	20 kHz, +10 dB ~ -10 dB
<b>Ausgangsspannung und -impedanz</b>	
Aufnahmeausgang (REC OUT)	150 mV
Kanalabweichung (Aux, 250 Hz ~ 6300 Hz)	±1 dB
Übersprechdämpfung (Aux, 1 kHz)	45 dB
<b>Kopfhörerpegel und -impedanz</b>	400 mV/330 Ω
<b>Lautsprecherimpedanz</b>	4 Ω ~ 16 Ω

### ALLGEMEINE DATEN

<b>Leistungsaufnahme</b>	190 W
<b>Netzspannung</b>	Wechselstrom 50 Hz/60 Hz, 220V (Für Kontinentaleuropa) Wechselstrom 50 Hz/60 Hz, 110V/120V/220V/240V (Für andere Länder)
<b>Abmessungen (B×H×T)</b>	315 × 50 × 290 mm
<b>Gewicht</b>	4 kg
<b>Bemerkung:</b>	Der Gesamtklirrfaktor wurde mit einem digitalen Rauschspektrometer (Anlage H.P. 3045) gemessen.

## MESSUNGEN UND JUSTIERUNGEN

### • Leerlauf-(ICQ)-Einstellung

1. Nach der Reparatur des Hauptverstärkers, den Lautstärkereglern auf Minimum zurückdrehen, bevor die Stromzufuhr eingeschaltet wird.
2. Die halb fest eingestellten Widerstände (VR203, VR204) für den ICQ-Abgleich entgegen dem Uhrzeigersinn drehen.
3. Anschließend die Stromversorgung mit dem Spannungsregulator langsam von 0V anheben und sicherstellen, daß die Leistungsaufnahme ohne Signal zum Verstärker 70 ~ 155mA bei 220V 50Hz beträgt.
4. Ein Gleichstrom-Voltmeter an **TP 1** und **TP 2** (linker Kanal) oder **TP 3** und **TP 4** (rechter Kanal) anschließen (siehe Abb. 10).
5. Den Netzschalter auf "ON" stellen, und VR203 (linker Kanal) oder VR204 (rechter Kanal) so abgleichen, daß die Spannung an jedem Testpunkt 10 Minuten später 2mV beträgt.

**Anmerkung:** ICQ fließt nicht während 2 ~ 4 Sekunden nach Einschalten des Netzschalters, wegen der Stummschaltung während des Ein- und Ausschaltens der Stromzufuhr.

### • Prüfung des Stummschaltungs-Schaltkreises während des Ein- und Ausschaltens der Stromzufuhr.

1. Eine 8Ω - Last an den Lautsprecheranschluß anschließen.
2. Ein 1kHz-, 100mV-Signal an den Nebeneingang (aux.) anlegen.
3. Überprüfen, daß die Ausgangsleistung 2 ~ 4 Sekunden nach dem Einschalten des Netzschalters auftritt.
4. Die Gleichspannung des Lautsprecheranschlußes sollte während des zeitlichen Abstandes vom Einschalten den Stromzufuhr bis zum Auftreten der Ausgangsleistung zwischen ±50mV betragen.
5. Die Ausgangsleistung sollte sofort nach dem Ausschalten der Stromversorgung verschwinden.

### • Prüfung des Lautsprecher-Impedanz-Umschaltkreises

1. Ein Gleichstrom-Voltmeter zwischen **TP 5** und Masse anschließen.
2. Überprüfen, daß die Spannung -27.0V beträgt, wenn der Lautsprecher-Impedanzwahlschalter in der 4Ω-Position steht, und -33,5 bis -35,5V, wenn der Wahlschalter in der 8 ~ 16Ω Position steht.

## FRANÇAIS

## CARACTERISTIQUES

(Sujet à changement sans préavis.)

## (DIN 45 500)

## SECTION AMPLIFICATEUR

<b>Puissance de sortie continue à 1 kHz</b> les deux canaux en circuit	2 × 30W (8Ω)
<b>Puissance de sortie continue de 20 Hz~20 kHz,</b> les deux canaux en circuit	2 × 25W (8Ω)
<b>Distorsion harmonique totale</b>	
à puissance nominale (20 Hz~20 kHz)	0,03% (8Ω)
à puissance nominale (1 kHz)	0,005% (8Ω)
à demi-puissance (20 Hz~20 kHz)	0,02% (8Ω)
à demi-puissance (1 kHz)	0,005% (8Ω)
<b>Puissance de sortie continue à 1 kHz</b> les deux canaux en circuit	2 × 20W (4Ω)
<b>Distorsion harmonique totale</b>	
puissance de -26 dB à 1 kHz	0,01% (4Ω)
puissance de 50 mW à 1 kHz	0,01% (4Ω)
<b>Distorsion d'intermodulation</b> à puissance nominale à 60 Hz: 7 kHz=4:1, SMPTE, 8Ω	0,03%
<b>Signal/Bruit</b> à puissance nominale (4Ω)	
PHONO	74 dB (IHF, A: 79 dB)
SYNTOISATEUR, AUX, BANDE (TUNER, AUX, TAPE)	84 dB (IHF, A: 93 dB)
<b>puissance de -26 dB (4Ω)</b>	
PHONO	62 dB
SYNTOISATEUR, AUX, BANDE (TUNER, AUX, TAPE)	62 dB
<b>puissance de 50 mW (4Ω)</b>	
PHONO	62 dB
SYNTOISATEUR, AUX, BANDE (TUNER, AUX, TAPE)	62 dB

## Réponse de fréquences

les deux canaux en circuit, -3 dB	10 Hz~25 kHz (8Ω)
<b>Bruit et ronflement résiduels</b>	0,8 mV
<b>Coefficient d'amortissement</b>	22 (8Ω)
<b>Sensibilité et impédance d'entrée</b>	
PHONO	2,5 mV/47kΩ
<b>SYNTOISATEUR, AUX, BANDE (TUNER, AUX, TAPE)</b>	150 mV/22kΩ
PHONO (tension d'entrée maximum, 1 kHz RMS)	150 mV
<b>Réponse de fréquence</b>	
PHONO	Courbe nominale RIAA ±0,8 dB (30 Hz~15 kHz)
SYNTOISATEUR, AUX, BANDE (TUNER, AUX, TAPE)	10 Hz~60 kHz (-3 dB)
<b>Réglage de la tonalité</b>	
BASSES (BASS)	50 Hz, +10 dB~-10 dB
AIGUS (TREBLE)	20 kHz, +10 dB~-10 dB
<b>Tension de sortie et impédance</b>	
<b>SORTIE ENREGISTREMENT (REC OUT)</b>	150 mV
<b>Equilibrage des canaux, AUX 250 Hz~6.300 Hz</b>	±1 dB
<b>Séparation des canaux, AUX 1 kHz</b>	45 dB
<b>Niveau de sortie des casques et impédance</b>	400 mV/330Ω
<b>Impédance de charge</b>	4Ω~16Ω

## DIVERS

<b>Consommation</b>	190W
<b>Alimentation</b>	CA 50 Hz/60 Hz, 220V (Pour l'Europe) CA 50 Hz/60 Hz, 110V/120V/220V/240V (Autres)
<b>Dimensions (L×H×Pr)</b>	315 × 50 × 290 mm
<b>Poids</b>	4 kg

## MESURAGES ET RÉGLAGES

## ● Ajustement de la marche à vide (ICQ)

- Après la réparation de l'amplificateur principal, tourner le volume sonore au niveau minimal avant de mettre en marche l'alimentation en courant.
- Tourner complètement les résistances semi-fixes (VR203, VR204) pour un ajustement dans le sens inverse des aiguilles d'une montre de ICQ.
- Ensuite, élever légèrement la tension d'alimentation à partir de 0V avec le régulateur de tension et s'assurer que la consommation de courant sans signal à l'amplificateur soit de 70 ~ 155mA à 220V 50Hz.
- Brancher un voltmètre à C.C. à TP1 et TP2 (canal de gauche) et à TP3 et TP4 (canal de droite). (Se référer à la Fig. 10.)
- Régler l'interrupteur d'alimentation sur "on" (mise en circuit) et ajuster VR203 (canal de gauche) ou VR204 (canal de droite), de telle sorte que 10 minutes après la tension à chaque point de mesure soit de 2 mV.

**Nota:** ICQ ne circule pas pendant 2 ~ 4 secondes après le réglage de l'interrupteur d'alimentation sur "on" (mise en circuit), du fait de l'accord silencieux pendant le fonctionnement de la mise en circuit/hors circuit.

## ● Vérification du circuit d'accord silencieux pendant le fonctionnement de mise en circuit/hors circuit.

- Mettre en circuit une charge de 8Ω à la borne des haut-parleurs.
- Appliquer un signal de 1kHz 100 mV à la borne d'entrée auxiliaire.
- S'assurer que la puissance de sortie soit délivrée à peu près 2 ~ 4 secondes après avoir tourné l'interrupteur d'alimentation sur "on" (mise en circuit).
- Le C.C. de la borne des haut-parleurs devra être en deçà de ±50mV pendant l'intervalle entre la mise "encircuit" et la livraison de la puissance de sortie.
- La puissance de sortie devra immédiatement se produire lorsque l'interrupteur d'alimentation est mis "hors circuit".

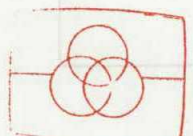
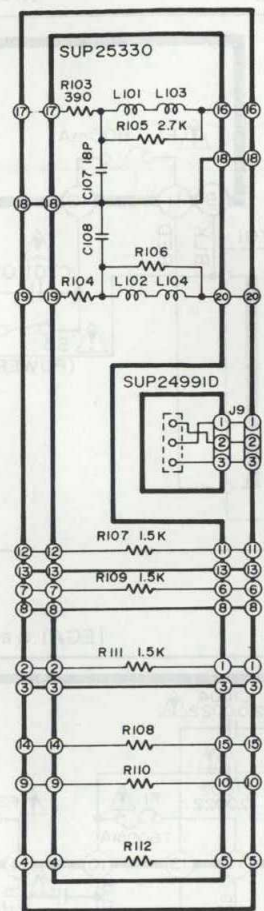
## ● Vérification du circuit de commutation d'impédance des haut-parleurs.

- Brancher un voltmètre à C.C. entre TP5 et la terre.
- S'assurer que la tension soit de -27.0V lorsque le commutateur d'impédance des haut-parleurs est à 4Ω, et à -33,5 à -35,5V lorsque le commutateur est à 8 ~ 16 Ω.



Input terminal circuit [EGA] [EGA] area only

[EGA] is available in F.R. Germany.

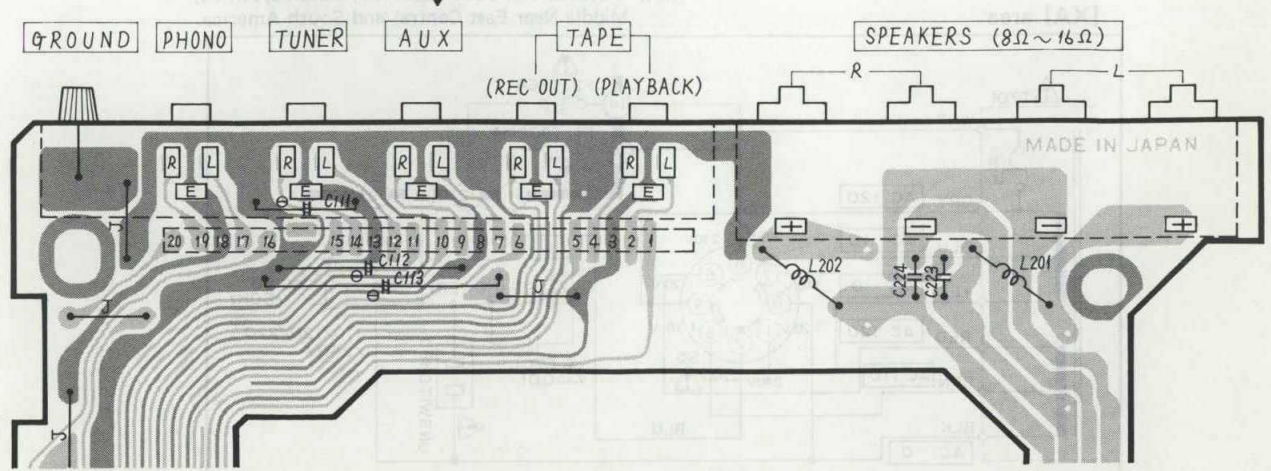
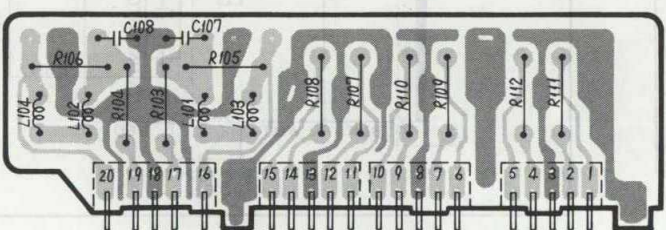


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Ground (Earth) Lines



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ESPECIFICACIONES

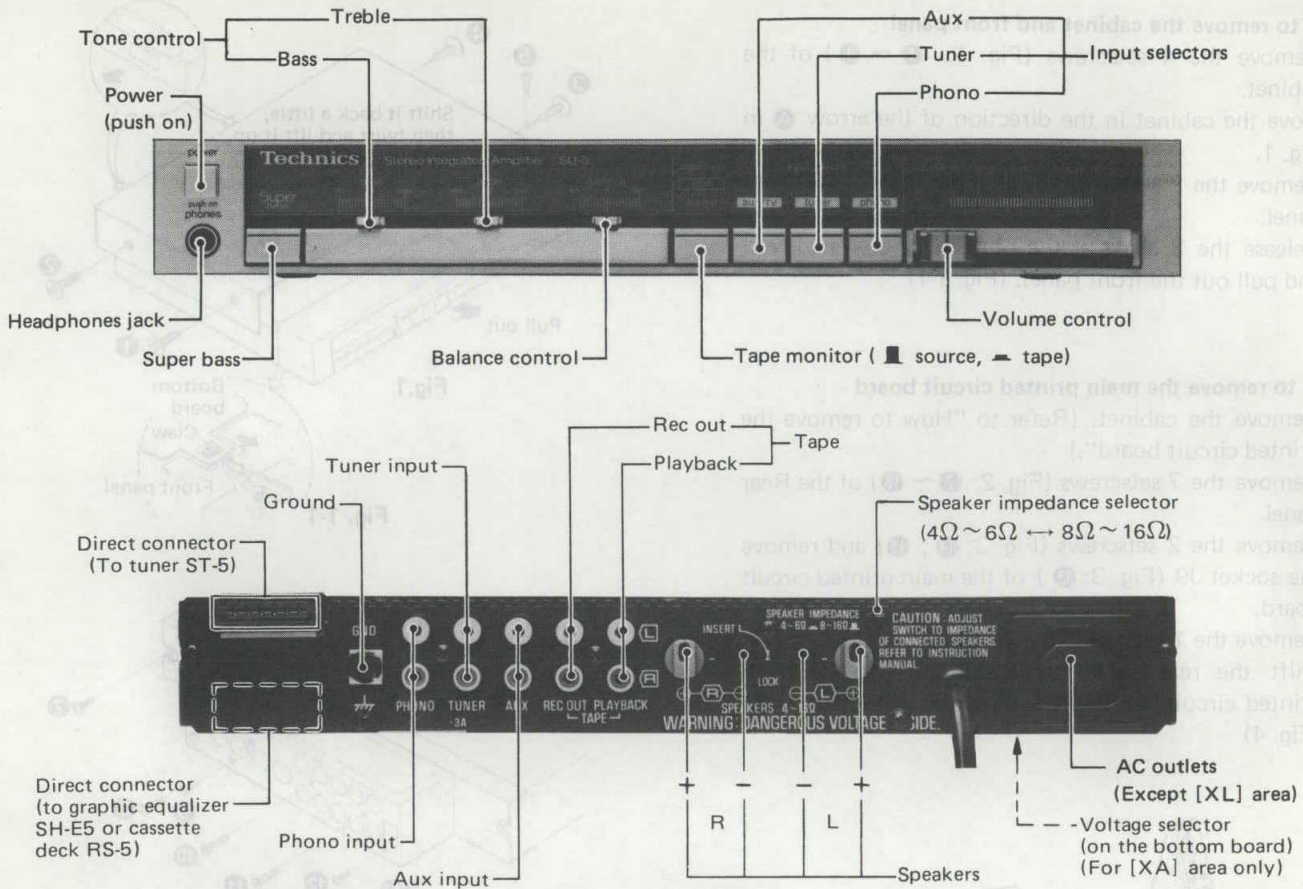
(DIN 45 500)

SECCION AMPLIFICADOR	
Potencia continua de 1 kHz en ambos canales	2 x 30W (8Ω)
Potencia continua de 20 Hz-20 kHz en ambos canales	2 x 35W (8Ω)
Distorsión armónica total	0.05% (100)
Potencia de régimen a 20 Hz-20 kHz	0.05% (100)
Potencia de régimen a 1 kHz	0.05% (100)
Distorsión por intermodulación	0.01% (100)
Relación de señal a ruido	0.01% (100)
Potencia de régimen (40)	0.01% (100)
TOCADIQC (PHONO)	0.01% (100)
SINTON. AUX. GRAB. (TUNER, AUX. TAPE)	0.01% (100)
GENERAL	0.01% (100)
CA 50 Hz/60 Hz 180V/250V/220V/240V (línea Europa continental)	180W
CA 50 Hz/60 Hz 180V/250V/220V/240V (Países orientales)	180W
Dimensiones (An x Al x Prof.)	315 x 50 x 250 mm
Peso	4 kg

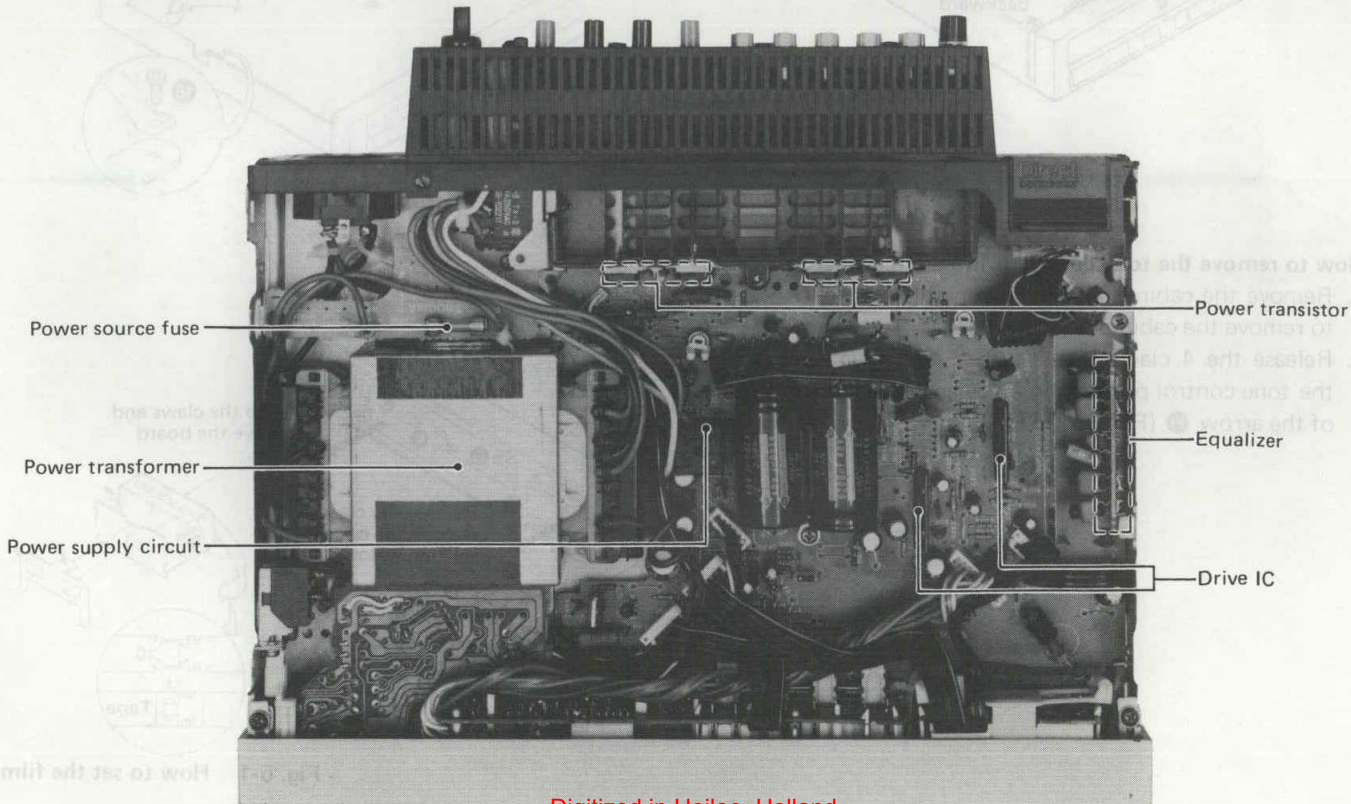
MEDICIONES Y AJUSTE

Ajuste de marcha en vacío (IC01)  
 Después de reparar el amplificador principal, gire el volumen de sonido al nivel mínimo antes de conectar la alimentación de corriente.  
 1. Gire completamente los resistores variables (VR202 y VR203) para ajustar IC01 a 100%.  
 2. A continuación, lentamente gire el ajuste de alimentación de DC, midiendo el receptor de voltaje y asegurándose de que el consumo de corriente sea menor que 100 mA a 230V AC.  
 3. Conecte un voltímetro de CA a los terminales de CA (L y N) (línea de entrada) (líneas de la Fig. 101).  
 4. Ponga el interruptor de alimentación en "ON" (conectado) y ajuste VR202 (canal izquierdo) a VR204 (canal derecho) de modo que el voltaje sea el mismo en cada punto de prueba de 200 mV.  
 Nota: IC01 no debe por sí mismo desconectar la línea de alimentación en "ON" debido a un calentamiento excesivo de la conexión de alimentación.  
 5. Compruebe la operación de circuito durante la operación de conexión desconectada de la alimentación.  
 6. Compruebe el funcionamiento de los canales de audio.  
 7. Ajuste el nivel de 1 kHz (100%) al terminal de entrada auxiliar.  
 8. Ajuste el nivel de 20 Hz-20 kHz al terminal de entrada auxiliar.  
 9. La CC de terminal de salida debe estar dentro de ±20 mV durante la alimentación "ON" y durante la desenergía.  
 10. La salida de desenergía intermitentemente cuando el interruptor de alimentación es puesto en "OFF".  
 11. Comprobación de circuito conector de impedancia de salida.  
 12. Conecte un voltímetro de CA entre L y N y tierra.  
 13. Asegúrese de que el voltaje de -32.0V cuando el interruptor de alimentación está en "ON" y -38.0V cuando el interruptor está en "OFF".

# LOCATION OF CONTROLS



- The power supply for this unit varies depending upon the areas. Also, the parts used for power supply are different. So, refer to the circuit diagram and the replacement parts list.
- \* 220V (50/60Hz) for continental Europe.
- \* 240V (50/60Hz) for United Kingdom and Australia.
- \* 110V/120V/220V/240V (50/60Hz) for other areas.
- [XA area] for other areas is provided with voltage selector .
- \* Phono input capacitance is about 150pF.

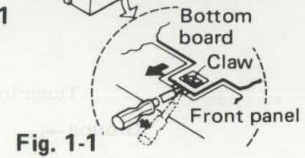
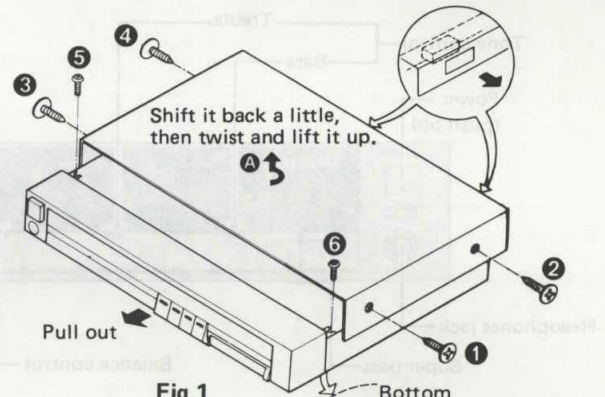


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## DISASSEMBLY INSTRUCTIONS

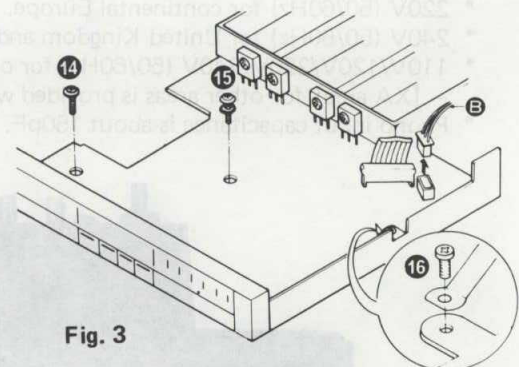
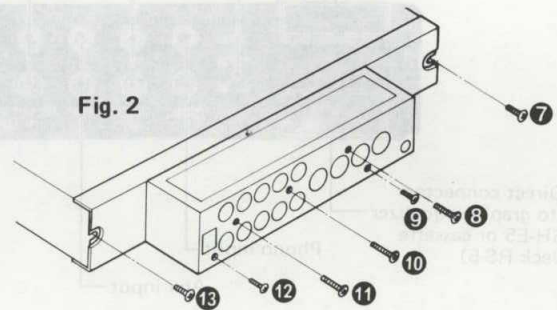
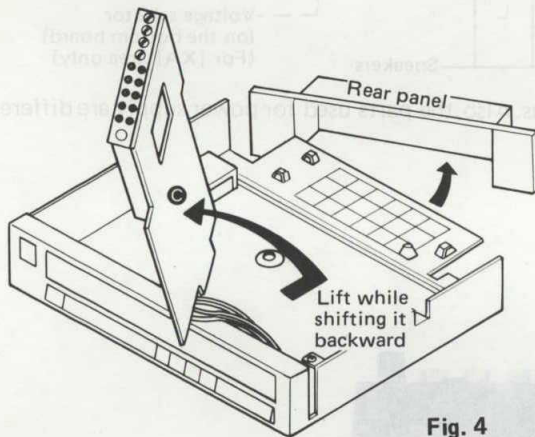
### How to remove the cabinet and front panel

1. Remove the 4 setscrews (Fig. 1: ① ~ ④) of the cabinet.
2. Move the cabinet in the direction of the arrow A in Fig. 1.
3. Remove the 2 setscrews (Fig. 1: ⑤, ⑥) of the front panel.
4. Release the 3 claws at the bottom by a screwdriver, and pull out the front panel. (Fig. 1-1)



### How to remove the main printed circuit board

1. Remove the cabinet. (Refer to "How to remove the printed circuit board".)
2. Remove the 7 setscrews (Fig. 2: ⑦ ~ ⑬) of the Rear panel.
3. Remove the 2 setscrews (Fig. 3: ⑭, ⑮) and remove the socket J9 (Fig. 3: B) of the main printed circuit board.
4. Remove the 1 setscrew (Fig. 3: ⑯).
5. Shift the rear panel backward and lift the main printed circuit board in the direction of the arrow C (Fig. 4)



### How to remove the tone control printed circuit board

1. Remove the cabinet and front panel. (Refer to "How to remove the cabinet and front panel.")
2. Release the 4 claws (Fig. 5: D ~ G), then remove the tone control printed circuit board in the direction of the arrow H (Fig. 5: H)

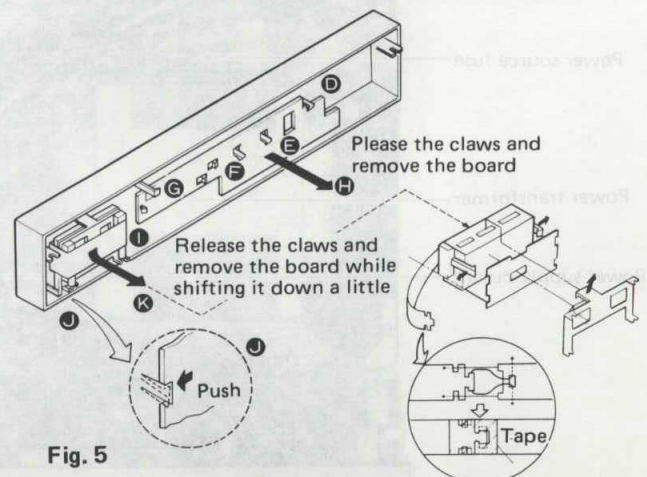


Fig. 5-1 How to set the film



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● **How to remove the volume printed circuit board**

1. Remove the cabinet and front panel. (Refer to "How to remove the cabinet and front panel.")
2. Release the 2 claws (Fig. 5: ①, ②) of the volume printed circuit board.
3. Remove the volume printed circuit board while shifting it down a little.
4. Remove the volume indicating film (Fig. 5-1) and release the 2 claws of the film holder.

● **How to remove the volume knob**

1. Release the 2 claws at the volume knob by a screwdriver, and remove the volume knob in the direction of the arrow ④ (Fig. 6).

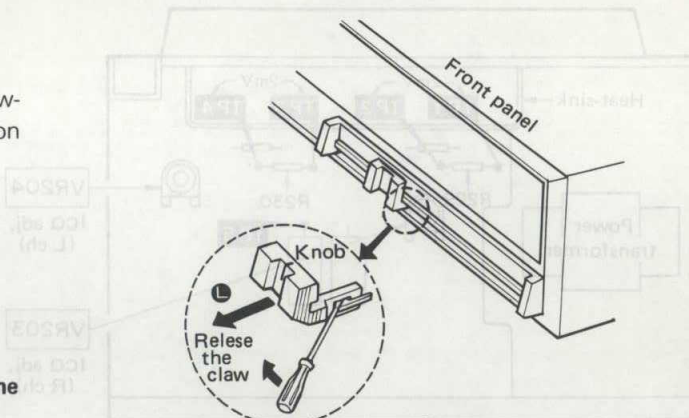


Fig. 6

● **How to remove the volume knob ornament and tone control knob ornament**

Notes: Remove the cabinet, front panel, volume printed circuit board and tone control printed circuit board.

**Volume knob ornament**

1. Release the ornament claws from the front panel and take out the ornament. (Fig. 7)

Pull out

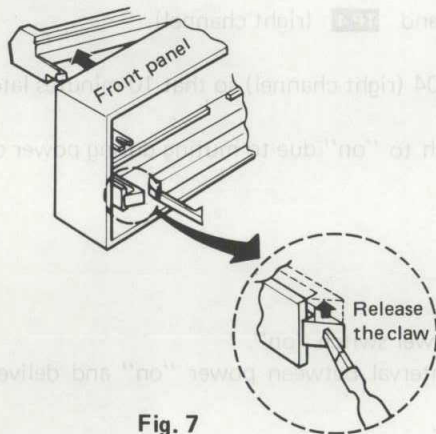


Fig. 7

**Tone control knob ornament**

1. Release the 7 ornament claws from the front panel, and take out the ornament. (Fig. 8)

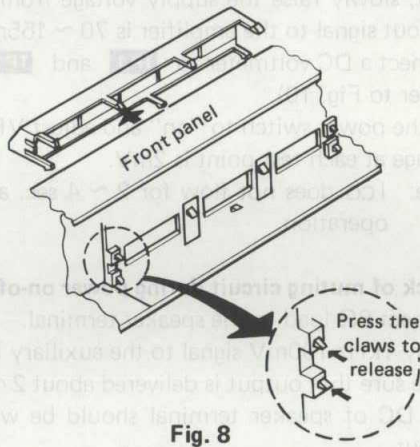


Fig. 8

● **How to remove the direct connector (to tuner)**

1. Remove the cabinet and the rear panel.
2. Tilt the direct connector as in Fig. 9 and press it down. (in the direction of the arrow ⑤ (Fig. 9) to remove.

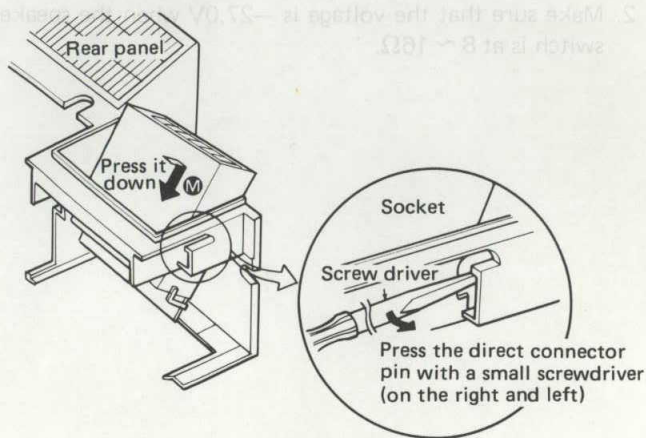


Fig. 9

## ADJUSTMENTS

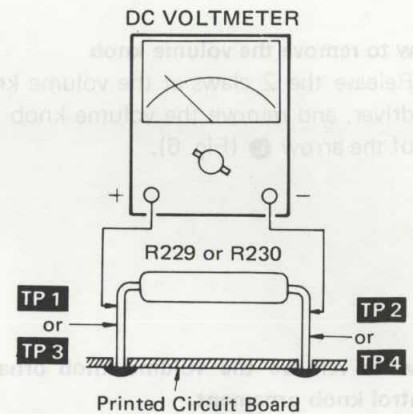
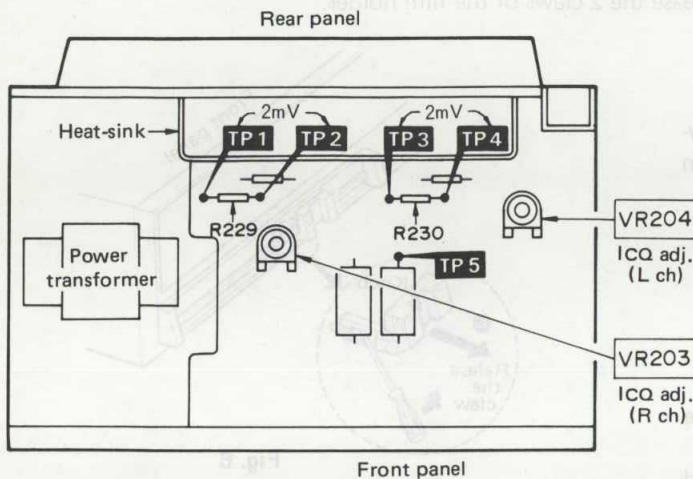


Fig. 10

### ● Idling (ICQ) adjustment

1. After repair of main amplifier, turn the sound volume to the minimum level before turning on the power supply.
2. Completely turn the semi-fixed resistors (VR203, VR204) for ICQ adjustment counterclockwise.
3. Next, slowly raise the supply voltage from 0V by the voltage regulator and make sure that the current consumption without signal to the amplifier is 70 ~ 155mA at 220V 50Hz.
4. Connect a DC voltmeter to **TP1** and **TP2** (left channel) or **TP3** and **TP4** (right channel). (Refer to Fig. 10).
5. Set the power switch to "on" and adjust VR203 (left channel) or VR204 (right channel) so that 10 minutes later the voltage at each test point is 2mV.

Note: ICQ does not flow for 2 ~ 4 sec. after setting the power switch to "on" due to muting during power on-off operation.

### ● Check of muting circuit during power on-off operation

1. Connect 8Ω load to the speaker terminal.
2. Apply 1kHz 100mV signal to the auxiliary input terminal.
3. Make sure that output is delivered about 2 ~ 4 sec. after turning the power switch "on".
4. The DC of speaker terminal should be within  $\pm 50\text{mV}$  during the interval between power "on" and delivery of output.
5. Output should immediately be gone when power switch is turned "off".

### ● Check of speaker impedance changeover circuit

1. Connect a DC voltmeter between **TP5** and ground (earth).
2. Make sure that the voltage is  $-27.0\text{V}$  when the speaker impedance switch is at 6Ω, and  $-33.5$  to  $-35.5\text{V}$  when the switch is at 8 ~ 16Ω.



# RESISTORS & CAPACITORS

- Notes:**
- Part numbers are indicated on most mechanical parts. Please use this part number for parts orders.
  - Important safety notice: Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
  - The "S" mark is service standard parts and may differ from production parts.
  - Unless otherwise specified. All resistors are in OHMS ( $\Omega$ ) K = 1000 $\Omega$ , M = 1000k $\Omega$ . All capacitors are in MICROFARADS ( $\mu$ F) P =  $\mu$  $\mu$ F

- Areas**
- [EX] is available in Scandinavia.
  - [EGA] is available in F.R. Germany.
  - [EK] is available in United Kingdom.
  - [EF] is available in France.
  - [EB] is available in Belgium.
  - [EH] is available in Holland.
  - [Ei] is available in Italy.
  - [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
  - [XL] is available in Australia.
  - [EW] is available in Switzerland.

## Numbering System of Resistor

Example

ERD	25	F	J	101
Type	Wattage	Shape	Tolerance	Value
ERG	2	AN	J	2R2
Type	Wattage	Shape	Tolerance	Value

Resistor Type	Wattage	Tolerance
ERD : Carbon	10 : 1/8W	G : $\pm$ 2%
ERG : Metal Oxide	25 : 1/4W	J : $\pm$ 5%
ERO : Metal Film	50 : 1/2W	
ERX : Metal Film	1 : 1W	
	2 : 2W	
	S1 : 1/2W	

ERD10TLJ0000  $\rightarrow$  Chip type carbon  
 ERO10MKG0000  $\rightarrow$  Chip type metal film

## Numbering System of Capacitor

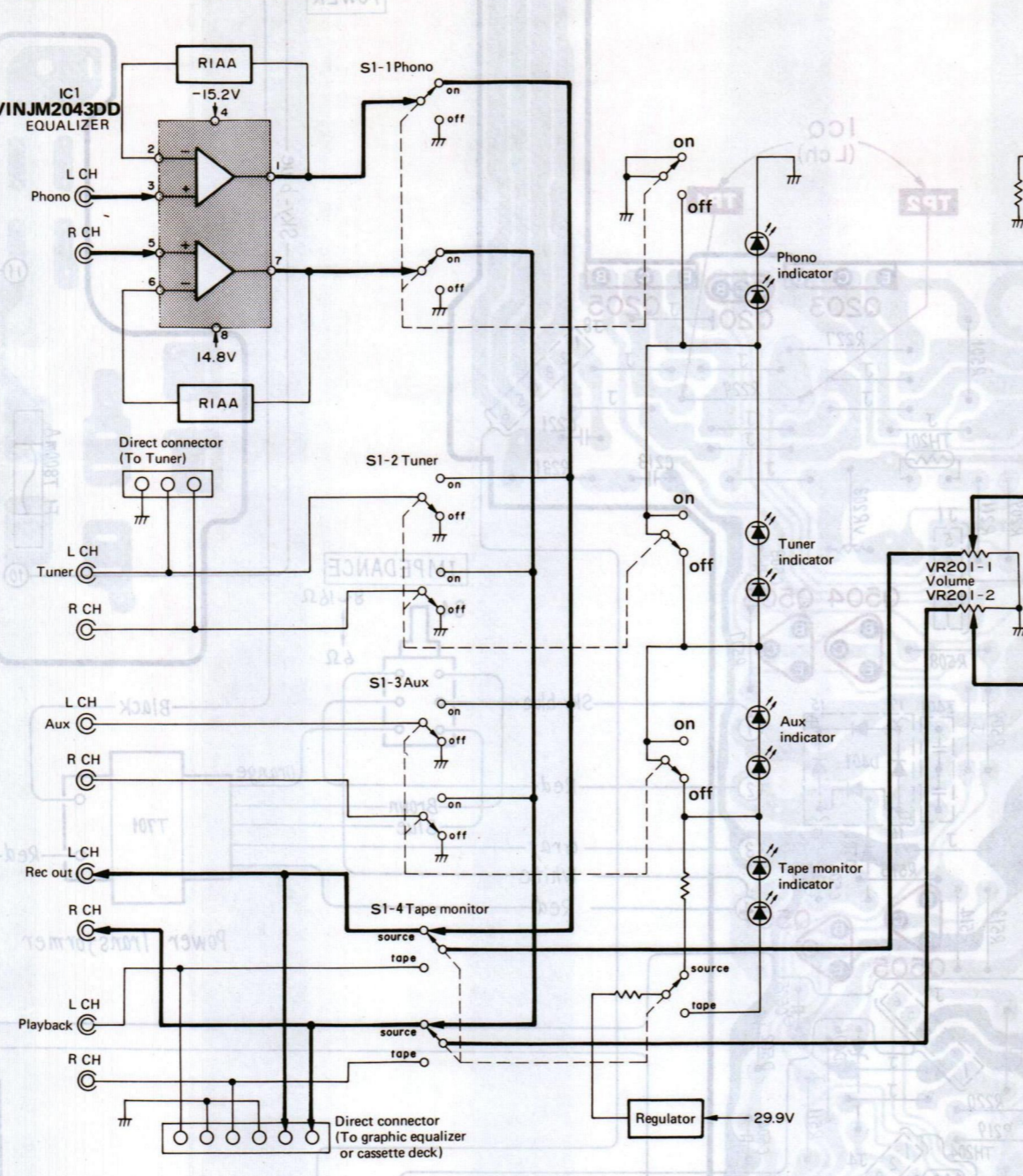
Example

ECKD	1H	103	Z	F
Type	Voltage	Value	Tolerance	Peculiarity
ECEA	50	M	R47	R
Type	Voltage	Peculiarity use	Value	Special use

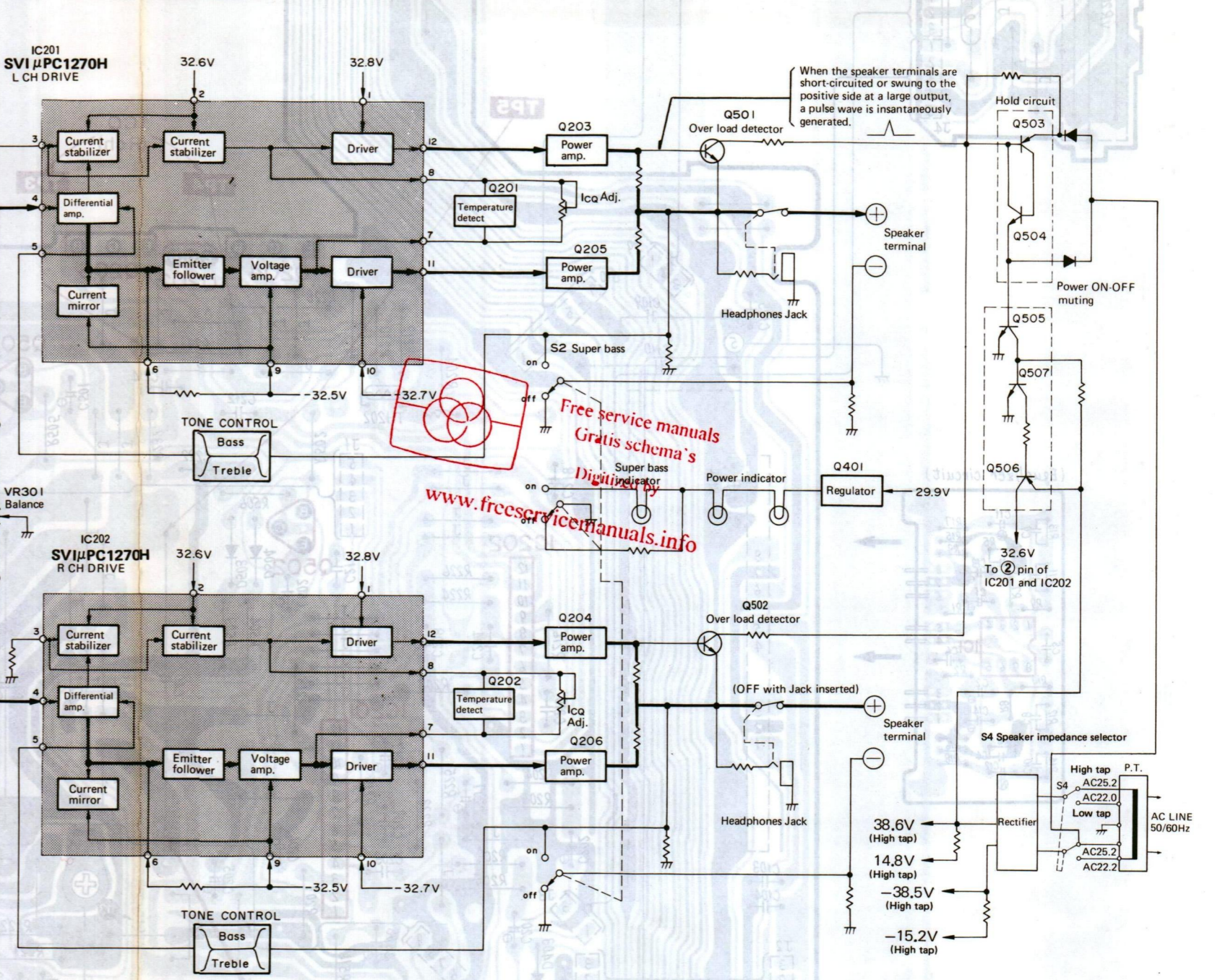
Capacitor Type	Voltage		Tolerance
	ECEA Type	Others	
ECEA : Electrolytic	1A : 10V	1H : 50V DC	J : $\pm$ 5%
ECEB : Electrolytic	1C : 16V	2A : 250VAC	K : $\pm$ 10%
ECEA...N : Non Polar Electrolytic	1E : 25V	KC : 400VAC	M : $\pm$ 20%
ECCD : Ceramic	1G : 40V		Z : +80%, -20%
ECKD : Ceramic	1H : 50V		P : +100%, -0%
ECQM : Polyester	1J : 63V		
ECQE : Polyester	50 : 50V		
ECET : Electrolytic	2A : 100V		

Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value	Ref. No.	Part No.	Value
<b>RESISTORS</b>											
R1, 2	ERD10TLJ391U	390	R229, 230	SRX1ANJR22	0.22	C1, 2	SECEA50M3R3R	3.3	C304	SECQM1H823JZ	0.082
R3, 4	ERO10MKG2213	221K	R231, 232	SERD25FJ100	10	C3, 4	SECCD1H101K	100P	C305	SECEA1HS100	10
R5, 6	ERO10MKG5622	56.2K	R233, 234	SERD25TJ153	15K	C5, 6	SECKD1H471KB	470P	C306	SECEA1HS100	10
R7, 8	ERD10TLJ271U	270	R241, 242	SERD25TJ154	150K	C7, 8	SECKD1H223JZ	0.022	C307, 308	SECCD1H470K	47P
R9, 10	ERD10TLJ680U	68	R301, 302	SERD25TJ223	22K	C9, 10	SECKD1H223JZ	0.022	C309, 310	SECCD1H121K	120P
R11, 12	ERD10TLJ184U	180K	R303, 304	SERD25FJ472	4.7K	C11, 12	SECEA1H823JZ	0.0088	C311, 312	SECEA1H182JZ	0.0018
R13, 14	ERD10TLJ123U	12K	R305, 306	SERD25TJ154	150K	C13, 14	SECEA1H823JZ	0.0088	C313	SECEA1H182JZ	0.018
R15, 16	ERD10TLJ563U	56K	R307, 308	SERD25FJ472	4.7K	C101	SECEA1ES101	33	C314	SECEA1H182JZ	0.018
R17, 18	ERD10TLJ102U	1K	R309, 310	SERD25FJ102	1K	C102	SECEA1ES101	100	C401, 402	SECEA1HS100	100
R101	SERD25FJ100	10	R401, 402	SERD50FJ152	1.5K	C103, 104	SECKD1H103ZF	0.01	C403	SECEA1HS100	10
R102 (Except for [EGA])	SERD25FJ100	10	R403	SERD25FJ100	10	C105	SECEA50Z1	1P	C404	SECKD1H102KB	0.001
R103, 104	SERD25FJ391	390	R404	SERD25FJ221	220	C107, 108	SECEA50Z1	1P	C501, 502	SECEA50Z47	0.47
R105, 106	SERD25FJ272	2.7K	R405	SERD25FJ181	180	[EGA] only	SECCD1H180KC	18P	C503	SECEA1HG3R3	3.3
R107 ~ 112	SERD25FJ152	1.5K	R406	SERD25FJ222	2.2K	C109, 110	SECKD1H103MD	0.01	C504	SECEA1HG221	220
R201, 202	SERD25FJ272	2.7K	R501, 502	SERD25FJ271	270	C111, 112	SECEA1CG330	33	C505	SECEA1AG221	220
R203, 204	SERD25FJ681	680	R503, 504	SERD25FJ472	4.7K	C113	SECEA1CG330	33	C506	SECEA2AG100	10
R205, 206	SERD25TJ683	68K	R505, 506	SERD25TJ563	56K	C114	SECEA50Z1	1	C701	SECKD1H103PF	0.01
R207, 208	SERD25FJ103	10K	R507	SERD25TJ123	12K	C201, 202	SECEA50Z1	1	C1001	SECKD1H103PF	0.01
R209, 210	SERD25FJ122	1.2K	R508	SERD25FJ103	10K	C203, 204	SECCD1H220K	22P	[EGA] only	ECQE2A473M	0.047
R211, 212	SERD25FJ222	2.2K	R509	SERD25TJ273	27K	C205	SECEA1J5330	33	C1001	SECKD1H103PF	0.01
R215, 216	SERD25TJ684	680K	R512	SERD25FJ472	4.7K	C206	SECEA1HG470	47	[F] only	ECKD1H103PF	0.01
R217	SERD25FJ100	10	R513	SERD25TJ564	560K	C209, 210	SECCD1H180KC	18P	C1002 ~ 1005	ECKD1H103PF	0.01
R218	SERD25FJ220	22	R514	SERD25TJ333	33K	C211, 212	SECKD1H333ZF	0.033	[EGA] only	ECKD1H103PF	0.01
R219, 220	SERD25FJ152	1.5K	R515	SERD25TJ273	27K	C213, 214	SECEA1H473JZ	0.047	[EGA] only	ECKD1H103PF	0.01
R221, 222	SERD25FJ820	82	R516	SERD25FJ100	10	C215, 216	SECEA50Z1	1	[EGA] only	ECKD1H103PF	0.01
R223, 224	SERD25TJ393	39K	R601, 602	SERD25FJ100	10	C217, 218	SECEA50Z1	1	[EGA] only	ECKD1H103PF	0.01
R225, 226	SERD25TJ273	27K	R603, 604	SERD25FJ100	10	C219, 220	SECKD1H221KB	220P	[EGA] only	ECKD1H103PF	0.01
R227, 228	SERD25FJ100	0.22	R605, 606	SERD25TJ333	33K	C221, 222	SECKD1H473JZ	0.047	[EGA] only	ECKD1H103PF	0.01
			R607, 608	SERD25FJ681	680	C223, 224	SECKD1H561KB	560P	[EGA] only	ECKD1H103PF	0.01
			R609	SERD25FJ100	10	C301, 302	SECEA1H183JZ	0.018	[EGA] only	ECKD1H103PF	0.01
						C303	SECEA1H823JZ	0.082	[EGA] only	ECKD1H103PF	0.01

## BLOCK DIAGRAM



## SU-5 SU-5



### How to replace chips (resistor)

- Unsolder from chip by using solder sucker.
- Remove chip with tweezers by rotating it while removing solder as shown in Fig. 11.
- Solder circuit board first and then solder chip in the direction of the arrow as shown in Fig. 12.

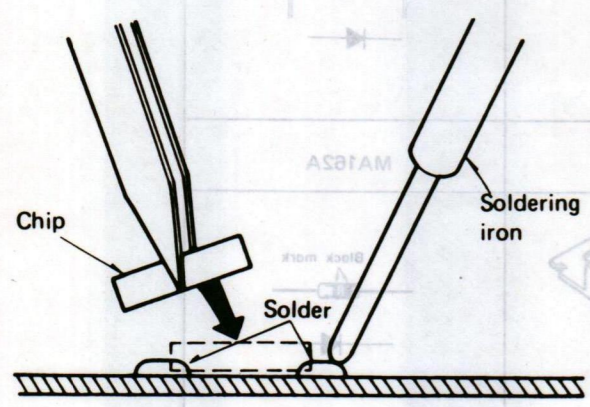


Fig. 11

### Note for replacing chips

- Do not heat chips more than three (3) seconds.
- Be careful not to damage the electrode of chips.
- Use soldering iron (less than 60W) and tweezers for replacing chips.

### Precautions for repair

When frequency is not indicated, FL (display tube), FL driver, digit circuit, and micro-computer must be checked by oscilloscope. In this case, take care not to allow short circuit between IC terminals or application of voltage from measuring instrument to IC terminals.

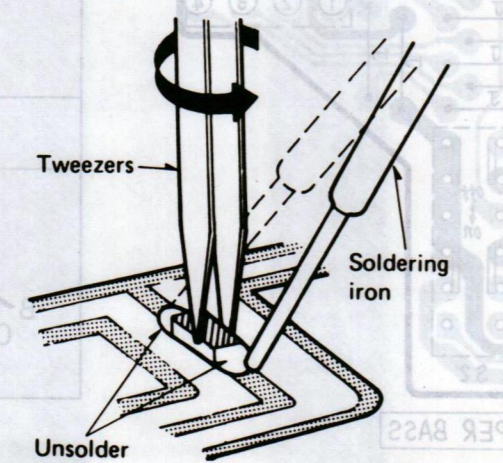


Fig. 12

### Super bass circuit

It detects the impedance characteristic of speaker as the alteration of the current that flows in the speaker, and lets it to be fed back to the main amplifier. In other words, as the speaker impedance increases, the amount of current fed-back decreases causing the amplifier gain to increase. Conversely, decrease in the impedance causes the amplifier gain to decrease. (See Fig. 13)

Typical impedance curve of speaker (Signal way)

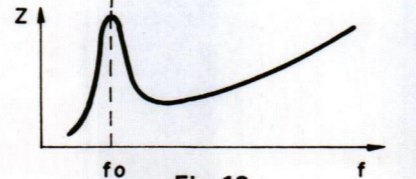


Fig. 13

The amplifier gain is decided by R219 and R221 at mid and high frequencies (No current feedback in this frequency range because of the low pass filter consisting of R607, C215, R221), and around  $f_0$  or lower, the amplifier gain changes due to the current feedback as in Fig. 14.

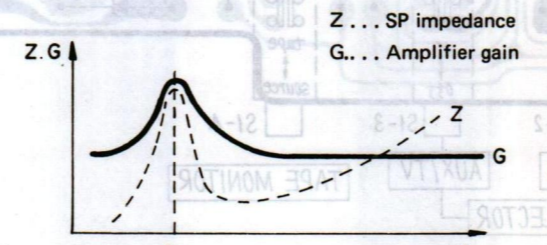
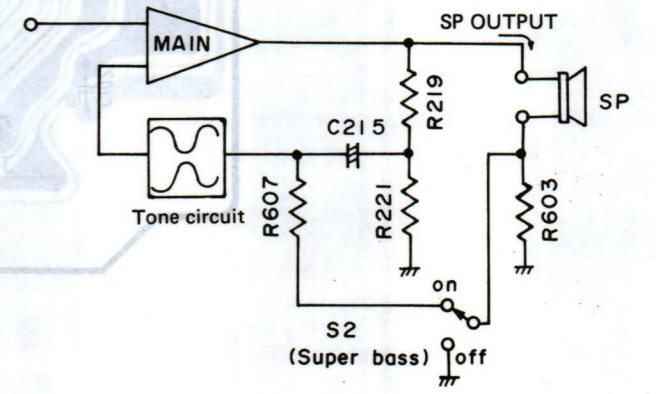


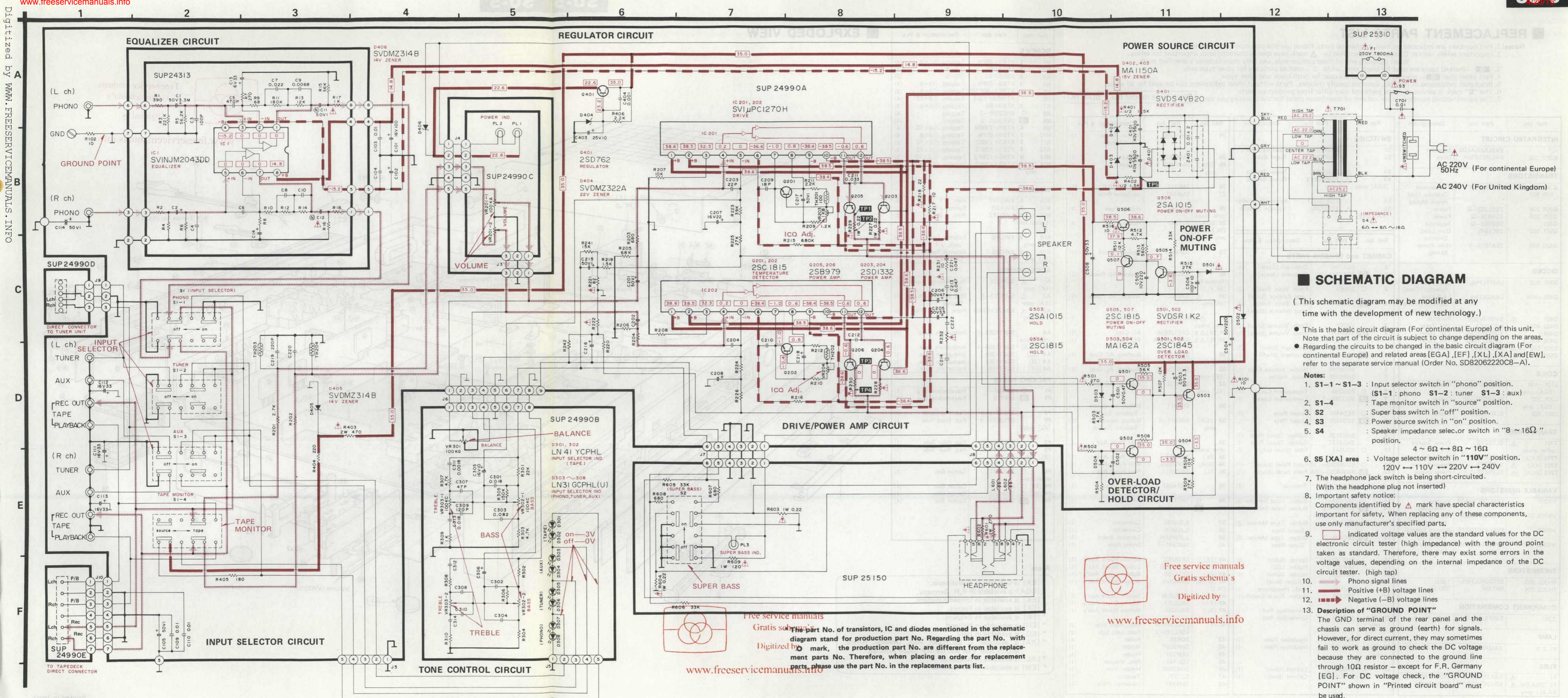
Fig. 14

Generally, speakers suddenly fail to produce sound smoothly at frequencies lower than  $f_0$ . In particular, small diameter speakers often fail to produce bass sufficiently, because  $f_0$  is at a relatively high frequency point.

This circuit not only makes up for this deficiency, but is able to make only bass drum and bass sound dynamic unlike ordinary bass boost sound.



Block diagram of super bass



### SCHEMATIC DIAGRAM

(This schematic diagram may be modified at any time with the development of new technology.)

- This is the basic circuit diagram (For continental Europe) of this unit. Note that part of the circuit is subject to change depending on the areas.
- Regarding the circuits to be changed in the basic circuit diagram (For continental Europe) and related areas [EGA], [EF], [XL], [XA] and [EW], refer to the separate service manual (Order No. SD82062220C8-A).

- Notes:**
- S1-1 ~ S1-3 : Input selector switch in "phono" position. (S1-1: phono S1-2: tuner S1-3: aux)
  - S1-4 : Tape monitor switch in "source" position.
  - S2 : Super bass switch in "off" position.
  - S3 : Power source switch in "on" position.
  - S4 : Speaker impedance selector switch in "8 ~ 16Ω" position.

4 ~ 6Ω ↔ 8Ω ~ 16Ω

- S5 [XA] area : Voltage selector switch in "110V" position. 120V ↔ 110V ↔ 220V ↔ 240V
- The headphone jack switch is being short-circuited. (With the headphone plug not inserted)

- Important safety notice: Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
- $\square$  indicated voltage values are the standard values for the DC electronic circuit tester (high impedance) with the ground point taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester. (high tap)
- Phono signal lines
- Positive (+B) voltage lines
- Negative (-B) voltage lines

**Description of "GROUND POINT"**  
The GND terminal of the rear panel and the chassis can serve as ground (earth) for signals. However, for direct current, they may sometimes fail to work as ground to check the DC voltage because they are connected to the ground line through 10Ω resistor - except for F.R. Germany [EG]. For DC voltage check, the "GROUND POINT" shown in "Printed circuit board" must be used.

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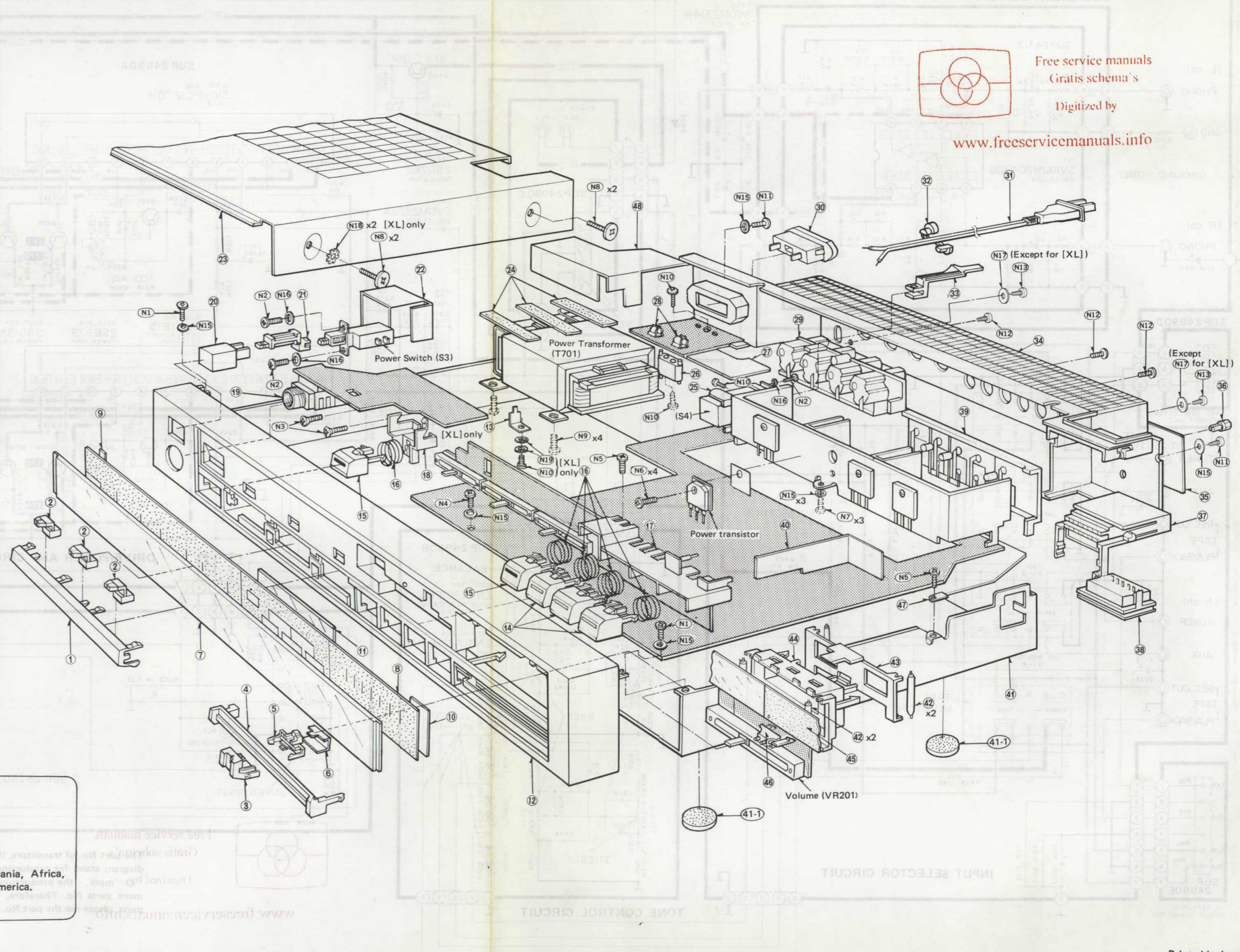
The part No. of transistors, IC and diodes mentioned in the schematic diagram stand for production part No. Regarding the part No. with  $\Delta$  mark, the production part No. are different from the replacement parts No. Therefore, when placing an order for replacement parts, please use the part No. in the replacement parts list.

**REPLACEMENT PARTS LIST**

**Notes:** 1. Part numbers are indicated on most mechanical parts. Please use this part number for parts order.  
 2. Important safety notice: Components identified by  $\Delta$  mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.  
 3.  $\square$ —marked parts are used for black only, while  $\circ$ —marked parts are for silver type only.  
 4. Part other than  $\square$ —marked  $\circ$ —marked are used for both black and silver type.  
 5. Bracketed indications in Ref. No. columns specify the area. Parts without these indications can be used for all areas.  
 6. The "S" mark is service standard parts and may differ from production parts.  
 7. The parenthesized numbers in the column of description stand for the quantity pre set. **Black type model No. : SU-5 (K)**

Ref. No.	Part No.	Description	Ref. No.	Part No.	Description	Ref. No.	Part No.	Description & Pcs
<b>INTEGRATED CIRCUIT</b>			<b>SWITCHES</b>					
IC1	SVINJM2043DD	Equalizer Drive	S1	ESB62657	Input Selector	24	SHG6293	Rubber, Power Transformer (3)
IC201, 202	SVIUPC1270H	Drive	S2	SSH1059	Super Bass	S2	SMN1837	Bracket (1)
<b>TRANSISTORS</b>			S3	SSH1057	Power Source	25	SMN1835	Bracket (1)
Q201, 202, 504	2SC1815-Y	Temperature Detector, Hold	S3	ESB90227S	Power Source	25	[EGA] only	
505, 507		Muting	S4	ESB70221T	Impedance Selector	26	SHE111	Spacer, P.C.B. (1)
Q203, 204	2SD1332-Q	Power	S5	ESE37200	Voltage Selector	27	SMX641	Insulation Plate (1)
Q205, 206	2SB979-Q	Power						
Q401	2SD762-O	Regulator						
Q501, 502	2SC1845	Over Load Detector						
Q503, 506	2SA1015-Y	Hold, Power Muting						
<b>DIODES</b>			<b>CABINET and CHASSIS PARTS</b>					
D301, 302	LN41YCPHL	L.E.D. Input Selector (Tape)	1	SGX7343	Ornament (Silver)	30	SJS9225	Socket, AC Power (1)
D303-308	LN31GCPHL	L.E.D. Input Selector (Phono, Tuner Aux)	1	SGX7343-1	Ornament (Black)	30	[EK, XL] only	
D401	SVDS4VB20	Rectifier	2	SBD59	Knob, Bass, Treble and Balance (Silver)	30	SJS9227	Socket, AC Power (1)
D402, 403	MA1150A	15V. Zener	3	SBD61	Knob, Bass, Treble and Balance (Black)	31	SJA88	AC Cord (1)
D404	SVDMZ322A	22V. Zener	3	SBD61-1	Knob, Volume (Black)	31	[EK, XL] S	AC Cord (1)
D405, 406	SVDMZ314B	14V. Zener	3	SGX7345	Ornament (Silver)	31	[XL] S	AC Cord (1)
D501, 502	SVDSR1K2	Rectifier	4	SGX7345-1	Ornament (Black)	32	SHR127	Bushing, AC Cord (1)
D503, 504	MA162A	Switching	4	SGX7345-1	Ornament (Black)	32	SHR129	Bushing, AC Cord (1)
<b>COILS</b>			5	SHR9599	Holder, Volume Knob	32	SHR129	Bushing, AC Cord (1)
L101, -104	ELQS181 KB	Choke	6	SHR5199	Cover, Holder	32	[EK] only	
L201, 202	SLQY07G-30	Choke	7	SGU289	Transparent Cover	32	[XL] only	
L601, 602	SLQY15G-10	Choke	7	SGU289-3	Transparent Cover	33	SBC511	Button, Impedance Selector Switch (1)
<b>TRANSFORMER</b>			8	SKD4434	Tinted Plate	33	[EGA] only	
T701	SLT5Z13	Power Source	8	SKD4435	Tinted Plate	33	[EGA] only	
T701 [EK, XL]	SLT5Z15	Power Source	9	SHS6135	Rubber, Tinted Plate	34	SGPU5D	Rear Panel Ass'y (1)
T701 [XA]	SLT5Z17	Power Source	10	SHS6137	Rubber, Tinted Plate	34	[EK]	SGPU5E
T701 [EGA]	SLT5Z13-1	Power Source	11	SDU147	Filter (Silver only)	34	[EGA]	SGPU5EG
<b>VARIABLE RESISTORS</b>			12	SGW4050-1SB	Front Panel (Silver)	34	[XL]	SGPU5L
VR201	EVBU09C10A15	Volume, 100k $\Omega$ (A)	12	SGW4050-1BA	Front Panel (Black)	35	SQT4891	Caution Label (1)
VR203, 204	EVNK6AA00B13	Ico Adjustment, 1k $\Omega$ (B)	13	RJT202B	Terminal	36	SHE135	Pin (Silver) (1)
VR301	EVAL43C10G15	Balance Control, 100k $\Omega$ (G)	14	SBC499-1	Button, Input Selector	36	SHE135-1	Pin (Black) (1)
VR302, 303	EVBL37C10C15	Tone Control, 100k $\Omega$ (G)	14	SBC499-3	Button, Input Selector	37	SJS9607	Connector (1)
<b>THERMISTERS</b>			15	SBC499	Button, Tape Monitor	38	SJS9605	Connector (1)
TH201, 202	ERTD2FCL101L	100 $\Omega$	15	SBC499-2	Button, Tape Monitor	39	SJF3055N	Terminal Board (1)
TH203, 204	RRT104	100k $\Omega$	16	SUS191-2	Spring, Button	40	SMC991-1	Shield Plate (1)
<b>COMPONENT COMBINATION</b>			17	SMP327	Holder, LED	41	[EX]	SKUU5D
Z201	SXRF5203ZSM	(0.01 $\mu$ F) x 2	18	SMP329	Holder, Button (Super Bass)	41	[EGA]	SKUU5EG
<b>LAMP</b>			19	SJJ71F	Jack, Headphone	41	[EK]	SKUU5E
P1, 2, 3	XAMR68S8	Volume, Super Bass	20	SBC489	Button, Power Switch	41	[EF, EB, EH, EI]	SKUU5H
<b>FUSE</b>			21	SUB115-1	Connection Rod	41	[EW]	SKUU5W
F1	XBA2C08TRO	250V, T800mA	21	SUB121	Connection Rod	41	[XA]	SKUU5X
F2	XBA2C16TRO	250V, T1, 6A	21	[EGA] only		41	[XL]	SKUU5L
			22	SMX627	Insulation Plate	41-1		
			22	SMX453	Insulation Plate			
			23	SKCU5E	Cabinet (Silver)			
			23	SKCU5KE	Cabinet (Black)			

**EXPLODED VIEW**



Ref. No.	Part No.	Description & Pcs
<b>SCREWS</b>		
N1	S XTBS3+8BFN	Tapping, $\phi$ 3x8 (2)
N2	S XSN3+6S	$\phi$ 3x6 (3)
N3	S XSS3+6S	$\phi$ 3x6 (2)
N4	S XTN3+8BFN	Tapping, $\phi$ 3x8 (1)
N5	S XTBS3+8BFN	Tapping, $\phi$ 3x8 (2)
N6	S XTWS3+12L1	Tapping, $\phi$ 3x12 (4)
N7	S XTN3+8B	Tapping, $\phi$ 3x8 (3)
N8	O SNE2095-2	Tapping, $\phi$ 3x8 (4)
N8	K SNE2095-3	Tapping, $\phi$ 4x10 (4)
N9	S XTBS3+10BFN	Tapping, $\phi$ 3x8 (4)
N10	S XTBS3+8BFN	Tapping, $\phi$ 3x8 (4)
N11	S XTN3+10BFZ	Tapping, $\phi$ 3x10 (2)
N12	S XTBS3+12BFZ	Tapping, $\phi$ 3x12 (3)
N13	S XTN3+10BFZ	Tapping, $\phi$ 3x10 (2)
N13 [XL]	S XTBS3+10BFZ	Tapping, $\phi$ 3x10 (2)
<b>WASHERS</b>		
N15	S XWG3FZ	Plain, $\phi$ 3 (8)
N16	S XWA3B	Spring, $\phi$ 3 (3)
N17	S XWG3FZ	Plain, $\phi$ 3 (2)
(Except for [XL])		
N18	S XWC4B	External Tooted Lock, $\phi$ 4 (2)
N19	S XWC3B	External Tooted Lock, $\phi$ 3 (2)
<b>ACCESSORIES</b>		
A1	$\Delta$ SJP5219	Plug Adaptor, Power Source (1)
A2	$\Delta$ SJP5213-1	Plug Adaptor, Power Source (1)
A3	$\Delta$ XBA2C16TRO	Fuse, 250V, T1.6A (3)
(EG) only		
A4	SGF11353-1	Instruction Book (1)
other areas		
A4 [EGA]	SGF11355-1	Instruction Book (1)
A4 [XL]	SGF11359	Instruction Book (1)
A4 [EI]	SGF11357	Instruction Book (1)
A4 [EK]	SGF1146	Instruction Book (1)
<b>PACKING PARTS</b>		
P1	O SPP691-1	Polyethylene Bag (1)
P1	K SPP713	Polyethylene Bag (1)
P2	SPS3673-3	Pad, Front Side (1)
P2	SPS3673-4	Pad, Front Side (1)
[XL] only		
P3	SPS3675-5	Pad, Rear Side (1)
P3	SPS3675-6	Pad, Rear Side (1)
[XL] only		
P4	O SPG4011	Carton Box (1)
other areas		
P4 [EF]	SPG4013	Carton Box (1)
P4 [XL]	SPG4015	Carton Box (1)
P4	K SPG4017	Carton Box (1)

**Areas**

- \* [EX] is available in Scandinavia.
- \* [EGA] is available in F.R. Germany.
- \* [EK] is available in United Kingdom.
- \* [EF] is available in France.
- \* [EB] is available in Belgium.
- \* [EH] is available in Holland.
- \* [EI] is available in Italy.
- \* [XA] is available in Southeast Asia, Oceania, Africa, Middle Near East and Central South America.
- \* [XL] is available in Australia.
- \* [EW] is available in Switzerland.

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